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## Accelerators

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From: Marc Sira, David Empson, Rubywand

**001- What are the correct settings for a ZipGSx? I've tinkered with "CPS Follow", "Counter Delay", and the like but have no idea what I'm actually doing.**

Bank C/D Cache Enable-- Leave this at the default setting (SW1-1 set to ON). This tells the Zip if it's OK to cache bank-switched RAM (the old language card area). Zip's own docs say "there is no known software requiring this"; but, that is why it's there, in case somebody ever finds software that doesn't like it you can try setting it the other way.

Correct "Misc Settings" CDA panel display\*: C/D Cache Disable Off

Defeat Paddle Delay-- The delay is necessary for playing most 8-bit games which use paddles or a joystick. Recommended setting is to have the delay active (SW1-2 set to OFF) unless you feel like experimenting.

Correct "Misc Settings" CDA panel display: Joystick Delay On

Defeat AppleTalk Delay should always be enabled (SW1-3 set to ON). The desktop will run much slower with the delay active. The reason most people needed it was for AppleTalk under System 5, and now there is an init on tybalt that fixes that. System 6 fixed the problem but requires CPS Follow to be enabled for the fix to work.

Correct "Misc Settings" CDA panel display: AppleTalk Delay Off

Defeat Counter Delay is present so that the ZipGS can be set to avoid the delays needed to pass one of the IIgs diagnostic self-tests. When set OFF, the ZipGS will "deaccelerate" (it temporarily ignores that any data can be read from the cache instead of the motherboard) for about 5 milliseconds any time you read one of the Video Counters. The delay lets the IIgs get past the particular self-test. Otherwise, the recommended setting is SW1-4 set to ON (delay inactive).

Recommended Correct CDA "Misc Settings" panel display: Counter Delay Off

Defeat CPS Follow should always be disabled (SW1-5 set to OFF). This lets the ZipGS automatically 'follow' the IIgs-- e.g. when it switches to "Normal" speeds the ZipGS is disabled. This is a requirement for a reasonable amount of timing-critical software. If CPS Follow is not active you will have problems

with Disk ]['s and System 6's AppleTalk driver and anything else that expects the Zip to slow down to 1MHz when the IIgs is instructed to slow down to 1MHz. For instance, border text demos (like the FTA XMAS demo) won't work. Expect weird things to happen if you play with this one.

Correct CDA "Misc Settings" panel display: CPS Follow On

ZipGS Enable-- The card should normally be enabled (SW1-6 set to ON).

SW1-7 and SW1-8 should be set to correspond to the size of your ZipGS's cache memory. (see below)

SW2-1 through SW2-7 set access speed for Slots 1-7. Set the switch OFF for slower access to the corresponding Slot. This is generally only needed for a small number of cards that are speed critical but not IIgs-aware. 5.25" disk interface cards are covered by the CPS FOLLOW option (1-5) if they are in slots 4 to 7.

I have found that it is necessary to enable the delay for slot 6 when using a 3.5" drive connected to the IIgs disk port. There are a few rare cases in which a long timed operation is performed in fast mode, and the ZIP throws the timing out unless this delay is enabled. In my case, I had some strange disk errors with certain disks until I enabled this delay.

Defeat Speaker Delay lets you turn off the delay required for "old Apple II" 1-bit sounds to play the way they would on 8-bit Apple II's or on a IIgs which is unaccelerated. Since the delay is necessary for getting correct sound from most 8-bit games, I recommend having the delay active (SW2-8 set to OFF). Recommended Correct CDA "Misc Settings" panel display: Speaker Delay Off

\*Note: Display refs are for ZipGS CDA version 1.3.7 (ZipDAV137shk.zip at <http://apple2.org.za/gswv/a2zine/System/> ).

#### Summary

The normally recommended SW1 settings are identical to the factory default settings except for SW1-4 ...

ON	x		x	x		x	m	m
OFF		x			x		m	m
	1	2	3	4	5	6	7	8

- 1- Cxxx/Dxxx Cache: ON= enabled.
- 2- Defeat Joystick delay: OFF= allow delay.
- 3- Defeat AppleTalk delay: ON= no delay.
- 4- Defeat Counter Delay: ON= no delay. Set OFF to pass IIgs diagnostic self-test #05 ("Speed Test").
- 5- Defeat CPS Follow: OFF for floppy drives to work.
- 6- ZipGS enable: ON. Set OFF to allow powerup boot in slow mode.

7 & 8- Set these to installed Zip cache memory size:

ON	ON	8k
ON	OFF	16k
OFF	ON	32k
OFF	OFF	64k

The factory default SW2 settings are ...

ON	x		x	x	x		x
OFF		x				x	x
	1	2	3	4	5	6	7

SW2-1 through SW2-7 control whether a card in Slot 1-7 is accessed

at full speed (set ON) or "normal" speed (set OFF)\*\*.

SW2-8 sets Defeat Speaker Delay. To play 'old Apple' music and effects correctly, the switch should be OFF to permit the delay.

\*\*Note: Whether or not a particular card can work without a slow-down is something you can determine by experimentaton. This is easiest using the ZipGS CDA accessed via the Desk Accessories menu (OpenApple-Control-Escape). The CDA settings are not permanent. Once you find the settings you like, you can turn OFF the computer and set the switches on the board to match the settings that work best.

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From: Todd P. Whitesel

## **002- Why should Appletalk Delay be disabled with a ZipGS?**

Because it saps performance every time an interrupt occurs.

The Appletalk delay was originally called the "Interrupt Delay" but they renamed it at the last minute because somebody actually tried an 8/64 on an Appleshare network and it dropped packets like crazy.

With "Appletalk delay" on, every time an interrupt occurs your Zip will disable acceleration for 5 ms, just like it does with the paddles and the speaker and the others. This is a significant effect because with VBL interrupts going you have one every 16 ms, so your Zip spends nearly 1/3 of the time not accelerating you.

Why this "fixes" appletalk: in system 5 and earlier (including the ROM appletalk code), there are software timing loops which assume 2.8 mhz operation. As you speed the system up, it gets more and more likely to drop incoming packets because it thinks they are being sent too slowly to be correct, when in reality the appletalk code is timing out too fast.

Why the Appletalk delay is not a complete solution: a full-size Appletalk packet that you'd get from a file server takes about 14 ms to transmit. The Appletalk delay covers the first 1/3 of the packet, the VBL interrupt covers at most another third of the packet, but nothing is guaranteed to keep acceleration off for the whole packet. If you speed the Zip up more, say to 10/64, it starts dropping long packets no matter what.

This latter problem was why I originally wrote ZipTalk. It required a slot delay to be enabled (in, say, slot 6 or 7), and before each appletalk packet was received I tweaked that slot -- slot delays are 50 ms, so the Zip stays unaccelerated way past the end of the packet and everything works. (I also patched packet sending, to be safe.)

In system 6 Apple fixed things correctly in the appletalk drivers. I removed the code from ZipTalk and released what remained as ZipFix. As of 6.0.1, the cursor flicker problem was fixed by apple in the control panel, so now you only need ZipFix for the GS/OS SET\_SYS\_SPEED hook, which nobody seems to use.

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From: Jeff Brielmaier

### **003- How do I set up a Transwarp on my IIE?**

Bank1: Sw 1-7 -> Change to OPEN if there is a memory card that uses the "Langauge Card bank switching technique". (Normally CLOSED)

Bank1: Sw 1-7 -> Change to OPEN if the plug in card must be accessed at 1 MHz (Normally CLOSED. OPEN for Floppy diskette controllers)

Switch 8 on both Banks: Sets the power up speed of Transwarp

	Bank1	Bank2	
3.6 MHz	OPEN	OPEN	<<Normal>>
1.7 MHz	CLOSED	OPEN	
1 MHz	OPEN	CLOSED	
1 MHz	CLOSED	CLOSED	

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### **004- Is there a way of disabling Transwarp for games?**

Press <Esc> at power-up will disable Transwarp completely until the next power off/on cycle.

A better way is to write a 01 to \$C074. This will slow Transwarp down to 1 MHz without disabling it completely. Writing a 00 to \$C074 will restore Transwarp to it's 'fast' speed.

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From: Rubywand

### **005- I recently bought an "M-c-T SpeedDemon" board. It's dated 1984 and draws a small apple on the screen after power-up. What kind of cache RAM does it have? There's a place for jumpers near the top of the card. Is there a way to control this thing through software or hardware?**

Your card may be a slightly later model. (I've never noticed ours draw a hires apple on the screen-- darn it!) Possibly, McT came out with a revision aimed at 128K IIE's.

The RAMs on our vintage model SpeedDemon are 100ns 2048x8 9128's (for a total 8K of pretty speedy cache).

I once asked McT about the jumper block you mention, they said the jumper is set at the factory to adjust on-card timing and to Leave It Alone. (On our card, the jumper block has 5 pairs. The pair 2nd from the top is jumpered.)

There is also a jumper pair near the bottom middle of the card. This is the Speed Jumper. Jumper it if you want 'demon to slow down for I/O accesses to Slots 4 & 5. (The 'demon always slows for Slot 6 I/O (\$C0E0 - \$C0EF.)

According to the "Manual" (a folded card), pressing PDL-1 (Closed-Apple on a IIe) upon power-up will engage a self-test. Pressing ESC at power-up will turn OFF the card and allow running at normal speed. To turn OFF the card later on, do a POKE (49152+256\*S) where S= Slot # of the slot the card is in; then, press RESET.

You can put the 'demon into any Slot; but, if you put it in Slot 0 (Slot 3 in a IIe), the card will not respond to any KB shut-off commands.

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### **006- How does the Speedemon rate as an accelerator for II+ and IIe Apples?**

In terms of raw performance (once you arrange for cooling), Speedemon may be the best of the 4MHz accelerators for early II's. I've never noticed any compatibility problems and the approx. X3.5 speed increase puts real 'snap' into your machine's response. (Besides, it's great for games like Elite!)

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### **007- My Speedemon accelerator board seems to run hot in my II+. Is this normal? Should I add cooling?**

Indeed, the 'demon is a power gobbler-- roughly 1.5A as I recall-- and some of the IC's run hot. When the board bombed after one long session, we cut out a square section on the back of the II+ and added a mini-fan, just to blow air across the 'Demon board. This ended the heat problem.

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From: Douglas M. Howell

### **008- How should the DIP switches be set on a version 3.03 Speedemon board?**

This is from the 1-page manual that comes with the card:

For owners without a Bank Switch Language Card in thier Apple, the first seven DIP switches control the access speed of the following:

```
switch 1 -- controls -- slot 1
switch 2 --      "    -- slot 2
switch 3 --      "    -- slot 3
switch 4 --      "    -- paddle/joystick port
switch 5 --      "    -- slot 5
switch 6 --      "    -- slot 6
switch 7 --      "    -- slot 7
```

OFF indicates slot/port is accessed at High Speed.  
ON indicates slot/port is to Slow Down for access.

All slots that can be accessed at High Speed and all empty slots should have the corresponding Dip switch set to "OFF" (this is the non-bank switch setting).

#### Special Note about Switch 4:

Switch 4 on the SpeedDemon DIP switch no longer controls the access speed to slot 4. It now controls how the joystick and paddles are read.

If switch 4 is in the "ON" position, the SpeedDemon will slow down to normal Apple speed for 50 milliseconds each time the joystick is accessed. This allows the software to read the joystick or paddles correctly. If switch 4 is in the "OFF" position, the SpeedDemon will not slow down when they are accessed.

Access to slot 4 is always at SLOW (normal) Apple speed.

Certain programs, such as Appleworks, use the joystick location, even when the joystick is not in use. If dip switch 4 is set to "ON" then these programs will not show any speed for some functions, such as calculations and sorts. Therefore, unless you need youysticks for your applications, switch 4 should be set in the "OFF" position.

If you have a Bank Switch Card (extended 80-col card, Ramworks II, Titan Saturn 128k card, excetera..) set switch 8 to the "ON" position.

#### Bank Switch Language Card Location:

Dip Switches 1-3 encode the location of your Bank switch language card. Use the following table to find the appropriate setting for your machine:

Dip Switch			Bank Switch Card Location
1	2	3	Slot #
----	----	----	-----
off	off	off	0
off	off	on	1
off	on	off	2
off	on	on	3
on	off	off	4
on	off	on	5
on	on	off	6
on	on	on	7

If you have two bank switch cards in your system, one must reside in slot 0. The other must be in the slot selected by DIP switches 1-3 above.

Special Note: Because the first three switches are used to encode the location of the Bank Switch Language Card, you can no longer control the speed of all the slots. Specifically you can not control slots 1,3, or 6. These slots woll now always run Fast except for slot 6 which will always run Slow.

Special Note: The slot that the Speedemon card resides in should be set to the "Off" position

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From: Will Baguhn

## 009- How can I get a 'Cache Hit' indicator for my ZipGSx?

This latest ZipGSx modification is pretty straightforward. When I decided I wanted a Cache HIT light instead of a Cache MISS light, I went to Rat Shack and bought a pack of Green LEDs (I like green. Blue or Orange will work just as well.)

I tried adding an inverter to the circuit but it just didn't want to play (obviously a cache HIT is the opposite of a cache MISS, and the LED on the board lights up for cache MISSES). Through the experimenting, I found that I could get the LED to light as desired without any "extra" hardware except the LED itself.

Simple mod: solder in the Anode of the LED to the Anode of the Cache Miss. Solder the Cathode to the Cathode of the Power LED.

(Even easier way to say it: there are four solder points for the existing LEDs. We use the two in the middle. The long lead goes to the yellow side, the short to the red. position as is comfortable. I can only guess that this would be a nice thing to attach to the TURBO light on the front of a tower case, should anyone ever mount a IIgs/ZipGSX inside a tower case... (also, it might be nice to turn SW1-6 OFF and connect the pins to the TURBO button on front. I don't know how useful it would be, but it might come in handy one of these days...)

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From: David Empson

## 010- How can I program the ZipGSx registers?

ZipChip GS Special Registers Ex ZIP Technology, 12 October 1990

Registers must be unlocked before they can be accessed (see \$C05A). Locking them will re-enable the annunciators.

Writing to any I/O location \$C058-\$C05F (whether registers are locked or unlocked) will reset delay in progress.

\$C058 R No operation

\$C058 W Write any value to force power-on/reset bit to COLD (forces next reset to restore ZIP registers to defaults/switch settings).

\$C059 R/W 76543210

- \*..... Bank Switch Lang Card cache disable=1/enable=0?
- .\*..... Pad1 delay (5 ms) disable=0/enable=1 \$C070/\$C020
- ..\*..... External delay (5 ms) disable=0/enable=1
- ...\*..... Cntr delay (5 ms) disable=0/enable=1 \$C02E/\$C07E

```

.....*... CPS follow disable=0/enable=1
.....*... Last Reset warm?                READ ONLY
.....*... Hardware DMA                    READ ONLY
.....*... non-GS (0)/GS (1)              READ ONLY

$C05A R 76543210
****.... Current ZIP Speed, 0=100%, 1=93.75%,..., F=6.25%
....1111

$C05A W Write values as follows:
$5x      Unlock ZIP registers (must write 4 times)
$Ax      Lock ZIP registers
other    Force ZIP to follow system clock (disable card)

$C05B R 76543210
*..... 1msclk - clock with 1 ms period
.*..... cshupd - Tag data at $C05F updated
         (read $C05F to reset)
..*..... Bank Switch Language Card cache (0), don't (1)
...*.... Board disable - 0=enabled, 1=disabled
....*... delay in effect (0=ZIP, 1=Slow)
.....*.. rombank (0/1) - not in development version
.....**  Cache RAM size (00=8k, 01=16k, 10=32k, 11=64k)

$C05B W Write any value to force ZIP to current speed
         (i.e. enable card)

$C05C R/W 76543210
*****. Slot 7-1 delay enable (all slots 52-54 ms)
.....*  Speaker delay enable (5 ms)

$C05D R Current 65816 bank

$C05D W 76543210
****.... Set ZIP speed, 0=100%, 1=93.75%, ..., F=6.25%
....**** Don't care

$C05E R Read last Tag data written and force the next write
         to create a trash tag value.

$C05E W No operation

$C05F R Read last Tag data written and reset cshupd.
         Note: apparently any write to a ZIP register
         (unlocked) will clear cshupd, but cshupd
         says that this location must be read.

$C05F W No operation

```

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**011- Is it possible to set up a simple ProDOS-8 application (SYS) file which turns the ZipGS OFF or ON?**

From the usual BASIC prompt, get into the Monitor (e.g. CALL -151) and type in the following code to turn OFF the ZipGS ...

```
2000:A9 50 8D 5A C0 8D 5A C0 8D 5A C0 8D 5A C0 8E 5A
2010:C0 0A 8D 5A C0 20 00 BF 65 1D 20 00 00 04 00 00
2020:00 00 00 00
```

A 2000L should look something like this ...

```
2000: A9 50    LDA  #$50
2002: 8D 5A C0 STA  $C05A    ; write $50 to $C05A four times to
2005: 8D 5A C0 STA  $C05A    ; enable access to the ZIP registers
2008: 8D 5A C0 STA  $C05A
200B: 8D 5A C0 STA  $C05A
200E: 8E 5A C0 STZ  $C05A    ; write $00 to $C05A to disable ZIP
2011: 0A      ASL           = SLOW mode
2012: 8D 5A C0 STA  $C05A    ; write $A0 to stop accessing ZIP
2015: 20 00 BF JSR  $BF00    ; Do a ProDOS QUIT call
2018: 65      $65
2019: 1D 20      $201D
201B: 00 00    BRK  $00
201D: 04 00 00 00 00 00 00
```

Use the following commands to save it:

```
CREATE SLOW,TSYS
BSAVE SLOW,TSYS,A$2000,L$24
```

To enable the ZipGS (= FAST mode), simply change one byte:

```
200F:5B
```

(this changes the STZ \$C05A to STZ \$C05B)

```
CREATE FAST,TSYS
BSAVE FAST,TSYS,A$2000,L$24
```

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From: William Baguhn

## **012- Is there some ZipGSx mod that will improve performance without going to a faster crystal, etc.?**

There is; you can do the ZipGSx Split Cache Mod. As your manual explains, Zip GSX speed comes from having a faster processor which can access code and data from its high-speed cache RAM. The standard 'GSX has a unified cache, which means data and code have the possibility of overlapping. If the cache controller sees a need to bring in a lot of code, it will go to main memory and bring in up to 64k of code (or 16k in a 16k cache system) and, possibly, overwrite useful data.

The reverse is also true. If the controller feels that a lot of data needs to be brought in, it will cache the data, and, possibly, overwrite useful code, causing another slowdown when the code needs to be fetched again.

With a split cache, the code and data segments no longer overlap. Caching code cannot overwrite data, caching data cannot overwrite code. The drawback is that only 32k of data and 32k of code can be cached at once (in a 64k system), but usually this provides for more speed than being able to cache a 64k mix of both.

To do the mod, you'll need a ZipGSX version 1.02 with either 16k or 64k cache on it. If you're not sure exactly what board you have, it's pretty straightforward to figure things out: open the computer and look at the Zip. The board revision is silkscreened on just beneath the processor.

The cache size can be determined from the DIP switch settings. However, a simpler guideline is look at the TAG/DATA sockets and count the number of chips. If there are only 2 chips, you have either an 8k or a 32k cache. If there are 4, then you should have 16k or 64k.

To modify your Zip for the Split Cache, you'll need a good hobby knife that can cut the traces without damaging the board underneath too badly, as well as two or three small lengths of wire. You will also need a good pencil-style soldering iron, desoldering pump or braid, and high quality rosin core (NOT acid core) solder. I use Radio Shack's .032 60/40 rosin core solder. Kester makes excellent quality solder which is sold at many electronics supply shops.

There is a potential of damaging expensive and delicate hardware. For example, when cutting a circuit trace be careful not to cut deeply, lest you cut a trace in the next layer of the circuit board. If you're not experienced with cutting traces or soldering on circuit boards, find an old board and take some time to practice.

The actual mod is very simple. Steps 1-3 and 5 are for all boards. Step 4 is for 16k cache boards only. (Note: The picture in FAQs resource file R005SPLITC may be helpful for doing these mods.)

1. Locate J6 and J7. They are both blocks of 3 pinholes, which may or may not have been soldered-in, near the bottom of the board next to connector J1, where the gray cable attaches.
2. Cut the SMALL trace between pins 2 and 3 of both J6 and J7. This trace is on the back (solder side) of the board.
3. Solder in a piece of wire between pins 1 and 3, of both J6 and J7. A wire that has been bent into a U shape before soldering seems to work best, both for ease of installation and aesthetic value.
4. 16k systems ONLY: (See the "16k" insert on the picture in FAQs resource file R005SPLITC.) Cut the trace between pins 1 and 2 of J8 on the top side of the board. (J8 is below the Cache SRAM sockets) Then, solder a piece of wire between pins 2 and 3 of J8.
5. Set the DIP switches appropriately. The DIP switches needing to be set are SW1-7 and SW1-8, they control the cache size. SW1-7 should be OFF for 64k, ON for 16k. SW1-8 should be ON.

Reversing these changes is fairly easy. If you decide that the performance change was detrimental, simply desolder the wires that you installed, and solder in wires to replace the traces that were cut.

I found that the split cache sped up my system notably, especially under the Finder and other desktop applications. Improvement was much less noticeable under text applications. (I haven't checked affect on compiling speed, yet.)

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From: Rubywand

I tried the split-cache mod on my 10MHz/64kB ZipGSx. Before/after timings were done for several tasks including Scrolls through Finder windows, Scrolls and Find/Replace through Coolwriter (super-res) and Appleworks (plain text) documents, and Platinum Paint fills.

Timing differences were very small-- usually within the error normally experienced when clicking a stopwatch for repetitions of identical events. Where a difference was observable, it favored the unified 64kB cache.

Evidently, at least on a 64kB board, the ZipGS does a fairly good job of managing the unified cache. Possibly, the mod comes out ahead in some tasks not sampled; or, it may work better on 16kB boards.

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From: Richard Der

**013- I have a 7MHz ZipGS. How fast can the board be pushed without getting new SRAMs or a new CPU? What parts do I need?**

You may be able to get it to run at up to 10MHz by just replacing the oscillator with a faster one for less than two dollars!

I have a Zip GS that came as a 7/32 and was used at 7MHz for a long time. The board came with a socketed oscillator, so one day I swapped out the 28MHz oscillator for a 36MHz one. The computer booted up at 9MHz. When the 36MHz osc was replaced with a 40MHz osc, the Zip ran at an amazing 10MHz!

Your mileage may vary, though. The GS that this upgraded Zip resides in has a high output power supply. Still, considering these oscillators cost \$1.39 each, it is worth getting three or four and trying an oscillator swap alone first. If a faster oscillator alone won't do the trick, then a faster CPU and/or faster cache chips may be necessary.

Good Luck!

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From: Frank M. Lin

## **014- What Oscillator freq corresponds to what TWGS/ZipGS operating speed?**

For TWGS and ZipGS, the crystal oscillators runs at 4 times the speed of the 65816. Below is a chart showing osc and corresponding TWGS or ZipGS speed.

Osc Frequency MHz	TWGS/ZipGS Speed MHz
28	7
32	8
33.3333	8.3333
36	9
40	10
42	10.5
46	11.5
48	12
50	12.5
55	13.75
60	15

My understanding is that, if you over-clock a CPU. It just won't function. You can't damage it. As the disclaimer said, do it at your own risk. I have tried to run my TWGS at 20 MHz, system won't boot at all. No damage.

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## **015- How do I experiment with different oscillator frequencies?**

Most of the following is from a piece on ZipGS upgrading by Long. It is also a useful guide for TranswarpGS owners.

The ZipGS can use three types of crystal oscillators: the common 4-pin "full size" oscillator module (about the size of a 14-pin TTL IC), a 4-pin "half size" oscillator module (also used on TWGS), or an on-card circuit with a separate crystal (little 2-pin metal canister). To be able to use a separate crystal, your ZipGS must have a resistor at R1 and capacitors at C13 and C14. These three parts are often omitted from Zips which use an oscillator module.

If your accelerator does not have a socket for the oscillator module, you should probably install one (14-pin for ZipGS; 8-pin for TranswarpGS). Experimenting with different frequencies will be much easier. (If your ZipGS has eyelets for a 16-pin socket\*, leave the top two pins open.)

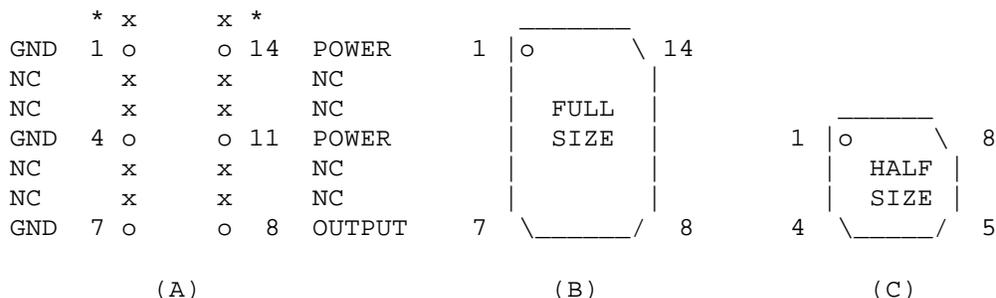
On ZipGS boards, only 6 of the 14 socket pins are connected (picture A). The Ground (GND) pins 1, 4, and 7 are connected together. The Power pins 11 and 14 are connected together; and, pin 8 is the module Output. Full size oscillator modules use pins 1, 7, 8 and 14 (refer to picture B). Half-size oscillator modules use the bottom four pins (4, 7, 8 and 11; picture C).

TranswarpGS uses an 8-pin socket intended for holding a half size oscillator module (picture D).

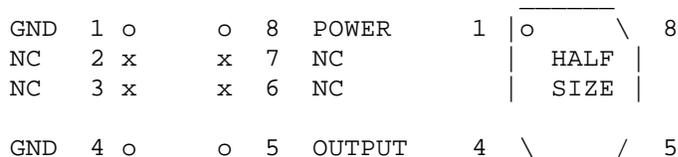
Make sure the module is oriented with the marked end (usually having a dot, squared corner, and/or notch) facing upward. Make sure the module is oriented with the marked end (usually having a dot and/or notch) facing upward. The lower two pins of the module should be in the lowest two pins of the socket.

WARNING: The oscillator may be damaged if installed incorrectly.

ZipGS



TranswarpGS

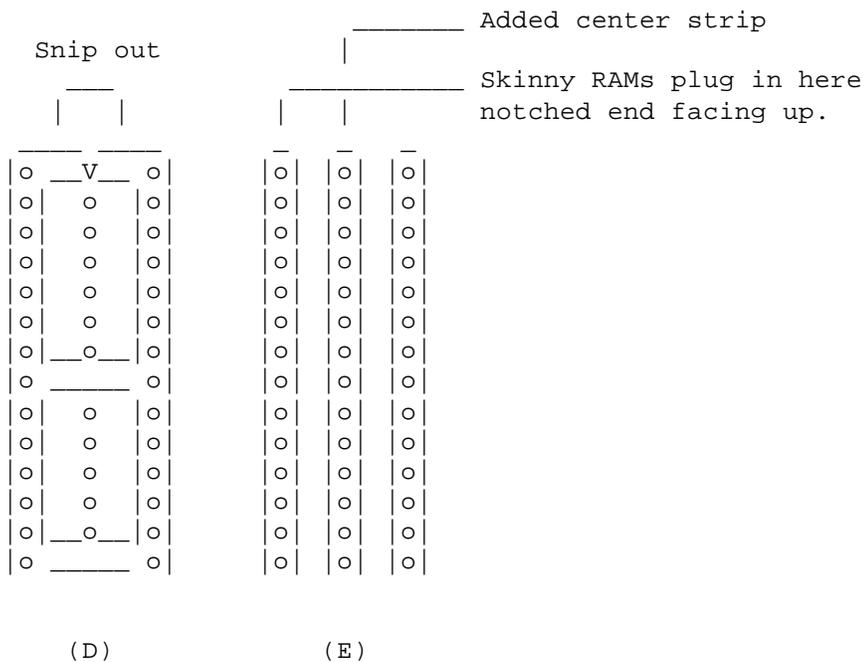


x - no connection (NC)

**016- How do I modify my ZipGS to accept the new "skinny" RAM chips?**

With a little modification you can make a Zip with wide sockets accept both the wide (600 mil) and the newer 300 mil skinny 32k x 8 Static RAMs (SRAMs). Ground yourself then carefully pry out the static rams. Look at the socket and you will notice two or three horizontal bars holding both sides of the socket together (Picture D). Carefully snip those out (wire cutters work well for snipping plastic). This will expose a column of holes. Now, solder in half of a socket.

Refer to Picture E below. Plug your skinny SRAMs into the left and center columns making sure the notch on the static ram is facing up-- i.e. toward top edge of board. (Applying power with a chip incorrectly socketed could damage the chip.)




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**017- Is it really necessary to increase board voltage to do a TWGS/ZipGS speedup?**

With the new 14 MHz parts, you should not need to mess with the voltage at all. It may be necessary to increase voltage at 15-16MHz and will likely be necessary at higher frequencies (e.g. 20MHz).

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**018- If I do a TWGS/ZipGS speedup mod, what kind of performance increase can I expect?**

This is just to give you a rough estimate of how much faster you might be able to achieve...

BenchMark v5.0 results:

CPU	Stock	TWGS	TWGS	TWGS	ZipGS	ZipGS	ZipGS
Version	ROM 01	1.8s	1.8s	1.8s	1.0.2	1.0.2	1.0.2
Cache/Spd		32k/15	32k/15	32k/15	64k/??	64k/??	64k/??
Clock Spd	2.8	15	13.75	12.5	16	15	14
	=====	=====	=====	=====	=====	=====	=====
Sieve	410.00	99.00	108.00	117.00	98.00	99.00	110.00
String	1151.20	270.00	292.00	303.67	259.00	262.00	282.00
Float 1	472.00	92.33	87.00	111.33	123.00	128.00	135.00
Float 2	1535.00	317.00	394.00	381.67	395.00	415.00	432.00

Fibonacci	2006.00	605.00	634.00	645.33	507.00	523.00	548.00
Integer	1553.40	307.00	330.00	346.67	420.00	431.00	443.00
Dhrystone	236	1136	1063	1000	NA	NA	NA
*		1351		1183	1282	NA	NA

\* Dhrystone v1.1 re-compiled under ORCA/C v2.0.1

System Software 5.0 QuickDraw II improvement test:

Stock //gs: 5648 ticks  
 TWGS 15 MHz: 1332 ticks (over 4x faster than stock)

If you look at the numbers, a 12 MHz or faster TWGS/Zip will make everything just about 4x faster than a stock //gs.

---

From: Scott G.

## **019- How can I modify my ZipGS for more cache and more speed?**

The process described below is very simple. It aims for a speed of 12.5MHz (or better) with 64k cache.

First, you will need one of the new Western Design Center 14MHz 65C816's. Students, teachers, and professors can order the IC in single quantities directly from WDC ( <http://www.wdesignc.com> ). Otherwise, the minimum order is \$100. Price is about \$20 each.

adapters: Nearly all of the newer, faster 32k x 8 SRAMs are in skinny 300-mil packages. If you would rather not modify your ZipGS for the skinny SRAMs, Digi-Key stocks 28-pin 300-mil to 600-mil adapter sockets from Aries Electronics for about \$12 each (Aries no. 1106396-28). You can plug a 28 pin SRAM into the 300-mil adapter socket and the adapter in turn plugs into the 600-mil socket on the Zip. (If you have some spare sockets lying around, you can build your own cheap, but that's another story.)

2-4 32k x 8 SRAM chips: There are many sources for 32k x 8 SRAMs and several types that will work. I got mine (HM62832-15, \$5 each) from JDR Microdevices. You'll want 15ns in the Tag RAM sockets. Up to around 12.5MHz, you want 70ns or faster Data RAM. If current cache size is 64k, your old TAG RAM chips will, usually, work as Data RAM and can be transferred to the Data sockets. Otherwise, go ahead and get two 25ns-35ns 32k x 8 SRAM chips for the Data RAM.

Data RAM should always be slower than Tag RAM. Barry Rees posted his experiences on this matter (that Data should be significantly slower than Tag) and I found that the original Tag chips were fast enough.

A "full size" oscillator module: Digi-Key, JDR, Mouser, ... have these. Divide oscillator speed by four to get Zip speed. JDR has the OSC50.0 (50MHz

oscillator), which will make a 12.5MHz Zip. The oscillators are cheap enough to get two or three for experimenting with higher speeds.

So, you just plug your Tag and Data RAM chips into the Digi-Key adapters and plug the adapters into the Tag and Data sockets of the Zip. Then, you install the new 65C816 and oscillator and make sure DIP switch 1-7 and 1-8 are both set OFF (for 64k cache). That's it, done completely without soldering.

ZipGS boards vary. On some you may be able to go above 12.5MHz by just plugging in a faster oscillator. On others, you may have to choose between getting faster Data RAM or settling for a lower speed. The new 65C816 is rated for 16MHz and many users have gone to 14MHz and above. For speeds above 12.5MHz, the usual recommendation is to get Data RAM rated at 35ns or better.

For a step-by-step guide, download my ZipUpgrade.SHK HyperCard stack at <http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple16/> in the Hypermedia/Hypercard/ folder.

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From: Wayne Stewart

I've sped up several ZipGS's and always topped out at 12 or 12.5MHz until I replaced the 74F00 on the board with a 74HC00. I'd strongly suggest taking the ZipGS as far as you can with plug-in parts, which'll likely be to about 12MHz; then, give the 74HC00 swap-in some thought.

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From: Scott G. and Andrew Roughan

## **020- Do I need new GALs to speed up my TransWarpGS?**

Probably not. The new 14MHz 65C816's available from WDC make it generally unnecessary to swap in new GAL chips to go to higher speeds. In fact, one user with the faster GALs already installed reports that his TransWarpGS would not work until GAL 3E was replaced with an older GAL 3A.

If you are attempting to use an older 65C816-- e.g. a 10MHz chip released in the early 1990's-- then, it may be necessary to upgrade the GALs (especially GAL 3A) to run reliably above 10MHz. Due to variations in boards and parts, about the only way to find out is to experiment.

---

From: Henry S. Courbis

A source for upgrade GALs is GSE-Reactive at <http://www.gse-reactive.com/>.

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From: Rubywand

## **021- I have an 8kB TransWarpGS. How does a cache upgrade compare with a speed upgrade?**

John Link charted some comparisons in 1991 involving nine setups: no-TWGS, and 7, 8, 9, 10MHz boards before and after the 8kB-to-32kB cache upgrade. He used three benchmarks:

1. time to calculate page breaks in a 218-page Appleworks document
2. time to scroll through a 39-page Awks-GS document
3. time to compile 4800 lines of MD-BASIC source code

For a 7MHz 8kB TWGS, the speed gain for the 32kB cache upgrade is roughly 33% to nearly x2.5 plain GS speed.

For a 10MHz 8kB TWGS, the speed gain for the 32kB cache upgrade is roughly 33% to about x3.25 plain GS speed.

His charts shows that a 7MHz TWGS with the 32kB cache performs slightly better than a 10MHz TWGS with 8kB cache on tests 1 and 3; it is a bit slower on test 2.

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## 022- How can I upgrade my TWGS to 32k cache?

SHH Systeme ( <http://www.wbwip.com/shh/> ), a German company, sells the cache upgrade piggyback board in various states of 'do-it-yourself' readiness. The ready-to-go version is \$69 (+ \$14 S&H). It includes three 32K cache RAMs (62256-15 or equivalent) and can support speed upgrades to 14MHz or better.

SHH does not automatically include the firmware ROM. If your firmware version is not v1.7 or v1.8, you will also need to order the v1.8 EPROM which SHH sells for \$12.

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From: Scott G., Andrew Roughan, Rubywand

## 023- How can I upgrade TWGS speed?

The process is very similar to that described earlier for the ZipGS. That is, you swap in a new 14MHz 65C816, a higher speed oscillator module, and, possibly, faster 32k x 8 SRAM chips. As mentioned in Q&A 020, you should not have to upgrade to faster GAL chips. Users with the newer GAL 3E in place may actually need to swap in an older GAL 3A.

According to a 1992 Appleworks Forum article by John Link, you can get to 12.5MHz with an older 10MHz 65C816, a 50MHz oscillator, and 35ns SRAM without upgrading to the faster GAL chips.

As with ZipGS, TransWarpGS speed = Osc Speed divided by 4. One difference is that the TransWarpGS oscillator module is of the "half-size" kind. Another is that, if RAM is upgraded, the usual practice is for all three to have the same speed rating. If you do the SHH cache upgrade, there should be no need to worry about replacing SRAM.

TransWarpGS boards vary just as do ZipGS boards. Some can be pushed to higher speeds than others. If you decide to do a speed upgrade, get two or three oscillators to allow for some experimentation.

For a step-by-step guide, download Scott G's TWGSupgrade.SHK. HyperCard stack. (See Q&A 019 above)

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From: Wayne Stewart

I have a TransWarpGS with rev A GALs and a rev 1.5 ROM. It came as 7mhz with an 8k cache. It was pretty unstable when I recieved it, so I put in a spare 14mhz 65c816 I had which stabilized it. Since I had a lot of rectangular oscillators from my ZipGS upgrade experimenting, I made up an adapter so I could use them in the TransWarp. With those two changes it's running at 14mhz.

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From: Andrew Roughan

It's time (June 2003) for an update on this article. I have recently purchased some more oscillators from Clarke & Severn Electronics. They can now provide custom programmed oscillators in 1/2 TTL packages for AU\$6.98 each.

I am currently running my ROM 3 system at 14Mhz. I have a Transwarp GS with ROM 1.8S and the 32k cache from Applied Engineering (35ns SRAMs). The GAL versions are TWGS1A1, TWGS2B1, TWGS3B1, TWGS4B1, TWGS5A1, TWGS6A1, TWGS7A1, TWGS8A1. I have the 14Mhz 65816 available from WDC. I have not purchased faster SRAMs or modified the power supply.

---

From: Rubywand

## **024- What kind of RAMs do I need for a TWGS or ZipGS speedup?**

If you upgrade your accelerator RAM, go for fast 32k x 8 Static RAM in a 28-pin Dip package. If your RAM sockets are "skinny" (about as fat as a typical 74xx TTL IC), you want a 300-mil wide package. Otherwise, you will need a 600-mil wide IC or a socket adapter for 300-mil (or do the socket mods described earlier in this FAQ).

Fast 600-mil package 32k x 8 SRAMs are fairly rare. However, the IDT71256 is supposed to be available at good speeds (25ns-40ns) in a 600-mil version from Integrated Device Technology.

The selection of 300-mil 32k x 8 SRAMs is much larger: Cypress's CY7C199, Hitachi's HM62256, ... .

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From: Sandy

**025- How can I tell the firmware version of my TWGS?**

With the IIGS turned on, press CONTROL-Apple-ESCAPE And go to the Transwarp CDA The ROM version will be displayed on the screen.

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From: Mitch Spector

**026- Do I need I need the 2B GAL for my Transwarp-GS to use a SCSI interface? If I do, where can I get one?**

The TWGS-2B GAL was a DMA fix Applied Engineering issued for the board. It is an absolute requirement for Transwarp to work at all with at least some RamFAST SCSI boards (e.g. the revision C boards).

With Applied Engineering long since out of business and the GAL virtually impossible to duplicate by conventional means, that leaves no good source for replacement GALs. I found it much more affordable (and less hassle) to just purchase a used TransWarp GS board with the 2B GAL to replace your old one.

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From: Supertimer

RamFAST revision D does not require the 2B GAL. The Apple High Speed SCSI card works with all TransWarps GS units.

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From: Rubywand

**027- When I change my ZipGS's Speed, Misc, and Slot settings via the Zip CDA, they are always lost after turning OFF the GS. What's wrong? Do I need a new BatRAM battery?**

No. The reason the settings are forgotten is that they are not saved in BatRAM or on-disk. ZipGS settings made via the Zip CDA or via the Zip Control Panel are only in effect for the current session of computing.

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**028- What do the check-marks mean next to settings in the ZipGS CDA? Are they original factory settings or what?**

More like "or what". The check-marks indicate the settings of the DIP switches on your ZipGS board.

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**029- After installing my ZipGS along with the ZipGS CDA and other software I've noticed that my ZipGS settings never seem to match the ones I originally set via the on-board DIP switches!?**

There are two likely explanations. One is that your interpretation of the settings is confused due to the rather poor explanations provided in the Zip on-disk HyperStudio 'manual'. It does not help that names/descriptions of the settings are not quite the same in the 'manual' and in the CDA or NDA.

For info on setting your on-board DIP switches, see question 001.

Another possibility is that when you installed the ZipGS software, you installed ZipInit in your SYSTEM/SYSTEM.SETUP folder. If you did, then whatever settings ZipInit is set up for will be the settings for your ZipGS after booting. That is, ZipInit will over-ride your DIP switch settings.

ZipInit is intended for use on diskettes which, when booted, will set up the ZipGS in some special way to match the software on the diskette. For example, you might want to turn OFF the ZipGS or reduce its speed when booting an arcade games diskette.

The cure for unwanted influence from ZipInit is to delete it from your SYSTEM/SYSTEM.SETUP folder.

---

**030- I have a ZipGS. Usually, it runs like a champ; but, sometimes when I power-ON my GS, I get an all-white screen and the computer just 'hangs'. What's going on?**

It may be that your ZipGS card is not making good contact in its Slot socket. This is a fairly nasty problem which has led users to pursue a number of false cures.

With power OFF, pull your ZipGS board and inspect the bottom-of-card connectors. What you will, most likely, notice is that the connector traces end approximately 1/8 inch or so from the bottom of the card.

Unfortunately, the GS Slot sockets make contact rather near the bottom of cards plugged into them-- roughly 1/8 inch or so from the bottom. The reason your GS sometimes hangs is that, sometimes, the ZipGS card is not making good contact with all Slot connectors.

One 'cure' is to make sure the ZipGS card's contacts are clean and that the card is thoroughly plugged in-- i.e. well lined-up with Slot contacts and inserted as far as it will go into the Slot socket.

A mildly tricky additional step is to use a small jeweller's screwdriver to reach into the Slot socket and carefully twist/pull/bend-out each contact very

slightly (naturally, with power OFF). You do not want any contact to normally touch a contact across from it.

Whatever, if your GS starts okay and does not exhibit the same kind of hanging in the future, you know that the ZipGS card is well socketed.

A more permanent, reliable cure is one not recommended for someone without experience working on circuit boards: You find a better Slot connector socket-- one with gold contacts which touch plugged-in cards higher up and with circuit board connections which will fit into the original holes-- and replace the connector. This is a very tricky replacement which requires careful de-soldering of the original Slot socket, cleaning of contact holes, and soldering on the new socket-- all without burning the circuit board or slicing traces on either side. Actually, slicing traces is okay, IF you are prepared to repair the damage. (Yes; I did this replacement on our GS. It works; but, If I had known what a hassle it would be, I probably would never have done it!)

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### **031- Ever since my accelerator speed upgrade it seems like my GS is always experiencing random system crashes. What's the problem and how can I fix it?**

When a GS equipped with an accelerator experiences frequent crashes into the monitor after a speed upgrade, the usual explanations are ...

1. the accelerator is over-clocked for the microprocessor or RAM;
2. there are serious noise spikes on the Slot power lines.

If you are 'pushing' your current RAM or using an old 65C816, you can upgrade to faster chips or swap in a slower oscillator.

Often, the problem will be noise spikes related to increased current load and/or increased sensitivity to noise related to faster clocking. See the POWER FAQs for Power Supply and motherboard mods which should help.

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### **032- I added a new accelerator board to my Apple and now my system is constantly bombing. What's the problem and how can I fix it?**

Most likely, the accelerator board's current load has led to increased noise on the +5V bus. See the POWER FAQs for Power Supply and motherboard mods which should help.

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### **033- How can I get a display of IIgs speed?**

You can use SpeedGS. This is a STARTUP program selector for ProDOS-8 on the Apple IIgs which features display of Boot Volume, Date/Time, and current Speed. Speed is shown as a rounded multiple of 'Normal'-- i.e. 1MHz. For download sites, see Csa21MAIN4.txt .

Apple II Csa2 FAQs: Applications, Part 4/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

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Csa2 FAQs file ref: Csa2APPLICS.txt rev135 June 2009

## Applications

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- 002- What GS programs are there for viewing/converting graphics?
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From: Rubywand, David Empson, and Michael Gährken

## **001- What Operating System environments does the GS support?**

The GS can support several. Some of the more popular OS environments include ...

DOS 3.3- usually Beagle's Prontodos or some other speeded version of the original DOS 3.3. This is the 5.25" diskette-based disk operating system used for years on earlier Apple II's. It's commands are designed for use from BASIC programs or from the keyboard. Many old Apple II games and other wares are on 5.25" diskettes which boot DOS 3.3.

ProDOS 8- e.g. ProDOS v2.0.3. This is a disk operating system which supports a variety of devices (e.g. 3.5" drives, hard drives, etc.) and allows sub-directories. Commands are very similar to DOS 3.3 and are designed for use in BASIC programs or from the keyboard. BASIC and 'system' programs can also utilize direct CALLs to well-defined ProDOS Machine Language Interface routines.

Apple Pascal- This is an early 1980's implementation of UCSD Pascal which can run on 40-column and 80-column Apple II's.

System- Originally called "ProDOS 16" and later "GS/OS", the collection of 'system stuff' (which includes GS/OS) is today called "System". The System Finder utilizes Toolbox routines to supply a super-res desktop, Windows-like environment. Both ProDOS 8 programs and 'GS Applications' (i.e. wares that need GS/OS to run) can be started from the desktop.

The current System, v6.0.1, can run on ROM-01 and ROM 3 IIgs's with at least 1MB of installed RAM. An earlier (smaller) System, v5.0.4, is sometimes chosen in order to obtain more free memory to run applications. Many modern IIgs applications expect to run under System 6.0.1 on a ROM-01 or ROM 3 machine with 4MB (or more) installed RAM.

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From: Dan DeMaggio and Rubywand

## **002- What GS programs are there for viewing/converting graphics?**

The Graphics Exchange converts between many formats of graphics.

816 Paint's File Utilities work well for converting hires or double-hires pics to GS super-res.

Prizm v1.0 Converts .GIFs, Amiga IFFs, Raw Files, and some other types to Greyscale (very fast), 16 colors, 256 colors, and 3200 colors!

SuperConvert (now at version 4) loads all GS formats, plus GIFS and other non-GS specific formats and saves in all GS formats including Finder Icon files. It has more dithering options than most of the other programs, but you may have to play with it to find the best one.

Platinum Paint is a commercial program that can import all GS formats plus MacPaint. It can only save in SHR and Apple Preferred. Version 2.0 can make Animations too!

ShowPic 6 is a shareware NDA that can display most GS formats. You can also save the resulting graphic as a IIgs SHR painting.

SuperPac is a commercial program which can create/display SuperPac format compressed pics and pic pieces

Dream Grafix supports all 3200 color picture types and also 16 color and 256 color pictures. This is a very impressive commercial paint program.

Convert 3200 will handle several popular PC and Mac formats in up to 256 colors.

Jpeg.Viewer can be used to view JPEG images in black & white.

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From: Rubywand, Deacon Blue

### **003- What Apple II emulators are available and where can I get them?**

The most popular 8-bit Apple II emus are AppleWin and Apple Oasis, which run under PC Windows, and Apple-PC, which runs under PC DOS and includes support for Mockingboard sound. These programs can turn your PC into an enhanced Apple //e running at least as fast as the real thing using software from virtual disks (disk image files). There are also 8-bit Apple II emus for Macs (one, Catakig, emulates a II, II+, or IIe) and Amiga (Apple 2000).

For IIgs emulation some good choices include Bernie ][ The Rescue (for Mac Power PC), KEGS (which runs under Win32, Mac OS X, Linux, and Unix's), ActiveGS (an Active-X port of KEGS), XGS (runs on PC's and Macs under a variety of OS's including DOS, Windows, and Unix), plus KEGS/32 and XGS/32 (for PC Windows). Another good looking IIgs emu is Sweet-16.

Running on modern machines, the current emulators do well on benchmarks vis-a-vis an accelerated IIgs. To get some idea of how the GS emus stack up, see the benchmarks comparison chart by Gilles Tschopp in FAQs resource file R026GSEMUS.htm . (This benchmark is a bit old and doesn't include all IIgs emus or take into account improvements to later versions of the emulators listed.)

For more emulator information, check out the comp.emulators.apple2 newsgroup and visit some of the emu websites.

For details and software relating to a specific emulator see ...

ActiveGS (IIgs emu for Windows PC)

<http://www.freetoolsassociation.com/>

Apl2Em

ref. [ftp://ftp.apple.asimov.com/pub/apple\\_II/emulators/apple\\_2\\_for\\_windows/](ftp://ftp.apple.asimov.com/pub/apple_II/emulators/apple_2_for_windows/)

Apple IIe (Macs and PowerMacs)

ref. [ftp://ftp.apple.asimov.net/pub/apple\\_II/emulators/IIe/](ftp://ftp.apple.asimov.net/pub/apple_II/emulators/IIe/)

ref. <http://apple2.org.za/gswv/a2zine/Utils/>  
Apple In PC (or "AppleInPC")  
ref. <http://kldp.net/projects/appleinpc/>  
Apple Oasis Page  
<http://www.geocities.com/SiliconValley/Lakes/4414/A4W.HTM>  
Apple PC (DOS)  
ref. [ftp://ftp.apple.asimov.net/pub/apple\\_II/emulators/applepc/](ftp://ftp.apple.asimov.net/pub/apple_II/emulators/applepc/)  
Apple2000 (Amiga)  
ref. <http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Emulators/>  
ref. <http://wuarchive.wustl.edu/~aminet/misc/emu/index.html>  
AppleCE (II+ emu for PocketPC)  
<http://www.geocities.com/bonelyfish/applece.html>  
Applelet Page (Java applet)  
<http://www.fasterlight.com/hugg/projects/applelet.html>  
Applemu (PC DOS)  
ref. <http://apple2.org.za/gswv/a2zine/Utils/>  
Appler  
ref. <http://www.simtel.net/pub/msdos/emulate/>  
AppleUni Page  
<http://dr.ea.ms/inside.html>  
ref. [ftp://ftp.apple.asimov.net/pub/apple\\_II/emulators/appleuni/](ftp://ftp.apple.asimov.net/pub/apple_II/emulators/appleuni/)  
AppleWin (Three development paths: "Applewin", "Applewin2", "Applewin3")  
<http://www.tomcharlesworth.pwp.blueyonder.co.uk/-Applewin>  
<http://pages.ripco.net/~wizwom/applewin/-Applewin2>  
ref. <http://apple2.org.za/gswv/a2zine/Utils/> -all current  
ref. [ftp://ftp.apple.asimov.net/pub/apple\\_II/emulators/applewin/](ftp://ftp.apple.asimov.net/pub/apple_II/emulators/applewin/)  
Bernie (PowerMacs)  
<http://www.bernie.gs/>  
Catakig Page (Macs and PowerMacs)  
<http://www.radix.net/~cklipsch/ctkgdoc/>  
ref. <http://catakig.sourceforge.net/dload/Catakig-2.00a5.dmg>  
Dapple Page (developing II+ and //e emu for DOS PC)  
<http://dapple.sourceforge.net/>  
Florence (IIgs emu in Java for Windows and Mac OS-X)  
<http://cgi.zipworld.com.au/~kashum/florence.pl?cmd=help>  
Gus (IIgs emu for PowerMacs)  
ref. <http://www.macscene.net/emulation/>  
iGS (XGS-style IIgs emu for Mac OS)  
ref. <http://www.macscene.net/emulation/>  
KEGS (IIgs emu for Mac OS-X, Win32, Linux, and almost any Unix with X11)  
<http://kegs.sourceforge.net/>  
ref. <http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Emulators/>  
KEGS OS-X Page (Mac)  
<http://www.casaGS.net>  
KEGS32 Page (IIgs emu for Windows PC)  
<http://www.geocities.com/akilgard/kegs32/>  
M.E.S.S. Page (8-bit A2's on PC and Mac)  
<http://www.mess.org/>  
Mess and xmess BIOS ROMs for Apple II, etc. at ...  
<http://mess.slur.net/>  
<http://users.aias.gr/lagakis/bk/mess.htm>  
OSXII Page (Apple //e Emulator for Mac OS X)  
<http://apple2.intergalactic.de/>  
Pocket //e (PocketPC)  
ref. <http://www.freewareppc.com/utilities/pockete.shtml>  
PsiApple Page: 64k II+ emu on a Psion  
<http://www.fasterlight.com/hugg/projects/psiapple.html>

Stop the Madness (Mac)  
ref. [ftp://ftp.apple.asimov.net/pub/apple\\_II/emulators/stm/](ftp://ftp.apple.asimov.net/pub/apple_II/emulators/stm/)  
Sweet16 for BeOS  
<http://www.sheppyware.net/>  
Sweet16 for Carbon  
<http://www.bernie.gs/>  
Virtual ][ (II/II+ Emulator for Mac OS X)  
<http://www.xs4all.nl/~gp/VirtualII/>  
XGS-DOS (PC) Page  
<http://www.casaGS.net>  
ref. [http://www.inwards.com/xgs/xgs\\_resources.html](http://www.inwards.com/xgs/xgs_resources.html)  
XGS/32 Page  
<http://xgs32.emucamp.com/>  
XGSMac (68k Macs)  
ref. [http://www.inwards.com/xgs/xgs\\_resources.html](http://www.inwards.com/xgs/xgs_resources.html)  
YAE Page  
<http://quark.netfront.net:6502/>  
ref. [ftp://ftp.apple.asimov.net/pub/apple\\_II/emulators/yae/](ftp://ftp.apple.asimov.net/pub/apple_II/emulators/yae/)

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From: Mitchell Spector

**004- I'd like to have a program for my //gs that can perhaps do more reliable file copies than Finder does, especially in the case of a damaged floppy. Any suggestions?**

I would recommend either ZZCopy or Photonix II, both are freeware and do a very quick and reliable job at duplicating 3.5 floppies (the former even works with 400K MFS and 800K HFS Macintosh disks). Either of the two programs work around damaged sectors on disks.

---

From: kburtch@pts.mot.com, David Empson, Rubywand, The Enforcer

**005- I'd like to do some 'serious' Apple II programming. Where can I find a information about soft switches (i.e. "PEEKs & POKEs"), monitor routines, and standard names used for these?**

You can find listings of Apple II soft switches and popular monitor routines in a manual for your computer-- e.g. the Apple II Reference Manual (for II and II+), the IIe Technical Reference Manual, the Apple IIgs Firmware Reference Manual, etc..

An excellent guide to many PEEKs & POKEs and monitor routines is the famous "Peeks, Pokes, and Pointers" poster from Beagle Bros (early 1980's). A fairly exhaustive guide to important memory locations in the Apple II is What's Where in the Apple II: An Atlas to the Apple Computer by William Luebbert (1981).

For a good on-line listing of PEEKs, POKEs, pointers, and CALLs, see the comp.sys.apple2.programmer FAQs:

html- <http://home.swbell.net/rubywand/csa2pfaq.html#004>

text- <ftp://rtfm.mit.edu/pub/usenet/news.answers/apple2/programmerfaq/part1>

---

From: Rubywand

## **006- How can I boot a good GS System with no hard disk?**

You can boot a decent System 5.0.4 or very modest System 6.0.1 from a 3.5" diskette. With two 3.5" drives, you can boot a decent System 6.0.1; but, disk swapping becomes a significant hassle when you want to run most applications.

A much better solution is available if you have a 4MB mem expansion card installed. (Actually, you can make do with about 2.5MB of RAM.) You can use a utility named "Flash Boot" by Jerry Kindall. Flash Boot auto-loads System from one or more 3.5" diskettes to /RAM5 RAM disk and boots it.

What you do is create a large enough /RAM5 to hold the System you want to boot. Next, you boot System as usual from diskette(s) and use the Flash Boot utility to prepare /RAM5 and install the auto-loader. Then, you copy the stuff you want to auto-load to /RAM5 and use the Flash Boot utility to create one or more 3.5" "image disks".

To install and boot System you start by booting from the first image diskette and feed in any others as prompted. System then boots from /RAM5 and works very much as though it were on hard disk.

---

## **007- Can I do Reverse Speech on my IIgs?**

Yes. Sound Studio and Sound Shop are two utilities which allow loading and reversing sound samples.

(ref. David John Oates; <http://www.reversespeech.com/> )

---

## **008- Is it possible to run PaintWorks from hard disk? Will it load files from an HFS partition?**

The Kzin Warrior published a block edit patch version in Computist #73 which lets you do this, at least on a ROM-01 GS. Using ProSel's Zap utility (also called "Block Warden") you search for \$C9 08 00 D0 CE on the PaintWorks Gold diskette or a copy. (I found these bytes in Block \$3D5 starting at byte \$1DF.) Change the 08 to 7F and save the change.

Copy Paintworks.Gold and the PaintTools folder (with its contents) to a folder on your hard disk.

The Patch allows you to to start PWG under System 6 and use most PWG features. However, some Palette selection options will bomb the program.

A few tests showed PWG will load files from an HFS partition.

---

## 009- How can I read a single ProDOS block into memory using Applesoft BASIC?

After booting ProDOS, you can do a CALL-151 to enter the monitor and type in ...

```
300: 4C 09 03 03 60 00 20 00 00 20 00 BF 80 03 03 85 FF 60
```

Do a CTRL-C to get back to the Applesoft prompt and enter ...

```
BSAVE PROZAP.BIN,A$300,L$20
```

The routine does a ProDOS Machine Language Interface CALL which reads the block into \$2000-\$21FF. It saves the Error# in \$FF.

```
300: 4C 09 03      start
303: 03           3 parms in this parms block
304: 60           unit # DSSS0000  Drv 1 (D=0) Slot 6 (SSS=110)
305: 00 20       buffer start
307: 00 00       block # Low, High ex: block 256 is 307: 00 01
309: 20 00 BF    JSR to do MLI command
30C: 80           command (80 for READ BLOCK; 81 for WRITE BLOCK)
30D: 03 03       loc of parms block
30F: 85 FF       save error # (00= no error)
311: 60           exit
```

A BASIC program could use the routine by POKE-ing the block # into \$307,\$308 (775 and 776 in decimal) and doing a CALL768. The MLI command code is POKEd into \$30C (780). If a PEEK at address \$FF (255) gives a result of zero, there is no error.

```
100 LOMEM: 8704
105 REM Sets start of var space above $2000-$21FF buffer
110 TEXT: HOME: PRINT CHR$(4)"BLOAD PROZAP.BIN"
115 B= 2
120 REM Sets block to read/write (block 2)
125 C= 128
130 REM Sets MLI READ command ($80); MLI WRITE is 129 ($81)
135 BH= INT(B/256): BL= INT (B-256*BH)
140 POKE 775,BL: POKE 776,BH
145 REM POKES block to read/write
150 POKE 780, C
155 REM POKES MLI command
160 CALL 768
```

```
165 REM Does the block read/write
170 PRINT "BLOCK ";B
175 E= PEEK(255)
180 REM E= error number
185 IF E<1 THEN 195
190 PRINT "ERROR ";E;"!";CHR$(7)
195 END
```

After running the program for a BLOCK READ, the block contents should be at \$2000-21FF.

---

From: Joseph M Barbey

### **010- Is there an Apple II program for amatuer radio CW code practice?**

I have a such a program at home. It's called QSO Kid. It requires a IIgs, and from what little I've used it, it seems like a really good program.

---

From: Gabriel Morales

### **011- Can I can use a Mac's hard drive with AppleTalk to do File Sharing just like it was a drive directly connected to the GS?**

You can. Be aware however that some software may not like to be used over an AppleTalk system.

This is more likely to be an issue for ProDOS-8 programs. The main problem under ProDOS-8 is with programs that insist on referring to devices by unit number (or slot and drive). Network volumes do not have a unit number.

Another issue is with filenames. GS/OS programs which assume ProDOS naming conventions will have problems with AppleShare or HFS volumes. ProDOS-8 programs have more problems: unless the file server hard drive or shared folder (and all relevant subfolders and files) are named using ProDOS-8 naming restrictions, then the files in question cannot be accessed by ProDOS-8 programs on an Apple II client.

A third issue (with both GS/OS and ProDOS-8) is with programs that bypass the file system calls and try to do block-level access to the volume. This is not permitted for file server volumes. (Examples: Copy II+, many functions in Prosel.)

One caveat: transmission is slow. Assuming an otherwise unused network, you get about the speed of a 3.5" floppy.

---

From: O Aaland

### **012- How can I use a Mac as a network server with my GS?**

In order to use the Mac as a server with a useable system folder you will have to have AppleShare version 3 running on the Mac. It sounds like you are wanting to use a local boot disk on the GS and then log on to the Mac to use the Mac hard drive. This will work with file sharing active on the Mac. The disk you need to make for the GS is a Network: Local Startup and not a Network: Server Startup disk. When booting from this disk you will be able to log on to the Mac and will be left in the program launcher. There is not enough room on a 800k disk for the finder along with the network files. I believe that you will also need to add the HSF FST to your startup boot disk also because it is not put there in the default install. Check in the drivers folder to be sure.

On the Mac set up a folder for the GS to use and turn on file sharing. On the GS, from the launcher get into the finder on your system disk and then copy the finder to the new folder on the Mac. Now you should be able to reboot the GS and after logging on the Mac, from the launcher, run the finder on the Mac hard drive. You will now return to the Mac hard drive when you quit your GS applications. You can put both applications and data files on the Mac and run them from there just like it was a drive attached to the GS. The speed is about the same as running from a 3 1/2 floppy, maybe a little faster. You are limited in what you can put in your system because of the 800k disk but having the finder on the Mac really helps.

If you can find a copy of AppleShare version 3 then you can boot directly from the Mac without any disk on the GS and the system size can be whatever the memory in the GS can handle.

---

From: David Empson

### **013- How can I set up an Appletalk network for 30 IIgs's using a donated LCII as a server? So far, I can get just 10 IIgs's connected.**

I assume you are using System 7.x File Sharing on the server? If so, you've just discovered one of its inherent limits. Changing computers will make no difference.

To be able to have more than ten clients, you will have to run the full AppleShare server software.

If you use AppleShare version 3.0, the IIgses can even boot over the network and won't require a local boot disk.

If you use AppleShare 4.0 or later, you lose the network boot capability, but in theory the Apple IIgses should still be able to use the server (I've never used anything later than 3.0).

You probably cannot run AppleShare 2.x on an LC III, because it only runs under Mac System 6.x.

Apart from the number of users, the full AppleShare server adds many useful features, such as administration tools, potentially acting as a print server, and faster performance. It ties up more resources on the machine than File Sharing.

AppleShare is commercial, but you might be able to get hold of a cheap copy of version 3 from somewhere.

As far as the multiple server option goes: that should work fine. If you have no need to communicate over the network between the servers, it would be a good idea to break the network up into separate segments (server and its block of clients). This will reduce confusion for the users (seeing more than one server), and will improve network performance.

In particular, note that LocalTalk is only intended to support a maximum of 32 devices per network segment. If you want 30ish or more computers on the same network, you should be using a router (which physically separates the network segments).

---

From: Rubywand

## **014- How can I capture a GS super-res screen to disk?**

For super-res game screens and many other graphics displays an ancient Classic Desk Accessory (CDA) known as "EA Screen Saver", "SDUMP.EA", etc. works well. The CDA (named "ScrnCapEA.CDA") and a Text info file have been uploaded to popular Apple II ftp sites. Look for a .SHK file named "ScrnCap.SHK" or "ScrnCapEA.CDA.shk".

ScrnCapEA.CDA lets you capture game, etc. 320 or 640 mode graphic screens as standard type \$C1 GS unpacked Screen files which can be loaded by Platinum Paint and many other GS utilities. To use the CDA to capture a screen, you must be able to access the Desk Accessories menu via the usual OpenApple-Control-Escape keypress.

Supertimer mentioned Clipit. This is a very nice capture New Desk Accessory (NDA) which lets you grab a part or all of many super-res displays, including desktop displays. The grabbed display is saved to the Clipboard. You can get the pic from the Clipboard onto a Platinum Paint work screen by going to Platinum Paint and doing a Paste.

A limitation of Clipit and similar NDA's is that you must be able to get to the 'Apple' menu or some NDA activation list or, if there is one, activate a 'Hot Key'. Also, these NDA's generally limit your grab to the Clipboard. Usually, this means you end up with just one pic per game, etc. session.

Games and other programs which shut off access to interrupts will, often, be a problem. You will usually not be able to get to the Desk Accessories menu and any screen capture 'Hot Key' keypresses will be ignored. Usually, the 'Apple Menu' is not available, so screen capture NDA's you use via the menu will not be

available, either. Sometimes, these programs include a built-in screen save feature; otherwise, capturing a screen will take special measures.

One way to capture most otherwise un-grabbable super-res screens is via a ProDOS-8 super-res utility which can save the super-res screen. The utility must be one which does not, itself, change the super-res screen upon startup (e.g. Nibble's SuperPac or a save/disp program you write yourself).

Make sure your Startup Slot is set to Slot 5. Start the game, etc. as usual. At some point insert a bootable ProDOS-8 diskette with the super-res disp/save utility into Slot 5, Drive 1. When you see the display you want to grab (and you are sure no Disk writes are occurring) do an OpenApple-CTRL-Reset boot, start the disp/save program and save the screen. Obviously, a disadvantage of this approach is that you get kicked out of whatever game, etc. you are running at the time of the boot.

---

From: TWS

You can get the ScreenPrint NDA, and save the screen to a file, or print it out.

---

From: Mitchell Spector

In addition to several CDA's and NDA's, you might want to try Ninjaforce's PicRipper program (useful for games and demos that lock out interrupts, rendering any desk accessories useless). It can grab Super-Hi-Res images still in memory and save them to disk. It is available at:  
<http://www.ninjaforce.home.ml.org> .

---

From: Boris Guenter

Try the SHR Capture CDA which allows you to enter the Control Panel and save as many screen pictures as you want. For programs which disable the Control Panel, you will need PicRipper2 or Antic's PicSaver, however.

Most of the screen capture programs mentioned here can be downloaded from Ground's mirror of Marvin's Apple II Infinitum:

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Mirrors/uni-kl/gs/>  
from the graphics/screensavers/ folder or  
from the graphics/misc/ folder.

---

From: Rubywand and Michael Gährken

**015- What programming languages are available for the Apple ][?**

Quite a few. Apple Integer BASIC (in-ROM on the first Apple II's), can be loaded into II+ and later models. Applesoft, a floating point BASIC, is in-ROM on all models starting with the II+. Older Apple II's can load-in Applesoft or, via a plug-in board, access it from ROM.

The best way to write Applesoft BASIC programs is using Program Writer, a full-screen editor from Beagle Bros. Users who want to speed up their Applesoft programs can use a BASIC compiler such as TASC or Einstein.

Then, there is MD BASIC, the BASIC-like MacroSoft from MicroSparc, a beta version of Apple's GS BASIC, and the new (1998) Byte Works GSoft BASIC!

Other Apple II languages are Apple Fortran, UCSD Pascal, Orca (Byte Works) Pascal, Terrapin Logo, Apple Logo, two Logos from ByteWorks, Isys Forth, Master Forth, (and many other Forths), Modula2, Aztec C, Orca/C, ... . Hyperstudio and HyperCard let you create stacks.

To the above you can add several assemblers including Merlin, Orca/M, an assembler from Ninja Force, and the MicroSparc Assembler.

Here are some good places to look for language software:

Ground

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple8/Languages/>  
<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple16/Languages/>

GS WorldView

<http://apple2.org.za/gswv/a2zine/Sel/> ; click "Utilities"

Syndicomm (sells languages by Byte Works)

<http://store.syndicomm.com/>

---

## 016- How can I see and edit what's in a Text file?

A handy utility for quickly viewing Text files under DOS 3.3 or ProDOS is Copy II Plus.

On the IIgs under the system Finder (the usual "desktop" display showing drives, folders, etc.) you can, probably, double-click on a text file to start up an application (program) which will display the Text and let you make changes.

Note: If you get an error message about not being able to find an application, you will want to think about setting up a link between Text type files and some Text editor program such as Teach. Some Text editor New Desk Accessories (like Shadowrite) will automatically establish a linkage.

Another way to view and edit Text files is to run a Text editor or word processor program and load in the file. On 8-bit Apple II's, some choices include Screenwriter II, AppleWriter, and, depending upon machine, some versions of Appleworks. On the IIgs you have many choices including Teach, Shadowrite NDA, CoolWriter, and Appleworks.

---

From: David Cross

### **017- How do I save a BASIC program in ASCII text form?**

The following line added to the front of your Applesoft BASIC program will save it in a Text file named "LISTFILE". It works in DOS 3.3 or ProDOS.

```
1 HOME:PRINT CHR$(4)"OPEN LISTFILE": PRINT CHR$(4)"WRITE LISTFILE": POKE 33,33:
LIST 2,: PRINT CHR$(4)"CLOSE": END
```

If you have a line 1 which you'd like to leave alone, you can enter the above at Line 0 and change LIST 2, to LIST 1,.

POKE 33,33 causes the text display routine to not insert any unnecessary spacing into your BASIC program listing, which cleans up the text file output nicely.

---

From: Rubywand

### **018- Where and how do I get GS System 6.0.1?**

GS System 6.0.1 is available from a number of sources and in several formats-- e.g. downloadable ShrinkIt archives, diskettes, etc.. For links, see Csa21MAIN4: Get It- Links to popular software packages.

---

From: Paul Schultz

### **019- Is a graphical user interface (GUI) available for 8-bit Apple II's?**

For the 128k Enhanced //e and //c series, the ones which come to mind are GEOS, Quark's Catalyst, and MouseDesk (aka Apple II Desktop).

GEOS was probably the most popular of the three although it never reached the popularity it gained on the C64 platform. The downside with GEOS is that it isn't ProDOS compatible. So, you are stuck with only using the GEOS compatible programs (GeoPublish, GeoCalc, GeoWrite,....)

Catalyst and MouseDesk are both very similar. They provide a ProDOS compatible version of the familiar Apple desktop GUI. MouseDesk was purchased by Apple and renamed Apple II Desktop. This was included in the original System Disk which shipped with the Apple IIgs. While shipped with the 16bit IIgs, A2 Desktop is an 8 bit program which works very well with my IIc+. I assume it would work with your IIe :-)

---

From: Supertimer

Actually, GEOS is ProDOS compatible, at least in the sense that Catalyst, MouseDesk, and Apple II Desktop are. GEOS can act as a program launcher for ProDOS programs. Obviously, for GEOS programs, GEOS acts like the full OS (much like GS/OS on the IIGS and MacOS on the Mac, actually), but it can do everything MouseDesk can do in regards to launching ProDOS programs. On the GEOS desktop, the files show up as icons stamped with "ProDOS; and, the user can copy and delete ProDOS files.

One neat thing about GEOS is the ability to expand the root directory past the 51 file limit on a ProDOS disk. If you have a bunch of stuff converted from DOS 3.3 to ProDOS you may find that things don't fit on the root directory of the ProDOS disk. Using GEOS, you can copy all the files to the root directory.

---

From: Rubywand

### **020- Where can I get Applesoft shape table info and programs?**

Go to the Ground archive's Beagle Bros folder at ...

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple8/Beagle.Oldies/>  
and download SHAPE.MECH1.SHK and SHAPE.MECH2.SHK

For information on using shapes in BASIC, go to Ground's Applesoft information folder at ...

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/MiscInfo/Applesoft/>  
and see the file hires.routines .

---

From: Sandy

### **021- How can I get a Postscript file from a GS document?**

To get a Postscript file from any GS document, press OpenApple-F when clicking "Ok" in the LaserWriter driver. This'll kick out a Postscript file in your \*/system/drivers folder.

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From: Rubywand

### **022- Where can I get Appleworks and Appleworks info?**

You can obtain the classic Appleworks word processor for the Apple II series from ...

Asimov (most versions)  
[ftp://ftp.apple.asimov.net/pub/apple\\_II/images/utility/word\\_processing/](ftp://ftp.apple.asimov.net/pub/apple_II/images/utility/word_processing/)

GS WorldView (v5.1)  
<http://apple2.org.za/gswv/a2zine/Misc/>

Complete documentation does not seem to be available on-line. You can find decent documentantation at ...

Aple II Text Files  
<http://www.textfiles.com/apple/DOCUMENTATION/appleworks>

Gareth Jones's web pages  
<http://modena.intergate.ca/personal/gslj/appleworks.html>

---

## **023- Where can I get Apple II languages, programming software, and programming info?**

Byte Works develops and publishes the Orca series of Apple II and IIgs languages including Pascal, C, Assembler, and the new IIgs BASIC. Byte Works also produces manuals, learning packages, and other language materials.

You can find several very good collections of Apple II languages and programming software plus loads of programming information on the net. A few major sources include ...

Asimov  
[ftp://ftp.apple.asimov.net/pub/apple\\_II/images/utility/programming/](ftp://ftp.apple.asimov.net/pub/apple_II/images/utility/programming/)

Ground  
<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple8/Languages/>  
<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple8/Beagle.Oldies/>  
<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple16/Languages/>

The comp.sys.apple2 Usenet newsgroup

The comp.sys.apple2.programmer Usenet newsgroup

For more details and links, see Q&A 006 in Csa21MAIN4 and the Apple II Programmer FAQs at ...

<http://home.swbell.net/rubywand/csa2pfaq.html>  
<ftp://rtfm.mit.edu/pub/usenet/news.answers/apple2/programmerfaq/part1>

---

From: Charles T. Turley

## **024- I'm running the Bernie IIgs emulator on my Mac. How can I boot DOS 3.3 disk images? I've tried everything and nothing works!**

Using my Mac PPC, I just change the file type of any 5.25 DOS 3.3 disk image to this:

New Type: DSK5  
New Creator: Gus!

Then, I drag and drop it over the icon of either Gus or Bernie. Both launch just fine for me in this way (assuming that the disk image is actually a boot disk).

---

From: Beverly Cadieux

## **025- Is there a way to convert two-column Text to one column?**

Yes. AppleWorks version 3.0 with TimeOut TextTools will do this.

First you have to install TimeOut. Then you copy the TimeOut accessories to the TimeOut directory. The one you want is TimeOut CopyBlock. To copy only column two, press OA-C (OpenApple-C) to highlight and copy the block of text on the right. Then scroll down to the end and paste it there.

Unfortunately this is only a copy. It is not a move and the second column stays where it was. You can delete it by pressing OA-Y at the end of each line of the first section.

Here's another scenario to separate two columns into one on a IIgs under Awks 5 with Ultra Macros:

Starting at the first letter of column 2, press OA-X and select a key for the macro to begin recording. Do a Tab, then down, and OA-left. Press OA-X to end recording.

Use the new macro all the way down column 2. Now you have a TAB on each line between the two columns.

COPY the entire text to the clipboard, and create a new spreadsheet. Copy the data into the spreadsheet. Because of the TAB, the two columns will come in as separate columns.

Use the spreadsheet's Block Move function to move column 2 to the foot of column 1. Sort (arrange) alphabetically if necessary. Copy the block and paste it back on your word processor document.

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From: David Empson

## **026- Where can I find an Apple II memory map?**

A memory map for a 128k Apple II along with related soft-switch, etc. information is available as FAQs resource file R032MMAP128.TXT.

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From: Rubywand

## **027- How can I move Applesoft BASIC programs to Quick BASIC on my PC?**

Transferring Applesoft programs on an Apple II to QBASIC, GW-BASIC, etc. on the PC is mainly a matter of moving a text copy of the program to the PC. (To make a text copy of an Apple II program, you LIST the program to a Text file. See Q&A 017 above.)

On the PC, you bring the A2 program text into your BASIC editor. BASICs available on a PC are not 100% compatible with Applesoft. Once you can list the Applesoft program on the PC under QBASIC (or whatever), you will, almost certainly, need to modify it.

It will be necessary to replace some Applesoft commands with their PC BASIC equivalents. Some commands are very similar but differ slightly in syntax; and you are likely to find that some conventions, such as the numerical value of "True" from boolean tests, are different.

The more an Applesoft program is "pure BASIC", the easier it will be to get it working on a PC. Programs which employ lots of PEEKs and POKEs, do monitor CALLs, and access other features specific to the Apple II will be more troublesome.

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From: Rubywand

## **028- How can I read .doc files under Windows?**

Quite a lot of information on Apple II websites, other sites, and on-disk is in .doc files. However, the .doc file format allows including pictures, which can lead to hacker vulnerability. Once this was discovered by Microsoft updates to XP switched OFF the legacy converters which allow reading and editing .doc files via such handy apps as WordPad.

Under ME and other early versions of Windows, there should be no problem reading .doc files. Otherwise, reading and editing .doc files could be a real chore.

Microsoft eventually supplied info for modifying a registry entry by hand to turn the converters back ON. Even better, someone at <http://helpdesk.graniteschools.org> came up with a simple script you can execute to do the job. The website is no longer active; but, the script file with a directions file is available from GS WorldView's Archive. There's also a file to flip the converters back OFF.

Go to <http://apple2.org.za/gswv/a2zine/Utils/> and download these files:

EnableLegacyConverters\_ON.txt  
EnableLegacyConverters\_OFF.txt  
EnableLegacyConverters-forReadingDocFiles\_Directions.txt

Mainly, the directions tell you to rename the \_ON and \_OFF files from .txt to .reg for executing.

Apple II Csa2 FAQs: CD-ROM, Part 5/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

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The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2CDROM.txt rev135 June 2009

## CD-ROM

- 001- What do I need to get/do to use Music and Data CD's on my GS?
- 002- What do I need discQuest for?
- 003- How can I back up my files on write-able CD-ROM?
- 004- Is a special driver needed for a Toshiba External 2X CD-ROM?
- 005- How can I get sound from my Apple HSS card + CD300 CD-ROM?
- 006- Where can I buy CD-ROM discs for the Apple II?
- 007- Where can I find more info on CD-ROM drives, products, etc.?
- 008- Where can I find out more about CD-ROM recording?

From: Rubywand, Jawaid Bazyar, Tony Diaz, George Rentovich,  
Wayne Stewart, Dave

## **001- What do I need to use regular CD Music Discs and access data discs (like the Golden Orchard CD) on my Apple IIgs?**

What you need is ...

1- RAMFast, Apple, or other SCSI interface card. The Slot in which the card is located must be set to "Your Card" (e.g. via the Control Panel).

Note 1: Today, SCSI devices normally expect that a "termination voltage" will be supplied by the SCSI interface card. RamFAST does this; but, most other cards do not. If you have such a card and have a hard disk connected and working, then, there should be no problem-- either the hard disk is supplying the voltage or the card has been modified. Otherwise, be sure to obtain information on the needed modification. (For the Apple Hi-Speed SCSI card termination power mod, see the Hard Disk and SCSI FAQs in file Csa2HDNSCSI.txt.)

Note 2: A version 1.01 ZipGS card needs to be upgraded to work with RamFAST.

2- External CD-ROM disc drive which your SCSI card supports.

The Apple Hi-Speed SCSI card is known to work with ...

Apple CD-150  
Apple CD-600i  
Apple CD-SC+  
Pioneer DRM-600.

The RamFAST is known to work with many drives, including any "SCSI Standard" drive and practically any NEC or Texel. Some specific models are ...

Apple CD-150  
Apple CD-300  
Nec CDR38  
Nec CDR25  
Nec CDR74  
Nec CDR84  
Nec CDR-501  
Nec CDR-502 (reads CDs fine but the front bezel music playing controls don't work when connected to a RamFAST)  
Philips CM425A  
Pioneer DM600 (which is a 6 disc CD changer)  
Pioneer DR-U06S (slot loading)  
Sony CDU8002  
Sony CDU8003  
Sony CDU555S  
Texel DM3X1S  
Texel DM3028  
Texel DM5028  
Toshiba 3401  
Toshiba XM-3501  
Toshiba XM640LB (40speed)

Note 1: Check to be sure that the SCSI device number of your CD-ROM drive does not conflict with the number for your hard disk, Zip Drive, etc.. Each device on the SCSI chain should have a different number, usually in the range 1-6. #6 is usually reserved for the device you wish to boot, such as a hard disk. (A drive's SCSI number is usually set via a switch on the back.) SCSI number does not need to relate to position on the chain.

Note 2: The last device on the SCSI chain (i.e. the drive which is physically at the end of the chain) should have its Termination set to ON and Termination for other SCSI devices should be set to OFF. If your CD-ROM Drive is the only SCSI device, Termination should be ON. (Actually, a SCSI interface card may be able to handle two devices with Termination set to ON. However, you are likely to have problems if the last device on the chain has Termination set OFF.)

3- A SCSI cable. Common SCSI plug/socket sizes are 50-pin and 25-pin. Get a cable which matches your CD-ROM drive and the device you plan to plug into (i.e. a SCSI hard disk, Zip Drive, ..., or your SCSI interface card).

4- To hear music played from a CD, Stereo headphones, speakers, or hi-fi cables need to be plugged into the CD ROM drive. Most drives have a mini- Stereo socket in the front. To fit the socket, the plug for your headphones, etc. must be a Stereo plug.

5- A Driver file which matches your interface card. For RamFAST, it is Ramfast.Driver. For Apple SCSI cards it is SCSI.Manager and SCSI.CD.Driver. The Driver file(s) should be in the SYSTEM/DRIVERS/ folder (i.e. the DRIVERS folder in the SYSTEM folder). To avoid conflicts, RamFAST users should remove SCSI.Manager, SCSI.CD.Driver, and other Apple "SCSI ..." drivers from the SYSTEM/DRIVERS/ folder.

6- In order to play standard Music CD's via your computer, you should have the following:

- A Media Driver which matches your CD-ROM drive. For example, RF.NEC is a driver supplied with RamFAST which works with NEC drives. The Media Driver should be in the SYSTEM/DRIVERS/MEDIA.CONTROL/ folder.
- A standard System 6 control panel file (i.e. a "CDEV") named "MediaControl". MediaControl should be in the SYSTEM/CDEVs/ folder
- A standard System 6 media control New Desk Accessory file (i.e. an "NDA") named "MediaControl.DA". MediaControl.DA should be in the SYSTEM/DESK.ACCS/ folder.

7- In order to access files on data CD-ROM discs (like DigiSoft Innovation's Golden Orchard CD), the standard System 6 High Sierra file system translator file (HS.FST) should be in the SYSTEM/FSTS folder. This lets you read ISO 9660 format data CD-ROM discs. You should already have the ProDOS FST (PRO.FST) in the same folder. This lets you read ProDOS partitions which may be included along with ISO 9660 partitions on a data CD-ROM disc.

Once the above items are checked, Shut Down your IIgs. Turn it OFF. Turn OFF the CD ROM drive. Wait 10-20 seconds. Turn ON the CD ROM Drive. Wait a few seconds and turn ON your IIgs. Boot System 6.01.

Your SCSI card manual and/or information supplied by the CD-ROM drive seller is the best guide for doing any necessary setup chores. If a SCSI hard disk or Zip Drive is already connected and working, it's likely that no special setup will be necessary.

Note: If the CD-ROM drive is the only SCSI device on the chain and you are using a RamFAST along with a ZipGS accelerator, be sure to run RAMFAST.SYSTEM after booting in order to change at least one setting. You want to click [O]ptions and set "TransWarpGS" to "NO".

#### Playing a Music CD

Click on Control Panels in the Apple Menu. Select the Media Ctrl control panel. I have "1" for Media Channel, "RF.NEC" (the name of the driver) for Media Device, and "GAME PORT" for Port. After entering your settings, close the panel. This will save your setup in a file named "Media.Setup" in the same Media.Control folder which contains your media control driver.

From the Apple Menu click on Media Controller to show the CD ROM player. Click Channel 1, the name of your CD ROM driver should show in the player display. Insert a CD. Click Play and adjust the volume on the drive.

Loading Data, Games, etc. from a Data CD

Startup is the same as described above. It seems to be a good idea to have a data CD in the drive before turning ON the computer. Some drive + card combinations may not go on-line if no CD is present by the time you turn ON the computer. You can experiment to see what works for your particular system.

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From: Jason Kettinger

I've got a Chinon CDA-435 1X speed (150Kps) SCSI-1 CDRom hooked up to my IIgs using the Apple HS SCSI card, and it works great. I don't have any encyclopedias, and CD-Audio disks do not get detected; but, the IIgs detects ISO/HFS CD removals and insertions fine without a reboot.

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From: Rubywand

**002- I've heard of a package called 'discQuest' which is supposed to open the way to accessing all sorts of commercial CD's. But, if I can play CD music and load files from data CD's, what do I need discQuest for?**

Below is a condensed discQuest review. It should help clarify things.

DiscQUEST v1.2.2

for 2MB IIgs from Sequential Systems

CD ROM drive, interface, and System 6 or later required;

hard disk and System 6.01 recommended

There is a burgeoning library of CD-ROM releases. History of the World from Library Reference is a case in point. discPassage is a PC/Mac interface program which lets a user access text, pictures, and sound tracks on CD's which employ a discPassage database.

Typically, dP products carry the digital data disc symbol and are labelled "for Mac or multi-media PC" with Mac and PC versions of discPassage included on-disc.

"Whoa! My IIgs has a CD-ROM reader, SCSI interface, and all the standard System 6.01 drivers. It still can't do much with those disc CD's."

Right. The basic IIgs setup CAN access data and programs on for-Apple II CD's. If you've added the appropriate Media NDA and Control Panel, your CD-ROM IIgs can also mimic a CD music disc player complete with all of the usual controls. Audio is output directly from the CD-ROM drive to headphones, a hi-fi amp, or a pair of amplified speakers.

"Fine; but, how do I ask the Family Doctor a question, peruse an encyclopedia, and use other neat CD-ROM data disc products?"

Actually, with HS.FST in your SYSTEM/FSTs folder, you can click the CD-ROM icon, display folders, and even load TEXT files from discPassage CD's. Your IIgs is 'compatible enough' with ISO 9660 even if some of the PC filetypes are unfamiliar. Still, this kind of access is hardly satisfactory. What you lack is the software key to unlock the discPassage database. Your IIgs cannot run PC or Mac versions of discPassage; but, it CAN run a for-GS database unlocker named "discQuest"!

How do the systems match-up? Well, I tried out several CD's under discPassage on a 33MHz '486 PC and discQuest on a IIgs with 10Mhz/64K ZipGSx. On the PC you get to see an intro pic (which discQuest skips); and, in one case, a sound file which played fine with discPassage did not work under discQuest.

As might be expected, pictures come in faster under discPassage because discQuest must often spend extra seconds processing each PC-format image. The larger the graphic and greater the number of colors, the bigger PC's advantage. Based upon samplings of several CD's, discQuest often needs about 15 seconds to load and display a pic that discPassage can handle in 3 seconds. Fortunately, you can reduce this delay by selecting Preferences and setting Color to "Gray-scale".

Both setups handled sound files well, consistently starting playback in under 4 seconds. The big surprise of the face-off came when comparing time required to open folders and display item choices-- for example, to open "Ancient Civilizations" and list article titles. DiscPassage routinely took 10-20 seconds; whereas discQuest seldom took even 2 seconds!

Just click the discQuest icon and, in a few seconds, the name and main folders of the current discPassage-compatible CD appear in a scrollable Browse window. From here you can open folders, do searches (by word, author, subject, or title) and read articles in scrollable windows. Of course, you can also listen to sound tracks, view pictures, and obtain printouts of text and pictures.

A major benefit of having reams of text 'on the computer' is that you can clip and save selections for use in articles, term papers, and other projects. discQuest scores a "pretty good" here, since you are free to add and delete text and can use Cut & Paste within whatever article you are viewing. The result may then be saved to disk. At present, however, discQuest does not maintain more than one text window on its desktop; nor does it support loading text files from disk or opening a New (blank) text window.

The standard discQuest package includes a sample CD (such as "Family Doctor" or "Total Baseball"), fifteen pages of information and instructions, and two diskettes. One diskette lets non-hard disk users start discQuest after a bare-bones System 6.0 boot. The other will Install discQuest and a monospace font (CoPilot.8) to hard disk plus, if desired, several support files. The latter include HS.FST and drivers for popular CD-ROM readers plus the Media NDA and Control Panel stuff to support playing music CD's.

If you already have CD-ROM up and running on your IIgs, then hard disk installation of discQuest should involve nothing more than creating a folder named DISCQUEST, copying the program there and copying CoPilot.8 to SYSTEM/FONTS. The other files were present in Sequential's Complete System Package. The one sent to me included discQuest software and info sheets, NEC MultiSpin (x2 speed) CD-ROM reader, RamFAST SCSI interface card, cable, Labtec CS-150 amplified speakers, manuals, and four more sample CD's.

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From: Matt Portune

### **003- How can I back up files on CD-ROM?**

Compact disk recording opens up many possibilities. Obviously, archiving software is one of them. Another is being able to record audio. In my studio, I've placed a lot of important material on analog tape; and, unlike the diskette situation, there is no doubt of the imminent danger of degradation. Burning the audio to CD would maintain the original quality, with the added bonus of random access.

CDR also opens up business opportunities. Archiving data for businesses and spinning off audio masters and mixes for bands and clubs are just two good prospects. All of which more than justified the cost of a CD Recorder.

First priority, of course, was preserving my precious ][ goodies! I began the whole process on a Wednesday afternoon, and worked non-stop through Sunday.

Step One was to archive programs and their support files into compressed SHK files. Not only does this help keep everything organized, but it also prevents loss of resource fork data when files are moved to the PC for processing.

I archived the data from every floppy I have plus files from each hard drive partition. A few items were archived twice; but, this way, I can choose from a 'raw' original or 'set up' version. (Besides, separating out duplicates would have taken an extra day!) Anyway, the entire backup only reached about 105 megs. There would be plenty of breathing room on a 650 meg CD.

Since all 10 of my hard disk partitions are ProDOS, I settled for transferring data to the PC in 32MB chunks. This was done using a home brew null-modem cable to connect the serial ports of both machines.

It's surprising that so many computer users go to the trouble of using diskettes for machine-to-machine transfers. Null-modem is so easy! I attached my cable, launched Spectrum v2.0 on the GS and Hyperterminal on the PC, and, then, told Spectrum to Zmodem-upload everything on the transfer stuff partition to the PC.

The machines held a steady transfer rate of about 4500 CPS. Since I had a few 32-meg partitions to upload it was a good excuse for leaving the computers to their work and indulging in Babylon 5 re-runs!

Finally, on Sunday afternoon, the uploading was complete. On the PC, everything wound up in a folder called "GS Backup". Inside this folder, I

created other folders (Games, Graphics, etc.). All in all, 100+ floppies and a 340 meg hard drive had been turned into a nice, organized 105 meg archive.

After double checking the archive, I slapped a blank CD into the recorder, started EZ-CD Pro, and selected "New" from the file menu. I scanned the displayed listing of burn formats for "HFS" because it is recognized by both GS System 6 and Mac. Unfortunately, HFS was not in EZ-CD Pro's list; so, I selected ISO-9660, which System 6 can handle via the HS.FST.

Actually, the whole process went very smoothly. I chose the "GS Backup" folder as the data to burn to the disc, and, after about 7 minutes, the CD recorder spit out a shiny new GS archive!

Or, so I thought... I put the CD in the GS drive. It mounted fine, but upon opening the CD, I found that EVERY file was placed in the root directory, instead of in it's proper folder. Also, every filename had a ";1" after it?!

It turns out that the ";1" is an end-of-filename character (the ";") followed by a an ISO-9660 version number. Versions of ISO-9660 which do not support the Apple Extensions require such a suffix for non-directory files. The cure is to find a CD burner program which supports either High Sierra Group format or a more up-to-date version of ISO-9660.

The directory problem was my fault. I was still learning the software's "parenting" feature, and had mistakenly told EZ-CD to make the disc with every file in the root directory!

Anticipating some such screw-up, I had made sure to not select "close disc" on the first burn. This makes a disc "multisession", which means you can do later burns ("sessions") and write new stuff until the disc is full, or until you "close" it. (You cannot, however, erase anything.) So, I told the software to make the first session inactive, and burn a second session which would have the files in their directories.

After another 7 minutes, out popped attempt #2. Sure enough, in the PC's CD-ROM drive the first session showed as ignored, and the new, Version 2, session was active! Alas, on the GS, the situation was reversed. Version 2 was ignored. I found out later (by asking someone) that HS.FST does not, currently, support multisession discs! As Poor Richard once observed in his Almanac: "Experience keeps a dear school ... ."

Despite a few tribulations, I'm pleased to report that my first CD was not a waste. If you have the Balloon NDA installed and double-click a file, it is recognized as an SHK archive and is opened accordingly. Opening the files from GSHK worked fine, as well. It 'ain't pretty'; but, the archives are all intact, and perfectly readable on the GS.

Since I have more things to add to a future CD (like GNO v2.0.6), I'll soon be ready to pull all the data off "disc 0" and burn a fresh one, doing it right this time. At least, for now, I have everything backed up on a safe, long-lasting medium, thus taming my dying-floppy paranoia. Now, if I could somehow archive the II hardware ...!

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From: M. Kelsey

I made a ProDOS 8 CD-ROM just today for the first time. I used Windows '95 since it has APSI driver emulation in an MS-DOS prompt and a \*freeware\* utility called DISK2CD from <http://www.goldenhawk.com> .

It consisted of only these few steps:

1. Get all software onto your Apple II hard drive that you want written to CD.
2. Disconnect the hard drive.
3. Reconnect the hard drive to a Windows '95 or DOS machine with appropriate ASPI drivers.
4. Run DISK2CD.
5. Test the CD out on your Apple II =)

Now I can use Copy II+ 6.5 to make disk images in an uncompressed form, store them with their file attributes, and have a bootable CD-ROM from which I can access the utilities and disk images! (WooHoo!) Bye bye to all those 300 5.25" disks!

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From: Supertimer

#### **004- Is a special driver needed for a Toshiba External 2X CD-ROM drive on a IIGS with Apple Hi-speed SCSI interface?**

Yes, you need an SCSI-2 driver. Sequential Systems sold such a driver for the Apple Hi-speed card. This driver works well with an Apple CD-300 and a quad-speed Hi-Val drive tested against it. The Toshiba drive is also an SCSI-2 standard CD-ROM. They all use the same commands and need this driver.

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#### **005- I have an Apple Hi-Speed SCSI card and CD300 CD-ROM drive on my IIGS. How can I get sound from my CD's?**

Sequential's driver allows the audio to work. It allows the Apple Hi-Speed interface to work with all new CD-ROM drives.

---

From: Joe Kohn

#### **006- Where can I buy CD-ROM discs for the Apple II?**

Shareware Solutions II ( <http://users.foxvalley.net/~joko> ) currently offers several CD-ROMs for the Apple IIGS:

- The Golden Orchard CD
- The TABBS CD
- Studio City CD
- HyperCard-based Script Central CD
- Bernie ][ The Rescue Starter Kit CD

- Apple IIGS Photo CD
- Open-Apple/A2-Central CD

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From: Charles T. "Dr. Tom" Turley

Having both The Golden Orchard CD and The TABBS CD, I can assure all Apple II and IIgs users that they both contain a wealth of Apple II/IIgs programs, graphics, music, information and a multitude of fantastic archives of great interest and value to any Apple II and IIgs user.

---

From: A.P.P.L.E. Webmaster

Apple Pugetsound Program Library Exchange ( <http://www.callapple.org/> ) is celebrating the 25th anniversary of its User Group founding by releasing the following Apple II Related CD-Rom Books:

- The Wozpak ][ CD
- Call-A.P.P.L.E. In Depth (Vol. 1-4) CD
- Call-A.P.P.L.E. 1978 Special Edition CD
- The A.P.P.L.E. Basic PDS Library CD
- Peeking at Call-A.P.P.L.E. Vol. 1 CD

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From: Stephen C. Davidson

### **007- Where can I find more information about specific drives, interfaces, and CDROM software?**

See the Apple II CD-ROM Info resource file R014CDROMIN.TXT . For additional SCSI interface information see the Apple II Hard Drives and SCSI FAQs file Csa2HDNSCSI.txt.

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From: Charles T. "Dr. Tom" Turley and Ed Eastman

### **008- Where can I find out more about CD-ROM recording?**

Andy McFadden's CDR FAQ's answered all the questions and concerns I had with making an Apple II CD for use on all computer platforms. The URL is <http://www.cdrfaq.org/> .

Apple II Csa2 FAQs: DOS & ProDOS, Part 6/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

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The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2DOSMM.txt rev135 June 2009

## **DOS & ProDOS**

- 001- What is a "DOS"?
- 002- What DOS's are available on Apple II computers?
- 003- Are there any faster better versions of DOS 3.3?
- 004- What commands are available in DOS 3.3?
- 005- How do I use DOS commands from the keyboard? a program?
- 006- How do I use variables in a DOS command?
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- 008- How much storage space is on a 5.25" diskette?
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- 010- What is the "Volume Table of Contents" or "VTOC"?
- 011- Can I assign names to my DOS 3.3 diskettes?
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- 014- What do the entries in a DOS 3.3 Catalog display mean?
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- 016- How can I use DOS 3.3 to read/write sectors from machine code?
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- 019- What information is included in the VTOC and Catalog sectors?
- 020- How does DOS 3.3 remember which sectors are used?
- 021- What are the formats of DOS 3.3's main file types?
- 022- How can I run DOS 3.3 programs from 3.5" disks and hard disk?
- 023- How can I get DOS 3.3 from the net without an A2 tcom utility?
- 024- What is ProDOS?
- 025- What are ProDOS's major features?
- 026- Which Apple II's can run which versions of ProDOS?
- 027- How can I create bootable ProDOS diskettes?
- 028- How do I make a ProDOS disk that will boot and start a BASIC program?
- 029- What is the maximum size of a ProDOS volume?
- 030- How do I LOAD, SAVE, etc. files under ProDOS?
- 031- What is a "pathname"?
- 032- What is the default volume and folder when ProDOS boots?

- 033- How can I set default volume and folder under ProDOS?
- 034- How can I discover the volume name of a just booted disk?
- 035- How do I create a folder?
- 036- How can I access ProDOS routines from machine language?
- 037- How can I convert DOS 3.3 wares to run under ProDOS?
- 038- How can I modify ProDOS to do BLOADs to Text Page 1?
- 039- How can I boot ProDOS on my Franklin computer?
- 040- What are some good DOS 3.3 and ProDOS references?
- 041- How can a BASIC program tell which DOS it's running under?

From: Rubywand

## **001- What is a "DOS"?**

"DOS" means "Disk Operating System". A DOS is a collection of machine language routines and data which lets a computer Read and Write information to/from disk. A DOS also includes commands, such as SAVE and LOAD, which you can use to create and access files on disk.

Apple II DOS, Commodore 64 DOS, and the DOS used on PC's are all called "DOS"; but, they are different systems. Their commands are similar, sometimes identical, because what users want to do with disks is about the same whatever the computer. However, the way each DOS arranges and keeps track of data on disk is very different. You will not, for example, be able to read files from a C-64 diskette on your Apple II running under DOS 3.3.

---

## **002- What DOS's are available on Apple II computers?**

DOS 3.3 is the first DOS to be widely used on Apple II computers. Many programs were written to use DOS 3.3 commands and saved on DOS 3.3 diskettes. Apple 'officially' replaced DOS 3.3 with ProDOS back in the early '80's. However, DOS 3.3 continues to be popular with II users. To get DOS 3.3 from the net, see Csa21MAIN4: Get It- Links to popular software packages.

Another Apple II DOS is the one introduced with Apple Pascal. Compared to DOS 3.3 or ProDOS, the Apple Pascal DOS is a very limited, cumbersome operating system.

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## **003- DOS 3.3 seems kind of slow. Are there any faster better versions of DOS 3.3?**

Yes. Today, most "DOS 3.3 users" do not actually use DOS 3.3. Long ago, Beagle Bros introduced patches which resulted in much better speed, freed-up extra disk space, and added a CATALOG command which shows number of Free Sectors. Their Prontodos or some modification of it is, for practical purposes, the "current version" of DOS 3.3.

ES DOS ][ adds a few mods to Prontodos. CATALOG shows Free Sectors and Number of Tracks and it scrolls the entire Catalog (scrolling stopped by pressing any key) instead of stopping when the screen is full. ES DOS ][ also

lets you use the semi-colon as a terminating 'wildcard' character. This DOS includes a CATALOG fix to show correct size of files bigger than 255 sectors.

Other popular, higher speed versions of DOS 3.3 include David DOS and Diversi-DOS; and, there are several small, special-purpose versions of DOS 3.3. (For example, one game maker used RDOS to save space and to make its diskettes harder to copy.) Below is a chart which compares speed and features for standard and speeded versions of DOS 3.3.

	BLOAD Time Test***	Does INIT	Large Files CATALOG fix	Frees 15 Sectors	Disp Free Sectors	Error Msg
Std DOS 3.3**-	8.9 sec	Yes	No	No	No	Yes
DavidDOS-	2.8 sec	No	Yes	No	Yes	Yes
DiversiDOS-	2.9 sec	Yes	Yes	No	Yes	err#
EsDOS-	2.3 sec	Yes	Yes	Yes	Yes	abbr*
ProntoDOS v1-	3.0 sec	Yes	No	Yes	No	Yes
ProntoDOS v2-	3.0 sec	Yes	No	Yes	Yes	Yes

\* abbr: shows abbreviated error messages

\*\* 1980-1983 versions

\*\*\* time to BLOAD MUFFIN from the 1983 DOS 3.3 System Master disk

You can get standard and high-speed DOS 3.3's from a number of places on the net. See Csa21MAIN4: Get It- Links to popular software packages.

---

## 004- What commands are available in DOS 3.3?

To get very far with "DOS 3.3" you will need the DOS Manual. This is especially true when it comes to using TEXT files. Other good sources of DOS 3.3 info include Beneath Apple DOS and Apple II User's Guide. For now, the following is a quickie guide to most Apple II DOS 3.3 commands:

LOAD NARF- loads a BASIC file named NARF.

SAVE NARF- saves current BASIC program in memory as file named NARF.

DELETE NARF - deletes file named NARF

CATALOG - lists contents of diskette to screen

RENAME NARF, NEWNARF - renames file NARF to NEWNARF

RUN NARF- loads and starts a BASIC file named NARF.

BLOAD NARF.PICTURE, A\$2000 - loads in a binary file named NARF.PICTURE starting at address \$2000.

note: \$2000 is a hexadecimal number (\$2000 = 8192 in decimal). DOS commands can use hex or decimal numbers.

BSAVE NARF, A\$300, L\$7F - saves \$7F bytes of memory starting at address \$300 as a binary file named NARF. (BSAVE NARF, A768, L127 uses decimal numbers to do the same thing.)

note: The above command statement illustrates typical DOS syntax ...

BSAVE-- the DOS command

NARF-- the file name (the space between the command and file name is not a requirement; BSAVENARF is okay)

,-- a comma to separate file name from parms which follow

A-- means an Address follows

\$300-- the address from which you want to start saving bytes (the \$ indicates a hex value; \$300= 768). Again, spaces do not matter; A768, A 768, A \$ 300 are all okay

,-- a comma to separate one parm from another

L-- means a Length follows

\$7F-- the length in hex (= 127); this is the number of bytes to be saved

The command statement says Save \$7F bytes, starting at address \$300, to a file named "NARF". NARF will have the bytes found at addresses \$300 through \$37E.

note: The order of parms following a file name does not matter.

BRUN NARF.DISP, A\$1000 - loads in a binary file named NARF.DISP starting at address \$1000 and starts executing machine instructions at address \$1000

LOCK NARF- locks file NARF (indicated by \* in a CATALOG). LOCKed files cannot be deleted, over-written, etc.

UNLOCK NARF - cancels LOCKed status of NARF.

VERIFY NARF - uses checksums to verify that NARF is not a damaged file

MON C, I, O - tells DOS to display Commands, Inputs from disk, Outputs to disk. You can specify one, two, or all three (e.g. MON C, O etc.).

NOMON C, I, O - cancels all MON requests. NOMON I cancels just the "I" request.

MAXFILES 7 - sets the number of file buffers to 7. (Upon booting DOS, the default for the MAXFILES value is 3.)

PR#1 - sets the destination for Apple outputs to the device in Slot 1 (usually a printer). PR# 3 sets it to Slot 3, etc.. PR# 0 sets the destination back to the display screen.

PR#6 - normally, boots the diskette in Drive 1, Slot 6.

IN# 6 - sets the source for Apple inputs to the device in Slot 6.

IN# 0 - sets the source for Apple inputs to the keyboard (default).

INT - (integer) puts system into Integer BASIC if it is present.

FP - (floating point) puts system into standard Applesoft BASIC.

OPEN NARFOO - prepares to read or write a TEXT file named NARFOO.

READ NARFOO - tells DOS that INPUT and GET statements will obtain characters from a TEXT file named NARFOO.

WRITE NARFOO - tells DOS that PRINTed characters will go to a TEXT file named NARFOO.

CLOSE NARFOO - used to terminate access to a TEXT file named NARFOO. Just CLOSE terminates access to all OPENed TEXT files.

EXEC NARFGO - tells DOS to execute the BASIC and DOS commands found in a TEXT file named NARFGO

The above TEXT file commands handle 'normal' sequential TEXT files. DOS can also OPEN, READ, WRITE, ... random access TEXT files. (See DOS manual.)

Most DOS commands also let you specify Drive and/or Slot. For example CATALOG, D2 lists the contents of the diskette in Drive 2 to screen. SAVE NARF,S5,D2 saves NARF to Drive 2 in Slot 5.

NOTE --> Using Drive or Slot parms in a DOS command sets the default Drive or Slot. So, after CATALOG, D2, a plain LOAD or SAVE will access Drive 2.

---

## **005- How do I use DOS commands from the keyboard? ... from a program?**

To use a DOS command from the keyboard, type it in. (A few commands can be issued only from a program.) To use a DOS command in a program enclose it in quotes preceded by PRINT CHR\$(4). For example:

```
100 PRINT CHR$(4) "BLOAD NARF, A$2000"
```

---

## **006- How do I use variables, say for file length, in a DOS command?**

Use variables in a command this way:

```
120 PRINT CHR$(4) "BSAVE NARF, A$2000, L"; NB
```

Line 120 says that the Length of NARF is the value of variable NB. NB is used here to represent the number of bytes (in decimal) to be saved.

---

## 007- How do I create new DOS 3.3 diskettes?

One of the best features of DOS 3.3 is that any bootable DOS diskette can create other bootable diskettes.

INIT HELLO - formats one side of the diskette in the currently active drive, adds DOS, and saves the current program as HELLO.

The program that's automatically placed on the new diskette is the one in memory when INIT is executed. It is called the "greeting program" or "hello program" because it is the program which will be run when the diskette is booted. Usually, the program is named HELLO; but, you can INIT HOWDY, or any name you like. The hello program can be very simple, such as ...

```
100 PRINT CHR$(4) "CATALOG"  
110 END
```

You are free to load in and change the hello program or even delete it, just like any other. The one restriction is that once a diskette is INITed, the name of the hello program is fixed for that diskette unless you use a utility (like Copy II+) to make a change. This is why it's a good idea to stick with the name HELLO. You will always know what the hello program's name is.

Once a diskette is INITed it can be used to store your programs and data files.

---

## 008- How much storage space is on a newly INITIALIZED 5.25" diskette?

A standard DOS 3.3 diskette has 35 Tracks. Each Track contains 16 256- byte Sectors. This gives  $35 \times 16 \times 256 = 143360$  bytes per side. Current versions of DOS 3.3-- e.g. Prontodos, etc.-- use Track 0 and Track 1 plus a sector on Track 2 for DOS; and, Track 17 is used for holding the Catalog of files and other disk information. This leaves roughly 130k bytes per side free for your HELLO program and other files.

By the way, when it comes to the way it is stored on-disk, DOS 3.3 is not like the PC's MSDOS or Apple's ProDOS. DOS 3.3 is 'hidden' on reserved tracks, mainly Tracks 0 and 1. There is no "DOS 3.3" file which will show up on a CATALOG.

---

## 009- On my PC I can FORMAT diskettes with or without adding the operating system. Can I format a DOS 3.3 diskette for just data storage? -- i.e. without adding DOS or a HELLO program?

Yes. DOS 3.3 does not have a plain "FORMAT" command; but, you can use utilities such as Copy II+ to easily format a diskette without adding DOS or a HELLO program.

A format will create 35 Tracks of 16 256-byte sectors each and verify that each Track is good. Then, it will allocate the Catalog track and create a disk info record called the "Volume Table of Contents" or "VTOC".

---

## 010- What is the "Volume Table of Contents" or "VTOC"?

The VTOC is a Sector which stores such basic information as Number of Tracks, Sectors per Track, DOS version, ..., and the 'map' of used/un-used Sectors. DOS 3.3 writes the VTOC at Track 17, Sector 0. (For more details on VTOC content see Question 019.)

---

## 011- Can I assign names to my DOS 3.3 diskettes?

DOS 3.3 has no way to name a diskette "NARF", "DISK 100", "DATA DISK ", etc. which DOS will recognize. You can, however, 'name' a diskette by giving it a Volume Number in the range 1-255.

Volume Number is set at the time a diskette is initialized. For example ...

```
INIT HELLO, V19
```

INITs a diskette as Volume 19. If no number is specified, the default Volume Number used by INIT is 254.

Several DOS commands can specify a Volume Number in order to decide whether a diskette is the right one for some application.

```
LOAD NARF, D2, V5    ... for example, will not load NARF from Drive 2 unless the
diskette's Volume Number is 5.
```

A few early pieces of commercial software used Volume numbering; and, new users often like to Volume number their diskettes. In practice, this turns out to be a bad idea. A diskette with any Volume Number except the default (254) is often difficult to work with via standard utilities. Also, once a diskette is INITed for a certain Volume Number, changing the number is difficult because Volume Number is embedded in each Sector. (i.e. You'll end up having to copy every file to another diskette and, then, re-INITing the source diskette to the new Volume Number.)

Besides, there's an easy way to give descriptive names to your DOS 3.3 diskettes which will not interfere with normal access. Just write the name ("GAMES DISK ONE", or whatever) to a Text file named, say, "DISK.ID".

DOS 3.3 will not know about the name or show it in a CATALOG. However, your programs will be able to find out the name by just reading DISK.ID.

---

## 012- What does it mean to "Boot" a disk?

BOOT comes from the idea of 'pulling yourself up by your bootstraps'. The Apple II disk controller ROM has just enough smarts to load-in DOS's Bootstrap Loader from Track 0, Sector 0 (it comes in at address \$800 ...).

The Loader loads in a still smarter, bigger routine from several sectors of Track 0. This routine is the one which loads in the rest of DOS, moves it to the proper place in memory, and ends up going to DOS's Cold Start routine. Finally, the hello program is loaded and executed.

---

## 013- What file types does DOS 3.3 have and how is file type information saved in the Catalog?

In a DOS 3.3 Catalog sector, the third byte in each file's entry tells the type of the file:

Byte Value*	File Type
00	Text
01	Integer BASIC
02	AppleSoft BASIC
04	Binary
08	S type
10	R: Relocatable object module
20	new A type
40	new B type

\*DOS 3.3 sets bit 7 of the byte if the file is locked. (e.g. 84 --> a locked Binary file)

Type R files show up in just a few applications. An R file begins with 6 bytes which a "loader" routine can use to tell the Target location of file contents, How many bytes to move, and Source location to move from.

Although S, new A, and new B are included, no official application was defined for them and no DOS commands were created to make any special use of these files.

---

from David Empson

There was an "R" type relocating loader included with the toolkit for use with BASIC programs and relocatable routines being loaded into upper memory.

"S" was used by some programs for a generic image file, or something that was not likely to be touchable with normal code.

The LISA assembler used the second "B" type for its source files. It had a patched version of DOS that changed the file type list to read "LARSBAIT", so



DOS 3.3 works like this:

```
JSR $3E3      ;get address of RWTS IOB (low in Y, high in A)
```

(you can either change the stuff that Y/A point to, or set up your own IOB and skip the call to \$3E3)

```
JSR $3D9      ;call RWTS (with IOB address in Y/A)
```

The IOB (Input/Output Block) is small but non-trivial. Here's what Beneath Apple DOS says:

```
$00    table type (always $01)
$01    slot *16
$02    drive (1 or 2)
$03    volume expected ($00 for any)
$04    track ($0-$22)
$05    sector ($0-$0f)
$06-07 address (lo/hi) of the Device Characteristics Table
$08-09 address (lo/hi) of the 256 byte buffer for read/write
$0A    not used
$0B    byte count for partial sector ($00 for 256 bytes)
$0C    command code (0=seek, 1=read, 2=write, 4=format)
$0D    return code (carry set on error):
```

```
$00 = no errors
$08 = error during initialization
$10 = write protect error
$20 = volume mismatch error
$40 = drive error
$80 = read error (obsolete)
```

```
$0E    volume number of last access (must be initialized)
$0F    slot number of last access *16 (must be initialized)
$10    drive number of last access (must be initialized)
```

Device characteristics table:

```
$00    device type (should be $00 for DiskII)
$01    phases per track (should be $01 for DiskII)
$02-03 motor on time count (should be $EFD8 for DiskII)
```

NOTE: RWTS uses zero-page location \$48, which is also used by the Apple monitor to hold the P-register value. Location \$48 should be set to zero after each call to RWTS.

---

From: Edhel Iaur, Esq.

**017- How many 'official' versions of DOS 3.3 are there and how can I tell which is running?**

According to The Dostalk Scrapbook, there are 3 official (as in Apple made 'em, I think) versions of DOS 3.3. PEEK (46725) supposedly tells you which is running:

```
165: oldest (1980)
186: better (January 1, 1983)
182: latest (?)
```

I remember one had something to do with the way text files are handled.

---

From: Dave Althoff

The second version would be the IIe release ("DOS 3.3e") which contains yet another APPEND patch, and an additional bit of code which shuts off the 80-column firmware during boot. That version comes on a new System Master which uses the LOADER.OBJ0 program to fast-load INTBASIC (or FPBASIC), and a revised "HELLO" program which displays the "BE SURE CAPS LOCK IS DOWN" reminder on a IIe.

---

From: Rubywand and Olcott

One big problem with DOS 3.3e (and, probably, any later versions) is that it uses some memory in the DOS area which the 1980 release leaves alone. This means it can not be safely patched with Beagle's "Prontodos" speed-up mods.

With DOS 3.3e, you get an APPEND patch (which turns out to introduce a new APPEND bug), a IIe display frill, and a DOS which is much slower than the 1980 DOS 3.3 patched for Prontodos.

---

From: David Empson

## **018- How can I find out the address and size of a BLOADED DOS 3.3 file?**

After you BLOAD a file, you can use the following command to find out the exact length of the file you just BLOADED:

```
PRINT PEEK(43616) + 256 * PEEK(43617)
```

Use another PEEK to find out where it was loaded:

```
PRINT PEEK(43634) + 256 * PEEK(43635)
```

The value displayed is the load address of the binary file.

---

From: Neil Parker and Rubywand

## 019- What information is included in the DOS 3.3 VTOC and catalog sectors?

VTOC

The Volume Table of Contents (VTOC) is Sector \$00 (0) on Track \$11 (17). This is the key sector from which all searches start out.

Example: A typical DOS 3.3 Disk's VTOC sector

```
Byte  00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E
0000- 04 11 0F 03 00 00 FE 00 00 00 00 00 00 00 00
0010- 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0020- 00 00 00 00 00 00 00 7A 00 00 00 00 00 00 00
0030- 15 01 00 00 23 10 00 01 00 00 00 00 00 00 00
....
0080- 3F 7F 00 00 00 00 00 00 00 00 00 00 00 00 00
....
00F0- 00 00 00 00 00 00 00 7A 00 00 00 00 00 00 00
```

Byte	Meaning
----	-----
\$00	Unused (always \$04 on my disks)
\$01-02	Track/Sector location of first catalog sector-- the standard location is Track \$11/Sector \$0F (17/15) Note: The location of first catalog sector may be different on some disks. DOS 3.3 can adjust; but, some utilities (e.g. Copy II Plus) assume T/S \$11/\$0F and will not be able to find the catalog.
\$03	DOS version number (\$03 for DOS 3.3)
\$04-05	Unused
\$06	Volume Number-- \$01-\$FE (1-254) is the standard range; \$FE (254) is the standard default VN Note: This entry merely records the VN for handy reference. VN is set when a disk is INITed and it is embedded in the Address header of each sector.
\$07-26	Unused
\$27	Max number of Track/Sector pairs in each sector of a file's Track/Sector list-- normally \$7A (122)
\$28-2F	Unused
\$30	Last track where sectors were allocated-- in the example it is Track \$15 (21)
\$31	Direction of allocation-- \$01 (+1)=inward; \$FF (-1)=outward
\$32-33	Unused
\$34	Number of tracks per disk-- normally \$23 (35)
\$35	Number of sectors per track-- normally \$10 (16)
\$36-37	Number of bytes per sector-- normally \$0100 (256)
\$38-3B	Bit map for Track \$00-- four bytes per entry (only two bytes are used); each bit in the two-byte entry indicates whether a sector is in use (0) or free for use (1). See example just below.

\$3C-3F Bit map for Track \$01

....

\$80-81 Bit map for Track \$12 (18)

Example: The entry shown is 3F 7F 00 00. Only the first two bytes (3F 7F) are used:

Sector-	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
Bit-	0	0	1	1	1	1	1	1	0	1	1	1	1	1	1	1
Hex-			3			F				7					F	

This shows that on Track \$12 only sectors \$F, \$E, and \$7 (15, 14, and 7) are used. The other sectors on the track are free for use.

....

\$C0-C3 Bit map for Track \$22 (34)-- usually the last track

\$C4-FF Unused on normal disks (may contain extra bit maps on disks with more than 35 tracks)

## Catalog

Starting at Track \$11/Sector \$0F (17/15 in decimal) and working downward in the track (e.g. Sector \$0E, \$0D, ...), each catalog sector contains a pointer to the next catalog sector, and seven file entries:

Byte	Meaning
----	-----
\$00	Unused
\$01	Track number of next catalog sector (\$00 if no more)
\$02	Sector number of next catalog sector
\$03-0A	Unused
\$0B-2D	First file entry
\$2E-50	Second file entry
\$51-73	Third file entry
\$74-96	Fourth file entry
\$97-B9	Fifth file entry
\$BA-DC	Sixth file entry
\$DD-FF	Seventh file entry

Each file entry looks like this:

Byte	Meaning
----	-----
\$00	Track number of this file's first track/sector list
\$01	Sector number of this file's first track/sector list
\$02	File type:
	Bit    Meaning
	---    -----
	7      0=unlocked, 1=locked
	6-0    File type (\$00=Text, \$01=Integer, \$02=Applesoft,
	\$04=Binary, \$08=S, \$10=Relocatable, \$20=A, \$40=B)
\$03-20	File name (high bits set; padded with blanks on right)
\$21-22	Number of sectors allocated to this file

---

## 020- How does DOS 3.3 remember which sectors are used to store a file?

Every file has a set of one or more Track/Sector List sectors. A Track/Sector List (T/S List) lists sectors (by Track and Sector number) which make up the file. Each T/S List sector points to up to 122 data sectors. If the file is too long for one T/S List sector, a second one is allocated, and a pointer to it is stored in the first one, and so on.

Note that DOS 3.3 supports "sparse" files...there may 0/0 pairs in the T/S List indicating parts of the file that were never written. When DOS 3.3 is reading a file and encounters a 0/0 pair in the T/S List, it passes a buffer full of binary zeros back to the calling program.

A Track/Sector List sector looks like this:

Byte	Meaning
----	-----
\$00	Unused
\$01-02	Track/Sector location of next T/S List sector (00 for Track means the list uses no more sectors since Track 0 can not be used)
\$03-04	Unused
\$05-06	Sector number in file (offset) of first sector represented in this T/S List sector (starting at byte \$0C below). Ex: 00 00 = file sector #0 (i.e. the sector specified is the first sector in the file). In a second T/S list sector, if required, the first sector listed would be file sector #122 (i.e. the 123rd sector) indicated by 7A 00-- hexadecimal \$007A = 122 in decimal.
\$07-0B	Unused

The rest of the T/S List sector lists sectors in which the file is stored ...

\$0C-0D	Track/Sector location of first sector (in this T/S List sector)
\$0E-0F	Track/Sector location of second sector (in this T/S List sector)
...	etc.

---

## 021- What are the formats of DOS 3.3's main file types?

A machine-language program is free to store whatever it wants in any file, but most programs (including DOS 3.3's own command interpreter) expect the data in each type of file to conform to certain formats:

A sequential text file consists of lines of ASCII text separated by carriage returns, and ending with a \$00 byte. The high bit of each character (except the \$00 at the end) is set.

A random-access file may be thought of as a set of mini sequential access files separated by strings of \$00 bytes. Each "mini-file" begins at a file

position which is a multiple of the random-access record length. (Note that sequential and random-access text files share the same file type. It is up to individual programs to know whether their data files are sequential or random-access.)

Applesoft and Integer BASIC files have the following format:

Byte	Meaning
----	-----
\$00-01	Length of tokenized BASIC program
\$02-end	Tokenized BASIC program

Binary files have the following format:

Byte	Meaning
----	-----
\$00-01	Load address
\$02-03	Length of binary image (i.e. file contents)
\$04-end	binary image

A Relocatable file contains the image of a program, followed by a relocation dictionary containing the information necessary to relocate the program to an arbitrary memory location. The file format is as follows:

Byte	Meaning
----	-----
\$00-01	Original program load address
\$02-03	File length (program image + relocation dictionary)
\$04-05	Length of program image alone (not including relocation dictionary)
\$06-xx	Program image
\$xx-yy	Relocation dictionary

(The format of the relocation dictionary is a bit too complex to describe here. I can provide details if anybody's interested.)

The other three file types (S, A, and B) have never been consistently defined by anybody. Several programs use these file types (especially type S) to store their private data files, but there doesn't seem to be any agreement on their internal format.

For further information I recommend the book "Beneath Apple DOS" by Don Worth and Pieter Lechner.

P.S. By the way, all two-byte fields in the above are stored in normal Apple II byte order, low byte first.

---

From: Rubywand

## **022- How can I run DOS 3.3 programs from 3.5" disks and hard disk?**

You can run quite a few DOS 3.3 programs from 3.5" disk, a large RAM disk, or hard disk. However, there are numerous DOS 3.3 programs which will not run this way and which could even damage files and directories on the larger media.

Problems are especially likely when a program modifies and CALLs machine code routines such as Read/Write Track-Sector (RWTS) and/or makes assumptions about the physical locations on disk of important DOS 3.3 areas such as the Volume Table of Contents, CATALOG track, and DOS itself. Using a special routine to save "High Scores" to a specific Track/Sector is just one of many ways a DOS 3.3 program might create havoc on a hard disk.

On the other hand, you have programs which stick to using standard DOS commands from BASIC such as, probably, most of your own DOS 3.3 programs and most 'type-in' software from publications like SoftSide. Programs like these should run fine using one of the techniques for accessing DOS 3.3 software from 3.5" diskette or hard disk.

There are two fairly popular approaches to running DOS 3.3 software from 3.5" diskette on an Apple II. One is to copy it to a specially formatted 3.5" diskette which boots a modified "DOS 3.3" such as AmDOS or OzDOS. Typically, you get two "400k disks" on each 3.5" diskette.

A very different approach is used by DOS 3.3 Launcher. It offers two options:

1- You can save some DOS 3.3 programs to ProDOS disk (including 3.5" disk or hard disk). These must be single-file programs that do not access the disk once they are loaded into memory. DOS 3.3 Launcher's Copier is used to set launch options.

2- Using the DOS 3.3 Launcher Copier, you can save an entire DOS 3.3 disk as a disk image to a ProDOS 3.5" diskette, hard disk, etc.. According to 'Launcher's docs:

```
>> Any disk that uses a standard RWTS (Read/Write Track/Sector) routine can be
copied in this manner. This includes not only DOS 3.3 disks, but also many old
games which use a standard RWTS, but are not actually DOS 3.3. They can then be
launched by DOS 3.3 Launcher, which "boots" the large file directly from your
hard disk. <<
```

To run a program from ProDOS-8, you start DOS 3.3 Launcher from a program selector such as ProSel-8 which supports the ProDOS 8 startup protocol - i.e. it can make applications automatically open a data file. (The DOS 3.3 Launcher docs tell how to setup a ProSel entry for a program.)

Running a program from the IIgs System Finder is much easier.

>> If you have properly installed DOS 3.3 Launcher, your DOS 3.3 programs should appear with DOS 3.3 icons when viewed through the Finder. To launch them, you simply double click on them, which launches them via ProDOS 8. <<

Of the two basic approaches (a special 3.5" DOS 3.3 or DOS 3.3 Launcher), DOS 3.3 Launcher seems to be the better way to go:

First, it is easy to set up the contents of a DOS 3.3 disk prior to converting it to disk image form-- you can use any of the popular disk management utilities such as Copy II Plus. Moving DOS 3.3 files onto an AmDOS or OzDOS disk with the crude FID-type copiers available is a hassle.

Second, DOS 3.3 Launcher turns out to create and use standard 143,360-byte ProDOS order (.po) disk images, except, at least on the IIgs, the 'Launcher requires a special filetype-- e.g. \$F1 to run at 1MHz, \$F2 to run at "Fast" speed. These filetypes make it possible for the DOS 3.3 Launcher icons (included) to link images to the program for easy launching under the Finder-- you just double-click on the image's icon.

So, you should be able to download any .dsk disk image on your PC, use an emulator to transfer the contents to a .po disk image, and transfer the .po file via NULL modem to your Apple II. Here you just need to adjust the filetype for use under DOS 3.3 Launcher. Or you can convert 5.25" .sdk (shrunked disk) files to .po disk image form and transfer these via NULL modem.

To download AmDOS, OzDOS, DOS3.3.Launcher, and ProSel, see Csa21MAIN4: Get It- Links to popular software packages.

---

## **023- How can I get DOS 3.3 from the net without an Apple II telecom utility?**

DOS 3.3 Dump is DOS 3.3 in an Apple II Text file. The purpose of the the dump file (dos33.dmp) is to make it possible for users without DOS 3.3 and without any Apple II telecom program to obtain DOS 3.3 from the net.

Once you have DOS 3.3, you can obtain ADT and have a way to transfer 5.25" .dsk disk image files from your net computer to your Apple II. (And once you can transfer disk images, you can get a good Apple II telecom utility and have a way to transfer all kinds of files!)

You can find DOS 3.3 Dump along with directions on several net sites. See Csa21MAIN4: Get It- Links to popular software packages.

---

## **024- What is ProDOS?**

ProDOS

ProDOS is the official Apple II DOS which came after DOS 3.3. Do not confuse "ProDOS" and "Prontodos". Prontodos is a slightly modified DOS 3.3 which

provides much faster disk I/O than standard DOS 3.3. ProDOS is a whole new disk operating system. To get ProDOS from the net, see Csa21MAIN4: Get It- Links to popular software packages.

---

## **025- What are ProDOS's major features?**

ProDOS has lots of nice features-- mainly, you can create sub- directories, diskettes ("volumes") can be named, and ProDOS works well on hard disks. The GS System 6 Finder can handle ProDOS files and launch programs from ProDOS diskettes. ProDOS's BASIC command interpreter shares many commands with DOS 3.3, too; so, it is not difficult for DOS 3.3 users to get started with the newer operating system.

---

From: David Empson

## **026- Which Apple II's can run which versions of ProDOS?**

Apple II's from an Apple II+ with 64k RAM through the IIgs can run versions of ProDOS up through version 1.9 and run Applesoft BASIC programs under these versions.

An older Apple II (with Integer BASIC in ROM) or any Apple II with less than 64k RAM can run ProDOS 1.0 or 1.0.1 but can not use the ProDOS BASIC interpreter (BASIC.SYSTEM). This is not a very useful setup as there are few applications that will work in this environment.

Versions 2.x.x of ProDOS require an Apple II equipped with a 65C02, 65C802, or 65C816 such as an Apple IIe-enhanced, //c, IIc+, or IIgs. The current ProDOS is version 2.0.3.

---

From: Rubywand

## **027- How can I create bootable ProDOS diskettes?**

Creating bootable ProDOS diskettes is more bother than creating bootable DOS 3.3 diskettes because ProDOS does not have any way to duplicate itself from memory-- i.e., it has no INIT command.

One way to make a new bootable ProDOS diskette is to first use Apple's ProDOS FILER utility or a ProDOS version of Copy II+ to FORMAT a diskette for ProDOS. This creates tracks filled with blank blocks so that the diskette can be used to hold ProDOS files. It also writes boot startup code in Blocks 0 and 1 on Track 0.

ProDOS is in a file on a bootable ProDOS disk and so, usually, is the ProDOS 'connection' to BASIC, named "BASIC.SYSTEM". To finish the job you copy BASIC.SYSTEM and PRODOS from some bootable ProDOS disk to the new diskette.

Another way is to use Disk Muncher or some other whole-disk copier to copy some bootable ProDOS diskette which includes BASIC.SYSTEM. You can delete any files you don't want from the copy.

Things are a bit easier on a IIgs running GS System. In the Finder (the usual GS main 'desktop'), you can insert a blank diskette and let Finder "Initialize" it for ProDOS. Then you can mouse 'drag and drop' PRODOS and BASIC.SYSTEM from a bootable ProDOS disk to your new disk. (Or, even easier, if you have a 'stock' blank bootable ProDOS diskette the same size as your new disk, you can just drag and drop the bootable disk onto your new disk.)

Note: If you want to copy the ProDOS used by GS/OS, copy the file P8 from the SYSTEM/ folder and rename it to "PRODOS" on your diskette.

---

## **028- How do I make a ProDOS disk that will boot and start a BASIC program?**

If you want ProDOS to boot and start a BASIC program, then both PRODOS and BASIC.SYSTEM must be present. (BASIC.SYSTEM should be the first .SYSTEM file on the diskette.) The "hello" program on a ProDOS diskette is named "STARTUP". This is the program which will be run upon booting the diskette. (If there is no "STARTUP" program, you will end up at the usual BASIC prompt after booting.)

A simple STARTUP program you can type in and save to your new ProDOS diskette is ...

```
10 TEXT: HOME
20 PRINT CHR$(4)"CAT"
30 END
```

After typing in the program, just enter SAVE STARTUP. Next time you boot the diskette, the above program will run and the diskette's CATALOG will be displayed.

A good ready-made STARTUP program and program selector for launching ProDOS 8 programs on a IIgs is available as speedgs.shk. The file unShrinks to the Startup program and a Readme directions file. To get speedgs.shk from the net, see Csa21MAIN4: Get It- Links to popular software packages.

---

From: David Empson

## **029- What is the maximum size of a ProDOS volume?**

When a diskette is formatted for ProDOS it is given a name by the user. A ProDOS diskette is also called a "volume". A ProDOS hard disk will, usually, be partitioned into two or more named volumes. The maximum size of a ProDOS volume is 32767.5 kilobytes (65535 blocks).

---

From: Rubywand

## 030- How do I LOAD, SAVE, etc. files under ProDOS?

LOAD (SAVE, RENAME, etc.) work very much as in DOS 3.3.; so, you can use Slot and Drive parms to specify the target volume. However, to get the most from ProDOS you will usually be working with volume names and folders. (or, "directories").

If GAME3.PIC is a binary file in a directory named "PICS" on a volume named "NARF", you could load it into memory starting at address \$2000 via

```
BLOAD /NARF/PICS/GAME3.PIC,A$2000
```

or, in BASIC

```
100 PRINT CHR$(4)"BLOAD /NARF/PICS/GAME3.PIC,A$2000"
```

So, in ProDOS, you can access a disk (or volume) by name ...

```
RUN /GAMES/CHINA.SEA
```

will find the disk (volume) named "GAMES", then, find, load, and run CHINA.SEA.

You can, also, refer to a disk by its location ...

```
CAT,S6,D1
```

will do a short-form catalog of the main directory of the diskette in DRIVE 1 connected to SLOT 6.

---

## 031- What is a "pathname"?

Suppose the file BARDS2.PIC is in the folder PICS on the diskette (volume) named "NARF". Then ...

/NARF/PICS/BARDS2.PIC is BARDS2.PIC's complete "pathname".

/NARF/PICS/ is a "pathname prefix" for all files in the PICS directory on the volume named "NARF".

A leading "/" indicates a volume name (/NARF).

The "main directory" or "root directory" is the one in which the files PRODOS and BASIC.SYSTEM (along with any other files the user wants there) are usually located on a ProDOS diskette. NARF's main directory pathname prefix is just /NARF/.

---

From: Rubywand and David Empson

### **032- What is the default volume and folder (directory) when ProDOS boots?**

When ProDOS boots, it will assume that LOADs, SAVEs, etc. refer to the main directory of whatever volume is in the boot Slot and Drive. It does not automatically establish a default volume or folder by name.

So long as no default volume name is set, references to disks by Slot and/or Drive (e.g. CAT,S6,D2) will set the default device (by Slot and Drive) much as happens with similar commands entered from the keyboard under DOS 3.3.

---

### **033- How can I set default volume and folder (directory) under ProDOS?**

The ProDOS PREFIX command followed by a pathname lets you set the default volume and folder (or directory) by name-- i.e. you set the default pathname prefix. For example,

```
PREFIX /NARF
```

or, in a BASIC program

```
100 PRINT CHR$(4)"PREFIX /NARF"
```

tells your computer to find the ProDOS volume (e.g. disk, hard disk partition, etc.) named "NARF" and, once it is found, set the current default directory to /NARF/-- i.e. the main or "root" directory of the volume named "NARF". From then on, commands like CAT, RUN GRAFIX, BLOAD STARTPIC, etc. automatically reference /NARF's main directory.

If you enter CAT PAINTERS/, ProDOS will go to the PAINTERS/ folder on /NARF and display a CATALOG of the folder's contents.

If you move your /NARF diskette to a different drive and do a CAT, ProDOS will scan your drives to find /NARF and do the CAT. If you remove /NARF completely and do a CAT, ProDOS will say there is a "PATH NOT FOUND" error.

Naturally, you can set the default prefix to a specific folder. For example,

```
PREFIX /NARF/EAMON/
```

or, in a BASIC program

```
100 PRINT CHR$(4)"PREFIX /NARF/EAMON/"
```

sets the volume (/NARF/) plus folder (EAMON/) as the new default prefix. A program running in that folder can BLOAD picture, etc. files and RUN games in

that folder without worrying about the names of the volume and folder in which your Eamon stuff is located.

If you know that the EAMON folder is in the currently active directory, you can use

```
PREFIX EAMON/
```

or, in a BASIC program

```
100 PRINT CHR$(4)"PREFIX EAMON/"
```

to set the folder as the default location without having to specify volume name. If the current default is /NARF/, the command will result in the new default being /NARF/EAMON/. If the current default is /NARF/GAMES/, the new default will be /NARF/GAMES/EAMON/.

If there is no default path at the time the command is executed, ProDOS will read the volume name, check for the EAMON/ folder, and add "EAMON/" to create the complete default pathname prefix.

Setting a default pathname prefix does not prevent using commands which specify other locations. For instance

```
CAT /PICS/BOXES/
```

will look for the BOXES/ folder on the volume /PICS/ and do a CAT.

To clear (eliminate) the default pathname prefix, use

```
PREFIX/ ("PREFIX" followed by a "/")
```

---

From: Rubywand

## **034- How can I discover the volume name of a just booted disk?**

You can discover the name of a ProDOS volume in a drive by doing a CAT. The volume name will be shown at the top of the screen listing (e.g. "/NARF/").

Another way-- one which works in programs as well as from the keyboard-- is to use the PREFIX command:

```
PREFIX
```

This command will normally return one of two results:

o- If there is an established default prefix, then, the result will be the current default prefix.

o- If there is no established default prefix, then, ProDOS will read the volume name of the volume in the default Slot and Drive.

Note: PREFIX used in this way does not establish or change a pathname prefix.

Booting clears any default prefix and sets default Slot/Drive to the boot drive. For your STARTUP program to discover the name of the volume on which it resides, it could execute the following:

```
100 PRINT CHR$(4)"PREFIX": INPUT"";P$
```

The volume name of the just booted disk (e.g. "/NARF/") will be saved in P\$.

---

From: David Wilson

### 035- How do I create a folder?

Creating folders (or directories) is the one time you do not need to provide a type parameter (e.g. TDIR) for the CREATE command. Hence

```
CREATE GIFPICS
```

would create a folder named "GIFPICS" in the current default directory.

---

From: Neil Parker

### 036- How do I access ProDOS routines from machine language?

You use the ProDOS Machine Language Interface (MLI). The MLI is responsible for carrying out nearly all of the functions (Read Block, Write Block, and 24 others) which ProDOS can perform.

Machine language programs call ProDOS by doing a JSR to the MLI at \$BF00. To determine which function to perform, ProDOS examines the "command" byte immediately following the JSR instruction. Immediately after the command byte come two more bytes that point to the command's parameter list. When the call completes, it returns to the code immediately following the parameter list pointer. A ProDOS MLI call looks something like this:

```
20 00 BF JSR MLI
80 DB COMMAND_CODE
50 03 DW PARAM_LIST_LOCATION
B0 __ BCS ERROR
```

In the above, the command code (\$80) says "Read a block" and the parameter list is located at \$0350. The MLI call returns with the carry flag set and an error code in the accumulator if an error occurred; so, a simple error check (the Branch if Carry Set instruction) is often the next instruction which is executed.

For a detailed description of functions including command codes and parameters, see a ProDOS manual or one of the other references mentioned in Q&A 040 below.

---

From: Rubywand

## **037- How can I convert DOS 3.3 wares to run under ProDOS?**

Quite a few DOS 3.3 programs will run fine under ProDOS with no change at all. Unless you have some reason to believe a DOS 3.3 program will not run under ProDOS, it's worthwhile to just copy it to a ProDOS diskette and give it a try.

Note: A few 'DOS 3.3' programs, mainly old commercial games, include routines which do direct writes to one or more sectors. This could overwrite parts of a file or a ProDOS directory. It's a good idea to copy risky-looking software to a ProDOS disk you can afford to lose (e.g. a bootable disk with no favorite programs, etc. on it). Boot this disk and try out the program.

The main barriers to running DOS 3.3 programs under ProDOS are ...

1. Size: DOS 3.3 leaves more space for programs than ProDOS + BASIC.SYSTEM. Some DOS 3.3 programs are too large for ProDOS. To use them you will need to find ways to reduce program size.

2. Areas of memory used: ProDOS reserves parts of memory, such as Text Page 1 (\$0400-\$07FF), for various pointers. Some DOS 3.3 programs LOAD or BLOAD into one or more of these areas. For example, some games BLOAD a lo-res pic or Text for you to look at while the rest of the game loads. Normally, ProDOS will refuse to do such loads and the result will be a BUFFERS NOT AVAILABLE error message. To run these programs you will need to unmark the reserved areas which get in the way (see next Q&A) and/or change the location(s) of the program's troublesome LOADs and BLOADs.

When ProDOS loads it uses most of the memory in the "language card" areas. Some DOS 3.3 programs also use this memory. If a DOS 3.3 program uses the "language card" it will probably have to be modified in order to run under ProDOS.

ProDOS handles buffer allocation differently than DOS. If a DOS 3.3 program lowers HIMEM in order to create space for BLOADing code or data, it may need to be modified to guarantee that the code/area is safe. (See page 237 of Exploring Apple GS/OS and ProDOS 8 or page 7-4 of Beneath Apple ProDOS.)

3. Names: DOS 3.3 file names can be longer and have more kinds of characters than ProDOS names. If a DOS 3.3. program BLOADs, WRITEs, etc. to any files, you will need to be sure that the file names used are compatible with ProDOS.

4. DOS/ProDOS Commands and Syntax: There are, really, very few DOS 3.3 command and syntax differences likely to cause problems under ProDOS. Still, there are some and you will need to check for these and make any indicated mods.

5. Integer BASIC: Int BASIC programs can be transferred to a ProDOS diskette; but, you can not run them directly under ProDOS. If you are willing to move an Int BASIC program to a Text editor, convert the syntax to Applesoft BASIC, and

EXEC the resulting Text file, you can obtain an Applesoft BASIC program which you can modify as necessary for ProDOS.

6. It's not DOS 3.3: Very old software, old commercial copy-protected software, and deprotected copies of old software may not be on DOS 3.3 disks. Your first challenge with such software is getting it into a form which will permit transferring files to a ProDOS diskette.

When checking and modifying a DOS 3.3 program for ProDOS a good program editor is essential. You will save untold hours of work when you invest in Beagle's tried and true "Program Writer".

---

From: Jeff Blakeney

### **038- How can I modify ProDOS to do BLOADs in the input buffer and Text Page 1 areas?**

You can use a POKE 48984,192 to modify the bit map. This protects pages \$00 and \$01, and unprotects pages \$02-\$07.

Note: Because the firmware and I/O cards make use of the "screen hole" bytes in the \$0400-\$7FF area, BLOADing over these can interfere with some devices.

For this reason, it is best to have special DOS wares on a separate ProDOS diskette with a STARTUP program which does the POKE 48984,192. This way you will know that the system has been changed to run the DOS wares and not inadvertently try to run a program like Appleworks, etc.. under the modified ProDOS.

---

From: David Empson

A safer method is to BLOAD the file elsewhere, and copy data onto the text screen in a loop, copying 120 bytes and skipping 8 bytes, repeated 8 times.

---

From: Supertimer, Rubywand, David Wilson, Steve Jensen

### **039- How can I boot ProDOS on my Franklin computer?**

In an old Apple Clinic note, Stephen Craft listed specific locations to change after your Franklin freezes. You could then restart via a 2000G from the monitor. Here is an updated listing showing the locations to change for several versions of ProDOS:

v1.1.1	\$269E: EA EA
v1.4	\$282B: EA EA
V1.6	\$282B: EA EA
v1.7	\$282B: EA EA
v1.8	\$2836: EA EA

v1.9           \$2865: EA EA  
v2.0.3        \$2836: EA EA

It turns out that the bytes Stephen was diddling are D0 03 in the sequence 69 0B D0 03 A5 0C 60. The sequence is near the end of a routine that checks for the "APPLE ][" string found in all genuine Apple II ROMs but not in most Apple II clone ROMs.

To fix the booting problem, do this:

Start Copy II+ and select "Sector Editor"

Swap-in the ProDOS diskette

READ Track 0, Sector 0

Search for (Hex bytes): 69 0B D0 03 A5 0C 60

When you find the above, change the D0 03 to EA EA and write the changed sector back to diskette.

The patch eliminates the checksum test/branch and allows ProDOS to boot on Apple II clones which would normally fail the check. This patch has no effect on ProDOS functioning on regular Apple II's.

The above patch is absolutely necessary to get a bootable ProDOS working for many Apple II clones. Jim Sather (inCider, March 1986) recommends a second patch which is optional. It prevents ProDOS from erroneously reporting that a //e-style 64K 80-column card is present when running on a Franklin.

Note: This patch should not be applied except by Franklin 1000 and, possibly, some other clone users. On a //e, //c or IIgs it causes ProDOS to not see an 80-column card or some extra memory.

The patch is not needed for Franklin 2000 series machines (the ones that emulate a IIe and IIc) or any of the Laser 128 series. You would not want to apply the patch to these units because they have emulated 80 column cards and 128k (expandable to 1MB on Lasers).

To do the patch, procede as described for the main patch and also do this ...

READ Track 0, Sector 0

Search for (Hex bytes): AE B3 FB E0 38

When you find the above, change it to A2 EA EA E0 38 and write the changed sector back to diskette.

---

From: Rubywand

**040- What are some good DOS 3.3 and ProDOS references?**

## DOS Books

The DOS Manual from Apple  
Beneath Apple DOS by Worth & Lechner  
Apple II User's Guide by Poole, Martin, and Cook

## ProDOS Books

ProDOS Technical Reference Manual from Apple (Addison-Wesley)  
Beneath Apple ProDOS by Worth & Lechner  
Exploring Apple GS/OS and ProDOS 8 by Little  
ProDOS Inside and Out by Doms and Weishaar

---

From: Dennis Jenkins, Rubywand, Dave Althoff

### **041- How can a BASIC program tell which DOS it's running under?**

A pretty good way is to check the three-byte JMP command starting at \$03D0. If it's 4C 00 BE, you're running ProDOS; if it's 4C BF 9D, you're running DOS 3.3 or a compatible variant (such as Prontodos).

Two (moderately rare) factors may change the DOS 3.3 JMP: 1- On old "slave disks" created on sub-48k Apple II's, DOS loads in at a lower address; 2- DOS 3.3 is sometimes moved up into the Language Card. So, your best procedure is probably to check for ProDOS and, if it isn't ProDOS, just presume that it's DOS 3.3.

Apple II Csa2 FAQs: Diskettes, Part 7/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Diskettes, Part 7/25  
This article was archived around: 07 Jun 2009 08:31:47 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2  
Source: Usenet Version  
Archive-name: apple2/faq/part7  
Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2DSKETTE.txt rev135 June 2009

## Diskettes

- 001- How many tracks can I use on a 5.25" diskette?
- 002- Can I use high-density 3.5" and 5.25" diskettes on my A2?
- 003- How can I tell DD from HD diskettes if they are not labeled?
- 004- Some old 5.25" disks with splotches don't boot. What gives?
- 005- How can I defragment a diskette and what is the speed gain?
- 006- Why aren't my old diskettes recognized by GS/OS?
- 007- Can I read Apple II diskettes on my PC?
- 008- Where the heck can I buy double density 3.5" & 5.25" diskettes?
- 009- Where can I find out about different floppy disk formats?
- 010- How can I copy disks?
- 011- How can I read Apple II 5.25" floppies on a Mac?
- 012- Can I create standard 3.5" IIgs diskettes on a Mac?
- 013- Can I transfer files on MS-DOS disks to my IIgs?

---

From: Rubywand

### **001- How many tracks can I use on a 5.25" diskette? So far, I've heard 35, 36, and 40. What's the actual number?**

The standard number of tracks on a 5.25" diskette is set by DOS 3.3 and ProDOS at 35, numbered 0-34 (\$00-\$22 in hexadecimal).

The original Disk ][ drive can usually handle 36 tracks with no problem. Newer 5.25" drives can handle 40 tracks.

Various modified versions of DOS 3.3 allow using 36 tracks and a few allow using 40 tracks. These mods, especially the 36-track versions, were fairly popular before the advent of 3.5" diskettes when an extra track made a noticeable difference in capacity. However, unless the extra capacity is vital for some

specific application, it is best to stick with 35 tracks in order to retain full compatibility with disk utilities (such as Copy II Plus) and other wares.

---

## **002- Can I use high-density 3.5" and 5.25" diskettes on my Apple II?**

I did some magnetization tests on Double Density (800kB) and High Density (1.4MB) diskette surfaces. The tested DD surface produced more than twice the deflection of the tested HD surface. Clearly, there is a big difference in signal levels required to reliably store data on HD vs. DD.

In fact, 5.25" HD (1.2MB) diskettes will not work at all on Apple Disk II drives. The 3.5" HD's may work fine on your 800k drives; or, they may just seem to work fine. Either way, there's no question: a drive optimized for DD will not be optimized for HD. If you'd rather not 'roll the dice' on your software collection, stick with Double Density diskettes.

---

From: Rubywand, George Rentovich, Mad ATARI user alternate, Joel

## **003- How can I tell the difference between unlabeled DD and HD diskettes?**

3.5" HD (1.4MB) diskettes come with a square notch in the upper left corner. DD (800kB) 3.5" diskettes do not come with this notch. In the early days of PC computing, some PC users punched or drilled notch holes in DD diskettes and used them as HD diskettes. If a 3.5" diskette has a circular notch in the upper left corner, it is likely to be a DD diskette.

DD 5.25" (360kB) diskettes look very much like HD 5.25" (1.2MB) diskettes; however, HD diskettes seem to almost never have a hub ring, while DD diskettes usually do. The hub ring may be white paper, etc. and easy to spot or cut from the same material as the diskette and barely noticeable. This difference has been mentioned by Peter Norton (of Norton Utilities fame) in one of his books.

The hub ring makes it easier for the Apple Disk Drive II and other older DD 5.25" drives to clamp and hold the diskette. Older DD drives also tend to damage the center when there is no hub. If the hub ring of a DD diskette has fallen off due to age, it's a good idea to transfer the contents to a new diskette.

Otherwise, about the only observable difference is that DD diskette surfaces often exhibit a more brownish cast whereas HD diskette surfaces are generally dark grey or black.

The surest test for 5.25" diskettes is to place the diskette into an Apple Disk II 5.25" drive and try to do a DOS 3.3 format. If it formats okay, it is almost certainly a DD diskette. (This test will not always work with the newer 40-track drives. Some of these can get through a format with an HD diskette.)

---

From: Rubywand

### **004- Recently I found that some of my old 5.25" disks would not boot. A check showed splotches etched on the surface of the media. What's going on?**

As you may recall, a number of the classier 5.25" diskette brands employed (still employ?) a lubricant on their jacket liners. While the lube worked to reduce drag and noise, it also, evidently, served as a growth medium for a particularly nasty plastic and/or oxide-eating fungus!

It's probably a good idea to check each of your old diskettes. Immediately backup any diskettes with splotchy discolorations.

---

### **005- How can I defragment a diskette and what is the speed gain?**

You can defragment a diskette by doing a File Copy of all files to a blank formatted\* diskette or RAM disk which is the same size as the original. The files on the copy diskette or RAM disk will be almost completely unfragmented.

\*Note: If the diskette is supposed to be bootable, the target disk should be INITIALIZED for the DOS (e.g. DOS 3.3 or ProDOS) used on the original before doing the copying. For DOS 3.3, you INIT a disk. For ProDOS, you can do an "Initialize" from the IIgs Finder or a "FORMAT" using Apple's ProDOS FILER utility or a ProDOS version of Copy II+.

A whole-disk copy back to the original completes the process. Tests show that this method produces much speedier diskettes than using a utility intended for optimizing hard disks.

For a nearly full 'workhorse' diskette which has seen many deletions and additions, you can expect the File Copy defragmentation method to yield a 30% to 40% improvement in access speed.

---

### **006- Why aren't my MECC and many other old diskettes recognized by GS/OS and mounted on the Finder display?**

The problem you mention is fairly common. GS/OS via its FSTs has pretty strict definitions for what qualifies as a valid DOS or ProDOS diskette. For example, perfectly good 36-track DOS 3.3 diskettes will not be mounted by the Finder just because the number of tracks is 36 instead of the expected 35.

Naturally, copy-protected diskettes have practically no chance of being recognized. Almost certainly, this is the reason the Finder will not mount your MECC disks.

You can, still, run software from most copy-protected diskettes by just booting them.

---

From: Vincent Joguin, Charlie, Rubywand

## **007- Can I read Apple II diskettes on my PC?**

Yes. There is a way for some PCs to read Apple II DOS 3.3 and ProDOS 5.25" floppies which are not copy-protected.

By "some PCs" I mean that the PC must have two floppy drives (only one has to be a 5.25" drive) and it must be running MS-DOS or Windows 95, 98, or ME. (It won't work with NT, 2000, and XP).

You also need a program called "DISK2FDI". (For a link to the program, see Csa21MAIN4.txt.)

DISK2FDI reads the Apple floppy and creates a disk image (.do) on the PC. These images will work on most emulators.

You may find that DISK2FDI has difficulty reading some sectors which read fine on your real Apple II. If that happens, try making a fresh copy of the diskette using Disk Muncher or some other fast whole-disk copier.

For a collection of postings on using Disk2FDI see ...

[http://apple2.org.za/gsvv/a2zine/Docs/Disk2FDI\\_InfoPostings.txt](http://apple2.org.za/gsvv/a2zine/Docs/Disk2FDI_InfoPostings.txt) .

---

From: Chris Norley

A while back I requested some information regarding the reading of Apple II floppies by an PC:

ORIGINAL POST:

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We have some old data from a small NMR spectrometer that was run from an Apple IIe. The same spectrometer is now run from a DOS machine and we'd like to be able to access the old data from the PC.

Does anyone know of or possess some utility to allow the data from the 5 1/4" Apple II floppies to be read from the PC? Any hints as to program names, ftp sites, etc. would be greatly appreciated.

SUMMARY OF RESPONSES:

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There is a card called the MatchPoint PC card that will let you read and write Apple II DOS, ProDOS, and CP/M disks on a PC 5.25" 360K drive. We used to have one installed in an XT here and it worked fine.

The other common way of moving the data is to connect an Apple II to a PC using a NULL modem cable and using comm programs such as Kermit to transfer the data.

---

Michael Hoffberg

About a year ago, I picked up card for my ibm made by TrackStar. It is basically an apple II that sits inside your IBM. When you enable it, it can boot off an apple drive, it uses the ibm keyboard and monitor.

In any case, I think that it is possible to transfer files between the IBM and Apple II with the card.

---

Fred R. Opperdoes

Any Apple II (E or GS) owner having an Applied Engineering PC Transporter card is able to do the job easily. It is maybe not easy to find such a person in your neighborhood.

Another possibility would be that you ask someone with an Apple IIGS to have your 5 1/4" Dos 3.3 or Prodos disk transcribed to a 3.5" Prodos disk. Every IIGS owner would be able to do so. Files on such disks can then easily be converted to MsDOS files on an MsDOS disk on a Macintosh using the Apple File Exchange Utility that comes with every modern Mac.

---

Leonard Erickson

You can use a COPYIIPC deluxe option board or some such. Central Point Software used to sell them.

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From: Peter Maloney

You could use an Apple Turnover, a PC/XT card that allows older IBM floppy drives to read/write Apple 5.25" diskettes. It was made by Vertex Systems Inc..

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From: Rubywand, Brian Hammack, Jay, Joan Sander, Simon Williams,  
Matthew S. Carpenter

**008- Where the heck can I buy the double density (DD)  
5.25" and 3.5" diskettes required for my Apple II drives?**

Here are places to try ...

GarberStreet Electronics ( <http://www.garberstreet.com/> ) sells 5.25" and 3.5" DD diskettes (\$3 per box of ten.)

GSE-Reactive ( <http://www.gse-reactive.com/> ) sells boxes of 10 5.25" DD floppies for \$5.

Albert Franklin (email: [jfrankl1@mindspring.com](mailto:jfrankl1@mindspring.com)) sells 5.25" DS/DD diskettes.

XDR2.com ( <http://www.xdr2.com/> click on "Disks") sells 5.25" and 3.5" DD diskettes in bulk (e.g. 50 3.5" for \$13).

Meritline.com ( <http://store.yahoo.com/meritline/floppydisk.html> ) sells 3.5" DD diskettes in bulk (e.g. 100 for \$14).

Peripheral Manufacturing, Inc (800-468-6888; email: [periphman@periphman.com](mailto:periphman@periphman.com) ) sells 5.25" DD diskettes in 10 packs (\$2.95) and 50 packs (with sleeves, \$15.00)..

Commodore 64 & 128 Products ( <http://www.oldsoftware.com/Commodore.html> search the page for disks for sale) sells 5.25" & 3.5" DD diskettes.

Floppydisk.com ( <http://www.floppydisks.com/> ) sells 5.25" and 3.5" DS/DD diskettes.

Check the non-Apple sections on eBay. Sometimes you'll see boxes of a thousand disks going for the cost of shipping -- if they're listed outside of Vintage Apple they seem to go a lot cheaper.

Thrift shops: you may find packs of used 5.25" DD diskettes at bargain prices.

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From: David Wilson

## 009- Where can I find out about different floppy disk formats?

Here is a table of floppy disk formats I have built up over the years:

disk size"	speed rpm	rate kb/s	encode scheme	trk kb	sector cnt*sz	trk/hd count	size kBytes	disk type
8	360	500	FM	41.67	26*128	77/1	260	SSSD (8)
8	360	500	FM	41.67	26*128	77/2	520	DSSD (8)
8	360	500	MFM	83.33	26*256	77/1	520	SSDD (9)
8	360	500	MFM	83.33	26*256	77/2	1040	DSDD (9)
5.25	300	250	FM	25.00	8*256	40/1	80	SSSD
5.25	300	250	FM	25.00	8*256	40/2	160	DSSD
5.25	300	245	GCR	49.00	16*256	35/1	140	SSDD (1)
5.25	300	250	MFM	50.00	8*512	40/1	160	SSDD (3)
5.25	300	250	MFM	50.00	9*512	40/1	180	SSDD (3)
5.25	300	250	MFM	50.00	8*512	40/2	320	DSDD (3)
5.25	300	250	MFM	50.00	9*512	40/2	360	DSDD (3)
5.25	300	250	MFM	50.00	9*512	80/2	720	DSDD
5.25	360	300	MFM	50.00	9*512	40/2	360	DSDD (4)
5.25	360	300	MFM	50.00	9*512	80/2	720	DSDD

5.25	360	500	MFM	83.33	15*512	80/2	1200	DSHD (4)
3.5	300	250	MFM	50.00	9*512	80/2	720	DSDD (5)
3.5	300	250	MFM	50.00	5*1024	80/2	800	DSDD (2)
3.5	var	var	GCR	var	var*512	80/2	800	DSDD (7)
3.5	300	500	MFM	100.00	18*512	80/2	1440	DSHD (6)
3.5	var	var	GCR	var	var*512	80/2	1600	DSHD (A)
3.5	300	1000	MFM	200.00	36*512	80/2	2880	DSED

- (1) Apple ][
- (2) Applix
- (3) IBM PC
- (4) IBM PC/AT
- (5) IBM PS/2 25,30
- (6) IBM PS/2 > 30
- (7) Macintosh & Apple //
- (8) IBM 3740
- (9) IBM System 34
- (A) AE 1.6MB drive on Apple //

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From: Rubywand

## 010- How can I copy disks?

Neither ProDOS nor DOS 3.3 includes a built-in Disk Copy command. So, to copy diskettes you will need to use some kind of copy utility. The ProDOS standard Utilities Disk includes a Disk Copy option. The DOS 3.3 System Master disk includes a Disk Copy program named "COPYA".

A very good Disk Copy utility for 5.25" (DOS 3.3, ProDOS, ...) diskettes is Disk Muncher. It is fast; and, the current version will automatically try to copy 36 tracks (used on some diskettes) and it includes verification checks. A good fast-copy utility for 3.5" diskettes is Diversi-Copy. The newer version of the ProDOS Utilities may be adequate for copying many 3.5" diskettes, too. The popular diskette utilities Copy II Plus and Locksmith include plain Disk Copy options, too.

Most of the above will work with standard disk images on emulators. However, Copy II Plus's regular DISK COPY will not work on emus (whereas, Locksmith's Fast Copy seems to work fine).

If you are on a PC running Windows, an easy way to copy a .dsk, .nib, etc. disk image file is to do a Right-click drag-and-drop of the file in the same folder.

On a IIGs, the easiest way to copy ProDOS diskettes is on the usual Finder desktop. You drag the icon of the disk you want to copy to the icon of a same-size target disk.

The above options are fine for copying diskettes which are not copy protected. COPYA and some other copiers which use the current DOS's RWTS routines can get around some forms of protection via POKES to DOS which turn off checking of Address header bytes, checksums, etc.. Otherwise, a bit copier, such

as the ones included in Copy II Plus, Locksmith, and Essential Data Duplicator, may get the job done. Using it's built-in parms library, Copy II Plus can reliably make copies of many copy protected disks.

If a lot of the software you need to copy is from MECC, a good try is to get an MECC copy program by John Kielkopf named "meccopy". It makes deprotected copies of many MECC diskettes.

You can find Disk Muncher, Copy II Plus, and other utilities mentioned above on several archives as separate files, on disks in ShrinkIt whole-disk (.sdk) form, and on emulator disk images (.dsk files). To download see links in Csa21MAIN4 Q&A 001.

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From: Streaming Wizard, Phil Beesley

### **011- How can I read Apple II 5.25" floppies on a Mac?**

Reading Apple II 5.25" floppies on a Mac requires the addition of special hardware. One company, Kennect, did make two drives that would handle this trick: the Drive 360 and the Drive 1200. They were primarily meant for reading 5.25" PC disks but were also advertised as having the ability to read Apple II DOS 3.3 and ProDOS floppies. Both required a device called the "Rapport", which plugged into the Mac's external floppy port and also gave the internal 3.5" drive the ability to read 720K PC disks.

If your Mac is an LC or some later model with the LC Processor Direct Slot (PDS) and it supports 24-bit memory addressing, you may be able to plug in a IIe LC Card (or "IIe Emulation Card"). This, basically, installs an Apple //e in your Mac to which an Apple II 5.25" Platinum drive can be connected. For more information, see Main Hall Q&A #14.

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From: Supertimer

### **012- Can I create standard 3.5" IIgs diskettes on a Mac?**

You are most likely to succeed with an older Mac. However, even older Macs that have built in compatible 800k (DD) drives will often produce a IIgs diskette that is not quite right-- such as a diskette that should boot gives the "Unable to Load ProDOS" error message.

If you have an older Mac that should write standard IIgs disks properly and it does not, clean your Mac drive and keep trying. For instance, you may need to extract a diskcopy archive a few times for the disk to write properly.

Newer Macs are, generally, less likely to succeed. Some Macs, such as iMacs with a floppy drive option, cannot format IIgs-compatible 800k diskettes.

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From: Simon Williams

There was a thread discussing the impossibility of creating bootable ProDOS disks from a Mac with a 'force-feed' floppy drive. Seems it ain't necessarily so.

Using Bernie ][ the Rescue on a G3 iMac with a cheap USB floppy, I first create a Diskcopy 4.2 800KB image, which I copy to a 1.44 MB diskette with the finder.

Then I transfer the disk image to a PowerPC 6100/66 which has the non-auto-inject disk drive (running System 7.5)... copy the image to the HD. Format an 800KB ProDOS disk with the finder and then use DiskDup+ to copy the image to the floppy...

So far it's worked perfectly. I've made both GS/OS 5 & 6 and ProDOS startup disks this way... :) The one oddity is that GS-formatted disks take a long time to write, whereas the ones formatted under MacOS seem to write much quicker...

DiskDup+ is the key. I wondered myself why I hadn't tried Diskcopy... so I tried it -- without success.

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From: Rubywand

### **013- Can I transfer files on MS-DOS disks to my IIgs?**

You can use Peter Watson's MUG! program on your IIgs to transfer files via MS-DOS Iomega Zip disks. MUG! will let you read Zip disks on a IIgs equipped with a Zip drive and a SCSI interface.

MUG is an NDA; so, it can be installed like other NDA's-- e.g. having the main MUG! file (probably MUG.1.01) in the System/Desk.Accs/ folder when booting.

For easy use, start with a regular ProDOS Zip disk in your IIgs Zip Drive. Start a standard IIgs desktop program that does not test inserted disks. A good choice is PMPUnzip. Swap in the MS-DOS Zip disk. Start MUG! from the Apple menu on the top menu bar.

Apple II Csa2 FAQs: Error List, Part 8/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Error List, Part 8/25  
This article was archived around: 07 Jun 2009 08:31:51 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2  
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Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2ERRLIST.txt rev135 June 2009

## **Main Error List**

- 001- What does error #\_\_\_ mean?
- 002- How do I do the IIgs Self-Test; what does Error Code \_\_\_ mean?
- 003- What does RamFAST Fatal Memory Fault Error \_\_\_ mean?
- 004- What is the explanation for getting a \_\_\_ error?
- 005- Where can I find more information on Apple II series errors?

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From: Jeff Hurlburt (in II Alive, 1996 plus updates)

### **001- What does error #\_\_\_ mean?**

#### **Error Codes**

Codes are in hexadecimal and are listed in numerical order. Except for a few IIgs System Failure codes, the system or sub-system reporting the error is shown along with the error description.

Most IIgs tool set error 'descriptions'-- like divByZeroErr-- consist of just the error name as published in the Toolbox References. When such an error is reported, the first two digits identify the Tool Set; the last two identify the error# (sometimes this identifies the individual Tool involved in the error). The name and number of each Tool Set which reports errors is identified in the listing by labeling the first error in each Tool Set group.

Many of the descriptions for 00xx codes refer to GS/OS errors. Usually, these codes have the same (or a very similar) meaning as ProDOS 16 (P16) codes, SmartPort codes, and 8-bit ProDOS 8 (P8) Machine Language Interface (MLI) codes. When there is a significant difference, other meanings are shown.

Note 1: Thanks to information supplied by David Empson several early System Failure Code messages (e.g. "File map destroyed") are now considered to be suspect as to accuracy. Yes, some kind of error has occurred; but, as David points out, the messages seem to have been incorrectly copied from Mac with no particular regard to relevance on the IIgs:

For example, all the errors referring to "Can't load a package" make no sense - the IIgs doesn't have any such thing as a package (but early Macintosh system software does). Here is another big clue: error \$30 is allegedly "Please insert disk (File Manager alert)". There is no such thing as the "File Manager" on the IIgs, but there is on the Mac.-- David Empson

Basically, it appears that the faulty messages function as defaults (place holders) when more accurate third-party messages are not supplied. The suspect messages may appear; so, they remain in this listing; but, now they are marked.

Error messages marked \*\* indicate a System Failure message considered to be suspect.

Note 2: Error messages marked \*\*\*\* indicate that a more detailed discussion is available in Question 004.

#### Error Codes List

0000 No error  
0001 GS/OS: bad system call  
0001 Tool Locator: dispatcher does not find toolset  
0001 P16: System Failure- unclaimed interrupt  
0001 P8: Invalid MLI function number  
0002 Tool Locator: routine not found  
0004 GS/OS: bad parameter count  
0004 System Failure- division by zero \*\*  
0006 SmartPort: bus error in IWM chip  
0007 GS/OS is busy  
000A P16: System Failure- unusable Volume Control Block  
000B P16: System Failure- unusable File Control Block  
000C P16: System Failure- Block Zero allocated illegally  
000D P16: System Failure- interrupt occurred while I/O shadowing off  
0010 GS/OS: device not found  
0010 Tool Locator: specified Version not found  
0011 GS/OS: bad device number  
0011 P16: System Failure- wrong OS version  
0015 System Failure- Segment Loader error \*\*  
0017-0024 System Failure- Can't load a package \*\*  
0020 GS/OS: invalid driver request  
0021 GS/OS: invalid driver control or status code  
0022 GS/OS: bad call parameter  
0023 GS/OS: character device not open  
0024 GS/OS: character device already open  
0025 GS/OS: interrupt table full  
0025 System Failure- Out of Memory \*\*  
0026 GS/OS: resources not available  
0026 System Failure- Segment Loader error \*\*  
0027 GS/OS: I/O error \*\*\*\*  
0027 System Failure- File map destroyed \*\*  
0028 GS/OS: no device connected  
0028 System Failure- Stack overflow \*\*

0029 GS/OS: driver is busy  
002B GS/OS: disk write protected  
002C GS/OS: invalid byte count  
002D GS/OS: invalid block address  
002E GS/OS: disk/volume switched  
002F GS/OS: device offline or no disk in drive  
0030 System Failure Alert- Please Insert Disk \*\*  
0040 GS/OS: bad pathname syntax  
0042 GS/OS: max number of files already open  
0042 P8: too many files open (can lead to NO BUFFERS AVAILABLE)  
0043 GS/OS: bad file reference number  
0044 GS/OS: directory not found  
0045 GS/OS: volume not found  
0046 GS/OS: file not found  
0047 GS/OS: duplicate filename/pathname \*\*\*\*  
0048 GS/OS: disk/volume full \*\*\*\*  
0049 GS/OS: volume directory full \*\*\*\*  
004A GS/OS: incompatible file format  
004A P8: incompatible ProDOS version  
004B GS/OS: unsupported (or incorrect) storage type  
004C GS/OS: End Of File encountered  
004D GS/OS: position out of range  
004D P8: position past End Of File  
004E GS/OS: access not allowed  
004F GS/OS: buffer too small  
0050 GS/OS: file is already open  
0051 GS/OS: directory damaged \*\*\*\*  
0051 P8: file count is bad  
0052 GS/OS: unknown volume type  
0053 GS/OS: parameter out of range  
0054 GS/OS: out of memory  
0055 P8: Volume Control Block table full  
0056 P8: bad buffer address (can lead to NO BUFFERS AVAILABLE) \*\*\*\*  
0057 GS/OS: duplicate volume name  
0058 GS/OS: not a block device  
0058 P8: bad volume bit map  
0059 GS/OS: file level out of range  
005A GS/OS: bad bitmap address (block# too large/ damaged disk) \*\*\*\*  
005B GS/OS: invalid pathnames for ChangePath  
005C GS/OS: not an executable file  
005D GS/OS: Operating system/file system not available  
005F GS/OS: too many applications on stack/ stack overflow  
0060 GS/OS: data unavailable  
0061 GS/OS: end of directory  
0062 GS/OS: invalid FST call class  
0063 GS/OS: file doesn't have a resource fork  
0064 GS/OS: invalid FST ID  
0065 GS/OS: invalid FST operation  
0066 GS/OS: FST Caution- weird result  
0067 GS/OS: device Name error/ internal error  
0068 GS/OS: device List full  
0069 GS/OS: supervisor List full  
006A GS/OS: FST Error (generic)  
0070 GS/OS: resource exists, cannot expand file  
0071 GS/OS: cannot Add resource to this type file  
0088 network error \*\*\*\*  
0100 System Failure- can not mount sys startup volume \*\*

0103 [01] TOOL LOCATOR: invalid StartStop record  
0104 tool cannot load  
0110 specified minimum Version not found  
0111 specified message not found  
0112 no message numbers available  
0113 message name too long  
0120 request not accepted  
0121 duplicate name  
0122 invalid send request

0201 [02] MEMORY MANAGER: could not allocate memory \*\*\*\*  
0202 emptyErr  
0203 notEmptyErr  
0204 lockErr  
0205 purgeErr  
0206 handleErr  
0207 idErr  
0208 attrErr

0301 [03] MISCELLANEOUS TOOL SET: bad input parameter  
0302 noDevParamErr  
0303 taskInstlErr  
0304 noSigTaskErr  
0305 queueDmgdErr  
0306 taskNtFdErr  
0307 firmTaskErr  
0308 hbQueueBadErr  
0309 unCnctdDevErr  
030B idTagNtAvlErr  
034F mtBuffTooSmall  
0381 invalidTag  
0382 alreadyInQueue  
0390 badTimeVerb  
0391 badTimeData

0401 [04] QUICKDRAW II: QD II already initialized  
0402 cannotReset  
0403 notInitialized  
0410 screenReserved  
0411 badRect  
0420 notEqualChunkiness  
0430 rgnAlreadyOpen  
0431 rgnNotOpen  
0432 rgnScanOverflow  
0433 rgnFull  
0440 polyAlreadyOpen  
0441 polyNotOpen  
0442 polyTooBig  
0450 badTableNum  
0451 badColorNum  
0452 badScanLine

0510 [05] DESK MANAGER: Desk Accessory not available  
0511 notSysWindow  
0512 badNdaTitleString \*\*\*\*  
0520 deskBadSelector

0601 [06] EVENT MANAGER: EM startup already called  
0602 emResetErr  
0603 emNotActErr  
0604 emBadEvtCodeErr  
0605 emBadBttnNoErr  
0606 emQSiz2LrgErr  
0607 emNoMemQueueErr  
0681 emBadEvtQErr  
0682 emBadQHndlErr \*\*\*\*

0810 [08] SOUND: no DOC or RAM found  
0811 docAddrRngErr  
0812 noSAppInitErr  
0813 invalGenNumErr  
0814 synthModeErr  
0815 genBusyErr  
0817 mstrIRQNotAssgnErr  
0818 sndAlreadyStrtErr  
08FF unclaimedSntIntErr- "UNCLAIMED SOUND INTERRUPT" \*\*\*\*

0910 [09] APPLE DESKTOP BUS: command not completed  
0911 cantSync- "FATAL SYSTEM ERROR 0911" \*\*\*\*  
0982 adbBusy  
0983 devNotAtAddr  
0984 srqListFull

0B01 [11] INTEGER MATH: bad input parameter  
0B02 imIllegalChar  
0B03 imOverflow  
0B04 imStrOverflow

0C01 [12] TEXT TOOL SET: illegal device type  
0C02 badDevNum  
0C03 badMode  
0C04 unDefHW  
0C05 lostDev  
0C06 lostFile  
0C07 badTitle  
0C08 noRoom  
0C09 noDevice  
0C0B dupFile  
0C0C notClosed  
0C0D notOpen  
0C0E badFormat  
0C0F ringBuffOflo  
0C10 writeProtected  
0C40 devErr

0E01 [14] WINDOW MANAGER: parm list first word is wrong size  
0E02 allocateErr  
0E03 taskMaskErr

0F01 [15] MENU MANAGER: menu started  
0F02 menuItemNotFound  
0F03 menuNoStruct  
0F04 dupMenuID

1001 [16] CONTROL MANAGER: Window Manager not initialized  
1002 cmNotInitialized  
1003 noCtlInList  
1004 noCtlError  
1005 notExtendedCtlError  
1006 noCtlTargetError  
1007 notExtendedCtlError  
1008 canNotBeTargetError  
1009 noSuchIDError  
100A tooFewParmsError  
100B noCtlToBeTargetError  
100C noFrontWindowError

1101 [17] LOADER: id not found / segment not found  
1102 OMF version error \*\*\*\*  
1103 idPathnameErr  
1104 idNotLoadFile (often: file incompatible with system) \*\*\*\*  
1105 idBusyErr  
1107 idFilVersErr  
1108 idUserIDErr  
1109 idSequenceErr  
110A idBadRecordErr  
110B idForeignSegErr

1210 [18] QUICKDRAW AUX: pic empty  
1211 badRectSize  
1212 destModeError  
121F bad picture opcode  
1221 badRect  
1222 badMode  
1230 badGetSysIconInput

1301 [19] PRINT MANAGER: driver not in DRIVERS folder \*\*\*\*  
1302 portNotOn  
1303 noPrintRecord  
1304 badLaserPrep  
1305 badLPFile  
1306 papConnNotOpen  
1307 papReadWriteErr  
1308 ptrConnFailed  
1309 badLoadParam  
130A callNotSupported  
1321 startUpAlreadyMade

1401 [20] LINE EDIT: LE startup already called  
1402 leResetErr  
1403 leNotActiveErr  
1404 leScrapErr

150A [21] DIALOG MANAGER: bad item type  
150B newItemFailed  
150C itemNotFound  
150D notModalDialog

1610 [22] SCRAP MANAGER: scrap type does not exist

1701 [23] STANDARD FILE OPERATIONS: bad prompt description  
1702 badOrigNameDesc  
1704 badReplyNameDesc  
1705 badReplyPathDesc  
1706 badCall

1901 [25] NOTE SYNTHESIZER: NS already initialized  
1902 nsSndNotInit  
1921 nsNotAvail  
1922 nsBadGenNum  
1923 nsNotInit  
1924 nsGenAlreadyOn  
1925 soundWrongVer

1A00 [26] NOTE SEQUENCER: no room for MIDI NoteOn  
1A01 noCommandErr  
1A02 noRoomErr  
1A03 startedErr  
1A04 noNoteErr  
1A05 noStartErr  
1A06 instBndsErr  
1A07 nsWrongVer

1B01 [27] FONT MANAGER: duplicate FM startup call  
1B02 fmResetErr  
1B03 fmNotActiveErr  
1B04 fmFamNotFndErr  
1B05 fmFontNtFndErr  
1B06 fmFontMemErr  
1B07 fmSysFontErr  
1B08 fmBadFamNumErr  
1B09 fmBadSizeErr  
1B0A fmBadNameErr  
1B0B fmMenuErr  
1B0C fmScaleSizeErr

1C02 [28] LIST MANAGER: listRejectEvent

1D01 [29] AUDIO COMPRESSION EXPANSION: ACE already started  
1D02 aceBadDP  
1D03 aceNotActive  
1D04 aceNoSuchParam  
1D05 aceBadMethod  
1D06 aceBadSrc  
1D07 aceBadDest  
1D08 aceDataOverlap

1E01 [30] RESOURCE MANAGER: resource fork used, not empty  
1E02 resBadFormat  
1E03 resNoConverter  
1E04 resNoCurFile  
1E05 resDupID  
1E06 resNotFound  
1E07 resFileNotFound  
1E08 resBadAppID

1E09 resNoUniqueID

1E0A resIndexRange  
1E0B resSysIsOpen  
1E0C resHasChanged  
1E0D resDiffConverter  
1E0E resDiskFull  
1E0F resInvalidShutDown  
1E10 resNameNotFound  
1E11 resBadNameVers  
1E12 resDupStartUp  
1E13 resInvalidTypeOrID

2000 [32] MIDI: MIDI tool set not started  
2001 miPacketErr  
2002 miArrayErr  
2003 miFullbufErr  
2004 miToolsErr  
2005 miOutOffErr  
2007 miNoBufErr  
2008 miDriverErr  
2009 miBadFreqErr  
200A miClockErr  
200B miConflictErr  
200C miNoDevErr  
2080 miDevNotAvail  
2081 miDevSlotBusy  
2082 miDevBusy  
2083 miDevOverrun  
2084 miDevNoConnect  
2085 miDevReadErr  
2086 miDevVersion  
2087 miDevIntHndlr

2110 [33] VIDEO OVERLAY: no Video device  
2111 vdAlreadyStarted  
2112 vdInvalidSelector  
2113 vdInvalidParam  
21FF vdUnImplemented

2201 [34] TEXT EDIT: TE already started  
2202 teNotStarted  
2203 teInvalidHandle  
2204 teInvalidDescriptor  
2205 teInvalidFlag  
2206 teInvalidPCount  
2208 teBufferOverflow  
2209 teInvalidLine  
220B teInvalidParameter  
220C teInvalidTextBox2  
220D teNeedsTools

2301 [35] MIDI SYNTHESIZER: MS already started  
2302 msNotStarted  
2303 msNoDPMem  
2304 msNoMemBlock  
2305 msNoMiscTool  
2306 msNoSoundTool  
2307 msGenInUse

2308 msBadPortNum  
2309 msPortBusy  
230A msParamRangeErr  
230B msMsgQueueFull  
230C msRecBufFull  
230D msOutputDisabled  
230E msMessageError  
230F msOutputBufFull  
2310 msDriverNotStarted  
2311 msDriverAlreadySet  
2380 msDevNotAvail  
2381 msDevSlotBusy  
2382 msDevBusy  
2383 msDevOverrun  
2384 msDevNoConnect  
2385 msDevReadErr  
2386 msDevVersion  
2387 msDevIntHndlr

2601 [38] MEDIA CONTROLLER: MC unimplemented  
2602 mcBadSpeed  
2603 mcBadUnitType  
2604 mcTimeOutErr  
2605 mcNotLoaded  
2606 mcBadAudio  
2607 mcDevRtnError  
2608 mcUnrecStatus  
2609 mcBadSelector  
260A mcFunnyData  
260B mcInvalidPort  
260C mcOnlyOnce  
260D mcNoResMgr  
260E mcItemNotThere  
260F mcWasShutDown  
2610 mcWasStarted  
2611 mcBadChannel  
2612 mcInvalidParam  
2613 mcCallNotSupported

4201 [66] FINDER: bad input  
4202 fErrFailed  
4203 fErrCancel  
4204 fErrDimmed  
4205 fErrBusy  
4206 fErrNotPrudent  
4207 fErrBadBundle  
42FF fErrNotImp

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**002- How do I activate the IIgs Diagnostic Self-Test;  
and, what does Self-Test Error Code \_\_\_ mean?**

The IIgs self-test is activated by holding down Open-Apple and Option and turning ON the computer. Or, with the computer ON, you can hold down the Open-Apple and Option keys and do a Reset (press Control and Reset).

During the test, the test number (in hexadecimal) is visible on the bottom of the screen followed by six zeros. After all tests are complete, a continuous 6 KHz one-second beep sounds and the screen displays a System Good message.

If a test fails, the screen immediately displays a message "System Bad:" followed by an eight-digit code (in hexadecimal) on the lower left hand side. The code is also displayed staggered in the upper left hand area to help you read it in the event of a display RAM failure. In case there is a video failure, the code is also sent to the printer port.

Example 1: You get the message "System Bad: 05020000"

This indicates failure of Test #05, the Fast Processor Interface Speed Test. The "02" says that the FPI got stuck in Fast mode (i.e. it could not switch to "Normal" Slow speed when asked to). Test #05 does not use the last four digits.

Note: If a ZipGS accelerator card is installed and not disabled and DIP Switch 1-4 (Defeat Counter Delay) is not set OFF (the default setting), your GS will bomb on Test 05. John Link reports that a TransWarp GS with the v1.5 ROM will fail the Speed Test. In neither case does failure indicate any actual malfunction.

Example 2: You get the message "System Bad: 080200D4"

This indicates failure of Test #08, the Battery RAM Test. The "02" says that there was a problem reading and writing a test value to some address. Next, the "00" says that the test value was \$00. "D4" says that the problem occurred with address \$D4 in the Bat RAM.

### IIgs Diagnostic Self-Test Error Codes

From: a list by Jeff Tarr, Jr., Apple IIgs Technical Reference  
by M. Fischer, and IIgs TechNote #095 by Dan Strnad

Error Codes are eight hexadecimal digits in the format 'AABCCDD'. The first two digits (the "AA" part) always show the test number. The meaning of the remaining six digits depends upon the particular test. (There may be a few differences in the GS diagnostic self-test depending upon ROM version. For example, earlier GS's may not include Test #0C (AA= 0C).)

ROM Test:G

AA= 01    BB= Failed checksum            DD= 01: RAM error

Note: A ROM failure will also be denoted by "RM" in the top left hand corner of the screen.

RAM 1 Test:H

AA= 02    BB= \_\_: Bank number            CC= Bit(s) failed  
          FF: ADB Tool error

Soft Switches:M

AA= 03 BB= State Register bit CC= Read addr. Low Byte

Address Test:K

AA= 04 BB= \_\_: Bank number CCDD= Failed RAM Address  
FF: ADB Tool error

Speed Test (FPI):

AA= 05 BB= 01: Stuck slow  
02: Stuck fast

Note: If a ZipGS accelerator card is installed and not disabled and DIP Switch 1-4 (Defeat Counter Delay) is not set OFF (the default setting), your GS will bomb on Test 05. John Link reports that a TransWarp GS with the v1.5 ROM will fail the Speed Test. In neither case does failure indicate any actual malfunction.

Serial Test:l

AA= 06 BB= 01: Register R/W  
04: Tx Buffer empty status  
05: Tx Buffer empty failure  
06: All Sent Status fail  
07: Rx Char available  
08: Bad data

Clock Test:H

AA= 07 DD= 01: Fatal error occurred - test aborted

Bat RAM Test:F

AA= 08 BB= 01: Addr. unique CC= bad addr  
02: NV RAM pattern CC= bad patt DD= bad addr

ADB Test:J

AA= 09 BBCC= Bad checksum DD= 01: Fatal error

Shadow Register:

AA= 0A BB= 01: Text page 1 fail  
02: Text page 2 fail  
03: ADB Tool call error  
04: Power on Clear bit error

Interrupts Test (Mega II and Video Graphics Controller):

AA= 0B BB= 01: VBL interrupt time-out  
02: VBL IRQ status full  
03: 1/4 sec interrupt  
04: 1/4 sec interrupt  
06: VGC IRQ  
07: Scan line

Note: There are reports that if a ZipGS accelerator card is installed and not disabled, then, your GS may fail parts of this test depending upon DIP Switch settings. Such a failure does not necessarily indicate a hardware fault.

Sound Test:3

AA= 0C DD= 01: RAM data error  
02: RAM address error  
03: Data register failed  
04: Control register failed  
05: Oscillator interrupt timeout

Note: If a ZipGS accelerator card is installed and not disabled, then, depending upon DIP Switch settings, your GS may fail parts of this test-- such as the Oscillator interrupt timeout check. Such a failure does not necessarily indicate a hardware fault.

Other

AA= FF (test number= \$FF) According to M. Fischer this shows a likely problem with the Mega II chip because that test number is used only during manufacturing testing.

---

From: Paul Creager

### **003- What does RamFAST Fatal Memory Fault Error \_\_\_\_ mean?**

\$00 Unknown, probably means that the RamFAST is very confused  
\$01-08 DRAM memory test failure  
\$09 EPROM checksum failure  
\$0C Z180 processor crashed, indicates some hardware fault  
\$0D Error writing cache data to disk  
\$0E Termination power error

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### **004- What is the explanation for getting a \_\_\_\_ error?**

0027 (ProDOS Error \$27, ...)  
0047 (ProDOS Error \$47, ...)  
0048 or 0049 (e.g. ProDOS Error \$48, ...)  
004B (ProDOS Error \$4B, ...)  
0051 (ProDOS Error \$51, ...)  
005A (ProDOS Error \$5A ...)  
0088 "network error"  
0201 "could not allocate memory" error  
0400 (see 0911)  
0512 (FATAL SYSTEM ERROR 0512) "badNdaTitleString"  
0681 and 0682 "bad event que" and "bad que handler"  
0682 "bad que handler"  
08FF "UNCLAIMED SOUND INTERRUPT"  
0911 and 09010001 (FATAL SYSTEM ERROR 0911)  
0C000003 GS Diagnostic Self-Test error  
1102 "OMF version error"  
1104 "file is not a load file"  
1301 "Unknown error \$1301"  
IIe Self-Test RAM error display  
RamFAST-SCSI FATAL MEMORY FAULT CODE=08  
RamFAST MLI Error!

```
RamFAST: RAMFAST.SYSTEM "Incompatible configure.dat"  
"CHECK STARTUP DEVICE"  
"NO BUFFERS AVAILABLE"  
"UNABLE TO EXECUTE BASIC.SYSTEM"  
"UNABLE TO LOAD PRODOS"
```

0027 (ProDOS Error \$27, ...)- In trying to access an apple SCSI hard drive hooked up to a GS I keep getting a \$27 error!?

This is an I/O error (input/output error). It may indicate that there is a problem on the SCSI chain, such as a loose connector, SCSI ID# conflict, absence of termination at the end of the chain, or absence of termination power. Another possibility is that one or more hard disk files have become corrupted. Replacing a few files may fix things; or, you may need to repartition or, even, low-level re-format the hard disk. --Rubywand

-----

0047 (ProDOS Error \$47, ...)- A "Duplicate pathname" error indicates that an attempt has been made to create a file which already exists or to rename a file to one which already exists-- i.e. the full pathname of a new or renamed file equals the full pathname of a file which already exists.

Note that it is okay to have a file or folder named, say, "PICS" inside a folder named "PICS"; and, you can have files named "PICS" in different folders. Also, ProDOS will permit overwriting a file with a file with the same name so long as the original and replacement file have the same filetype.

What ProDOS does not like is an operation which tries to create a file or folder whose full pathname is the same as an existing file or folder. For example, you cannot create a "GAMES" folder on /RAM5 (i.e. /RAM5/GAMES) if there is already a file or folder there named "GAMES"-- i.e. one whose pathname is /RAM5/GAMES.

This error might easily occur when running a self-extracting file if the self-extracting file has a name which matches the name of a contained file-- a solution for this problem would be to rename the self-extracting file. A more general solution for duplicate name creation is to create a new folder and use the extraction utility (e.g. ShrinkIt-GS), instead of doing a self-extraction, to extract files from the source file to the folder. --Rubywand

-----

0048 or 0049 (e.g. ProDOS Error \$48, ...)- Error \$48, of course, means "volume full"-- you are out of space on the target volume. Unfortunately, "volume full" is, sometimes, incorrectly reported when the actual problem is too many entries in the volume's main directory. (see below)

A \$49 "volume directory full" error means the main or "root" directory of the target volume has 51 entries and that an attempt has been made to create a 52nd entry. When it is incorrectly reported as "volume full" it can be very confusing to a user who CATALOGs the volume and discovers plenty of free blocks. The solution is to move some of the files in the main directory to folders. Only a volume's main directory has this low limit on number of entries. You can have many more than 51 files in a folder

. --Rubywand

-----

004B (ProDOS Error \$4B, ...)- is an "unsupported (or incorrect) storage type" error. I suspect you are on the GS and that the game or whatever you are trying to run is supposed to have a forked file and now the program can not find it. This has happend to me when Dragging files around. I recommend you recopy the game from your original disk, or re-unShrinkIt to the location you wish it be. If you believe a file may have a resource fork, avoid copying it with Copy-II Plus or moving it around on the GS des ktop under an old operating system-- either process could result in losing the resource part of the file. --thedm

-----

0051 (ProDOS Error \$51, ...)- My 3.5 copy of AppleWorks 3 said "Error loading ATINIT" (on my //c, no less), so I tried using Copy ][+ 9.1 to copy ProDOS 2.0.3 over the top of the apparently broken copy of ProDOS 1.7 on the AppleWorks disk. It then ran the drive, cleared the screen, and informed me so: Error \$51. Does anybody know what the heck this means?

The error indicates the directory is damaged. You MIGHT be able to salvage stuff by doing a FILE copy, rather than a disk copy. --Jim Lowe

-----

005A (ProDOS Error \$5A ...)- Today, I discovered that one of my Appleworks files had been overwritten by nulls. Luckily, I have a backup copy of that file. When I tried to delete the bad file and rename the backup I got ProDOS error \$5A. Any insight into what this error message means and what I can do about it?

Error \$5A "block number out of range" (sometimes known as "baked bit- map") means there's a bit set in the bit map which corresponds to a nonexistent block on that volume. You could try taking a block editor and writing zeroes to the upper bit map blocks on the volume to cure it. --Randy Shackelford

-----

0088 "network error"- Can anyone enlighten me as to why Copy-II Plus and ProSel-8 are unable to work with a network volume that the Apple utility (and plain-old Basic) has no trouble with?

Simple answer. Copy-II Plus and ProSel-8 bypass the file system and do direct block I/O to disk volumes. This is verboten with server volumes, and you get error \$88 for your trouble when you try. You'll have to use network friendly apps whenever you access the server volume. --Randy Shackelford

-----

0201 "could not allocate memory" error- After using the installer to install the basic Sys6 over Sys 5.04 on my hard drive, I couldnt run a ProDOS-8 program. Before the ProDOS 2.0.1 sign comes up, it says "Error \$201". I have more than 4MB! What's wrong?

A \$0201 error when switching to ProDOS-8 usually means some utility has left part of bank 0 or bank 1 allocated. You have enough memory free, but some particular memory that ProDOS 8 needs is not available.

I have seen occasional \$0201's after using Find File 1.0 (included with 6.0) before switching to ProDOS-8. --Dave Lyons

-----

0512 (FATAL SYSTEM ERROR 0512) "badNdaTitleString"-- comes from FixAppleMenu (in the Desk Manager). It means that one of your installed New Desk Accessories does not have a well-formed menu title string. In particular, the required backslash (\) character was not found (make sure bit seven is off). --IIgs TechNotes

-----

0681 and 0682 "bad event que" and "bad que handler"-- What do these error codes mean? How does the GS determine if an error is FATAL (as in FATAL SYSTEM ERROR)???

The errors are 'Event Manager errors'. A key press and mouse button press are examples of "events". The errors indicate a record of events was messed up. One of many places this might occur is while you are typing-in text. "FATAL" usually means that System believes that things are so messed up in memory that restarting is necessary. Sometimes, "FATAL" means that System suspects that there may be a hardware failure. --Rubywand

-----

0682 "bad que handler"-- My IIgs crashes with a Fatal Error \$0682 whenever I have my expansion memory card plugged in and try to access the Control Panel. Also the Alternate Display mode seems to be missing and stuff won't boot. What's wrong?

Error \$0682 indicates a data structure maintained by the Event Manager is corrupted. It is either the Event Queue itself, or something related to it. The most common cause for this is buggy software which has overwritten memory.

The second most common cause is a faulty or incorrectly configured memory expansion card (or bad RAM on that card). The event queue normally lives near the top of "fast" memory, so it is always located in the memory expansion card if you have one.

Similarly, the list of items in the Desk Accessories menu is in RAM, so lack of Alternate Display Mode points to memory corruption of some kind. --David Empson

-----

08FF "UNCLAIMED SOUND INTERRUPT"-- A sound interrupt has occurred but none of the available interrupt handlers were willing to deal with it. The Sound tool set thinks this is pretty serious; so, it notifies the System Failure Manager and you get the error message. A possible cause is that the table of interrupt vectors or the pointer to the table has been messed up in memory. --Rubywand

-----

0911 and 09010001 (FATAL SYSTEM ERROR 0911); was error number 0400 on ROM-00 machines. Fatal System Error 0911 and Diagnostic Self-Test error code 09010001 mean the same thing: You are experiencing an ADB "can't sync" problem which, usually, seems to relate to a hardware malfunction.

See Csa2HDDWHACK.txt for more discussion and possible fixes.

--Rubywand, David Kopper, Guenther Unger, Gabriel Hawkins, Michael Mahon

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0C000003 GS Diagnostic Self-Test error/ Sound Test: Data register failed

There is one possible reason for this failure code being reported by the self-test: do you have a ZIP GS accelerator in the machine? The ZIP GS, if enabled, causes the IIgs to fail some of its self-tests (only because the tests are relying on the speed at which the processor normally operates, and get confused because the CPU is running faster than expected). If this is the case, you must turn off the computer and disable the ZIP GS by setting switch 1-6 OFF before you can run the self-test properly. --

David Empson

-----

1102 "OMF version error"- When trying to launch some GS programs I am encountering the following error message:

Sorry, system error \$1102 occurred while trying to run the next application. Return to launching application or restart system.

So, whats wrong with my IIgs and how do I fix it?

Probably, there is nothing wrong with your IIgs. The "incompatible Object Module Format" error appears to indicate that your versions of the problem programs are, in some ways, not compatible with your operating system. Try launching the program from an earlier version of System or after booting an old "ProDOS-16" diskette. --Rubywand

-----

1104 "file is not a load file"- I downloaded some GS Desk Accessories fine; but, when I try to use them I get this error. How come?

Error \$1104 is reported by tool \$0B11 LoadSegNum (tool \$0B in toolset \$11). The error is reported if a check of a file's directory entry shows that the file is not file type \$B3-\$BE.

If an NDA or CDA were downloaded and its file type were not preserved, then the file might be okay, but it would not be recognized as a load file. Try changing the file type (\$B9 for a CDA; \$B8 for an NDA). An NDA named "File.Manager" by Jeff Hartkopf and Glen Bredon's ProSel-16 are two utilities that allow changing file type. --Rubywand

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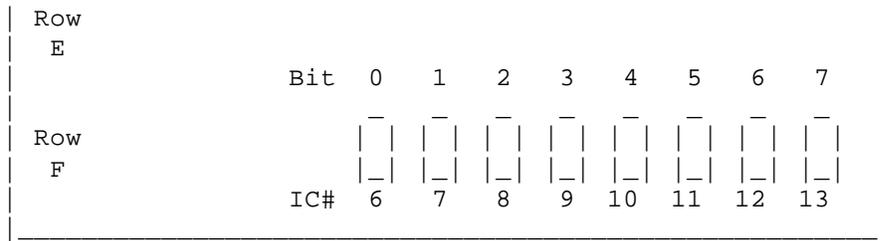
1301 "Unknown error \$1301"- When I tried to open a file in Platinum Paint, I got this error message. What's wrong?

I got the same error message when I tried to run Platinum Paint with Bernie ] [ The Rescue on a G3 Power Mac. The error code refers to a missing driver; but, even if the correct printer driver is present, what Platinum Paint really wants is for the D C Printer Control Panel settings to be correct. --Jim Pittman

-----

IIe Self-Test RAM error display: RAM 0 1 0 0 0 0 0 0- I get this error message when doing a selftest on my //e enhanced boot up. What's it mean?

The indication is a bad or loose RAM chip in the Bit 6 position. The RAM chips are in Row F at the front of the motherboard starting with Bit 0 and running to the right when viewed from the front of the computer.



Front of Apple IIe

If your RAM chips are in sockets, try removing and re-socketing the second chip from the right. If this does not work or if your chips are soldered in place, the chip is probably bad and will need to be replaced. -- Rubywand

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RAMFAST-SCSI FATAL MEMORY FAULT CODE=08- Could it be a problem with my SCSI card?

It looks like RamFAST thinks there is a problem with the on-board memory. Before calling Alltech, you might try pulling the board from the Slot-- do this only with GS power turned OFF-- and wedging-up and re-seating each memory IC. (This assumes the mem IC's are socketed.) If you're not sure which IC's are memory chips, do them all. Re-seating the IC's may reestablish a pin- to-socket contact which has been broken due to oxidation coating on an IC pin or due to the IC working loose over time. --Rubywand and

-----

RamFAST MLI Error!  
Command: 04-03 86 00 60 05 00 00 00 00  
Status: 2F

I have a new 530MB hard drive, and a ROM 03 GS with a RamFAST (ROM F, I think). From the Ramfast utilities, I could do a low-level format on the drive

with no problem. However, when I attempted to partition it, I saw the error message listed above.

As it turns out, this drive has a place for a jumper documented to "Disable TI Negotiation." Before giving up all hope, I put a jumper in there. This apparently made it possible to partition the disk, and things look good now. --  
John David Duncan

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RamFAST: RAMFAST.SYSTEM "Incompatible configure.dat"- My 10 year old came to me this weekend upset because of something that's happened to his GS. When he boots it up, he is getting a message about an incompatible configure.dat file, then ends up in the ramfast scsi utility!?

If the GS ends up displaying the RamFAST.System screen, and "Incompatible ..." message, click on the error message to clear it and then click Options. Set these according to your system-- mainly, click TransWarp to "No" if you do not have a TransWarp installed. Probably, you will want Password, RomDISK, HD Backup, and Short Timeout set to "No", as well. (You can experiment with Short Timeout and DMA; but, for now, set them to "No".) The other options should be "Yes".

Click Save, then Quit. If you get the <<BOOT>> prompt, click it. If you end up looking at a BASIC prompt, try entering PR#7 (assuming your SCSI interface is in Slot 7) to see if the hard disk will boot.

If either of the above gets you into the Finder where you can copy files, then you will have a way to make backups.

To check that the config has been correctly written to hard disk you will need to turn OFF the machine. (i.e. from the Finder, do a Shutdown and then turn OFF the GS.)

After 10-20 seconds, turn ON the computer and see if it boots correctly. If it does, fine. If it does not, you may have to reformat the hard disk. --  
Rubywand

-----

"CHECK STARTUP DEVICE" - Why do I get this message when I try to boot a disk?

This error message usually means that there is no diskette in the boot drive, the drive door is not closed, or that the disk is not bootable. On a system which has several drives-- e.g. 3.5" and 5.25" drives and/or a hard disk-- the message indicates that no bootable disk was found on any of the drives tried.

If you know that a bootable disk is present, the indication is a problem with the drive (see Q&A above) or with the drive controller (which may be a card plugged into a Slot) or with a cable connecting the drive or with settings which affect recognition of the drive with a bootable disk.

The problem may be that the bootable disk is not detected because the IIgs Control Panel is not set correctly-- e.g. the Startup Slot is set below the number of the Slot associated with the drive and/or the Slot with an interface card is not set to "Your Card". Note: After changing a Slot setting in the

Control Panel, especially for a SCSI interface, it may be necessary to turn Off the computer and do a fresh power-up for the new setting to be in effect.

If the expectation is to boot from /RAM5 RAM disk, make sure that /RAM5 is initialized before copying files to it. (/RAM5 is normally automatically formatted as a ProDOS volume when you first power up; but, it will not have the required boot block unless it is initialized or unless you do a whole-disk copy to /RAM5 of a bootable disk.) --Rubywand

-----

"NO BUFFERS AVAILABLE" error message. What does this mean?

This message often indicates that there has been an attempt to load into an area protected by ProDOS. For example, many old DOS 3.3 programs like to directly load a text message or lo-res pic into Text Page 1 (\$400-\$7FF), an area protected by ProDOS. Running such a program under ProDOS would be likely to produce the "NO BUFFERS AVAILABLE" message. You can recover from the error via a CALL48888. --Rubywand

-----

"UNABLE TO EXECUTE BASIC.SYSTEM" - Why do I get this message when I boot a ProDOS disk?

BASIC.SYSTEM has been loaded; but, startup code has detected one of two conditions:

- o- It did not find a \$4C at \$E000 (which it takes to mean Integer BASIC may be installed).
- o- It did not find at least 64K of RAM.

The usual reason for getting this error message is that ProDOS with BASIC.SYSTEM has been booted on a 48K or smaller Apple II; or, the Apple II has a faulty Language Card (try re-seating IC's on the card). --Sandy Mossberg, Rubywand

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"UNABLE TO LOAD PRODOS" - Why do I get this message when I try to boot a ProDOS diskette?

For a ProDOS disk to boot properly, you need a good copy of the PRODOS file. It can be copied from any bootable ProDOS diskette. Or, from IIgs System, copy the file named "P8" (in the SYSTEM/ folder) to your diskette and rename it to "PRODOS". --Adam Myrow

The error message means that enough of boot track (e.g. Track 0) was read to tell that the disk is formatted for ProDOS; but, for some reason, the system file named "PRODOS" is failing to load. Possibly, PRODOS is not present on the disk or the file is corrupted or there is a problem with the drive which prevents reading the file.

If the disk boots okay from a different drive, this usually indicates that your original drive has dirty heads, may be poorly connected, has a problem with head alignment, or (5.25") needs a speed adjustment. If the disk is a 5.25"

diskette created on a newer model 5.25" ("40-track") drive, it may be an HD (high-density) diskette. Standard Apple 5.25" drives cannot reliably read HD diskettes-- see the Diskettes FAQs page. --Rubywand

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From: Rubywand

## **005- Where can I find more information on Apple II series errors?**

### Resources & Credits

#### IIgs Diagnostic

Jeff Tarr, Jr.

Apple IIgs Technical Reference by M. Fischer (pg. 213-217)

IIgs TechNotes #95: ROM Diagnostic Errors by Dan Strnad Sep, 1990

#### GS/OS

Apple IIGS GS/OS Reference (pg. 438-439).

For info on Expressload and System Loader refer to pg. 200-234.

#### ProDOS 16 and System Loader

Apple IIgs ProDOS 16 Reference (pg. 302-311)

#### ProDOS 8

ProDOS Technical Reference Manual (pg. 77-79)

Beneath Apple ProDOS by Worth & Lechner (pg. 6.59-6.61)

#### RamFAST

Paul Creager (wily@svpal.svpal.org)

#### SmartPort

Apple IIGS Firmware Reference (pg. 156).

#### Tool Sets

Volumes 1-3 of the Apple IIGS Toolbox Reference set.

A good on-screen listing of errors encountered on the IIgs (plus lots of other toolbox, softswitch, etc. info) is available via Dave Lyons's NiftyList CDA package (\$15, Shareware). Another good on-screen list is Jeff Tarr Jr.'s ErrorCodes CDA v1.7 (\$5, Shareware).

Applesoft, DOS 3.3, ProDOS BASIC.SYSTEM, and ErrorWindow error codes are not listed because errors are reported directly in text messages. For codes and descriptions see ...

#### Applesoft

Basic Programming Reference Manual (pg. 81)

#### DOS 3.3

The DOS Manual (pg. 114-115)

Beneath Apple DOS by Worth & Lechner (pg. 8.20)

#### BASIC.SYSTEM

Exploring Apple GS/OS and ProDOS 8 by Little (pg. 249)

#### ErrorWindow

'Toolbox Reference: Volume 3 (pg. 52.53-52.56)

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#### Search Help

IIgs Diagnostic Self-Test --> look for "IIgs Self-Test"  
IIe Diagnostic Self-Test --> look for "IIe Self-Test"  
//e Diagnostic Self-Test --> look for "IIe Self-Test"

Apple II Csa2 FAQs: Floppy Disk Drives, Part 9/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Floppy Disk Drives, Part 9/25  
This article was archived around: 07 Jun 2009 08:31:55 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2  
Source: Usenet Version  
Archive-name: apple2/faq/part9  
Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2FDRIVE.txt rev135 June 2009

## **Floppy Disk Drives**

- 001- How do I add a write-protect On-Off switch?
- 002- How do I add external speed adjustment to my Disk ][ drive?
- 003- How can I adjust my 5.25" drive for optimum performance?
- 004- How do I clean my disk drive R/W head(s)?
- 005- What is the pinout for a duodisk drive connecting cable?
- 006- What DuoDisk mods are necessary?
- 007- Will a Duodisk function correctly on my ROM 3 GS?
- 008- How do I fix a false Write Protect?
- 009- My 3.5 Disk Drives don't work! What should I try?
- 010- I added SCSI; now, my 3.5" drives often fail to work. Why?
- 011- Both of my Disk ]['s come on when booting! Is there a fix?
- 012- In connecting a Disk II I misaligned the connectors. A fix?
- 013- A sound like a shotgun going off came from my drive. A fix?
- 014- Uni-disk and Laser drives: neither works with my IIc. Why?
- 015- How do I replace a 3.5" drive mechanism with one from a Mac?
- 016- I have one 5.25" drive. Sys6 shows two icons!? Is there a fix?
- 017- How can I tell a 13 from a 16-sector Disk ][ controller card?
- 018- Can a Disk ][ Drive be used on a IIc or GS smartport?
- 019- How do I install a bi-color LED R/W indicator in my Disk ][?
- 020- What's the scoop on the 3.5" High Density drive?
- 021- What is a "UniDisk"?
- 022- What is a "RAM disk"; and, how do I create one on my IIgs?
- 023- Which 3.5" drive/interface combinations work on a IIe?
- 024- How can I boot from my /RAM5 RAM disk?
- 025- My 5.25" drive ruins every disk I insert. How can I fix it?
- 026- Incorrect 'Disk Full' error on a 3.5" Unidisk drive. Why?

From: Stephen Buggie

## 001- How do I add a write-protect On-Off switch to my Disk ][ drive?

### Adding an Auto/Manual Write-Protect (A/MWP) Switch

Often, as when doing copying, it is useful to be able to guarantee that a diskette is Write-Protected whether or not the side is notched. Other times, it is convenient to defeat Write Protection-- for example, when you wish to write to a diskette side which is not notched. And, naturally, you also want a setting which permits Normal, notch-controlled, Write-Protect.

Based upon a circuit suggested by David Wilson (Australia), the A/MWP enhancement offers full user control of Write Protect. The switch's three positions are

Normal: a diskette side must be notched to permit writing.  
Protect ON: Writing is prohibited regardless of notching.  
Protect OFF: Writing is allowed regardless of notching.

### A/MWP Step-by-Step

Unplug the drive from the disk controller and remove the case.

Drill a mounting hole. This can be at a convenient spot in the back or in the plastic front panel. On the front, a good spot is at the lower left, above and to the left of the "in use" LED. Another open spot is at the upper right in the space just above the diskette slot; but, we're saving this place for Part 2's enhancement. (You can't use the lower right, of course, because this would mess up the "Apple" logo!)

Cut three wires (Brown, Black, and White) long enough to run from the mounting point to the Large Connector plugged onto the back, middle of the Disk ][ circuit board.

Solder the leads to a Single-Pole Triple-Throw mini toggle Switch: Brown to center, White to one end, Black to other end. Twist the leads or encase them in tubing.

Mount the Switch. Normally, the Switch handle will point ...

- o- in the Black lead direction for "Normal" (center and White connected)
- o- at Center for "Protect ON" (no connection).
- o- in the White lead direction for "Protect OFF" (center and Black connected).

Mounting the switch with the Black lead on top is recommended because it is easy to remember that Up = Normal. Route the leads to the area next to the Large Connector. (Make sure no wires will get in the way of an inserted diskette.)

Locate the Brown and Black leads coming from the Notch Detect micro-switch. The leads are the Brown (bottom) and Black (top) pair near the right end of the Large Connector (as viewed from the front of the drive).

Cut the Notch Detect micro-switch leads about 1" away from the Large Connector.

Connect the Black Notch Detect, Black Large Connector, and Black Switch leads (i.e. strip ends, solder, and cover in heat-shrink tubing or tape).

Connect the Brown Notch Detect lead to the White Switch lead.

Connect the Brown Large Connector lead to the Brown Switch lead.

Viola! Now you're ready to replace the cover, plug in the drive, and try out your A/MWP enhanced Disk ][.

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From: Ed Eastman

Most of the time what you want to be able to do with a Write Protect modification is turn On Write Enable when a disk is not notched. That is what this mod for does. Details relate to the 5.25" Unidisk but the method will also work with other Apple II 5.25" drives.

The way the write protect sensor works on newer drives is that an LED on one side shines on a phototransistor (the sensor) on the other side. When there is a notch in the diskette you insert, light passes through the gap and the sensor 'closes' to complete the Write Enable circuit.

What we will do is give the Write Enable circuit an alternate enable option using an On/Off switch. A mini toggle switch is okay; but, I like to use a small normally-open momentary contact pushbutton switch from Radio Shack. It's compact, looks nice, and pressing the button for the few seconds usually required for a file, etc. write is no problem.

I normally mount the switch in the upper left part of the face plate, opposite the light to balance the look. Drill a hole a little smaller than required and use scissors or a larger drill to taper the hold to just where you can screw in the switch.

Before soldering on leads and mounting the switch, decide where you want to make the connections. You can locate the output leads from the sensor and splice one switch lead to each; or, you can find the place on the circuit board where the sensor leads go and connect there.

On a Unidisk you will see a large connector labeled "CN1" near the front. Pins 9 and 11 of CN1 are the write protect sensor connections. More convenient connection points are the circuit board edge side of R12 and the wire at J29.

Solder on leads long enough to reach the connection points and screw in the switch. On a Unidisk, connect one switch lead to the R12 point near the edge and one to the wire at J29.

Now when you need to override write protect on an unnotched disk, you simply press the button while writing. Go ahead and plug in the drive and give it a try.

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From: Stephen Buggie

## 002- How do I add an external speed adjustment to my Disk ][?

Reference: FAQs Resource file R006SPDKNOB.GIF

### Adding a Speed Control Knob to your Disk ][ Drive

This article tells how to move speed adjustment from the Disk ]['s dark interior to a handy front-panel location and how to "tune" the drive for optimal performance.

One drive-test software vendor states that Disk ][ is good for about 500 hours of normal use between speed adjustments-- not exactly a strong argument for placing the control on the front panel! On the other hand many of today's Disk ][ owners are interested in applications which go beyond "normal use".

Some utilities (e.g. DiversiCopy II) report rotational speed during ongoing applications; so, relocating the speed adjuster to the front panel is especially helpful. Similarly, users who want to back up their old, copy-protected wares know that ready access to speed control is essential.

Finally, there is no question that, whatever your applications, periodic speed trimming will be required. When it is, you'll be very glad \_your\_ Disk ][ has a front panel Speed Knob!

### Adding Speed Knob

To install Speed Knob you will need a good quality, linear taper 5k Ohm potentiometer, some wires, and a knob with a pointer mark or some other way to show position (e.g. a ring of numbers). Most of the work, really, consists of opening the drive and drilling a hole. There is no need to disconnect the drive from the controller card.

1. Remove the 4 bottom bolts and slip off the case. Unscrew the 4 bottom bolts holding the drive to the case bottom, and unplug the main ribbon cable. The drive can now be moved to your work area.
2. Drill a hole properly sized and centered for mounting your 5k Ohm pot in the upper right front panel.
3. Place the drive on its face and unscrew the 2 bolts which hold the small daughter board to the drive. (Be ready to catch loose spacers, washers, etc..)
4. Turn the small board over to the bottom side. Locate and cut the traces going to the mini-pot speed adjuster as shown in pic R006SPDKNOB.GIF.
5. Cut three wires, White, Gray, Black, long enough to reach from the board to the front panel. Connect these to your 5k Ohm pot and to the small circuit board as shown in pic R006SPDKNOB.GIF. (In case you cannot view the pic, what you're doing is substituting the new pot for the mini-pot. )

6. Re-mount the daughter board. Mount the 5k Ohm pot. Install knob.

7. Bring the drive back to the computer. Slide it onto the case bottom plate, reconnect main ribbon cable, replace bottom bolts, slide on and re-fasten case top.

You can use Copy II Plus, XPS, APEX, or one of several other utilities to set speed (see next question). A good starting adjustment will be near the center of Speed Knob's range. Once speed is adjusted, you can loosen and re-set the knob so that its position indicates a "correct" speed setting.

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### **003- How can I adjust my 5.25" drive for the best performance?**

The typical 5.25" drive will run for months with no need for maintenance save an occasional dusting or session with a head-cleaner disk. When adjustment is required, it will usually be to fine-tune Speed or, less often, to set track centering.

If a 5.25" drive has difficulty reading diskettes, including those it created, and head-cleaning does not help, then, the odds are it's time to adjust speed. If your drive is a Disk ][ and does not have the external 'Speed Knob' mod, look for a small hole on the lower right side near the back-- some owners add this hole to allow easy access to the Speed Adjustment mini-pot screw. If there is no hole, you will need to remove the case. (Remove bolts on bottom and slide out the drive through the front.)

On the 5.25" Apple 'Platinum Drive', the Speed Adjustment is accessed through a small hole on the bottom of the drive near the front on the right side. Non-Apple 5.25" drives may place the Speed Adjustment almost anywhere. Look for a small hole through which you can see a screw head. If you don't find one, remove the case and look for a mini-pot labeled "Speed" or something similar.

The most popular speed adjustment software utility is, probably, dear old Copy II Plus. From the menu, just select "Verify", then "Drive Speed". Put a diskette into the drive you want to adjust and, turning the Speed Knob (or mini-pot shaft) use Copy II's numeric speed display to zero-in on the 'magic' 200ms. number. (Standard Disk ][ rotation speed is 300 rpm, which comes out to be 0.2 seconds per revolution.)

Other speed adjustment utilities show an rpm number or a hires pointer. Whatever, all speed check routines need to read AND write; so, you will usually need a "scratch diskette" which you do not mind having over-written.

Track-center realignment is needed when a Disk ][ writes and reads its own disks fine, but does not 'communicate' with many other Apple II 5.25" drives. It generates disk errors when reading disks written by other drives and other drives have the same problem with its diskettes.

CALL A.P.P.L.E's APTEST, now in the public domain, tests track-center alignment. With this software, the user checks the alignment of the drive with disks regarded as well aligned --- such as Apple diskware supplied with the computer or some unprotected, original, commercial software diskette. (In a

pinch, a diskette formatted by any drive that has no problem reading most other diskettes should be okay.)

Basically, a track-centering test tries to step your head between two tracks of the 'standard' diskette and read the tracks on either side. If the number of successful reads from each track is about equal, the head is "centered" and your drive is well-aligned with the standard diskette.

The test may indicate serious misalignment. ("Aha! That explains why my IIgs and II+ have problems reading each other's diskettes!") Centering adjustment is done by slightly repositioning the stepper motor (mounted on the underside of the drive). This requires loosening the two bolts holding the stepper-motor, rotating it clockwise or counter-clockwise, and retightening.

The adjustment/test process may require several repetitions. Each time, the program will report "differential fractions". The smaller these numbers, the closer you are to near perfect alignment with tracks on the diskette.

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From: Rubywand

Suppose you have just one drive and it is so far out of adjustment that it will not boot a speed adjustment utility diskette? In this case, you can remove the drive cover, turn over the drive, and (probably) find that the drive has a strobe pattern on the main pulley or flywheel.

Set a fluorescent light near the drive (or do the adjustment in a room with fluorescent lighting). Get the drive spinning via power-on booting or a PR#6 and adjust the speed for a stable pattern.

Note: If you live in a place which supplies 50Hz power and the drive is intended for use in the U.S. or other country with 60Hz power, you may have to experiment with + deviations in speed from a stable pattern.

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From: Rubywand

## **004- How do I clean my disk drive R/W head(s)?**

The easiest way to clean a drive's R/W head(s) is with a Cleaner Diskette. This is a diskette with a paper disk such as the 5.25" and 3.5" Cleaner Diskettes available in Radio Shack's Disk Drive Head Cleaner Kits. These kits usually include "Cleaning Fluid" (isopropyl alcohol), too.

The 5.25" Cleaner Diskette has panels you pop out to expose the cleaning surface. Apple II 5.25" drives have a single head which contacts the disk from the bottom and a pressure pad which presses against the top side. So, pop out the panel on the bottom side of the Cleaner Diskette and leave the top panel in place. When cleaning, insert the diskette with the bottom side facing down. This lets the paper disk rub against the head and avoids wear on the pressure pad.

The 3.5" diskette has a small plastic panel you can snap out for cleaning two-head drives. Since the standard 3.5" 800k Apple II drive has two heads, snap out the panel so that both the top and bottom heads get wiped.

To clean your drive head(s), you squirt a few drops of Cleaning Fluid onto the Cleaner Diskette disk, insert it into the drive, and get the disk spinning. Allow about 20 seconds for a 5.25" and a couple 10-second spins, with drops between spins, for a 3.5" drive. (Booting the Cleaner Diskette is one way to get it spinning. If DOS or ProDOS is installed, doing a CATALOG is another way. For example: CATALOG,S6,D2 would get your 5.25" Drive 2 spinning. Doing a RESET will stop the spinning.)

If you think it has been several months since the drive was last cleaned, repeat the procedure-- i.e remove the Cleaner Diskette, add more fluid, etc.. As a rule, do not let the disk spin more than 15-20 seconds for any cleaning cycle. This is especially a concern with 3.5" drives where the heads are mounted on springs and much more subject to snagging and being pulled out of alignment.

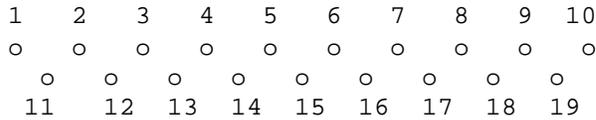
---

From: Steve Jensen

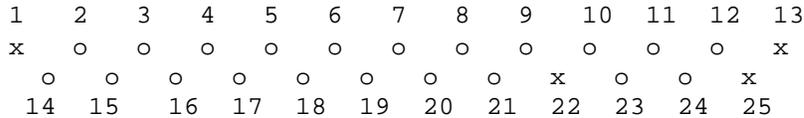
**005- I picked up an apple IIe and a duodisk drive at a thrift store. Could someone describe the connecting cable?**

I just checked the pinout on a Duodisk cable. The numbers for the pins are inside the plug by the pins, but I'll draw them for you.

DB 19 looking at the end of the cable:

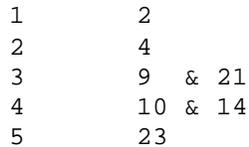


DB 25 looking at the end of the cable: (x = no pin)



Cable

DB 19      DB 25



6	7
7	19
8	20
9	8
10	12
11	15
12	16
13	17
14	18
15	5
16	24
17	11
18	3
19	6

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From: Steve Jensen and Jonathan Adams

## **006- What DuoDisk mods are necessary?**

The following is excerpted from an info file from my old bbs ...

There are TWO modifications that should be made to Duodisk drives:

The First one was recommended by Apple several ago to solve occasional problems with trashing diskettes. The solution is to remove 2 capacitors.

The Second modification is only required to solve a problem with daisy-chaining on the GS Smartport, though the modified Duodisk will still work fine on older Apple II's. It requires removing a resistor.

### **DUODISK MODIFICATION #1- REMOVAL OF TWO CAPACITORS**

This mod should be done on ALL Duodisks, no matter whether they're used on //e's, IIGS's, etc. The problem was that diskettes would sometimes be damaged when doing an Open-Apple-CTL-Reset or when using disks with certain kinds of copy protection. The mod was in an Apple dealer service bulletin several years ago for "analog board PN 676-[]101 or 676-[]102."

The Analog board is the one inside Drive 1 in the Duodisk. You may have to unplug the cable near the back right of the board to see the board's model number. Anyway, if you have the -101 or -102 board, just snip out Capacitors C29 and C30 at board locations A1 and B1, respectively.

### **DUODISK MODIFICATION #2- REMOVAL OF A RESISTOR**

This mod should be done for Duodisks used with a GS; otherwise, it is optional. The problem is that the Duodisk draws just a little too much current when connected to the GS Smartport. This can render other drives on the chain inoperable. Problems are MOST likely to occur when the Duodisk is daisy-chained from a Unidisk 3.5 Drive.

Remove the top cover and turn the drive so that the identifying number will be at the bottom left of the analog board. The number might read 676-[]101, 676-[]102 or 676-[]107. (ROM 3 GS users should check Q&A 007.)

If the I.D.# for the analog board is 676-[]101 or 676-[]102, use a pair of nippers and cut out resistor R8 (located at position A2).

If the I.D.# for the analog board is 676-[]107, use a pair of nippers and cut out resistor R39 (located at position C3).

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From: Dave Althoff

There are two capacitors which must be clipped from the board on the DuoDisk regardless of what machine you intend to use them on. Failure to do this can lead to very nasty failures. For instance, some copy-protection schemes can cause the drive to start writing unexpectedly-- say, during a re-boot-- thus trashing the disk without regard to the write-protect switch.

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From: Chet Gerhardt

I have done the capacitor removal mod with all DuoDisks I have sold and my own DuoDisks. It is amazing that after all of this time most still have not had the mod done.

---

From: Steve Buggie

### **007- Will a Duodisk function correctly on my ROM 3 GS?**

I have three Duodisks. The one connected to my flagship ROM 3 IIgs has had the resistor and capacitors clipped out as recommended in a memo from Mitch Spector. It works perfectly!

---

From: Rubywand

A Duodisk may not be entirely functional connected to the usual ROM 3 "Disk" connector (i.e. the SmartPort). Users report that the system may not start up unless a write-protected disk is inserted in the Duodisk. Apple, in Tech Library notes #5010 and #5434, mentions these reports and says that there is some code in the ROM 3 ROM that does not handle the interface to a Duodisk properly. Apple's workaround is to connect the Duodisk to a drive interface card instead of to the Smartport.

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From: John L. Graham

### **008- How do I fix a false Write Protect?**

I recently ran into this problem with a Disk II. It insisted the disk was write protected. I checked the write protect switch, but it was okay. I pulled all the chips out of the analog board inside the drive, cleaned the contacts with a clean pencil eraser (one was really dirty, almost looked burnt) and re-installed them. Voila! The problem went away.

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From: Rubywand

### **009- My 800K, 3.5 Disk Drive is no longer working on my IIGS. When a disk is inserted the drive tries to read it and then locks up the entire system forcing me to do a 3 finger reboot. Any suggestions on where to start troubleshooting?**

If you have a SCSI interface card plugged into your GS, you may have run into a bug which seems to affect setting up of the diskette port. (See the next question and answer.)

Try cleaning the heads using a Head Cleaner Diskette, such as a paper diskette + cleaning solution kit from Radio Shack. (See Q&A 004.)

In a few rare cases, a drive may actually have globs of dust inside which end up interfering with its operation. You can shine a flashlight into the slot to check for a heavy dust buildup. The safest way to clean out dust is to open the case and the drive and remove the dust. However, you can try inserting a small cheap plastic artist's paintbrush (slightly dampened) into the slot and, with a flashlight, lightly sweeping around to pick up dust. ("Lightly" means you do not push or snag on anything, especially the R/W heads.) Blow into the slot and do another sweep with your brush.

If cleaning does not seem to help, try wiggling the drive cable while attempting to CAT a known-good, unprotected diskette in the drive. If wiggling helps, you are likely to have a bad cable or a GS plug with a loose connection to the motherboard.

Try formatting a diskette. A drive which can format and R/W diskettes it has recently formatted but cannot read most other diskettes probably has heads which have become misaligned.

Set your boot Slot to Slot 5 and try power-up booting a couple bootable ProDOS diskettes known to be in good condition. If you can boot a variety of diskettes, including commercial game, etc. diskettes, the odds are pretty good that your drive is okay.

A 3.5" drive that, after cleaning, cannot boot known-good diskettes is likely to have screwed-up heads. However, it's a good idea to try unplugging and re-plugging the drive (with the computer OFF) and, then, try another boot.

If you have a 5.25" drive attached, boot ProDOS from the 5.25" drive and try some CAT's of non-protected known good 3.5" diskettes in the 3.5" drive. As earlier, do the cable wiggling test while attempting the CAT's.

A very good test is to try out the drive on a friend's IIgs or IIc+. If it continues to bomb, it is likely to have R/W heads which have become badly misaligned, heads which are badly worn, or heads which have been partially dislodged from the mountings. (The 3.5" drive's heads are held in place by springy metal sheets. Unlike the mounting for the 5.25" Disk ][ head, these are fairly delicate. If anyone has tried cleaning the heads by sticking in an alcohol swab and 'swishing around', there is a good chance the head mountings are messed up.)

Shops which replace heads are fairly rare. I had this done a few years ago and the drive still works fine. However the charge is around \$80. It is cheaper and easier to get a good 2nd-hand drive at a swap-meet. You can, also, look for a bargain Mac drive and do a "transplant" as described by Steve Buggie in the Winter 1996 issue of II Alive.

Steve Buggie is a good source of information on drive repairs. Check out some of his recent posts to this newsgroup.

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### **010- Sometimes the 3.5" drives on my GS do not function correctly. This started after adding a SCSI interface card. Is there a fix?**

This problem seems to crop up from time to time, especially when a SCSI interface is present and when no device is connected and recognized on the SCSI chain. (For example, you may have only a Zip Drive connected to your SCSI interface; but, it is not powered ON or no Zip disk is inserted.)

Evidently, something (e.g. a register or softswitch) involved in the usual GS power-up routine relating to on-line devices gets messed up. Arranging to have some active, on-line device on the SCSI chain (or removing the SCSI card) seems to help reduce frequency of the problem.

A nearly certain fix is inserting a 3.5" diskette into Drive 1 before or just after power-up. This usually forces recognition of 3.5" diskette drives and enables correct functioning.

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### **011- Both of my Disk ]['s come on when booting! How can I fix this?**

Basically, it sounds like Drive 2 does not know when to stay OFF. There are three fairly high-probability places where a glitch may cause this to happen:

1. The 74LS132 on the Disk ][ Controller card may have a blown gate or some pins may be making poor or no contact. Try unplugging and re-socketing the IC. This usually takes care of bad contact problems. (Or, you can replace the 74LS132 IC with another 74LS132 or 74132. A 74LS00 or 7400 may work, too.) Also unplug and re-socket the 9334 and 556.

2. The ULN2003 IC on the Drive 2 main circuit board may have a bad gate or may have developed some poor pin-to-socket contacts. Remove the drive cover. Unplug and re-socket the ULN2003 IC. (Replacing a blown ULN2003 should not be too difficult. Both Mouser and Newark carry the IC.)

3. Drive 2's cable may have developed a short between pins 14 and 16. Mark the position of the cable at the Controller card and at the Drive 2 circuit board and unplug the cable at each end. Use an Ohm meter to check for shorts between adjacent pins. If you find a short between 14 and any other pin you can try repairing the cable or cutting out line 14 and running a new lead; or you can get a replacement cable.

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From: Rubywand

**012- In connecting a second Disk II drive to my Disk II card I misaligned the connectors. The result upon turning it on was a static-like clicking noise. Now I can't load anything from disk. Is the Disk II card dead? Are the IIe and Drives all right?**

Try removing the drive which was connected incorrectly. If your system boots from the remaining drive (connected in the Drive One position), this is a fairly good indication that the Disk II card and IIe are okay and that the removed drive is messed up.

If it looks like a drive is bad, remove the cover and inspect the drive's main circuit board for blown components. If nothing obvious shows up, a decent fix try is to replace the 74LS125 IC on the drive's main circuit board. (Also, see Q&A 013.)

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From: Ryan Underwood

I accidentally offset a row of pins on the //e disk controller card when plugging one of the drives in. Snap, crackle... you get the picture. I opened up my freshly fried Disk II, and in the center of the board there is a 74LS125 that is blown. Replaced it (it was socketed) with the same chip from another Disk II, and voila! it works again.

I would reasonably assume that misaligning the drive connector on the controller is what blew the 74LS125 in several Apple II drives before they got to me. Note that while the genuine Apple Disk II simply lights the LED and doesn't move the head at all when this IC was blown, a Mitac drive actually ate disks. So any number of dead Apple II drives with different symptoms could have a blown 74LS125.

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From: Rubywand

**013- Last night a sound like a shotgun going off came from my 5.25" Disk ][ drive. Now it doesn't work. How can I fix it?**

The noise was probably an electrolytic capacitor exploding. Sometimes, these develop internal shorts, heat up, and blow (kind of like a sealed can of beans on a campfire).

The fix is to remove the drive cover and replace the blown capacitor. (Look for a small can-like component with goo and/or shredded foil coming from it.) Circuit board markings should help identify the component. Here are some suggested replacement values:

C2 (on +12V line): 220uF-500uF at 20V-50V  
C4 (on +5V line): 470uF-500uF at 10V-25V  
C5 (on -12V line): 10uF-50uF at 20V-50V

If there is some difficulty identifying the blown capacitor, replace it with a 500uF unit rated at 20V-50V.

Before removing the bad capacitor, note which lead is connected to the outside 'can' part and mark the circuit board where this lead is connected. This is the Negative side of the capacitor. When installing the new capacitor make sure its negative lead goes to the marked point on the circuit board.

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From: Wayne Stewart

**014- Recently I picked up two 3.5" drives at a swap meet - a Uni-disk and a Laser 128 drive. I've tried cleaning the heads; but, neither works with my IIc. What's the problem?**

The 3.5 UniDisk won't work on the earlier IIc unless the IIc has had a ROM upgrade. The Laser 3.5 is actually a Macintosh drive with the addition of an eject button. It isn't compatible with any Apple II unless it has a special controller card, which of course a IIc doesn't.

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From: Stephen Buggie

**015- Can I replace a bombed Apple II 3.5" drive mechanism with one from a Mac?**

Yes. 3.5" drive mechanisms are cheaply and abundantly available from the Macintosh world. Although Apple II users have increased their interest in 3.5" drives, these drives have declined in their utility for Mac users who have

shifted to hard drives, CD-ROM, and flopticals. Few Mac owners have use for the external 3.5" drive any more; if they have not yet discarded their external 3.5" drive, it is now in storage.

#### MAC AND APPLE II 3.5" DRIVES: SIMILARITIES/DIFFERENCES

The basic Sony 3.5" mechanism is shared by Mac and Apple II. It stores 800K of data on a two-sided disk. Unlike the IBM version with its constant rotational speed, Mac/Apple II drives maintain constant head velocity by varying the rotational speed as the head assembly approaches towards or moves away from the disk hub. Mac and Apple II drives differ in their track sectoring arrangements, so disks cannot be read directly without special translational software. The opportunity for compatible disk sharing was lost during development, because rival teams working on Mac/Apple II drives went their separate ways (Steve Weyhrich, APPLE II HISTORY, Pt. 9, 1992).

The platinum 3.5" drive supplied with the IIgs is directly compatible with the Mac, although the Mac ignores its front panel manual eject button; Mac disk ejection is handled strictly by the desktop trash icon command. An older version of the external Mac 3.5" drive lacks the manual eject button and, in its casing, is plug-incompatible with Apple II. Thanks to advice provided by Ken Watanabe, I learned that the inner mechanism is identical among all versions of 800K Mac and Apple II drives, including the internal drive mechanism in the Mac CPU. This is good news for Apple II users who wish to transplant the abundantly available Mac mechanism into their platinum 3.5" drive casing.

#### WHAT ABOUT THE APPLE UNIDISK 3.5" DRIVE?

The classic white UniDisk drive was released in 1985 as a 3.5" platform for the IIe and IIC. This release date was 18 months prior to the introduction of the IIgs. Disks written by the UniDisk 3.5 and Platinum 3.5 drives are fully interchangeable; the two models differed because the earlier UniDisk 3.5 used an intelligent microprocessor-controlled analog board to slow the data transfer rate to match the IIe/IIC parameters. This slowdown was not needed for the popular platinum 3.5 drive used by the IIgs.

Can the Mac mechanism be transplanted to the UniDisk 3.5 casing? Probably yes, but this has not yet been verified. I am reluctant to hack with the working UniDisk 3.5's attached to my IIC's. I now seek a mechanically jammed UniDisk 3.5 drive to verify whether its life can be resurrected with a Mac transplant.

#### FINDING A USED MAC 3.5" DRIVE MECHANISM

The internal DSDD 800k drive mechanism can be salvaged from any mid-vintage Mac except for early models (Mac 128, Fat Mac 512) --- those two models used a quaint single-sided 400k drive. Suitable models include the Mac Plus, Mac SE, Mac II, or other Macs that have the standard DSDD 800K mechanism --- newer Macs have incompatible high density drives. Get a genuine Mac Sony drive mechanism, not a clone; the suitability of non-Sony clones is uncertain.

Salvaged internal drives must be removed from the Mac internal mounting bracket --- take out the four side-mounted bolts, and slide the mechanism

forward. The early version of the external Mac mechanism is mounted in a plastic casing that resembles the Apple II platinum drive except that the manual eject button is absent.

Remove the mechanism from the casing, but save its round external cable and db-19 plug --- that cable/plug can be used later to adapt flat-ribbon Apple II drives for use with the IIgs or IIIc! The Mac externaldrive's plastic casing can be saved for use as a coin bank, or discarded.

You should anticipate that the older Mac drive has had plenty of use; most Mac users have fewer drives attached to their computer than is common for the Apple II.

The 3.5" drives are sturdier than hard drives, but to protect the drive's head assembly from damage during rough shipment, the seller should be asked to ship the unit with a disk inserted.

#### DISASSEMBLY OF THE APPLE 3.5" PLATINUM DRIVE

Use a well-light work area that gives you plenty of elbow room, with containers to hold bolts and other small parts. All dimensions (left/right/top/bottom/front/rear) refer to the unit's own dimensions, NOT to your own egocentric viewpoint as the observer. Standard precautions against static or other electrical damage must be followed: Discharge static frequently by touching grounded metal, wear a grounded wrist strap, hand all power OFF when attaching/removing drives, put insulating tape over the db-19 drive plug when not in use.

Move slowly and patiently when removing or inserting the mechanism from its housing ---- metal parts must not be forced or bent. These tools are needed: (a) medium and small Phillips-head screwdrivers, (b) a small pliers, and (c) a fine-tipped felt marker. This procedure was outlined in an essay by Lorne Walton (Apples BC, 1992), but many further details have been added here to facilitate disassembly and drive replacement.

The first step is to remove the worn/defective mechanism from its Apple II platinum casing. Flip the casing on its back and rest it on soft cloth. Remove the four shiny bolts from the bottom of the casing. With the unit inverted, slowly lift the bottom half-shell of the plastic casing upward and push the external cable's attached grommet towards the upper casing. The unit's bottom casing should come off cleanly.

Use the felt marker to label the unit's own main dimensions, writing on the metal internal shroud: front-bottom, rear-bottom, left side, right side. Examine the metal innards as they lie upside down in the upper casing. Note that a red and black wire pair are tucked on the inner edge of each side --- These two wires go to the eject switch (right front) and to the red in-use LED lamp (left front).

At the unit's rear, observe that the wire pairs terminate in RED and BLACK plugs. Use the felt-tipped marker to write "R" and "B" on nearby metal surfaces to identify the positions of these two plugs. These letters will help during reassembly when reinsterting the two plugs onto their proper pins. Next, use the small pliers to grasp each plug, slowly and carefully pulling it backwards to remove it from its mounting pins.

With the black and red plugs each removed, slide the top plastic cover in a rear-to-front direction, past the metal-enshrouded mechanism. The wire-pairs from the eject-button and also from the in-use LED lamp should remain tucked into their plastic side-braces.

You now hold the mechanism, enshrouded in its grey metal shielding, with the external db-19 cable protruding from the rear. Remove the two medium Phillips mounting bolts (with flat washers) from each side. Remove the single medium Phillips bolt/washer that is centered on the upper-rear metal shroud. Then lift off the upper-rear should and look inside.

Note that the round external cable terminates in a familiar IDE-20 flat-ribbon connector that plugs into the inner mechanism. Unplug that inner connector --- the small pliers can be used to rock and pull the connector towards the rear. With the IDE-20ribbon connector unplugged, the inner mechanism can be slid forward and out.

As you hold the inner mechanism in your hand, observe that a shiny thin metal shroud covers its top and sides. Use the felt-tipped pen to label this shroud's dimension: TOP-FRONT and TOP-REAR. This thin shroud should be removed by rocking it and spreading its thin side-tabs. At this point, you have the bare mechanism in your hand, with heads visible from its top perspective, and with pancake motor visible underneath.

You are now ready to begin reassembly, but pause to appreciate what is before you. Hold the old mechanism and its Mac replacement side-by-side --- they should appear identical. The date of manufacture is coded on a sticker on the pancake motor (e.g., 8809 = September 1989). Apply rubbing alcohol with a cotton swab to clean the surfaces of both read/write heads.

#### REASSEMBLY

Remount the innermost top-and-sides metal shroud, taking care that its "fingers" have clicked into place on the mechanism's sides. When properly fitted, both bolt-holes on each side will be visible through the shroud's thin metal. If the shroud does not fit, or if the bolt-holes are not seen, check with your dimensional labels to verify that the front and rear have not been reversed.

With the top/side inner shroud correctly in place, then reverse the disassembly steps: Slide the mechanism through the front of the metal shroud. Reattach the IDE-20 internal ribbon connector, align the two bolt holes on each side of the outer shroud with the mechanism and reinstall the four medium Phillips bolts and their washers. Then reattach the rear-upper shroud with its centered bolt and washer. Reassembly of the outer metal shroud is now finished!

The final reassembly task is to refit the enshrouded mechanism into the plastic outer casing. Lay the inverted UPPER plastic half-shell on the bench, with its front facing away from you.

Observe the small red or black wires tucked along the sides of the upper plastic half-shell. With the metal enshrouded drive mechanism upside down, it should be slid into the plastic top-shell, from its rear to its front. Check that the red-black wires remain tucked along the inner edge between the plastic

casing and the metal shroud. Insert the black and red plugs into their respective connectors. Note the "R" and "B" markings you wrote on the metal shroud; those markings will guide the plugs' insertion into their proper connectors.

The oblong-shaped grommet attached to the round external cable should be fitted first to the bottom plastic half-shell casing, which is then mated to the top casing. Reattach the four small shiny Phillips bolts through the bottom plastic half-shell, and you're done!

---

From: David Empson

**016- I have one 5.25" drive connected to my GS, but the System 6.0.1 Finder display shows two 5.25" icons!? How can I fix this?**

You need to change the AppleDisk5.25 driver file's auxiliary filetype from \$010E to \$0101. You can use File Manager (an NDA utility) to make the change.

For a standard GS/OS device driver, the lower six bits specify the number of devices supported by the driver (see the file type note on GS/OS drivers: FTN.BB.XXXX), so the maximum number of devices that can be supported by a single driver is 63. You should NEVER increase this higher than the original value, because the driver probably doesn't have space in its device tables to support more drivers than it originally claimed to.

The AppleDisk5.25 driver supports a maximum of 14 devices - two 5.25" drives for each available slot. (In theory, it should be able to support 16: all seven real slots, plus the built-in disk port, but Apple never completed the implementation of dynamic slot switching for drivers, probably for compatibility reasons.)

Don't change any of the higher order bits. The high order byte specifies the type of driver (\$01 = GS/OS device driver), and the top two bits of the low order byte specify the type of GS/OS driver (00 = standard).

NOTE: All of the above applies ONLY to GS/OS standard device drivers, not to GS/OS supervisory drivers, printer drivers, or anything else. See the filetype note for further information.

There is one bit in the auxiliary type which is the same for all types of drivers: bit 15 set (\$8000) indicates the driver is inactive (this is what Finder toggles when you click on the "Inactive" check box).

---

From: Neil Parker

**017- How does one distinguish between a 13 and 16-sector Disk ][ controller card?**

For a while at least, new 16-sector Disk II cards shipped with a little white circular sticker depicting a red Apple with the number "16" in the middle.

But the sticker is hardly a reliable test. A better test is to look look at the part numbers of the P5 PROM (the lower left chip on the card) and the P6 PROM (left column, second from the top).

	13-sector	16-sector
	-----	-----
P5	341-0009-xx	341-0027-xx
P6	341-0010-xx	341-0028-xx

The 16-sector PROMs may also be labelled "P5A" and "P6A".

A program can test the card type by looking at its slot ROM space. The signature bytes are as follows:

```
$Cn01: 20
$Cn03: 00
$Cn05: 03
$Cn07: 3C
$CnFF: FF if 13-sector; 00 if 16-sector
```

For example,

```
1  REM Scan the slots for Disk II interfaces
2  REM By Neil Parker
10 FOR S = 1 TO 7
20 A = 49152 + 256 * S
30 IF PEEK (A + 1) < > 32 OR PEEK (A + 3) < > 0 OR
   PEEK (A + 5) < > 3 OR PEEK (A + 7) < > 60 THEN 100
40 PRINT "Disk II (";
50 T = PEEK (A + 255)
60 IF T = 0 THEN PRINT "16-sector"; GOTO 90
70 IF T = 255 THEN PRINT "13-sector"; GOTO 90
80 PRINT "other";
90 PRINT ") in slot "S
100 NEXT
```

---

From: Dan DeMaggio

## **018- Can a Disk ][ Drive be used on a IIc or GS smartport?**

Yes. Call Jameco Electronics. Get the S20-pin header- to -DB19-pin connector module. It is intended for adapting II/II+ drives for IIc. (Part# 10022; Product name: AAM APPLE IIC ADAPTER; price: \$3.95)

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From: Rubywand

## **019- I would like to add a Read/Write indicator to my Disk ][ drive. How can I do this with a bi-color LED?**

The circuit described below works well. It shows Red for Drive Enabled + Write and Green for Drive Enabled + not Write. That is, a Read is assumed if the drive is ON and no Write is occurring. The advantage of this approach is that you always have a lighted LED 'drive ON' indicator and, so, there is no need to drill a new hole in your drive panel. The new LED can use the hole occupied by the old "in Use" indicator LED.

### Parts

IC- 74121 or 74LS121 1-Shot multi-vibrator  
Qgreen- 2N2222A gen purpose NPN transistor  
Qred- 2N2222A gen purpose NPN transistor  
Rcath- 120 Ohm 5% 1/4 watt resistor  
Rgreen- 3.3k 5% 1/8 watt resistor  
Rred- 3.3k 5% 1/8 watt resistor  
Rp- 20k 5% 1/8 watt resistor  
Cp- 10uF/10v 10% "dipped tantalum" capacitor  
LED- 2.2V 20ma 3-lead (common cathode) Green/Red bi-color LED

### Building the Circuit

IC- locate pin-1 and mark it on bottom side with white-out.  
'Dead-bug' mount the IC using epoxy in the open area near  
top-middle of board with pin-1 end pointing to the right.

connect Rcath to solder pad at - (minus) end of C2  
connect #20 wire from IC pin-7 to solder pat at - end of C2

connect Rp from IC pin-11 to IC pin-14  
connect Cp + to IC pin-10 and Cp - to IC pin-11

connect #20 wire from IC pin-14 to solder pat at + end of C4

connect a wire from IC pin-3 to end of R16 closest to 74LS125

connect Rgreen to IC pin-1 (74121 "/Q" output)  
connect Rred to IC pin-6 (74121 "Q" output)

solder transistor Qred Collector to Q1 power transistor Collector  
(solder pad area at left front of circuit board just to left of  
the power transistor). Position toward left edge of pad.

solder transistor Qgreen Collector to Q1 power transistor Collector  
solder pad to the right of Qred.

LED- connect a 3-wire 11" cable to the LED (black to center, red to  
to lead with right-angle bend, green to lead with slant bend).

Old "in Use" LED- pop off the retainer ring and push through the LED. Leave the LED mount in the hole. Cut off the LED, spread cable ends and tab over with cellophane tape. (Put old LED and ring into parts box.)

Spread apart retainer 'leaves' of LED mount (at back side of panel) to permit easier insertion of new 3-lead LED.

Run LED + cable over back of board and along bottom toward the hole in the front panel. Push through hole. (If hole is too small, use a Dremel tool and steel 'bulb bit' to slightly enlarge front part of hole.)

connect LED cable black to free end of Rcath  
connect LED cable green to Emitter of Qgreen (right transistor)  
connect LED cable red to Emitter of Qred.

position old LED cable beneath new LED cable.

connect a wire from the free end of Rgreen (on IC pin-1) to the Base lead of transistor Qgreen.

connect a wire from the free end of Rred (on IC pin-6) to the Base lead of transistor Qred.

Add epoxy to the back of the LED and holder to secure the LED.

#### How it Works

When /Enable goes low to select the Drive, the power transistor (Q1) switches ON and supplies +12V at its Collector. If there is no Write, 74121 output /Q is high, Qgreen conducts, and the LED shows Green. That is: the Green LED will light during boots and for any READS.

If the Drive is selected (/Enabled is low) and there is a Write operation and Write Protect is not ON, then, the /Write Request signal at 74LS125 pin 8 will go low. This triggers the 74121 One-Shot (at pin 3) producing an approx. 160ms pulse at 74121 output Q. For the duration of the pulse, /Q is low and Q is high. Qred conducts, and the LED shows RED to indicate WRITE.

---

From: Dan DeMaggio

## **020- What's the scoop on the 3.5" High Density drive?**

In order to do High Density on the Apple II, you will need both the High Density 3.5" drive and the Apple 3.5" HD controller. If you don't have both, you will only be able to do regular density. Of course, you will also need High Density diskettes.

Once you have collected the above items, you are in for a pleasant surprise. ProDos 8 programs not only recognize it, but most programs format and

recognize HD disks just fine. You can even boot off of a HD disk, allowing plenty of room for System Desk Accessories and such.

There are a few drawbacks: You cannot boot copy-protected software or some FTA demos. You can't daisy-chain a 5.25" on an HD card. Also, it takes up a slot, even on the GS.

---

From: Benjamin Summers

## **021- What is a "UniDisk"?**

The UniDisk 5.25 was Apple's replacement for the venerable Disk ][. It featured an updated design, tan color plastic case, a DB-19 cable, and daisy-chain port on the back to which other drives could be connected. The case color was later changed to platinum and the drive was rechristened to the "Apple 5.25 Drive".

The UniDisk 3.5 was Apple's first 3.5" drive for the Apple II line. Like the UniDisk 5.25, it had the DB-19 cable and daisy chain port on back. UniDisk 3.5 was dropped in favor of the Apple Disk 3.5, a different design, at the time of the launch of the IIgs.

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From: Mitchell Spector

One important difference you forgot to mention: The UniDisk 3.5 was an "intelligent" drive, whereas the Apple 3.5 was a "dumb" drive. There was a specialized circuit board inside the UniDisk 3.5 drive which had its own processor, memory, IWM controller and firmware. This was needed for the //c, in order for the drive to process data before sending it on to the machine (which was too slow to do the job by itself). You can easily spot a UniDisk 3.5 as it matched the snow-white color of the //c and had its access LED and eject button above the disk insert slot (the Apple 3.5 has them in-line).

---

From: Rubywand

## **022- What is a "RAM disk"; and, how do I create one on my IIgs?**

A RAM disk is a block of memory which your computer uses like a disk.

To create a RAM disk on your IIgs ...

o- Boot a ProDOS-8 or DOS 3.3 diskette; or, start your computer with no boot and press CONTROL-Reset to get to the Applesoft prompt.

o- Press OpenApple-Control-ESC (all three keys at once) to get to the Desk Accessories menu and select "Control Panel".

o- In the Control Panel menu, select "RAM Disk".

o- Set "Minimum RAM Disk Size" and "Maximum RAM Disk Size" to the the same value = size of the RAM disk you want. If you have enough RAM left over to start your operating system and run your favorite application, a good RAM disk size is 800k.

o- Press Return to set the value. Exit the Control Panel. Exit the Desk Accessories menu. Turn OFF the computer.

When you next power up your computer, your RAM disk will be ready to use.

---

From: David Empson

### **023- Which 3.5" drive/interface combinations work on a IIE?**

For the UniDisk 3.5 (model number A2M2053), you need either Apple's "SuperDrive" card or the "Liron" card. The UniDisk 3.5 is quite rare. It is a clean white color instead of greyish "platinum". It also has the eject button just above the line of the disk insertion slot, with a separate manual ejection hole.

The "Liron" card's official name is "Apple 3.5 Floppy Disk Drive Interface Card". It has the word "Liron" on the back (which is the nickname of the IWM disk controller chip, if I remember right).

For the Apple 3.5 Drive (model A9M0106 as used on the IIgs), you need either Apple's "SuperDrive" card or the third party "Universal Disk Controller" card. The drive is platinum in color and has the eject button in line with the disk insertion slot and the ejection hole is in the middle of the button.

The "SuperDrive" card's official name is "Apple II 3.5 Disk Controller Card". The card has an LED on top, and has its own processor, RAM and ROM.

For the Apple SuperDrive, you need the "SuperDrive" card. Model ID is inconsistent. Check for something like "Family number G7287".

The SuperDrive looks exactly the same as the Apple 3.5 Drive. It supports 1.44 MB high density and 720 KB double density disks as well as the 400 KB and 800 KB formats. You can use a SuperDrive with the Universal Disk Controller card, but you won't be able to use its extra capabilities, and it will behave like an Apple 3.5 Drive.

---

From: O Aaland and Michael Pender

### **024- How can I boot from my /RAM5 RAM disk? All the files are there but it just beeps at me and says 'check startup device'!?**

For the RAM disk to be bootable, you need to do a whole-disk copy of a same-size bootable diskette to the RAM disk. Or, you can initialize\* the RAM disk before you copy files to it or do an install.

\*Note: To initialize the RAM disk, click on the RAM disk icon to select it. Then, click on "Disk" on the menu bar and select "Initialize". Follow the prompts to init the disk.

Finally, in the IIgs Control Panel, go to Slots and set Startup Slot to "RAM Disk".

---

From: Ryan Underwood

**025- My 5.25" drive ruins every disk I insert. How can I fix it?**

Probably, the drive's Write signal is ON when it shouldn't be. This happens with some 5.25" drives when a 74LS125 IC on the drive's circuit board is blown. (I accidentally offset a row of pins on the //e disk controller card when plugging in a drive and blew the IC.) I removed the drive cover and replaced the 74LS125-- it was socketed-- voila! it worked again. (For possible disk-trashing fix for DuoDisk drives, see Q&A 006.)

---

From: Beverly Cadieux

**026- I have a 3.5" UniDisk drive on my GS that has performed flawlessly for years. Recently, when I try to save a file to a diskette, I get a 'Disk Full' message; but it isn't full. This happens with other diskettes, too. What's going on?**

There is a known problem when attempting to save an Appleworks file to a 3.5" UniDisk drive when the disk in the drive is write-protected. It ruins the disk for future use, and you can't save to it any more. If you try to save to that disk again later, the situation you describe will happen.

---

From: Mark R. Percival

Perhaps the cable has come loose at the back of your IIgs or there is some buildup of corrosion on the pins. I had a similar problem with an Apple 5.25" drive once that ended up beng that. Try unplugging your drive and making sure the contacts are clean and then plug it back in.

Apple II Csa2 FAQs: File Utilities, Part 10/25 Note from archiver<at>cs.uu.nl:  
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Subject: Apple II Csa2 FAQs: File Utilities, Part 10/25  
This article was archived around: 07 Jun 2009 08:31:59 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2  
Source: Usenet Version  
Archive-name: apple2/faq/part10  
Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from  
the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2FLUTILS.txt rev135 June 2009

## **File Utilities**

- 001- What are "binscii" files and how are they used?
- 002- What are .SHK files and how do I use them?
- 003- How do I get ShrinkIt or GS-ShrinkIt going on my Apple II?
- 004- How do I deal with the \$00 type Apple II files I get on my Mac?
- 005- Can I work with .zip files on my Apple II?
- 006- What are DSK, NIB, 2MG, HDV,... disk image files & how do I use them?
- 007- Where can I get ShrinkIt, binscii, DSK2FILE, ASIMOV, etc.?
- 008- I have downloaded files in "gz" format? How do I use them?
- 009- Which programs can change ProDOS filetype?
- 010- What is Copy II Plus and where can I get it?
- 011- How do I use Copy II Plus to create and convert IMG files?
- 012- How do I set write protection for an emulator disk image?
- 013- How can I create a disk image from a ShrinkIt .sdk file?
- 014- How can I convert a .po image to/from a .dsk or .do image?
- 015- What do file name extensions mean and how do I access the files?
- 016- How do I tell what kind of file this is?
- 017- How can I create new .dsk, .nib, etc. disk images?
- 018- How can I convert .dsk image <--> .nib image?
- 019- How can I convert Diskcopy images to diskette or to other formats?
- 020- How can I move files to/from .dsk and .2MG disk images?
- 021- How can I unfork forked files on my Apple II?

---

From: Rubywand

### **001- What are "binscii" files and how are they used?**

The term "binscii" comes from combining "binary" with "ASCII". A file in  
binscii form has been changed so that it can be transmitted as text to/from net  
servers and services which do not handle pure binary transfers.

Today, practically all servers can handle pure binary transfers; so, binscii is no longer in popular use. However, quite a few old A2 files are still in binscii form and binscii is used for files uploaded to comp.binaries.apple2.

To convert binscii'd files to their un-biniscii'd form, you can use a program named "BINSCII" or, on a GS, the New Desk Accessory named "GScii". These programs can, also, create binscii files.

Note: Binscii is in no way related to Binary II. Binscii changes the entire file into Text. Binary II is just a small block of bytes tacked onto the front of a file, mainly to identify the file's filetype.

---

## 002- What are ShrinkIt (.SHK) files and how do I use them?

ShrinkIt files are the Apple II world's answer to .ZIP files in PC-ville. An .SHK file is a file which contains one or more files which are almost always in compressed form. Usually, they are produced by GS-ShrinkIt (also called "GSHK" or "ShrinkIt-GS") or the Balloon NDA, or by 8-bit ShrinkIt. Some .SHK files are produced by Macs; these may not always be compatible with A2 ShrinkIt programs.

An .SHK file can be unshrunked by ShrinkIt even if it shows up on the Apple II with a TXT or BIN filetype and even if the name does not end with ".SHK" or ".shk". If a ShrinkIt file does not show up as available for unshrinking, you can toggle an "All files" option to see the file and then select it. If an .SHK file has a Binary II header, ShrinkIt will automatically remove it and assign the correct filetype. (Of course, this will usually be SHK.)

Other kinds of ShrinkIt files include .SEA and .SDK. An Apple II .SEA file is a IIgs executable self-extracting archive-- i.e. you can click it on the GS Finder and it will unShrink. There are also Mac .SEA files and these are not GS-compatible.

A ShrinkIt whole-disk archive is an .SHK file which is usually labeled ".SDK" to show that it is a Shrunked diskette. An .SDK file can archive a 3.5" diskette (both sides) or 5.25" diskette (one side). Most are archives of 5.25" DOS 3.3 diskettes produced by 8-bit ShrinkIt.

A whole-disk ShrinkIt archive retains all data bytes on a diskette, including files, Catalog/Directory sectors, empty tracks, and DOS if present. An .sdk file of a DOS 3.3 5.25" disk created by 8-bit ShrinkIt also preserves volume number-- important for some games and utilities which depend upon volume numbers to identify disks. (5.25" whole-disk archives created by GS-ShrinkIt do not preserve volume number.)

8-bit/IIe ShrinkIt can be used to fully unshrink any Apple II .SHK file except .SHK files which contain files with GS/OS resource forks and .SEA files. For this reason, 8-bit ShrinkIt should not be used to unshrink .SHK file archives containing GS programs unless you know that none of the contained files has a resource fork.

GS-ShrinkIt can handle nearly all kinds of Apple II .SHK and .SDK files. It will not handle shrunked 5.25" DOS 3.3 .SDK files created by 8-bit ShrinkIt. In fact, most users automatically use 8-bit ShrinkIt to create and unshrink .SDK

files of old 5.25" wares. (Balloon does not currently support whole-disk archives.)

Naturally, things are somewhat more crowded on 64K Apple II's. On these machines, the functions are separated. SHRINK creates .SHK files and UNSHRINK unshrinks them.

On a PC, the utility NuLib (v3.24) lets you view contents and unshrink most kinds of .SHK files. (There is a handy option to unshrink and convert Apple II text files to PC text format.) It will not unshrink IIgs files with resource forks.

Here is a simple one-line batch (text) file program for easily viewing the contents of .shk files you download to a PC (just double-click on the file name):

```
c:\nulib\nulib v %1 |more
```

The above is for NuLib.exe located in folder c:\nulib . Save the text as nulibv.bat in c:\nulib and tell Windows to use c:\nulib\nulibv.bat as the 'application to perform action' for doing an Open. (You do this by selecting View--Options in the My Computer window and editing the file type info for .shk files.)

NuLib can also convert 5.25" .SDK files into .PO (ProDOS order) disk images which can be used by Apple II emulators. This works for .SDK files produced by 8-bit ShrinkIt but not for those produced by GS-ShrinkIt.

The unshrinking process is very speedy and the size of a compressed ShrinkIt file is, often, around half that of the original files it contains. This makes .SHK files very handy for archiving your software. And, since a ShrinkIt file also preserves filetype information of contained files, ShrinkIt has become the preferred format for uploading and storing Apple II files on the internet.

---

## 003- How do I get ShrinkIt or GS-ShrinkIt going on my Apple II?

### Getting GS-ShrinkIt v1.1

If you do not already have Balloon or an earlier version of GS-ShrinkIt, there are several ways to get GS-ShrinkIt going once a file is downloaded and transferred to your IIgs. Here are the two easiest ways:

#### A. The Self-Extracting (.sea) version

A IIgs .sea file is a IIgs application which self-extracts the file contents when executed from the usual Finder desktop display. Since the file gshk.sea will, most likely, arrive as a Text type file, you will need to change the file's filetype to \$B3 (S16) before it can be executed.

Several utilities can change ProDOS filetype. If you do not have one, you can download tchange.bin and follow the directions\* in tchange\_info.txt to get it going on your Apple II.

You can find GS-ShrinkIt in an .SEA file (e.g. gshk.sea) and tchange.bin on several archive sites. (See Q&A 007 below.)

#### B. The Shrunked Disk (.sdk) version

GSUTILS.sdk is a shrunked whole-disk file which can be unshrunked to 800k 3.5" diskette using 8-bit ShrinkIt (or GS-ShrinkIt). If booted, this diskette starts a bare-bones System 6.0.1 and launches GS-ShrinkIt.

Besides GS-ShrinkIt, also on the disk (in .SHK files) are the ZLINK shareware telecom utility and ASIMOV for converting .dsk files. Coolwriter (for reading Text) is on the disk as a non-shrunked file. All of these can be copied to hard disk or to other diskettes.

GSUTILS.sdk is available on Ground in the useful.stuff/ folder mentioned above. The 8-bit ShrinkIt in a self-extracting version can be found in the same folder.

#### Getting SHRINK and UNSHRINK (for 64k Apples)

SHRINK and UNSHRINK permit 64k Apple II users to work with .SHK files. These files are usually maintained in non-shrunked form. You can find them on several sites. (See Q&A 007 below.)

To get these utilities going on your Apple II, download SHRINK, UNSHRINK, and SHRINK2PLUS.TXT (e.g. as separate files or on a .dsk disk image). Once the files are transferred to your Apple II, follow the directions\* in SHRINK2PLUS.TXT.

\*Note: If you download an Apple II file to a PC and transfer to a Mac and get filetype \$00 ("Unknown"), the process described in the directions will not work when the \$00 file is moved to your Apple II. One solution is a Mac utility to set filetype to \$04 (TXT). See ProTYPE info in the next Q&A below.

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#### Getting 8-bit ShrinkIt

From: Beverly Cadieux

The easiest way to get the current (3.4) version of 8-bit ShrinkIt going is via the self-extracting archive, SHRINK.EXE.

o- Download the file, (transfer to your Apple II if necessary,) and get into AppleSoft BASIC (run BASIC.SYSTEM and get to the AppleSoft "]" prompt).

o- Be sure to set the ProDOS PREFIX to the location of SHRINK.EXE on your Apple II. For example, if it is in the main directory of volume HD1, you would enter

PREFIX /HD1

o- Now, enter -SHRINK.EXE (that's a dash, then the file name):

-SHRINK.EXE

Shrinkit will self-extract, along with a documentation file. (ShrinkIt v3.4 consists of two files. One is a small start file which may be named "Shrinkit.System", "ShrinkitST.sys", or something similar. The other is the main program file which must be named "Shrinkit".)

You can find SHRINK.EXE in Ground's useful.stuff/ folder (See Q&A 007 below).

---

From: Randy Shackelford

### **004- How do I deal with the \$00 type Apple II files I get on my Mac?**

Some II users like to download Apple II files to a PC and transfer them to a Mac for eventual transfer to Apple II ProDOS diskettes. Unfortunately, under most circumstances, PC Exchange writes files onto ProDOS disks as extended typeless (\$00) files which are difficult to work with on the Apple II.

What you need is to get hold of a Mac application named "ProTYPE". You drag 'n drop the files on ProTYPE, then copy 'em to the floppy. The files will work then.

---

From: Rubywand

### **005- Can I work with .zip files on my Apple II?**

The GS can unZIP .zip files via PMPunZip by Paul Parkhurst.

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From: Supertimer

Tony Marques wrote Angel, the fastest unzipping utility for the Apple II. It can create .zip files, but only one file per archive.

---

From: Jim Pendarvis

To zip a file using Angel, highlight the file to zip and press OpenApple-Z. You'll get a file named ZIPDFILE.ZIP. If you then select another file to zip, it will overwrite the first one. (Don't forget to set your destination directory first. That is the hardest thing to remember about using Angel.)

---

From: Rubywand, Orgone Accumulator, Greg E. Nelson, Eric Shepherd, Roger Johnstone

## **006- What are DSK, PO, DO, HDV, NIB, and 2MG "disk image" files and how do I use them?**

A "disk image" is typically a file containing every data byte on a diskette-- i.e. Catalog tracks, files, DOS (if present) etc.. One kind of disk image, NIB, tries to preserve all disk information (e.g. sector headers, sync bytes, etc.).

Apple II emulators running on a PC, Mac, etc. treat disk image files like diskettes. Disk image files are also a handy way to archive Apple II disks on hard disk and to maintain wares on ftp and other download sites.

DSK's (.dsk, .do, .po and .hdv files)

DSK (usually .dsk) files are disk image files used by popular Apple II emulators like AppleWin to run A2 wares on the PC or Mac. Usually, they are images of Apple 5.25" game, utility, etc. diskettes. A standard 5.25" DSK file is 143,360 bytes in length:

1 side x 35 Tracks/side x 16 Sectors/Trk x 256 Bytes/Sec = 143,360 Bytes.

DSK files of 800k 3.5" disks are much less common.

Data in a DSK disk image file can be arranged in the sector order used by DOS 3.3 or in the sector order used by ProDOS. The filename suffixes relate chiefly to how data is arranged in the file:

.dsk- technically, this may be an image which has its data in DOS 3.3 or ProDOS order. (The emulator program is supposed to check a .dsk file to determine the ordering used.) It has become standard practice to use the .dsk suffix for only DOS 3.3 order files.

.do- an image which is in DOS 3.3 order. This suffix is seldom used today. DOS 3.3 order image file names usually end with ".dsk".

.po- an image which is in ProDOS order. If an image is in ProDOS order, its name should end with ".po" (not ".dsk") to avoid confusion.

.hdv- typically an image 800k (819,200 bytes) or greater in size in ProDOS order. The image is intended for use as a virtual hard disk by various Apple II and IIgs emulators (e.g. Apple Oasis). The IIgs program ASIMOV2 can create .hdv files (select "Raw image"). The file name should end with ".hdv".

Note: data order does not relate to whether a disk image is a DOS 3.3 or ProDOS disk. In fact, nearly all 5.25" disk image files (of both DOS 3.3 and ProDOS disks) are in DOS 3.3 order; and, DOS 3.3 order is the default setting for image creation programs like DSK2FILE and ASIMOV and the transfer/creation program ADT.

On a PC, NuLib can create disk images from 8-bit ShrinkIt whole-disk (.sdk) files (but not from .sdk files which were produced by GS-ShrinkIt). These images will be in ProDOS order. You can convert a .po disk image to a DOS 3.3 order .dsk by using a disk copier like Disk Muncher on an emulator to copy from the .po image to a .dsk image.

On ftp sites, DSK files are usually in a ZIPped form to conserve space. For example, on the Asimov site, narfgames.dsk.gz is a DSK file of the narfgames disk which has been g-zip compressed. Other archive sites may use standard ZIP compression and the file name might be "narfgame.zip" or "narfgame\_dsk.zip". On a PC, WinZIP will uncompress g-zipped and ZIPped DSK files.

A DSK file can be converted to actual diskette form on an Apple II using DSK2FILE or (GS-only) ASIMOV. If a 5.25" .dsk disk image file is transferred to your Apple II using ADT (or ADTgs for IIgs), it is automatically converted and written to 5.25" diskette. For more about ADT and ADTgs see Telecom-1.

Most 5.25" DSK (.dsk and .do) files are of a DOS 3.3 or some related DOS disk. The target diskette should be INITed for DOS 3.3. (or, it can be formatted using Copy II Plus, etc.) and you should use the default DSK2FILE or ASIMOV "DOS 3.3 Order" setting. If a disk image file has a .po suffix, use the DSK2FILE or ASIMOV "ProDOS Order" setting.

Note: In most cases it is okay to use either a DOS 3.3 or ProDOS formatted diskette as the target (and; the target disk does not need to be empty of any files). However, ProDOS formatting uses a default Volume Number of 1, which is different from the DOS 3.3 default of 254. Since ProDOS stuff does not care about Volume numbering and DOS 3.3 stuff may, the target disk should generally be one INITed with the default Volume Number-- e.g. INIT HELLO .

Here is a quickie step-by-step guide for getting a 5.25" DSK disk image file into useable form:

1. Download the file in binary mode from an ftp archive site via ftp:// ...
2. If file length is not 143,360, use WinZIP or equivalent to unzip it.
3. Transfer the DSK file to your GS via Mac diskette or a NULL modem transfer. One way or another, the file needs to end up on a ProDOS diskette or ProDOS hard disk volume on the GS.
4. If you are using DSK2FILE, jot down the complete path name of the DSK file (e.g. /RAM5/NARFGAMES.DSK ) because DSK2FILE will ask you to type it in.
5. Insert the formatted 5.25" target diskette into Drive 1 (Slot 6). This diskette needs to be 16-sector formatted. Plain DOS 3.3 formatting with the default Volume number is, generally, best and easiest. (You can boot a DOS 3.3 or Prontodos disk and do an INIT HELLO to format a 5.25" diskette.)
6. Start DSK2FILE or ASIMOV. Normally, you will accept the defaults (5.25", DOS 3.3 order). If you know the DSK is a ProDOS image in ProDOS order-- like the file name ends with ".PO", select "ProDOS Order". (ProDOS disk images are, fairly often, in DOS order to make them more universally transferable.)

7. Select the "Image file ---> Diskette" option, follow prompts, and you should end up with a good diskette. (If everything seemed to go well but the disk does not work, try repeating the process using the other "Order" option.)

DSK2FILE and ASIMOV can, also, create disk image (.dsk or .po) files. Similarly, using ADT to transfer a 5.25" disk automatically creates a .dsk disk image on the PC. The source disk can be for a game, etc. so long as the diskette is not copy protected.

Note: DOS 3.3 products which depend upon Volume numbering to identify diskettes will normally not work in disk image form on an Apple II emulator because Volume number information is embedded in non-data parts of a disk and is not included in a standard .dsk disk image file.

#### NIB (.nib)

Some copy protected diskettes can be converted to another kind of disk image called "NIB". Saltine's Super Transcopy (SST) incorporates bit copy routines to attempt to produce a nibblized disk image of a 5.25" diskette.

On your Apple II, SST reads the disk bytes from half a disk and stores that data on a whole normal disk. Then it does the same for the second half. These two disks can be converted to .dsk disk images and moved to a PC or Mac. There, the .dsk images are merged into a NIB image using SST running on an emulator.

If successful, you have a .nib file which can be used like a diskette on popular Apple II emulators. (For one or two older emulators, .nib files are the only useable images.)

The standard length of a .nib file is 232,960 bytes-- much larger than a DSK. However, since .nib files include sector address header and other non-data 'embedded' diskette information, they can be used to image many protected disks.

Naturally, a .nib file preserves DOS 3.3 volume numbering. This allows programs which use volume numbers to identify their disks to run on emulators. Many disks with no copy protection are in .nib form instead of .dsk because the game, etc. which uses the disks needs to check volume numbering.

#### 2MG (.2mg; sometimes .2img)

Today, more and more IIgs software is being converted to 2MG disk image format used on XGS and other IIgs emulators. These are .dsk or .nib images with a prefix (usually 64 bytes) which includes information about size, format, sector ordering, volume number, locked/unlocked, etc..

2MG files may also have a Comment and/or extra file information added following the disk image data. The format can accommodate disk images ranging from 5.25" diskette up through hard disk. For 2MG format details, see [http://apple2.org.za/gsvv/a2zine/Docs/DiskImage\\_2MG\\_Info.txt](http://apple2.org.za/gsvv/a2zine/Docs/DiskImage_2MG_Info.txt) .

The usual length of an 800k .2MG image (with no Comment or extra data) is 819,264 bytes\*.

You can use ASIMOV2 to convert .2MG files back to diskette form as well as for creating .2MG files from 800k diskettes. The utility Imgutnew.exe can be used to convert most available Diskcopy images to 2MG format on PC.

\*See ... Size Note: Transferring to 3.5" disk (at bottom of this page)

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From: Rubywand

**007- Where can I get ShrinkIt, Shrink (64k), Unshrink (64k), GS-ShrinkIt, binscii, GScii, BISCIT, TCHANGE, DSK2FILE, ASIMOV, PMPunZip, Angel, FileManager, 2qwk!, GZPK, Disk Muncher, Copy II Plus, NuLib, Balloon, DskIn & DskOut, Saltine's Super Transcopy (SST), FishWings, UnforkIt, XTRAX, StuffIt Expander, Diskcopy, Clone, Imgutnew.exe, DiskDup+, ProTYPE, MECC Copy, BlockWarden, BlockWork, ProDOSifier, DISK2FDI, CiderPress, ProDOS File Navigator, FID and Apple Commander?**

For links, see part 25 - Get it!

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**008- I have downloaded a bunch of files for the Apple II lately that are in a format called GZ. I understand it is some variation of Zip but I don't have a translator or it on my GS. Does anyone know where I can find one?**

5.25" disk image files downloaded from Asimov, mod files, and some others are, often, in GZ g-zipped format and usually have the .gz file name extension (like narfgame.dsk.gz). If you download the files to a PC, you can use WinZIP to unzip the file.

Note: Due to the use of an extra period, names of g-zip compressed files-- names such as "narfgame.dsk.gz"-- do not always survive downloading to PC's. Some setups may remove the ".gz" from the name when saving the file. In order to be correctly recognized by WinZIP, the file's name should be repaired so that it ends with ".gz".

Usually, once unzipped, an Asimov GZ image file will end up as a 143,360 byte DSK file with a name ending with ".dsk". The file may be used as a virtual diskette on an emulator like AppleWin; or, it may be transferred to a real Apple II via NULL modem and converted to Apple-readable diskette form using DSK2FILE or (GS-only) ASIMOV. (Or, it may be NULL modem transferred directly to 5.25" diskette via a version of ADT.)

If you download a GZ file directly to your Apple you can use a program named "GZPK" v2 to convert it from gzip form to a zip format which can be unzipped via PMPUnzip 2.0 or Angel. A GZ file from the Asimov site should end up as a DSK file.

---

From: lachlan\_arnott and Byron Desnoyers Winmill

On a Mac, you can use MacGzip to unZIP g-zipped (.gz) DSK files into uncompressed form. Another choice (for doing the same job as WinZIP on a PC) is Aladdin's StuffIt Expander and the DropStuff Expander Pack. These utilities can be found on many Macintosh related ftp sites. (See Q&A 007.)

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From: Slick

### **009- Which programs can change ProDOS filetype?**

I prefer More Info or Disk Witch, myself. I'll go through a list of stuff on my hard drive to manipulate filetypes:

DAs:

Alter (NDA)  
Conchshell (CDA)  
Disk Witch (CDA)  
File Manager (NDA)  
File Info2 (NDA)  
File Info Edit (NDA)  
Super Info II (NDA)  
Utilities CDA (CDA), not very good

Finder Extras:

More Info

GS/OS Applications

Instant Access

File Passage

ProDOS 8

FAZ II (File Attribute Zap II)

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From: Boris Guenter

File-A-Trix by Karl Bunker should do the job. Best of all, the latest (and last) version 1.1.1 of this program is freeware.

Since I had a few troubles with the latest version, I suggest trying both versions 1.1 and 1.1.1.

---

From: Tony Ward

I also prefer File-A-Trix. It performs a wide variety of functions including copy, move, delete, rename, catalog, make new folder, set file attributes (lock, unlock, filetype, auxtype), find file, format (floppy only), view text, Teach and AWP files. Best of all, it's a CDA that works from GS/OS and ProDOS 8, although there are some restrictions under P8 (i.e. no HFS disk access, no viewing forked Teach files, etc.)

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From: Gareth Jones

I use either File-A-Trix, Change-A-File 4.20, or Deliverance (part of the Salvation Utilities).

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From: Rubywand

Some programs which can be used to change filetype are ...

Jeff Hartkoph's File Manager- a GS NDA which lets you change Type, Auxtype, Date, and Access attributes. It is handy for modifying several files in quick succession.

Paul Parkhurst's PMPunZip- a GS application which includes an option for changing Type, Auxtype, and Access attributes. (In the File menu click on Modify File Attributes.)

Glen Bredon's ProSel (ProDOS 8 utilities)

Roger Wagner's Filetype Changer- a vintage BASIC utility which lets you change just the Type. A BRUN-able .BIN version is on Ground. (This is good enough for getting the GS-ShrinkIt .SEA file's filetype set correctly so that it can self-extract.)

---

From: Beverly Cadieux

And a biggie - AppleWorks v5.1-> File Activities, Change File Type.

---

From: Jay Edwards

TimeOut FileMaster does a great job and never argues about it. Best of all, it likes so many versions of AppleWorks.

---

From: Rubywand

## **010- What is Copy II Plus and where can I get it?**

Copy II Plus is the best general purpose utility for copying disks and managing files on DOS 3.3 and ProDOS diskettes. Most of the Copy II Plus functions also work with disk images (e.g. .dsk files) on emulators; however, COPY DISK and FORMAT are important functions which do not work correctly with emulators. Good versions which handle both DOS 3.3 and ProDOS files are 7.x - 8.x.

Note: Versions 9.x require at least an enhanced IIe and have a few notable bugs. Version 9.0's Catalog Sort option can mess up your directory. Neither version 9.0 nor 9.1 works correctly with the /RAM5 RAM disk. The best added capability of Version 9.x is being able to compare files.

No version of Copy II Plus will copy files which include a resource part, usually called a "resource fork". In some cases the copy may seem to be successful; but, it will be a mess. Only some, relatively new, IIgs files include a resource fork. No DOS 3.3 files or files intended for access under ProDOS 8 have resource forks.

The most versatile releases of the utility are, probably, Versions 7.1 and 7.2. They include the capability for creating disk images. The images are not compatible with popular emulators; but, they are a handy way to archive DOS 3.3 disks on a hard disk.

For places to get Copy II Plus in ShrinkIt shrunk disk and emulator disk image files, refer to Q&A 007 above.

---

From: tturner, Rubywand, Greg Buchner, Labelas Enoreth

## **011- How do I use Copy II Plus to create and convert IMG files?**

First, to the best of my knowledge, only versions 6.x and 7.x of Copy II Plus can create a disk image file (called an "IMG" file). The feature was gone by version 8, for sure.

To create an IMG file you COPY--> DISK to an over-size target volume. Versions 6 and 7 will create a type "IMG" file instead of complaining about a "size mismatch" (which is what other versions of Copy II Plus do). It is fairly common to end the name of the new IMG file with ".img".

Doing the opposite lets you convert an IMG file back to diskette. That is, you select the COPY --> DISK option and pick the large volume with the IMG file as Source and a blank unformatted 5.25" diskette in the Slot 6, Drive 1 drive as Destination. You pick an IMG file on the Source volume and it is transferred to the diskette.

Copy II Plus IMG files are not compatible with DSK2FILE or ASIMOV and will not work on emulators such as AppleWin. Also, not all files ending with ".img"

are Copy II Plus disk image files. I have seen ".img" (and ".image") used for Diskcopy disk image files.

---

From: Rubywand

**012- I'm using an Apple II emulator to play games. The game directions say the boot disk must have a write protect tab. How do I set write protection for a disk image?**

Under Windows on a PC, you can right-click on the file name, select Properties, and adjust the "Read-only" attribute. Checking "Read-only" turns ON write protection; unchecking it turns write protection OFF.

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From: Jon Bettencourt

On a Mac, you select the file, go up to File --> Get Info..., and click on "Locked."

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From: Rubywand

**013- How can I create a disk image from a ShrinkIt .sdk file?**

NuLib v3.24 can be used to make .po disk images from ShrinkIt 5.25" whole-disk archives-- e.g. .sdk files.

Note: NuLib v3.24 can create 5.25" disk images only for .sdk files created by 8-bit ShrinkIt (not ones created by GS-ShrinkIt). Since most .sdk files were created by 8-bit ShrinkIt, there is usually no problem.

For instance, suppose you have downloaded a whole-disk archive (.sdk file) of a 5.25" disk of modem utilities named "modem1.sdk" and wish to convert it into a disk image. For this example, it is assumed that you have downloaded NuLib v3.24 and unZIPed it and, now, have all of your Nulib stuff (nulib.exe, docs, etc.) in C:\nulib on your PC:

- o- After downloading to the PC, check the file name of the .sdk file you want to convert. The name should have from 1 to 8 characters followed by ".sdk". If it doesn't, rename the file so that it does. The file modem1.sdk follows the above rule; so, there is no need to rename it.
- o- Move or copy modem1.sdk to the C:\nulib folder.
- o- Since you are probably in Windows95 (or later) open an MS-DOS window.
- o- In the DOS window, go to the nulib folder ...

```
C:\WINDOWS>cd\
```

```
C:\>cd nulib
```

o- Enter the xd command to create the disk image from modem1.sdk:

```
C:\nulib>nulib xd modem1.sdk
```

You should get a message saying the 'NEW DISK' image is being extracted ending with "...done".

o- Exit the MS-DOS window-- e.g. click on the "X" in the corner.

o- Open the C:\nulib folder. Probably, your new disk image will be named "new.dis". Rename the new file to "modem1.po". It should show up with a size of 140k in the usual Windows listing. (If it shows size 0, go to "View" for the window and click "Refresh".)

If the new modem1.po has some size other than 140k-- like size is shown as 75k, etc.-- it means that modem1.sdk was probably created by GS-ShrinkIt and can not be converted to a disk image using NuLib. (You might as well scrap the bad modem1.po .)

Most likely, though, the conversion will work and modem1.po will be a good disk image.

---

## **014- How can I convert a .po image to/from a .dsk or .do image?**

Most emulator programs have no problem using .po, .do, or .dsk disk images. So, the usual reason for wishing to change ordering is to go from .po (ProDOS order) to .dsk (typically, DOS 3.3 order) to permit transferring the image to your Apple II via ADT. In a few cases, it may be useful to go from DOS 3.3 order to ProDOS order, too.

Since a disk copy done on an emulator (like AppleWin) adjusts ordering to match the target, doing a disk copy from, for example, a .po image to a .dsk image (in DOS 3.3 order) is a simple way to do a conversion\*. A good emulator choice for Windows users is AppleWin. A good disk copier program is Disk Muncher-- it is included on the TNILUTIL.DSK available from Ground and GSWV.

An easy way to check ordering of a bootable .po or .do disk image is to boot it under AppleWin. If it boots correctly, the ordering is as claimed-- .do = DOS 3.3 order and .po = ProDOS order. For a bootable .dsk image, you can change the suffix to ".do" or ".po" and boot it to check that it is really in the order you expect.

\*Note: AppleWin, evidently, checks the ordering of a .dsk image used as a target for copying. It does not check actual ordering of .po or .do images. So, for example, if the target image has the ".po" suffix, the copy to the image will be in ProDOS order. Some emulators may work differently.

---

From: David Kopper, Dan DeMaggio, Boris Guenter, Nathan Mates,  
Phil Abro, Rubywand, Labelas Enoreth, Tony Turner

## 015- What do the different popular file name extensions, like ".BSC", mean; and, how do I access the files?

File name extensions tell you what sort of file you are dealing with so that you will know which program(s) to use to unpack, unShrink, display, etc. the file. Many programs which create such files do not automatically add an extension-- for example, most of the disk images on the Golden Orchard CD are Diskcopy files with no name extension. Many other programs which create files suggest a default extension as part of the name-- GS-ShrinkIt generally suggests ".SHK"-- but, the user can change this and save under any legal name desired. (One popular change is using ".SDK" for ShrinkIt whole-disk archive files.)

Some extensions indicate a filetype recognized by Apple II ProDOS; but, often, the extension is just for user information or to help some utility recognize the file as one it can deal with. For such files the actual ProDOS filetype is usually TXT, BIN, or SHK.

What is it? (What program do I use?)

-----

.2MG	also .2IMG- XGS IIgs disk image file usually 800k or larger (GS ASIMOV2; PC Imgutnew.exe)
.AAF	Apple Archive Format [TEXT] for source code (aaf.unpacker)
.ACU	NuFX Applelink archive (ShrinkIt*)
.ALU	usually a multi-file, non-compressed A2 archive (ALU)
.APF	GS super-res "Apple Preferred" packed graphics format (Platinum Paint, Convert 3200, etc.)
.ARC	PC Archive (GS-ShrinkIt* or DeArc2E or PC Arc program)
.BMP	Windows Bit-Mapped graphics format (GS Convert 3200; many PC viewers)
.BNX	NuFX with BLU header. (ShrinkIt*)
.BNY	BLU archive. (ShrinkIt*)
.BQY	NuFX with BLU header. (ShrinkIt*)
.BSC	BinScii file. [TEXT] (BinScii or GScii)
.BSE	A GSHK* .SEA file with a Binary II header (ShrinkIt*)
.BSQ	BinScii'd NuFX file. [TEXT] (BinScii plus ShrinkIt* on the result)
.BXY	NuFX archive with a Binary II header. (ShrinkIt*)
.CPT	Compactor Pro archive (Compactor Pro on a Mac only)
.DIMG	Diskcopy disk image file usually produced by a Mac (GS Clone or Diskcopy; Mac Diskcopy; PC Imgutnew.exe)
.DO	a .DSK file specified as having data in "DOS 3.3 Order" i.e. uses DOS 3.3 sector ordering (A2 DSK2FILE and GS ASIMOV)
.DSK	standard emulator disk image-- length is 143360 bytes for 5.25" disk images (A2 DSK2FILE and GS ASIMOV)
.EXE	A2 Executioner file [TEXT]. (On A2; some files may EXEC properly under only DOS 3.3.)
.GIF	Graphics Interchange Format: Compressed picture (IIGIF for //e; Super Convert, ... on GS; PC, etc.: many viewers and editors)

.GZ GZip PC archive format often used for storing A2 emulator disk images (GS GZPK v2 plus PMPUnZIP or Angel; PC WinZIP)

.HDV Raw (DSK) ProDOS ordered disk image file 800K or greater in size; used by emus as a virtual hard disk (ASIMOV2 on IIgs)

.HQX Mac BinHex file. [TEXT] (BinHex on Mac or GScii)

.HTM HTML [TEXT] with embedded Text commands (Web browsers, web editors, etc.)

.IMAGE Diskcopy images (see .DIMG)

.IMG Type IMG or "user #7" Copy II Plus disk image file (A2 Copy II Plus v6.x or v7.x)  
.IMG is sometimes used for Diskcopy images (see .DIMG)

.JPG PC JPEG hi-res, hi-color graphics format (GS JPEG.VIEWER, etc. B/W only or PC, Unix viewers)

.LBR a multi-file, non-compressed A2 archive (Librarian)

.LHA LHA Archive (PC/Amiga LZH program)

.LZH LZH Archive (PC/Amiga LZH program)

.NIB emulator disk image (typical length: 232960) for protected 5.25" software (A2 Saltine's Super Transcopy)

.PCX PC graphics format (GS Convert 3200; PC many viewers)

.PD compressed GS multi-palette graphics file w/o palettes (GS SuperPac)

.PNG PC PING hi-res, hi-color graphics format (PC viewer)

.PO a .DSK file specified as having data in "ProDOS Order" i.e. uses ProDOS sector ordering (A2 DSK2FILE and GS ASIMOV)

.PS compressed GS multi-palette graphics file with palettes (GS SuperPac)

.QQ BLU archive. (ShrinkIt\*)

.SDK ShrinkIt disk image, usually NuFX-compressed (ShrinkIt\*)

.SEA Self-extracting A2 ShrinkIt\* or Mac ShrinkIt archive (depending upon kind, run on Apple IIgs or Mac)

.SHK usually an A2 NuFX-compressed archive; non-A2-compatible Mac .SHK archives also exist (GS ShrinkIt\* / Mac unshrinker utility / PC Nulib-- does not extract GS resource forks)

.SIT Mac StuffIt archive. (Stuffit on Mac or GS ShrinkIt)  
GS-ShrinkIt will not decode StuffIt Deluxe files.

.TAR Unix Tape Archive (Unix tar with -xvf option, GS EXE tar)

.TGZ Gzipped .TAR file

.uu Unix uuencode file [TEXT] (//e uudecode, Unix uudecode)

.uue Unix uuencode file [TEXT] (//e uudecode, Unix uudecode)

.TIFF Graphics format (GS SHR Convert)

.TXT [TEXT] An ASCII text file (Text editors, word processors, etc.)

.UU Unix uuencode file [TEXT] (A2 uudecode or Unix uudecode)

.UUE Unix uuencode file [TEXT] (A2 uudecode or Unix uudecode)

.Z Compressed file (GS-ShrinkIt or Unix uncompress)

.ZIP PC Zip Archive (GS PMPUnZIP or UNZIP [GS Shell EXE] or PC WinZIP, PKUNZIP, Unix unzip)

.ZOO PC Zoo Archive (GS-ShrinkIt??? or PC ZOO program)

\* Note: GS-ShrinkIt (= GSHK) can handle all ShrinkIt files except .SDK (shrunken disk) files of 5.25" DOS 3.3 disks created by 8-bit ShrinkIt. 8-bit ShrinkIt does not work for GS files having a resource fork or GS .SEA files.

---

From: Apple's ftp site ...

Most files are in one of a few common formats, and many are a combination.

```
.sit    StuffIt 1.5.1 archives
.hqx    BinHex 4.0 file
.bin    Binary file
.image  Diskcopy 4.2 image file
.txt    plain ASCII text file
.bsc    Apple II BinSCII file
.shk    Apple II ShrinkIt file
```

Most of the Macintosh files are BinHexed StuffIt files. This means you need to transfer the file, then read the license agreement which is prepended to it (with any text processor), use BinHex or any utility which can read BinHex 4.0 files to decode the BinHex to a StuffIt archive, then use UnStuffIt or the StuffIt Expander (or a similar utility) to decompress the .sit file into the final file.

In some cases the final file is a .image file. These are exact duplicates of floppy disks (with verified checksums). Use Diskcopy to convert these files into floppy disks for installation. Some Apple System Software is in this format.

Most of the Apple II files are either straight text or BinSCII'd ShrinkIt files. This means you need to transfer the file, then use BinSCII to convert the .bsc file to a ShrinkIt file, then use ShrinkIt to create the final file or disk.

Note: Apple calls their BinSCII'd .SHK files ".bsc" instead of ".bsq". It is fairly common for uploaders and ftp sites to tag any BinSCII'd file as ".bsc". The rationale is that, once a user un-BinSCII's a file, he or she will find an .SHK, .ZIP, etc. file and know how to continue.

---

From: David Kopper

## **016- How do I tell what kind of file this is?**

Here is a simple guide to help you identify a file. You should always go by filename extension first, but not everybody uses those. In Unix, you can use the 'head' command to look at the first couple of lines of a file. If it turns out to be a binary file, you may be in for a surprise. You may want to use the Unix 'file' command to find out if it is a text file or not first. Once you have identified the file, check the earlier info on filename extensions for how to deal with it.

If there are lines in the file that look like this (there can be other text before it--search for 'FiLeStArT'):

```
FiLeStArTfIlEsTaRt
ABCDEFGHIJKLMNOpQRSTUVWXYz0123456789()
GBINSCII      AQhmAAAAA8)4MIAI02DA9ARMQEDtAQhmAIVZ
gYITA6u7xADA0MjM3YTNB1DOENkQwYURzITM2UDN5gzNDJUQGVeRyEDM1QzM4c jN
CFUOFR0QxAjR0MjM3YTNB1DOENkQwAQRzITM2UDN5gzNDJUQGVeRyEDM1QzM4c jN
...
```

then you've got something encoded by BinSCII. You must decode all the parts using BinSCII. Then, if the resulting file is in some compressed form, you would use an appropriate utility to uncompress it. (For example, you would use 8-bit ShrinkIt to uncompress a whole-disk .sdk archive file.)

On the other hand, if you have a binary file which resembles:

```
NuFilei][!/#NuFX_<:c[[[ H`F-fGSCII~[
cRJ0)fNN^P)3'A2p6SF6X#GPd<9#'LC^08N7n\NB7Dd!eMN&eYX0Am=fXp
dsPAsp7rh`I'NS0ALAFi2)2ysGEQ$K9CP%L9
...
```

then you have a NuFX file (note the key words NuFile and NuFX). You should be able to extract the files it contains using ShrinkIt.

On the third hand, if you have a text file which resembles:

```
begin 666 nonsense.bny
M4W5N3U,s4F5L96%S92 T+C$s\%- $4U0V,"Ds(SsZ(%1U92!/8W0s.2 Q,CHS
M...3HT.2!%1%0s,3DY, HT
```

then you have a uuencoded file.

On another hand, if you have a text file which begins with

```
(This file must be converted with BinHex 4.0)
:$&4)48C28N0&,P009!"6593K8dP8)3%!!!#Ls!!!!!!Qie009#%!!3!!SPKb6'&
e!3!!!!!!!!!!!!#!!P8D'8J4QpbBf9P)IN33)(4$N#"d4K!JG%S!!!!!!`!'VfJ!"VP
```

then you have a BinHex file. The GScii NDA by Derek Taubert decodes BinHex files on an Apple IIGS. You can also use a variety of macintosh programs to do the decoding. There is also a Unix implementation of BinHex called mcvert.

On one more hand, if you have a text file which resembles:

```
CALL-151
E00:38 A5 FF D0 32 D8 20 8E FD AD 30 BF 8D 6A 0E 20
E10:00 BF C7 6D 0E 0D 80 02 D0 1D 20 00 BF C5 69 0E
```

and more lines like that, followed by a bunch of lines that look like:

```
A90885A420732090242039FB2058FCA200BD9220F00620EDFDE8D0F5200CFDA9
008DF2038DF3038DF4036CFCFFE6A4A5A4C96F90CFA9008DFCBFA9018DFDBFA0
A90885A420732090242039FB2058FCA200BD9220F00620EDFDE8D0F5200CFDA9
```

then you have an Executioner file.

---

From: Rubywand

## **017- How can I create 'blank' .dsk, .nib, etc. disk images?**

The simplest way to get a new .dsk or .nib is to copy an existing one and delete the files. Under Windows, you can just Right-click drag-and-drop a file in the same folder to get a copy. If you want a DOS 3.3 formatted image, pick a DOS 3.3 image to copy. If you want a ProDOS formatted image, pick a ProDOS image to copy. You can use a utility like Copy II Plus v7.4 to delete the files.

If you want a DOS 3.3 image, it's a good idea to boot DOS 3.3 and INIT HELLO the new image. This guarantees that the new image is correctly formatted. Doing an INIT also allows you to pick the version of DOS 3.3 that the new image will boot-- i.e., it will be the version of the DOS 3.3 (e.g. regular DOS 3.3, ProtoDOS, EsDOS, ...) which does the INIT. And, the INIT command allows you to set Volume Number on a .nib (which may be important if the image is supposed to work with a game, etc. which looks for a particular Volume Number).

DOS 3.3's INIT works fine as a way to format images; but, the routines used by many utilities are not reliable. In general, you should be wary of using utilities like Copy II Plus and Apple's ProDOS Utilities to handle formatting of images on an emulator.

Another way to obtain fresh disk image files is to download 'blank' .dsk and .nib images from the Apple II archives which offer them.

However you create or obtain a 'blank' disk image of the sort you want, once you have one, you can save future bother by making multiple copies of it-- e.g. via multiple drag-and-drop copies-- and naming the copies something like "D33blank1.dsk", "PDblank1.dsk", "D33blank1.nib", etc..

---

## **018- How can I convert .dsk image <--> .nib image?**

You can use a whole-disk copier such as Disk Muncher to copy from one to the other. For .nib --> .dsk, the .nib must not be a copy protected image.

For a .dsk --> .nib copy on an emulator using most whole-disk copiers, one result will be to set the Volume Number of the .nib to the default assigned to the .dsk. For example, converting a normal .dsk image this way will result in a .nib with VN set to 254.

If you want to 'convert' from .dsk to .nib without changing the VN of the .nib, use a copier that transfers just the contents. The old Apple program, COPYA, will do this if the program is modified to eliminate formatting of the target disk. Change the Line which does the INIT (usually Line 250) to ...

---

## **019- How can I convert Diskcopy images to diskette or to other formats?**

Diskcopy is a Mac disk image format with names ending in ".dimg", ".img", ".image", or with no suffix. (Sometimes, incorrectly, ".dsk" is used.) The typical length of a Diskcopy file used for an Apple II 800k image is 838,484 bytes\*. On a Mac, you can use the Mac Diskcopy utility to convert diskettes to images or images to diskettes.

On a IIgs, you can use Clone or Diskcopy to convert a Diskcopy image to diskette. (It may be necessary to set filetype to \$E0 and auxtype to \$0005 in order for the file to be recognized as a Diskcopy image.)

Clone is more user-friendly. Both utilities work fine for converting Diskcopy images (such as those on the Golden Orchard CD) to 3.5" diskette. If the Diskcopy file was created under a version greater than 4.2, you will probably need to do any conversions on a Mac which can run a later version of Diskcopy.

On a PC, the XGS utility Imgutnew.exe can be used to convert most available Diskcopy images of Apple II software to 2MG image format. The Diskcopy image name may need to be changed (spaces removed, etc.) to fit PC DOS format in order for Imgutnew.exe to work.

\*See ... Size Note: Transferring to 3.5" disk (at bottom of this page)

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From: Charlie Danemark and Andy McFadden

## **020- How can I move .shk and other kinds of files to/from .dsk and .2MG disk images?**

If you are using Windows 95 ('98, 'Me) you can use FishWings or CiderPress to import .shk and other kinds of files onto .2MG or .dsk disk images formatted for ProDOS. You can also export files from disk image to your PC.

---

From: Rubywand

## **021- How can I unfork forked files on my Apple II?**

You can do it 'by hand' using a block editor to change filetype, etc. information in a directory block; or, you can use UnforkIt. UnforkIt is a BASIC program by Ivan Drucker which splits a forked file into two files, neither of which is forked.

---

Size Note: Transferring to 3.5" disk

Although 2MG, Diskcopy, and some other 800k image formats have file sizes greater than 800k, on a ProDOS diskette they will often occupy a good deal less space. You will often be able to transfer such files (e.g. via a NULL modem connection) to an Apple II 800k diskette so long as you employ a protocol which does not pre-send size information, such as X-modem.

Apple II Csa2 FAQs: Games, Part 11/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Games, Part 11/25  
This article was archived around: 07 Jun 2009 08:32:01 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2  
Source: Usenet Version  
Archive-name: apple2/faq/part11  
Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2GAMES.txt rev135 June 2009

## **Games**

- 001- Where can I get games for my Apple II?
- 002- Where can I find hints, docs, pics, and other game information?
- 003- Where can I get game creation programs and information?
- 004- What are some games in double-hires?
- 005- Which IIgs games will not run on a ROM 3 IIgs?
- 006- Where can I find out about A2 Infocom & Infocom-style games?
- 007- What games, etc. are on the 'Asimov Want List'?
- 008- For disk space used, what is your favorite Apple II game?
- 009- Where did the Apple II Game Gods go?
- 010- Are there any games which play 'old Apple II' music during action?
- 011- Are there any new games for the Apple II/IIgs?
- 012- How do I get my Apple II game site listed in the FAQs?
- 013- How do I play the games?

---

From: Rubywand, Zeprfrew, Charles T. Turley, John Beatty,  
Netrunner68, Marc Sira, Swigg, Steve Evans, Jm

### **001- Where can I get games for my Apple II?**

There are many places you can get Apple II software, especially games:

- o- Local Apple II Users Group (may be part of a Mac Group in your area)
- o- Sellers of original and second-hand software (See ads on the comp.sys.apple2.marketplace newsgroup and sites, like KulaSoft, A2Central.com, and Shareware Solutions II.) Also check the Apple II FAQs Vendor listings:

Csa21MAIN3.txt  
<http://home.swbell.net/rubywand/A2FAQs3VENDORS.html>

o- Regular posters to this newsgroup will often send diskettes with some utilities and games for the cost of diskettes and mailing.

o- Apple II archives maintain large collections of software which you can download via PC and transfer to your Apple II. See the Apple II FAQs Game Site and Major Site listings:

Csa21MAIN3.txt

<http://home.swbell.net/rubywand/A2FAQs7GAMESITES.html>

<http://home.swbell.net/rubywand/A2FAQs4MAJORSITES.html>

---

## **002- Where can I find hints, docs, pictures, and other game information?**

Several of the larger game archives offer docs, hints, cheats, and walkthroughs. Fewer go into copy deprotection and copying.

Three very good collections of Apple II game hints, docs, cheats, and solutions are on ...

Apple II Textfiles

<http://www.textfiles.com/apple/>

Asimov or an Asimov mirror

[ftp://ftp.apple.asimov.net/pub/apple\\_II/documentation/](ftp://ftp.apple.asimov.net/pub/apple_II/documentation/)

GS WorldView's Archive

<http://apple2.org.za/gswv/a2zine/Docs/>

You can find screen shot and game box pics-- great for making disk labels-- on some sites; but, no single archive or web page offers anything like a comprehensive selection.

Author, publisher, and historical information is relatively rare. One site, The Giant List, does a good job listing game authors along with their games, publishers, and dates.

If a game or series has its own web site, this will often be the best place to look for docs, support materials, pictures, and author/publisher info. Good examples are sites for Ultima, Bard's Tale, Infocom games, and the games published by Penguin/PolarWare.

For links see the Apple II FAQs Game Site listings:

Csa21MAIN3.txt

<http://home.swbell.net/rubywand/A2FAQs7GAMESITES.html>

---

## 003- Where can I get game creation programs and information?

There are a number of gaming systems which include Apple II software for creating games. Examples which continue to attract new authors are Eamon (Text adventures) and Explorer/gs (Ultima-style adventures).

For links see the Apple II FAQs Game Site listings:

Csa21MAIN3.txt

<http://home.swbell.net/rubywand/A2FAQs7GAMESITES.html>

---

From: Thry, Mitchell Spector, Rubywand, Kevin Loesch, John L. Graham,  
Edhel Iaur, Shawn T. Beattie, Kelly Petriew

## 004- What are some games in double-hires?

Below is a listing of Apple II games which are entirely or mainly in double-hires.

Air Heart  
Aliens  
Arthur  
Bad Dudes  
Batman  
Battle Chess  
Black Cauldron  
California Games  
Card Sharks  
Columns  
Corruption (Text/Dhgr)  
Crossbow  
Death Sword  
Destroyer  
Dragon Wars  
Empire  
Global Commander  
Gold Rush  
Heavy Barrel  
Hunt for Red October  
Impossible Mission II  
Indiana Jones and the Temple of Doom  
Ikari Warriors II  
Into the Eagle's Nest  
Journey  
King's Bounty  
King's Quest (I, II, III, IV)  
Labyrinth  
Last Ninja  
Legend of Blacksilver  
Leisure Suit Larry in the Land of the lounge Lizards  
Los Angeles Crackdown

Manhunter  
Maniac Mansion  
Might & Magic II  
Mixed-up Mother Goose  
Neuromancer  
Pipe Dream  
Platoon  
Police Quest  
Press your Luck  
Qix  
Rad Warrior  
Rampage  
Robocop  
Shogun  
Space Quest  
Space Quest II  
Spiderbot  
Spy vs Spy III  
Star Trek: First Contact  
Strategic Conquest  
Street Sports Baseball  
Street Sports Basketball  
Street Sports Football  
Street Sports Soccer  
Temple of Apshai Trilogy (optional hires or double-hires)  
Tetris (Hgr/Dhgr)  
The Games : Summer & Winter Edition  
Thexder  
Transylvania (Dhgr version)  
Victory Road  
Universe II  
World Games  
Zork Zero

---

From: Sevag, ...

### **005- Which IIgs games will not run on a ROM 3 IIgs?**

Some older GS games have been converted to run on a ROM 3. These are games that I found to not work (I tried all versions):

Alien Mind (cracked version)  
MJ Basketball  
Shuffle Puck  
Captain Blood  
Skate Or Die  
Star Wizard

and one demo:

Weaky Demo

---

Update

I found a version of Streets Sports Soccer that runs on ROM 3-- it's the one without the crack screen on bootup. So that game is gone from the list now.

---

From: Rubywand

## **006- Where can I find out about Infocom & Infocom-style games I can play on my Apple II?**

A good start is a series of fantasy game articles published, mainly, in the August through November 1999 issues of GS WorldView and since added to from time to. These are now interlinked for easy perusal.

The articles cover 1990's through early 2000's interactive fantasy competition releases, Infocom's Lost Treasures I and II, a 'missing Lost Treasure', plus some more recent Zork series releases. Coverage includes brief descriptions plus download links. A convenient way to get into the articles is to go to GSWV's Archive at ...

<http://apple2.org.za/gswv/a2zine/Sel/index.html>

and click on "Infocom & Infocom-type Adventures".

---

## **007- What games, etc. are on the 'Asimov Want List'?**

Games and related wares which users have requested be uploaded to Asimov (at [ftp://ftp.apple.asimov.net/pub/apple\\_II/incoming/](ftp://ftp.apple.asimov.net/pub/apple_II/incoming/)):

### Disks

Arcade Volume I from Key Punch Software- It had several nice action games by "Rod" or "Hot Rod" including Sea Hunt and Galactic Glider.

Berzerker Raids

Car Builder

Conflict in Vietnam (probably needs to be in .nib form)

Cross Country Canada

Dragon Fire (not the arcade game)- The title screen had inversed text, centered, and it said DRAGON FIRE; definitely low-res; the maze is a rip off of Super Dungeon and Dragonmaze. I think the character was four squares big, and was red. ... Probably from Level 10.

Empire II: Interstellar Sharks (1982, EduWare)

Empire III: Armageddon (1984, EduWare)

Gertrude's Puzzles (The Learning Company)

Gertrude's Secrets (The Learning Company)

Gwendolyn (1983, Artworx) picture-text adventure

Hot Rod and Hot Rod 2

Ice Demons- You use the paddles to control 1 or 2 characters that shoot arrows at demons that emerge from platforms of ice. One of them was a

happy face; one of them was a happy face with sunglasses.  
John Madden Football  
La Femme qui ne supportait pas les ordinateurs (The woman who couldn't  
stand computers) by Chine Lanzmann  
Match Boxes (Broderbund)  
Music Construction Set (mouse-capable version)  
Pride and Prejudice  
Quintic- listed in Nibble Vol 7 No 2, February 1986  
Rogue Trooper  
Sign of the Wolf  
Silent Service (8-bit version)  
Star Warrior  
Starflight 1 and 2 (PC only?)  
Thunder Cloud  
Toy Shop (Broderbund)  
Transportation Transformation  
Wizard War  
Worms

#### Docs

Genetic Drift (instructions and hints)  
Three Mile Island

#### Other

Apple Intercourse

#### Found!

Wings Out of Shadow (Berserker Works) - Sallyraphael (aka Knockstump)  
Star Crystal (Ba'rac Limited) - Sallyraphael (aka Knockstump)  
Odell Lake - Chris M.  
Super Dungeon (Programma) - aghwerhefw  
Think Quick - Sam  
Kaves of Karkhan (LEVEL-10) - Mike Maginnis  
Karateka II, both parts - Sallyraphael (aka Knockstump) and xorxif  
Alkemstone (LEVEL-10) - xorxif and Mike Maginnis

---

From: Mookie Harrington, A2MG, Paul Guertin, Tony Turner, Matt Jenkins,  
Donald C. Lee, Dennis Doms, John L, Roy Miller, Jay Edwards,  
Joe Kohn, John Minkov, Michael Crimlisk, Mary Sauer, Dave Althoff,  
Rubywand, A2BOBR, GSMANIAC, Erik Struiksma

### **008- For the space used on disk, what is your favorite Apple II game?**

Here are the results from postings to Csa2, Cea2, and Apple II forums on  
Delphi:

Airheart

Ali Baba  
Alice in Wonderland  
Alien Mind  
Archon  
Aztec  
Balance of Power  
Bard's Tale  
Bard's Tale II  
Boulder Dash  
Bounce It  
Brickout  
Castle Wolfenstein  
Caverns of Freitag  
Choplifter  
Computer Baseball  
Conan  
Dark Forest  
Dark Heart of Ukrul  
David's Midnight Magic  
Death Sword  
Drol  
Eamon games  
Elite  
Epoch  
Flight Sim II  
Hadron  
Infocom text adventures  
John Madden Football  
Journey  
Karateka  
Kings Quest I, II, and III  
Lady Tut  
Legacy of the Ancients  
LemminGS  
Lode Runner  
Marble Madness  
Masquerade  
Mean 18  
Montezuma's Revenge  
Moon Patrol  
Ms. Pacman  
Olympic Decathlon  
Panzer Battles  
Pick 'N' Pile  
Pitfall II  
Prince of Persia  
RasterBlaster  
Reach for the Stars  
Rescue Raiders  
Robot War  
Robotron 2084  
Rocky's Boots  
Scott Adams' Adventure games  
Serpentine  
Shanghai  
Sherwood Forest  
Silent Service

Skyfox  
Sneakers  
Space Quest: The Sarien Encounter  
Spare Change  
Stellar 7  
Struggle for Guadalcanal  
Super Bunny  
Swashbuckler  
Sword of Kadash  
Tetris  
The Lurking Horror  
Thexder  
Ultima  
Ultima IV  
Up 'n Down  
Wasteland  
Wavy Navy  
Wayout  
Where in the World is Carmen Sandiego?  
Wings of Fury  
Wizardry I - Proving Grounds of the Mad Overlord  
Wizardry V  
Wolfenstein 3D  
Wraith  
Zany Golf  
Zork  
Zork Zero

---

From: John Romero

## **009- Where did the Apple II Game Gods go?**

Interesting bit of info: about a year and 1/2 ago, i was touring Sculptured Software in Salt Lake City, UT. I had just finished talking to the Mortal Kombat team and was rounding a corner, passing some offices and i noticed a name on the door, "Peter Ward". I instantly thought, "NO WAY!". There was a guy in the office and i said, "Are you Peter Ward????!!"

The guy said, "No, Peter is at home, sick right now."

Me: "Is that the same Peter Ward that created Black Magic for the Apple //?"

Him: <slight pause> "Wow. You are the ONLY person i've ever met that knew that. That was a LONG time ago!"

Me: "Oh man, i am a BIG fan of Peter's work. I even have some of his earlier stuff -- South Pacific Quest, remember that one?"

Him: "Nope. I gotta tell Peter about this!"

I've never heard from Peter though.

Another interesting tidbit: remember Threshold? It was THE COOLEST Space Invaders clone ever to grace an Apple // screen (actually it was more of an Astro-Blaster clone). It was created by Warren Schwader (he also did that Cribbage game that had a bad bug in it.) Well, back in March 1992, we of id Software travelled to Sierra (Online) to show them a pre-alpha version of Wolfenstein 3D. Sierra was interested in buying id Software back then (for a very, very CHEAP price!) and we wanted to show them our new 3D technology to get them all juicy. Well, i was asking Ken Williams if he knew where any old Apple // guys were and he said he had ONE still working at Sierra. He brought us into a room with an older guy and said, "This is Warren Schwader." Instantly, i was saying, "We're not worthy! We're not worthy! Threshold was a KICK ASS game! You created a legend!"

Sierra balked at our asking for a \$100K advance payment on the buyout, so the deal died and we released Wolfenstein 3D.

That summer of 1992, just after Wolf3D was released, John Carmack and i drove to Kansas City for one of the last A2-Central conferences. We brought a laptop and a copy of Wolf3d with us because, lo and behold, Tom Weishaar got ahold of Silas Warner (creator of the original Castle Wolfenstein) and had Silas give a seminar. What a night. Carmack and i sat out in the hallway for hours talking to Silas and Bill Heineman about all kinds of old A2 stuff. We have an original Wolf3D manual with Silas' signature on it. It's framed. :)

Am i on a roll or what? I have even more info....

As soon as The Secret of Mana was released, i bought it because i absolutely LOVE Squaresoft's games. I worship at the altar of Squaresoft. :) As soon as i plugged the SNES cart in, I just sat to watch the demo. (BTW: always, ALWAYS sit and watch game demos. Lots of work goes into them and sometimes there's very useful stuff there.) I was reveling in the beautiful music and unfolding Mana Tree graphic when the first line of the credits scrolled up. "PROGRAMMED BY NASIR."

OH MY GOD! THE ULTIMATE DEITY OF THE APPLE // GAME IS STILL PRODUCING SOME OF THE BEST GAME SOFTWARE AVAILABLE! (sorry 'bout the caps.)

I was blown away. If you want to experience the epitome of 65816 game programming after 15 years of practice (5 of that being 6502), get The Secret of Mana for SNES and luxuriate in the masterful codesmithing of Nasir once again. Nasir is one of the Old Ones, alongside Bill Budge, Bob Bishop, Olaf Lubeck, Don Fudge, etc, etc. I could go on and on. I remember every game and every name.

And here's another one... :)

In 1995, i went to the Computer Game Developer's Conference in Santa Clara. It was fun seeing and talking to other game designers. Well, at the CGDC there was a Job Fair, which is where people go to get information on various companies so they can try to get a job there. There were many companies represented at the Job Fair. This is so funny: Dan Gorlin was at the Job Fair and he walked over to the Broderbund booth and talked to them. He even had a name tag on, but the Broderbund people HAD NO IDEA WHO

HE WAS!!! The creator of one of Broderbund's biggest titles (okay, a while ago. :) was TREATED LIKE A WANNABE GAME PROGRAMMER!!! I mean, we're talking about the guy that created Choplifter and Airheart! Amazing! I mean, how many other games of Broderbund's have been ported to a stand-up coin-op? NONE!

Well, I haven't heard about what Dan's been up to nowadays, but.....another one of Broderbund's previous blockbuster programmers HAS been busting his hump for a while on the NUMBER 2 RPG game of 1995 (voted by GamePro magazine)! The name is Doug Smith and the game is The Secret of Evermore (SNES). What did Doug do for Broderbund??? Well, he ONLY CREATED LODERUNNER!!!! Sierra just brought Lode Runner back into the light recently, since they had it updated for the PC.

Whew. That tired me out. But i have more. If anyone here is an old Apple II game fanatic, i'd love to trade email with ya. Especially if you have any juicy info on Where Are They Now?

```
+-----+
| John Romero          |
| johnr@idsoftware.com |
| id Software, inc.   |
| Release date: When it's done. |
+-----+
```

---

Nov 2003 Update

I have an incredible amount of information to share regarding the whereabouts of several Apple II legends....and also write about the amazing Apple II Reunion that I had back in 1998 in Dallas at my company Ion Storm. I have 6 hours of videotaped interviews with Nasir, Bill Budge, Warren Robinnett, etc.. I also have an audio cassette with interviews of Dan Gorlin, Joel Berez and others. I need to get this stuff in MPG and MP3 form... Hopefully in the next few months I'll be doing that.

John Romero  
Project Lead, Design Lead  
Midway Home Entertainment

---

From: ANO\_NYMOUS and Erik Struiksma

## **010- Are there any Apple II games which play music using 'Old Apple II' sound while action is happening?**

Try Microwave by Jim Nitchals and Jay Zimmerman. Jim worked on sound drivers with Steve Hales (primarily for the Mac) under the company name Halestorm. The company and its technology was later sold to Thomas Dolby's Headspace.

Another game that plays music through the speaker while your character moves is Dig Dug.

In both games the sound is a bit on the choppy side.

---

From: Rubywand

## **011- Are there any new games for the Apple II/IIGs?**

Yes. Games introduced since the late 1990's include ...

Eamon #242: The Dungeon of Traps (in GSWV's Archive\*, click "Games")

Garden ( <http://drhirudo.pdroms.de/> )

GShisen 2000 (on A2Central.com)

Infocom-style Text games: HLA Adventure, Zork UU, and many others (in GSWV's Archive\*, click "Infocom & Infocom-type Adventures")

Santa Paravia and Fiumaccio: The Tournament Edition (in GSWV's Archive\*, click "Games")

Shipwrecked (in GSWV's Archive\*, click "Games")

Silvern.Castle (on Ground; see Collections folder for Jeff Fink; also check A2Central.com)

Sparks (in GSWV's Archive\*, click "Games")

SuperMarioBros/gs (on IIGS Haufbrauhaus)

SuperQuest v5.51 (in GSWV's Archive\*, click "Games")

Tom Bomben ( [http://www.deater.net/weave/vmwprod/tb1/tb\\_6502.html](http://www.deater.net/weave/vmwprod/tb1/tb_6502.html) )

Ultima/gs (Shareware Solutions II)

Wolfenstein-3D (On Sheppyware)

\*GS World View's Archive page

For links to sites mentioned, see ...

Csa21MAIN3.txt

<http://home.swbell.net/rubywand/A2FAQs4MAJORSITES.html>

To add a new game to the FAQs, email [rubywand@swbell.net](mailto:rubywand@swbell.net) . Include "Apple" in the message title.

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## **012- How do I get my Apple II game site listed in the FAQs?**

Send an email describing your site to the Apple II FAQs maintainer at [rubywand@swbell.net](mailto:rubywand@swbell.net) . Include "Apple" in the message title.

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## 013- How do I play the games?

You have several options:

1- Download disk images (e.g. .dsk, .nib, .2mg files) and use these as virtual disks to play the games on a PC or Mac via Apple II or Apple IIgs emulator software. Popular Apple II emulators include AppleWin and Apple Oasis.

Normally disk images will be in .zip or .gz compressed form when downloaded. Use WinZip or a similar utility to uncompress these files.

For more emulator references and download info, see Q&A 003 in Csa2APPLICS or (html) <http://home.swbell.net/rubywand/Csa2APPLICS.html#emu> .

For info about disk images, see related Q&A in Csa2FLUTILS or (html)<http://home.swbell.net/rubywand/Csa2FLUTILS.html> .

2- Download and uncompress the disk images of games you want to play. Then, transfer the images to your Apple II (or IIgs)-- e.g. using a NULL modem connection and either a dedicated .dsk transfer utility like ADT or a general telecom utility such as ProTerm, Modem MGR, or Spectrum. On your Apple II or IIgs the images can be converted to diskettes.

Many Apple II and IIgs games are also in compressed ShrinkIt form. These may be whole-disk (.sdk) files or file archives (.shk files). Sometimes ShrinkIt files are maintained in .zip form; which means you will need to use WinZip or a similar PC/Mac utility to uncompress them to .sdk or .shk form after downloading. After transferring to your Apple II or IIgs, use 8-bit ShrinkIt or GS-ShrinkIt to uncompress the ShrinkIt file.

ShrinkIt disk archives usually yield a DOS 3.3 or ProDOS disk which you boot to play a game. ShrinkIt file archives for a game usually yield one or more files and a program intended for running under ProDOS. Some file archives yield files intended for execution under a shell (such as ORCA/M) or via an interpreter (such as Frotz or one of the 'Lost Treasures' Infocom interpreters).

For more about transferring files, see Csa2T1TCOM or (html) <http://home.swbell.net/rubywand/Csa2T1TCOM.html> .

3- Go to a website which lets you play Apple II games on-line.

Besides the above, other routes may involve using Apple II software which can directly access some images (i.e. without conversion to diskette) or using an Apple II board in your PC or Mac.

Apple II Csa2 FAQs: Hard Disks & SCSI, Part 12/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Hard Disks & SCSI, Part 12/25  
This article was archived around: 07 Jun 2009 08:32:03 GMT  
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Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2HDNSCSI.txt rev135 June 2009

## **Hard Disks & SCSI Interfaces**

- 001- How difficult is it to add a hard drive to my IIgs?
- 002- What kinds of hard drive systems are available?
- 003- What do SCSI ID numbers mean?
- 004- What is "SCSI-2" and how is it different from SCSI-1?
- 005- Will a SCSI-2 hard drive work with an Apple II system?
- 006- Will my Rev. C SCSI Card work with a SCSI-2 drive?
- 007- What is SCSI "termination power"?
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- 025- Where can I find Profile maintenance and formatting info?

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From: Bradley P. Von Haden

## **001- How difficult is it to add a hard drive to my IIGS?**

Adding a hard drive is not much of a problem. Usually, you will need to insert an interface card, possibly connect a cable or two, and change a Slot setting in the Control Panel Desk Accessory.

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## **002- What kinds of hard drive systems are available for Apple II users?**

The most versatile and most common hard drive set-up is an internal SCSI interface card and an external SCSI drive. Hard drives, cd-rom drives, removable media (SyQuest, Iomega), flopticals, and scanners all can be added to the SCSI chain. Insert the card in a slot, connect a cable or two, and change a slot setting.

The preferred SCSI card is the RamFAST Rev. D SCSI card. The next best card is the Apple Hi-Speed SCSI card.

Here are some RamFAST notes:

- faster than Apple Hi-Speed, especially in ProDOS
- provides termination power to the SCSI chain
- allows partitions to be mapped in ProDOS
- device drivers come on the card in the upgradeable ROM chip (3.01f)
- allows up to 8 devices to be added to the chain
- allows up to 12 partitions to be active at any one time (switchable)
- allows up to 12 partitions per drive
- about \$130 new

Here are some Apple High Speed notes:

- no longer produced or supported by Apple
- does not provide termination power to the SCSI chain (can be modified to provide termination power)
- does not allow partitions to be mapped in ProDOS
- device drivers are software
- allows up to 7 devices to be added to the chain
- allows over 100 partitions to be active at any one time
- allows up to 20 (?) partitions per drive
- about \$110 new (if still available)

For the hard drive itself, look for a SCSI drive in an external enclosure with the following features:

- 30 day money-back guarantee
- external SCSI ID switching

- dual 50 pin SCSI connectors
- no or switchable termination (use an external terminator at end of SCSI chain)
- switchable termination power (on/off) is a plus for users of SCSI interface cards which do not supply termination power

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From: Rubywand

Another way to go is a 2.5" IDE drive mounted on an IDE interface card. This "hard card" plugs into a Slot-- usually Slot 7. Alltech sells the Focus Hard Card in varying sizes (e.g. 60MB for \$99) with system software installed. SHH Systeme offers the FileCard (about \$170 + cost of drive) as well as a series of IDE controller cards to which you can add a 2.5" IDE drive (about \$120-\$170 including mounting kit).

The IDE hard card approach offers speed and capacity comparable to SCSI, very easy installation, and, it eliminates hassles with external boxes and cables. Of course, you will still need to add a SCSI interface card if you want to connect a SCSI CD-ROM and/or Zip Drive.

Note: If you want your system to include a SCSI CD-ROM drive, it is best to have a SCSI Zip Drive or SCSI hard disk connected to the SCSI interface, too. This provides a write-able medium for saving SCSI interface card setup parms.

---

From: Rubywand

### **003- What do the SCSI ID numbers mean?**

SCSI ID numbers identify devices on the SCSI chain. Each device should have its own, unique ID number in the range 0-7. (If two devices on the SCSI chain have the same ID number, there will be a conflict and your system will not function correctly.) Higher numbered devices have higher priority-- get 'looked for' first-- so, it is standard practice to set the device you boot from to 6 or 7.

Most external SCSI devices have a thumbwheel switch, slide switch, or jumper block on the back to set ID number. Some, like the Creative x2 CD-ROM drive let you click through 0-7. The Zip Drive lets you pick 5 or 6. (By the way, SCSI ID numbers have nothing to do with which Slot the SCSI interface card is in.)

---

From: David Empson

SCSI ID 7 is usually special because the Apple SCSI and Hi-Speed SCSI cards count as a device set to ID 7 by default (and every Macintosh has a hard-wired SCSI ID of 7). The only thing that is special about ID 0 is that it is the standard ID used for an internal drive on a Macintosh.

There is no problem using SCSI ID 0 on an Apple II. On a RamFAST SCSI card, it is also safe to use SCSI ID 7 for a drive. The RamFAST doesn't have a SCSI ID, but every other SCSI card does.

---

From: David Empson

## **004- What is "SCSI-2" and how is it different from SCSI-1?**

For hard drives, "SCSI-2" basically means that the drive supports a stricter command set. The physical interface is usually identical.

For other device types, "SCSI-2" means a lot more, because the original SCSI standard didn't define much in the way of device types and command sets, so most devices use proprietary command sets. SCSI-2 standardises the command sets for most types of devices.

There are three special types of interface that you might see mentioned:

"Fast SCSI" supports data transfer at twice the speed of the original SCSI standard (10 MB per second vs 5 MB per second). This will not be a compatibility issue, as it is just the maximum transfer speed supported by the drive. The Apple II cannot transfer more than one megabyte per second.

"Wide SCSI" uses a different cable arrangement to double the width of the data path (16 bits instead of 8 bits). A wide SCSI drive cannot be used with an Apple II, unless it can also operate in "narrow" mode with the original 50-pin connector. (There is also "Fast Wide SCSI", which doubles the data rate and the width of the bus.)

"Differential SCSI" involves a different type of interface to the computer, where every data signal has a balanced positive and negative pair of wires, rather than a single wire and a ground line. I believe it has a different type of connector. Differential SCSI drives cannot be used with an Apple II."

Some drives use a proprietary connector, but the standard (narrow, non-differential) SCSI bus uses the same 50-pin connector for SCSI-1 and SCSI-2.

The only significant problem you might run into is termination, and supply of termination power. SCSI-2 devices tend to be fussier about termination than older devices.

---

## **005- Will a SCSI-2 hard drive work with an Apple 2 system?**

Usually, yes. I'm on my second Quantum drive that is described as "SCSI-2".

There is a major caveat to this answer. Some newer drives require a host which implements the arbitration phase of the SCSI communication dialogue. The RamFAST doesn't do this, and as a result there are some drives that cannot be

used with a RamFAST SCSI card. A notable example is the Quantum Fireball series. However; the Trailblazer and all older Quantum models work fine.

---

## **006- I have a plain ol' Rev. C SCSI Card, will this work with a SCSI-2 drive?**

My Quantum LPS240 is working fine on an original Apple SCSI card.

Note: With the original Apple SCSI card, the card itself is not terminated, so if you are connecting more than one device, you need to add a second terminator between the computer and the first drive (using a "pass-through" external SCSI terminator, or internal termination on the first drive).

---

## **007- What is SCSI "termination power"?**

At least one device (SCSI card or any SCSI drive) must provide power for the SCSI terminators by feeding 5 volts onto the TERMPWR line on the SCSI bus.

Usually, termination power is fed through a diode to prevent backfeeding from a higher voltage source in case some other device is also supplying termination power. A good implementation will have a fuse to protect against shorts and a capacitor to cope with a sudden rise in termination power drain.

The Apple SCSI cards do not provide termination power (though some recent Apple Hi-speed SCSI cards were modified by Apple to provide termination power). The RamFAST SCSI card can supply termination power.

If a drive can supply termination power, I recommend letting it do so. The TERMPWR line can, in some cases, represent a significant load on the +5V rail going to the Slots. Both of my Quantum drive mechanisms provide termination power to the SCSI bus, avoiding the need to supply it from anywhere else.

---

From: Rubywand

On the RamFAST SCSI RevC card, DIP switch #1 is set to ON to supply termination power. On other RamFAST SCSI cards, a jumper is placed at JP1 to supply termination power.

According to RamFAST documentation, it is okay to have the card set to supply termination power whether or not another device does with a few notable exceptions. If a connected hard disk (e.g. a Sider drive) has a sticker saying that the drive supplies termination power and that the interface must not, then the RamFAST must be set to `_not_` supply termination power.

---

From: LJSilicon

**008- I just reinstalled System 6.0.1. Now every time I cold boot I get this message 'RamFAST/SCSI is searching the SCSI bus for devices' and have to wait several seconds. WEIRD?!**

When you reinstalled the software, the RamFAST set itself for a long search. This is an option that you can change using the RamFAST utility. What it is doing is giving your scsi devices a chance to spin up. If you want a fast check, go to the options menu on the utilities and reset the Short Timeout option there to "YES".

---

From: David Empson

**009- I would like to make my own SCSI cable. Does anyone on csa2 know the pinout for the standard 50-pin SCSI cable?**

The cable pinout is documented in the technical reference manual for the Apple High-Speed SCSI card (and the original one as well).

This pinout is not a simple mapping from one end to the other; it is NOT easy to make one of these yourself. Apart from any issues of wiring errors, you also need a properly shielded cable to minimise noise being picked up or radiated. You should definitely not use a ribbon cable.

Here is the pinout, assuming I haven't made any typos (I can't see any).

DB-25	50-pin	Function
1	49	-REQ
2	46	-MSG
3	50	-I/O
4	45	-RST
5	44	-ACK
6	43	-BSY
7	16,18,19	Ground lines
8	26	-DB0
9	20,21,22	Ground lines
10	29	-DB3
11	31	-DB5
12	32	-DB6
13	33	-DB7
14	1,2,3	Ground lines
15	48	-C/D
16	4,5,6	Ground lines
17	41	-ATN
18	7,8,9,11	Ground lines
19	47	-SEL

20	34	-DBP
21	27	-DB1
22	28	-DB2
23	30	-DB4
24	23,24,25	Ground lines
25	38	TERMPWR

The unlisted pins in the 50-pin connector (10, 12, 13, 14, 15, 17, 35, 36, 37, 39, 40, 42) are ground.

Note: the numbers for the 50-pin connector are counted along each row, like a Dsub-25. They are NOT the wire numbers in a ribbon cable.

---

From: Steve Reeves

**010- Is there some patch for SCSIHD.DRIVER to make it ignore APPLE\_DRIVER43 driver partitions?**

Yes; you can change the counter in the string comparison routine that checks for the "Apple\_Driver" partition type string so that it only checks the first 12 characters. This counter is at byte \$3574 in the System 6.0.1 SCSIHD.DRIVER file and is originally \$1F. Change this to \$0B and the driver will then ignore "Apple\_Driver43" partitions.

If you make this or any other patch to the driver, I also you recommend you bump up the version number. Change byte \$01FF from \$10 to \$2E (for version 6.02 experimental).

---

From: Harold Hislop

**011- Someone told me there's supposed to be a bad bug in the ROM 3.01e RamFAST. What is it?**

Don't use the built in backup/restore in 3.01e!!! The restore operation will nuke the partition map on the drive being restored to, as well as all existing partitions on that drive!

---

From: Bradley VonHaden

**012- What are correct HS SCSI settings, etc. for a Bernoulli drive? My system is as follows:**

ROM 1 Apple //gs  
4MB AE RAM card  
8MHz ZIP GS  
Apple High-Speed SCSI card  
90MB Bernoulli hard drive

System 6.0.1

Three things I can think of to check:

One possibility is DMA compatibility. If your memory card is not DMA compatible, then switch 1 on the Apple HS SCSI card should be open (up).

Another possibility I guess is a SCSI ID conflict. The Apple HS SCSI card's ID at the factory is set to 7. Here are the Apple HS SCSI card switch combinations:

note1: Switch 1 controls DMA; open (up) turns DMA off  
note2: Switches 2-4 control SCSI card ID  
note3: 'U' means open (up), 'D' means closed (down),  
'z' means Set for correct DMA (see note1)

SWITCH:	1234	1234	1234	1234	1234	1234	1234	1234
SETTING:	zUUU	zUUD	zUDU	zUDD	zDUU	zDUD	zDDU	zDDD
CARD ID:	0	1	2	3	4	5	6	7

Third, the scsi chain needs termination power to work properly. This is different from termination. Both are required for a properly functioning scsi chain. It is possible that neither the Bernoulli drive nor the Apple HS SCSI card is supplying termination power. If this is the case, and there is no other device on the scsi chain to supply said power, it probably won't work. There is a modification (requires soldering skills) to the Apple HS SCSI card to make it supply termination power.

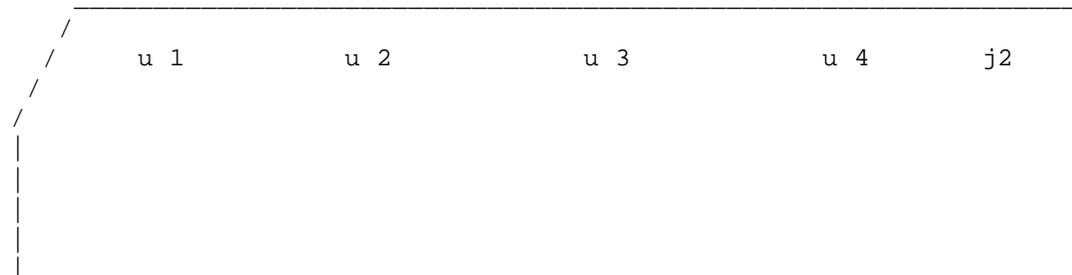
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From: Jack Countryman IAC

**013- I want to configure a CMS hard drive controller card to run a 20 meg drive for a //e. Could someone supply info on settings?**

According to the CMS manual for the 1990 ROM, the six sets of eight pairs of jumpers (u1....u6) are for the following purposes.

Note: This description of the jumpers is only true for the 1990 ROM. On the 1987 ROM the jumpers have a different usage.





- u 1: Boot Scan delay....manual shows no jumpers here in default configuration
- u 2: first (left) jumper is 'Enable I.C.P. (Yes/No)', middle 6 not used, last (right) is 'multiple initiators (Yes/No)'...manual shows no jumpers in default configuration
- u 3: Selection phase time out delay....I believe this sets how long the card waits for the drive to come up to speed(?)...manual shows the default as having 4, 5, and 7 with jumpers installed
- u 4: Arbitration phase time out delay....manual shows default as no jumpers installed
- u 5: Bus Free phase time out delay...manual shows default as jumper on number 1
- u 6: Interrupt recovery delay....manual shows jumpers on 3, 4, and 5

J1 and J2 are single sets of pins. The manual says J2 is not used, but J1 is to be jumpered.

The card I have here, came out of a IIGS where it was hooked to first a twenty meg CMS drive, and later a forty meg CMS drive. It has the following jumpers set (for use with 1990 ROM only):

- u1: jumper on 7
- u2: no jumpers
- u3: jumpers on 4, 5, and 7
- u4: no jumpers
- u5: jumper on 1
- u6: jumpers on 3, 4, and 5
- j2: no jumper
- j1: jumper

As I recall, this setup yeilded a rather long pause for the hard disk to come up to speed (about 40 to 45 seconds) that we found necessary at the time to avoid boot problems.

---

From: Andrew Roughan

The CMS SCSI card has three ROM revisions.

The 1987 ROM uses jumpers on the card to define the partitions on the drive. These partitions cannot be greater than 32MB and only two partitions are supported. The manual should be considered a MUST HAVE.

The 1989 ROM is similar to the 1987 ROM in functionality, but it has an annoying habit of shutting down the drive after a period of inactivity. It needs an access attempt to start it up again, but this access will return a failure error code (ok when you can redo the action but not too good otherwise :). A plus in its favour is that the jumper settings are available from the utility software. Because of this, the manual is not a necessity.

The 1990 ROM gets around the problem of jumper based partitions by assuming that each partition on the drive will be 32MB (or as much as is left less than 32MB). This ROM will therefore support > 60MB of storage on multiple drives. The drawback is that only two partitions can be accessed at a time. The ROM supports switching them in and out at boot time (hold down the Open Apple key). The jumper settings are once again available in the utility software.

For the sake of compatibility with the Apple Partition Map, (do you wish to use the same drive on a RamFAST or Apple SCSI card? or on a Macintosh?) the CMS SCSI card should not be considered.

However if you just wish to access one 60MB SCSI hard drive from an Apple II, then the CMS card will do the job well.

The CMS SCSI card has one advantage over the RamFAST and Apple SCSI cards. It can be used to share a hard drive between computers. For example it is possible to use two 1989 ROM cards (in an Apple //e and a //gs) to share a 60MB drive with a second //gs which has a 1990 ROM card.

The CMS utilities disks for all ROM versions are available on the following mirror of the ground archive:

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple8/Utils/>

CMS.NOV87.SHK  
CMS.OCT89.SHK  
CMS.APR90.SHK

I also scanned in the manual for the 87 ROM and currently host it here:  
[http://home.datacodsl.com/kalandi/apple/CMS88\\_OwnersManual.pdf](http://home.datacodsl.com/kalandi/apple/CMS88_OwnersManual.pdf)

The manual is also available on GSWV at <http://apple2.org.za/gswv/a2zine/Docs/> .

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From: B.J. Major

## **014- Does it matter when I power-ON my SCSI hard disk?**

From the Apple IIgs Owner's Reference, page 267:

"In order for the Finder to recognize a hard disk, the hard disk must be switched on and up to speed before you start up (or restart) the computer.

Switch on the hard disk, wait about 10 seconds for it to come up to speed, and then restart the computer."

From the Macintosh User's Guide for desktop Macs, page 216:

"IMPORTANT: Always turn on any external SCSI devices connected to your Macintosh before turning on the computer itself. Otherwise, your computer cannot recognize the SCSI devices."

---

From: Randy Shackelford

**015- Can I leave SCSI devices I'm not using OFF when I turn ON my GS?**

If it were not okay, I would have fried plenty of hardware. I do this all the time. I have seen no problems with having some devices off. As I have mentioned, I keep my magneto optical off most of the time; and, my buddy who uses my 700 now has a flatbed scanner and leaves it off most of the time. Both work fine.

---

From: Daniel L. Miller

**016- Is there a generic SCSI tutorial available for downloading?**

Yes. Bus signals, commands, etc. for the Small Computer Serial Interface are described in the text resource file R008SCSITUT.TXT .

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From: Rubywand

**017- What is the correct time-out setting for a Focus hard drive?**

Supposedly, the purpose of having the Focus spin down and stop after 2, 10, or whatever minutes of idleness is to prevent over-heating and unnecessary wear. After a few days of trying various TO settings, I set my "Time Out" to "Never" and have had no problems with over-heating or crashes even after many all-day sessions.

---

From: Harold Hislop, Dan Brown, Rubywand

**018- How do I modify my Apple Computer High-Speed or Rev C SCSI card to supply Termination Power?**

The Termination Power modification for Apple SCSI cards consists of adding a diode. The mod for each card is shown in resource file R009SCSIMOD.GIF.

The High-Speed card pic shows a simple sketch of the back of the Apple High Speed SCSI card near connectors 26-33. The directions say that you connect a 1N914 diode between two points:

The anode (non-banded end) of the diode goes to the \*top\* of L1. The cathode (banded/striped end) of the diode goes to the >bottom< of RP2

The pic shows the \*top\* of L1 to be a solder pad (just a solder pad with no trace showing) a little ways up from a point between connectors 32 and 33.

The >bottom< of RP2 is just a bit up and to the left of the \*top\* of L1. It is the lowest of several points (the pic shows 8) arranged in a vertical column and should have a trace going off to the left.

The other pic shows where to connect the diode on an Apple Rev C SCSI card.

---

From: Scott G

### **019- Can I get a Focus drive bigger than a couple hundred MB?**

Get a 40MB Focus Hard Card from Alltech. Get an 800MB IDE 2.5" Quantum GO-drive from Computer Shopper sources for pennies. Replace the original drive on the Focus Hard Card with the big one (VERY easy and self-explanatory, just use a screw driver). Low level format, partition, and high level format. That's it!

---

From: Gary Black

### **020- On my ROM-03 GS the hard disk is connected to a CMS SCSI card. How do I install System 6.0.1?**

It turns out that the SCSI drivers that come on the Sys 6.0.1 Install Disk downloaded from ftp.apple.com are incompatible with CMS ver 3.0 (and probably earlier) SCSI cards.

What I did was to replace scsi.manager and scsihd.driver in the System 6.0.1 Install disk SYSTEM/DRIVERS folder with scsi.manager, scsihd.driver, AND CMS.driver from the CMS Utility disk.

With the replacement scsi drivers installed, the Install disk recognizes the hard drive and installation went smoothly from that point. (The CMS files are dated 1989 and 1990, so they are a bit older than the 6.01 files, which are dated 1993. But, they work!)

---

From: Scott G

**021- How is DMA set for SCSI cards with 8MB RAM cards on the GS?**

DMA needs to be turned off with the Apple HS SCSI card or the RamFAST revision C card. It does not need to be turned off with the RamFAST revision D card (differentiated by being half sized). Current RamFAST cards are revision D as are late model CV Tech cards. It is the RamFAST revision D that is designed to DMA into any RAM card, even 8MB models. It was made around the time of the CV RAM 8MB model that turned into the RAM GS Plus, but functions just as well with the Sirius card.

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From: Louis Cornelio

**022- My 20MB Focus bombs and there's some goo on the card. A fix?**

The goo is leaking from the drive due to a failed seal which seems to plague some of the older Conner drive modules. The fix is to check with the seller of the drive for a replacement. At Alltech, a good Apple II person to contact is Tony Diaz.

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From: Joe Walters

**023- Where can I find the RamFAST manual on the net?**

You can find the RamFAST manual at ...

<http://apple2.org.za/gswv/a2zine/Docs/RamFASTManual.txt> (Text file)

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Docs/> (.BSQ binscii file)

<ftp://apple2.tffenterprises.com/pub/apple2/miscinfo/> (.BXY ShrinkIt file)

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From: Chuck Newby

**024- How can I tell which Apple SCSI card I have?**

The Apple High Speed SCSI card has a set of Dip Switches on it; the Rev C doesn't, and the ROM chip date is older than 1989, if it shows at all. The Apple SCSI cards older than REV C don't work in my IIe or IIgs.....

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From: Supertimer

The Apple High Speed SCSI card has a printed label on one of the chips showing the name "Sandwich II" on it.

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From: David Empson

The ROMs for the three (non "High Speed) Apple SCSI card firmware revisions are ...

341-0112A revision A firmware  
341-0112B revision B firmware  
341-0437-A revision C firmware

There is only one firmware revision for the high-speed card

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From: Patrick Schaefer and Dakin Williams

## **025- Where can I find Profile maintenance and formatting info?**

See the ProfileHardDriveMaintenance.txt file on Ground at ...

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/upl2000/Apr/> .

Apple II Csa2 FAQs: Hardware Hacking, Part 13/25 Note from archiver<at>cs.uu.nl:  
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The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from  
the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2HDWHACK.txt rev135 June 2009

## **Hardware Hacking**

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- 002- How can I use a thermistor to read temperature on my A2?
- 003- Will a prototyping Slot Board fit all Apple II's with Slots?
- 004- What is the pinout for the Apple II series Slots?
- 005- I've been getting Fatal System Error 0911. Is there a fix?
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- 007- How do I replace my GS "BatRAM" battery?
- 008- Is there a program to record/restore Control Panel settings?
- 009- How I can safely clean out dust from my Apple II?
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- 024- What No Slot Clock chip should go in my IIC+ and where?
- 025- Where can I find Apple II socket, etc. pinouts?
- 026- What IC do I need to use the GS-RAM Plus in my Apple IIgs?
- 027- Where can I get prototyping boards that fit Apple II Slots?
- 028- What are the numbers and functions of major Apple II ROMs?
- 029- What is the C-One?
- 030- How can I whiten my browned Apple II case, KB, mouse, etc.?

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From: Paul Guertin

**001- Could anyone suggest a good project book for the Apple IIe. I'm interested in using an old box for tracking the temperature in a water bath.**

Vernier software publishes a book called "How to Build a Better Mousetrap" which contains 14 hardware projects for the Apple II. Project #6 is a temperature probe connected to PDL0.

ISBN for the book is 0-918731-16-X.  
Vernier Software ( <http://www.vernier.com> )  
2920 S.W. 89th Street  
Portland, Oregon 97225 USA  
(503) 297-5317

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From: Sheldon Simms

A good book is Inside The Apple IIe by Gary B. Little. It isn't a project book, but it does have a good chapter on using the Game I/O connector for "electronics experiments."

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From: Cyrus Roton

**002- How can I use a thermistor (a resistor which has a variable resistance related to ambient temperature) to read temperature on my Apple II?**

You can connect a thermistor to a paddle input and supply a voltage to the other end. Current flows through the thermistor to charge a .022 mfd capacitor inside the apple2. When the paddle is read, the apple2 discharges the capacitor and resets a timer. Then the cap is allowed to charge. When the charge reaches the trigger level (3.2 volts) the timer is stopped and the count is read out.

The lower the value of the thermistor, the faster the charge and the lower the count. Also, the higher the voltage, the faster the charge. A resistance of about 120K with a 5 Volt supply will give a count of about 250. You can add an external capacitor across the paddle input (to ground) to increase the charging time (if needed)

The formula is  $\text{charge} = \text{input volts} * (1 - \exp(-t/RC))$

So, you can use a supply voltage and external capacitor as required to fit the resistance value of the thermistor (or other resistive component). Probably, the best way to find the correct values would be to try a variety of values and plot

the "count" as a function of the variable resistance. Then compare the plot against the resistance curves for the thermistor (probably not linear), and work out some conversion formula to use in your program to correlate "count" to temperature.

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From: David Empson

### **003- Can I use the same prototyping Slot Board for all of the different Apple II's with Slots?**

Prototyping boards certainly would be the same for the II, II+, IIe, and IIgs. The slots on all slotted Apple IIs are physically identical

There are minor differences between the slot signals on the various machines and on some slots in the same machine, mostly affecting rarely used special pins. (See Question 004 for more details on signal differences.)

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### **004- What is the pinout for the Apple II series Slots; and, what differences are there in Slot signals from machine to machine?**

Here is a quick summary of the Apple II series Slot signals:

Pin 1: I/O Select ( $\$Cn00-\$CnFF$ , where n is the slot number).

Pins 2-17: Address bus A0-A15.

Pin 18: Read/Write.

Pin 19: unused on the II and II+. On the IIe and IIgs, this has composite horizontal and vertical sync on slot 7, and is unused on other slots, except for slot 1 on the IIe only, which has a diagnostic function to disable the oscillator on the motherboard.

Pin 20: I/O Strobe ( $\$C800-\$CFFF$ ).

Pin 21: this is the RDY input to the micro on all machines, but it behaves a little differently in the IIgs, or in a machine with a 65802 installed.

Pin 22: this is the DMA pin on all machines. Again, there are special issues for doing DMA on the IIgs which can cause compatibility problems.

Pin 23: this is used for the interrupt daisy chain (out) on all Slots except 7. In the IIe only, this pin can be connected to the GR signal (graphics mode enabled) via a motherboard modification.

Pin 24: DMA daisy chain out.

Pin 25: +5V.

Pin 26: Ground.

Pin 27: DMA daisy chain in.

Pin 28: Interrupt daisy chain in.

Pin 29: Non Maskable Interrupt.

Pin 30: Interrupt Request.

Pin 31: Reset.

Pin 32: this is the INHIBIT pin on all machines. This behaves differently on all three machines: the II and II+ only allow the \$D000-\$FFFF ROM area to be inhibited. The IIe allows RAM to be inhibited as well, but has strange interaction with main and auxiliary memory. The IIgs only allows this signal to be used if the machine is running in slow mode.

Pin 33: -12V.

Pin 34: -5V.

Pin 35: unused on the II and II+. On the IIe and IIgs, this is the colour reference signal on slot 7 only. It is unused for other slots in the IIe, except for slot 1 where it provides a poorly documented facility to disable the keyboard address decoding. On the original IIgs, slot 3 provides the M2B0 signal (Mega II Bank 0) via this pin and it is unused on other slots. The ROM 3 provides M2B0 for slots 1 to 6.

Pin 36: 7 MHz system clock.

Pin 37: Q3 - Asymmetrical 2 MHz clock.

Pin 38: Phase 1 clock (1.023 MHz).

Pin 39: something called "USER 1" on the II and II+, which can be used to disable all I/O decoding if a modification is made on the motherboard. On the IIe, this pin provides the SYNC signal from the micro, which indicates an opcode fetch. On the IIgs, this pin provides the M2SEL signal, which indicates that a valid slow memory access is in progress. This pin must be used by IIgs cards that decode the address without use of the IOSEL, IOSTRB or DEVSEL pins.

Pin 40: Phase 0 clock (1.023 MHz).

Pin 41: Device Select (\$C0n0-\$C0nF, where n is the slot number plus 8).

Pins 42-49: Data bus D7-D0.

Pin 50: +12V.

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From: Rubywand, David Kopper, Guenther Unger, Gabriel Hawkins, Michael Mahon

**005- I've been getting Fatal System Error 0911 and when I do the internal diagnostic it gives a system bad : 09010001. Is there a fix?**

Fatal System Error 0911 and Self-Diagnostic Test 09010001 mean the same thing: You are, very likely, experiencing one of the following malfunctions:

o- Temperature-sensitive ADB IC

This problem was first identified in a 1988 article in issue #58 of *Computist*. If your IIgs is a true ROM-01 (produced starting in mid-late 1987) or a ROM 3, you are very unlikely to have an ADB IC with this defect.

Otherwise ... A guess would be that you are running a ROM-00 machine which has been upgraded to ROM-01. If this is the first time you've noticed the '0911 problem, it is likely that this is the first summer you've owned and used this particular machine.

Many early GS's come with an ADB IC which malfunctions over a narrow range of relatively low temperatures. Rooms are normally cooler during summer; so, this is when the error pops up most frequently. Some users first notice a plague of '0911 crashes after adding a System Saver-GS (which increases cooling).

Note: Some reports have attributed '0911 crashes to overheating of one of the two main ADB IC's. So far, it looks like these reports are cases of misinterpreting the actual failure syndrome-- i.e. warming up a cool IC enough to get into its failure region.

'0911 bombs can occur 'any time' but they usually happen at startup and when doing OpenApple-CTRL-ESC accesses to the Desk Accessories (CDA's, Control Panel, ...) menu. As the machine warms up, '0911 crashes tend to become less likely.

The bad news is that there is no 100% fix except to replace the temp sensitive ADB IC-- hard to do since it is soldered to the motherboard and, in any case, known-good replacements are difficult to find.

As to which ADB IC-- there are two, the ADB Controller and the ADB GLU-- our notes say the ADB Controller; but, we could have easily misidentified the function back then and the ADB GLU IC 'clicks' better with memories of the fix. (The ADB GLU IC is a square IC near the right front of the motherboard.)

Note: The easiest way to identify the temp sensitive IC is to apply the fix (below) and see if it works. If it does, fine. If not, it is easy to move the fix to the other IC. For now, my suggestion is to try the ADB GLU IC first.

Since the problem is coolness, a decent cure is to tape a small 12V bulb (e.g. a 20-30 ma. panel light bulb) to the top of the ADB IC. Use duct tape and try to enclose the bulb and IC in a kind of mini-oven. Run the leads from the bulb to the +12V Fan power pins near the back left area of the motherboard.

The idea is to quickly warm up the IC. I used a scheme like this on our early GS and 0911 bombs dropped from 4-5 per day to 2-3 per week. If you can safely power the bulb via an external power module (e.g. a calculator or radio 'AC adapter') so that the bulb can be ON at least a few minutes before powering up the computer, 0911 bombs might disappear entirely.

o- Defective keyboard, loose connector on KB, and/or a bad KB cable

Some users report that swapping in another keyboard cured their '0911 crashes. In the same vein, a loose connector socket in the KB or a bad KB cable would be worth checking for.

o- System noise and/or lowered motherboard voltages

If '0911 crashes suddenly appear after an accelerator or other power-sucking board is added, it is fairly likely that the added load has increased system noise and, possibly, also lowered motherboard voltages.

One possibility is that your power supply needs to have heavier leads swapped in. Also, you may need to jumper some of the power traces feeding Slots on the motherboard. For more discussion about this see Q&A 005-007 in Csa2POWER.txt.

A defective power supply on the way to failing is another possibility. A failing power supply is more likely to be the culprit if '0911 crashes appeared 'from nowhere'-- i.e. nothing was changed, no new board was added, etc..

o- Poorly socketed Expansion Memory card

With power turned OFF, try removing and replacing your Expansion Memory card.

---

From: Rubywand

## **006- My GS control panel keeps resetting to the defaults and forgetting the date between power-ups. What's wrong?**

Most likely, your battery-- also called the "BatRAM battery" needs to be replaced. When the GS is OFF, the battery supplies power to the clock and its attached 256-byte RAM. This small RAM is where Control Panel settings are 'remembered'.

If, upon power-up, the GS believes the Control Panel settings have been messed up due to a low battery, it will reset the settings to their default (check-marked) positions.

---

From: Rubywand, Duncan Entwisle, Jerry Cline, Bruce Baker

## **007- How do I replace my GS "BatRAM battery"?**

The standard GS battery is a 3.6V Lithium type rated at 1.2AH. It is called the "BatRAM" battery because it keeps the Battery RAM and Clock IC going when you turn OFF power. To get to the battery, you must disconnect the AC cord and pop out the Power Supply.

If you have a ROM 03 GS, you can slip out the old battery and slip in 'one like it'. On the ROM 01 GS, you will need a Lithium battery with leads you can connect to cut-off leads from the old battery-- about 3/4" each for most connection methods-- remaining on the motherboard. Be sure to mark the "+" lead on the motherboard with white-out.

Night Owl Productions used to sell a convenient "Slide-On" Lithium battery made by Tadiran. It came with springy ends that would slip over the cut-off leads from the original GS battery.

Radio Shack sells a few models of 3.6V Tadiran Lithium batteries. Mostly, these have smooth ends and are intended to fit into a holder-- for example, one model is "AA" size. Connecting an insulated size AA holder and using a size AA 3.6V battery is one way to handle BatRAM replacement now while making future replacements easier.

Another Radio Shack 3.6V Tadiran Lithium battery comes as a small rectangular insulated pack with red and black wires going to a plug. From the catalog illustration, it appears that the plug could be fitted onto the cut-off leads if these were long enough to be shaped to match the plug's connectors. (If you decide to have long cut-off leads, it's a good idea to slip heat-shrinkable tubing over the leads to insulate them for most of their length.)

It may be that your best bet for getting a good BatRAM replacement battery is All Electronics (800-826-5432; <http://www.allcorp.com> ). Their catalogs often list 3.6V lithium batteries with and without wire leads in various sizes at low prices.

If you like, you can always solder, crimp, etc. insulated leads going to some plug or socket which matches the connector of a particular battery you'd like to use. Whatever, make sure that the new battery's "+" lead connects to the "+" lead on the motherboard.

For connecting solid wire bare leads, you can use the spring connectors from a Radio Shack electronics experimenter kit or just wrap the new battery's leads around a large sewing needle to make them springy. The springy leads can then be slipped over the cut off leads on the motherboard. Another non-soldering approach is to use "wire nuts".

Should you do any soldering to the cut-off leads, use good quality rosin core solder (e.g 63 Tin multi-core) and try to avoid long heat exposure. You do not want to melt the connection at the motherboard. Similar concerns apply to soldering to the new battery leads. With good solder and clean leads it should be possible to "tin" each lead and make the connections in a few seconds for each operation.

Especially if you are joining bare leads to bare leads, you could end up with more bare wire than you are comfortable with. Check that the bare leads do not touch anything they should not. Bend the leads as required and position the new battery so that nothing will bump into the Power Supply when it is replaced.

The usual recommendation for this kind of work is that the computer be OFF. This reduces the risk of damage should a bit of solder, a wire, etc. fall onto the motherboard.

When disposing of the old battery, snipping off its leads at the battery to reduce the chance of a direct short is a good safety measure. It's hard to be sure an old battery is completely dead; and, a direct short could produce enough heat to burst the battery and/or start a fire.

GS users are sometimes shocked to discover that a replacement battery may cost \$8 to \$13. This has led to suggestions that 2-3 standard 1.5V cells in a holder be used. While any number of lower-cost replacement setups can work, this is pretty close to a classic 'you get what you pay for' situation. Regular 1.5V cell combos reportedly crater in about a year. A 3.6V 1.2AH Lithium battery is routinely good for at least 5 years.

Our old Nite Owl battery is going on year 8 or 9. That's a lot of years without having to worry about burst and leaking cells or needing to pull the Power Supply and mess with swapping-in replacement cells.

---

From: Rubywand

**008- Is there a program to record my Control Panel, etc. settings and restore them after the GS BatRAM battery is replaced?**

Yes. A number of users have created programs to Save and Restore BatRAM values. The one included as a FAQs Resources file is named "BATRAMMER". It is in file R007BATRAMM.zip. After unzipping the downloaded file, use ShrinkIt or GS-ShrinkIt to unpack the file.

---

From: Adalbert Goertz

**009- How can I safely clean out dust from my Apple II's motherboard, case, and expansion cards?**

I use a Dustbuster. Block one exit vent and aim the other vent as a blower into the computer. That Dustbuster has strong lungs!

---

From: George Rentovich

**010- I'm afraid that oxidation on pins may be causing bad contacts and memory problems. How can I remove the oxidation without resorting to sand paper?**

Tarn-X works great for removing oxidation from chip pins without a lot of work or risk in harming the chips.

Soak the chips in a shot glass until all black oxidation is gone; then, remove the chips and put them in another shot glass with alcohol to rinse. I use a third shot glass with alcohol again to be sure and, then, take out the chips and let dry.

---

From: Rubywand

**011- Recently I was using my GS and smoke started coming from the inside. Now my ADB peripherals (KB and mouse) don't work! It looks like the smoke came from an 8-legged module in the upper leftmost corner right behind the composite video connector and ADB jack. What's wrong? How can I fix my GS?**

The module you are talking about is L2 "D-15C". This is an 8-pin thing containing four inductors (coils). Three inductors are used. They are in series with the ADB Desktop connector. Evidently, one of the inductors burned out. This would explain the smoke and the loss of ADB functioning.

The three inductors run ...

pin 1 to pin 8  
pin 2 to pin 7  
pin 3 to pin 6

You can use an Ohm meter to detect which one is open. (Example: the correct reading from pin 2 to pin 7 would, probably, be less than an Ohm.) Since the pin2-pin7 inductor connects to +5V on the pin7 side, it is the best candidate for a burn out should pin2 somehow have been shorted to ground.

Note: Jon Christopher reported that when his L2 module bombed it was due to a short in a spliced-on KB cable. It turned out that the resulting burn out fused some of the inductors together inside the module. So, if you detect any break after such a burn out, it is probably best to just remove the module and replace all three inductors.

Replacing the inductors should be fairly easy, although it will probably be necessary to remove the motherboard. The value of the inductors is not critical,

so 15-20 turns of small wire-- like wirewrap wire-- wrapped on a pencil or screwdriver shaft will make a small coil you can use. Make three coils.

After removing the damaged L2 module, use an Ohm meter to check for a short to ground at pins 1, 2, and 3. (If, as in the case of a short in a spliced-on KB cable, you know where the short is/was, you can skip this check.) Eliminate the short before continuing.

Solder your home-brew coils in place (pin 1 to pin 8 for the first coil, etc.), put everything together, and your GS should be as good as new.

---

**012- My ROM-01 GS has an odd postage stamp size circuit board tacked onto the motherboard near the front edge. What is the board for?**

The circuit on the mini-board is a low-gain 1-transistor amplifier which seems intended mainly as a buffer/voltage-level shifter between the 'old Apple' sound output of the Mega Chip and Op Amps which drive the Speaker and Sound jack.

On the underside of the motherboard, beneath the boardlette, a surface-mounted resistor (SR1) has been scratched out. Leads from the mini-board run to SR1's connection points as well as Ground and a +12V supply point near Op Amp UM12.

The circuit does not appear in the GS 'Hardware Reference ROM-01 schematics; but, it is shown in ROM-03 schematics. Some ROM-01 GS's do not have the mini board; so, it seems likely that the circuit was included on-motherboard in later ROM-01's and all ROM-03's. By the way, the circuit was certainly installed at the time of manufacture and was not part of the standard ROM-00 to ROM-01 upgrade.

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**013- I have 256kB on my 1MB Apple IIgs Memory Expansion Card. How do I add more memory and set the jumpers?**

The standard Apple IIgs 1MB Memory Expansion Card can be usefully configured for 256kB, 512kB, and 1MB.

For 256kB, the top left 8 sockets (i.e. the left half of the top row) should be filled. No jumpers should be placed on the pins near the lower right end of the board.

XXXXXXXXX-----  
-----

0 0 (no Jumpers)  
0 0

For 512kB, the entire top row of sockets should be filled. The bottom pair of pins should be jumpered.

XXXXXXXXXXXXXXXXXXXX

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O O  
0-0 Jumper bottom pair

For 1MB, all sockets should be filled. The top and bottom pairs of pins should be jumpered.

XXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXX

O-O Jumper top and bottom pairs  
O-O

To get the full IIgs mem card upgrade to 1MB you can order a kit of 24 256k x 1 41256 DRAM mem IC's from Alltech (760-724-2404) for \$24.00.

---

From: Supertimer

### **014- I've heard that some have moved their IIgs's to PC tower cases. Is this hard to do?**

It is not hard to do at all...

I mounted the motherboard with the expansion cards going horizontal in relation to the ground (you need to drill some extra holes in the tower case because the GS has different mounting holes than the PC). The cards are light enough that they stay put this way. The only time this could be a problem is with unusually heavy cards, like the Focus or MicroDrive units...

The cards don't line up with the openings on the case, but that's not a problem because Apple cards, unlike PC cards, have ribbon cable extended DB connectors that can be mounted on the openings at the back of the case...

For the power supply, I rewired a PC power supply to feed the GS. The voltages are the same, so simply match +5V with +5V, +12V with +12V, -5V with -5V, -12V with -12V, and the grounds and your GS will be ready to run!

The PC power supply (250 watts) and fans have a benefit...my GS is more stable now than it was in its native case. I recommend this upgrade for those who feel up to it. Use a full tower case for the best results and most room to work with.

---

**015- I recently picked up a spare GS from a flea market and would like to convert it into a portable. Has anyone done this?**

Yes. Tony Diaz has an article describing a couple conversions on his web site at <http://www.apple2.org/AppleIIgsPortables.html> .

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From: Erick Wagner

**016- Where can I get Robot kits to use with my Apple II?**

If you have a an RS-232 interface (2400 or 9600bps) you might consider a kit from Lynxmotion ( <http://www.lynxmotion.com> ). They sell various robot and robotic arm kits that utilize hobby R/C servo motors. Scott Edwards Electronics and several other companies sell devices that allow you to control up to 8 servos per board.

You'll have to write all of the software yourself (sending commands to identify a servo and a position value).

---

From: Rubywand

A good source of current information on robot making, Parallax BASIC stamp programming, and related projects is Nuts & Volts Magazine (800-783- 4624; <http://www.nutsvolts.com> ).

A good on-line resource for BASIC Stamp components and info is the BSS Club at <http://www.geocities.com/SiliconValley/Cable/7772/>.

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From: David Chiu, Dick Pirong, Bart, Paul Grammens

**017- Where can I get the "Zip" package chips to expand my AE GS-RAM III memory Expansion card to 4MB?**

The Applied Engineering GS-RAM III uses 20-pin "Zip" package 1M x 4 DRAMs (NEC D424400V-80 or OKI H5144024-70). A few other Apple II memory cards also use relatively rare Zip package RAM.

As of November 2002, you could find the NEC chip at Spi Semiconductor (818-884-8000; <http://www.spisemi.com/index.html> ). Search for 424400. For other suppliers, a fairly good try is a current issue of Computer Shopper magazine.

Whenever you order these memory IC's, be sure to confirm that the chips are, in fact, in the Zip package.

---

From: Gilles Aurejac

### 018- What chip can I use to replace a bad RAM IC on my IIE motherboard?

The 4164 (64k x 1) works on motherboards using eight memory chips. The RAM on my motherboard is in sockets; so, it was easy to replaced a bad memory chip with one.

---

From: Rubywand

### 019- Could someone please post a resistor color code chart?

Color	Digit	Multiplier (when 3rd band)	Example
Black	0	x1	-- Red Red Black = 22 Ohms
Brown	1	x10	-- Blue Grey Brown = 680 Ohms
Red	2	x100	-- Orange White Red = 3900 Ohms
Orange	3	x1000	-- Yellow Violet Orange = 47k Ohms
Yellow	4	x10000	-- Red Green Yellow = 250k Ohms
Green	5	x100000	-- Orange Orange Green = 3.3M Ohms
Blue	6	x1000000	-- Red Yellow Blue = 24M Ohms
Violet	7	x10000000	-- ...
Grey	8	x100000000	
White	9	x1000000000	
Gold	-	x 0.1	-- Brown Brown Gold = 1.1 Ohms
Silver	-	x 0.01	-- Orange White Silver = 0.39 Ohms

#### Tolerance (4th band)

Red is <5% (courtesy of Edhel Iaur)  
Gold is 5%  
Silver is 10%  
no color is 20%

Example: Grey Red Orange Gold is 82k Ohms +/- 5%  
Example: Brown Black Green Silver is 1M Ohms +/- 10%

Note: carbon resistors almost always err on the high side.

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From: Mitchell Spector

## **020- What advantages does the ROM 3 GS offer vs. the ROM-01 GS?**

The ROM 3 Apple IIgs offers many minor enhancements vs. the ROM-01 which make the machine more functional and pleasant to use:

- You get a machine that is about 5-10% faster for GUI, floppy disk loading and RAM Disk operations (due to updated smartport firmware and System 5 tools being in ROM).
- A machine that is more flexible when working with AppleTalk and slots (you don't have to give up an extra slot and you can stick a card in slot 4 and still use the mouse in GS/OS).
- A nicer text Control Panel that lets you resize RAM Disk with a warm-boot and a cleaner way to size it too (no min/max size junk). Also a 'Mouse' menu and other existing things cleaned up and made better.
- A just over 1 megabyte of RAM built-in to start off with; so, you can have 5 MB of DMA compatible memory in total.
- The MB0 signal provided in slots 1 through 6, so you can stick in a Video Overlay Card and Second Sight in together, and not worry about having to reserve slot 3.
- Hardware shadowing of text page 2 with Alternative Display Mode (no slowing down your system to a crawl when you see a screen full of 2's running 8-bit software).
- A newer ADB keyboard microcontroller with built-in sticky keys, keyboard mouse and compatibility with the indicator LEDs on extended keyboards.
- A removable Lithium battery (in a snap case. Just pop the old one out when your clock and Control Panel settings stop working).
- Less power consumption and electrical noise from the motherboard,
- A set of pins (location 'S1') on the motherboard to make the text Control Panel disappear, making your GS settings tamper proof where young children are around

There are even a couple of more goodies, like the Step/Trace commands in Monitor or the improved disassembler. Even if you are not a programmer, they're handy for peeking at SHR graphics still in memory (from Monitor hit 'S' and then the return key).

Things like sticky keys and mouse keyboard come in handy too-- like if you are eating or drinking with one hand, you can still reset the computer using the other.

The down side is that some old GS games and demos won't run. However many of the more worthwhile ones have been patched.

---

From: Scott G

### **021- How can my ROM 3 GS + 8MB Sirius card do large file copying?**

An error in the Sirius manual (a 1 page paper) recommends that ROM 3 users remove one of the SIMM modules since the ROM 3 has 1MB and 8MB is max. When I did this, the GS reported 8MB, but copying large groups of files or large files (>800k) failed. When I put the missing SIMM back, the GS still reported 8MB, but the file copy problems vanished. It appears that the Sirius needs eight 1MB SIMM modules for 8MB even on a ROM 3.

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From: Rodney Hester

Turns out I had the opposite experience. In my system (ROM 3 with 8MB Sirius v2.0 and Focus drive) the large file corruption problems, "ghosties" (weird video artifacts), random system crashes (especially when Balloon 2.0 was active), etc. all went away when I removed "SIMM 8". (There is some numbering on the back of the Sirius.)

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From: Supertimer

### **022- I just received my Sirius RAM card and populated it with 8 1MB SIMMS. However my ROM 3 GS crashes early in the boot process. Could it be a problem with my RamFAST and DMA?**

First, if your RamFAST is the Rev. C (full-length) card, it cannot DMA to 8MB; so, you will have to turn DMA off. The Rev. D can DMA to 8MB fine.

Second, make sure there are 8 SIMMs on the Sirius. Alltech used to say that you are supposed to take out one of the SIMMs when using the 8MB Sirius card on a ROM 3; but, this leads to problems. Plug in all 8 SIMMs and use it that way. You lose the 1MB from the motherboard this way, but you gain it back on the 'extra' SIMM you put in.

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From: David Wilson

**023- I have several different model Apple II computers ranging from a II+ up through a IIgs. Does anyone know where I can get diagrams for these machines?**

I know of three books with Apple ][+ schematics:

Jim Sather's "Understanding the Apple ]["

"The Apple II Circuit Description" by Winston D. Gayler  
published by Howard W. Sams & Co (ISBN 0-672-21959-X)

Apple II Reference Manual (1979)

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From: Charles T. Turley

A set of IIgs ROM-01 schematics was published in the September 1999 issue of GS WorldView. Go to GSWV's Archive at ...

<http://apple2.org.za/gswv/a2zine/Docs/IIgsMotherboardSchematics/> .

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From: Rubywand

The Apple II Reference Manual (1979) includes a II/II+ schematic, a keyboard schematic, and annotated firmware listings. For Disk II and Disk II Controller schematics, see The DOS Manual (1981) from Apple.

For the IIe and enhanced IIe, see the Apple IIe Technical Reference Manual. The 1986 edition includes diagrams and annotated firmware listings.

The Apple IIc Technical Reference Manual (1987) includes IIc schematics and firmware listings for the three major IIc versions. A later (1989) "Second Edition" of the manual includes IIc+ coverage.

The Apple IIgs Hardware Reference has a good set of schematics. The First Edition covers the ROM-01. The Second Edition covers ROM-01 and ROM 3. Unfortunately, there is no IIgs firmware listing.

Although most Apple II manuals are out of print, many can still be purchased from on-line book sellers such as Amazon.com.

On-line, GS Worldview's archive offers a couple folders with several schematics at <http://apple2.org.za/gswv/a2zine/Docs/> .

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From: David Empson

### **024- I just got a Dallas Smartwatch (aka No Slot Clock) for my Apple IIc+. Where does it go?**

There is only one ROM in the IIc+: it is probably 32KB in capacity, like the UniDisk revision of the IIc and later IIc models, hence it would be a 28 pin chip.

Assuming the SmartWatch works in the IIc+ (and I don't know of any reason why it wouldn't), you need to put it under the chip labelled "Monitor ROM". Make sure you get it around the right way!

One other point: I hope you got the right variety of the SmartWatch. The part number should be DS1216E. The letter suffix indicates the type of chip which the SmartWatch works under, with "E" being a 28-pin ROM. The suffix should be printed in the form of a large green letter (silk screened) on the small circuit board which is visible beside the DS1216 chip inside the SmartWatch.

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From: Charles T. Turley

Related FAQs Resource: R023PINOUTS.TXT (text file)

025- Where can I find Apple II socket, etc. pinouts?

See the FAQs Resource file R023PINOUTS.TXT.

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From: Adalbert Goertz

026- What IC do I need to use the GS-RAM Plus in my Apple IIgs?

You need the GSPLD1A.1 for a ROM-01 GS and the GSPLD1B.1 for a ROM 3 GS.

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From: Rubywand

### **027- Where can I get prototyping boards that fit Apple II Slots?**

The standard Apple II Slot card has 50 contacts, 25 per side, and is up to 2.75" high (not counting contacts). Contact spacing is 0.10". Length varies. About 0.50" of the length can extend beyond the contacts toward the back of the computer.

You may be able to find an 'Apple II prototyping board' from a surplus parts seller; however, these boards are no longer a standard item. To get a new

board, you will probably have to get a PC ISA-8 ("PC XT") Slot board (or an ISA-8/16 Slot board with the extra contacts trimmed off).

An ISA-8 board has 31 contacts per side spaced the same as an A2 card. From the edge facing the front of the computer, you will need to count down and trim away 6 contacts (per side). It's best to use a real A2 board as a guide to determine pin centering and to decide what to slice off for a good fit in an Apple II Slot. A Dremel tool with a sand wheel is good for this sort of slicing.

The best deal I've found on proto boards for Apple II Slot card projects is the 9003 PB from Marlin P. Jones (still offered as of Feb 2004). It's a good length for most applications (5.6") and costs \$7.95. The 9003 PB is 4.25" high; so, you will need to cut off about 1.5" from the top to get a fit in most Apple II's.

Another approach to getting an A2 prototype board is to 'clean off' and reuse a surplus A2 card. Or, you can slice off the connector pins (plus a bit extra) from some surplus A2 or ISA-8 PC board and bolt the connector to a common rectangular proto board.

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From: Patrick Schaefer, Quadrajet1, David Empson,  
David Wilson, Rubywand

## 028- What are the numbers and functions of major Apple II ROMs?

341-0001-00*	Integer BASIC E0	1978
341-0002-00*	Integer BASIC E8	1978
341-0003-00*	Integer BASIC F0	1978
341-0004-00*	Integer BASIC F8 (Old Monitor ROM)	1978
341-0009	13 Sector drive controller P5 ROM	
341-0010	13 Sector drive controller P6 ROM	
341-0011-D0*	Applesoft BASIC D0	
341-0012-D8*	Applesoft BASIC D8	
341-0013-E0*	Applesoft BASIC E0	
341-0014-E8*	Applesoft BASIC E8	
341-0015-F0*	Applesoft BASIC F0	
341-0016-00*	Programmer's Aid #1	1978
341-0020-F8*	Applesoft BASIC F8 (Autostart Monitor ROM)	
341-0027	16 Sector drive controller P5 ROM	
341-0028	16 Sector drive controller P6 ROM	
342-0033-A	//c Monitor ROM \$00	1985
341-0036	][plus character ROM	
341-0065-A	Super Serial Card	1983
342-0077-A	IIGS ROM-00	
342-0077-B	IIGS ROM-01	1987
341-0080-B	ProFile 5MB RW-Z8	1981
341-0112-A	Apple SCSI (non-HS) revision A firmware	
341-0112-B	Apple SCSI (non-HS) revision B firmware	
341-0124-A	IIGS Keyboard i8048	
342-0132	IIE (and //c) Keyboard ROM (USA)	1982
342-0132-A	IIE (and //c) Keyboard ROM (USA)	1982
342-0132-B	IIE (and //c) Keyboard ROM (USA) rev DVORAK, pad	
342-0132-C	IIE (and //c) Keyboard ROM (USA)	

342-0132-D	//c Keyboard ROM USA	1984
342-0133-A	IIe Video (Char Gen) ROM	1982
342-0134-A	IIe EF ROM	1982
342-0135-A	IIe CD ROM	1982
342-0135-B	" (identical)	1982
341-0150-A	IIe Keyboard ROM UK/usa	1982
341-0151-A	IIe Keyboard ROM deutsch/usa	1982
341-0160-A	IIe Video ROM UK/usa	1982
341-0161-A	IIe Video ROM deutsch/usa	1982
341-0265-A	//c USA Char Gen	1983
342-0272-A	//c Monitor ROM \$FF (original)	1983
342-0273-A	//c, //e (enhanced) Char Gen UK	
342-0275-A	//c, //e (enhanced) Char Gen deutsch	1983
342-0303	//e (enhanced) EF ROM	
342-0304	//e (enhanced) CD ROM	
342-0349-A	//e (platinum) CF ROM	
342-0372-A	//e (enhanced) KB ROM deutsch/usa	1985
341-0437-A	Apple SCSI (non-HS) revision C firmware	
342-0445-A	//c Monitor ROM \$03 (memory expandable)	
341-0625-A	//c plus Monitor ROM \$05	1988
341-0728	IIGS ROM 3 FC-FD (prototype)	
341-0729	IIGS ROM 3 FE-FF (prototype)	
341-0737	IIGS ROM 3 FC-FD	1989
341-0748	IIGS ROM 3 FE-FF	1989
341-0749	IIGS ROM 3 FE-FF (prototype)	

\* Note: Use of "-00", "-DO", etc. suffixes (or no suffix) seems to vary radomly. For instance, an E8 ROM might be numbered 341-0014 or 341-0014-00 and have "E8" stamped elsewhere on the ROM.

In most cases, this also seems to apply to "-A", "-B" suffixes (or having no suffix).

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From: Rubywand

## 029- What is the C-One?

The C-One is a modern (2003) 65816-based motherboard designed to fit in a standard PC ATX case. Promoted as an "enhanced adaptation of the Commodore 64", C-One's 20MHz uP, advanced graphics and sound, I/O, and other capabilities has attracted the attention of Apple II users as the model for a similar-design Super IIGs. (ref: "C-One Page" in the FAQs Major A2 Sites listing.)

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From: George Rentovich, the guys on the English Amiga Board, Rubywand

## 030- My Apple II's case, mouse, and keyboard have been discolored by years of exposure to sunlight, UV, etc.. How can I re-whiten them?

Years of exposure to sunlight and other UV can result in yellowing or even browning of Apple II cases. One solution is to pick a color and paint the case via a few light coats of a spray paint. If you want to restore the original color, you can get a good match using Apple II pictures available on the net.

A recently discovered alternative to painting is bleaching out the discoloration using hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>). According to claims, the process described here does not damage painted labels, metal inserts, etc. except as they may be attached by a water soluble adhesive.

Note: Most of the info here comes from the English Amiga Board at <http://eab.abime.net/showthread.php?t=37808> .

#### What You Need

- Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>)- water added as necessary to get desired concentration
- Vanish Oxy Action or Oxi Clean Versatile Stain Remover or pure TAED (Tetra Acetyl Ethylene Diamine)-- don't need much
- UV 'Blacklight' bulb (60 watts or so) in a lamp (indoors) or sunlight  
Note: Do not use other UV sources, such as germicidal lights.
- Plastic or glass container (possibly with a transparent cover)
- Bostik Blu-Tack or similar reusable adhesive to help hold small parts in position
- Water close by, such as in a large bowl, for washup and washing off cleaned parts
- Rubber gloves
- Full Protection Goggles. You only get one pair of eyes!
- Tongs may be helpful for retrieving smaller parts

**WARNING:** Do Not even think about mixing in chlorine bleach with the H<sub>2</sub>O<sub>2</sub>! The result could be to release chlorine gas.

#### Hydrogen Peroxide Mixture

Hydrogen peroxide(H<sub>2</sub>O<sub>2</sub>) comes in two well-known forms: stable and unstable (rocket fuel) determined mainly by concentration. The highest concentration which is commonly available and which is allowed for postal shipping is 35%. H<sub>2</sub>O<sub>2</sub> in useful strengths is available in various forms and concentrations from several sources including chemical sellers, cleaner makers, and hair product sellers.

Note: Sometimes H2O2 concentration is expressed in "volume". A peroxide product for hair bleaching may be labeled "40 Volume". To get the % concentration, you divide by 3.3. 40 Volume = about 12% H2O2.

H2O2 specified as "not less than 20% nor more than 40%" is available in a gallon size as a cleaning product called "Urine Rescue" by Prochem for about \$15/gallon. You can obtain 12% H2O2 (such as "Super Star 40 Volume Clear Peroxide Gallon" for \$7.77/gallon) from various hair salon sellers.

The higher the strength, the speedier the whitening. However, at 35% you have a more hazardous solution (e.g. in terms of skin/eye splashes) and will need to monitor the process more closely to avoid etching of the plastic.

Another factor is that the H2O2 you use will probably not retain its whitening properties for more than a few days. If you use lower concentrations you can stretch out your H2O2 supply over more cleaning sessions. A good balance of speediness, hazards, and cost is around 20% H2O2. 12% is fine, too; but, slower. Whatever your concentration, you will need enough to keep the item being whitened wet during the process.

Plain H2O2 is not particularly speedy as a whitener below roughly 100 degrees F. So, to activate the H2O2 a small amount of TAED (Tetra Acetyl Ethylene Diamine) is added at the start of the process. One popular cleaning product containing TAED is Oxi Clean. About 1/4 teaspoon per gallon of H2O2 solution is enough.

#### Container

This process requires UV light on the surfaces you wish to whiten. (This can come from the sun or a blacklight bulb.) Whatever container you use needs to keep the plastic in the solution and allow light to reach the surfaces. Since the process does generate some heat it is best to avoid using exceptionally flimsy plastic containers.

Some smaller parts may tend to float due to build up of gasses in gaps and recesses. A reusable adhesive gum, like Blu-Tack, can hold them in position in the tank so that keytops, etc. stay emersed in the solution and get light.

The container, tank, etc. needs to be out of the reach of small children and pets. Be sure to let older children and anyone else who may be able to reach the container know that the stuff inside is not plain water and is hazardous. Place warning signs/notes on or near the container.

If outside using sunlight, use a transparent lid or similar covering to keep out birds and insects.

#### Some Hazards

The main hazard from H2O2 is probably to eyes. Wear full protection goggles and have plain water available for flushing eyes or skin in case of contact with H2O2.

Another hazard is the oxygen given off during the process. At higher concentrations oxygen can ignite from electrical sparks, candles, etc.. The place where you do the process should be well ventilated.

The UV light to be used for indoor work is 'blacklight' UV. It is sometimes used to highlight posters in darkened rooms. (Other UV sources, such as various germicidal lights, can be more hazardous to vision.) It is best to avoid long exposure-- i.e. do not stare at the lighted process for extended periods.

#### Process

- 1- Thoroughly clean the item(s) to be whitened with soap and water.
- 2- Set the container for the cleaning process in a safe area out of reach of small children and pets.
- 3- Place the item(s) in the container. If KB keys or similar small items are to be cleaned, you may want to stick them in place with Blu-Tack, etc..
- 4- Put on goggles and gloves.
- 5- Pour in the H2O2. Add water to get desired concentration. Do not fill to brim. Allow some room for foaming activity.
- 6- Add 1/4 teaspoon of an 'Oxy' cleaner or pure TAED per gallon of H2O2 solution. (Expect some foaming action.)
- 7- If indoors, turn On your blacklight(s). Check that surfaces to be whitened are getting light.
- 8- Every hour or so check the progress of the whitening. Time required depends upon many variables. It may be a few hours, several hours, or a few days.
- 9- When whiteness is satisfactory, remove the part(s). Wash or submerge in plain water and dry.

#### The Gel Option!

In order to simplify whitening larger items such as cases, the EAB guys have developed an H2O2 gel which can be brushed on.

Here's a quickie summary from a posting by Merlin ...

#### Ingredients

- 1 pint Hydrogen Peroxide, at least 20% strength
- 1 teaspoonful xanthan gum (health food shops or Ebay)
- 1/2 teaspoonful Vanish Oxy Action Plus (any 'Oxy' laundry booster will do)
- 1 teaspoonful glycerine

#### Equipment

- Gloves and Goggles (Safety First!)
- 1 UV blacklight lamp

Liquidiser or hand blender

#### Procedure

Chuck all ingredients except the Oxy into a container and mix until a smooth thick gel is formed.

Just before you use it, add the Oxy in by stirring and then brush the mix onto the item to be treated. Stick it under the UV lamp.

Check regularly until the yellowing has gone.

ref: <http://eab.abime.net/showpost.php?p=467655&postcount=294>

Take care!

#### Search Help

AE GS-RAM III RAM --> look for "Zip" package  
GS Juice Plus RAM --> look for "Zip" package

Apple II Csa2 FAQs: History, Part 14/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: History, Part 14/25  
This article was archived around: 07 Jun 2009 08:32:07 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2  
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Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2HISTORY.txt rev135 June 2009

## History

- 001- Where can I find an in-depth history of the Apple II?
- 002- What happened in the final years of the Computer Wars?
- 003- How did Woz invent the Apple computer?
- 004- What did the first Apple ads look like?
- 005- When did the Apple II FAQs begin and who have maintained it?

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From: Steven Weyhrich

## **001- Where can I find an in-depth history of the Apple II?**

A comprehensive Apple II History is presented in six volumes:

Volume I  
R016V1HIST.TXT  
R016V1HIST.HTML  
Volume II  
R017V2HIST.TXT  
R017V2HIST.HTML  
Volume III  
R018V3HIST.TXT  
R018V3HIST.HTML  
Volume IV  
R019V4HIST.TXT  
R019V4HIST.HTML  
Volume V  
R020V5HIST.TXT  
R020V5HIST.HTML

Volume VI  
R021V6HIST.TXT  
R021V6HIST.HTML

Volumes I - V are the actual history. The Appendices are in Volume VI.

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From: Rubywand

**002- In 1981 it seems like 'the world' was Apple's for the taking. What happened?! What were Apple II users saying and feeling in the final years of the Computer Wars?**

The Computer Wars Chronicles

What follows is a series of articles I originally did for COMPUTIST beginning in the late 80's. They chronicle the end of an era. You will find all of the speculation, analysis, predictions, and hype one might expect in writings which oscillate between recognition of impending reality and a crusade to oppose it.

The pieces are, roughly, dated by Issue number. The first article appeared in Issue 67 in the late Summer of 1989. I'm pretty sure the last article appeared in the Fall of 1991.

This collection was recently reprinted in Tom Turley's A2-2000 on-line 'zine. Tom keeps insisting that old A2 writings will be of interest to 1990's computer users. Maybe he's right. It may be entertaining to relive these snapshots of Apple II history.

Jeff Hurlburt, 1997

ISSUE 67/ Revolution

The Missing Upgrade

Spring has long since sprung and my predicted "significant IIgs upgrade" has yet to materialize. The problem, according to Western Design Center's Bill Mensch, is not available hardware--- 65816's have been tested above 12 Mhz and the '832 will soon be ready for prototyping--- the problem, he says, is that Apple is not particularly interested in an upgrade, or, even, in preserving the II series!

Unbelievable? Not at all. Neither Commodore nor IBM were willing to upgrade their lower priced lower profit lines; if Apple lets the II stagnate into obsolescence, it will be following a well-worn trail. Elimination of the II line would free the company of any remaining hacker/experimenter influence, cure a chronic case of microprocessor schizophrenia (65xxx vs. 68xxx), and release

resources currently devoted to II series development, production, and marketing. Finally, speculation aside, one has only to look at what the company has done--- or, more precisely, NOT done--- to support its IIgs...

NEED: Traditionally, upgrades are forced by the competition. By fall of last year, it was clear that lower prices for VGA resolution IBM clones posed a serious threat. The II series would be in serious trouble, I reasoned, if Big Green did not soon introduce a MAJOR IIgs upgrade. The bare bones requirement has to be something around 8 MHz speed, with a mod to access display memory at current "fast" speed, AND access to 640 x 480 16-color graphics. More sound RAM, a second display block, better disk I/O, and a multi-color TEXT mode would be nice; but, obviously, without speed and graphics parity, the IIgs isn't even in the ball game.

Such demands are not, as some like to claim, merely a product of users losing out in 'my computer is better than yours' contests. For many applications, it is now possible to define something like speed and resolution 'absolutes': there is such a thing as "not fast enough" or "not enough detail", whatever the competition is doing. Today, no super-res word processor or desktop publisher runs "fast enough" on the IIgs-- the user is always conscious of trading away speed for "power"--; nor can the user obtain anything like an accurate on-screen view of many fonts. "WYSIWYG" just isn't possible with only 200 lines of vertical resolution.

Similar considerations apply with respect to many utility, scientific, and entertainment applications. The worry is that continued incompatibility with VGA-developed 'control panels', windowing setups, and artwork will slow the release of IIgs versions; and that, increasingly, speed may become a disqualifier. No one, in short, is talking about 'gilding the lily'; the focus is upon such mundane concerns as decent 'productivity applications' comfort levels and continued access to new products.

Now, as you read this, it is summer; IIgs sales are on a double-digit slide, and, assuming there is no last minute upgrade announcement, the II line IS in serious trouble. Just how serious became obvious to me when a fellow IIgs devotee, Baywoof (a.k.a. "the Boardbasher"), confessed that he was dumping his Apple and moving to an IBM. He figures that, for the price he can still get for his IIgs stuff, he can buy a complete VGA color '386 clone system.

I've seen his numbers; and, at worst, the difference is probably less than three or four hundred dollars!-- this for a three or four times speed increase, twice the hard disk storage, faster floppy access, lower peripherals prices, easier upgrades, larger software base, and much better graphics. (BUT, he will, for now, have to give up IIgs-quality sound. Ha!)

Anyone still inclined to accept the pomp and glitz of Apple group festivals at face value need only peruse a recent "Computer Shopper". With luck, somewhere in a few hundred pages of IBM clone ads and product reviews, you will find Don Lancaster holding forth in the the three or four pages of what qualifies as the "Apple" section.

"Wait!", you cry, "what about the 'New II in '89' promised at last winter's 'Fest? or reports of a plug-in upgrade?" So far, the only evidence of a "New II" is yet another addition to the malingering IIc series and some talk of a "New IIgs" with in-ROM operating system smarts and on-board MIDI. As for Apple's

plug-in upgrade, this is rumored to be a bridge board to partial Mac compatibility. That is, for a few hundred dollars, you may soon be able to turn your IIgs into a Mac Jr.! (Gosh, wasn't it just

a few months ago that IBM carried off a Fortune Worst Marketing Blunder of the Decade Award for its PC Jr.?)

We have, long ago, passed the point where it makes any sense to talk about maintaining II series dominance in software markets. And, since schools must select computers with an eye to what students will use at home, Apple's much-touted education base is about to 'turn blue' as well. The question now is: how much of the current base of users and creative talent can be held while someone (Applied Engineering, Comlog, Laser, ?) puts together a significant, reasonably priced upgrade?

QUALITY CONTROL and SERVICE: Our II+ ran flawlessly for nearly six years before requiring a new power supply and keyboard IC replacement. A veteran of countless experimental mods, it continues to perform well. Our IIgs, on the other hand, is presently on its third motherboard! (Actually, it may be the fourth; it's hard to be sure. I do recall that one of the replacement boards didn't do anything, except short out the power supply.)

The main problem is an apparently endless supply of sub-spec proprietary IC's (e.g. video and ADB controllers). So, why three (3) motherboards!? Well, Apple does not allow its local sales/service reps to replace soldered-on IC's. Should your ADB controller bomb (or, more likely, you finally discover that it has been sporadically malfunctioning all along), "repair" consists of swapping out the motherboard. If your warranty has expired, the cost is \$270 plus your old board!

As to old complaints-- a II series marketing strategy designed to create a toy image, high prices, slowness in releasing documentation, Mac exploitation of II events, etc., etc.-- elaboration is hardly necessary. The record is one of studied insult, rapacious greed, sloppiness, and dismal neglect.

Let Them Eat Cake

Does Big Green management truly wish to be rid of the II? I doubt it. As security against future Mac troubles, the II series has proved to be priceless insurance. (Remember, it was the IIgs and solemn oaths to 'be true to our Two' that turned things around in '86.) The Apple Lords appear, instead, to have opted for the no-development-cost, string-the-user-along strategy perfected by Commodore in dealing with its 64/128 line. Unfortunately, the IIgs is priced against '386-class competition, not cartridge arcade machines.

In the long run, the biggest problem with this 'Mac in red, II gets fed; Mac in black, II gets sack' philosophy may be that it makes for remarkably poor PR. Scan through the message bases of a few local Apple BB's and what you find is the kind of mistrust and ill will that used to be reserved for 'The Phone Company'.

There is, for some reason, a widespread perception that Apple is perfectly willing to sit on its hands while hefty user computing investments turn to mush. Now, what do suppose is going to happen when many of these thousands of II

owners and former owners are asked to suggest company, school, and university computer purchases? Somehow, Apple is managing to convert its most valuable asset into a fatal liability. (It's not nice to skimp on your II insurance premiums!)

#### Another Way

Anticipating that, whether by design or accident, Apple may be angling for a Mac-only strategy, several respected II series supporters have joined to combat the shift and develop alternatives. In our conversation, Mensch identified such "Working Group" participants as himself and other WDC personnel, Tom Weishaar, Mike Westerfield, and representatives from Applied Engineering and Comlog.

While his "preferred remedy" is to persuade Big Green stockholders to force II support, Mensch admits that the group is already exploring non-Apple options. Among these, the simplest calls for third-party development of a speed-up/graphics add-on. For an outlay "well below \$500" you would retain access to current IIgs wares and enjoy the benefits of a new, higher performance standard. More dramatic cures call for Apple to 'spin off' an independent II products company or even sign away II rights to one or more established manufacturers.

When asked if a cloner (e.g. Laser) might launch its own super IIgs, Mensch steadfastly refused any comment. From Laser, Grant Dalke's response was a somewhat obtuse, carefully worded observation that, if such a product appeared to be feasible, Laser would announce it when it was ready. (Hmmmmm) "So, are you saying that no IIgs-like product is being developed?" Answer: "No comment". Well, the last time I got answers like these to questions like these was back in the summer of '85 when trying to pin down Bill Mensch about a 65816-based "IIx". If Jim Hart's rumored 7.8MHz, 640 x 400 resolution, ... "IIgs+" actually exists, a reasonable guess is that it's sitting in Laser's labs.

#### Change

We have, it seems, reached the situation narrowly averted only three years ago. Hobbled by inept generalship and beset by swarms of power-packed IBM clones, the II world is moving to an inevitable consensus: Apple has lost the 'Mandate of Heaven'; II leadership is up for grabs. I believe most users would like to see the company rediscover its hacker/experimenter roots and become a 'serious player'; it had better. What remains of the Empire (fat, contented Macsville) is already scheduled for plundering by hordes of '486-based monsters.

The 'bad news' is that, as the battle over speed, graphics, disk I/O, and other needed advances heats up; it will, for a time, become difficult to present software designers with a 'standard II'. Clones, plug-in upgrades, and third-party motherboards (along with firmware and operating system mods) will add to the confusion; some established II suppliers will fold; etc., etc.. (It ain't gonna be pretty, Pilgrim.) Indeed, once it becomes clear what revolutionaries mean by having to "break eggs to make an omelet", more than a few users are sure to bail out and head for the relatively peaceful IBM clone realm.

On the positive side, just such a state of flux is most likely to produce fierce competition, lower prices, increased opportunities for developers, and significant leaps in performance. One way or another, you WILL get your upgrade. If all this sounds interesting-- even, like it might be fun-- then hang on. You have the 'right stuff' for the II Revolution!

Note: Bill Mensch's semi-informal "IIgs Working Group" plans one or more meetings this summer. To offer comments, ideas, etc., or to otherwise 'get involved', contact Andrew Hall at the address listed in "Vendors".

#### ISSUE 68/ Keep-It-Simple Upgrade

If the best Apple can do for its II line turns out to be a "new IIgs" with 1MB of motherboard RAM and 128K of sound RAM plus NO upgrade offer to current IIgs owners... Well, the next "Apple Fest" could turn into the first "Apple Frost". As to movement on the 'II manufacturers upgrade front', I have yet to here a peep from Applied Engineering, Comlog, Western Design Center, or anyone else in the business. (Like, where are the Japanese when you really need them?!)

So, to get things rolling, here's a specific proposal: Since the big problem with any worthwhile upgrade is maintaining current compatibilities while extracting graphics control and output from the motherboard kluge, why not put everything on a single, slot-pluggable board which also plugs into the motherboard 65816 socket?

"Everything" includes an 8-10 MHz 65816, cache RAM, 640 x 400 (at least) x 256 colors graphics controller, an input (via a short jumper chord) from 'old graphics' output, video output & switching circuitry, ROM's, 1MB of RAM, duplicate sound system with 256K RAM, sound input for 'old sound' output (via another jumper chord), and a mini-connector to drive a 'to be developed' improved disk interface. The board amounts to a vastly improved IIgs which can, when asked, take over the motherboard and work like the old machine-- NOT, to be sure, so dramatic an approach as some might wish; but then, the idea is to 'keep it simple'.

#### ISSUE 72/ No Foolin'

Last year's Apple II predictions were, mostly, on-target. According to a Reuters News Service release, II series shipments fell nearly 52%. Many new games have not been released in a II format, some users have defected, and a few established publications (notably dear old CALL Apple) disappeared. On the other hand, the Great Apple Dump predicted by some, turned out to be a 'Dump-ling'; net user base probably held or increased. Most product releases continue to include, eventually, a II version; and, several very attractive products are available ONLY for IIe or IIgs. In Star Trek terminology, the II series took a 'direct hit' in '89; and has come back stronger and tougher.

Which brings us to the other half of the infamous Issue #67 commentary. True, we do not see curls of smoke rising from Cupertino, circling vultures, and fat barbarians bidding for the crown. We do see lower profits, dropping stock value, and declining market share. Big Green, as in the days just prior to its last II series 'rediscovery', needs a major, attention-getting, marketing

success. Some "industry analysts" have suggested a low-priced Mac; but, aside from being a contradiction in terms, IF a for-real '90's technology Cheapo Mac were offered, the first casualty would be the current high-profit-margin Mac II. A not-for-real sub-performing Cheapo would, of course, merely repeat IBM's PC Jr. fiasco.

In following through with release of GSOS 5.0, Apple demonstrates that it is not quite ready to fall on its sword. Whether Big Green has forgotten how to wield it remains to be seen. A vast market is still wide open, ripe for plucking by the first manufacturer able to tell a "PC" business machine from a genuine "Home Computer". Apple used to know the difference; and, with Spring in the air and just a bit of prompting from its II users, may be on the verge of remembering.

ISSUE 74/ (Report from the Computer Wars)

When the great wheel of the small computing universe takes a major turn, wobbles, and settles into a new plane, there are bound to be many users who will doubt the evidence of their senses. ("Did the earth tremble? Did the stars shift? WHAT happened?!") Hence, the 'last minute' decision to compress this month's reviews and issue the "Report".

Report from the Computer Wars

## I. Tsunami

What promised just last summer to be a PC wave has become a rolling tsunami. One minute you're strolling down a city street, considerately stepping over and around islands of PC hardware; the next, you're running for your life in the shadow of a churning skyscraper-high wall of machines and circuit boards. Something important has happened in Computerville; a milestone has been reached. When? Sometime between last fall and this spring. What? Nothing less than the end of Computer Wars I!

## II. Myth

During some fifteen years of competition among names like Altair, Southwest Technical, Imsai, (Ohio Scientific, Tandy, Atari, Apple, Commodore, ...), it became an article of faith that the outcome would be THE dominant computer maker. Presumably, the manufacturer of the best machines would attract the overwhelming majority of users and that would be that.

Much to the delight of TRS-80, Apple II, and Atari 800 makers, the Microcomputer Club soon gave way to product-specific groups of true believers determined to expand membership and win immortality ("II Forever!", etc.) for their machines. It was entertaining; but, of course, it was mainly hype.

Even were users willing and able to flit from machine to machine like butterflies, no major manufacturer was particularly attracted to anything so intangible as Computer Wars "victory". The corporations (believe it or not) were aiming to maximize profits, not user numbers! Both Apple and Commodore built up large, enthusiastic home user bases, then neglected them in favor of the lower volume, higher profit business market. So much for "winning the world".

### III. Sluff-off

For home users, developers, software publishers-- for everyone, in fact, with a stake in the "low end" machine-- such half-hearted support has always been as puzzling as it is frustrating. We invest hard cash in an Apple computer, join Apple clubs, subscribe to Apple publications, (slap Apple stickers on binders, use an Apple key ring, ...), fill shelves with Apple software, and buy Apple peripherals. Apple, in return, drags out development of a IIgs operating system, pours money into its business machine, and adopts a 'dog in the manger' position which all but kills any chance of a timely third party upgrade needed to maintain IIgs performance parity with the competition.

To be fair, Apple has behaved no worse-- indeed, on the whole, much better-- than other home user 'flagships'. Each new II model has preserved broad downward compatibility; and documentation, from early manuals through the current Addison Wesley series, has been among the best. Finally, both the IIgs and its operating system benefitted from recent minor upgrades. It's no wonder home users are confused. If Apple is at all concerned about its II series, why isn't it concerned enough?

After the near brush with collapse in '85, we reasoned that Apple (now also "Big Green" the business machine maker) would forever regard holding onto its II home user base as a high priority. Surely, Apple had learned its lesson.

So it had, though not the lesson we supposed. IIgs revenues were a help in those troubled times; but the more important contribution was an industry-wide confidence that "Apple is back". Stock values rose, capital rolled in, the Mac II was launched, and viola!, Apple WAS back! The lesson for Apple was clear enough: 'everyone' still equated corporate health with II prosperity. It had become captive to its low end, low profit product line.

There are several reasons why Apple might view this situation with alarm. Of these, the popular notion that a IIgs resulting from a series of forced upgrades might impact Mac sales is probably the most over-rated. As Apple's own marketing people have adroitly demonstrated, it is entirely possible to render a product "business invisible". Your ads merely assert that the IIgs is a home/school computer and that the Mac is for business. Once the systems are bundled with appropriate software and the price tags slapped on, few IS managers would consider filling an office with IIgs's.

No, the simplest explanation for Apple's concern is also the one which best fits the facts. Well before the '85 crisis, Apple had decided that costs of its II series were beginning to outweigh rewards. Selling all of those computers, disk drives, and printers to create a large home user base was great fun. Customer service, support R&D, and selling upgrades to maintain it was not nearly so profitable. Apple wished to be free to deal with its II series on its own terms. Most certainly, the Lords of Cupertino were determined to be rid of a situation which allowed home user complaints, doomsday editorials, or expressions of teacher dissatisfaction to rock corporate pylons at the foundation.

By 1988, an aggressive ad campaign and expanding Mac II sales had solved the problem. Apple shed its "home computer maker" skin and became "Apple, the maker of pricey, high class business computers". Whether the II line is spun-

off, sold, or merely "supported" at current low levels, one thing seems clear. The odds are very slim that II users will ever again be an important part of Apple's empire. Consider yourself sluffed.

#### IV. IBM: Grud-maker

IBM's first PC was chiefly remarkable for what it was not. It was not a closed-box, highly complex machine packed with proprietary hardware. Featuring an out-of-the-Intel-manual design with slots for peripheral boards, it was virtually Apple's II+ 'done in business grey'.

From the start, PC's simple, straightforward profile proved both a blessing and a curse. The blessing was that flocks of third party manufacturers quickly began to fill the machine with performance-enhancing boards and peripherals. The curse, from IBM's point of view, is that it proved impossible to protect PC from hordes of grud-like cloners.

[Note: In case you missed playing "Dark Forest" or a sequel, gruds are short, green, swarthy, fast-multiplying reptiles-- sort of a one-horned ninja turtle without the shell.]

Anybody could make a "PC compatible" and, from AT&T to one-garage assembly shops, 'anybody' did. Worse still, as IBM moved first to the XT and then the AT, it encountered successively more cloners taking progressively less time to develop better copies at lower prices! When, at last, Big Blue moved to its supposedly less clonable PS/2 platform, it was already widely understood that the best grud AT's were at least as good as the IBM original AND cheaper.

Had the Mainframe Moguls set out purposefully to create a dangerously competitive computer making sub-culture, they could hardly have improved upon the course followed. Faced with such inept meddling, the Apple Lords must have felt a bit like the old Sorcerer watching his Apprentice chop the animated broom into a million pieces. Naturally, by the time Big Blue ran for the hills, the small computing landscape was knee-deep in gruds. (Even today, it is said, Apple's Consummate Enlightened One will awaken in the dead of night, sit up bolt straight in his bed, and scream "Why must I lose to such idiots!")

For good or ill, IBM had delivered big manufacturer technology and the market to go with it into the hands of countless small manufacturing free enterprise fanatics. Here the "big names" appear on metallic stickers slapped into square indentations thoughtfully provided by PC case manufacturers; and you're only as good as your prices are low.

Though, in this maze of interlocking board makers, assemblers, and sellers, each component may come from almost anywhere, by 1988 the cloners had managed a 'stock' AT featuring VGA color. Soon there followed compatible '386 models, low cost Ad Lib sound; and (barely months after the chip became available) the first '486 machines were ready. Incredibly, the no-name gruds had moved beyond mere clone-making without missing a beat.

#### V. Outcome

Computer Wars I did not pick a winning manufacturer; it did pick a winning, standard platform: the "PC AT or compatible". Just look at unit sales, the quantity, quality, and range of software releases, peripherals variety, and newspaper/magazine advertising. The clincher is a pattern of plummeting prices, increasing performance, and rapid adoption of cutting-edge technology. It all adds up to the same thing: a 'standard computer'. Today, when you say "computer", everyone knows you mean "PC".

As of summer 1990, the 'typical PC' is an 8-16MHz '286-based machine with 640K-1MB (zero wait state) RAM, 1.2 MB 5.25" floppy, and 40-60MB hard disk. Featuring VGA color and Ad Lib sound, the system also includes "enhanced keyboard", VGA monitor, and cards for serial & parallel I/O, disk controllers, clock, and joystick ports-- all for about \$1400. (33MHz '386 versions sell for roughly \$2000). If current trends persist, by late fall prices will have dropped 10-15%.

Where does this leave II users? As of this spring, IIgs users sat atop a large, diverse software base. As of summer, very little has been added. While you can reasonably expect continued releases in such areas as utilities, languages, and education, the outlook for productivity wares is rather poor. As for major vendor entertainment releases, don't ask! Just take last summer's predictions and slap on a "You are Here" sticker.

Though loyal, literally, to a fault, II users are not likely to long tolerate a situation which not only saddles them with sub-par performance, but also shuts them out of the major vendor software stream. Mainly, you 'won't take it any more' because you don't have to. Look at the economics: As a IIgs owner you are probably looking forward to a speed/graphics upgrade and the addition of a 40-60MB hard disk. Well, at normal Apple stuff prices (and assuming a graphics upgrade becomes available) your planned outlay comes painfully close to the total cost of the "typical PC AT"! This much seems clear, by next summer many (perhaps most) II owners will also be PC users.

Doom? Gloom? The 'end of forever'? Not at all. In fact, the gruds may have delivered what Apple only promised: practically unlimited II continuance. One of the ironies of the present situation is that the very forces which make taking the PC plunge so appealing (e.g. low prices) also make dumping your IIgs stuff unattractive. Even as the junior partner in a two-machine installation, your IIgs is worth vastly more to you than it is likely to sell for. (Besides, all of your records are in Appleworks files; little Suzy just started "Dungeon Master", etc., etc..) So long as II's remain in the hands of skilled users there will be no lack of interest in performance enhancements, peripherals, and new software.

The gruds may be dancing in the streets, but the biggest winner in Computer Wars I is the computer user. Proprietary fiefdoms and semi-monopolistic pricing are being swept away; and, for the first time, we can look forward to a unified software base spanning home, school, and business users. Granted, this was a conflict that ended, not with the clash of cymbals, but the toot of a kazoo. The big name manufacturers, assorted publications, and many others will, naturally, try to pretend that it's 'business as usual'. It isn't. Computer Wars I is history. Computer Wars II is a whole new ball game!

ISSUE 75/ One More Time?!

After four years of minimal 'gs support, Apple's Consummate Enlightened One has issued an inCider encyclical assuring II users of the company's continued commitment. The letter mentioned such worthwhile achievements as an improved operating system and the imminent II Hypercard (but neglected to specify where the company had been committed or how long the treatment is expected to last). Fine; but, why now?

If letters, BB postings, etc. are any indication, many II partisans believe the explanation is to be found in continued 'unstoppable' PC market share advances. Supposedly, The Computer Company MUST play its 'II card' yet one more time or face extermination.

In the best of all possible worlds, Big Green's new Macs would sell like hotcakes; AND a portion of the capital generated would go into a serious II-based assault on the home/school market. (As even PC devotees will admit, the smugly confident PC universe could stand a good scare.) In the Real World, our experience has been that the level of attention to II user concerns is inversely related to Mac success. Small wonder, then, that The C.E.O.'s latest proclamation resembles less an assurance of support than a trial balloon. (Basically: "Just in case things really get bad; what will it take to jump-start your interest in Apple products?") Fair enough; and, it goes without saying, any trial balloon from the First Apple Lord merits a response.

Dear C.E.O.:

First comes THE upgrade; then, we can talk about hypercards, frame grabbers, CD interfaces, Mac links, and other such embellishments. Our needs are modest enough; say an 8 MHz '816 motherboard with 2 megs of main RAM, 256K or so of sound RAM, and capabilities for 640 x 400 256-color graphics. By way of compensation, you are encouraged to rip out the network of expensive, glitch-prone kluges designed to promote IIe compatibility. (This should help with costs; and, you can always market a IIe plug-in for old-II diehards.) An in-ROM '816 BASIC would be nice; but, for now, an empty socket and a promise will suffice.

Price is very important. Not only must the individual IIgs owner be convinced that the upgrade represents a good buy; he/she must also believe that other IIgs owners will feel the same. So far, my polling indicates a number somewhere around \$300. Naturally, when we bring in our machines to buy the new board, we shall wish to keep our old boards. They're no good to you anyway, and will supply many experimenters with endless hours of fun (to say nothing of generating countless interesting articles for Apple user publications).

A tad costly? No doubt. Still, a few hundred mil to reinvigorate your IIgs base and attract new buyers is a bargain. (Like, it sure beats losing the whole ball of wax!) In return, we'll buy your products, enlist recruits, kick stock prices up ten or twenty points, and save dear old Apple-- one more time.

Your pal, Jeff

ISSUE 79/ Home Again

## Change-over

Last fall the lone remaining advertiser-supported Apple II-only monthly announced the intention to "include Mac coverage". At the time, there seemed little reason for comment. Unlike, say, a TI-99 bulletin board I've called, a computer magazine can not be content with discussions of summer vacations and fishing trips. If a publication can't find enough II products 'action' to pay the bills, it has to find something else to talk about.

## Re-discovery

My reason for mentioning the II-to-Mac shift now is that inCider's move is symptomatic of maneuvering we must expect and be wary of in the post-Computer Wars I world. Regular viewers of the weekly PBS computer-stuff show "Computer Chronicles" have already heard the new 'party line'. Basically, it goes like this: "For years the home computing market has been in the doldrums. Recently, however, Apple and IBM have re-discovered the individual user! They are coming to the rescue with powerful, low-priced products like the Mac LC and PS/1."

Okay, so what is the pay-off in being "re-discovered"? First, the PS/1: It is a compact, attractive, AT-compatible '286 machine which requires an optional box to accommodate standard PC/AT peripheral cards. At \$2000 for the basic color version, PS/1 is priced near the limit of what most home buyers seem to be willing to 'go for' in an initial purchase. It is also priced above faster '386 no-name (a.k.a. "grud") AT's with more RAM and larger hard disks and far above equivalent grud '286 systems.

Mac LC is an attractive, compact, Mac-compatible 68020 machine which, with the addition of a low-cost IIe card, can run IIe software. At, roughly, \$3000 for the basic color version it is priced far beyond the typical home buyer's initial investment limit. However, as inCider noted in it's "Meet the Mac LC" face-off with an equivalent hard disk II system, the IIgs can end up costing as much as the base 'LC plus IIe card (assuming the IIgs purchaser makes a series of remarkably poor buying decisions). Same-price grud competition includes a new crop of much faster '486 AT's with more RAM and much larger hard disks.

It was, I believe, Abraham Lincoln who once observed: "You can re-discover some of the people all of the time and all of the people some of the time..." At least "'Chronicles" avoided references to the "little people" and "unwashed masses"; but the meaning is clear enough. Technological trickle-down has proved out, we have been noticed by the big name manufacturers! The "doldrums", of course, refers to THEIR home markets-- understandable, when you consider that no major manufacturer has paid any real

attention to home users for the last five years. THE home market has been flourishing since 1989, when home buyers began to snap up no-name VGA+AdLib PC/AT's like they were going out of style.

They were (going out of style). First came the '286 wave; and now, as of spring '91, higher speed '386 systems are selling for well below \$2000. A good barometer of what's hot (and what's not) is the computer advertising in your newspaper's Sunday "Business" section. This, typically, is where all computer stuff advertisements (with prices!) appear. I checked ours; and, believe it or

not, in five or six pages plastered with computer ads, neither the PS/1 nor the Mac LC were listed. The word "Apple" did not appear even once! (Yes; I have, in the past, found an 'LC ad. Prices were NOT listed.)

Today's home programmer/ game-player/ composer/ author/ educator... is learning to shop for speed, power, and upgradability (i.e. slots!) regardless of brand name. Any suggestion that he or she is willing to settle for PS/2-1's, "Low Cost" Macs, or other sub-business-class machines is not merely off-target, it is the reverse of the actual situation. Typical office applications have little need for quality sound, large color palettes, or exceptional speed-- all areas under continual pressure from designers of entertainment products. The home computer MUST be a relatively 'hot', versatile performer; and, there are all sorts of reasons why the home purchaser, in particular, aims for the 'most machine' he or she can reasonably afford.

First, of course, he or she is buyer AND user. Shopping for five or ten word processor/office machines someone else will use is one thing; buying the one YOU and family members will be using is quite another matter. Other home user motivators include an interest in a wide range of steadily more demanding software, peer pressure, and concern that younger family members truly have 'the power to be their best'.

In the same broadcast, "'Chronicles" notes that home markets are becoming more attractive because "business markets are becoming saturated". Again, we are dealing with THEIR business markets. One can expect to sell just so many \$4000-\$6000 name brand units when more powerful machines are available at half the price. Eventually, buyers for oil corporations, universities, etc. were bound to wise-up. (Does anyone still blow \$49.95 on a box of ten For-Sure-Certified diskettes?)

I do not doubt that IBM, Commodore, Apple, Compaq, etc. WANT to sell piles of machinery to home users. I do doubt that any of them knows what this market looks like. If the big guys and their media placidly presume home computists to be both less demanding AND less informed, it does not augur well for their home market showdown with the gruds.

Where Are You?

You are here! Should "here" mean "primarily a II+ (IIe, IIc, II clone) user", then you are acutely aware of being out of the mainstream of personal computing. (Either that, or you've been 'out' for so long that you're starting to think you're 'in'!) Not only is very little new software coming from the major vendors; but nothing looks as good as the super-res and VGA stuff you've seen on other machines. You CAN upgrade the II, even to the point of adding a VGA display; but the biggest problem isn't YOUR hardware. It's the thousands of other 'old II' users who must be persuaded to make the same changes-- that is, if you wish to create a recognizable 'super II' user base, develop and trade programs, attract vendors, etc., etc..

Recommendations: Keep your II, use it, enjoy it; and, when opportunities arise, improve it if the costs are not too steep. Hardware experimentation is a valuable, time-honored II owner activity. Given the rapid pace of microprocessor and component advances, there really is no telling what you might be able to achieve. Should you decide to sample the era of modern store-bought personal

computing, go for the best, most II-like machine you can afford. As of Spring '91, this probably means either 1. take a risk on the IIgs OR 2. grab a PC-owner friend and shop the local grudge establishments for a '386 PC/AT.

"Here" may be the joyful realm of PC-ville. Your 'big problems' are deciding whether to

1. add another 2MB of RAM (to handle "Windows 3.0" stuff), and/or
2. fill that little vertical panel slot with a 1.44MB 3.5" drive, and/or
3. swap out your old 40MB drive for a 120MB unit, and/or
4. dump your old VGA card plus the non-multi-sync monitor and replace with extended VGA equipment.

Recommendations: Yes, Yes, Maybe, Not yet. It may also be a good idea to keep your weekends open and your car gassed-up, just in case someone calls about doing some shopping.

If "here" is IIgs-ville then you already know the 'old place' isn't what it used to be. I've lost track of the number of IIgs projects "cancelled for lack of market interest", deceased hardware suppliers, and major vendor PR persons who (politely) barely refrain from laughing when I ask about "availability in IIgs format". As to national/international publications which actually devote hundreds of column inches to II coverage on a monthly basis...; suffice it to say you won't need base ten numerals to count them.

A sampling of local bulletin board listings pretty well sums up what has happened. In a printout from 1986, of 70 boards, 17 (24.3%) are listed as "Apple" BB systems, which ties with PC for the lead. By December 1990, of 298 boards, 8 (2.7%) are "Apple" BB's. Amiga and Atari shares are even smaller; C-64/128 (4.4%) and Mac (3%) come in a bit higher. PC's share is 81.5%.

You (we) were entirely justified in expecting Apple to make a major II series effort long before now-- if only to prevent nearly complete dominance of unit sales, peripherals development, and software releases by a platform with which no Apple product is compatible. Think back to the late '80's and you can see that the threat of a strong, improving IIgs was the last barrier to a no-name PC/AT sweep. When, by mid-'89, the "threat" evaporated, Amiga, Atari, Mac, and even IBM each had good reason to be very very concerned. If they weren't then, you can bet they are now. Mac's big watchword used to be "Friendliness"; today it's "Connectivity". IBM, who used to believe IT decided PC standards, dares not market the PS/1 without offering an optional expansion box to hold AT-compatible cards!

So much for spilt milk. As they say in the beer commercials: "Well, Pard, (slurp) it don't get no worsen this!" 'It' could; but, evidently, it won't. Several bright spots on the horizon point to, if anything, the beginnings of a IIgs upturn. First, there's the Mac LC. Last Fall, according to "industry watchers", 'LC was destined to displace IIgs and, thus, signal the inevitable demise of the II series. Instead, as we now know, 'LC positions color Macs, more or less permanently, OUT of IIgs territory. Big Green's Mac cards are on the table. When Apple makes a serious low-end market play, it will be the 'IIgs card'.

Every IIgs user is aware that most major software vendors are not releasing 'all of that great PC stuff' in IIgs format. Too little attention is given to the continuing strong support from sources like Beagle Bros, Roger Wagner, Byte Works, and MECC. Nibble and SoftDisk-GS regularly release quality software and individual programmers continue to produce useful, innovative shareware.

Two recent product releases are especially encouraging. Apple's GS/OS 5.04 may come on as "just another revision of old, familiar GS/OS" to IIgs owners preoccupied with hardware needs. No problem; the 'Rule Book' says that if you use a machine, you're supposed to carp about the operating system. Meanwhile, PC/AT users are falling all over themselves in glee at the thought that they may soon have something like GS/OS.

The other release is "Platinum Paint" from Beagle Bros. It's the kind of product that could have "mainstream users" wondering where the mainstream is. If the IIgs is dead, at least it's attracting some very classy flies. If it's not, what might we look forward to when the upturn REALLY gathers steam?!

Though inCider's "Meet the Mac LC" piece made no recommendations and was hardly enthusiastic-- well, actually, it reads like something one might come up with in a Mac prisoner of war camp-- even so, Roger Wagner responded with a full-page rebuttal. One comment was especially thought provoking: "The IIgs is the best platform with which to enter the '90's."

My first reaction was something along the lines of "Poor RW. He's finally blown a 'higher functions' LSI chip. How can IIgs be the 'best platform' if it's not supported?" But that, of course is RW's point. Viewed 'in itself', instead of "Will it be around next year?", "Is it smart buy?", etc. the IIgs has remarkable potential. For starters, it is the ONLY platform to offer both an abundance of expansion slots AND sophisticated firmware. It is also a compact machine widely regarded as the best looking computer ever produced by anyone. (Well, it never hurts to be good looking.)

Granting that IIgs is in the "Best Platform" running; what's the problem? Why isn't the Best Platform doing BP-type stuff? This one's easy. Just imagine that you've switched-in a bigger power supply and crammed a 1MB model IIgs with the best available performance enhancers. What is missing? Exactly! Until we can either swap-out motherboards or plug in a card to obtain 'state of the world' graphics capabilities, non of the other add-ons will be enough to spark a full-scale IIgs swarming. Conversely, once super graphics ARE in place, all of the other add-ons and the IIgs itself will immediately become vastly more attractive.

Recommendations: Keep, use, enjoy, and learn about your IIgs. It could wind up as one of the big winners in Computer Wars II. Speed-up, math co-processor, and similar enhancements are worth a serious look, so long as you are willing to accept the risks (i.e. future compatibility) that come with 'leading the pack'.

As to user hardware experimentation, why not? Your Apple club's IIgs VGA card project could be THE way to crack the graphics logjam. ("What about the CRT monitor and 'old IIgs' super-res?" Easy. We buy multi-syncs, plug them into your new super IIgs VGA card and 'standardize' IIgs as a dual color monitor machine! Now, what sort of programming, flight-sim, CAD, and adventure game software do you suppose THAT would attract!!)

By now it should be clear that, for the active computer user, access to a PC/AT machine is a 'given'. Along with your radio, TV, and telephone, it has become 'standard equipment'. Interestingly, it has not attracted much experimenter interest nor anything like a fanatic user group following. Today's generic PC/AT IS a good, solid machine and, by far, the best price/performance personal computing value-- besides which, it continues to absorb an overwhelming portion of major software vendor attention. It has not, however, replaced the Apple II.

Why? Many reasons; but, to keep it short: you can't and/or won't do "Apple II" stuff on your PC. This especially applies to experimentation and one's willingness to try out enhancement products from a growing list of new 'garage shop' suppliers. Ironically, when a II user moves from II-only to "two"-- i.e. adds a PC-- there is more enthusiasm for enhancements and, after a brief dip, time spent using the older machine actually increases! For whatever reason, the "endless Apple II" does seem to be on the rebound. Two computers really are better than one.

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From: Charles T. "Dr. Tom" Turley

### **003- How did Woz invent the Apple computer?**

Following is a Steve Wozniak interview which appeared in the Summer 1997 issue of II Alive.

Looking Back: Woz Tells: "How I Did It!"

Charles T. Turley, interviewer

The recent flurry of speculations surrounding Apple Inc.'s future seems to have stirred up questions concerning birth of the Apple II. Some writers have reported that coding of the first II ROMs was a fairly simple affair since, "of course", Steve Wozniak had access to an assembler and terminal. Similar "obvious" and "easy" comments have surfaced about the decisions to use dynamic RAM and include a BASIC interpreter. I decided to ask Woz for all the facts.

C.T.: You've seen the report; how much is accurate?

Woz: The author of the report I received from you is wrong when he says no ROM of large size was assembled by hand. I could never afford an assembler for the 6502 which I bought for \$20.

First, I connected the 6502 to Static RAM and a video terminal of my own design. I then wrote a short "monitor" program to watch the keyboard and display characters, both under interrupt and polled. We didn't have 256 byte PROMS, just 256x4 PROMS at that time. I used two of the ones we burned for calculator development at HP. The first hardware bringup had a few frustrating hours but I got it working with polled keyboard that night.

I then wrote a 256 byte "Monitor" program which watched the keyboard for hex data entry (address:data data data) and hex display and program initiation ("Run"). I got very good at typing in hex and very very good at checking data entry carefully, character by character. I still can't read a credit card number without a high expectation of mistake, but I have good habits to this day.

C.T.: Even Commodore's Vic20, which appeared years later, uses easy-to-design-for static memory IC's. What was behind the decision to use dynamic RAM?

Woz: I switched to dynamic RAMs when someone at our club sold some for a couple of bucks each. After all, in 1975 these were the first RAMs cheaper than core memory, the 4K dynamics. I bought some 22 pin AMI ones, there were three vendors.

Virtually none of the other hobby computers around that time used dynamic RAMs, I decided it was because of the hobbyist technician sense of most fans I met, they weren't true engineers. Also, they were familiar with low-cost routes like surplus stores where the favorite RAM was the 2102 static. But for me, designing for the dynamic RAM was a piece of cake and I had fun at that which I excelled, combining MSI chips in clever ways.

Steve Jobs asked what did I think of the Intel dynamic RAMs. I told him I felt they were the best. Although they required more driving circuitry for Row and Column addressing (not just a wire from the CPU for each address line) they were in a smaller package. I had for some time measured the worth of my IC designs in terms of how little board space they took, not how few chips. So these 16-pin Intel chips, plus some row/column multiplexers and timing signals, actually took less board space than the 22-pin AMI RAMs. And saved some transistor clock drivers as well.

I felt we could never afford any Intel chip, having heard how the 8080 was \$370. But Steve got a rep to give us 16 samples. So the Apple I started with the best possible RAM choice, even before it was certain how things would go with RAMs. When the 16K dynamics appeared in the Intel compatible format we were luckily on the right track.

C.T.: How did BASIC come to be part of the first Apple computer?

Woz: The book "101 BASIC Games" made me think that the right higher level language for these low cost computers was BASIC, even though I'd never used it. I referred to an HP BASIC manual to develop my syntax diagrams. Hoping to be noted as the first with a 6502 BASIC, I left out floating point. But what I wanted was games, logic simulations, puzzle solving, etc. and integers are fine. Most of my college programming was numerics done with integer only operations for large accuracy.

I wrote the entire BASIC by hand with no assembler. I kept thousands of pages of my hand-done work from day 1. The final Apple II Rom code was entirely done by hand and is in a notebook. The Apple II was the first product to ship with 2K Roms from Synertek. 4K total of code. I built in a disassembler and wrote a mini-assembler (no symbols, only absolute hex or decimal addresses and constants) which shipped either in the Apple II or in a later Rom addition.

C.T.: What about peripherals like the printer interface, cassette, and disk? I guess these were all coded using an assembler; right?

Woz: By the time the Printer card was done with it's 256 byte ROM I may still have been coding by hand or we might have gotten our first assembler. It's unusual to this day that you plugged in a printer and it attached itself to the op-sys by means of a driver in ROM on the printer card. True plug'n play. Possible to this day but rarely done (I've heard of some Newton exception).

The ROM op-sys of the Apple II could direct output and input to any of 7 slots. Mass media was read and write an entire cassette file at once.

The floppy brought a very tight hardware design, coupled very tightly to the lowest level access subroutines which I wrote without an assembler. Randy Wiggington wrote the "Read Write Tractor Sector" routines, a step higher. Randy and I began a full op-sys but we farmed it out to Shepardson associates. Needless to say, none of that was done by hand!

---

From: Jason Aubrey Wells <jaw016@engr.latech.edu>

## **004- What did the first Apple ads look like?**

Below is the text of the Apple II advertisement which appeared in the September 1977 issue of Scientific American.

The home computer that's ready to work, play and grow with you.

Clear the kitchen table. Bring in the color T.V. Plug in your new Apple II\*, and connect any standard cassette recorder/player. Now you're ready for an evening of discovery in the new world of personal computers.

Only Apple II makes it that easy. It's a complete, ready to use computer--not in a kit. At \$1298, it includes features you won't find on other personal computers costing twice as much. Features such as video graphics in 15 colors. And a built in memory capacity of 8K bytes ROM and 4K bytes RAM--with room for lots more. But you don't even need to know a RAM from a ROM to use and enjoy Apple II. It's the first personal computer with a fast version of BASIC--the English-like programming language--permanently built in. That means you can begin running your Apple II the first evening, entering your own instructions and watching them work, even if you've had no previous computer experience.

The familiar typewriter-style keyboard makes communication easy. And your programs and data can be stored on (and retrieved from) audio cassettes, using the built-in cassette interface, so you can swap with other Apple II users. This and other peripherals--other equipment on most personal computers, at hundreds of dollars extra cost--are built into Apple II. And it's designed to keep up with changing technology, to expand easily whenever you need it to.

As an educational tool, Apple II is a sound investment. You can program it to tutor your children in most any subject, such as spelling, history, or math. But the biggest benefit--no matter how you use Apple II--is that you and your family increase familiarity with the computer itself. The more you experiment with it, the more you discover about its potential.

Start by playing PONG. Then invent your own games using the input keyboard, game paddles and built-in speaker. As you experiment you'll acquire new programming skills which will open up new ways to use your Apple II. You'll learn to "paint" dazzling color displays using the unique color graphics commands in Apple BASIC, and write programs to create beautiful kaleidoscopic designs. As you master Apple BASIC, you'll be able to organize, index, and store data on household finances, income tax, recipes, and record collections. You can learn to chart your biorhythms, balance your checking account, even control your home environment. Apple II will go as far as your imagination can take it.

Best of all, Apple II is designed to grow with you. As your skill and experience with computing increase, you may want to add new Apple peripherals. For example, a refined, more sophisticated BASIC language is being developed for advanced scientific and mathematical applications. And in addition to the built-in audio, video and game interfaces, there's room for eight plug-in options such as a prototyping board for experimenting with interfaces to others equipment; a serial board for connecting a teletype, printer and other terminals; a parallel interface for communicating with a printer or another computer; an EPROM board for storing programs permanently; and a modem board communications interface. A floppy disk interface with software and complete operating systems will be available at the end of 1977. And there are many more options to come, because Apple II was designed from the beginning to accommodate increased power and capability as your requirements change.

If you'd like to see for yourself how easy it is to use and enjoy Apple II, visit your local dealer for a demonstration and a copy of our detailed brochure. Or write Apple Computer Inc., 20863 Stevens Creek Blvd., Cupertino, California 95014.

Apple II is a completely self-contained computer system with BASIC in ROM, color graphics, ASCII keyboard, light-weight, efficient switching power supply and molded case. It is supplied with BASIC in ROM, up to 48K bytes of RAM, and with cassette tape, video, and game I/O interfaces built-in. Also included are two games paddles and a demonstration cassette.

#### SPECIFICATIONS

- \* Microprocessor: 6502 (1 MHz).
- \* Video Display: Memory mapped, 5 modes--all Software-selectable:
  - o Text--40 chars/line, 24 lines upper case.
  - o Color graphics--40h x 48v, 15 colors
  - o High-resolution graphics--280h x 192v; black, white, violet, green (16K RAM minimum required)
  - o Both graphics modes can be selected to include 4 lines of text at the bottom of the display area.
  - o Completely transparent memory access. All color generation done digitally.

- \* Memory: up to 48K bytes on-board RAM (4K supplied)
  - o Uses either 4K or new 16K dynamic memory chips
  - o Up to 12K rom (8K supplied)
- \* Software
  - o Fast extended Integer BASIC in ROM with color graphics commands
  - o Extensive monitor in ROM
- \* I/O
  - o 1500 bps cassette interface
  - o 8-slot motherboard
  - o Apple game I/O connector
  - o ASCII keyboard port
  - o Speaker
  - o Composite video output

Apple II is also available in board-only form for the do-it-yourself hobbyist. Has all of the features of the Apple II system, but does not include case, keyboard, power supply or game paddles. \$598.

PONG is a trademark of Atari Inc. \*Apple II plugs into any standard TV using an inexpensive modulator (not supplied).

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From: Rubywand

## **005- When did the Apple II FAQs begin and who have maintained it?**

The first comp.sys.apple2 (Csa2) Apple II FAQs Keeper was David Kopper. He put together some Q&A and posted the first FAQs on 28 Nov 1990. The FAQs was distributed via net.answers (now news.answers) starting on 17 Dec 1991.

Csa2 FAQs Keepers and periods of activity are ...

David Kopper	Fall 1990 - Summer 1992
Dan DeMaggio	Summer 1992 - Summer 1996
Nathan Mates	Summer 1995 - Summer 1998
Jeff Hurlburt	Winter 1997 - current

Apple II Csa2 FAQs: Input Devices, Part 15/25 Note from archiver<at>cs.uu.nl:  
This page is part of a big collection of Usenet postings, archived here for your  
convenience. For matters concerning the content of this page, please contact its  
author(s); use the source, if all else fails. For matters concerning the archive  
as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Input Devices, Part 15/25  
This article was archived around: 07 Jun 2009 08:32:11 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2  
Source: Usenet Version  
Archive-name: apple2/faq/part15  
Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from  
the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2KBPADJS.txt rev135 June 2009

## Input Devices

- 001- How do I do the Shift Key Mod?
- 002- What's a "VIDEX" board?
- 003- I need a GS ADB keyboard cable! Where can I get one?
- 004- How can I make a PC-to-Apple Joystick converter?
- 005- How can I do an Apple-to-PC Joystick conversion?
- 006- What are the dip-switch settings for the "BITMOUSE" card?
- 007- How can I switch my IIe keyboard layout to Dvorak?
- 008- What keyboards work as replacements for a GS keyboard?
- 009- What is a Koala Pad and how do I test it?
- 010- Can I convert a C-64 Koala Pad to work on my Apple II?
- 011- How do I make the internal cable for a IIe numeric keypad?
- 012- Is there a cable or card which lets you connect two joysticks?
- 013- How do I write programs for the Apple Graphics Tablet?
- 014- Why does my II+ KB act like the CTRL key is always pressed?
- 015- Can I replace my bad IIe keyboard with one from another IIe?
- 016- Why does my IIe keyboard keep repeating characters?
- 017- How do I read the joystick on a GS in native mode?
- 018- Is a Y-adapter available for my GS keyboard?
- 019- How do you use the Kensington TurboMouse with a IIgs?
- 020- How do I clean my mouse?
- 021- What is the best kind of mouse pad?
- 022- How do I clean my keyboard?
- 023- Is there a fix for a bad trigger on my Flight Stick?
- 024- How can I improve the feel of my original (beige-key) IIc KB?
- 025- Can I replace my broken GS mouse with one from a Mac?
- 026- What is the pinout for the IIe, //c, and similar 9-pin mouses?
- 027- How do I write programs which use the mouse?
- 028- How can I replace a bad keyboard encoder IC on my IIe?
- 029- Can I use an Apple III joystick on my Apple II?
- 030- How can I be sure my joystick is properly adjusted?
- 031- How can I play joystick games on an emulator?
- 032- How do I fix a "stuttering" IIgs? (IIgs keyboard fix)

033- How can I use a PC mouse on my Apple II?

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From: Steve Jensen

## **001- How do I do the Shift Key Mod?**

Here's info from my files on the 'shift key mod':

The one wire shiftkey mod is the oldest and simplest fix that can be made to the Apple II to get true upper and lower case operations with the shift key. Most good word processors have input routines that check the PB2 input on the game I/O port to determine if the shift key is being pressed. Some programs that have these routines are Wordstar, Write-on, Apple Pascal 1.1 and many others. Follow the steps below to install the shift key mod.

parts:

- 1 mini-grabbette clip (Radio Shack PN 270-370)
- 1 15 in. piece of small guage wire
- 1 16 pin socket

- 1) Solder one end of the wire to the mini-grabbette clip.
- 2) Solder the other end of the wire to pin 4 of the 16 pin socket as close to the body of the socket as possible.
- 3) Turn the Apple II off and remove the cover.
- 4) Remove anything plugged into the game I/O socket.
- 5) Attach the mini-grabbette clip to pin 24 of the keyboard encoder connector. This connector is located inside the Apple II directly beneath the RESET key. Pin 1 is nearest the power supply and pin 25 is nearest the right edge of the Apple II. Use the grabbette clip to attach to the standoff \_pin 24\_ (second from the end).
- 6) Lead the other end of the wire with socket attached along the right edge of the motherboard and plug it into the game I/O port. Be careful to plug pin 1 to pin 1 when putting this socket in. Pin 1 of the game I/O port is towards the front of the computer.
- 7) Replace the cover and start using lower case characters.

---

From: Paul Creager

## **002- I opened an Apple II+ the other day found that there was a board labeled "VIDEX" tacked under the keyboard. What is a "VIDEX" board?**

The official name is the Videx Keyboard Enhancer. It replaces Apple's keyboard encoder board underneath the keyboard. Besides providing true U/L capability (with the Shift Key), it had a small (10-20 character) buffer and supported programmable macro keys.

I had one on my ][+. I remember a couple of wires had to be run to the motherboard. One enabled true Shift key usage. The other I can't remember. If you don't have a wire running to an IC on the motherboard, that explains why your Shift key isn't working. It could very well be the same spot where the "traditional" Shift key mod is made.

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From: Rubywand

### **003- I got a free IIGS but with no GS ADB keyboard cable! Where can I get one?**

Jack Somers and Supertimer report that ADB cables which will work fine are available at low prices from stores which carry Mac supplies.

An alternative is to get an SVideo cable from your nearest video/audio electronics store. Although these cables have no external shield, all four ADB lines are connected. I tried one on our GS and it worked fine. One thing: the absence of an external shield may produce extra TV/Radio interference.

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### **004- How can I make a PC-to-Apple Joystick converter?**

If you are looking for the best stick at the best price for your Apple II, building a simple PC-to-Apple2 joystick converter is the way to go. Practically every computer stuff store carries PC sticks and you will have a wide selection of brands and models from which to choose.

Note: The converter detailed here will not work with "auto-fire" circuits included in some PC joysticks. If you use an auto-fire stick with this converter, "auto-fire" should be switched Off.

For a modified design which supports both auto-fire and non auto-fire operation see FAQs Resource R030PCA2RF.GIF.

My PC stick is a standard CH Products "FlightStick". A resistance measurement produced a disconcerting revelation: the X and Y pots top-out around 100k Ohms-- 50k less than a standard Apple II stick! Fortunately, you can compensate for the difference just fine by adding a bit of capacitance. The finished converter is shown below:

To PC Stick	To Apple II	Or to 16-pin IC plug
15-pin Dsub	9-pin Dsub	ribbon cable to
female connector	male connector	internal Game socket

[1] [4] and [5]	-----[2]	+5V	[ 1]
[2]	-----[7]	Button 0 (PB0)	[ 2]

```

[3] -----[5] X-axis (PDL0) [ 6]
[6] -----[8] Y-axis (PDL1) [10]
[7] -----[1] Button 1 (PB1) [ 3]
[3] Ground [ 8]

```

On the Apple II side ...	9-Pin	16-Pin
add 680 Ohm resistor between	[7] & [3]	[ 2] & [ 8]
add 680 Ohm resistor between	[1] & [3]	[ 3] & [ 8]
add .01 uF cap* between Optional: for fine-tuning, add a 500k trim pot in series with the cap.	[5] & [3]	[ 6] & [ 8]
add .01 uF cap* between Optional: for fine-tuning, add a 500k trim pot in series with the cap.	[8] & [3]	[10] & [ 8]

\*Note: The Capacitors compensate for smaller R range of PC sticks. The C values are approximate. There is some variation in the built-in capacitance for each Apple II and a ".01 uF" cap may be off by 20% or more.

For standard 100k Ohm PC sticks, picking a ".01 uF" cap pretty well guarantees you will be able to cover the full Apple II X and Y range (0-255). To make sure and to get a wide active swing, it's a good idea to use clips to attach caps and check performance using the program below.

A pictorial 'diagram' of this converter is available. For the pictorial, see FAQs Resource R029PCA2XRF.GIF.

For checking and adjusting stick performance on your Apple II, use a program which continuously reads and displays X and Y stick values. The program below does this and displays "B0" when Button 0 is pushed and "B1" when Button 1 is pushed. Do a CTRL-C to exit.

```

20 PRINT "X= "; PDL(0); TAB(15); "Y= ";PDL(1); TAB(30);
30 IF PEEK(49249)>127 THEN PRINT " B0";
40 IF PEEK(49250)>127 THEN PRINT " B1";
50 PRINT: GOTO 20

```

Note: If your Apple II uses an accelerator chip or board, make sure that it "slows down" for joystick accesses or just set Speed to "Normal" (1MHz).

Most likely, after X and Y centering is set (around 128) you will find that the a stick tops-out too early in the X-max and/or Y-max direction. For best control precision, what you want is for extreme values to occur near the extremes of stick movement:

X (horizontal) Left= 0 Right= 255  
Y (vertical) Up= 0 Down= 255

This way, you have lots of active swing which makes graphics work and playing most games much easier.

If you included the trim pots in your converter, adjusting for maximum active swing will be easy so long as you can get to the max 255 values with the pots at lowest resistance. (Increasing the resistance acts like lowering the value of the connected capacitor.) If your converter does not include the trim pots, experiment with swapping in capacitance values between .002 uF and .01 uF to get the best control 'spread'.

The converter I built fit inside heat-shrink tubing. Putting it in a small plastic box may be better. You could mount the trim pots (and/or switches with fixed "trim resistors") and select between settings for a 'Fast', short swing, 'hot' Game Stick and a 'Normal', full swing, 'cool' Game/Graphics Stick.

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## **005- I have a great Apple II joystick I'd like to use on my PC. How can I do an Apple-to-PC Joystick conversion?**

If you've compared the pinouts and info for Apple II and PC joysticks, then you know there are some important differences:

The Apple II stick uses a 9-pin plug vs. the PC's 15-pin plug. (Older Apple II sticks may use a 16-pin plug which fits in an IC socket.)

The Apple II stick's X, Y controller potentiometers are a bit larger.

The buttons are wired differently.

You can use an Apple-to-PC adapter (such as the one supplied with the Epyx A2/PC joystick) to handle plug conversion; or, you can replace the entire cable with one from an old PC stick.

The PC's joystick interface will work with the Apple2 150k pots; but, in some applications, you may notice a tendency to max out early in the stick swing. You can correct this by connecting a 300k resistor across each pot (from the center to the end with a wire going to it).

The difference in button wiring is the main reason an Apple-to-PC conversion involves opening the joystick and making changes. (The Apple stick has a slightly more complex, less flexible circuit. Apple2-to-PC is not as easy as PC-to-Apple2.)

Basically, you need to change the Apple stick's button wiring so that it looks like the PC stick's button wiring.

The mods mentioned above are not difficult, especially if you swap in a PC cable. If you want to be able to use the stick on an Apple II, then some kind of switching will be required.

Apple II Joystick (9-pin male connector)		(Old 16-pin IC-style plug)
[2]-----	+5V	----- 1
[7]-----	Button 0	----- 2
[5]-----	X-axis	----- 6
[8]-----	Y-axis	----- 10
[1]-----	Button 1	----- 3
[3]-----	Ground	----- 8

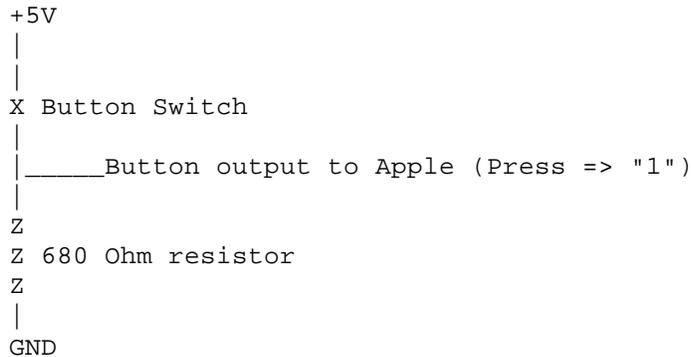
PC Joystick  
(15-pin male connector)

[1]-----	+5V
[2] -----	Button 0
[3] -----	X-axis
[6] -----	Y-axis
[7] -----	Button 1
[4] and/or [5]	Ground

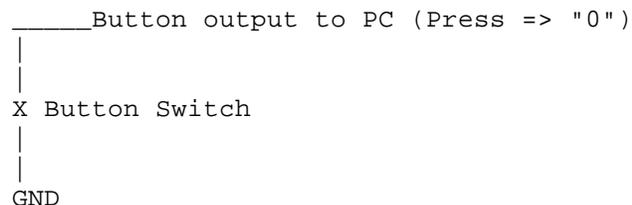
Both sticks tie one end of each X, Y potentiometer to +5 and send the center (wiper) to the an output. (Or the wiper may go to +5V and an end to the output; it doesn't much matter.) The standard Apple II pot is 150K Ohms; most PC sticks use 100k Ohm pots.

The buttons are wired differently.

On the Apple II stick (see below), each button switch goes to +5V. The other end goes to GND through a resistor (one resistor for each button). A button's Output is from the junction of the switch and its resistor. When the button switch is not closed, its Output is near 0V (=logic 0). Pressing a button sends +5V to the output (= logic 1).



As shown below, a PC stick button Output is normally an unconnected wire. Most likely, inside the computer, a PC or compatible Game Port has this line tied to a 1k-3k resistor going to +5V. So, the line will normally be at something close to +5V (= logic 1). Pressing the button grounds the line and pulls it down near to 0V (= logic 0).



## Apple2-to-PC Joystick Conversion: Step-by-Step

### DOING THE CONVERSION

To convert an Apple2 joystick for PC use you will need a cable from an old PC stick (or a 6-wire cable and 15-pin male connector). You can find junk PC sticks with good cables at flea markets and lots of other places. You will also need two 330k resistors.

1. First, open the Apple joystick case and mark each wire going to the cable. The best way is to use small self-stick labels. Label each wire by function (e.g. "+5", "X", "GND", etc.).

You can use an Ohm meter to, for example, verify that the wire you think is Button 0 really goes to pin 7 on the Apple 9-pin connector (or pin 2 on the old 16-pin IC style connector). Pinouts for both kinds of A2 sticks are shown below:

Apple II Joystick  
(9-pin male)

```
[2]---- +5V
[7]---- Button 0
[5]---- X-axis
[8]---- Y-axis
[1]---- Button 1
[3]---- Ground
```

Apple II Joystick  
(16-pin IC-style plug)

```
[1]---- +5V
[2]---- Button 0
[6]---- X-axis
[10]--- Y-axis
```

[3]---- Button 1  
[8]---- Ground

The +5V wire is easy to find. It will go to each pot and to one side of each Button switch.

The Apple2 Ground wire goes to the 'bottom' end of each fixed resistor. You do not need to label it; because it will be removed.

2. Once the wires are labeled, cut each about 1 inch from the point it goes into the cable. Remove the cable. (Keep the cable; it may come in handy for some later Apple2 project.)

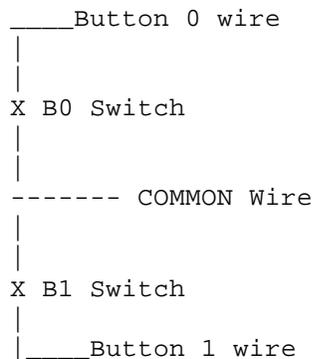
Now, is the time to rewire the Buttons.

3. Remove (snip or unsolder) the two fixed resistors. If the Button 0 or Button 1 lead becomes disconnected from its switch during removal of a resistor, reconnect the lead.

Check to see that, now, the Button 0 wire is the only one going to one side of the Button 0 switch. The same goes for the Button 1 wire.

Snip off or unsolder the +5 leads going to the other side of each button switch at the non-switch end. If a wire runs from one switch to the other, leave it alone. If not, connect a wire from switch to switch. This is the "common" side of the switches.

You want to end up with a single wire going to the common side of the switches and separate Button 0 and Button 1 wires going to the other side:



Label the COMMON wire as "GROUND"

4. The 330k resistors will help bring the outputs of the Apple2 X and Y 150k Ohm pots closer to the 0-100k range PC prefers. Connect a 330k resistor 'across' each pot-- i.e. from the center post to the post going to a +5 lead.

5. Label each of the leads coming from the PC cable. If it is still connected to a joystick, the following pic will help identify each lead:

PC Joystick  
(15-pin male connector)

```
[1]----- +5V
[2] ----- Button 0
[3] ----- X-axis
[6] ----- Y-axis
[7] ----- Button 1
[4] and [5] ----- Ground
```

If the cable is still connected, snip the the leads once they are all labeled. If both Ground ([4] and [5]) leads are present, twist them together and treat like a single Ground lead.

#### FINISHING UP

6. You have six labeled wires in the Apple2 joystick case: +5, GROUND, B0, B1, X, and Y. The same six leads are labeled on the PC cable. Splice each Apple2 wire to the corresponding PC cable wire. Use heat-shrinkable tubing to cover each connection.

7. Seat the new cable in the joystick case, arrange leads to avoid mounting posts, etc., and close up the case. Viola!

#### CHECKS

If you have an Ohm meter here are some checks you can do:

X (Horizontal) Check- check R between cable pins 1 and 3. As you move stick left to right R should go from 0 to about 100k.

Y (Vertical) Check- check R between cable pins 1 and 6. As you move stick up to down R should go from 0 to about 100k.

Button 0 Check- (Button 0 is the main, "Fire" button.) cable pins 2 and 4 or 5. It should be very high and go to 0 when Button 0 is pressed.

Button 1 Check- check R between cable pins 7 and 4 or 5. It should be very high and go to 0 when Button 1 is pressed.

#### TRYOUT

Plug in the stick and try it with a game.

Some games (such as Elite Plus) will claim no joystick is present if the stick is badly out of adjustment. If this happens, try the stick on a game which is less picky and includes pre-play stick adjustment.

Once adjusted, your 'new' stick should work fine with all PC wares.

---

From: Alberto Roffe

**006- Can someone tell me the dip-switch settings for the "BITMOUSE" card by Sequential Systems?**

The following comes from the BitMouse card manual, which I have installed in my //e:

Switch 1- This switch controls mouse tracking sensitivity

OFF: Slow

ON: Fast

Switch 4- CPU speed

OFF: 1 to 4 MHz

ON: 5+ MHz

Switches 2&3 currently have no function.

---

From: David E A Wilson

**007- How can I switch my IIE keyboard layout to Dvorak?**

There are a number of ways to set the NTSC //e keyboard to Dvorak.

1- If you have a Rev A motherboard cut X1 and join X2. This will allow AN2 to control the keyboard layout (default will be Dvorak).

2- If you have a Rev B motherboard and want AN2 to control the keyboard layout cut X2 and solder a short wire between the back half of X2 and the back half of X3 (do not join X3).

3- Obtain a 24 pin IC socket. Solder 3 fine wires to pins 12, 19 and 24. Solder the other ends to a SPDT switch (pin 19 to the centre/common terminal). Remove the keyboard ROM, insert the switch+socket and then insert the keyboard ROM. Cut X1 (if Rev A) or X2 (if Rev B) to isolate pin 19. Mount the switch somewhere convenient.

All the above was taken from "Understanding the Apple IIE" by Jim Sather. I recommend it to you.

---

From: Bradley P. Von Haden, Supertimer, Chippy

**008- My stock GS keyboard has been acting flaky; now I'm looking for a GS keyboard replacement. What's available?**

Work with an Apple IIgs:

Apple ADB Keyboards I and II  
AppleDesign Keyboard (approx. price: \$85)  
Apple Extended Keyboard (original)  
Apple Extended Keyboard II (approx. price: \$155)  
Adesso 105 Extended Keyboard (approx. price: \$80)  
Adesso 102 Extended Keyboard w/ Trackball [Trackball does NOT work]  
(approx. price: \$100)  
AlphaSmart Pro ADB keyboard (approx. price: \$270)  
AlphaSmart 2000-3000 (approx. price: \$200-\$230)  
Arriva Extended (approx. price: \$40)  
Datadesk Lil'BigBoard (approx. price: \$60)  
Interex Mac-105A Extended (approx. price: \$55)  
Key Tronic MacPro Plus (approx. price: \$130)  
OptiMac Extended Keyboard  
PowerUser 105E Extended Keyboard (approx. price: \$60)  
SIIG, Inc MacTouch Model 1905 (approx. price: \$100.00)  
SIIG, TrueTouch [ROM 03 only]  
Sun OmniMac Ultra [extended, ADB type]  
Suntouch ADB Extended Keyboard (approx. price: \$75)  
VividKey Extended Keyboard (approx. price: \$60)

Do not work with an Apple IIgs:

Apple Adjustable Keyboard  
MacALLY Peripherals Extended Keyboard  
MicroSpeed Keyboard Deluxe MAC

---

From: Rubywand

## **009- What is a Koala Pad and how do I test it?**

The Koala Pad is drawing pad peripheral. It 'looks like' a two-button joystick to your Apple II. So, any software which accepts joystick input can use the pad. This includes the paint program originally included with the pad (the "Koala Micro-Illustrator"), "Blazing Paddles", "Dazzle Draw", "816 Paint", and many other programs.

The Koala Pad has the old 16-pin game plug. It is supposed to be plugged into the Old Game Port socket. This is an 'IC socket' near the back right side of the Apple II (II+, IIe, IIgs) motherboard. The cable end should be facing toward the back.

It's a good idea to get a 9-pin plug -to- 16-pin socket converter cable so that the pad can be plugged into the newer, external, 9-pin Game Port. This makes it much easier to unplug the pad when you want to swap-in a joystick for games. The converter cable is not hard to build; or, you may find one at a swap meet.

You can test your KoalaPad using software which checks joysticks. For example, touching the stylus to the upper left corner outputs X,Y readings close to 0,0; touching the stylus to the lower right corner outputs X,Y readings of 255,255. Near the center of the pad, the output is about 130,130.

Some indication of shrinkage or stretching on the pad seems to be normal. Our pad does not present a 'slate flat' look either; but, it works fine. Before deciding that your pad is defective, try it out on a joystick checker program. If you are using some kind of accelerator on your Apple ][, be sure to set speed to 1MHz.

Similarly, you can check your software by substituting a joystick for the KoalaPad.

---

### **010- I have a Koala Pad with a 9-pin DIN female plug. I guess it's a C-64 model. Can I convert a C-64 Koala Pad to work on my Apple II?**

Since the standard Commodore-64 9-pin DIN port is male, it looks like your Koala Pad (with a female plug) is, indeed, intended to work on a C-64, VIC-20, etc. machine.

As to whether or not the C-64 Koala Pad can be used on an Apple II, it looks like, probably, it can, if you can find or build an adapter. This is, really, a guess. It is based upon the capabilities of the C-64 Game port, time constant capacitor values used in the C-64, and the probability that Koala Pad's makers would not wish to make major design changes between Apple and C-64 models.

Although C-64 joysticks are of the simple "switcher" type which connect to Game port switch inputs, the C-64 Game port also includes X and Y analog "paddle" inputs. These are at pin 9 (X) and pin 5 (Y).

The C-64 manual does not ever seem to specify an optimal max R value for the pots connected to these inputs; but, the capacitor part of the expected R/C circuit is 1000 pF in each case and the caps go to ground just as they do in the Apple II.

In short, the C-64 "paddle" inputs look very much like the Apple II joystick inputs. A \_try\_ at an adapter would look something like the following  
...

To C-64 Koala Pad (9-pin male DIN)	To Apple II Game Port (9-pin male DIN)
---------------------------------------	---

1 ?	
2 ?	2nd Button -> 1
3 ?	
4 ?	
5 <-	PDL1 (Y) -> 8
6 <-	main button -> 7
7 <-	+5V line -> 2
8 <-	GND -> 3
9 <-	PDL0 (X) -> 5

The above assumes that the C-64 Koala Pad will use C-64's "Fire Button" input for its main button. The second button would, then, connect to one of the four joystick switch inputs. (Actually, since all of the switch inputs, including the Fire Button, are just inputs to a port IC, any two may be the ones used to handle Koala Pad's buttons.)

It should be possible to detect the button lines on the Koala Pad connector using an Ohm meter (on R x 100 range) with one lead connected to the GND pin (pin 8) and using the other lead to check pins 1, 2, 3, 4, and 6. A button lead similar to one on an Apple II should show up as a 500-700 Ohm resistance.

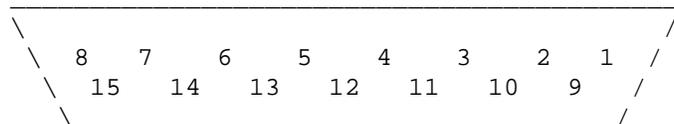
Again, we are dealing with guesses. If you decide to try making a converter, be sure to post what you discover. Good luck!

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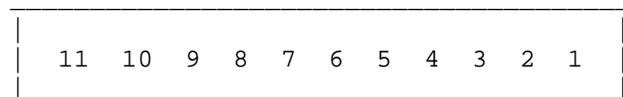
From: Mark Wade

**011- Does anyone have the pin-to-pin mapping that would allow me to construct a suitable internal cable for a IIE numeric keypad?**

You need a female Dsub-15 to 11 pin female header. If the female Dsub-15 is numbered like this:



And the 11 pin header is numbered like this:



Then:

DB-15	Header
12	11
11	10
10	9
9	8
NC	7
7	6
6	5
5	4
3	3
2	2
1	1

The header is as viewed on the motherboard. The DB-15 is the female connector that you would plug the keypad into.

---

From: Rubywand

### **012- Is there some cable or card which lets a II user connect two joysticks?**

Yes. One is Paddle-Adapple from Southern California Research Group. It is a small external card with sockets for the joysticks. A ribbon cable runs into the Apple II and plugs into the 16-pin Game socket.

As noted in the "for Apple II, //e, & Franklin" model's data sheet, Paddle-Adapple lets you switch between two sticks; or, with the switch set to "A" plus proper jumper settings, you can access two two-button sticks. The jumpers also allow programming the card for different X-Y and button configurations.

---

From: Oliver Schmidt and Guillaume Tello

### **013- How do I write programs for the Apple Graphics Tablet?**

The Apple Graphics Tablet I know of is rather large and heavy; its pen is attached to it with a (too short) cable; it makes funny sounds that change when the pen is moved in/out the reach of of the tablet.

A long time ago I patched a few programs to make use of this tablet. To make it clear in the first place - I don't have these patched versions available anymore :-(. But I found a listing from which I can tell you this:

To detect the interface card, I looped over all slots to check in its firmware for

```
$B0 at location $Cx01 and  
$20 at location $Cx09
```

x being the slot number. I never found this 'signature' in any other firmware.

To check for the pen position one has to poll the tablet (again x being the slot number):

```
LDA $CFFF ; switch off all extension ROMS
```

```
LDA $Cx00 ; switch on the extension ROM of the tablet
```

```
LDA #$Cx
```

```
STA $07F8 ; initialize some hidden text screen data area for the tablet firmware
```

```
JSR $CBB9 ; call well known location ;- ) in tablet firmware
```

When the pen is in reach of the tablet (up or down) this routine will return immediately. Else it will block - fortunately, the routine checks the keyboard strobe (\$C010) too and will also return if a key is pressed, even if the pen remains out of tablet's reach.

After the routine has returned one can get the information:

\$0280 pen state:

bit 0 = 0 Pen down, bit 0 = 1 Pen up  
bit 1 = Previous pen state  
bit 4 = 0 Pen has been localized, its state and positions are valid.  
bit 4 = 1 Pen out of reach but key pressed and then X=Y=0

\$0281 Low byte of X pen position

\$0282 High byte of X pen position

\$0283 Low byte of Y pen position

\$0284 High byte of Y pen position

X and Y have 13 bits resolution from 0 to 8191. Using my Apple Tablet, I get values from 300 to 6350 and the bounds are not reached.

---

From: Rubywand

**014- My II+ keyboard acts like the CTRL key is always pressed when it isn't. (Press 'G' get beep....press 'M' get CR, etc.) Is there a way to fix this problem?**

Are you sure that your CTRL key is not stuck? Try diddling the key. You can, also, pull the keytop and shaft and see whether (carefully) lifting out the small crossbar wire makes any difference. (If it does, a squirt of Radio Shack Control Cleaner into the switch and a wipe with a cotton swab may de-gunk things and help restore normal functioning.)

Another possible source of the problem is a KB Controller IC pin making poor contact with the line coming from the CTRL key circuit. (Try removing and re-socketing the KB IC.)

U1, a 7400 quad nand gate IC, could have gone bad or be making poor contact at some pins. This could result in an 'always-pressed CTRL key' signal at pin 11.

When the CTRL key is not pressed, pins 12 and 13 of U1 (connected to the CTRL key switch) should be at nearly 5V and pin 11 (which goes to pin 19 of the KB Controller IC) should be at logic "0" (roughly 0V - 0.25V).

If U1 pins 12 and 13 are at 0V (or very close) when the CTRL key is not pressed, your CTRL key switch is, probably, stuck.

If U1 pins 12 and 13 are at/near 5V and pin 11 is not near 0V, U1 is probably bad or making poor contact at some pins.

If U1 pin 11 is near 0V and pin 19 of the KB Controller IC is not, then, there is either a break in the line connecting the pins or one or both IC's are making poor socket contact.

If pin 19 of the KB Controller IC is near 0V when the CTRL key is not pressed and near 4-5V when the CTRL key is pressed, then, if you still have 'stuck CTRL key' symptoms, there is a good chance that the KB Controller IC is messed up.

Note: all of this assumes that your KB is like the one diagrammed in the Apple ][ Reference Manual on page 101.

---

From: Owen Aaland

**015- Can I replace my bombed IIE keyboard with one from another IIE?**

All four styles of the early keyboards are interchangeable. The first production machines have the keyboard mounted to the base pan while later ones are mounted to the underside of the top of the case. The mounting holes for all the keyboards except the platinum models are located the same.

---

From: Bruce R. Baker

**016- At my school we have a IIE that has some problem with its keyboard. When you push a key it keeps on repeating until you push another, which also repeats. Is there a cheap easy way to fix this?**

My experience is that this is more simple than it looks. You have one stuck key. It is stuck down. Have you opened the machine and moved the keyboard? If so you may have replaced it wrong, it is rubbing on one of the edges. The key that is stuck is next to the edge.

If this does not apply to you, often pressing all of the keys until it stops (because by pressing on the right key, it comes unstuck) will work.

---

From: Dave Althoff

My first suspicion is a stuck key, and if this is a beige ][e, the first place I'd look is the [~/~] key, adjacent to the power light.

---

From: Owen Aaland

The escape is a likely key for this as it is located where it can easily contact the case but does not exhibit any problems until another key is pressed and then that key will repeat.

---

From: Rubywand

If the KB Encoder IC or the IOU IC is loose or has pins making poor contact, you could get the symptoms described.

Open the case and locate the KB Encoder (a big, 40-pin IC on the right side of the motherboard just to the right of three ROMs). Use a small, thin-blade screwdriver to scotch up the IC. (You want to get some lifting for all pins, even if you end up just removing the IC.) Press the IC back into the socket.

Do the same with the IOU (a big, 40-pin IC just to the left of the three ROMs).

The idea of lifting up and re-socketing each IC is to let the socket contacts scrape a fresh connection with each pin on the IC.

---

From: tgeer@pro-gumbo.cts.com (System Administrator)

**017- A while ago someone posted about how to read the joystick on a GS in native mode. They said that it was possible to read both paddles at once and therefore get much more accurate readings?**

Only the high bit of these locations is valid. When the high bit of either location becomes 0 then the corresponding analog input has timed out.

You will actually get more accurate results by reading them one after the other with the accumulator set to 8 bits wide and the index registers used to hold the counts (16 bits wide). This allows for a much faster loop, giving better resolution. Assuming that this routine is called from full native mode, the following code will do the trick:

```
strobe    equ    $C070        ; analog input timing reset
pd10     equ    $C064        ; analog input 0
pd11     equ    $C065        ; analog input 1

start     php                    ; save processor status register
          phb                    ; and data bank register
          sep    #%100000      ; make accumulator 8 bits wide
          lda    #0            ; make data bank = 0
          pha
          plb
          ldx    #0            ; initialize the counters
          txy
          lda    strobe        ; strobe the timing reset
```

```

loop1    inx                ; increment pdl0 count
         lda    pdl0        ; is high bit = 0?
         bmi    loop1      ; no, keep checking
         lda    strobe     ; yes, strobe the timing reset again
loop2    iny                ; increment pdl1 counter
         lda    pdl1        ; is high bit = 0?
         bmi    loop2      ; no, keep checking
         plb                ; yes, restore data bank
         plp                ; and processor status register
         rts                ; return to caller (could be RTL)

```

Notice that the actual counting loops are only 9 cycles long. This gives the best possible resolution. You will need your counters to be 16 bits wide as the results will easily overflow the capacity of an 8 bit counter.

Using memory locations as counters will only serve to slow the counting loop down. If X and Y contain valid data before entry, you will need to save them off to the stack and pull them back in after interpreting the joystick results. I have used this exact method to read the analog inputs on my Science Toolkit box which connects to the joystick port.

The results have been extremely accurate (much more than would be needed for a game which reads the joystick).

---

From: Dan DeMaggio

### **018- Is a Y-adapter available for my GS keyboard?**

Yes. Redmond Cable has an ADB Y-connector cable for separating your mouse from the side of your keyboard.

---

From: Mark Wade

### **019- How do you use the Kensington TurboMouse with a IIgs?**

The Version 3.0 Kensington TurboMouse ADB works fine on a later model IIgs (such as a mid-late 1987 true ROM-01 IIgs). It will not work correctly on a ROM-00 IIgs even after the standard ROM upgrade to ROM-01. The Version 4.x TM will not work on any IIgs.

Dip switches:

Right handed use: (L but click, R but click lock) SW1 Up  
Left handed use: (R but click, L but click lock) SW1 Down

The other switches are for what they call "chording" and are listed as:

	SW2	SW3	SW6
Command N	Dn	Dn	Up

Command O	Dn	Up	Dn
Command W	Dn	Up	Up
Command S	Up	Dn	Dn
Command P	Up	Dn	Up
Command Q	Up	Up	Dn
Command Z	Up	Up	Up

---

From: Rubywand

**020- My mouse feels very bumpy. Everyone says it needs cleaning but when I look inside there is just a little dust and the rubber treads on the rollers look okay. So, how am I supposed to get my mouse any cleaner?**

It does sound like you have a gunked-up mouse. Rollers are whitish plastic, black plastic, or metal-- they do not have treads. The "tread" is gunk.

It is best to clean a mouse with the computer OFF. The main reason is that, otherwise, it's hard to avoid unintended clicking on stuff that could cause problems. There is no need to disconnect the mouse unless you want to move to a better work area for the cleaning.

First, get together a few supplies and tools:

A wooden desoldering stylus or flat-tipped plastic TV technician's tool is handy for dislodging gunk. (Probably, a small jeweler's screwdriver is okay. However, you do not want to scratch a roller.)

Small skinny long-nosed pliers are good for picking out globs of gunk and dust.

Windex or some relatively safe spray cleaner.

Paper towels and a cotton swab.

To open the mouse use fingernails to rotate the panel insert around the ball opening on the bottom. The panel and ball should come out. Spritz the ball and panel with cleaner (or put them in a glass with soap and water). Wipe dry.

Dampen a paper towel with cleaner and wipe the outside case. With a cleaner-dampened paper towel, clean the cord for at least a foot or so near the mouse.

Look inside the mouse. You may see globs of dust and gunk. Remove these-- pick them out-- as best you can.

Inside, there should be 3-4 rollers. If it's been a month or more since the last cleaning each will probably look like it has a dark gray rubber tread. Use the desoldering stylus, etc. or a fingernail to dislodge gunk on each roller.

The best way to dislodge gunk is to push the 'tread' sidewise (kind of like removing a tire) as you work your way around the roller. Use the skinny long-nosed pliers to pick out strips of the 'tread' as it unpeels.

Use a cleaner-dampened swab to finish cleaning each roller.

Use the swap to wipe around and pick out any remaining dust or gunk, replace the mouse ball, and rotate the plastic panel into place.

One way to simplify mouse cleaning is regular timely use of an Ergotron "Mouse Cleaner 360" or similar kit. The Ergotron kit includes a couple velcro balls, cleaner, wipe cloth or shammy, and a mouse cleaner track pad. You squirt cleaner on the proper size ball, stick it in your mouse, run it around in a circular motion on the track pad, and finish up with a wipe using the cloth or shammy.

Such kits do not seem to be much help in removing established gunk 'treads'. (Actually, the Ergotron might get the job done; but, it would take a lot of revolutions. It is easier to dislodge 'treads' by hand and use the Ergotron to get rid of residue.) Cleaning kits can avoid tread build-up if used every week or so.

---

## **021- What is the best kind of mouse pad?**

The best mouse pads are cloth-covered 1/8" - 1/4" rubber foam. The cloth should have a slightly prickly feel when brushed by your finger tips. Such pads offer some resistance to mouse movement. This makes positioning easier and helps reduce fatigue.

The worst mouse pads are plastic or plastic coated. These usually offer little resistance to movement and transfer hand oils, dust, and other gunk into the mouse so rapidly that cleaning becomes a nearly daily chore.

Cloth-covered pads do get dirty. It's a good idea to wash your mouse pad every couple of months. (Use warm soapy water, rinse, blot with towel, and let dry.)

---

## **022- Does anyone know what is the best way to clean a keyboard after several months of using it without affecting the imprinted letters or numbers on the keys?**

First, if you do not have a picture of the keyboard, it's a good idea to make a diagram of key locations.

If the keyboard is a separate unit, remove the keyboard cover-- i.e. the 'shell' that surrounds the keys. Spritz it with a cleaner (like Windex, Fantastik, etc.), wipe, and let soak in warm soapy water.

What you need to do next is pull the key tops. A puller tool which lets you get around and under a key on two sides is very helpful; or, you can use fingers and a small screwdriver or letter opener to pop off the key tops. For SPACE and

other large keys, take care to unhook stabilizer bars and pay attention to how the bar for each is connected.

Spritz each key top with Windex, Fantastik, etc., wipe, and let soak in warm soapy water. The letters, numbers, etc. on key tops are, usually, solid plastic and should not be in any danger of getting wiped off. For sure, you would not want to use any petroleum distillate or other solvent which attacks plastic for cleaning.

Everything is rinsed, blotted with paper towels, and allowed a couple hours to dry.

Once the KB interior is de-dusted you can blot away remaining moisture from key tops, etc. and put everything together. Install the large key tops with stabilizer bars first, then press on the others. If the keyboard is a separate unit, wipe/clean the cable.

A different approach suggested by some is to remove the keyboard and wash it in a dishwasher. Using a dishwasher might be okay if you use liquid detergent. (Granular stuff shreds glass-- not good for plastic or circuits-- and may leave deposits.)

Main things would be make sure any gunk gets washed away so that it doesn't get stuck inside a switch, etc. and that everything thoroughly dries.

It's probably best to remove the KB after the rinse cycle. Do not go through a heat dry cycle; that could lead to streaks and blotching, even partial melting, of the plastic.

Afterwards, dunk the KB in a sink of warm water. Submerge and lift out several times to suck out any glop. Shake the KB and dry what you can with paper towels to avoid streaking and blotching of plastic. Remove any globs of gunk you find; and, put the KB someplace to dry for a few days. (Avoid direct sun light; it's not good for the plastic.)

---

## **023- Is there a fix for a bad trigger on a CH Products Flight Stick?**

If the trigger on your "Flight Stick" doesn't always fire when squeezed, the problem is likely to be too much space between the trigger and the PB0 microswitch. A simple fix is to apply two or three layers of self-stick label bits to the back of the trigger piece (easily accessed once the handle is opened). To check your work, use an ohmmeter connected across the button output or plug in the stick and RUN a two-liner to display PB0 status:

```
10 IF PEEK(49249)>127 THEN PRINT "X";
20 GOTO 10
```

Pressing the trigger should spit out X's. Once you know your stick is fixed, just slap it together and you've got the hair-trigger snap-action response "Flight Stick" is supposed to deliver.



---

From: Mitchell Spector

### **024- How can I improve the feel of my original (beige-key) IIC keyboard?**

You can improve the feel by removing the black rubber mat. This is a spill-guard; but, people complained it hindered their typing so it was removed in next generation IIC's. You can safely remove yours by just lifting it up; it's attached by a few drops of glue.

Some people claim typing is even further improved if you remove the small metal clips in between each key stem (these produce a click sound when you type). You can reverse all this if you do it carefully, I did myself.

---

From: Supertimer

### **025- Can I replace my broken GS mouse with one from a Mac?**

Yes, if it is a Macintosh ADB mouse. The "teardrop" ADB Mouse II that comes on newer Macs works great on the IIGS and can be found for a few bucks in Mac for-sale groups. Third party ADB mice should work too.

Note: Mice for Mac Plus and before are not ADB so won't work. Mice for the new iMac won't work because they are for the USB interface.

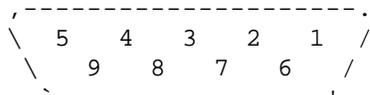
---

From: David Empson and David Wilson

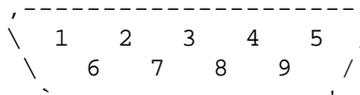
### **026- What is the pinout for the IIE, //c, Laser and similar 9-pin mice?**

The IIE/IIC/Mac Plus mice can plug into the //c or IIC+ Game/Mouse Port or, on a IIE, into the 9-pin socket of a Mouse Card. When plugged into the //c or IIC+, several Game Port pins are redefined for use with a mouse.

Dsub-9 Female Socket on Computer



Dsub-9 Male Plug on Mouse



Mouse	Usual //c, IIC+ Game Port Function
-------	------------------------------------

1	MOUSE ID	Pushbutton 1
2	+5V	+5V
3	GND	GND

4 XDIR           no Game Port function on //c, IIC+;  
                  this TTL-compatible input can be read at \$C066  
5 XMOVE           Game Control 0 or PDL0 (Joystick X-axis)  
6 n.c.           (no Game Port function on //c, IIC+)  
7 MOUSE BUTTON   Pushbutton 0  
8 YDIR           Game Control 1 or PDL1 (Joystick Y-axis)  
9 YMOVE           no Game Port function on //c, IIC+;  
                  this TTL-compatible input can be read at \$C067

---

From: David Empson

### **027- How do I write programs which use the mouse?**

The assembly language interface to the mouse firmware is documented in the reference material that was supplied with the IIe AppleMouse card, the IIC Technical Reference Manual, and the IIgs Firmware Reference Manual.

For a 'how to' discussion, see FAQs Resource file R034MOUSEPRG.TXT.

---

From: Alberto Cavalcoli

### **028- My IIe has a bad keyboard encoder IC. Where can I get a replacement?**

The AY-5-3600 PRO keyboard encoder is not easy to find, but it can be replaced by the KR-9600-PRO keyboard encoder. The 9600 IC has more features, such as the bounce fix. I have installed one in my IIe and it works fine.

---

From: David Empson

### **029- Can I use an Apple III joystick on my Apple II?**

No. The Apple III joystick port has very little in common with the Apple II one. The Apple III joystick's internal circuit arrangement and plug pinout are very different from that for an Apple II joystick.

Do not attempt to connect an Apple II joystick to an Apple III, or vice versa. At the very least, it will not work. At worst, you could damage the computer. Here are the joystick port pinouts, for comparison:

	II	III
1	SW1	GND
2	+5V	+5V
3	GND	GND
4	PDL2	Joy-X
5	PDL0	SW0
6	SW2	+12V
7	SW0	GND

8 PDL1 Joy-Y  
9 PLD3 SW1

---

From: Rubywand

### **030- How can I be sure my joystick is properly adjusted?**

To check and fine-tune your joystick, run an Apple II joystick adjustment program such as the one on the TNILUTIL disk available from Ground or GSWV (see Q&A 001 in Csa21MAIN4.txt). If you get a range of 0-255 for Horizontal and Vertical with centers around 128 and both buttons work, the stick is properly adjusted and ready for use.

If you can not reach extreme values (0 or 255), the stick will not work for some applications. For example, you will not be able to guide your worm in the game "Serpentine".

---

From: Delfs and Rubywand

### **031- Many games with a joystick option do not work with joystick on the Apple II emulator I'm running on a PC. Is there some way to use my PC stick with these games?**

The problem is that PC sticks do not have the required resistance range. (They top out around 100k Ohms; whereas, A2 sticks top out at 150k.) As a result, the emulator will not detect a value indicating extreme Down or Right.

One fix is to go to the PC Control Panel, select "Gaming Options" (or whatever it's called), and re-calibrate your joystick. The trick is to under-calibrate. So, when, told to move the stick in a circle, do not go out as far as you can. Instead, move it in a small circle.

A different fix is to modify your PC joystick to increase its range. Adding a 0.01uF capacitor from each pot's non-ground tab to ground will do this. Running the leads through a small DPST switch mounted in the joystick lets you switch out the caps for regular PC use. (For details see R033EMUJSMOD.GIF.) Since the joystick's range is extended by flipping the switch to connect the caps, there is never any need to under-calibrate when in the PC Control Panel.

Either way, to check and fine-tune your stick for emulator use, run an Apple II joystick adjustment program on the emulator. (See Q&A 030 above.)

If you do the joystick modification, set the switch OFF, to the PC position, when doing any PC Control Panel calibrations. (Doing a calibration with the caps switched ON would defeat the range-extending function of the modification.) Set the switch ON, to the Apple II position, when checking and fine-tuning joystick adjustments on your Apple II emulator and for playing Apple II games on the emulator.

---

From: George Rentovich

**032- Today my IIgs started "stuttering"-- i.e. working for a bit then freezing for a bit then working again. Anyone have a fix?**

I have seen this before. The cause was a bad connection to the keyboard's mini-DIN-8 connector. One of the leads from the connector to the keyboard circuit board had broken its solder connection; and, the line was intermittantly connecting.

When one or more lines is broken or loose, information is not getting back to the computer or is interrupted. Seems like the computer is waiting for it; and, you get "stuttering".

The solution was to resolder the mini-DIN connection(s) on the keyboard. I did it and all is fine.

The keyboard's min-DIN connectors are fairly well known weak spots on the IIgs; and, I have repaired more than one keyboard for bad connections. In one a copper trace going to a connector was broken-- repaired that by soldering in a jumper made from a bit of solid copper wire.

---

From: Roger Johnstone

**033- How can I use a PC mouse on my Apple II?**

I have developed a small adapter which lets you plug a PS/2 mouse (mechanical, optical, cordless, etc. as used with IBM PC-compatibles) into an Apple mouse port. It works with the mouse port on the AppleMouse card and the built-in mouse ports of the Apple IIc, IIc+, and Laser 128. (It should also work with older Macintosh models (128K, 512K, Plus); but, I don't have one to test it on.)

The adapter, which was demonstrated at KFest 2003, has a pair of microcontrollers which translate the PS/2 protocol into the Apple mouse format. No software changes or drivers are needed on the Apple side.

I've set up a web site with pics and info for selling the adapter via PayPal at ...

<http://vintageware.orcon.net.nz/> .

Apple II Csa2 FAQs: Monitors, Part 16/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

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## Monitor

- 001- How can I fix an unstable display?
- 002- I'm using a TV + IIC RF module. How can I improve the display?
- 003- What monitor repair Safety precautions are recommended?
- 004- How do I discharge the High Voltage anode?
- 005- How do I open my RGB monitor's case and get set for repairs?
- 006- What tools and solder should I use for repairs?
- 007- What's the fix for a flickering, Jumping, display?
- 008- How can I fix an all-red, all-blue, etc. monitor display?
- 009- Is there any more RGB Adjustments info?
- 010- How do I adjust Centering on my GS RGB color monitor?
- 011- How do I adjust Focus & Intensity on a blurry GS RGB Monitor?
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- 033- How many dots are actually sent to the GS monitor per line?

- 034- My GS RGB monitor takes a long time to get bright. A fix?  
035- Where can I get a GS RGB monitor cable?  
036- Can I replace my Apple II composite monitor with a PC VGA monitor?  
037- IIgs monitor screen goes blank and power light goes out. A fix?  
038- Why doesn't hires look as good on my GS RGB monitor?
- 

Monitor RepairMini-Manual (Q&A 001-014) 4/98 version

This mini-manual describes Repairs & Adjustments which usually involve removing the case. Before removing the case, check to see that the your problems are not due to a poorly connected monitor cable or misadjusted monitor controls.

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From: Rubywand

**001- My display is sharp but it seems to be unstable. Is there a quick, easy fix for this?**

Maybe. First, check your cable connections to make sure they are solid. Also, try diddling the side and back controls. Sometimes, these become dirty or develop bad spots.

If diddling a control seems to cure or nearly cure an unstable, jumping, etc. display, you can be fairly sure that a squirt of Control Cleaner will help. The cleaner needs to reach the control's resistance element-- the place where the wiper touches the carbon track in a potentiometer-- and you should turn the control back and forth after squirting the cleaner. Probably, you will need to remove the case to get a good shot at the dirty control.

---

**002- My Apple IIc has the IIc RF modulator module and is connected to a color TV through a TV/Game switch. The color is okay but the display is more or less ragged depending on where I run the cable. Is there a way to get a better, more stable display?**

If you are using a plain hi-fi type cable to connect from your IIc modulator to the TV/Game switch, then, changing to a video cable may help. If you are using a much longer cable than necessary, try a shorter cable.

Another popular trick is to form any unused length into one or more loops (use wire ties or tape to hold the loops together). Wrapping unused cable length around a ferrite or iron core (e.g. from an old transformer) is a variation on the same idea.

---

**003- What Safety precautions should I take when working on my monitor?**



```
[ | ]  
[ | ] insulated Anode lead going to HV module  
[ | ]
```

Needless to say, UNPLUG the monitor before beginning. Simply turning it off isn't good enough.

2. Get a clip lead and clip one end to a long slender screwdriver
3. Clip the other end to the metal chassis of the TV (i.e the metal frame parts)
4. Carefully! slip the screwdriver tip under the rubber flap on the top of the tube until it touches the internal wire that both holds the anode wire in place and conducts electricity.

Step 4 may result in a somewhat loud "SNAP" as the tube is discharged. Be prepared so you don't jump and break something.

WARNING: After "discharging", do not assume that no High Voltage is present. Almost certainly, some High Voltage remains or may reappear over time.

---

From: Rubywand

## **005- How do I open my RGB monitor's case and get set for doing internal adjustments or repairs?**

Whatever it is you plan to fix, if you remove the monitor case, you will probably need to unplug the cable running from the circuit board to the Controls/Switch Module on the side of the case. Use 'whiteout', nail polish, etc. to mark the position of the plug. In more detail ...

1. Unplug everything from the monitor & let it sit for a day.
2. Put on protective GOGGLES. Place the unit face down on a wooden or plastic-topped surface with lots of space and good lighting. Remove the screws. Place the unit in normal position.
3. Have a fat magazine ready. Slide the case off until you are able to see the control leads plugged into the main board on the right side of the case. Mark the plug position with 'white-out', nail polish, etc.. Unplug the connector.
4. Slide off the case while supporting the monitor and slide the fat magazine under the circuit board to prop up the monitor from behind.
5. Discharge the HV (optional, but, generally, a good idea).
6. <Do adjustments, fixes on Monitor>
7. When done, reinstall the control assembly.
8. Still wearing GOGGLES, support the monitor, remove the magazine, slide on the case, reconnect the plug, finish sliding on the case, replace screws.

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## **006- What tools and solder should I use for repairs?**

For any soldering use a good quality pencil-style iron rated at 25-40 watts with a holder and sponge. Use high quality (60/40 tin/lead or better) rosin core solder (e.g. Kester "44" 20 gauge).

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## **007- How do fix a Flickering, Jumping, display which sometimes collapses to a line?**

If the monitor exhibits major flickering, periodic collapse of the display to a line, etc., then it may help to know that a common source of such problems is one or more bad connections where the High Voltage module is joined to the main circuit board. (This module is the black thing with a HV lead running to the CRT-- it's near the left, back. The slotted nub controls in its case set Focus and base Intensity.) Often these connections look okay because it is hard to see the small fractures in the solder surrounding the pins.

The cure is to resolder all of the pins coming from the module (on the under-side of the circuit board). Before doing the soldering, clip a wire to the metal chassis and touch the other end to each HV module pin and other points in the area. While soldering, avoid touching anything conductive on the monitor with anything but the iron and solder.

---

## **008- Suddenly my monitor has an all-blue (all-red, etc.) screen! How do I fix this?**

You probably have a blown choke on the little chroma board mounted to the back of the CRT. The choke will be connected to one of the larger, R/G/B output transistors. Use an Ohmmeter to find the open choke. Replace the bad choke with 'one like it' or brew your own: wind about 25-30 turns of #30 wire on a small ferrite core.

A more detailed procedure is presented below ....

1. The part that causes the problem when it fails is a "choke" or "inductor" , it is mounted on a small circuit board attached to the back of the monitor tube itself. This part looks like a small blue ceramic ball with two leads coming out the bottom, and is color coded for 10 microhenries.

2. There are three of these items on that circuit board, and if any one of them fails, the symptom is a screen all of one color, with total loss of any controls of the monitor. The parts are identified by number, and what color the screen is will tell you which one to replace.

L6R2 for a Red screen

L6G2 for a Green screen

L6B2 for a Blue screen

3. You can probably get a 10 microhenry choke at Radio Shack, or it is available for \$1.28 (plus a \$5 Handling charge) from Digikey Corporation at (800) 344-4539. They take Mastercard, Visa, and C.O.D.. The Digikey part number is M8025-ND.

4. After replacing this part, the monitor colors may need to be readjusted via the small color trimpots on the same circuit board.

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From: David Fretz

### **009- Any more RGB Adjustments info?**

R13- RGB Intensity  
C86- Horizontal Position on RGB  
C85- NTSC Color Hue Adjustment  
C45- NTSC Frequency Adjustment

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From: James Poore

### **010- How do I adjust Centering on my GS RGB color monitor?**

Color monitors do vertical and horizontal centering differently than do monochrome monitors. Almost all color monitors have either a jumper arrangement or actual centering controls, sometimes both. Centering adjustments are usually located on the PCB with no access holes, so the back will most likely have to be removed to get to them.

If your monitor uses jumpers, there should be 3 tabs that each jumper can be connected to. For vertical adjustment the tabs should be marked as 'up', 'down', and center. If your pix is too high, then you would connect the jumper to the down tab. For horizontal adjustment the three tabs should be marked 'left', 'center', and 'right'.

If your monitor has centering controls, then adjust for best centering.

Many GS monitors use small tab switches to adjust centering. These are located near the back of the main circuit board.

Adjustment of Vertical Size, etc. via shafts on back of GS monitor can affect centering. For small changes, these adjustments may get the job done.

Adjustment of Intensity and Focus (see below) can affect centering.

---

From: Rubywand

## **011- How do I adjust Focus and Intensity on a blurry GS RGB Monitor?**

These adjustments may also help cure display "bowing", etc..

Intensity and Focus controls are on the High Voltage Module (black module near back of circuit board) inside the case.

Follow procedure outlined earlier for safety (e.g. unplug, wait, wear goggles, ...) and removing the case.

Note the position of the two controls on the HV Module (at the left, back). Mark the back of the cover where handy access hole should be. Take the case cover to another area (i.e. away from the exposed CRT neck). Remove the control assembly from the right side of the case.

Using a Dremel tool, hole saw, ... cut an approx. 1" diameter hole in the back of the case. Use this opportunity to give the case interior a good cleaning. (If you wash it, be very sure it's dry before continuing.)

Reinstall the control assembly.

Put everything back.

Reconnect cable and AC cord. Turn on the computer & monitor. Let it sit 10-20 minutes. Use the normal side of case controls to get the brightest, 'decent-focus' picture you can obtain.

Using a plastic TV technician's tool (and flashlight if necessary) adjust the Intensity and Focus controls (through the hole in back) on the HV module to get a good looking display.

Work back and forth between the back and side controls. What you're aiming for is a display with good brightness and sharp focus when the side controls are near their middle positions.

Cover the back hole using a piece of duct tape, a large sticker, etc.. (The opening is a potential shock hazard, especially if the monitor is within reach of children.)

---

From: "John F. Reeves" and Sam Goldwasser

## **012- I need to replace the High Voltage "flyback" power transistor in my Appicolor monitor. The part bears no manufacturer's mark, just two lines of text:**

D1650

7A

What part should I get?

The transistor is part Q502 on the PCB of the Applecolor RGB monitor, manufactured in 1987. This is the only power transistor in the HV section, the only one which is on a heat sink. ...."

D1650 is a 2SD1650 which crosses to an ECG2331. You should be able to pick one up at your local electronics shop. Try MCM Electronics, Dalbani, etc..

---

From: Rubywand

### **013- How can I fix sporatic Shrinking and Flicking in-out of Focus?**

Arcing from the metal brace to the HV module can cause the display to momentarily shrink and flick out of focus.

Follow safety and setup procedures outlined earlier.

The cure is to bend the brace up enough to increase the arc path and clean the surfaces involved. Apply HV dope to the brace and module where distances are small.

If the case interior seems pretty clogged with dust and gunk, it's a good idea to remove the side-mounted Controls/Switch (C/S) Module and give the case a good washing. (Be very sure it is well dried before replacing.) You should also clean the two controls on the C/S Module with spray-in Control Cleaner.

Before putting the case back, this may be a good time to adjust base Intensity and Focus (the two nub controls on the HV module). Position the monitor so that screen is easy to see and the nub controls are accessible.

Plug in the the C/S Module. Adjust the C/S Module controls to center positions. Plug in the monitor to the computer. Get a Desktop display with some text and icons. Use an insulated tool to adjust the nub Intensity and Focus controls for maximum sharpness at 'normal' viewing intensity. A magnifying glass is helpful to obtain max pixel sharpness.

---

### **014- Suddenly my GS monitor exhibits a serious case of display shimmy which sometimes degenerates into jagged lines. How can I fix this problem?**

Side-to-side shimmy indicates that Horizontal lock is not stable.

A good fix try is to adjust Horizontal Hold (the "<- ->" knob/stub) until the shimmy stops. This usually works unless 1- The HH control is already at its extreme setting, 2- The HH control has 'dirty' or burn spots at the position which would, ordinarily, be the correct setting, 3- The display stabilizes but ends up moved too far to the left or right side of the screen.

If, adjusting Horizontal Hold does not fix the problem, you will probably need to remove the case. For starters, this will let you squirt some Control Cleaner into the HH control.

With the case removed, you will have access to some other controls which may help solve the shimmy problem. Two are on the black High Voltage module: one nub controls base Intensity; the other controls Focus. There are also a couple small tab switches located near the back edge of the main circuit board. One sets Horizontal position; the other sets Vertical position.

If you reconnect the side controls and power cord, you will be able to experiment with adjustments.

Working with monitor adjustments with the case removed requires constant awareness of potential hazards. For example, you would connect the AC power cord to the monitor before plugging it into an AC socket. The monitor needs to be on a plastic or wooden table with nearby clutter removed. It may be easiest to support with the rear of the circuit board resting on a thick magazine.

You should have one or two plastic TV technician tools. These are rods with ends for turning slotted controls. (A whole set will cost a few dollars at Radio Shack.) Such tools are handy for adjusting the controls on the back of the HV module, for flipping the tab switches, for tapping components you suspect may be loose, etc..

Note: If the HH control seems to have serious burn spots-- e.g. you notice a crunchy feel when turning the knob-- you may have to get it replaced in order to achieve a correct setting. Replacing such a control is a job for someone with experience in working with monitors or TV's. If you decide to do it, be sure to check safety and setup suggestions listed earlier. De-solder the control, remove it, and take it to an electronics parts seller to get a replacement.

Working with Horizontal Hold, the Horizontal tab switch, and the Intensity control on the HV module, (and, maybe, the Focus control and Vertical Size) you should be able to eliminate any shimmy and end up with a properly sized and positioned display.

Note: On some monitors, you may have to trade-off Vertical Size in order to get a stable display which retains good linearity.

Once the shimmy problem is cured and the display is the right size and positioned correctly, work back and forth between the side controls and Focus to get a sharp display.

=====  
End of Monitor Repair Mini-Manual  
=====

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From: Michael Hickey, G. Utter, Jeff Blakeney, Steve Jensen, Blake Patterson,  
Scott Alfter, Louis Schulman, James Keim, Faisal Karmali, John Fenske

## 015- Which monitors and adapters can I use to replace my IIgs monitor?

You should keep an eye out for any analog RGB monitor that can horizontally sync down to 15.75 kHz. These include:

AppleColor RGB Monitor replacement (model A2M6014, the IIgs monitor)  
Commodore 1084 models and equivalents like the Magnavox Professional 80  
Sony CPD 1302 MultiSynch  
NEC MultiSync (original), MultiSync II, MultiSync 3D  
Commodore 1902 (although most of these only do digital RGB)  
Tandy CM-8 (not sure about model but it was used with the Cocom3)  
Atari SC1224 (used with the ST series)  
Some TVs

For example, I just tried a Sony CPD 1302 multisynch monitor on a GS and it works perfectly; and it has a .25 dot pixel! Very crisp picture. I used a standard cable from a Mac II (or you could check with Redmond Cable at <http://www.redcab.com/> ).

The NEC MultiSync II is another excellent monitor that will sync down to 15 kHz. (The MultiSync IIA won't work, though.) A cable you can use is shown below:

NEC Multisync II Dsub-9	IIgs Dsub-15
1 Red	2 Red
2 Green	5 Green
3 Blue	9 Blue
4 Horizontal Sync	3 Composite Sync
5 Vertical Sync (NC)*	
6 Red GND	1 Red GND
7 Green GND	6 Green GND
8 Blue GND	13 Blue GND
9 GND	

\*Note: DO NOT hook up Pin 5 (Vertical Sync); just chop it off. The NEC Multisync II is capable of composite sync on its horizontal sync pin.

The Atari SC1224 used with the ST is a ~15 kHz monitor. There were several versions, one by Goldstar, which appeared in one of the two case styles used by Atari over the years and bore the Atari logo. It works fine with the IIgs, provided an adapter cable is created. Redmond Cable can provide it.

The Commodore Amiga 1084 monitors and Magnavox equivalents (e.g. Professional 80, 8CM515) will work with the Apple IIgs. You will need a special Dsub-9 to Dsub-15 cable:

1084 model with Dsub-9 (Analog mode)	IIgs Dsub-15
1 GND	13 GND (Blue)
3 Red	2 Red
4 Green	5 Green
5 Blue	9 Blue
7 Composite Sync	3 Composite Sync

1084 model with DIN-6 Analog Connector	IIgs Dsub-15
1 Green	5 Green
2 Horizontal Sync	3 Composite Sync
3 GND	1, 6, 13 GND's
4 Red	2 Red
5 Blue	9 Blue
6 Vertical Sync (NC)*	

\*Note: DO NOT hook up Pin 6 (Vertical Sync). Just chop it off.

---

From: Ruud

Here's a different approach: my Powermac 7500 is right next to my IIgs; so, I plugged its composite video output into the video-in port of the 7500, started Apple Video Player, and lo and behold, it *is* possible to use your 1024\*768 multires RGB Powermac monitor as a IIgs monitor, in a pinch. Color is all washed up, but mono is OK.

---

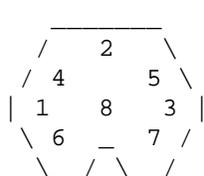
From: Stefan Voss, Joakim Ögren

## 016- What are the pinouts for Commodore's 1084 monitors?

1084 & 1084S Monitor Analog Connector  
6 PIN DIN FEMALE viewed at the monitor

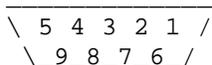
	<table border="0"> <tr> <td>Pin#</td> <td>Signal</td> </tr> <tr> <td>Pin 1</td> <td>G Green</td> </tr> <tr> <td>Pin 2</td> <td>HSYNC Horizontal Sync</td> </tr> <tr> <td>Pin 3</td> <td>GND Ground</td> </tr> <tr> <td>Pin 4</td> <td>R Red</td> </tr> <tr> <td>Pin 5</td> <td>B Blue</td> </tr> <tr> <td>Pin 6</td> <td>VSYNC Vertical Sync</td> </tr> </table>	Pin#	Signal	Pin 1	G Green	Pin 2	HSYNC Horizontal Sync	Pin 3	GND Ground	Pin 4	R Red	Pin 5	B Blue	Pin 6	VSYNC Vertical Sync
Pin#	Signal														
Pin 1	G Green														
Pin 2	HSYNC Horizontal Sync														
Pin 3	GND Ground														
Pin 4	R Red														
Pin 5	B Blue														
Pin 6	VSYNC Vertical Sync														

1084 & 1084S Monitor Digital Connector  
 8 PIN DIN 'C' FEMALE viewed at the monitor



Pin#	Signal
Pin 1	NC not connected
Pin 2	R Red
Pin 3	G Green
Pin 4	B Blue
Pin 5	I Intensity
Pin 6	GND Ground
Pin 7	HSYNC Horizontal Sync
Pin 8	VSYNC Vertical Sync

Commodore 1084d & 1084dS Analog/Digital Connector  
 9 PIN D-SUB FEMALE viewed at the monitor



Pin	Name	Analog Mode	Digital Mode
1	GND	Ground	Ground
2	GND	Ground	Ground
3	R	Red	Red
4	G	Green	Green
5	B	Blue	Blue
6	I	not used	Intensity
7	CSYNC	Composite Sync	not used
8	HSYNC	not used	Horizontal Sync
9	VSYNC	not used	Vertical Sync

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From: Rubywand

## 017- What is a "composite video monitor"?

A composite video monitor is a display which requires a composite video signal such as that output by an Apple II computer. The signal is called "composite" because it is a mix of Video, Horizontal Sync, and Vertical Sync signals. A color composite video signal will, also, include Color Burst. These signals are separated inside the monitor.

The cable for connecting such a monitor is a single wire surrounded by insulation with an outer shield (usually braided copper) covered by insulation. The inner wire carries the signal, the shield is at 'ground'. Often, each end of the cable has a standard RCA plug-- so; the cable looks much like a normal audio hi-fi cable. (In fact, a decent hi-fi cable will, often, work fine for connecting your Apple II to a composite color monitor.)

The main differences between a hi-fi cable and one intended to carry video signals are 1) the video cable usually has a better, tighter shield; 2) the video cable is characterized for impedance matching at, usually, 50 or 75 Ohms;

and 3) the video cable exhibits lower capacitance between the center lead and the shield.

You can connect your Apple II to a Monochrome or Color composite video monitor.

---

From: Michael Pender and Rubywand

### **018- What is the usual way to connect an Apple II to a display?**

For a IIgs, you connect to the IIgs RGB monitor. For other Apple II's, you use a video quality 'RCA cable' to connect to a composite color monitor, such as one of the Apple II monitors or a third party monitor like the Amdek Color-1. (The IIgs has a composite color output which can go to a composite monitor; but, for IIgs super-res, the results are unsatisfactory.)

An alternative to a composite monitor is to connect to a color TV directly or through a VCR. Most VCRs and many modern televisions have a composite video input port. Rather than buying a new monitor, a person can usually use an RCA cable to connect the Apple to a spare VCR or television. The stabilization logic built into even a cheap VCR can go a long way toward cleaning up an ugly picture.

---

From: Rubywand

### **019- Does anybody know how to do the "Color Killer Mod" on a //e?**

It looks like you should be able to do a full-screen color-killer on a IIe by using a general purpose NPN transistor (2N3904, 2N2222, etc.) to shunt the Color Burst signal. The transistor's collector would connect to the junction of R15 and R13; the emitter lead would go to Ground. The transistor should be connected directly to the R15-R13 junction and ground.

The base lead would go through a 2k-3k Ohm resistor to an annunciator output, such as An-3 at pin 12 on the 16-pin J-15 Game connector. PEEKing the appropriate addresses should flip Color OFF and ON.

The reason for qualifiers such as "looks like", etc. is that I have not actually tried a mod like this on a IIe. Monitors are remarkably sensitive to Color Burst. If the transistor does not do a good job of shunting the signal, enough may get through to trigger Color-ON.

A more positive (but less easy) technique is to use a 74LS32 OR gate to control flow of the 3.58MHz signal. The IC could be tack-soldered onto U88 via its +5 and GND pins. U88 is the 74S02 which has the gate which produces Color Burst.

Pin 12 of the 'S02 would be bent up and connected to the output of an 'LS32 OR gate (e.g. pin 3). One of the OR gate's inputs (pin 2) would go to Pin 12 of the 'S02 socket. The other (pin 1) would go to an annunciator output.

Turning ON the annunciator forces the OR gate output to "1" and eliminates Color Burst. Turning OFF the annunciator lets the OR gate output follow the 3.58MHz signal and enables Color Burst.

---

## **020- I connected my IIE to a color TV using a Radio Shack "TV/Game Switch" but it doesn't work. How come?**

A "TV/Game" switch is, usually, intended to switch RF (radio frequency) signals. For example, in the "TV" position it connects the TV's VHF antenna input to the VHF antenna (e.g. the long "rabbit ears"). This way, you can watch TV.

In the "Game" position it connects the TV's VHF antenna input to a game machine's or computer's CH 3 or CH 4 output. To see the computer's display, you need to set the TV Channel selector to the channel being output by the computer.

The reason your setup does not work is that the IIE does not output an RF signal. (In fact, no Apple II has built-in circuitry for outputting an RF signal.) The IIE outputs composite video. Composite video is pure video information like the kind output by a VCR through the standard 'Yellow' cable. It produces a better, sharper image than video which is converted to RF and fed into a TV's antenna input.

The usual way to connect an Apple II to a display is described in Q&A 018.

Getting an "RF Converter" ("TV Converter", etc.) module is another way to go. For about \$30 Radio Shack sells a box which will convert an Apple II's video signal to RF on CH3 or CH4.

One thing to consider when looking for ways to connect to a color TV without a standard "Video" input is that you could end up wasting time and money better spent on just getting a standard composite color monitor (like the Amdek Color-1) at a local Apple II swap meet.

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## **021- Can I use a color TV with my IIC+?**

Yes. You can use one of the methods described above, or (for TV's with an S-Video input) some module for converting to S-Video (e.g. Video Turtle); or, you can use the RF Modulator module especially designed for the IIC series.

The IIC RF module is formed to fit the IIC case and has a "CH3-CH4" slide tab on the top. Once the module is plugged in and a cable run to the TV's antenna inputs or to a TV/Game switch, you can get very nice, colorful on-TV hires and double-hires displays.

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From: David Empson

**022- A friend with Apple //c's and IIC+'s wants to connect them to RGB monitors. What is the //c/IIC+ video port pin configuration?**

First, I should correct a misconception: the video port on the back of the IIC+ is not an RGB port. It is a video expansion port, which provides all of the internal video generation signals used by the IIC/IIC+ which can be used to generate an alternative video output signal.

The actual functions of the IIC video port are as follows:

1	TEXT	Indicates text mode is active (spcl fn in DHR mode)
2	14M	14 MHz clock signal
3	SYNC	Horizontal and vertical sync
4	SEGB	Vertical counter signal from IOU, or lo-res indication
5	1VSOUND	Sound output (one volt peak-to-peak)
6	LDPS	Video shift load enable
7	WNDW	Active area display blanking
8	+12V	+12 volts DC
9	PRAS	RAM row address strobe
10	GR	Graphics mode enable
11	SEROUT	Serialized character generator output
12	NTSC	Composite NTSC video output
13	GND	Ground reference
14	VIDD7	Bit 7 of video shift latch (hi-res mode col shifting)
15	CREF	Colour reference timing signal

These come from the IIC Technical Reference, both first and second editions.

You cannot connect a monitor directly to the IIC video port (with the possible exception of the the LCD display, or an NTSC monitor). To produce RGB output (or anything else) from this port, you need an external adapter box.

This adapter is not simple: it has to decode the colour information from the NTSC video signal (or generate it by detecting the graphics mode and monitoring bit patterns), generate appropriate sync signals, etc.

I believe there is (or was) an RGB output adapter for the IIC, which should also work on the IIC+.

---

From: James Stafford

**023- Where can I buy a replacement RGB monitor for my GS?**

Alltech Electronics sells RGB monitors that they specially set up for the Apple II for around \$150.00 I believe. These monitors were Atari monitors that they fixed to work on Apple II's. Alltech also has used llgs RGB monitors.

For other sources, see the Vendors listing in Csa21MAIN2 or on the web page at <http://home.swbell.net/rubywand/A2FAQs3VENDORS.html> .

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From: David Empson

## **024- What kind of RGB monitors will work with a IIC and a Laser 128?**

I don't know about the Laser. The IIC doesn't have built-in RGB output. Its video port provides several low-level timing signals which allow RGB data to be decoded from the composite video signal (which is also provided on the port), but this requires external hardware.

The "standard" IIC RGB adapter (assuming there was one) would probably have produced digital RGB output, the same as the Apple III and the Apple IIe memory expansion cards with RGB output. With a digital RGB monitor, standard digital logic levels (TTL) indicate whether a colour (or colour weighting) is present or absent. One wire is required for each bit of each primary colour.

The IIgs, on the other hand, produces an analog RGB signal - a voltage on the Red, Green and Blue outputs represents the intensity of each primary colour. Any number of shades of each colour can be supported, by providing a finer resolution digital to analog converter within the computer. The IIgs has 4-bit D-to-A for each primary colour. High-end video cards on the Mac and PC (SVGA) use 8-bit D-to-A for each primary colour.

Digital RGB monitors cannot be used with an Analog RGB signal (unless comparators are used to generate a digital signal from the analog one).

Analog RGB monitors cannot normally be used with a Digital RGB signal, but generating an analog signal is possible with a resistor network (an example of this is given in the Apple III Owner's Guide). In some cases, it may be possible to plug an Analog RGB monitor into a Digital RGB output, but it won't produce the correct colours (when compared with a Digital RGB monitor).

There are two common types of digital RGB monitor: one type will work with the Apple III, Apple IIe (with RGB card), Apple IIC (with RGB adapter) and CGA on an IBM PC (different cables or adapters are required). This type has intensity and one bit each for red, green and blue (16 colours in total).

The second type is usable with EGA. This has two bits each for red, green and blue (64 colours in total). These monitors also have a higher scan frequency than the first type, and cannot be used with an Apple II (unless a card has been specially designed to use them).

Analog RGB monitors are mainly classified by the scan frequency and resolution. The IIgs RGB monitor (A2M6014X) operates at similar frequencies to television - around 15 kHz. Macintosh and VGA/SVGA RGB monitors do not support such low scan rates, and typically work at about 30 kHz or higher. The Mac cannot use the IIgs RGB monitor, and the IIgs cannot use Mac/VGA RGB monitors.

Some third-party MultiSync monitors will work on the Mac/VGA and IIgs, but these are very rare now. Most MultiSyncs do not go as low as 15 kHz.

"15 kHz" and "30 kHz" refers to the horizontal scan frequency - Apple II video output has a horizontal retrace roughly 15,000 times per second.

Vertical retrace is a different issue (it is much slower - usually 50 to 100 retraces per second), and most monitors are very flexible in the supported vertical retrace rate, as far as I know.

This is also where "interlacing" comes in. Interlacing is a technique which doubles the effective vertical resolution of the monitor, by performing two vertical scans (fields) per frame, with a slight vertical shift in the second field. The scan lines for the second field are interleaved between the scan lines for the first field.

An interlaced display has more noticeable flicker than a non-interlaced display with double the frame rate, because the phosphor is only lit half as often.

For example, the Second Sight card will support a 400 line interlaced mode with the IIgs RGB monitor. There will probably be noticeable flicker in this mode (especially out of the corner of your eye).

This mode will have 60 fields (i.e. 30 frames) per second, whereas the standard IIgs video output is non-interlaced with 60 frames per second (but only 200 lines vertical resolution).

(I'm assuming 60 Hz mode - the IIgs also support 50 Hz mode, for use in countries with 50 Hz mains supplies and TVs.)

Television also uses interlacing - with NTSC, there are 525 lines per interlaced frame and 30 frames per second, with alternating lines being scanned on each pass of the electron beam (262.5 lines per field, 60 fields per second).

PAL uses 625 lines per frame, usually at 25 frames per second (312.5 lines per field, 50 fields per second).

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From: Rubywand

## **025- Can I replace my GS RGB monitor with one from a PC?**

Modern PC monitors generally have a Horizontal scan rate which is too high to be compatible with the GS. For some replacement options, see Q&A 015 above.

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## **026- What are the specs and pinout for the GS RGB monitor?**

Max Resolution: 640 Horizontal dots x 200 Vertical dots/lines

Dot Pitch: .37mm

CRT Size: 12"/ 11.5" viewable

Video Bandwidth: 6.5MHz (+/- 1.5DB)

#### Scanning Frequencies

	60Hz model	50Hz model
Horizontal:	15.734kHz	15.696kHz
Vertical:	60Hz	50Hz

Pin	Function
1	Red video ground
2	Red composite video
3	Composite sync
4	(not used)
5	Green composite video
6	Green video ground
7	(not used)
8	(not used)
9	Blue composite video
10	(not used)
11	(not used)
12	(not used)
13	Blue video ground
14	(not used)
15	(not used)
Shell	Shield ground

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From: Mitchell Spector

The above specs show only maximum resolution when used with a plain Apple IIgs. It has an interlaced mode which allows you to display 640x400, though it isn't going to be easy to look at for long periods of time. You can see the interlaced mode if you have a VOC or Second Sight card.

The viewable area on an Apple IIgs is probably a fair bit less than 12"/ 11.5" viewable when you take into account all the space reserved by the border in all display modes. That probably makes it about 10" viewable or so. If you hook up another video source (e.g. a SuperNintendo) then you can use the entire 11.5", including what would be the border area.

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From: Rubywand

## **027- Do I need to connect a monochrome monitor to my IIE to get readable 80-column text?**

Maybe not. Try turning down the "Color" control to get a B/W display and adjusting Brightness and Contrast. This will, possibly, make 80-column text readable on your composite color monitor. Just how readable will depend upon the particular monitor. On the popular Amdek Color-1, readability is marginal at best. According to some user reports, readability is decent on Apple's composite color monitor.

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From: Michael J. Mahon

Regarding the above ...

First, turning down the color control will do nothing to increase the bandwidth of the luminance circuits, so the improvement in detail will be negligible. The only possible improvement is from decreasing any additional blur from the low bandwidth chroma signal.

Second, it is not just "some user reports" that the AppleColor //e and //c Composite monitor is fully 80-column-capable. This is a very special monitor which switches the the luminance channel to high bandwidth when the color killer is on, or when the "monochrome" switch on its front panel is pressed.

Of course, there is still a shadow mask, so the characters are not as "fully formed" as with a pure monochrome monitor, but the monochrome resolution is good enough to make it the only monitor required on even a "mostly text" machine.

To my knowledge, there are no other composite color monitors that have this feature. I think it deserves some credit!

---

From: Jim Krych (ab453@cleveland.Freenet.Edu)

## **028- Is there a high-quality replacement for RGB monitors?**

Yes. It's called the "VideoTurtle." (What follows comes from a Video Turtle advertisement.)

The VideoTurtle is a product that converts your RGB signal, known as TV RGB-15.75KHz scan rate for NTSC, into S-Video! S-Video is an enhanced form of TV with better clarity and resolution than the "TV" we are all familiar with.

With your computer, the VideoTurtle, and an S-Video equipped TV, you get equal or better display quality, than your old RGB monitor. Not only that, you get a much bigger and eye-pleasing display, and a TV to boot!

The VideoTurtle, from Turtle Enterprises, can be purchased for \$149.95 from one of it's authorized distributors, such as Tex Comp Ltd. To order call 1-800-846-3474. For technical information on TV RGB systems we haven't mentioned, or general technical help, call 1-626-967-3341. Turtle Enterprises can be reached via email: videoturtle@hotmail.com

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From: Tony Cianfaglione

### **029- Can I use a GS RGB monitor with my IIc?**

I use a IIc with a GS RGB monitor constantly through a Video 7 cable and it works fine. The 80 column text is crystal clear plus you can make it 4 different colors by flipping switches on the Video 7. A digital RGB displays 16 colors on a IIc but the GS RGB still displays 8.

---

From: Rubywand

### **030- I connected a composite monitor to my GS at the standard "RCA plug" output but I get a fuzzy dim display. The monitor worked fine on my II+. What's the problem?**

When a composite monitor is known to be okay, a fuzzy/dim display usually indicates that the video output level is too low. (A too-bright, whitish, faded look could indicate the output is too high.)

You can adjust video output on a II+ via the small on-motherboard knob near the Game I/O socket. There does not seem to be any way to adjust composite video output on the GS. If your monitor has a video input level adjustment, try changing the setting.

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### **031- Ever since adding a SecondSight video board it seems like my GS is always crashing. Is the SS board causing problems?**

SecondSight adds some nice features; but, it is known to be a power hog. Most likely, your system is crashing due to noise glitches on the +5V and/or +12V power busses. The fix is to fatten power supply leads and, probably, add on-motherboard +5V and +12V jumpers to a couple Slots. Details are supplied in the POWER FAQs (csa2POWER.TXT).

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From: James D. Keim

**032- My SecondSight board bombs every time I try to run Inwords or PublishIt. What's wrong?**

Inwords and PublishIt use the DHR display. The SecondSight cannot emulate the DHR display and locks up the system.

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From: Eric Jacobs

**033- Including the left and right borders, how many dots are actually sent per line in 320 and 640 modes on the GS?**

Including the left and right borders, plus the horizontal retrace, the video sends out more than 320 or 640 "dots" before the screen begins scanning the next line. Here's a quick summary of the Apple II video that's been used throughout the whole series (assuming 60 Hz video here). It's a slightly modified NTSC signal, though the differences are small enough for most monitors to accomodate.

Everything in the Apple II is derived from a 14.31818 MHz master clock. This runs both the video and the processor/memory subsystems. The cycle time is therefore 69.8 ns. For 640-mode (or 80 cols, or double-hires) the dots are sent out at simply this rate. In 320-mode (40 cols or single-hires) the dots are sent out at half that rate, 7.15909 MHz (one pixel every 139.6 ns). The NTSC standard calls for 227.5 cycles of color reference (3.579545 MHz) per horizontal line, for a horizontal scan rate of 15.734 KHz (3.579545/.2275). The Apple II rounds this up to 228 cycles of 3M, so the horizontal scan rate is 15.699 KHz (3.579545/.228). This is well within the tolerance of most monitors. So therefore in 320-mode  $228 * 2 = 456$  "dots". In 640-mode there are 912 "dots". I put dots in quotes because, obviously, only 320 or 640 of them are actually seen as part of the screen.

When the GS is outputting a composite video signal, each horizontal line must contain a horizontal sync pulse and color burst, and there can't be a border during this time, or else the TV won't register a sync. On the RGB, the GS puts the border color on. So, the answer to your question is  $456 - 320$  or 136 pixels in 320-mode and  $912 - 640$  or 272 pixels in 640-mode. This includes both borders and the horizontal sync. Of course, a good proportion of this time is not visible; this depends on the overscan settings of the particular monitor.

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**034- I picked up a IIgs RGB monitor at a garage sale. The focus is off and it took several minutes until the**

**display got brighter but it's still not very good. Are there any adjustments that can be made?**

The problem you describe is consistent with low B+ going to the flyback transformer which results in low brightness level, poor focus, and blooming when the brightness and/or screen level is turned up. More than likely if this monitor has been sitting around for awhile, the filter capacitors have gone to mush. Sometimes they can be revived by leaving the monitor on for a long period of time <over 24hrs> but, usually, they require replacement.

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From: Wayne Stewart

**035- Where can I get a GS RGB monitor cable?**

You can try a store selling Mac supplies and get a Mac 15 pin cable. I'm using one right now where I needed a longer than standard cable

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From: John J and Tim

**036- Can I replace my Apple II composite monitor with a PC VGA monitor?**

Yes; you can use a VGA-Box (or "V-Box"). It accepts 4 composite video inputs (NTSC or PAL) and 1 VGA input. The output is VGA.

Briefly VGA-Box converts your Apple II video (from the RCA plug) to a 15-pin VGA/SVGA output you can plug it into a modern PC monitor.

VGA Box is priced under \$50. For a pic and ordering info, see <http://store.yahoo.com/baysoftgames/vgabox1.html> .

I was using an old monochrome monitor. Finally I can play all my games in color once again!

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From: Stephen Shaw

**037- My IIGS monitor works for about half an hour, then the screen goes blank, and the power light goes out. Pressing the power button has no effect.**

Disconnect the monitor, remove the AC power cord, and open up the case. Warning: High voltages are present! For case opening directions, safety tips, and tool info, see Q&A 003-006 above.

The power supply has about five components one of which is a big white ceramic resistor (3.3 ohms in the 110V colour monitor). You will probably find that the solder connecting this resistor has crystallized.

Unsolder the resistor, scrape the leads with a Stanley knife (gently!). Clean the solder pads with some 200 grit wet and dry sandpaper. Resolder the resistor and voila!

If the resistor is OK. Then check the "kickstart" cap in the power supply (by swapping in a substitute). You can also check the STKxxxx power supply chip for bad solder joints.

Good luck!

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From: Rubywand

**038- When I play old hires games on my GS the RGB monitor display does not look as good as my old Amdek Color-1 connected to the II+. What's wrong?**

Most hires displays look better on a composite color monitor, such as the Amdek Color-1, than they do on the GS's RGB monitor. The difference is even more striking for double-hires displays. (King's Quest and Air Heart look much better on a Color-1 connected to a IIc+ than on an RGB monitor connected to the GS.)

What's wrong is that the GS's display circuits do just a passable job of translating hires and double-hires into RGB form.

Apple II Csa2 FAQs: Power & Cooling, Part 17/25 Note from archiver<at>cs.uu.nl:  
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Subject: Apple II Csa2 FAQs: Power & Cooling, Part 17/25  
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Csa2 FAQs file ref: Csa2POWER.txt rev135 June 2009

## **Power Supplies & Cooling**

- 001- What's the pinout and load specs for the IIgs Power Supply?
- 002- Are the power supplies for the ][+ and IIe interchangeable?
- 003- What are the output capabilities of GS and IIe power supplies?
- 004- Can I use a 'generic' surplus power supply in my Apple II?
- 005- How do fatter leads reduce noise on the +5V & +12V lines?
- 006- Is there any more that can be done to eliminate glitches?
- 007- Is there a power supply upgrade kit for the Apple IIgs?
- 008- What kind of internal fan can I install in an Apple IIgs?
- 009- Why do so few GS power supplies have a fan installed?
- 010- What are some good Apple II power supply fix tries?
- 011- Some of our classroom IIe's don't work at all. Is there a fix?
- 012- Why does my Apple IIe often fail to turn on?!
- 013- What does a rapid chirping noise on a GS power supply mean?
- 014- How do I fix a nearly dead GS power supply?
- 015- What is a "Buggie Power Supply"?
- 016- Do I need the metal shielding in my GS case?
- 017- My System Saver IIgs has gotten very noisy. How can I fix it?
- 018- My System Saver IIgs panel feels springy? Is there a problem?
- 019- Can an overloaded power supply affect IIgs sound?

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From: David Empson

### **001- Does anyone have pinout and current ratings info for the Apple IIgs Power Supply?**

7	- 5 Volts	0.25 Amps
6	-12 Volts	0.25 Amps
5	+12 Volts	1.0 Amps
4	+ 5 Volts	4.0 Amps
3	--nc--	
2	GND	

1 GND

The Power Supply connector pins are numbered as above. When you are sitting in front of the computer, pin 1 is nearest you. (i.e. pin 7 is nearest to the back of the motherboard).

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From: Rubywand

### **002- Are the power supplies for the ][+ and IIe interchangeable?**

Yes. The plugs are the same and the ratings are the same and they look alike. Aside from, possibly, needing to add mounting holes for particular models, you should be able to swap ][+ and IIe power supplies whenever you wish.

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### **003- Could someone compare the output capabilities of the GS and IIe power supplies?**

Okay. This is from information presented in GS and IIe manuals:

PS Connector Pin# (GS/IIe)	Output Volts	Max. Output Current (GS/IIe)
7/6	- 5 V	0.25 Amps /0.25 Amps
6/5	-12 V	0.25 Amps /0.25 Amps
5/4	+12 V	1.00 Amps /1.50 Amps
4/3	+ 5 V	4.00 Amps /2.50 Amps
2/2	GND	
1/1	GND	

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### **004- Can I use a 'generic' surplus power supply in my Apple II?**

Sure. Check out the power supplies listed in the MPJA, JDR, Jameco, and similar catalogs (see <http://home.swbell.net/rubywand/A2FAQs3VENDORS.html> for links). Mainly, you are looking for a relatively compact switching power supply which fits the following guidelines:

- 1- all four Voltages (+/- 5V and +/- 12V) are available\*
- 2- the power supply can be fitted into your Apple II
- 3- the +5 Volt output is rated at 5-10 Amps
- 4- the +12 Volt output is rated at 1.5-3 Amps
- 5- price is no more than \$25

\* Except for PC power supplies, good four-output models with a -5V output seem to be rare. You can add a simple -5V regulator circuit to the -12V output to obtain -5V.

As more and more new surplus power supplies are dumped, part of your shopping challenge is finding one which is small enough to work well with the Apple II. This explains the price guideline. If a unit costs more than \$20, the odds are pretty good that it's too big physically or electrically.

Too big electrically? In general, power supplies need to be loaded in order to do a good job of regulation. A 25-Amp output which is called upon to deliver 1 or 2 Amps is more likely to exhibit problems with feedback and regulation than were it asked to deliver, say, 5 or 6 Amps. An Apple II with a few power-sucking Slot cards will work fine with many PC power supplies; a base system with no cards could have problems adequately loading some PC supplies.

Your best choice for an in-the-case replacement is likely to be some \$10-\$15 unit rated at a total of less than 125 watts which was originally designed to power a printer, monitor, or portable PC. Probably, it will be "open frame" with no case, switch, fan, or power cord.

Installing a power supply unit-- i.e. one not specifically designed for the Apple II-- inside your Apple II can involve a fair amount of work. When I did such an install on our II+, the most time-consuming part was fixing up a way to mount the On/Off switch and AC cord socket in the usual power supply opening in the back of the case. (Mounting the stuff on a small plastic panel set into the opening worked fine.)

The power supply board itself mounted nicely on spacers in the space provided for the standard PS. Once the AC and various DC lines were connected, the new PS came on-line without a hitch. Our II+ hasn't had any power supply problems since.

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From: Rubywand, Marvin Miller, Michael Mahon

**005- Could you please explain how adding thicker wire will decrease noise on the +5V and +12V lines? I received and installed my new "Heavy Duty" A2 power supply and get the same results with my Second Sight board as before-- it still locks up the computer on boot-up.**

The leads coming from most Apple II power supplies have a low resistance-- much less than 1 Ohm. (Thanks to Michael Mahon for driving home this point!) Even so, as a user piles on peripherals and the current load increases, a wire lead's resistance may prove to be too high to allow maintaining proper operating voltages and low system noise-- e.g. you routinely get "FATAL SYSTEM" errors.

A good indicator of power problems is a noticeable drop in voltage on the +5V line as measured on the motherboard. Instead of the 4.9V - 5.0V typical for a light load, it will be 4.7V or lower.

Measurements and experiments with standard IIgs power supplies indicate that the actual DC voltage drop through the 18 gauge +5V and Ground leads is only (approximately) a total of 0.04V at 3Amps, which is what a moderately "loaded" IIgs system will draw. The explanation for getting a drop of 0.2V - 0.4V or greater appears to be power supply regulation error. Some standard (and "heavy duty") Apple II power supplies with 18 gauge leads will hold at-motherboard voltage to around 4.9V at 3-4 Amps and some won't.

It is easy to see that a system designed to work at 5 Volts will eventually begin to malfunction as the available voltage drops by half a volt or more. In fact, any actual computer system would be likely to experience crashes long before the average, measured at-motherboard voltage got down to 4.5 Volts.

A voltmeter reading at the motherboard does not show instantaneous spike or "noise" voltages. Each time a circuit switches, there is a change in current drain. Quite a few circuits are switched with each main system clock transition; so, the change in current can be substantial at 1 x and 2 x main clock frequency. Other events, like turning ON a disk drive, can also produce brief up or down shifts in current drain. Either way, you have brief changes in voltage across the power supply and its leads.

The brief voltage changes are called "spikes" because they are VERY brief. The larger the current shift and the greater the effective resistance of the power supply plus its leads, the higher the spike voltage generated. Since these spikes are in series with the circuits connected to the PS and since they are difficult to eliminate via bypass capacitors, they propagate throughout the system.

Even worse, as current draw increases and spike voltage increases, at-motherboard supply voltage decreases. So, you have a 'double whammy': the lowered supply voltage reduces IC noise immunity just when you need it most.

At some point, noise spikes appear which cause latches, memory IC's, etc. to switch state. If the latch is on a RAMfast, you may get a disk read error. If a memory chip is affected, data will be corrupted, program instructions may change, ....; in short, your computer is likely to malfunction.

All of which is bad enough; but, there may be another negative affect when noticeable system noise appears 'across' the power supply. How many csa2 posts complain about GS power supplies that crater "for no reason" after just a couple months? How many users seem to be on eternal quests for a solution to PS woes? Reducing the noise may significantly extend the life of your Apple II power supply.

Power supplies with noticeable regulation error often benefit greatly from heavier leads, especially for +5V and Ground. Reducing the actual drop through the lines reduces the resulting error; and, at-motherboard voltage is back to 4.8V or better under high loads. The heavier leads also reduce noise.

Whether or not tighter regulating power supplies benefit significantly from swapping in heavier leads is an open question. At high switching frequencies the power supply's leads will have a higher effective resistance and the spike

voltages appearing across the power supply output will be larger. If you notice otherwise 'mysterious' system glitches despite having a good, solid looking power supply and/or that power supplies tend to crater when connected to your Apple II, swapping in heavier leads may be a good idea.

Our current GS power supply is the one which came with the computer when it was purchased in the Fall of 1986. Yes, our GS was plugged into a System Saver IIgs fairly early on; but, then, line deglitchers have been a nearly universal accessory since the mid-1980's. The main difference between our power supply and the piles of blown units is that fattened +5V, Ground, and +12V leads were added back when we upgraded to an accelerator board. Despite having also added a Focus Hard Card drive, RamFAST SCSI

interface, and a couple other boards, system crashes are very rare-- perhaps one every 8-10 sessions (and those usually relate to a fault in the software).

The 'bottom line' is that, so long as the power supply is not actually defective, real world experience supports fattening at least the +5V and Ground power supply leads as a major step in curing crashes due to system noise. (See also Marvin Miller's GS WorldView article: "I Did the IIgs PS Mod, and the glitches are gone!" at <http://apple2.org.za/gswv/a2zine/Sel/IdidThePSmod.html> .)

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From: Rubywand

### **006- Fattening my GS's power supply leads greatly reduced system crashes. Is there any more that can be done to eliminate glitches?**

Yes. There is another weak link in the power delivery 'chain': the motherboard circuit traces supplying power to Slot boards are fairly skimpy, especially on ROM-01 boards. A heavy power user, such as a souped-up Transwarp accelerator board, in Slot 7 can produce significant noise up and down the entire Slot 'backplane'.

The cure is to remove the motherboard and tack on #18 - #16 gauge jumper leads. (See Question 007 for details.)

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### **007- Does anyone here remember the Mac SE upgrade kit that included 18-ga wire, a bunch of new caps and other fun stuff, that increased the computer's amperage and allowed more upgrades, also fixed many problems? Is there a power supply upgrade kit for the Apple IIgs that someone has constructed?**

Okay; here is your very own

A2-2000 On-Line Power Supply Mods Kit!

Swapping-in fat leads is, technically speaking, a pretty simple job. You pop out the power supply, open it, unsolder old +5, +12, and Ground leads, solder in the new leads, close and replace the power supply. The tricky part is what hackers call the "mechanics".

First, #12 or #14 gauge wire is not very flexible. Getting stranded wire (instead of solid) helps. Probably, #14 gauge is more than fat enough for all three leads. One case where #12 or #10 gauge may be worth the extra trouble is the +5V lead.

Use wires colored the same as those you replace. On the standard connector, the first two leads are Ground. Almost always, these are black. Next, there is a space, then, in order +5, +12, -12, -5.

Depending on the bother involved, you can un wedge the wire bundle where it passes through the supply case and remove the three old wires (+5V, +12V, and one Ground wire). Or, you can just cut away each old lead. Leave the -5V and -12V leads and one Ground lead alone.

Getting to the PS circuit board involves some work. After removing the mounting bolts, you will have to scooch up the board in order to get to the bottom side. This will be easier if the wire bundle has been unwedged.

Another hurdle is soldering to the circuit board. Once the old leads and excess solder are removed, you will probably find that the holes are too small! A jeweler's screwdriver makes a good hand drill for enlarging holes. (Drill from the circuit side. Be careful not to tear or dislodge the printed circuit.)

The new leads should be routed through the unused fan slots. (If a fan is attached, remove it. It's in the wrong place to do much good in cooling your GS.)

Note: If you have a fan mounted to the PS and you wish to keep it, then, it will be necessary to enlarge the original cable exit hole. A sheet metal "munching" tool should let you do this without having to entirely remove the PS circuit board. (Just be sure to catch all of the munched pieces!)

When routing the leads be careful not to place a twisting force on a lead where it is soldered to the circuit board.

To get to each spronger (contact) in the plug, press on it through the slot on the side near the wire end. This pushes up a small retaining tab so that pulling on the attached lead will pull out the spronger.

Cut off the old lead, clean the end, and solder on the new lead. Press the spronger back into the plug. To avoid mixups, it's best to complete the process for each lead before doing the next.

When plugging in the power supply, take time to shape and arrange the wires to minimize stress on the motherboard.

Fatter +5, +12, and Ground leads should protect you power supply and reduce circuit noise.

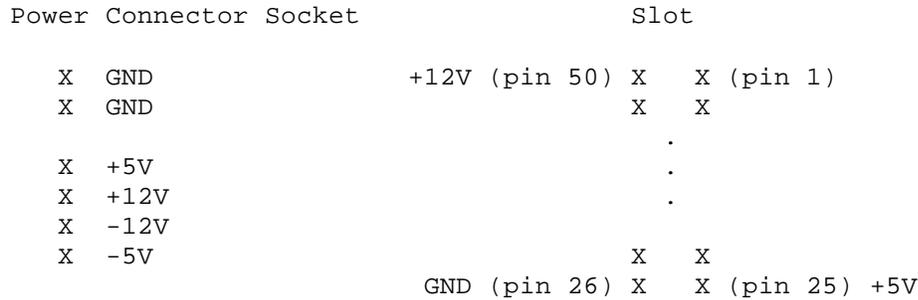
If audio noise in your stereo card output and/or system bombing due to noise glitches were problems, they may be eliminated. A lot depends upon which cards you've installed, which slots they are in, and whether your IIGs is a ROM-01 or ROM-03.

The motherboard circuit traces supplying power to each Slot are fairly skimpy, especially on ROM-01 boards. A heavy power user in Slot 7 can produce significant noise up and down the entire Slot 'backplane'.

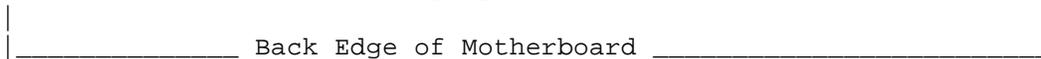
The cure is to remove the motherboard and run leads to a couple Slots ...

First, flip over the motherboard and get oriented. Below is a quickie sketch showing the Power Connector points as well as key power pins for a Slot. The view is from the Bottom with the Back of the motherboard facing you:

Bottom of Motherboard



.... Ground Plane Area (plug shields, etc. connected here) ....



A good way to make sure you know what's where is to use an Ohm meter to check Resistance from pin 26 (GND) to a metal plug shield near the back of the motherboard. (Set your meter to Ohms X1. Touch one meter lead to pin 26 and the other to a metal plug shield. Resistance should read nearly zero. Reverse the leads and repeat the check. Again, Resistance should read nearly zero.)

Repeat the check for R between pin 26 and the GND points on the Power Connector socket. R should be nearly zero. Using a marker pen or white-out, mark pin 26 (GND) on Slots 3 and 7. Also mark the GND points of the Power Connector socket.

GND: On the bottom side of the motherboard, connect a Black #16 gauge wire from one of the Ground points of the Power Connector socket to the Ground plane area near the back of the motherboard. Run a short Black #16 gauge wire from pin 26 of Slot 3 to the Ground plane; run a short Black #16 gauge wire from pin 26 of

Slot 7 to the Ground plane. (You may need to scrape through green insulating lacquer to solder to the Ground plane area.)

+5V: On the bottom side of the motherboard, connect two #16 gauge Red wires to the +5V point of the Power Connector socket. Connect the other end of one +5V Red wire to pin 25 of Slot 3; connect the other end of the second +5V Red wire to pin 25 of Slot 7.

+12V: If you have any cards which are likely to draw heavily on the +12V line, then, on the bottom side of the motherboard, run a #18 gauge White wire from the +12V point of the Power Connector socket to pin 50 of the Slot in which the card is normally located. Otherwise, just run an #18 gauge White wire from the +12V point of the Power Connector socket to pin 50 of Slot 7.

Check your connections. One quick check is that the GND and +5V wiring to Slots 3 and 7 should be Black, Red (moving left to right) and Slots 3 and 7 should 'look the same'. Any +12V wire should be on the same side of the Slot (i.e. the same column of pins) as GND. None of the wires should be connected to a middle pin on any Slot.

Notes:

1. All wires are insulated.
2. When cutting wires, allow enough slack to permit routing each wire. You want to avoid having a wire rest against pointy connections on the motherboard. Route wires away from motherboard mounting holes and around places where the bottom of the case supports the motherboard.
3. The case's bottom and back metal shields are something of a shorting hazard. Replacing the motherboard is much easier if these shields are popped out and ditched.

Once everything checks out, replace the motherboard taking care that no wires are caught between a support point and the motherboard.

---

From: Mitchell Spector

**008- I would like to install an internal fan in an Apple IIgs. I pulled a good looking fan from an old PC power supply. It is an NMB "FLOW MAX" rated: DC +12V @0.14 Amps. Is this fan okay? How do I connect it?**

The voltage rating is fine, the amperage level should be fine as well.

You can connect the fan to the two-pin connector near the back left side of the motherboard. The pinout for the "Fan connector" is +12V and Ground. The +12 is the pin closest to the powersupply, or the pin on the left if you are facing the GS motherboard from the front end. Most fan wires are color coded, so the red wire goes to power and black to ground.



---

From: Rubywand

## **009- Why do so few GS power supplies have a fan installed?**

Most users depend upon System Saver GS to handle cooling because the GS case is not designed to take advantage of an internal fan. With a fan mounted on the power supply, you can, mainly, blow air around inside the case. The fan is not much good for drawing in cool air from outside or pushing hot air out.

Another problem is noise-- both the kind produced by a fan when its bearings begin to go and electrical noise which degrades the quality of sound output. The fan uses the +12V pins which are needed for simple installation of a popular sound digitizer card. A fan mounted on the PS case could prevent plugging long circuit boards into Slot 1 and, possibly, Slot 2.

Perhaps, as Charles Plater seems to suggest, there is some reason for an internal fan. Mounted on the power supply (which is the only place a mounting point is available), a fan could blow some air into the power supply. Supposedly, this could extend power supply life.

Still, many users have 11 year-old GS's with original power supplies which continue to work fine with no internal fan.

Basically, a PS-mounted fan in a GS appears to be the cure for a problem which has yet to be discovered.

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## **010- What are some good Apple II power supply fix tries?**

Apple II power supplies can often be repaired. The bother involved varies considerably with the cause of malfunction.

Note: The following refers more or less directly to II+ and IIe supplies; however, many of the ideas will work with the IIgs power supply as well.

Note: Unless otherwise indicated, power should be turned OFF.

### **A Short**

Open the case and check inside for indications of Coke spills, debris, etc.. If everything looks okay, continue on. If not clean away the mess; it could be causing a short. After cleaning (and drying), turn ON the power to see if the problem is fixed.

Pull all cards from Slots and turn ON power. If the machine 'comes alive' one or more of your cards may have a short or may have been cross-socketed. Clean the contacts on each card (e.g. with alcohol). With power OFF, replug a card (be sure to line-up card and Slot contacts) and turn ON power. Do this for each card. If a card causes the machine to fail, it is, probably messed up. If

no card produces a failure the original problem was, likely, a card which was not properly inserted.

#### Bad Power Cord

Unplug and replug the power cord at the point where it connects to the IIE. Turn ON power. Try wiggling the power cord. If the Power Supply comes ON at any time, try substituting a power cord from a known-working IIE. If this fixes the problem, you can be pretty sure that the problem was a power cord with a broken wire.

#### Poor Power Supply Connector Connection

Unplug and re-plug the Power Supply cable to the motherboard. Turn ON power. If the machine seems to respond, or responds when the connector is wiggled, you probably have a dirty or loose connection.

Clean the power supply plug and socket with an alcohol swab. Using long-nosed pliers slightly re-crimp the 'holes' on the socket (or, insert a jeweler's screwdriver into the space between each hole and the plastic casing and twist). The idea is to restore a firm grip for all contacts.

Another possibility is a loose or broken socket solder connection to the motherboard. The repair is to remove the motherboard and re-solder the connections to the socket.

#### Bad Switch

It is fairly easy to identify a bad switch-- it will, usually, not snap cleanly into position, feel crunchy, and/or have a burn spot. The repair is to replace the switch with some AC power switch that will fit. Or, you can permanently connect the switched lines and add an in-line switch to the power cord.

#### Blown Fuse

Some power supplies may have a fuse. Open the power supply. Look for a fuse mounted to the circuit board. If there is one, check it. An Ohm meter can be used to check for continuity if it is not obvious that the fuse is blown. If the fuse is blown, replace it.

#### Bad "Global" Element

Look toward the end where the power cord is connected. Somewhere close to the place where wires from the switch go to the circuit board there should be a small disk-shaped component which is not a disk capacitor. Probably, it will be black with no markings. This is a "global" resistor. Check it to be sure that it is not cracked and that both leads are really connected to the disk.

If the global element is broken or if a lead has popped off, you will need to get a replacement from an electronics supply shop. (Tell the shop person where the global resistor comes from and describe its size.)

### Blown Electrolytic Capacitor(s)

On the end of the circuit board near the Switch are some relatively large electrolytic capacitors (typically these are tubular aluminum things with shrink-wrapped grey or light-green covers on which there are markings). Usually, they are the same size and have the same uF value and Voltage rating. One (or more) of these may be obviously blown or may just show some slime near the base.

If you find something like this, the suspect capacitor should be replaced by one of the same (or slightly larger) uF value with the same (or larger) Voltage rating. Size and shape are, also, important in order to get a good fit.

When removing the bad cap, be sure to mark the "+" side on the board-- use the markings on the cap's cover to identify the "+" side. Install the replacement cap with its "+" lead in the marked hole.

Note: Also see the fix in the next Q&A and the C7 fix discussion in Q&A 012.

### Messed-up or 'Dirty' Adjustment

The power supply may have a mini-potentiometer mounted on the circuit board for fine-tuning voltage output. Usually, it will be somewhere near the end opposite the Switch and will have a slotted plastic 'knob'.

If there is such an adjustment, mark its current position and, then, turn it back and forth. (If you have some Radio Shack, etc. 'Circuit Cleaner', into the mini-pot first is a good idea.)

Set the adjustment a bit to one side of the original setting and plug in the power supply. If it now seems to work the problem was a 'dirty' voltage adjustment control.

Check the voltage on the +5V line with a meter and adjust it to 5 Volts. (Note: no output due to a dirty adjustment control seems unlikely. Incorrect output is more probable; and, this could cause a IIE to not work.)

Beyond the above, you are, most likely, looking at a bombed electrolytic capacitor which is not obviously bad, a blown resistor (which may be easier to spot), or a blown main power transistor (the big silvery thing mounted on a heatsink). Unless you enjoy more involved electronic testing and repair work, your best course is, probably, to get a replacement power supply.

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From: Mark Cummings

**011- Some of our classroom IIE's don't work at all. There is no beep and nothing on the monitor. Do the power supplies need to be replaced?**

Maybe not. My experience with a couple Australian Platinum //e's indicates that you may be able to repair the power supplies.

The power supply in the //e's I fixed is made by Dyna Comp, Inc. for Apple, model no: 699-0136. Ratings are as follows: Input 240V/50Hz, Output +5V/4A, +12V/1A, -5V/.25A, -12V/.25A.

Measuring the voltages on the //e motherboard I get +5V= +1.3V, +12V= +2.8V, -5V= -4.3V. If I disconnect the power supply connector from the motherboard and switch it back on, I measure the correct voltages on the connector.

The fault is caused by one or two failed 1uF 35V 85deg small electrolytics. The location of each is as follows:

o- 103mm (4.1") from the back, and 27mm (1") from the left of the circuit board

o- 163mm (6.4") from the back, and 10mm (0.4") from the left of the circuit board.

I checked each of the ones I removed. they measured less than .05uF.

The fix is to replace each capacitor with a 1uF 35V or higher rated electrolytic-- if there is no "+" indication on the circuit board, mark the plus side before removing the old capacitor. I used 1uF 50V 85deg as that's what was in my parts bin. (You may need to clean up some gunk leaked onto the board by the old capacitors.)

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From: Stephen Shaw

These are called "kickstart capacitors" in switched mode power supply (SMPS) technology circuit descriptions. If you ever get an SMPS in with tripping or low output voltage or amperage, change all small value electrolytic capacitors (below 330uF and 35v) with high temperature capacitors (105 degree centigrade).

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From: O Aaland

**012- My Apple IIe usually fails to turn on! I have to turn its power switch on and off several times and sometimes wait a long time before it finally powers up!**

If the power supply you are working on is an ASTEC brand the most common problem is the 10V 220 uf capacitor located about 1 inch to the rear and left of the transformer. I find this to be the cause in about 80 percent of the ones I repair. Use a 25V 220uf capacitor as a replacement and chances are real good that it will not fail again.

---

From: Stephen Shaw

If you open the power supply up (WITH THE MAINS PLUG OUT!) you will find a capacitor C7 near the transformer in the middle of the printed circuit board (a 220 uF 16V capacitor if I remember correctly) change it for a 220uF 25V 85 degree Centigrade rated capacitor and it should clear the problem up.

---

From: Jeff Allen

I've been trying to fix several dead Apple II power supplies from a local school and have managed to bring back one from the dead now. The fix was to replace the 10V, 220uF electrolytic cap with a new one. (I used a 35V piece). Assuming that the board markings are useful, this was C7, on an Astec board with the datecode "T8312" on it. I'm curious if anyone else that has replaced that cap has noticed any browning of the pc board where the leads enter from that 27ohm 2W 'R4' beast. ....

---

From: Rubywand

Very interesting! A bad C7 would screw up the regulator's feedback voltage.

Even better, Jeff Allen's observation of the heat spot on the PCB seems to indicate that heat from the nearby 27 Ohm power resistor is responsible for shortening C7's life. If there is some way to eliminate this hot spot-- e.g. using a 10W resistor, perhaps with a heatsink attached, or mounting the resistor on the power supply's metal case-- many II+ and IIe power supply crashes might be prevented.

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From: Rubywand

**013- To my horror, this morning when I flipped my GS ON it emitted a rapid chirping noise (maybe 8-10 times a second) and refused to start!?**

The chirping usually means that the PS load-detect circuit thinks that the load is too great (i.e. that it draws too much current) or that there is an 'open' in a major output line (i.e. that there is, practically, no load at all).

This can mean that the power supply is bombing and, so, almost any load is too great. It may, however, mean that a short has developed on the motherboard or on a Slot. It can, also, mean that a break has developed somewhere in the +5V line or at the connection of the connector to the motherboard.

One test is to unplug the power supply, remove it, and do some load tests. (Note: If the PS has a slotted adjustment pot, mark its position and, then, turn it back and forth in case it has become stuck at a dead spot on the control.)

If the PS can deliver +5V with a 3 Ohm power resistor connected across the +5V and Ground lines, +12V with a 15 Ohm power resistor connected across the +12V and Ground lines, and correct Voltage for -12V and -5V lines into, say, 100 Ohm resistors, then the PS is likely to be okay.

If the PS starts to chirp when even small loads are applied (e.g. 10 Ohms across the +5V output), then it has one or more bad components or is badly off-adjustment. If it has an adjustment, try cleaning the control and retry the load tests after a small change in the adjustment setting.

If the chirping persists, replacing the unit with a new A2 power supply, a module from Jameco, etc. or a Buggie external PS may be the easiest cure.

---

From: Mike Smith

**014- My GS power supply seems to be nearly dead! The only odd looking symptom so far is that one of the big electrolytic capacitors near the power input side is at 260 volt & the other is at 30 volt?!**

There is a 100k bias resistor in the front end of the inverter. If this resistor is broken, loose, or otherwise 'open' you will get the symptoms described. Replace the resistor and both capacitors should be at the same voltage ( approx 140 volt) and within the 200 volt working rating of the capacitors. This should fix the power supply.

---

From: Stephen Buggie

**015- What is a "Buggie Power Supply"?**

It is an external power supply, usually a surplus PC unit, which connects to the Apple II via a heavy-duty cable.

My IBM-style power supplies generate the same voltages (+5v, +12v, -12v, -5v) as those required by the Apple II. But IBM-style power supplies deliver 150-200 watts of power, more than twice the weak output of the standard 60 watt Apple II power supply. Thus, problems associated with weak power (screen freezeups, crashes) in the Apple can be reduced or eliminated by using an IBM power supply on the Apple.

With a strong IBM power supply, you can fill all your interface card slots or add extra disk drives without overloading the power source.

Recently, I have offered these power supplies for Apple II:

IBM 150 watt power supply, soldered to 5 ft cable; choice of either IIgs or IIe plug. \$27.00 plus \$5.00 UPS shipping (\$8.00 shipping to Canada)

Cable-only: connects to IBM power supply at power-points P8, P9, and Molex-4. Allows you to connect the IBM power supply you already own to an Apple II (Specify whether IIgs or IIe plug is needed). \$14.00 plus \$3.00 priority mail; To Canada: US\$4.00.

Above cables made with heavy duty wires (AWG-18, with 600v insulation; color-coded. All power supplies and cables thoroughly pre-tested prior to shipping.)

200 watt power supplies occasionally available at \$3.00 extra cost, but an extra 3-4 weeks must be allowed.

Eight page illustrated instruction manual sent with each order; also the manual is available on self-booting text-file disk.

Faster service!

During the past month, users have had to wait 2-3 weeks from payment to shipment. More power supplies have arrived, and I have ordered the cable components in larger quantities, so through the remainder of the summer I expect to ship the orders within 4-7 days.

Steve Buggie                      buggie@unm.edu  
200 College Rd.                  (505) 863-7504 office  
Gallup NM 87301                (505) 863-2390 home

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From: Joseph Lee

## **016- Does the metal R/TV interference shielding in my GS case matter?**

I've done some testing. The Radio/TV interference shielding mattered, at least for all the people around in my former dorm.

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From: Rubywand

My tests were done in a separate dwelling (i.e. not an apartment, dorm, etc.) and focused upon effects in our 'Computer Room'. Turning ON the GS produces some interference with or without shielding and the level seems to be the same.

One problem with R/TV interference is that its level and kind is dependent upon many factors. For example, I can get virtually complete elimination of GS-produced Radio station interference by simply turning ON a printer connected to our PC!

Each user will have to weigh the trade-offs for his/her situation. Removing the shielding eliminates a dust trap and improves air flow. It is easier to pass cables through case slots; and, if you need to remove the motherboard (to make repairs, add Slot jumpers, etc.), removing the bottom shield removes a shorting hazard when the board is re-installed.

If you remove the lid and do not like the way Radio or TV reception is affected, leave the shielding alone. If the result is acceptable, scrap the shielding.

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From: Scott G

## **017- My System Saver IIgs has gotten really noisy. How can I fix it?**

It may be that the fan inside the unit is showing wear. The good news is that replacing the fan is an easy and rewarding task.

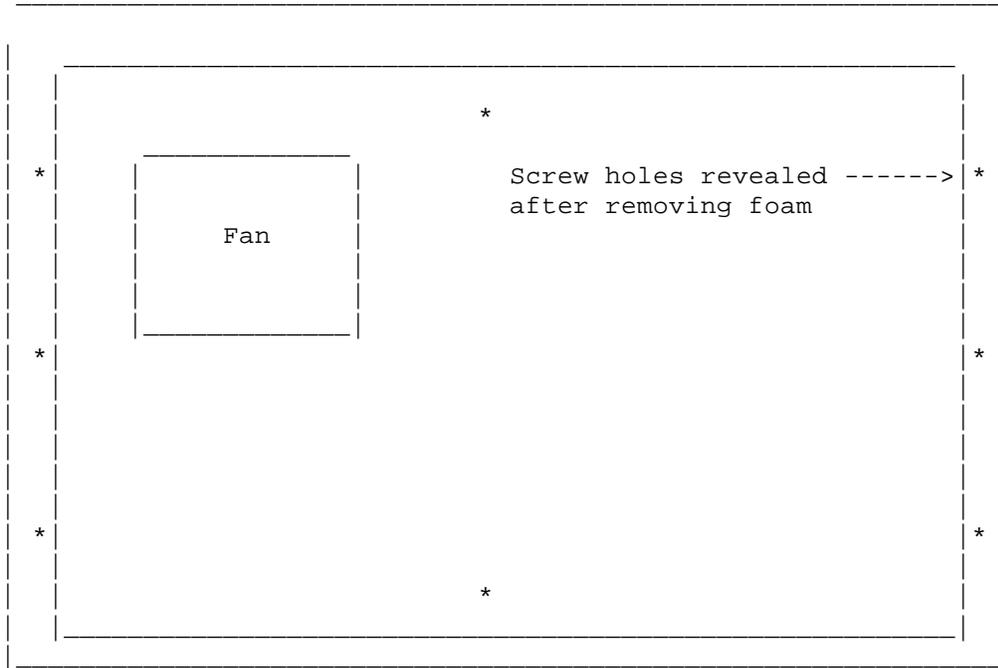
I knew my fan was starting to die when it sounded like it was wheezing during spin-up. The fan, a Sprite model SU2C7, uses sleeve bearings, whose lifespan is determined by the lubricating oil supply in the bearings. When enough of the oil evaporates, metal will grind against metal resulting in heat and resistance that cause the fan to quickly lock-up. Better quality fans use ball-bearings, but Kensington apparently used the cheapest component available. Even among the models with sleeve bearings, the SU2C7 is the least capable. It can only move 18 cubic feet of air a minute (half what a typical PC fan moves) and has a 55,000 hour rating.

In looking for a replacement for my dying fan, I chose to use a better model. The Sprite model SU2B1 has the same dimensions as the SU2C7 used in the System Saver and is readily available from Digi-Key corporation. It uses ball bearings for long life (the fan is rated for 73,000 hours) and can move 34 cubic feet of air a minute. The higher quality is readily apparent: the replacement is currently noticeably quieter than the original even though it is moving more air per minute.

To replace the System Saver fan, first make sure the System Saver AC power cord is unplugged. Next, you will need to open the case.

Opening the System Saver case involves removing eight screws. You can remove the foam weatherstripping along the periphery of the case to expose the screws OR you can poke through/around the foam at each screw hole. The screw access holes are arranged as shown in the following diagram (bottom view of the System Saver):

FRONT



BACK

Once inside, the fan can be removed by unplugging the power cord that connects it to the circuit board. A grounding wire that is attached by a screw must also be removed. The fan itself is held to the case by two screws. Once you remove the SU2C7, you can replace it with the SU2B1. Now mount everything back together again with the screws. Apply new foam weatherstripping if necessary.

The refurbished System Saver is now better than a factory new model! Notice the difference in sound: a quiet hum rather than a loud rumble. If you have a lot of cards, you will notice that the inside of the IIGS is a lot cooler too. An upgraded System Saver is a great way to counteract accelerator instability caused by heat.

Sources and parts needed:

- 1) Part: Sprite model SU2B1 (Digi-Key Part No. CR103-ND)  
Source: Digi-Key Corp. (1-800-344-4536/www.digikey.com)  
Note: Check below for other fans that will work.
- 2) Part: Foam weatherstripping tape (3/8th inch width, 3/16th inch thick) Source: Home Depot (or a comparable hardware store)

From: Louis Cornelio

The fan I removed from my System Saver IIgs is the Comaire-Rotron Sprite SU2C1-- 'C1, not 'C7. Actually, out of the case, it seems very quiet. Much of the noise seems to be rattle from contact with the plastic case of the SS ...

I put down some foam weatherstrip along fan-case contact points and that did the trick! I guess there was a bit of vibration or something. The fan is still audible, but only slightly from the air.

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From: Shaun Olson, Rubywand

Below are specs, ordering numbers, and prices for several possible System Saver IIgs replacement fans. As you can see, the noise numbers for the sleeve bearing fan models originally used in System Saver IIgs are not bad. The catch is that the numbers are for new units before bearing wear begins to increase noise. If you replace your fan, a ball bearing model is recommended.

Digi-Key 800-344-4539  
Mouser 800-346-6873  
Newark 800-463-9275

cfm = cubic feet per minute of air moved  
db = measure of noise produced (for a new unit); lower is better

Comaire-Rotron Sprite SU2C1 <SS Original> (Digi-Key #CR251-ND,  
p.2138 in Sep-Dec 2007 (T073) catalog)  
3.14sq. x 1.64 (80x42 mm) 20cfm 27db 6watts 115VAC sleeve bearing \$27.50

Comaire-Rotron Sprite SU2C7 <SS Original> (Digi-Key #CR108-ND,  
p.2138 in Sep-Dec 2007 (T073) catalog)  
3.14sq. x 1.64 (80x42 mm) 18cfm 26db 6watts 115VAC sleeve bearing \$26.80

Comaire-Rotron Sprite SU2B1 (Digi-Key #CR103-ND,  
p.2138 in Sep-Dec 2007 (T073) catalog)  
3.14sq. x 1.64 (80x42 mm) 34cfm 40db 11watts 115VAC ball bearing \$29.00

Sunon AC Axial Fan SF11580A-1083HBL.GN (Digi-Key #259-1379-ND,  
p.2130 in Sep-Dec 2007 (T073) catalog)  
3.15sq. x 1.5 (80x38 mm) 24cfm ??db 14watts 115VAC ball bearing \$16.36

ADDA AC Fan (Mouser #664-AA8381HB-AT-LF, p. 1716 in 2007 catalog)  
3.15sq. x 1.5 (80x38 mm) 24cfm 25dB 9watts 115VAC ball bearing \$14.08

ADDA AC Fan (Mouser #664-A8038MBT-110LF, p. 1717 in 2007 catalog)  
3.15sq. x 1.5 (80x38 mm) 24cfm 25dB 6watts 115VAC ball bearing \$14.08

Orion OA80 Series Fan (Mouser # 670-OA80AP111WB, p. 1730 in 2007 catalog)  
3.15sq. x 1.5 (80x38 mm) 31cfm 29dB 12watts 115VAC ball bearing \$12.00

NMB 3115FS Series 3115FS-12W-B10-A00 (Newark #58K3033,  
p.1476 in 2008 catalog (#125))

3.1sq. x 1.5(80x38 mm) 22cfm 36db 6watts 115VAC ball bearing \$18.30

NMB 3115FS Series 3115FS-12W-B20 (Newark #68K1212,  
p.1476 in 2008 catalog (#125))

3.1sq. x 1.5 (80x38 mm) 27cfm 40db 7watts 115VAC ball bearing \$18.30

NMB 3115FS Series 3115FS-12W-B30 (Newark #58K7893,  
p.1476 in 2008 catalog (#125))

3.1sq. x 1.5 (80x38 mm) 32cfm 44db 9watts 115VAC ball bearing \$18.30

Comaire-Rotron Sprite SU2C1 <SS Original> (Newark #84K0240,  
p.1473 in 2008 catalog (#125))

3.14sq. x 1.64 (80x42 mm) 20cfm 27db 6watts 115VAC sleeve bearing \$32.78

Comaire-Rotron Sprite SU2C7 <SS Original> (Newark #77B7043,  
p.1473 in 2008 catalog (#125))

3.14sq. x 1.64 (80x42 mm) 20cfm 26db 6watts 115VAC sleeve bearing \$41.07

Comaire-Rotron Sprite SU2B1 (Newark #83K4218, p.1473 in 2008 catalog (#125))

3.14sq. x 1.64 (80x42 mm) 34cfm 40db 11watts 115VAC ball bearing \$32.92

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From: Rubywand

### **018- My System Saver IIgs front panel has started to feel more springy? Could this be a problem?**

Yes. It indicates the plastic may be becoming brittle and that supports behind the panel are weakened or broken. Some 'springy panel' users report pressing on a switch and poking a hole in the panel!

Prolonged exposure to sunlight and/or long exposure to heat from the GS are the usual causes. Preventative measures are to keep your GS away from sunny windows and to increase airflow through the System Saver for hot running systems. The easiest way to achieve the latter is to swap in a fan with a higher cfm rating. (See fans listed in the previous answer.)

Panels which feel very springy should be reinforced. Open the case and use epoxy to reinforce panel and switch supports.

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From: Rodney Hester

### **019- Can an overloaded power supply affect IIgs sound?**

Yes, it can, even when the computer seems to be working okay otherwise. When I first plugged in my new TDX Stereo Card, I got sound, but very, very quiet. When I turned up the speakers (a \*LOT\*), the audible noise from the bus got almost deafening, yet the music level increase was barely perceptible.

It was at this point that I recalled why I bought a Buggie power supply in the first place. I had never needed it, having suffered no major power-starved related problems in the past; but, thinking it might make some small difference, I removed the internal power supply and connected the Buggie and tested again.

I have never, ever heard something sound so sweet! It balanced the volume perfectly and completely eliminated the bus noise.

Apple II Csa2 FAQs: Printers, Part 18/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

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The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2PRINTER.txt rev135 June 2009

## **Printers & Interfaces**

- 001- How do I do the ImageWriter II self-test?
- 002- What are the DIP switch settings for IW-II and IW-LQ printers?
- 003- How do I do the ImageWriter-LQ alignment test?
- 004- Can I use a 'straight-through' cable to connect my IW-II?
- 005- My Imagewriter II doesn't print! What's wrong?
- 006- How can I keep paper from jamming in my Imagewriter II?
- 007- The bottoms of letters don't get printed. How can I fix this?
- 008- What is the 'trick' for restoring a printer ribbon?
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- 011- What are the DIP switches on my Grappler+ for?
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- 013- What's the best GS interface for connecting a parallel printer?
- 014- How can I use my Epson Color Stylus 800 with my IIgs?
- 015- Why aren't fonts found after being moved to a new GS volume?
- 016- When I run Platinum Paint I get error \$1301. What's wrong?
- 017- Can I clean the nozzles on an Epson Stylus printer?
- 018- What is the pinout for a GS to ImageWriter I cable?
- 019- Where can I get Imagewriter II ribbons?
- 020- How can I connect my Imagewriter II to a PC?

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From: Mike McElfresh

**001- How do I do the Imagewriter II self-test?**

With the printer OFF, hold the Form Feed button down while pressing down the ON switch. Release both buttons when the print head starts to move. To stop, turn the printer OFF.

---

From: Rubywand

## **002- I bought an ImageWriter II and an ImageWriter LQ. What are the DIP switch settings for these printers?**

While a number of settings are the same; there are some differences between IW-II and IW-II LQ in DIP switch settings as well as which DIP switches are present. Unless there is a note attached or a setting is labeled "IW-II" or "LQ", the indicated setting applies to both printers.

IW-II DIP switches are located near the left front side, inside the printer. Lift the cover to get access. LQ DIP switches are located near the left rear of the printer under the rear cover. When changing switches, power should be OFF.

### **ImageWriter II & II LQ DIP Switch Settings**

In Imagewriter manuals, "SW-1" refers to DIP switch module 1. Each such module has several individually numbered switches. For example SW-1 #5 refers to switch #5 on the SW-1 module.

When a switch is UP (pointing toward the back of the printer)  
it is open or OFF.

When a switch is DOWN (pointing toward the front of the printer)  
it is closed or ON.

When a setting is labeled "usual" this refers to the usual setting  
at the time a printer is shipped in the USA.

The settings for SW-1 have to do with printout format. ImageWriter control codes can override these settings. The codes for a particular setup could be sent in a character string by your program or an application.

On SW-1 all of the switches are normally open (UP) except #8 which is closed (DOWN). These settings work for printouts under Appleworks and several other programs which take care of page breaks. For tasks like listing a program, doing a hex dump in the monitor, etc. you may want SW-1 #5 to be DOWN for automatic skipping over perforations between pages.

Character Set	#1	#2	#3	
SW-1				
American	U	U	U	default
Italian	D	U	U	
Danish	U	D	U	
British	D	D	U	

German	U	U	D
Swedish	D	U	D
French	U	D	D
Spanish	D	D	D

Form Length

SW-1 #4

11 inches	U	default
12 inches	D	

Auto Perforation Skip

SW-1 #5

No	U	default
Yes	D	

Character Pitch

SW-1 #6 #7

10 cpi	U	U
12 cpi	D	U default
17 cpi	U	D
160 dpi	D	D (proportional)

Line Feed with Carriage Return

SW-1 #8

No	U	CR only
Yes	D	CR plus LF

The settings for SW-2 are concerned with hardware interfacing. #1 and #2 set the baud rate the printer will expect:

SW-2		#1	#2	
300 (on IW-II)		U	U	
19200 (on IW-II LQ)		U	U	'LQ default
1200		D	U	
2400		U	D	
9600		D	D	IW-II default

You should set the switches to match the speed of your printer interface. For the IIgs serial Printer Port, the Port and the DIP switches would normally be set for the maximum speed the printer can handle (e.g. IIgs Port at 9600 baud and DIP switches set DOWN DOWN for the IW-II).

SW-2 #3 is usually set UP to enable DTR hardware handshaking. If your interface wants to use XON/XOFF handshaking, set #3 DOWN.

SW-2 #4: If you have the 32K Memory Option, LocalTalk card, etc. installed, SW-2 #4 should be set DOWN. Otherwise, it should be set UP (the usual setting).

IW-II: SW-2 #5-#6 on the IW-II are factory-set to optimize hammer firing and should be left alone by the use (On my IW-II #5 is DOWN and #6 is UP.)

'LQ: SW-2 #5-#7 (#7 is only on the 'LQ) on the IW-II LQ are used to set the number of cut sheet feeder bins attached to the printer.

'LQ SW-2	#5	#6	#7	
1	U	U	D	
1 and 2	D	U	D	
1, 2, and 3	D	D	D	
1 and envelope	U	U	U	default
1, 2, and envelope	D	U	U	
1, 2, 3, and envelope	D	D	U	

'LQ: SW-2 #8 (only on the 'LQ) sets Auto Paper Load position.

To print line	U	default
To paper bail	D	

'LQ: SW-3 #1-#5 (only on the 'LQ) are factory-set to optimize printer operation and should be left alone by the user.

'LQ: SW-3 #6-#8 (only on the 'LQ) control vertical alignment of dots in bidirectional printing mode. Set for best alignment.

---

### 003- How do I do the ImageWriter II LQ alignment test?

The 'LQ Alignment Test

With printer OFF, press Select, Line Feed, Form Feed. Hold them pressed, turn ON printer, and release buttons after printer head starts to move.

The printout shows four possible switch settings with six lines of vertical bar printouts for each setting.

Settings are indicated like this: 1 0 0 (which means DOWN UP UP). An asterisk by a setting means it is the current setting.

Set the switches to the setting which best lines up the vertical bars in the printout.

---

### 004- Will a 'straight-through' cable work for connecting an ImageWriter II to my GS?

No. In the ImageWriter cable, Pins 1 & 2, 3 & 5, and 6 & 8 are supposed to be swapped from one end of the cable to the other.

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**005- My ImageWriter II doesn't print! The head moves, and I can hear the pins striking the paper, but I get nothing. What's wrong?**

Check ribbon positioning. If the ribbon is properly positioned, then, you may need to adjust the the print head - to - roller distance (sometimes called the "paper width" adjustment). There is a small lever near the lower right side of the roller. Click-position it in a notch or two.

---

**006- How can I keep paper from jamming in my Imagewriter II?**

A surprising number of Imagewriter users go for years putting up with paper jams during long printouts. A nearly 100% cure is to just pop up the top rollers so that they do not press the paper against the roller.

---

**007- I notice that the bottoms of letters on my ImageWriter II's printout are not showing up. How can I fix this?**

A likely explanation is that the printhead needs to be moved in (toward the big roller) a notch. This is a standard "Paper Thickness" adjustment on many printers. On IW, you do it with a lever to the right of the roller.

Another possibility is that the printhead needs cleaning. Be careful what you use to clean a printhead because some solvents can dissolve the mask which lines up the pins. Light oils and gasoline seem to be especially bad. A fine bristle toothbrush plus some standard detergent in warm water or a household cleaner (like Fantastik, etc.) should remove most dust and gunk. Whatever you use, avoid soaking the printhead in anything very long-- i.e. get it reasonably clean and then blow/blot dry.

Changing settings on the DIP with the factory settings which "users should leave alone" may have some effect on firing of the bottom pins. I don't know. Probably, you would want to try everything else first.

---

**008- What is the 'trick' for restoring a printer ribbon?**

For cartridge ribbons, such as the one in ImageWriter II, it is easy to 'restore' a ribbon to dark printing with a few spritzes of WD-40. Using a pocket knife, pry off the lid of the cartridge, and, as evenly as possible, lightly spritz the bunched-up ribbon. Restore the lid and roll the tape back and forth a few inches. Let the cartridge sit for several days in a plastic bag.

The idea is that the WD-40 spreads unused ink into the ribbon's print area; so, it will not work for restoring multi-Color ribbons. Since you are adding no ink, this trick is good for only one or two 'restorations'.

---

**009- Can anyone tell me how to connect a printer with a "Centronics interface" to my Apple II?**

The Centronics interface is the standard parallel interface for many printers. To connect such a printer to an Apple II, you need a printer interface card and cable. Since the cards were a popular item in the early 80's and were produced by several different companies you should be able to get a good one without too much trouble.

The cards turn up fairly often at swap meets, should be easy to find on comp.sys.apple2.marketplace, and are still sold by regular A2 vendors. MC Price Breakers (360-837-3042 Mon-Fri 9:30am-5:30pm Pacific Time) offers a "Full Text & Graphic Interface" w/cable for Centronics type parallel printers for \$29.95.

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From: Mitchell Spector

**010- I bought a Grappler+ printer interface card at a swap meet. Where can I get a cable? What is the pinout for the cable?**

The cable you need is the very common "Centronics cable". It is sold by several Apple II vendors. The pinout is shown below:

Grappler+ Pin Assignments

~~~~~

|      |            |
|------|------------|
| STB  | 1          |
| D0   | 3          |
| D1   | 5          |
| D2   | 7          |
| D3   | 9          |
| D4   | 11         |
| D5   | 13         |
| D6   | 15         |
| D7   | 17         |
| ACK  | 19         |
| BUSY | 21         |
| P.E. | 23         |
| SLCT | 25         |
| N/C  | -          |
| GND  | all others |

---

## 011- What are the DIP switches on my Grappler+ for?

The DIP switches are used to configure your card for a series of different printers out there. I'll list those settings:

DIP switch settings:

~~~~~

DIP SWITCH POSITIONS	1	2	3	4
Epson Series and Star Gemini	OFF	ON	ON	ON
NEC 8023/C, Itoh 8510/DMP 85	OFF	ON	ON	OFF
Centronics 739-1	OFF	ON	OFF	ON
Anadex Printers	OFF	ON	OFF	OFF
Okidata 82A, 83A, 92, 93, 84	OFF	OFF	ON	ON
Okidata 84 w/o Step II Graphics	OFF	OFF	OFF	ON
Apple Dot Matrix	OFF	OFF	ON	OFF
IDS Printers	(Any position)			

Notes: DIP switch ON = "+" side or set to right.  
Switch 1 controls MSB, the 8th bit. Setting switch 1 to 'ON' makes MSB not transmitted...

---

From: Joe Kohn

The Harmonie printer drivers are available from Shareware Solutions II. As the publisher, the most frequently asked question I get is "Which Grappler+ dip switch setting should I use for an HP DeskJet?"

According to those who use a Grappler+ to connect a DeskJet, the dip switch settings are:

1-ON (up)  
2-OFF (down)  
3-OFF (down)  
4-ON (up)

---

From: Beverly Cadieux

Joe, I've checked hundreds of Apple II Mail Group messages, and every time Grappler+ dip switches are mentioned in connection with DeskJets, people say they use OFF ON ON ON-- i.e. - + + +

Since you are calling ON "up," we are probably using about the same setting. We call ON "down," (pushed in, toward the +). So your ON is probably our OFF.

When switch 1 is ON the MSB is not transmitted to the printer. When the Switch 1 is OFF, MSB is under software control. AppleWorks requires that switch 1 be OFF to allow high ascii characters (enabled with a Control-I H in the interface code) to print. If it were ON, they would be prohibited.

Switch one doesn't matter unless you want to send a high bit through. If you don't care about printing high ASCII (language characters, legal and math symbols, box edges), then it can be set either way.

---

From: Scott G

## **012- What printers will the Harmonie drivers work with on my GS?**

The 4550 automatically senses Epson LQ code and turns on emulation. It is like if the DIP switch were set to automatic in older BJC models.

---

From: Jim Stafford

My Canon BJ 600 works fine with the above driver. The only thing the driver doesn't do is color!!! Make sure you have the Epson dip switch set on your printer(see the manual).

---

From: Joe Kohn

I know for a fact that Harmonie supports HP LaserJets, DeskJets, and DeskWriters.

Tony Diaz (of Alltech Electronics) brought home an Epson Stylus 600 and connected it to the IIGS. Of all things, the first thing he tried was Print Shop GS, and he said it printed out beautifully, in full living color. The margins were all correct, and everything else about it was right...using the PSGS Epson LQ driver.

He was also able to output text at 360 x 360 from EgoEd, using Harmonie's Epson LQ4000 driver; and, he could dump text to the printer with a PR#1 from the Applesoft prompt. So, apparently these Epson Stylus printers do have internal fonts and can be used from ProDOS-8.

Tony was able to print out a graphic from Platinum Paint at 360 dpi; but, only in grayscale. In fact, so far, everyone reports that they can print in full glorious color from Print Shop GS, but that, when printing from GS/OS via Harmonie's EpsonLQ drivers, the printout is limited to grayscale.

See also Q&A 011 above.

---

From: Supertimer

**013- I have recently acquired an Apple IIGS and I want to use my Panasonic PanaPrinter parallel dot matrix printer with it. What is the best parallel card to use with my IIGS?**

The best parallel card is no parallel card. The IIGS is has serial ports and the best way to use parallel printers is with a serial to parallel converter.

Global Computer Supplies, <http://www.globalcomputer.com/> , has a bi-directional model (TAC6180) that is excellent. It supports serial rates of 300-57600 bps, so using a fast serial driver on the GS can get you printing at 57600 bps. I doubt most printers go faster than this.

---

From: Michael Pender

The later-model PanaPrinters included both serial and parallel ports. They shipped with an external parallel interface, but the interface is part of a parallel-to-serial daughterboard that plugs into an internal serial interface.

It is not necessary to add a parallel card. Open the case, remove the daughterboard and plug the serial printer cable into the Dsub-25 serial connector on the main board.

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From: Ronald Clark

014- How can I use my Epson Color Stylus 800 with my IIGs?

I have an Epson 800 and it works with PrintShopGS and Proterm 3.1 with a Grappler+ card.

---

From: Supertimer

You can also use the Epson 800 on the GS serial printer port. You need an ImageWriter II serial cable and the Epson LQ4000 driver from the Harmonie package of printer drivers sold by Shareware Solutions II.

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From: Owen Aaland

**015- I have a problem with getting fonts recognized. I copied the entire contents of one PRODOS Volume (named "AA") to another hard drive with a different volume name for use on another GS.**

When I launch AWGS or any other GS word processor on the second GS, I am told to "insert disk AA" when a font is requested. Is this a Pointless problem? A Typeset problem? Should I reinstall the fonts or what?

Reinstalling them should make them work but an easier thing to try first is to go into the FONTS folder inside the SYSTEM folder and trash the 2 files called TrueType.List and Font.Lists. When you restart your computer it will search through your Fonts folder and rebuild these lists. This is the procedure to use if you install fonts by dragging to the folder instead of using an installer.

---

From: Joe Kohn

If you are using Pointless, the problem is not a bug; it's a feature ;-)

When you open the Pointless Control Panel and click on a font name, you'll notice that pathname information (where the font is stored) is displayed. So, you could always open the Pointless Control Open, click on a font, click the Remove button, and then click the Add button in order to let Pointless know where on your other system the fonts are located.

---

From: Jim Pittman

**016- When I run Platinum Paint I get error \$1301. What's wrong?**

Yes, I got the same error message when I tried to run Platinum Paint with Bernie ][ The Rescue on a G3 Power Mac. The error code refers to a missing driver, meaning, I assume, a printer driver. But even if the correct printer driver is present, what Platinum Paint really wants is for the D C Printer settings to be correct.

- 1) Be sure you have an appropriate printer driver in \*/System/Drivers.
- 2) Go to the Control Panel. Open D C Printer. Be sure the appropriate port or slot is checked, as well as the appropriate printer driver.

(If you have a cable connecting the printer port to the printer, then "Select a Port" would be "Printer" and "Select a Printer Type" would be "ImageWriter" or whatever you have. If you have a parallel card in Slot 1 then "Select a Port" would be "GrappplerPlus" or whatever, and "Select a Printer Type" would be "DeskJet560C.HAR" or whatever you have.)

---

From: Douglas Taylor

## **017- Can I clean the nozzles on an Epson Stylus printer?**

If you've got an Epson Stylus with clogged ink nozzles (anyone with a Stylus that sits idle for a couple of months), check out <http://www.weeno.com/art/0899/140.html> .

Basically, Blake W. Patterson explains that you may be able to unclog the nozzles using isopropyl alcohol. Here is a snip from the article on WEENO:

"I simply removed the black print cartridge from the printer and dropped 7-10 drops of alcohol down in the ink-recepticle area where the ink cartridge normally sits (there should be a little hole down in there where the ink actually flows from the cartridge into the head), replaced the ink cartridge, and ran a few sessions of the printers head-cleaning routine. It took quite a few cleaning sessions (probably 15-20) with a few pages of text prints thrown in there just to try and move some ink, before it cleared up."

"It actually had to sit overnight, with the last few cleanings done the next morning, before all was well--but well it is. Everything works perfectly now, and I don't have to go out and buy a new printer."

---

From: David Empson

## **018- Can anyone tell me what the pin to pin throughput is on the GS to ImageWriter I cable?**

Looking at the IIgs serial connector, the pins are numbered as follows:

8 7 6  
5 4 3  
2 1

The signals on each pin are:

- 1 Handshake Out (DTR)
- 2 Handshake In (DSR)
- 3 Transmit Data minus
- 4 Signal Ground
- 5 Receive Data minus
- 6 Transmit Data plus
- 7 General purpose input (DCD)

8 Receive Data plus

Shield is frame ground.

The ImageWriter I or DeskJet 500 has a female DB-25 connector, arranged in the standard order for DTE (Data Terminal Equipment):

- 1 Frame Ground
- 2 Transmit Data
- 3 Receive Data
- 4 Request to Send (output from printer, probably not used)
- 5 Clear to Send (input to printer, probably not used)
- 6 Data Set Ready (input to printer)
- 7 Signal Ground
- 8 Carrier Detect (input to printer, probably not used)
- 20 Data Terminal Ready (output from printer)

The pinout of the cable is:

IIgs (Mini-Din-8 male)	Printer (DB-25 male)
1 (HShk Out)	6 (DSR)
2 (HShk In)	20 (DTR)
3 (TxD-)	3 (RxD)
4 (Gnd)	7 (Gnd)
5 (RxD-)	2 (TxD)
6 (TxD+) no connection	
7 (DCD) no connection	
8 (RxD+) must be connected to signal ground (IIgs pin 4, printer pin 7)	

If you have a shielded cable, also connect the cable shield to the Mini-Din-8 plug's shielding, and to pin 1 and the shield of the DB-25.

---

From: Mike Ford, Sandra Warnken, michaelhint, Donald L Johnson

### **019- Where can I get Imagewriter II ribbons?**

Several common printers use this same ribbon: the NEC 8023, some Citech, etc.. Office Depot sells the black ribbons-- Nu-kote brand, part# NK160-- for about \$5 each. They also carry the Color ribbon. Sams Club may still sell them; or, you can order the ribbons through Staples and Hallmark stores.

Another source is michaelhint@wycol.com. In a newsgroup posting he offers to supply black ribbons for about \$.75 each plus shipping (\$3.55 for up to around 10) and color ribbons for about \$3.00 plus shipping.

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From: Rubywand, M Kelsey, Mark, Glynne Tolar

## 020- How can I connect my Imagewriter II to a PC?

You can do Text printouts from your PC to IW-II by selecting the C-Itoh 8510 as your printer in Windows 3.1 up through at least ME. (Just go to settings: printers: new and select the c-itoh 8510.) The connection from the IW-II must go to a serial port-- e.g. COM-1 or COM-2.

The cabling information shown below is from the the Imagewriter II manual. It's the connection to an RS-232C port. Including pin 5 in the jumpered pins on the 25-pin side is an addition. I'm not sure how important it may be. Perhaps it is added to allow diagnostic testing.)

If you make your own, you need an 8 pin mini-DIN circular male connector, a DB25 female connector, and 5-conductor shielded cable. Up to 20 meters should be OK.

Cable details as follows...

8 pin	25 pin
DTR 1 -----	*- 5 CTS * 5,6,8 are jumpered *- 6 DSR together at db25 end. *- 8 DCD
DSR 2 -----	20 DTR
TD- 3 -----	3 RD
SG 4 **-----	7 SG
RD+ 8 **	
** 4 and 8 are jumpered together at 8-pin end.	
RD- 5 -----	2 TD

Connector SHIELD or pin 1 (PG)  
connected to cable shield  
on DB25 end. (Only one end of  
the cable shield needs to be  
connected to the connector shield.)

One alternative is to use a IIE (SSC) to IW-II cable (part #590-0335) plus a standard NULL modem cable plus any gender changer connector (or 25 to 9 changer) necessary to connect to the PC COM port you want.

The standard basic NULL modem 'cable' (or 'adapter') is two Dsub 25-pin female sockets, call them "A" and "B", wired back-to-back as follows (arrows indicate signal direction):

Socket-A			Socket-B		
	TXD	2	->	3	RXD
	RXD	3	<-	2	TXD
	RTS	4	->	5	CTS
	CTS	5	<-	4	RTS
DSR &	DCD	6&8	<-	20	DTR
	GND	7	--	7	GND
	DTR	20	->	6&8	DSR & DCD

The two cables (plus gender/9-pin adapters as needed) give you the connection described in the IW-II manual.

A CrossWorks cable (plus adapters as needed) is supposed to work, too.

Either the homebrew cable or one of the combinations of existing cables mentioned should allow a hardware handshaking connection at 9600 baud.

For the C-Itoh 8510 printer, go to "Properties" (in the Files menu). For Port settings, select the correct COM port. Data bits, parity, stop bits should be the usual 8-N-1. Speed or baud rate should be 9600. Flow control should be Hardware. On your IW-II, DIP switch 2-3 should be Up (open).

Yet another alternative is to use a IIgs or Mac high-speed modem cable (e.g. part 950-0109) connected to a NULL modem plus adapters as needed. This works fine; but, you will lose the hardware control lines and need to switch to Xon/Xoff handshaking. In "Properties", Flow control should be Xon/Xoff. On your IW-II, DIP switch 2-3 should be Down (closed).

Apple II Csa2 FAQs: Sound & Music, Part 19/25 Note from archiver<at>cs.uu.nl:  
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Csa2 FAQs file ref: Csa2SOUND.txt rev135 June 2009

## **Sound & Music**

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- 003- Do I get Stereo from my IIgs Sound Output jack?
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- 025- Squeals and other noises spoil my GS stereo board sound? A fix?
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- 028- Does any Apple II emulator include Mockingboard support?
- 029- Does anyone know what a "Supertalker" card is used for?
- 030- My GS stereo board's sound output is very low and noisy. A fix?
- 031- How can I create sounds and music on my 8-bit Apple II?
- 032- Where can I get Mockingboard disks and music?

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From: Todd Whitesel

**001- If the GS only has eight output chanel, then it would seem to me that it could only play eight different sounds at a time. So how can I digitize fifteen different sounds and play them all back simultaneously?**

To summarize the following lecture:

There are 32 oscillators (16 generators) and 16 channels. Not all are used for actual sound output.

Oscillators are "smart voices" Generators are oscillator pairs that can generate extra effects with each other Channels are actual independent output lines like left and right speaker

That said, let's start at the top.

The DOC is a coprocessor with its own dedicated 64K of RAM. All the sound samples have to be put in this RAM before they can be played.

The DOC has 32 'oscillators' which are essentially smart DMA channels. Their basic function is to sweep through areas of the DOC memory reading samples and playing them. They can do so at variable speeds (automatically repeating or skipping sample values as necessary), they can loop on a power of two boundary, they can stop when they read a zero, they have independent volume settings, and various other things that aid in reproducing complex instruments without loading down the main CPU.

But when you come down to it, the DOC is capable of playing 32 sounds simultaneously and independent of each other, provided that all the sample data fits in the DOC RAM.

The oscillators are not all perfectly identical in operation. For the basic sample playing and looping they are, but for some more complex functions they must be paired. This is where the concept of 'generators' comes from -- the 16 generators ARE operationally identical and that is why software prefers the generator concept. Both oscillators and generators are numbered from 0, so oscillators 0 & 1 are generator 0, oscillators 2 & 3 are generator 1, and so on.

Generator 15 (oscillators 30 & 31) is reserved for system use (one oscillator is set to loop slowly at zero volume, to generate tempo; I forget if the other is used by anything, it's probably used to play mono samples).

Most software use one generator per voice. Since 15 generators are left over, spec'ing the GS as having "15 voice sound capability" is a fair statement.

The actual output that comes out the DOC is a 'time-domain multiplexed' sound output and five digital bits. What happens is this: the DOC services each oscillator in turn, and for each oscillator the current sample value is multiplied by the oscillators' volume setting and a voltage proportional to the product is output on the sound output. Four of the digital bits are set to the

'channel number' setting for the oscillator and the last one simply changes voltage from about 3 volts to about 0.5 (for you EE folks out there, this is the negative edge of an output-valid strobe).

External hardware is responsible for splitting off the various channels (4 bits means that there can be 16 of them) and outputting them seperately. The motherboard hardware just ignores the channel setting and mixes all the sound outputs into the speaker/earphone. The sound connector on the motherboard only has room for 3 of the four bits, so expansion cards that plug into the sound connector can only get 8 seperate output channels. Most stereo cards (AE's sonic blaster, for example) only pay attention to the lowest bit, so even numbered channels are left and odd numbered channels are right (or is it the other way round? I forget).

No, it isn't simple, but it gives a lot of flexibility -- most of which is largely untapped.

---

From: Keen Jeffrey Alfred

## **002- Is there a way to output quadrphonic sound on a IIGs?**

We all know that the "S" in GS stands for sound. Stereo cards abound but the GS is capable of much more. The following circuit uses the same technique as stereo cards to decode stereo but decodes quadrophonic. Inside the GS by the memory expansion slot exists the J-25 sound expansion connector that most stereo cards use. The pin outs are as follows:

### J-25 Connector

- 1 Analog to digital in (end nearest front of computer)
- 2 Analog ground
- 3 Waveform out
- 4 Channel address zero
- 5 Channel address one
- 6 Channel address strobe
- 7 Channel address two

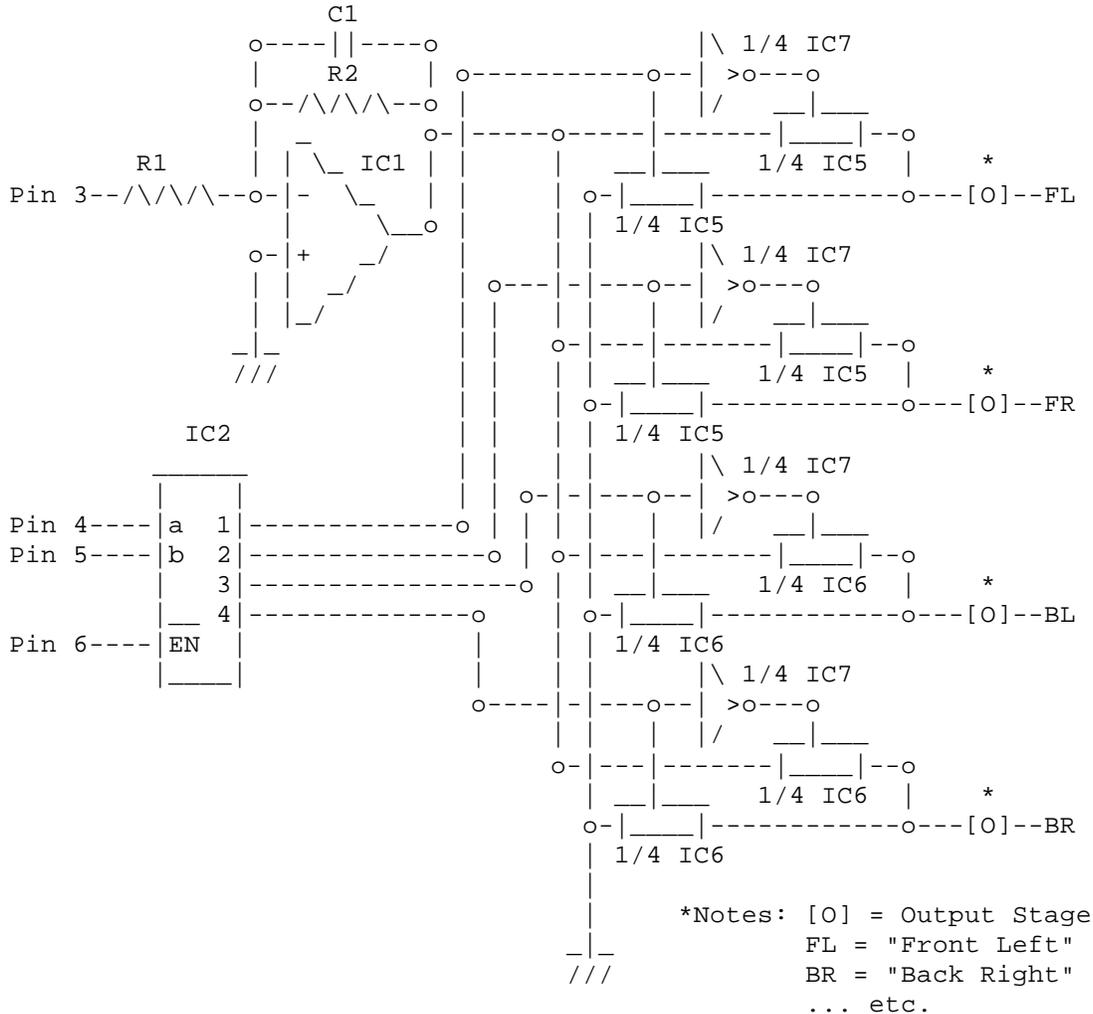
The analog in (pin 1) doesn't concern us here. The waveform out is the important signal. The contains the output of all oscillators one after the other in quick succession (the DOC only handles one at a time). When the DOC is outputting the waveform from an oscillator it puts the channel address from the DOC register \$A0 + osc (most significant four bits) on the three channel address lines and pulls the channel address strobe low. (The DOC realy has four lines but only three are connected in the GS).

The circuit below uses the first two lines the decode the channels (creating 4 unique channels) and breaks the signal into four parts depending on the address using cmos single position single toggle wired as dual position single toggle switches. Then the chopped output is smoothed with an active low pass filter with a corner frequency of 17.7KHz.

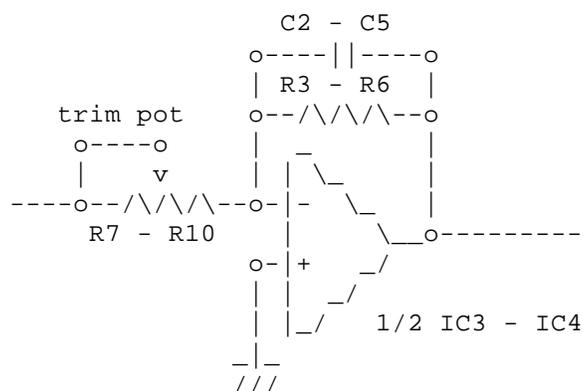
Because most programs only use stereo the second channel address is normally low so this circuit will also decode stereo and this will turn up at

the front two outputs. I have built this circuit on a bread board but need to make a PC board to make a better sounding circuit. Also the output impedance should be set to 75K ohms but I haven't yet gotten around to it.

To make sound in stereo or quad all you have to do is place the binary address of the channel you wish the sound to have in the control register for the oscillator (the tools can do this) and there you have it.



Typical Output Stage [0]



- R1 - R6 : 1.2k ohm
- R7 - R10 : 2k ohm trim potentiometer
- C1 - C5 : 47pf
- IC1 : LM318 high speed op-amp
- IC2 : 74F139N dual 2 to 4 decoder
- IC3 - IC4 : TL072 dual op-amp jfet input
- IC5 - IC6 : 4016 cmos SPST analog switch
- IC7 : 4069 cmos hex inverter

---

From: Brian Willoughby

While there is nothing \*wrong\* with your circuit, I thought that I would mention that the functionality of IC2, IC5, 6 & IC7 are combined in a few standard CMOS chips. It turns out that your circuit is so useful in many applications that you can easily find it in one chip, thus saving wiring and lowering noise.

Look for a Siliconix DG506 or any make of 4058. I'm not absolutely sure about the number 4058, but just check in any CMOS 4000 series list for an 8-channel to 1 analog multiplexer/demultiplexer (not the digital type, they won't handle audio/sound signals).

---

From: Seth D. Kadash

One of the chips Brian refers to is a 4052. Both the LM318 and the 4052 can be purchased from B.G. Micro (214-271-5546). Cost for both was \$3.75 USA.

The other parts can be purchased from Radio Shack.

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From: Rubywand

### **003- My IIgs has a stereo cable plugged right into the Sound Output jack. Isn't that two-channel sound?**

Nope; and, it is not "stereo" either. The jack is a standard stereo jack; but, the "Left" and "Right" outputs are connected to a single 'composite' source. Possibly, Apple originally intended to supply two-channel sound; perhaps, the idea was just to simplify connections to stereo systems. (Stereo devotees get upset when you give them just one 'channel' to plug in.) Whatever, the fact remains: for multi-channel output you need to add a "stereo board".

---

### **004- Why should I add a stereo board to my GS?**

Some programs offer true stereo-- effects and music are lifted from stereo sources or 'recorded' using two mics-- others deliver simulated stereo. Many products output some effects (like a bow twang) through one channel and other effects (the THUNK! of an arrow hit) through the second channel. Stereo, of course, produces spacious, '3-D sound'; but, even the 'separated channels' approach can spread out the action and add realism.

---

### **005- Can I build my own GS stereo board?**

Yes. Apple includes a rough outline for a stereo board design in the GS Hardware Reference Manual. The "TDX Stereo Board" is a real-world realization of the Apple description.

Note: See the FAQs Resource file R004STEREO.GIF for the TDX diagram.

From input to output, the TDX design is straight-forward and simple. First, IIgs audio enters the 14052 where the "Left" and "Right" channels are separated using the C0 input to turn ON the appropriate section (output X or Y) when its channel is valid. (This happens at supersonic speeds so that the user doesn't notice that each channel is ON half of the time.) Then, each output goes to a pair of op amps where it's filtered and amplified.

Design objectives were low noise, low distortion, and low power consumption. From the start I expected that on-board power amp IC's would be too puny to drive our speakers to desired volume levels and maintain low distortion; so, the board includes no power amp IC's and is not intended to directly drive low impedance loads such as speakers. Like a tuner, CD deck, or other hi-fi source, it connects to a stereo amplifier's AUX inputs (or "Tuner", "Tape", etc. inputs) or to the inputs of speaker units with built-in amplifiers. TDX has plenty of juice to drive any decent stereo system at 'blow out the windows' volume levels.

As shown in the diagram, nearly all connections between TDX and the computer, including ground, are made over the J-25 lines. Power (+5 Volts and -5

Volts) comes from the slot into which the board is plugged. The outputs go to "RCA-type" hi-fi jacks mounted on the rear of the board for easy access via standard audio cables. When placing the jacks, be sure to allow space (between the jacks and rear of the computer) for the cable plugs or arrange for the jacks to line up with an opening.

The J-25 connection is via a 7-pin mini-molex ribbon cable. It can go to J-25 (located near the memory expansion slot); or, if J-25 is being used by the Hyperstudio A/D input board, it plugs in there. (On both J-25 and its extension on the A/D board, pin #1 is nearest the front of the computer, pin #2 is next, etc..) All of the parts, including the Apple-compatible circuit board, are commonly available.

I built the TDX stereo board near the start of the IIgs era just as games like "Tower of Myraglen" were beginning to appear. It sounded great then and it sounds great today running "Dungeon Master", "Instant Music", "Jam Session", and Hyperbole MIDI-synth pieces. If your IIgs is still in mono mode, why not make this the year you 'go stereo'. Add a commercial unit or build the TDX. Either way, when you spread out the sound you open up the fun!

---

From: Bryan Ogawa

## **006- How can I transfer sound files created on a Mac to my GS?**

I did the following to get stuff that my next-door neighbor digitized on his LC using the Control Panel Document Sound for Mac Sys. 7:

### 1. Digitize

Find the System Folder, and the System document/whatever (it's called a SUITCASE) and double-click:

find the sound I wanted...

copy to my HFS formatted 800K disk

plop it into my GS

### 2. Convert

Get AudioZap out and sic it on the files.

Click RESOURCE fork when it asks where to get the sound for.

Save it in any format you want.

Then, you can probably use SynthCreate to make a SYNTHLAB wavebank...

---

From: Mitchell Spector

**007- I just got a Phasor Sound Card and now I need some info. What are the 4 DIP switches used for? What are the 2 POTs used for? And, where can I get programming information?**

The Phasor is a great sound card. Offers you 12 sound channels (using all sorts of wave-form patterns and effects, similar to FM-synthesis in IBMs), 4 white noise generators (synthesized drums, etc) and a 1-voice synthesized speech channel, expandable to 2 speech channels. Has a 4 watt amplifier that can drive stereo speakers (left & right). It's compatible with most older sound cards, like the Mockingboard, ALF, SMS and Echo+. Few programs ever supported it, let alone many programs out there that supported the older cards. It did, however, come with some decent software that showed off the card's features and let you experiment with it a bit.

The four DIP switches control emulation modes and standard Apple ][ internal speaker sound-level (only if you disconnect internal speaker and have old speaker toggling sent to Phasor). Switches #1 and #2 are for emulations. Switches #3 and #4 control your old internal speaker sounds, again, \*if\* you have speaker disconnected and that pin location on motherboard connected to Phasor.

You can set Low, Medium and High volume with three different DIP positions. This doesn't affect Phasor music/sound however. To do that, you must turn those two pots you asked about. Each controls either the left or right stereo channel. Turning them clock-wise increases volume, and you probably don't want this too high up, or sound gets distorted! Put both on an equal setting, unless you want one channel louder/softer than the other.

Phasor DIP switch emulation modes:

```
~~~~~  
Native Phasor mode:  1: closed, 2: closed  
Mockingboard mode:  1: opened, 2: closed  
Echo+ mode:         1: opened, 2: opened
```

(Never got the Echo+ mode to work!)

For more information see FAQs Resource file R013PHASOR.TXT .

---

From: Adrian Whichello

**008- What is required to build a Sound Input board for my IIGs?**

I found the following circuit on ground (as text) in the file digitizer.circuit at ...



If you can get the file <http://cassius.ee.su.oz.au/~adrianw/gsaudioin.bsq> there's proof there that it all works (a raw sound file I made).

---

## 009- Does anyone know where I can get some details on MockingBoard hardware and programming?

MockingBoard Mini-Manual 11/97 version

From: Rubywand

### Part 1: Kinds of MockingBoards

The original MockingBoards come in four basic 'flavors':

Sound I-- produces music tones and a variety of sound effects (3 voices to 1 Audio Output)

Speech I-- produces speech or limited sound effects (1 voice output to 1 Audio Output)

Sound II-- 2 x Sound I on a single board (3+3 voices to 2 Audio Outputs)

Sound/Speech I-- Sound I + Speech I on a single board (3+1 voices to 2 Audio Outputs)

Note ...

Audio Output: This goes to a speaker or hi-fi amplifier

Voice: a musical note, sound effect, speech sound, etc.

Quite a few of the original MockingBoards were sold. Later MB's use model names like "MockingBoard A", etc.. The main difference between the original series and letter-named boards is wider availability of Speech.

Edhel Iaur and Mike Mahon supplied details on models A-D. Prices are from a Sweet Micro Systems ad in the December, 1985 issue of A+ magazine:

MockingBoard A is a stereo music and sound synthesizer with six voices. Suggested retail price is \$99.00. This model has two sockets for adding speech synthesis IC's so that a user could add speech to one or both Audio Outputs. Except for the speech upgrade options, MB-A is very similar to the earlier Sound II.

"MockingBoard B" is just the name of the Speech Upgrade; it is not a separate MB board. The kit consists of one speech synthesizer chip. Earlier MB's used the 16-pin SC-01 speech IC, while later board runs provided 24-pin sockets for the newer (but somewhat flawed) SSI-263 speech synthesizer chip. Suggested kit retail price is \$89.00.

MockingBoard C is simply a MB-A that has been upgraded by plugging in one speech chip. Suggested retail price is \$179.00. (There was an 'undocumented' upgrade, obtainable by plugging in the other speech chip, which allowed the board to "sing harmony" with itself!)

MockingBoard D is a stereo music, sound and speech synthesizer for the Apple IIc. It connects to a IIc through a serial port and is, of course, external (unlike the Slot board models for other Apple II's). Its drivers are very different from the slot I/O of the other MockingBoards. Suggested retail price is \$195.00.

Phasor is a MockingBoard-compatible sound card produced by Applied Engineering. Looking at the software that comes with the Phasor may be helpful to MB users.

MockingBoards work on Apple II's with at least 48K RAM. MB can go into any Slot (except for MB-D, which must plug into a IIc). Most programs expect it to be in Slot 4; however, it is fairly common for a program which supports MB to ask you to enter the Slot #.

Most for-MB products will work with Sound I, Sound II, Sound/Speech I, A, and C. (Some work with D.) Products that use MB include Ultima III, IV, V Sky Fox, Wiley Byte', Thunder Bombs, Lancaster, Under Fire, Music Construction Set, GuitarMaster, and Music Star.

MB's 0.5 Watt Audio Output(s) can directly drive an 8 Ohm speaker. You can also run the Output(s) to a hi-fi amplifier.

Except for speech-only models, MB uses the General Instruments AY-3-8910 Programmable Sound Generator IC. The PSG has 3 on-chip tone oscillators (via channels A, B, C) and a Noise Generator (NG). So, for example, the Sound II can play up to 6 notes or effects at once. The NG on each PSG can be mixed with any, all, or none of the three tones.

Many MB "Speech" version boards use the Votrax SC-01 Speech Synthesizer IC. The SC-01 uses 64 phoneme sounds to produce speech. MB software lets you adjust duration of each phoneme in 4 steps, create "rules" for custom sounds, and speak sentences from text in BASIC programs. The SSI-263 speech synthesizer appeared on later model MB's. (At present, more info on the SSI-263 is not included here.)

All MB versions use the 6522 Versatile Interface IC to handle board I/O. Except for the Sound I board, early models have circuit board points to which you can add cables to utilize I/O ports not needed for Sound or Speech.

## Part 2: Sound Programming

Each Programmable Sound Generator (PSG) has 3 output Channels: A, B, and C. There are also 3 Tone oscillators, one committed to each Channel, and one Noise Generator (NG) which can send its output to any Channel(s). Amplitude (output Level or Volume) and Envelope Control ON/OFF is set for each Channel.

The PSG's Enable/Disable register has 8 bits. Three bits let you decide whether or not to send a Tone oscillator's output to its Channel. For example, you can enable Tone outputs for the oscillators going through Channels A and B while disabling Tone output for the oscillator connected to Channel C.

The Enable/Disable register also lets you decide whether or not to send the Noise Generator's output through a Channel. Three bits let you decide which Channel(s) the NG's output will go through. For example, you can enable NG output through Channels A and C but not through B; or, disable NG output through all three Channels, etc..

If, for example, Channel A's Tone oscillator output is enabled and NG output is enabled for Channel A, then, a mixed Tone + NG signal will go through Channel A. Setting Channel A's Amplitude controls the Level for the mixed signal.

Often, a programmer will want to individually control the Levels of Tone outputs (for music) and Noise outputs (for sound effects). This is accomplished by using one PSG Channel only for Noise and two Channels only for Tones. Since the MB Sound II has 2 PSG's, a typical game application using the board will have 4 music tones and 2 effects sounds-- each individually controlled for Level.

More specifically, the user can set Tone Frequency (12 bits, 4 coarse & 8 fine) and Amplitude (4 bits) for each channel individually. A fifth Amplitude bit lets you decide if a channel's Level will be "fixed" (use the Level value) or "variable" (i.e. follow the current Envelope pattern). You have 4 bits to set Noise Generator Frequency.

$$\text{Tone Freq} = \text{A2 Clock Freq} / [ (4096 \times \text{Coarse}) + (16 \times \text{Fine}) ]$$
$$\text{Noise Freq} = \text{A2 Clock Freq} / (16 \times \text{NG value})$$

The Envelope of the combined outputs of enabled sources can be controlled for Period (16 bits, 8 coarse & 8 fine)\*\* and, roughly, for Shape (4 bits).

$$\text{Env Freq} = \text{A2 Clock Freq} / [ (65536 \times \text{Coarse}) + (256 \times \text{Fine}) ]$$

The registers of the PSG are described briefly below:

Reg.    Function and Bit(s) used

00    A Freq. fine (bits 0-7)  
01    A Freq. coarse (bits 0-3)  
02    B Freq. fine (bits 0-7)  
03    B Freq. coarse (bits 0-3)  
04    C Freq. fine (bits 0-7)  
05    C Freq. coarse (bits 0-3)  
06    NG Freq. (bits 0-4)  
07    Enable/Disable    note: Enable =0/ Disable =1

bit 5: NG sent to A  
bit 4: NG sent to B  
bit 3: NG sent to C  
bit 2: A Tone  
bit 1: B Tone  
bit 0: C Tone

Ex: Writing \$F0 to Reg 07 plays tones A, B, C plus noise on C  
Ex: Writing \$F8 to Reg 07 plays tones A, B, C and no noise

08    A Level (bits 0-3) and

Envelope Control (bit 4): 1 = Use Env; 0 = Use Level value

09 B Level (0-3) and  
Envelope Control (bit 4): 1 = Use Env; 0 = Use Level value

0A C Level (0-3) and  
Envelope Control (bit 4): 1 = Use Env; 0 = Use Level value

0B Envelope Period Fine (bits 0-7)

0C Envelope Period Coarse (bits 0-7)

0D Envelope Shape (four bits):

Continue (bit 3) 0= do 1 cycle and set Level to zero  
Attack (bit 2) 1= count up 0= count down  
Alternate (bit 1) 1= reverse count direction each cycle  
Hold (bit 0) 1= do 1 cycle and hold count

To program the MB you write to the board's 6522 I/O chip(s). All address references here are for a MB Sound II (2 Audio Outputs) in Slot 4.

\$C400 ORB1 function to perform, Output 1  
\$C480 ORB2 function to perform, Output 2  
\$C401 ORA1 data, Output 1  
\$C481 ORA2 data, Output 2  
\$C402 DDRB1 data direction, Output 1  
\$C482 DDRB2 data direction, Output 2  
\$C403 DDRA1 data direction, Output 1  
\$C483 DDRA2 data direction, Output 2

Before sending music, etc. data to the MB you must Initialize the board's I/O. To Initialize the 6522's: Store \$FF at \$C402 and the other three DDRxx addresses. This needs to be done by your program just once.

Your program gets access to a PSG via the 6522 by using a few basic Function codes which set the PSG's I/O control lines:

```
Set Inactive = $04
Set PSG Reg# = $07
Write Data = $06
Reset = $00
```

To Write to a PSG register: Tell the PSG which Register you wish to access (i.e. Set the "current register" #) and Write the data. This is easiest to do with subroutines to handle the basic Functions.

Example Subroutines (for Output Channel 1):

```
Set Reg #      1000:  A9 07   8D 00 C4   A9 04   8D 00 C4   60
Write Data     100B:  A9 06   8D 00 C4   A9 04   8D 00 C4   60
```

Notice that each Function sub ends by setting the PSG control lines to Inactive.

Similarly, to do a Reset (set all PSG regs to zero) ...

```
Reset          1016:  A9 00   8D 00 C4   A9 04   8D 00 C4   60
```

To put the value \$55 in PSG Register 02 (Channel B Freq. fine) ....

```
1080: A9 02      put Reg#   in A (6502 accumulator register)
1082: 8D 01 C4   store A at the Data address ORA1
1085: 20 00 10   JSR to Set Reg#   (sets "current register" to Reg 2)
1088: A9 55      put the value $55 in A
108A: 8D 01 C4   store A at the Data address ORA1
108D: 20 0B 10   JSR to Write Data ($55 goes into PSG Register 2)
1090: 60        Exit from subroutine
```

---

## 010- How do I get my MockingBoard to work on my GS?

You need to go to the GS Control Panel and change the Slots setting for the Slot your MB card is in to "Your Card".

The 'standard' place for a MockingBoard is Slot 4. A few early programs require that the board be there in order to work; but, most programs which use MB will let you specify the Slot. A few games and other wares require modifications or interface software to work with MB on a GS.

---

## 011- I have a Mockingboard Sound II board installed in my GS but cannot get it to work with Ultima IV and Ultima V. How can I play these games with MockingBoard music and sound effects?

There are a couple of software packages which will let you play Ultima IV and Ultima V with MockingBoard sound on a Mockingboard-equipped IIgs. Both of these wares take care of activating the MockingBoard Slot without changing Control Panel settings. You can find the software on ...

Ground in the AOL area (U4MOCKV2.SHK and U5MBONGS.SHK):  
[http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Collections/AOL/in the Games/Adv./Roleplay/](http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Collections/AOL/in%20the%20Games/Adv./Roleplay/) folder.

GS WorldView's archive (U4MBonGSv22.zip and U5MBonGSv11.zip):  
<http://apple2.org.za/gswv/a2zine/Games/> .

---

From: Tom Mage

## 012- How can I get 'regular Apple sound' (like BEEPs, etc.) to play through my Mockingboard's outputs?

I recently got a Mockingboard C, which, it turns out, has a plug and cable specifically for connecting in sound from the Speaker! (Most likely, the MB A has a similar connection.)

---

From: Rubywand

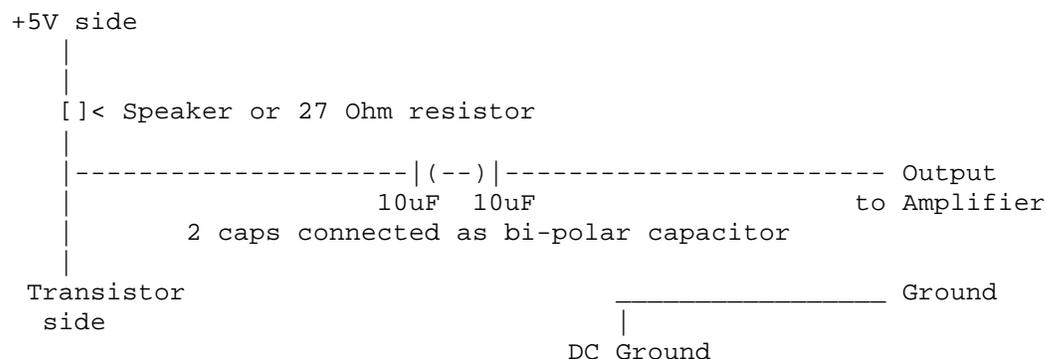
Evidently, older Mockingboards (like our Sound II) do not include the built-in Speaker connection; so, users with these boards will need to do a simple mod.

The Apple II speaker is in the Collector circuit of the sound output transistor-- one end of the spkr goes to a resistor and capacitor connected to the output transistor Collector and the other goes to +5V (not ground). To get an audio output signal, the spkr must be in place; or, you can substitute a 1 watt resistor-- something in the 22-39 Ohm range.

The output should come from the side of the spkr (or 1 watt resistor) going to the resistor & capacitor connected to the transistor-- i.e. the side which is not the +5V side. The output goes through a coupling capacitor to the center lead of your RCA plug. The Ground side of the RCA plug goes to ground.

"Ground" is DC ground = any motherboard trace area which is connected to the ground side of the power supply. For example, the outside "shell" of the composite video output is soldered to ground.

Here is a rough picture ...



You can get a bi-polar coupling capacitor at Radio Shack or make one by connecting two 10uF caps neg end to neg end. The value is not critical, a 2uF-5uF bipolar cap or two 5uF caps connected back to back is fine. Voltage rating should be 10V or better.

---

From: Michael Mahon

For the vast majority of connections to external amplifiers, a non-polarized capacitor is not required in this circuit, precisely because the transistor side of the capacitor never goes below ground. A 4.7 uF capacitor, with the (+) side toward the transistor collector and the (-) side toward the amplifier will do the job nicely.

---

From: Mitchell Spector

### **013- Are there any GS programs that will let me play MIDI files that I get from the web?**

The best one out there is MIDISurgeon 2.0, formerly available from EGO Systems. It lets you convert and tweak (very finely if need be) MIDI files into MIDIsynth format, what most people heavily associate with synthLAB. MIDIsynth is really the best way to hear MIDI sequences, though it is very limited these days: 7 voices and 64K worth of patches maximum (chosen from a small number of instrument banks out there, with a sparse selection). If you have MIDI files that are under 7 voices and only use a couple of instruments it is passable.

There is also the freeware MIDIConvert program, but it isn't very flexible.

WaveLAB (another program by Dave Tribby) is also worth downloading, it allows you to create new instrument banks.

You should be able to get MIDIConvert from the TFFE and Ground FTP sites. SynthLAB/MIDIsynth is part of System 6, downloadable from Apple's FTP site. As for MIDISurgeon, you'll have to contact Dave Tribby to find out its status.

I personally just use a MIDI connection between my Apple IIgs and PC with one end running synthLAB and the other CakeWalk Express, then have one side "play" the other and I record that. Makes editing much easier and faster.

---

From: Edhel Iaur, Esq.

Apple's SynthLAB may be necessary for many solutions. Check out the following URLs for related midi wares:

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple16/>  
in the Music/Applics/ folder  
<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Mirrors/uni-kl/>  
in the gs/music/ folder  
<ftp://apple2.tffenterprises.com/pub/apple2/music/>  
[http://www.whatisthe2gs.apple2.org.za/the\\_ring/index.html](http://www.whatisthe2gs.apple2.org.za/the_ring/index.html)  
click on "Creative Aural"

-----

From: Clayburn Juniel/Effective Software Solutions

Hey, what about Music Composer? It's much better than synthLAB for doing MIDI playback.

Just a note. Music Composer\* does use the MIDIsynth tool to play the music, and to do some editing. MIDIsynth does a lot that synthLAB doesn't use. It was always my impression that synthLAB was never finished.

---

From: Robert Hill

### **014- Would FExt.NDA let you play thru Synthinit if you placed Synthinit in the System.Setup folder?**

OK, I guess it's shameless plug time :) FExtNDA will allow you to use SynthInit from any desktop program. Place SynthInit in your System.Setup folder, and FExtNDA in your Desk.Accts folder (of course :). Then, in FExtNDA's preferences, check 'Send finderSaysIdle'. If you want to be able to use keypresses to change songs, also check 'Send finderSaysKeyHit'. For more useful information on using the two together, check the docs in FExtNDA.

PS: SynthInit isn't the only Finder Extension that will work: IR, DeskTracker, FinderView, FinderSounder, TeacherReader, EGOed, etc. etc. etc. all work.

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From: Charles T. Turley

### **015- Can I play .WAV files on my GS?**

Yes. Download and check out 'Universal Sound Edit'. It's a GS sound editor that handles virtually every type of sound format from just about all computer platforms.

You can read the documentation file and download the program archive, USE.SHK, from Ground's 1WSW collection:

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Collections/1WSW/>  
in the GS.WorldView/GS.AUDIOWARES/ folder.

Other good IIgs sound editors are Sound Shop and Sound Studio.

You can get all three editors with docs in SoundGS\_SoundEditors.zip from GS WorldView at <http://apple2.org.za/gswv/a2zine/Utils/> .

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From: Dave Huizing

## 016- What formats are used for audio files?

See the Audio File Formats Guide FAQs resource file R011SNDFMTS.TXT .

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From: Charles T. Turley

## 017- How do I use my Echo speech synthesizer to produce speech?

See the Echo II Speech Synthesizer Mini-Manual FAQs resource file R012echo.txt .

A complete set of Echo II disks was made available in the February and March 2000 issues of GS WorldView. The disks, in ShrinkIt whole-disk (.sdk) form, along with a Text info file are available for download in EchoCollection.zip from GSWV at <http://apple2.org.za/gswv/a2zine/Utils/> .

You can find the collection of 5.25" disks in disk image form on Asimov at [ftp://ftp.apple.asimov.net/pub/apple\\_II/images/utility/sound/echo\\_disks/](ftp://ftp.apple.asimov.net/pub/apple_II/images/utility/sound/echo_disks/) .

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From: Ian Schmidt

## 018- What types of sound files are used on the GS?

Several types of sample files are used. Here are the most common.

Name	Ext.	FType	Description
Raw	no std.	BIN	Contains only raw sample data. The auxtype is normally the sample rate divided by 51. (See section CA for more on why this is).
ACE	.ACE	\$CD	Contains raw sample data compressed with ACE, Apple's Tool029 sound compressor.
ASIF	no std.	\$D8	Contains sample data plus additional data. Notable due to its use by SoundSmith.
AIFF	.AIFF	\$D8	Interchange format popular on the Macintosh. Not used much on the IIGs.
Hyper Studio	no std.	\$D8	Contains raw or ACE compressed data plus additional information.

rSound no std. \$D8 Resource fork contains one or more rSound and rResName resources. Used by HyperCard IIgs and the Sound CDev.

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## **019- Where can I find more info on cards, editing, digitizing, ...?**

See the Sound & Music info FAQs resource file R015SNDNMUS.TXT .

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From: Rubywand

## **020- What is "old Apple" sound and how is it produced?**

All Apple II computers can produce "Old Apple" sound without any special boards or add-ons. The system BEEP you hear upon a Reset is an example.

The sound is produced by code which addresses memory location \$C030. Each time \$C030 is referenced the output of a flip-flop going to a simple audio amplifier stage changes state.

For example, in BASIC, X= PEEK(49200) will produce a single click. In machine code, so would AD 30 C0 (Load Accum from address \$C030). Duration and Frequency of sound can be set by placing the address reference instruction inside a loop and using other loops to control speed of references.

Although the signal going to the internal amplifier is always a square wave, creative coding by music enthusiasts, game developers, and other users has produced remarkable effects ranging from two-voiced music and game sounds to speech.

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From: Mitch Spector

## **021- What is a good source for .WAV and .BNK files?**

Have a look on Ground at ...

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple16/Music/> .

You should find a couple of different custom made instrument banks for MIDIsynth. A few to look for: 'Europe.bnk', 'MIDI.bnk', 'InstF.bnk', 'InstA.bnk', 'GrandPiano.bnk', 'Jazz.bnk', 'MT32.bnk'.

And check TFFE: <ftp://apple2.tffenterprises.com/pub/apple2/music/> .

Another good source is commercial IIgs sound software from the What is the IIgs? site at ...

[http://www.whatisthe2gs.apple2.org.za/the\\_ring/creative\\_aural.html](http://www.whatisthe2gs.apple2.org.za/the_ring/creative_aural.html) .

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From: Rick Diffley

## **022- How can get more System Sounds for my GS?**

IF you have HCGS (HyperCard GS) then, one way to get System Sounds is to place a HCGS stack with rSounds in the Sound folder. You'll have plenty of new sounds to use with the Sound CDev.

Making a new stack and moving sounds into it works fine, but so does making a COMPLETELY EMPTY file of type \$55/\$0001 (HyperCard Stack -- you can save an empty text file and then change its file type to do it) and then moving the sounds into THAT. Afterwards, you can change the file type of that file to \$D8/\$0003 (Sound Resource) so HyperCard won't try to actually open it as a stack. This saves about 7K of space.

Also, sound files that are placed in the \*/System/Sounds folder can be directly used by HCGS v1.1! You don't need to install those sounds into a stack! There's a smaller and much more manageable hammer. All that's required is HyperCard GS and some utility to change file types.

To get sounds out of a HCGS stack and into a system sounds file, with NO OVERHEAD whatsoever, do the following:

- 1) Create an empty text (or binary, or whatever) file on disk.
- 2) Change the file type of that file to \$55/\$0001 (HyperCard GS stack).
- 3) Use HyperCard's XCMDs (or Hang's sound stacks) to copy sounds into that file that used to be a text file.
- 4) Change the file type of that file to \$D8/\$0003 (Sound resource).
- 5) Throw that file into your system Sounds folder.

You could also just create a new stack from within HCGS and do the same thing, but it'll be about 7K larger, due to the information HCGS puts in a stack's data fork when it's created.

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From: Rubywand

## **023- How do I get System 6.0.1 to run Music Studio 2.0 from hard disk?**

A problem which seems to trip up many users is placement of the WAVES folder. You can put most of Music Studio in a folder named "AppleMusic" (or whatever); but, the WAVES folder needs to be in the main directory of the volume.

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**024- Using Sound Shop and similar utilities, I get static and scratchiness on my GS sound samples and, sometimes, hum.**

**What's wrong and how can I get better recordings?**

There are several ways to get "static" when recording sounds on your GS. One is to have incorrect settings for the sound recording program. If input level is set too low, you may be recording relatively more noise than sound. If input level is set too high, you may be getting "clipping"-- the signal gets chopped at the peaks-- which can sound like static.

Also, check the Sampling Rate setting. A too-low sampling rate can result in glitchiness which sounds like static. If you have not already done so, try experimenting with your sound recording program's settings.

If your sound input board has more than one input, then, one may be for "Line Input" for recording from a tuner, tape deck, etc. and another may be for "Mic". If there is a choice, be sure your sound source goes to the right input. For example, to record using a microphone, it should be plugged into "Mic".

Hum usually indicates a different problem. Almost always it indicates a broken or very poor Ground/shield connection. Check your connector jacks and plugs. Sometimes just turning a cable plug in the socket/jack will establish a good contact and end hum.

If you are using a microphone, it could be the source of problems. Static can come from a mic which is damaged, has some sand, etc. sitting on the diaphragm, has an intermittent ON/OFF switch, has a damaged cord, or has a loose connection at the plug.

Or; you may be using a perfectly good microphone which is badly mismatched to your sound input board. For example, a high quality mic may deliver a very low output. Your input circuit may auto-boost amplification to try to compensate; but, the result may be to obtain an audible recording with greatly increased noise. (Your signal-to-noise ratio at the input is too low.)

By the way, the mic supplied with Hyperstudio (the Apple IIgs version) is not an especially high quality unit; but, it works fine with Hyperstudio's GS sound input board. If you are not sure that your mic is okay and is the right sort for your sound input board, try swapping in one from a tape recorder, etc..

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**025- Squeals and other noises spoil my GS stereo board sound? A fix?**

An unshielded cable going to J-17 can pick up some noise; but, it is not likely to be noticeable except at higher volume settings when no music/sound is being output. Rerouting the cable may help.

Really bothersome noise probably comes from the Slot bus feeding the Slot your stereo board is plugged into. The problem is noticed more often on Rom-01 GS's than ROM 3's because the latter seem to have heavier power traces and this

helps reduce noise. However, any GS may exhibit Slot noise when a few power-sucking boards (e.g. an accelerator) are plugged in.

For ways to reduce noise see the Power Supplies and Cooling FAQs file CSA2POWER.TXT. Check Q&A related to power supply enhancements and/or possible swaps. Also check Q&A 019.

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## **026- My IIGs has no sound from the internal speaker. How can I fix this?**

The fix may be fairly easy. Try plugging Stereo headphones into the Sound Output jack on the back of the GS. Whatever you plug in (headphones, a connection to an amplifier, etc.) must have a Stereo plug. If you get sound through the headphones but no sound when the headphones are unplugged, it means that your jack is, probably, messed up.

There's a leaf switch which is part of the jack which is supposed to close and connect-up your internal speaker when nothing is plugged in. If this switch's contacts become dirty or the leaf loses its springiness, the switch fails to close. The easiest long-term fix is to either

- A. solder a jumper which keeps the switch closed whether or not anything is plugged in or
- B. plug in an external speaker (using a Stereo plug).

Another, fairly rare, cause of Sound loss is that the internal Speaker "+" lead has been pressed against a pointy Ground circuit point on the motherboard. This sometimes happens when the small front panel and/or the motherboard has been removed and replaced without making sure the Speaker lead is routed correctly.

If neither of the above fits your Soundlessness problem, describe your system and post the question to Csa2.

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## **027- Where can I find GS music and music creation programs?**

A good first place to look is Ground at ...

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Collections/apple16/>  
in the Music/Applics/ folder.

Also be sure to check these collections:

NoiseTracker (NT or NTGS) programs, info, and music files  
<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Collections/1WSW/>

Music Composer programs, info, and music files  
<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Collections/Clay/>

Sonix program, info, and wave files

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/Collections/SoWhat/>

For Soundsmith, mod players, ... and lots of songs go to TFFE at ...

<ftp://apple2.tffenterprises.com/pub/apple2/music/> .

For more, check out Music Studio, Instant Music, and other commercial IIgs sound software from the What is the IIgs? site:

[http://www.whatisthe2gs.apple2.org.za/the\\_ring/creative\\_aural.html](http://www.whatisthe2gs.apple2.org.za/the_ring/creative_aural.html) .

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From: Deacon Blue, Kyle Kim, Tom Charlesworth

## **028- Does any Apple II emulator include Mockingboard support?**

The ApplePC DOS-emulator has built-in Mockingboard emulation. Here's a section of the version 2.52a 'apple.doc' from David Ellsworth:

"ApplePC emulates the Mockingboard through any Adlib compatible sound card (all Soundblaster compatibles are Adlib compatible).

"One and a half (1.5) Mockingboards are emulated, for a total of nine voices. The Mockingboards are 'perched' in slots 4 and 5. The one in slot 4 has six voices. The one in slot 5 has three voices. This is because the Adlib card has only nine channels."

The Apple in PC emulator (AiPC) and a newer version of AppleWin (v1.12.3) also offer varying levels of Mockingboard support.

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From: Wayne Stewart

## **029- Does anyone know what a "Supertalker" card is used for?**

According to the MCI Supertalker manual, the card plugs into a Slot and lets you digitize human speech and store it on diskettes. Supertalker can replay the stored digitized speech via the speaker supplied with the system.

Supertalker software includes the Vocal Preparation System (VPS) for developing phrase diskettes. A phrase diskette can have numerous tables containing words, phrases, and complete sentences.

Quality of recorded data is dependent on the selected digitizing rate which can range from 512 bytes/sec (lowest) up to 4096 bytes/sec (best). Playback volume has four software selectable levels.

It's a pretty nifty card. Some time back we had an Apple II meeting where we played around with it and a few other audio cards but mostly with the Supertalker.

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From: Rodney Hester and Rubywand

### **030- My GS stereo board's sound output is very low and noisy. A fix?**

An output cable may be poorly connected or defective-- check for breaks and shorts; or, a chip or connection on the board may be loose or defective.

A perfectly good card correctly connected with good cables can exhibit these symptoms in a IIgs with an overloaded power supply, even when the computer seems to be working okay otherwise. The problem is basically the same as described in Q&A 025 above, except that affects are more severe.

See the Power Supplies and Cooling FAQs file CSA2POWER.TXT. Check Q&A related to power supply enhancements and/or possible swaps. Especially check Q&A 019

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From: Michael J. Mahon, Simon Williams, Rubywand

### **031- How can I create sounds and music on my 8-bit Apple II?**

Ground and other archives maintain several utilities for creating "old Apple II" sounds and music.

Two of the more recent developments are Mike Mahon's "Sound Editor" and a music sequencer named "Timlord" from Simon Williams. (See Mike's page and Simon's Luddite Enterprises page for downloads.)

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From: Rubywand

### **032- Where can I get Mockingboard disks and music?**

You can find the set of Mockingboard disks in GS WorldView's Archive at <http://apple2.org.za/gswv/a2zine/Utils/MockingboardDisks.zip> .

A disk which will play the music of Ultima V on a IIgs equipped with a Mockingboard is in GS WorldView's Archive at ...

<http://apple2.org.za/gswv/a2zine/Misc/MockingboardUltima5musicGS.zip> .

Apple II Csa2 FAQs: Telecom Hardware & Transfers, Part 20/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Telecom Hardware & Transfers, Part 20/25  
This article was archived around: 07 Jun 2009 08:32:25 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2, comp.sys.apple2.comm  
Source: Usenet Version  
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Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2T1TCOM.txt rev135 June 2009

## **Telecom-1 Hardware & Transfers**

- 001- How do I transfer files between my Apple and a PC or Mac?
- 002- How do I transfer/convert my A2 word processor files to a PC?
- 003- How do I use ADT & ap2222pc to transfer disks between A2 & PC?
- 004- How do I transfer files between computers using NULL modem?
- 005- How do I NULL-modem Text files without getting garbage?
- 006- How do I make a "NULL Modem" cable?
- 007- What is the maximum length for a NULL modem connection?
- 008- What are the connections for a standard modem cable?
- 009- How do I make a GS hardware handshake High-Speed modem cable?
- 010- What is the maximum modemming speed I can get from my Apple II?
- 011- What telecom programs run on Apple II computers?
- 012- Where can I get ADT, ADTgs, Agate, Modem MGR, Spectrum ...?
- 013- What are the settings for the Apple Super Serial Card?
- 014- What are the Serial Pro card's dip switch settings?
- 015- What are the settings for an Apple Serial Interface Card?
- 016- What cable can I use to do NULL modem transfers with my IIc?
- 017- What cable(s) can I use to connect a modem to my IIc?
- 018- How can I connect a modem with a Dsub-9 socket to my IIgs?
- 019- How can I program the Super Serial Card in assembly language?
- 020- How do I set up Hyperterm to do transfers with my Apple II?
- 021- How do I get an Applesoft program into a PC-DOS computer?
- 022- I want to use a fax modem with my IIGS. Is this possible?
- 023- Can I do modem-to-modem transfers between my home computers?
- 024- What cable can I use to do Apple IIc <---> PC ADT transfers?
- 025- Where can I buy modem cables and NULL modem adapters?

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From: Rubywand

## **001- How do I transfer files between my Apple and a PC or Mac?**

The best, most flak-free way to move stuff between your Apple II and PC or Mac is via a standard NULL modem transfer. (A NULL modem connection joins a serial port of the Apple II to a serial port of a PC, Mac, etc. via a NULL modem connector joining modem cables from each computer. Radio Shack and ThinkStuff sell NULL modem connectors/cables.) The usual way to get the most out of this connection is to have a telecom program on the Apple II talking to a telecom program on the PC or Mac. For more information on standard NULL modem transfers see Q&A 004 below.

A variation of the standard NULL modem setup is a software package plus cable specifically designed for transferring files between computers. For information on such a package, see Q&A 002 below.

Other ways of doing a direct PC-Apple II transfer include ADT and Ap2222; and, for Mac-Apple II transfers, there is MacADT. These software packages include programs for both computers-- e.g. Apple II and PC-- which let the user do transfers via serial ports (ADT) or game port and printer port (Ap2222). They are, mainly, intended for moving whole A2 5.25" disks. For more information, see Q&A 003 below.

Another option is to use a BBS-- perhaps your own company BBS-- or an internet website, ftp site, etc.. You upload from one machine and download with the other. For more information about uploading and downloading, see the Telecom-2 FAQs.

A completely different approach is to move files on diskette. For PC transfers, this normally requires that either the Apple II or the PC have a plug-in card and disk drive which lets it read diskettes from the other machine. For example, an Apple II could have a PC Transporter board with a PC drive connected; or, the PC could have a TrackStar board with an Apple II drive connected. For more about TrackStar, see relevant information in Csa21MAIN1.

Depending upon model, installed OS, and available utilities, Macs can exchange files with Apple II computers via ProDOS and HFS 3.5" diskettes. Macs with the A2 plug-in board can handle standard 5.25" A2 diskettes.

A modified version of the above approach is for PC users to employ a utility which allows writing to HFS diskettes.

Files can also be exchanged with PC's and Mac's using Zip disks. (See Csa2ZIPTF.)

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From: SuperTimer and Rubywand

If your other computer is a Mac, you can format a Mac HFS (standard) DS/DD 3.5" disk and the GS can read and write it if you have the HFS FST installed. That's how I exchange files with a Mac...

On a PC, you can install a program called MacDrive 98. This program allows Windows 95 to read, write, and format HFS volumes.

To transfer files from HFS media to ProDOS disk on the IIe, IIc, or IIc+ you can use A2fx or HfsLink. The IIe, etc. must have an 800k 3.5" drive connected to access 800k HFS diskettes. This method would also work for IIgs's which can not run a version of System supporting the HFS FST.

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From: Ruud

For Mac users, if the file arrives in a .zip or .sit form, it's easier to work with because it's 'protected' from being altered by the Mac file system (i.e having a resource fork added). An .shk file isn't protected since that is a native A2 format.

Then it's a matter of getting the file onto a Mac \*with an old-style disk drive\*, mostly the ones that 'suck your disk in' by themselves, but some later ones - mainly in 68k machines, Powerbooks seem particularly good - work as well. Powermac drives are not reliable, while a 68k Powerbook or SE/30 works fine.

So, after getting it onto the 68k, I unzip/unstuff the file to obtain the contained .shk, etc. files and let them be processed by ProType, which restores A2 file types. Then I put them onto a ProDOS disk mounted on the 68k Mac (using system 7.6.1) and restart ProType and let it change the types on the A2 ProDOS diskette again just to be sure.

After booting the ProDOS disk on the Apple II, it is just a matter of starting Shrinkit v3.4 to unshrink any .shk files.

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From: MDRipley37

For Mac users, there is a shareware utility named "[2Mac" for transferring 5.25" diskettes from Apple II computers to Mac as IIe- and Bernie ][ the Rescue-compatible disk images. It works for transferring images from Mac to Apple II diskettes, too. I have used it for over a hundred transfers with no problems and Apple II disks that boot up just like the originals.

---

From: Rubywand

002- How can I transfer and convert word processor files from an Apple II to a PC Microsoft format (DOS, Word)?

There is a Sequential Systems package complete with cable named "CrossWorks" which lets you transfer Appleworks, Word Perfect, text, and other ProDOS files to a PC. It transforms them to a variety of PC formats (e.g. AppleWorks to/from Microsoft Works). An alternative is to convert the Apple II file to plain Text and send it that way.

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From: Bill Mackin

**003- I've heard of ADT and ap2222pc. How do these packages work for transferring Apple II disks between an Apple II and a PC?**

Yesterday I downloaded ap2222pc.zip written by some guy in Hong Kong. It copies whole Apple disk images over to the PC, or PC to Apple, or individual files back and forth!

You buy a 25-pin male parallel port connector and two 8-pin DIP sockets from Radio Shack. He gives the wiring diagram for connecting 9 wires between them. You type in a 6502 assembly program on your apple at address 300. Save the program, shut things off, hook up the wire from your PC printer port to the Apple Game Controller socket, turn them on (Apple first, then the PC), and run his programs.

It works great! I've already made 26 disk images from my old Apple disks.

---

From: Paul Guertin, Sean Gugler, Paul Schlyter, Rubywand, Ronny Svedman, David Schmidt

ADT (Apple Disk Transfer) lets you transfer 5.25" 16-sector A2 disks from your Apple II to your PC. It will also transfer standard 5.25" .dsk disk image files from the PC to a formatted 5.25" diskette on the Apple II. The connection is a fairly simple NULL modem link between serial ports using standard cables and adapters.

Transferred disks can be DOS 3.3, ProDOS, Pascal, ... . However, ADT will not correctly transfer most copy protected disks to the PC; and, it will not transfer ProDOS-order (usually .po) disk image files to the Apple II.

Note: Several limitations seem to be overcome in a newly released (2006) ADTPro version which runs under ProDOS.

ADT is a pair of dedicated telecom transfer programs-- one for Apple II running under DOS 3.3 and one for the other computer (almost always a PC; but, there is also a version for Mac). The PC-side program is available in a version for Windows 95, 98, Me (adt.exe) and one for MS-DOS (now named "adtdos.exe").

There are several versions of the Apple II-side program in order to fit different models and serial interfaces:

ADTssc- The current version (1.22) of 'standard ADT'. It requires that an Apple Super Serial Card or compatible card be installed or that the Apple II be a //c or IIc+ (which have SSC-compatible serial ports).

ADTcc- ADT modified to work with many, mostly older, non-Super Serial Card serial interfaces. (Current version is 1.21.)

ADTgs- Currently at v.91, this is ADT modified to work with the IIgs modem port. (ADTgs will, at present, do only PC-to-Apple II disk image transfers.)

ADTPro- Recent release for ProDOS which runs on 64k Apple II (with the Apple SSC card) and with the Apple IIgs native modem port at 115kbps. This distribution also uncludes a new interface for the other side.

ADT is practically always distributed as a .zip file including at least an Apple II and PC program plus directions for transferring the Apple II program dump file to your Apple II, setting up, and operation.

One distribution, ADT\_2004.zip, includes the three earlier Apple II-side programs, both PC-side programs, directions, and assorted support files.

Each Apple II-side program is a block of code (e.g. adt.dmp) designed to be dumped from PC to an Apple II running DOS 3.3 via a simple Text transfer to the monitor which requires no terminal or other special software on the Apple II.

Once both sides are installed, ADT transfer speed typically ranges from 9600 baud through 19,200 baud.

---

From: Delfs

If you find you just can't get your communications software to transfer that ADT file, then lets try it without any comm software at all. We will still essentially make the IBM type in the program on the Apple II using the comm ports of both computers.

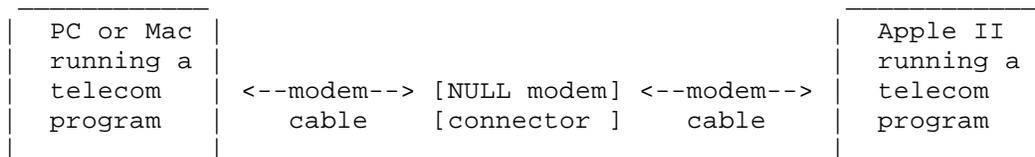
For directions, see ADT\_TransferWithoutCommSoftware.txt on GS WorldView at <http://apple2.org.za/gswv/a2zine/Docs/> .

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From: Rubywand

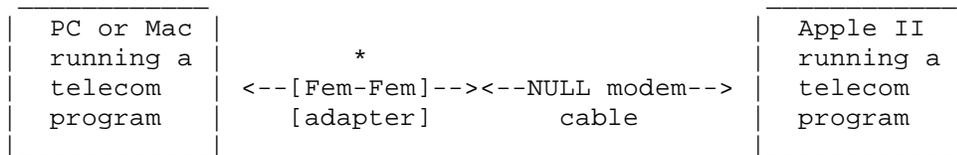
## **004- How do I transfer files between computers using NULL modem?**

You will need a NULL modem connector and each computer needs a modem cable and telecom program. A IIE or II+ will also need a serial card.



"NULL modem" means "no modem". A NULL modem connector is just a pair of connectors wired 'back to back' with a few lines switched so that each computer views the other pretty much as though it were a modem. Radio Shack, Marlin P. Jones, and other places sell NULL modem adapters in the form of small modules or short cables for a few dollars; or, you can make your own.

Since a NULL a modem connection generally requires fewer control signals than a connection to a real modem, there are many workable variations of this setup. One pretty good try is to use a serial printer cable connected to the Apple II-- for example, on a IIgs you can use a Mac Imagewriter I cable. This eliminates the need for a NULL modem adapter. (You will probably need a Female-Female plug adapter to connect to the PC\* COM port or PC modem cable.)



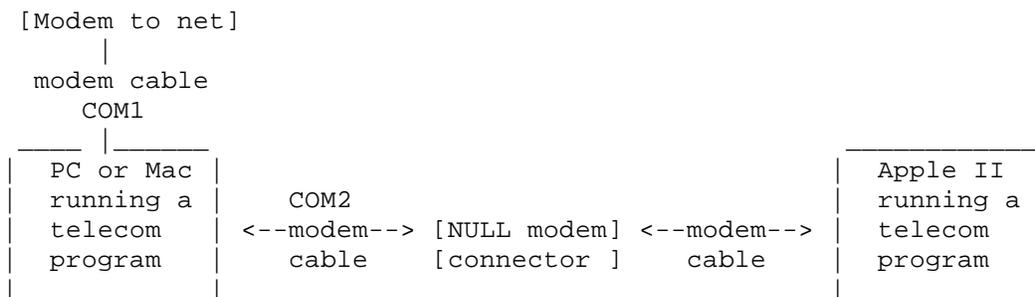
One possible disadvantage of this method is that signal lines may be missing and you will not be able to get hardware handshaking. (Tests using the IW-I cable on a IIgs showed no loss of speed under Spectrum or ADTgs.)

On the Apple II side, you can choose from several good telecom programs. Since you would like to be able to do Z-modem transfers, good choices include Intrec's ProTerm-A2 3.1 (Enhanced IIe -- IIgs), MGR Software's Modem MGR (II+ - - IIgs), AnsiTerm (IIgs), and Spectrum (IIgs). You can also choose from among many other programs. Generally, these support X-modem but do not support Z-modem.

If you're running under a current version of Windows, HyperTerm works very nicely on the PC side. (For sending Text files from PC to Apple under HT, be sure to uncheck "send line enders" in the ASCII settings.) If there is a choice of terminal emulations, it seems best to stick with something simple, such as "ANSI" or, even "none", or, if available, "auto-detect". (For transfers to an Apple II running ZLink, select "Auto-detect" in Hyperterm.)

A good NULL modemming program for running under DOS is Telemate, commonly available as shareware. Many other telecom programs are available and work fine under current Windows, old Windows, and DOS. Similarly, there is a good selection of Mac telecom wares.

To do transfers, you just connect the modem cable from each machine to the NULL modem connector. If your PC or Mac has a spare COM port, the connection can remain in place without disrupting normal net connections through the other COM port.



If you can not use a separate PC or Mac port for your connection to the Apple II, you can move the PC modem cable connection from your net modem to the NULL modem for doing transfers or use a switch box.

For a GS, the recommended modem cable is a "high speed" type which allows hardware handshaking and, if present, this option should be set in the GS telecom software. The same is true for other Apple II's with serial ports or boards (like the Super Serial Card) which can do hardware handshaking.

However, a "plain" modem cable-- one supposedly without lines for hardware flow control-- usually works fine. (Often, the main limiting factor will be your serial card or serial port hardware and the speed of your Apple II. Apple II's with accelerator cards or chips can usually achieve better transfer rates than unaccelerated machines.)

Set the same format (8-N-1), baud rate, and protocol (e.g. Z-modem) on each telecom program.

Note: "8-N-1" means 8 data bits, No parity, 1 Stop bit. Today, most ports and cables will support hardware handshaking; so, this should be the usual flow control setting. (If it does not work, check your cable to see that connections match those suggested for your Apple II and interface. If you can not get hardware handshaking to work, then you may need to specify a non- hardware flow control option for one or both of the connected computers .)

A good first-try speed setting seems to be 9600 baud. If you get errors, try moving down to 2400 baud (or, in at least one reported instance, moving up to 19,200). An accelerated GS running Spectrum can connect with modern PC's running HyperTerm at 57.6k baud or better. An unaccelerated GS will top out around 38.4k baud.

Note: Spectrum, ProTerm 3.1, Modem MGR, and some other newer Apple II telecom programs do not require that you modify IIgs Control Panel settings for speed and handshaking. Since Spectrum directly accesses the GS serial port, speed, etc. settings are done in the program. (By the way, this frees-up Slot 2 -- the GS modem firmware Slot-- for any peripheral card which needs to have its Slot set to "Your Card" in the Control Panel.)

Note: On the PC, HyperTerm allows setting the Port Configuration-- i.e. Format, Baud Rate, and Flow Control for COM1 or COM2-- for a particular setup which you can save under a name, like "GSxfers.ht". Whenever you start HyperTerm to do transfers to/from the GS, you need to Open GSxfers.ht (or whatever you name it) in order have your setup in place.

Place each program in terminal mode-- often, this is the default mode. Or, the particular telecom program may have menu items or buttons you select for specific kinds of transfers.

Next, you will usually select the function (send or receive) on each machine and the protocol. The protocol should be the same on both machines. Z-modem is the best choice for most single or multiple file transfers. (Text files can be an exception-- see the next question. A plain ASCII transfer will circumvent most problems but is slower; and, you may need to send and receive/capture files one-by-one instead of in batches.)

Finally, you will select the file or files to send or "Open".

At the start, some experimentation is likely to be involved in getting your computer-to-computer transfers going. For example, you may find that it matters which end you start first. (When using ZLink on the Apple II and doing an X-modem transfer, start the Send side first, then the Receive side.) If your setup works best starting Receive first, you may find that one telecom program or the other does not give you enough time to start Send-- i.e. it keeps "timing out". The fix is to change the program's "Time Out", "Inactivity Delay", etc. setting.

Note: Some telecom programs may expect an end-of-send signal which the sending program does not supply. Pressing CTRL-X or RETURN on the Apple II or ESC on the PC often seems to work okay for terminating the Send.

---

From: Jeff Blakeney

You don't need to manually tell Spectrum or other modern telecom programs to receive a file each time you do a Z-modem transfer. Just make sure that you have Auto Receives turned ON. In Spectrum the setting is in the Settings/File Transfer/Receive Options... dialog.

---

From: Rubywand

## **005- How do I NULL-modem Text files without getting garbage?**

The main problem in A2-PC Text file transfers is that Text files created by the PC use a CR and an LF to end a line whereas Apple II-created Text files use just a CR. So; PC files show up on Apple II displays with annoying "#" or inverse "?" symbols; and, Apple II files show up on PC displays with long, un-terminated lines interspersed with block symbols.

For PC-to-A2 Text file transfers, Z-modem, X-modem, etc. usually work fine if you have some way to deal with the extra Control characters, mainly line feeds. On the GS, Appleworks 5 does a good job of automatically cleaning out such garbage; and, Text editors like ShadowWrite and CoolWriter have options to quickly strip out offending line-feed Control characters. Some telecom programs, including Spectrum, have Text editors which can strip out Control characters and perform other manipulations to clean up a file.

An alternative is to do a plain ASCII Text transfer. (The PC telecom program should be told not to add line feeds or "line ends".) Depending upon your A2 telecom program, the result may be saved from your Capture Buffer, captured directly to an on-disk Text file, or selected and saved from the Scrollback buffer.

Similarly, for A2-to-PC Text transfers, you can use Z-modem or some other block transfer protocol if you have a PC utility which can convert Apple II text to text PC's like. For example, one way to send several Text files is to put

them in a .SHK file, Z-modem them to the PC, and use Nulib (v3.24) to unshrink the files in PC Text format.

Otherwise, you are probably better off doing a Text transfer. Set your A2 telecom program to "send LF's". If there is a "Prompting" option it should be OFF. Do an "ASCII Text", "Plain Text", etc. Send. The PC telecom program should be set to Receive Text if this option is available. If it is not, you will be able to select and save the text from the PC program's display or save the text from some capture buffer.

Some programs with a "Receive Text" option may expect some end-of-send signal which the sending program does not supply. Pressing CTRL-X on the Apple II or ESC on the PC often seems to work okay for terminating the Send. For example, Telemate will ask if you wish to abort the transfer-- you answer "Y"es-- but, the file will still be saved on the PC.

Other programs may expect you to click something to signal the end of a transfer. If you are using HyperTerm to receive text on your PC, you select "Stop" in the Transfer--Capture menu to end the transfer.

---

From: Edhel Iaur, Esq.

Appleworks 5.x seems to do a pretty good job of cleaning up text files from the net. (e.g. it automatically clears out the annoying LF's which show up in most text file viewers.) There is, also, a standard Awks macro which will get rid of end-of-every-line CR's.

---

From: Rubywand

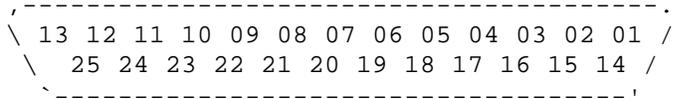
## **006- Does anyone have directions for making a "NULL Modem" cable?**

A typical NULL modem is two Dsub 25-pin female sockets (call them "A" and "B") wired back-to-back as follows ...

Socket-A	Socket-B
2	-> 3
3	-> 2
4	-> 5
5	-> 4
6 & 8	-> 20
7	-> 7
20	-> 6 & 8

Note: 6 & 8 are connected at each socket. (That is, if you are making a cable instead of using back-to-back sockets, you do not want to run 6 and 8 separately to pin 20 on the other socket. For back-to-back sockets, it's okay to run separate short leads if you like.)

A Dsub-25 female connector viewed from the front



If you can find a couple old-style Dsub-25 plug casings, the sockets can be mounted and the casings can be glue-gunned together to make a nice compact unit.

For Apple2-PC (or Mac, etc.) transfers, you plug the modem cable from the Apple II into one side of the NULL modem and the modem cable from the PC into the other side. If the PC has a 9-pin serial port connector, use a 9-to-25 adapter cable to connect to the NULL modem. Similarly, for Mac users, if the Mac cable has a special connector, use a converter to a male Dsub-25M connector for plugging into the NULL modem.

Dedicated IIgs NULL modem cable

The usual IIgs NULL modem cable consists of a High-Speed IIgs modem cable connected to a NULL modem adapter which connects to a modem cable coming from the PC. If you want to 'roll your own' single piece IIgs --> PC cable for NULL modem connections, here is the pinout info:

IIgs Mini-Din 8	PC Female Dsub Dsub-25F or Dsub-9F	Dsub Signal
3	3	2 RXD
5	2	3 TXD
4,8	7	5 GND
2	4	7 RTS
1	5,6,8	1,6,8 CTS, DSR, DCD
7	20	4 DTR

---

**007- What is the maximum length for a computer-to-computer NULL modem hardware-handshaking connection?**

Most texts agree that around 50 feet is the 'safe' maximum length.

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**008- What are the connections for a standard modem cable?**

The standard modem cable which can support hardware handshaking connects eight lines between two male Dsub25 connectors:

Seial Port	Modem	Signal Name
Dsub25m	Dsub25m	
2	2	TD (transmit data)
3	3	RD (receive data)
4	4	RTS (ready to send)
5	5	CTS (clear to send)
6	6	DSR (data set ready)
7	7	GND (ground)
8	8	DCD (data carrier detect)
20	20	DTR (data terminal ready)

There are many variations depending, mainly, upon differences in Serial Port sockets; and, some lines may be omitted in some cables.

For NULL modem transfers, the Modem side plugs into the NULL modem connector.

---

From: Tae Song (White Wolf)

**009- Does anyone out there in Net.Land have the pin connections to use for a GS CTS/RTS hardware handshake compatible "High-Speed" modem cable?**

View is looking into the cable connector/plug at the pins.

Male Mini-Din 8	RS-232 Male Dsub-25M
6 7 8	01 02 03 04 05 06 07 08 09 10 11 12 13
3 4 5	14 15 16 17 18 19 20 21 22 23 24 25
1 2	

DIN-8	Dsub-25M	Signal Discription
3	2	TXD (Transmit Data)
5	3	RXD (Receive Data)
4,8	7	GND (Ground)
2	5	CTS (Clear to Send)
1	4,20	RTS & DTR (Ready to Send and Data Term Ready)
7	8	DCD (Data Carrier Dectect)

Places to get a IIgs High-Speed modem cable:

InTrec Software ( 888-PROTERM; <http://www.intrec.com> )

MC Price Breakers ( 360-837-3042; <http://www.mcpb.com> )

Sellers of Mac supplies (IIgs cable is same as mini-8 Mac modem cable)

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From: David Empson, Richard Der, Rubywand, Hal Bouma

## **010- What is the maximum modemming speed I can get from my Apple II?**

IIE and earlier Apple II's: These require a serial card which usually plugs into Slot 2. In general, the card determines maximum connection speed for these computers.

Many early serial cards max out at 9600 baud. Apple's Super Serial Card (SSC) and compatible serial cards max out at 19,200 baud. (Lightning Systems made a "Turbo ASB board" add-on for the SSC which extends speed to 230,400. A 1MHz Apple II with the SSC and Turbo ASB should be good for 57.6k baud.)

IIC and IIC+: These machines have built-in serial ports which are generally compatible with software specified as requiring a Super Serial Card.

Original IIC releases use a cheap method of generating the clock frequency for the serial ports. Most implementations based on the 6551 chip use a 1.8432 MHz crystal, which gives exact baud rates; but, these IIC's take the master system clock (14.31818 MHz in an American IIC) and divide it by eight to produce 1.7898 MHz. The 3% decrease in clock frequency produces a 3% drop in the baud rate, which is enough to prevent operation with some serial devices, particularly intelligent modems running at 1200 bps or faster.

This is not always a problem, and I have successfully used one of these IIC's with a ZyXEL U-1496E modem and a direct connection to a IIgs at 9600 bps. I have had problems in other cases.

Later motherboards use a crystal, (and, some original motherboards may have a crystal installed) resulting in much better behaviour. You can make a reasonable guess at whether you have the original motherboard by checking which firmware version is installed. From the BASIC prompt enter PRINT PEEK(64447) and check the displayed value against this list:

255	Original firmware- probably original motherboard
0	UniDisk 3.5 support- may be original or revised motherboard
3 or 4	Memory expansion card- revised motherboard

In theory, the IIC's maximum baud rate is 19,200. Whether it can actually keep up with that rate is another question. 9600 should be fine. IIC+ baud rate generation is reliable and max speed is 19,200 baud.

IIgs: Although the firmware IIgs Control Panel allows a top setting of 19,200, maximum speed for the built-in IIgs serial ports is about 230k baud. Spectrum and a few other telecom products directly control the ports and allow 57.6k transfers.

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From: Gareth Jones

## **011- What telecom programs run on Apple II computers?**

KERMIT: Available in DOS 3.3 and ProDOS versions, this freeware runs on any Apple II. (On a GS, you need to turn the "DCD Detect" option OFF in the modem control panel.) KERMIT is little harder to set up and use than some other telecom software; but, works fine for Kermit and X-Modem transfers. It supports VT52, VT100, and dumb terminal emulations.

ZLink: a ProDOS system program that requires a IIe, IIc, or IIgs. It supports X-modem and Y-modem file transfers; VT100 and partial VT220 emulations. The "macro" program that comes with it is simple, but fine for some things, like auto-entering your password. A nice feature is that ALL the options are shown and set in a single screen display, reached by pressing Open-Apple-?. I used this program quite happily for a number of years, so it is probably worth a download to see if it meets your needs.

Talk is Cheap 4.0: An excellent program for the IIe, IIc, or IIgs. It requires an accelerator chip (e.g. a Zip Chip) in a IIe or IIc to communicate over 4800 baud. With the accelerator chip, you're fine up to 19,200 baud. It has an excellent scripting language, which was used as the basis for Spectrum's scripting language. File transfer protocols are X-modem (various types, such as 4K X-modem and 1K X-modem) and Y-modem (for downloads). The manual is a good tutorial for telecommunications. You may be able to find an early shareware version on the net.

ProTerm 3.1: This has been the most popular commercial telecom program available for the Apple II. The program supports many emulations, every file transfer protocol I know (including Kermit), and if you have a mouse, it'll give a mouse and pull-down- menus environment.

Telcom: Similar to ZLink in features (except no macros), this is a free never-finished commercial product by Jawaid Bazyar for IIgs only. Featuring a mouse-and-menus interface implemented on the text screen, Telcom offers X-modem uploads and downloads, Y-modem downloads, and VT100 or ProTerm Special Extended terminal emulations.

Spectrum: This is the ONLY GS/OS telecom desktop program (i.e., standard menus, the system clipboard for cutting and pasting, etc.). VERY strong scripting language that even supports sounds, icons, fonts, colours, clickable buttons (like HyperCard). It supports most terminal emulations, many file transfer protocols (e.g. Z-modem, though not Kermit. Yet). The author and publisher have released version 2.0 and are committed to developing it further.

ANSITerm: from Parkhurst Micro Products. Paul Parkhurst's program is supposedly the best colour ANSI graphics available on a GS. It supports macros, many file transfer protocols, and there is a demo version to try out. GS users only.

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From: Rubywand

Another very good program is Modem MGR from MGR Software. It runs on any Apple II and works with a wide range of modems, 80-column boards, and clock cards. MM supports popular protocols from X-modem through Z-modem and many terminal emulations.

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From: Supertimer

Agate offers Z-modem. Z-modem is a much better protocol, with a resume function (web browsers should take note) and powerful CRC-32 error checking. Agate was shareware, but the user decided he couldn't accept money for an unfinished product. None of the shareware checks were cashed. I think it is freeware now.

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From: Penman, Supertimer, Rubywand, MDRipley37, David Schmidt

**012- Where can I get ADT, ADTgs, ADTcc, ADTwin, ADTux, ADTPro, Agate, Modem MGR, Spectrum, ProTerm, Ap2222pc, ZLink, ][2Mac, MacADT, A2fx, HfsLink?**

For links to the above, see Csa21MAIN4: Get It- Links to popular software packages.

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From: Tom Kelly, David Empson, Rubywand, Ed Eastman, John Van Winkle

**013- What are the settings for the Apple Super Serial Card?**

Here is some information about Super Serial Card (SSC) Settings:

Recommended Slots

Slot 1 for printer use

Slot 2 for modem (and most non-printer serial communications) use

Jumper Block- configures serial I/O lines. This does not set the operating mode of the card. Operating mode is set via the DIP switches.

For typical printer use, label is right side up (arrow points DOWN), DIPs are set for printer operation, and a printer cable is used. This jumper setting can also be used with a modem cable to make a NULL modem connection to another computer. (DIPs would then be set for modem operation.)

For typical modem use, the label is upside down (arrow points UP), DIPs are set for modem mode, and a modem cable goes to the modem. To make a NULL modem connection to another computer, use a modem cable + NULL modem adapter.

Note that RS-232-C signals on the SSC use negative-true logic; that is, they are true at 0v and false at +5 volts.

DIP Switch Settings (up is ON for each switch)

These set the default operation of the SSC. The settings may be overridden via commands entered from the keyboard or from software.

SW1 Dip Switch Settings

SW1 Dip Switch 1-4 Settings

Baud	SW1-1	SW1-2	SW1-3	SW1-4	SW1-8
50	on	on	on	off	not used
75	on	on	off	on	"
110	on	on	off	off	"
135	on	off	on	on	"
150	on	off	on	off	"
300	on	off	off	on	"
600	on	off	off	off	"
1200	off	on	on	on	"
1800	off	on	on	off	"
2400	off	on	off	on	"
3600	off	on	off	off	"
4800	off	off	on	on	"
7200	off	off	on	off	"
9600	off	off	off	on	"
19200	off	off	off	off	"

SW1 Dip Switch 5-7 Settings

	SW1-5	SW1-6	SW1-7
Modem operation	on	on	on
Printer operation	off	on	on*

Note

Switch SW1-5 and SW1-6 help define the operation mode of the card.

1-5	1-6	Operation Mode
on	on	Modem
off	on	Printer
on	off	Emulate Apple Serial Interface Card with P8 PROM
off	off	Emulate Apple Serial Interface Card with P8A PROM

Switches SW1-7 and SW2-7 select between the standard and secondary Clear To Send signals when the jumper block is set for printer operation.

1-7	2-7	pin
on	off	CTS
off	on	SCTS

For modem operation,  
 SW1-7 should always be ON and  
 SW2-7 should always be OFF.

\*For printer operation, the setting may vary.  
 If using an Imagewriter II  
 SW1-7 should be ON and  
 SW2-7 should be OFF.

#### SW2 Dip Switch Settings

Switches SW2-1 through SW2-4 functions depend upon whether modem or printer operation is enabled.

#### SW2 Dip Switch 1-4 Settings for Modem operation

Data Bits	Parity	Stop Bits	SW2-1	SW2-2	SW2-3	SW2-4
7	none	1	on	off	off	on
7	odd	1	on	off	on	off
7	even	1	on	off	off	off
7	none	2	off	off	off	on
7	odd	2	off	off	on	off
7	even	2	off	off	off	off
8	none	1	on	on	off	on
8	odd	1	on	on	on	off
8	even	1	on	on	off	off
8	none	2	off	on	off	on
8	odd	2	off	on	on	off
8	even	2	off	on	off	off

#### SW2 Dip Switch 1-4 Settings for Printer operation

SW2-1 Default data format  
 on 8 data, 1 stop  
 off 8 data, 2 stop

SW2-2 Delay after sending out a RETURN character  
 off None  
 on 32 milliseconds

SW2-3 and SW2-4 set line width and video output

2-3	2-4	Function
on	on	40 column output, video on
on	off	72 column output, video off
off	on	80 column output, video off
off	off	132 column output, video off

#### SW2 Dip Switch 5-7 Settings (Modem or Printer operation)

SW2-5 enables automatic line feed generation.  
 on auto-send a linefeed after sending a CR  
 off no linefeed auto-send

SW2-6 enables interrupts.  
 on Yes (recommended for baud rates of 1200 or greater)  
 off No

SW2-7 used with SW1-7 to select CTS signal  
 on may have this setting for use with some printers  
 off correct setting for modem operation

(SW2-8 is not used)

### Connector Pin Assignments

10-Pin Header	Dsub-25 Connector	Signal Name
1	1	Frame Ground
2	2	Transmit Data (TXD)
3	3	Receive Data (RXD)
4	4	Request To Send (RTS)
5	5	Clear To Send (CTS)
6	6	Data Set Ready (DSR)
7	19	Secondary Clear To Send (SCTS)
8	7	Signal Ground
9	20	Data Terminal Ready (DTR)
10	8	Data Carrier Detect (DCD)

Pins 1-7 and 2-7 are set together to determine the SSC pin to be read for the Hardware Handshaking signal. Generally set to monitor Pin #20.

### Typical Configurations (and Don't Forget The JUMPER Block)

	Modem**		ImageWriter I/II Printer***	
	SW1	SW2	SW1	SW2
	1234567	1234567	1234567	1234567
ON	XXXX	XX XXX	X XX	X XX
OFF	XXX	X X	XXX X	XX XX

\*\* Default is 9600 baud, 8 data bits, no parity, 1 stop bit. The correct settings for SW2-5 (on= auto-send linefeed after CR) and SW2-6 (on= enable interrupts) may vary.

\*\*\* This is the setting recommended in the IW-II manual.

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From: Michael Mahon, Ed Eastman, Steve Jensen

An unmodified SSC can access the external oscillator circuit via software to get 115,200 bits per second. All you have to do is dump \$10 into \$C0AB instead of the \$1F that's normally there.

Although not supported in many applications, the new 115k setting has been added to ADT 1.23.

Note: Some SSC boards may need to upgrade to a later version of the 6551 ACIA chip to function reliably at higher speeds.

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From: Kevin M. Carr

### **014- Could someone who has an Applied Engineering Serial Pro card please post a list of the dip switch settings for the 2 banks of switches?**

I use an AE Serial Pro in my IIE to connect to my ImageWriter II. All of the DIP switches are set to OPEN (switch down). The switch block next to the printer interface connector is for hardware handshaking signals. (Copied without any permission whatsoever from the AE Serial Pro User's Manual.)

- o Switch 1, when closed, select pin 4 (Request to send) as the flow control handshaking line. Some printers which use this line are: Data General TP2; Heath H-25; Olympia ESW102/103; QUME Sprint 5; and Smith-Corona TP1

- o Switch 2, when closed, selects pin 11 which is, according to RS-232-C specifications, undefined and is used by some serial printers as a printer-ready signal. Some Centronics, Texas Instruments, and Epson serial printers may use this pin.

- o Switch 3, when closed, selects pin 19 (Secondary Request to Send) as the handshaking line. Some of the printers that use this pin are the Anadex DP8000/9000, Bell TP-1000, Lear Seigler 310, NEC 3500/7700, and Digital Equipment (DEC) LA-series serial printers.

- o Switch 4, when closed, selects pin 20 (Data Terminal Ready) as not only the device-available handshaking line but also as the data-flow-control line. Some Diablo, C.Itoh, Okidata, QUME, Tectronics, or Xerox printers may use this handshaking signal.

- o When all of the switches are open, Data Terminal Ready (Dsub-25 pin 20) is the only line monitored as the hardware handshaking line from your printer. This supports most popular serial printers.

The second set of DIP switches (close to the front of the card) is for generating Maskable (IRQ) and Non Maskable (NMI) interrupts from the 6551 Asynchronous Communications Interface adapter (ACIA) chip and the 6818 clock chip. The switches select the type and source of interrupt request. Normally all switches are in the OPEN position.

- o Switch 1: IRQ from 6551

- o Switch 2: NMI from 6551

- o Switch 3: IRQ from 6818
- o Switch 4: NMI from 6818

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From: Cyrus Roton <croton@ridgecrest.ca.us>

**015- What are the switch settings for the old Apple Serial Interface card?**

The switch settings are as follows:

1	2	3	baud rate
on	on	on	110
off	on	on	134.5
on	off	on	300
off	off	on	1200
on	on	off	2400
off	on	off	4800
on	off	off	9600
off	off	off	19200

sw 4 off = enable delay after CR

5	6	line wt	video
on	on	40	enable
off	on	72	disable
on	off	80	disable
off	off	132	disable

sw 7 off = enable LF after CR

---

From: Supertimer

**016- I've heard that I can use some sort of printer cable to do NULL modem transfers with between my IIC and a PC. Which cable?**

Get an "Apple IIC to ImageWriter I" cable. It has a DIN-5 plug on one end and a standard Dsub-25 plug on the other with the correct line swapping for NULL modem. Depending upon whether your PC connection is to a 25-pin or 9-pin port and whether or not an extension cable is used, you may also need a Dsub-25 to Dsub-9 cable and/or a Dsub-25 gender changer. (The latter are standard items at many computer stuff stores.)

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From: David Empson

## 017- What kind of cable should I use to connect a modem to my IIC?

Here is the pinout of the IIC serial port looking at the back of the computer:

DIN-5F (female)  
socket with  
Apple's numbering

```
5      1
4      2
      3
```

The functions are:

- 1 Handshake Out (nominally DTR)
- 2 Data Out (TxD)
- 3 Ground
- 4 Data In (RxD)
- 5 Handshake In (nominally DSR)

To connect a IIC to a typical modem use the following pinout for a non-hardware handshaking cable:

IIC DIN-5M	Modem Dsub-25M	DIN-5 plug	Dsub-25M male connector
1 Handshake Out	20 DTR		
2 Data Out	2 TxD	1 5	,-----/ /-----.
3 Ground	7 Gnd	2 4	\ 1 2 ... 12 13 /
4 Data In	3 RxD	3	\ 14 ... 25 /
5 Handshake In	6 DSR*		`-----/ /-----'

\*You might want to use pin 8, DCD in some cases.

To connect a IIC to a modem with a 9-pin connector you can use the pinout below for a non-hardware handshaking cable:

IIC DIN-5M	Modem Dsub-9M	DIN-5 plug	Dsub-9M male connector
1 Handshake Out	4 DTR		
2 Data Out	3 TxD	1 5	,-----/ /-----.
3 Ground	5 Gnd	2 4	\ 1 2 ... 4 5 /
4 Data In	2 RxD	3	\ 6 ... 9 /
5 Handshake In	6 DSR*		`-----/ /-----'

\*You might want to use pin 1, DCD in some cases.

The IIC cannot do hardware handshaking\*\* very well, but this is as close as you can get:

IIC	Modem			
DIN-5M	Dsub-25M	DIN-5		Dsub-25M
		plug		male connector
1 Handshake Out	4 RTS			
2 Data Out	2 TxD	1	5	-----/ /-----.
3 Ground	7 Gnd	2	4	\ 1 2 ... 12 13 /
4 Data In	3 RxD	3		\ 14 ... 25 /
5 Handshake In	5 CTS			-----/ /-----'

\*\* Note that you need comm software which supports hardware handshaking on the IIC to do this properly. I expect ProTerm does, but ZLink and Talk Is Cheap almost certainly don't.

The IIC's handshaking lines have annoying side effects, which cause problems with hardware handshaking:

1. The "Handshake Out" signal is implemented to mean "I want to send data" (the official and original meaning of RTS). If you turn off the output handshake line, the IIC will stop sending data. For a hardware handshaking modem, RTS is supposed to mean "You are allowed to send me data" (from the computer's point of view).

If the computer tells the modem to stop transmitting, the computer will also be unable to transmit. This will reduce the rate at which data can be transferred bidirectionally, but doesn't cause any other problems.

2. The "Handshake In" signal is implemented to mean "There is receive data present" (the official meaning of DCD). If the incoming handshake line is disabled, the IIC will stop receiving data (ignore any data on RxD). For a hardware handshaking modem, CTS is supposed to mean "You are allowed to send me data" (from the modem's point of view).

If the modem tells the computer to stop transmitting, the computer will also be unable to receive, and will discard any data sent by the modem while CTS is not active. This can cause screen corruption and loss of data blocks or acknowledgements during a file transfer, which will require retransmission. It is only likely to be a problem while a lot of data is being sent, so is more likely to cause problems during a file upload than a download. If the comms software is quick enough, it can drop RTS immediately when CTS is lowered, which will prevent the modem from sending any more data.

---

From: SuperTimer

**018- I have a good modem that has a standard RS232 serial port and responds to standard "AT" commands; but, it has a Dsub-9 connector. Is there an adapter or cable that will let me connect the modem to my IIGs?**

Yes; the cable to use is a Macintosh to Hayes Modem cable. This can be found in any computer store. Just ask for a Mac to modem cable. All new Mac cables are usually hardware handshake cables, so you should have no trouble with higher speeds.

---

From: Aaron Heiss

## **019- How can I program the Super Serial Card in assembly language?**

You can access and control the SSC using these four I/O addresses ("s"= Slot location of card +8; e.g. for Slot 2, s= \$A):

\$C0sB: Control Register  
\$C0sA: Command Register  
\$C0s9: Status register  
\$C0s8: Data Register

For details, see FAQs Resource file R031SSCPRG.TXT .

---

From: Rubywand

## **020- How do I setup Hyperterm to do transfers with my Apple II?**

Hyperterm is a good general purpose PC telecom utility for running under Windows on the PC side when transferring files to/from your Apple II.

To use Hyperterm, you must first have defined a connection setup and saved it under some name like "A2at300.ht". From then on, whenever you start Hyperterm, you can click Files and select Open and pick your connection setup from a list which will include A2at300.ht and any other setups you have created.

Note: By the way, the Files menu relates to these connection setups, not to stuff you want to send. You pick stuff to send (or a directory to receive to) when you click Transfer and make a choice like "Send File" or "Send Text File". Once you choose a Transfer activity, you will be able to Browse folders.

A 300 Baud Setup

Here is an example of creating a 300 baud Hyperterm setup. It is intended for 'typing in' Text to your Apple II which is set to accept inputs through a serial port via the IN#2 command. So, the setup uses a fairly long "Line Delay" and uses no "Flow Control".

1- Start Hyperterm, get past any intro window (e.g. click "Cancel"), and select "New Connection" in the Files menu.

2- "Phone Number" page

Connect using= Direct to Com 1 (or whatever PC Com port you will use)

Click on Configure\* and set

Bits per second= 300

Data bits= 8

Parity= None

Stop bits= 1

Flow control= None

(You should not need to change any Advanced settings)

Click OK

\*Note: This settings window comes up automatically on some versions.

Click on the "Settings" page tab

3- "Settings" page

Terminal keys is selected

Emulation= Auto Detect

Backscroll buffer lines= 500

(You should not need to change Terminal Setup)

Click on ASCII Setup

Send line ends with line feeds is not selected

Echo typed characters locally is not selected

Line delay= 40 milliseconds

Character delay= 0 milliseconds

Append line feeds ... is not selected

Force incoming data to 7-bit ASCII is not selected

Wrap lines that exceed terminal width is selected

Click OK

4- Click OK again to finish. Then, click Files and do a Save As to save the new setup under the name "A2at300.ht" (or any other .ht name you like).

A 19,200 Baud Setup

This setup is intended for normal NULL modem file transfers back and forth with an Apple II running a telecom program such as ProTerm, ZLink, Modem MGR, Spectrum, etc.. It is identical to the 300 baud setup above except for the following:

Bits per second= 19200

Flow control= Hardware\*\*

Line delay= 0 milliseconds

Save the new setup under some name like "A2at19200.ht".

\*\*Note: If hardware flow control does not work, try "Xon/Xoff".

---

From: Dave Althoff and Jeff Blakeney

**021- How do I get an Applesoft program into a PC-DOS computer in text format? Both computers have modems, but I have no terminal program for the Apple.**

Make sure that your serial ports are connected together, and run the comm program on your PC. Now, for our purposes, lets assume you have the serial card in Slot #2.

Force the PC into terminal mode; and, make sure that the PC and II's baud rates are the same-- at least 9600 for a fairly speedy transfer.

Make sure the ][ is displaying a \*40-column\* screen.

Now, try typing "IN#2" on the ][. Type something on the PC. It should appear on the Apple. (Cool, ain't it?!)

In fact, try typing "PR#2". On either computer. Now, you should get an Applesoft prompt on your terminal screen! In fact, you can use the PC comm program as a keyboard for your ][!

All right, at this point, you should have data flying back and forth between the two machines. On the ][, type "POKE 33,33".

Now, on the PC, tell your comm program to start a text capture. Tell it to add line feeds after carriage returns.

On the ][, load the BASIC program, and type LIST. The program listing will appear on the Apple screen and be dumped into the PC comm program's capture buffer.

To break communications, type "IN#0" and "PR#0" on the ][.

---

From: Brian Hammack

**022- I want to use a fax modem with my IIGS. Is this possible? I tried all kinds of choices from the install menu of Proterm 3.1. Is there a certain string required?**

Yes. Only difference between a fax modem and a "regular" one is the fax instruction set. I have a 28.8 fax modem on my GS.

Most likely, you have to use a "CTS/RTS" parms setting in the Install, and an init string that handles things correctly. The book for my 28.8 ultrageneric suggested AT&F [use default settings] but that doesn't do the job. So the string I am using to trip all the triggers is:

ATX3\Q3

Before that, I was using something that worked except at 2400:

```
ATX4&M0Y0\N2
```

---

From: John M. Davies

Just pointing out, the INIT string is not a function of the comm program, it is a command to the modem itself, so any good comms package should be able to send any sort of init string to the modem.

ATZ is the standard Hayes command to 'RESET MODEM TO DEFAULT' settings, and must be on it's own line, hence the <return> character is required. After that, most modems will also respond to standard Hayes command set commands, but the individual modem in use will usually have an extra set of commands provided by that modem's manufacturer, to support any unique features.

If you don't have docs for your modem, try searching the web site of the manufacturer.

---

From: SuperTimer, Greg Buchner, David Empson

### **023- Can I do modem-to-modem transfers between my home computers?**

Maybe. One way is to use your in-home phone line. To connect, you take a phone off the hook and connect using telecom programs on each computer. You can connect and do transfers once the lines are free of beeps, tones, etc. which indicate a phone is off the hook. If your phone company is one that keeps beeping you forever, the connection will not work. An alternative which some suggest is using a phone extension cord to connect the modems.

---

From: Jeremy Penner

I've done this successfully (though not with an Apple []) using this simple procedure:

- 1) Dial your home-phone number on a regular telephone.  
You should get a busy signal.
- 2) Hang up the phone. Your phone should now start ringing.
- 3) Give one computer the "ATA" command, while giving the other the "ATX3D" command.

ATA causes the one modem to pick up the phone as if someone was dialing into it, and ATX3D causes the other modem to pick up the phone and act as though it had just dialed in someplace. This allows the two modems to handshake, and you can go from there.

ATX3D should work with all Hayes-compatible modems. I can make no guarantees that the phone-your-own-number trick works with all phone companies.

---

From: Steph and Gist

## 024- What cable can I use to do Apple IIC <---> PC ADT transfers?

Below is the pinout for a IIC NULL modem cable for use with the ADT disk image transfer utility. It shows signal names and signal directions.

Both 9 and 25-pin numbering is shown for the PC connector end. For the IIC plug, DIN-5 pin numbers are listed with traditional Apple pin numbers in parenthesis ...

DIN-5M (Apple)		Dsub9 9 pins	or	Dsub25 25 pins
4 (2) TXD	-->	2 RXD		3 RXD
5 (4) RXD	<--	3 TXD		2 TXD
2 (3) GND	---	5 GND		7 GND
1 (1) DTR	-->	6 DSR --,*		6 DSR --,*
		1 DCD --'		8 DCD --'
3 (5) DSR/DCD	<--	4 DTR		20 DTR

\* pins connected by a jumper

Usual Apple numbering for a male cable connector (plug) as viewed looking at the pins from the front is ...

```
1      5
 2     4
   3
```

Whether the PC Dsub connector is male or female depends upon what it needs to plug into.

---

From: Aage Rettvin

I constructed a new shielded five-lead cable with the above pin assignment setup for a Dsub25 plug with the correct jumpering of pins 6 and 8. This cable design basically corresponds to the wiring for a standard serial- printer cable (type: Imagewriter-I).

But, even running under MS-DOS 6.22, the software failed to get communications going!

During troubleshooting I confirmed that the cable was OK by using Hyperterm (on the PC) to force a text-file transfer to the ADT "Receive" or "Directory"

wait-state and by sending sample-files from the IIC by issuing a 'send' command from ADT to Hyperterm.

I discovered that the problem was different numbering of the onboard COM ports in DOS vs. Win98. That is, in DOS COM #1, #2 corresponded to WIN98 COM #3, #4. Once this was straightened out, everything worked.

ADT is now running at 9600 bps, and I'm producing new disks on the fly! Really awesome!!

---

From: Rubywand

## **025- Where can I buy modem cables and NULL modem adapters?**

Many Apple II sellers listed on the Vendors page also sell modem/printer cables and adapters (including NULL modem cables/adapters). Here are a few:

Cyber Guys ( <http://www.cyberguys.com/> ) modem and NULL modem cables

IEC ( <http://www.connectworld.net/cgi-bin/iec/framepr.html> ) click "Cable Assemblies"

InTrec Software ( <http://www.intrec.com/proterm-a2/> ) click on Order Form'

MC Price Breakers (go to <http://www.mcpb.com/html/ap2cbls2.html> )

MPJA/ Marlin P. Jones ( <http://www.mpja.com> ) NULL modem adapters

Pacific Cable ( <http://www.pacificcable.com/AppleCables1.htm> )  
Good selection of modem and printer cables.

Sellers of Mac supplies (IIgs high-speed modem cable is same as current miniDIN-8 to DB25 Mac modem cable)

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### Search Help

DB25	--> look for "Dsub25"
//c	--> look for "IIC"
Xmodem, X modem, ...	--> look for "X-modem"
Ymodem, Y modem, ...	--> look for "Y-modem"
Zmodem, Z modem, ...	--> look for "Z-modem"
Z-Link, Z.Link, Z Link, ...	--> look for "ZLink"

Apple II Csa2 FAQs: Uploading & Downloading, Part 21/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Uploading & Downloading, Part 21/25  
This article was archived around: 07 Jun 2009 08:32:26 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2, comp.sys.apple2.comm  
Source: Usenet Version  
Archive-name: apple2/faq/part21  
Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2T2TCOM.txt rev135 June 2009

## **Telecom-2: Downloading & Uploading**

- 001- What's the easiest way to download files from Apple II sites?
- 002- Some of my downloads are bad; what's wrong?
- 003- Are there download files I should process on the PC (or Mac)?
- 004- How do I upload files?
- 005- What kinds of files should I upload to which sites?
- 006- How can I read & send email and newsgroup msgs with my A2?
- 007- With a fast modem, how can the IIe connect to the internet?
- 008- I'm running the Lynx web browser. Where do I put the URL?
- 009- How do I download an .SHK file through Lynx?
- 010- Can I send and receive FAXes using my Apple II?
- 011- What is a "Binary II" header?
- 012- Should I add a Binary II header to files I upload?
- 013- How can I use my Apple II on the internet?
- 014- Why do I get bad .zip downloads? Is there a solution?

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From: Rubywand

### **001- What is the easiest way to download files from Apple II sites?**

Modern PC internet browsers like netscape and Internet Explorer have spoiled much of the challenge of connecting to sites on the net. For example, entering

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple16/Games/>

in IE's "Address" box gets you to Ground's IIgs games folder ready to download with just a mouse click.

## Downloading via a Browser

Some major Apple II sites are FTP sites-- places you get to via an ftp:// URL. FTP connections tend to have a pretty raw look-- instead of colorful backgrounds, pictures, fancy buttons, etc., what you see is mainly text showing folder and file names. You may get folder icons and, perhaps, some simple icon next to each file name.

Today, many Apple II sites are web sites with pages you get to via an http:// URL. Often, web download sites will offer a relatively fancy display listing titles with descriptions and, by each title, a button to click to do the download. Other web sites may do without html pages and not be much fancier than an FTP site.

Whether FTP or HTTP, you usually just click a button or file name to start the download process. An exception might be when the file is a Text file you wish to download; for Text file downloads you may need to right-click or SHIFT-click on the item to get some sort of 'Save file' dialogue.

If the file is some binary type (like .shk, .dsk, .zip, etc.), just clicking on the download link or button should bring up a Save dialogue-- like an alert asking if you wish to Save the file-- or take you immediately to a Save window.

When regular (left) clicking gets you to a Save dialogue or window, it indicates that the download page's server knows that the item is not Text or that your browser is one which defaults to binary mode when the filetype is not recognized. Either way, the odds favor getting a good download.

Many Apple II sites are on servers which have no difficulty recognizing PC filetypes like .zip and .bin but do not recognize popular Apple II filetype designations such as .shk, .sdk, and .dsk. If a regular click on a download link or button for a shk, or other binary file results in a dump of garbage text to your screen, it means your browser thinks it is supposed to download some kind of Text file.

Right-clicking or SHIFT-clicking should allow you to avoid the garbage and get a Save dialogue and download the file. However, since the browser thinks it's Text, the resulting file will probably have the linefeed character code (\$0A) added after every \$0D in the file which is not followed by an \$0A. So, almost certainly, the download will be corrupted.

One try at a workaround if you are on an http:// site is to try the place's ftp:// URL if it has one. If that doesn't help, contacting the FTP site via an FTP program will almost certainly work.

If you are using an older browser, going to a newer version of IE or Netscape could get the job done.

If you have not defined the particular Apple II filetype in Windows and/or your browser, that may help. (See Geoff Weiss's page which talks about making web browsers aware of Apple II file types for ftp connections at <http://www.gwlink.net/geoff/IIdownload.html> .)

If the item is available from another place, you may find that going there for your download solves the problem.

Another pretty good alternative is to go ahead and download the .shk, etc. file and use a PC utility named "Uncook" to try producing a copy with the corruption removed.

Uncook was 'discovered' by GS Ed (manager of the ACN Florida archive); and tests indicate that it usually succeeds when the file is corrupted. If the file is not corrupted, Uncook may produce a messed up copy! Fortunately, it is pretty easy to tell when the latter occurs.

If the result of Uncook is a file just 2-4 or so bytes smaller, the original is probably good and the Uncook is bad. If the new (Uncooked) file is known to be the correct size (like it's a 143,360-byte .dsk file) or if it is many bytes smaller, or if the site is known to deliver corrupted files, then the Uncooked file is probably good. And, if there is any doubt, you can always try using both files-- e.g. the .sdk file which gets you a "bad data" error during unshrinking is the bad one.

Uncook.zip is available from GS WorldView's "Download Help" page at <http://apple2.org.za/gswv/a2zine/DownloadHelp.htm> . To get Uncook, click on "Download" near the bottom of the page.

#### Downloading via an FTP Program

A slightly different approach is to use a good FTP program (often called an "FTP client"), such as WS\_FTP or Cute FTP. It is easier to download (or upload) multiple files, speed is usually a bit better, and, since you can force binary mode, direct FTP is not much bothered with file type recognition.

To connect to an FTP site you can run a dial-up program to establish contact with your Internet Service Provider (ISP) and start your FTP program. If you are on the net under Netscape, 'Explorer, etc., then you are already connected to your ISP and can start your FTP program as a new task.

After starting your FTP program, you can select the FTP site you want from a list you've created. The list, also called a "profile list", contains ...

o- the site's internet name-- such as "ftp.apple.asimov.net" (Note: there are no "/" folder separators in this entry.)

o- the particular folder or directory you want to begin with-- such as "/images"

o- and the folder on your computer for downloads-- such as "C:\Downloads".

Other information, such as the kind of connection (usually "Unix standard") and the password you send to the site-- usually you will log-in as "anonymous" and use your email address as the password-- are entered more or less automatically when you first create a site's profile entry. (To create a new entry you will usually just click "New", "Create New", etc. instead of picking a site to contact.)

When the connection is made, you will see a list of files and folders in the folder you have entered. If you open one of the folders, you will get a new listing of files and folders contained in the selected folder.

You can, also, change the the drive and folder on your hard disk to which you wish to download. For example, the default "local" folder may be

C:\Downloads whenever you connect to Asimov. If you want downloads to go into D:\TempStuff, you can pick this destination. Another situation in which you may wish to change the local folder is when uploading files to a site.

Practically all programs and compressed disks will be in .SHK, .SDK, .DSK, or some other "binary" form. In fact, "Binary" should nearly always be your download/upload mode setting, even when downloading (or uploading) Text files. About the only exception would be when dealing with a binscii archive site which can not handle binary.

In general, when downloading an Apple II .SHK, .ZIP, etc. file, it is best to avoid letting any "helper" applications process the file during download. Usually, it is best to unzip .zip and .gz files on the PC but, still, after you have completed the download. Your Apple II can take care of un-Shrinking and most other kinds of processing which may be required after the file is downloaded and transferred from the PC (or Mac).

To download one or more files you click-highlight each file you want. Then, you click some button-- such as an arrow symbol pointing to your C:\Downloads folder-- to start the download.

Usually everything will go smoothly and the files will appear on hard disk in your target folder (e.g. C:\Downloads). If you use a dedicated ftp utility you will, usually, be able to see the exact length of a file on the site's file list. One good check for a successful download is to compare file lengths displayed in your target folder with those shown in the FTP site's file list. If you do straight downloads with no processing, there should be no differences for binary transfers. (Text file transfers in Text mode often result in small length changes.)

---

## 002- Some of my downloads are bad; what's wrong?

If the exact length of a downloaded file is different than its exact length on the download site (e.g. as shown via your FTP client program), the download is probably corrupted. (Text files are something of an exception-- i.e. the download length may be different and the file may have characters added; but, usually, the "corruption" has no damaging impact.)

A common reason for getting a bad download is that a binary file-- e.g. a .shk, .dsk, etc. file-- was downloaded in Text mode. (See discussion about this in Q&A 001 above.) An FTP program should be set to "Binary" before doing most downloads from ftp sites. If using a browser, pick one which defaults to binary mode for unrecognized file types (e.g. a current version of Internet Explorer).

Some files may seem to be corrupted-- i.e. 'not work right'-- even if a length check shows that the download size is identical to the file's size on an ftp site. One possibility is that the file was corrupted somewhere in the upload process. This is fairly rare for files made available for download.

A few Apple II files still include a Binary II prefix. This may cause the file to appear corrupted to some utility you try to use on a PC; but, it will work fine once transferred to your Apple II. (Normally, a modern Apple II telecom program such as Spectrum or ProTERM will be set to automatically strip

off the Binary II prefix during transfer. GS-ShrinkIt and 8-bit ShrinkIt will remove a Binary II prefix from .shk, etc. ShrinkIt files.)

The file may be okay but incorrectly named. For example, an .sys or .bin file may be shrunk but still uploaded as an ".sys" or ".bin" file (instead of ".shk"). Or, an .shk file may be uploaded in binscii form as an ".shk" file. (Such a file should end with ".bsq".) When a downloaded .shk or .sdk file is rejected by ShrinkIt, it's a good idea to try running it through Binscii or GScii. Sometimes the result will be a genuine .shk or .sdk file.

Other kinds of files are just misunderstood. A user who downloads a 'disk image' file named NarfGame.dsk.gz" may conclude it is "corrupted" when it is rejected by an emulator program or fails to convert to diskette with DSK2FILE or ASIMOV. But, all that's required is to decompress the .gz file using WinZIP or similar utility to produce a true .dsk disk image file.

A source of possible confusion for IIgs users is the occasional .shk or .sdk file which looks fine but is rejected as damaged by GS-ShrinkIt. The problem may be that the file was created by a Mac owner. Sometimes these Mac-created Shrink files unShrink fine using GS-ShrinkIt; sometimes, not. Before trashing a "damaged" .shk or .sdk IIgs file, try running it through Balloon.

---

From: Greg J. Buchner

Balloon is a IIGS desk accessory that was put out by Ego Systems...it handles ShrinkIt archives from anywhere you can access a New Desk Accessory on the IIGS. For the Mac, you'd use Shrink II.

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From: Rubywand

### **003- Are there any kinds of files I should process on the PC (or Mac) before transfer to my Apple II?**

Yes. Many old games and other interesting wares downloaded from "emulator" sites like Asimov will arrive as .gz files. These will, almost always, be compressed 5.25" disk image (DSK) files. They should be un-compressed on the PC via WinZIP before being sent to your Apple II. This avoids a messy de-compression process on the Apple and makes the DSK file available on the PC (or Mac) should you wish to use it with AppleWin or some other A2 emulator program.

Note: If you are running an FTP program under plain DOS or Windows 3.x, long file names will be truncated to fit PC's old "8 and 3" format. A .gz file may not show up in your C:\UPDOWN (or whatever) directory with the ".gz" suffix. It is still a .gz file and will not be useful as a disk image (DSK) file until it is uncompressed. The usual size of a 5.25" disk image file is about 143kB.

Other chores you will want to handle on the PC before sending a file to your Apple II include converting .HTM (HTML) files to text and splitting up very large Text files. Similarly, it will be easier to view, process, and convert most large graphics files on the PC.

---

## 004- I need some help with uploading. I uploaded a large file to an Apple II ftp site but nobody seems able to download it without ending up with garbage. What's wrong?

Uploading files to an FTP site is a fairly simple process-- basically, it's pretty close to the reverse of downloading described above. For example, to upload a group of Apple IIgs files named "NARFGAME" you would ...

- o On the GS, use GS-ShrinkIt to create a single compressed file containing the NARFGAME files. The new .SHK file could be named "NARFGAME.SHK". (On an Apple IIe or other 8-bit Apple II, you could use an 8-bit version of ShrinkIt to compress the NARFGAME files.)
- o Use Spectrum or some other A2 telecom program to NULL modem NARFGAME.SHK to, say, the PC's C:\UPDOWN folder using Z-modem protocol. (Z-modem is easiest; but, other protocols, like X-modem, are fine. Mainly, both telecom programs involved in the transfer, Apple II and PC, need to be set to the same protocol.)
- o Dial-up your ISP-- no need if you are already connected via Netscape, Explorer, or some other browser or application.

### Uploading via a Browser

- o If you are running Netscape or some similar browser, you can do the upload very easily to one of several ftp sites. (Some ftp sites may not permit uploading from a browser. A major Apple II site which will is Asimov.)

Go to the site's upload URL-- e.g. you might type in `ftp://ftp.apple.asimov.net/pub/apple_II/` (or click your bookmark for "Asimov") and click on the incoming/ folder to open it.

Note1: The folder for uploads will usually be named "upload", "uploads", or "incoming". Sometimes, there will be folders inside, like apple2/, apple2gs/, etc. which you should open depending upon where you think your stuff fits.

Note2: Some sites will show the current contents of the uploads folder and some will not. Often you will see a nearly blank screen.

Open a window for the folder on your system which has the file or files you want to upload. For example, you may want to upload the file NARFGAME.SHK which is in the C:\NeatGames\ folder on your hard disk. So, you would open a window for C:\NeatGames\.

Select (click on) the files to upload and drag them onto the uploads page display-- you would click on NARFGAME.SHK and drag it onto the part of your screen showing the uploads page display (which may be blank).

Click "Yes" when asked if you want to upload the file(s).

If the site accepts your upload you will get some kind of message indicating this somewhere on your screen-- maybe at the bottom-- saying "upload successful", "upload done", etc..

#### Uploading via an FTP program

- o If you prefer using an ftp program (e.g. WS\_FTP, Cute FTP, etc.) or the ftp site will not permit browser uploads, start your ftp program.

Select the desired FTP site's name in your "profiles list" (or, if necessary, create the profile entry) and connect with the FTP site.

Navigate to the FTP site's uploads folder-- usually, it will be named "upload", "uploads", or "incoming". There may be folders inside this one (like apple2/, apple2gs/, etc.) to open depending upon what sort of stuff you are uploading.

Note: you may or may not see any files listed when in a site's Uploads folder. Some FTP sites hide file names in this folder and/or restrict folder access to upload-only.

For .shk, .dsk, and most other program files you upload, make sure 'transfer mode' is set to "binary". (For Text files, mode can be "text" or "ASCII"; however, "binary" mode is fine for Text uploads.)

Highlight "NARFGAME.SHK" (and any other binary mode files to upload) in the listing of files in your C:\UPDOWN folder.

Click an arrow button (or whatever) to start the transfer to the FTP site's uploads folder.

If the upload is successful, you will usually get a message like "transfer complete" on your ftp program's display.

With a little experience everything is nearly 'automatic'. However, there are a few common mistakes which can ruin an upload:

- o Probably, the most common error is failing to make sure "binary" is set (check-marked, etc.) as the transfer mode when an .SHK file or other non-Text file is uploaded using an ftp program. Basically, you should use binary mode for all uploads to modern ftp sites. If some site complains when a .txt file is uploaded in binary mode, use "text" (or "ASCII") mode for the Text file.

- o Many Apple II users seem to feel that, because "Binary Up"-- an option which adds a Binary II header-- is available on their telecom program, it should be used for all transfers. It is best to turn OFF any Spectrum (ProTerm, etc.) option which adds a Binary II header. (Also, you should not use GS-ShrinkIt's option to add a Binary II header.) A Binary II header renders a file useless until the header is stripped off; so, for example, any Text file with the header will be un-readable by a PC. If a down

loader does not have an A2 telecom program which automatically strips off the header during NULL modem transfers (or if "Binary Down" is turned OFF), the Text file will look like garbage on the Apple II as well.

- o Too many old-time Apple II users still insist upon doing a binscii conversion of all .SHK files before uploading them. When, as sometimes happens, a binscii'd .SHK file is uploaded as an ".SHK" file, downloaders end up with a ".SHK file which ShrinkIt cannot unshrink". Except for uploads to text-oriented services like comp.binaries.apple2, binscii is not necessary on the modern internet.

- o Sometimes, a user will NULL modem an Apple Text file to PC using a block transfer protocol (like Z-modem) and, then, upload the file as Text intended to be readable on-line. Such a file will, usually, be a mess when viewed on a PC.

- o Mac owners sometimes use the Mac version of ShrinkIt to create a ".SHK" archive of Apple II files which is then uploaded to an Apple II FTP site. The result is another 'mystery .SHK file' which Apple II users cannot unshrink. .SHK files uploaded to an Apple II FTP site should be created on an Apple II using an Apple II version of ShrinkIt.

In short, most of the common uploading errors are the result of carelessness or of doing something which is unnecessary. A good uploading 'rule of thumb' is "Keep it simple".

---

## 005- What kinds of files should I upload to which sites?

### I. Many Apple II ftp sites

These sites prefer .SHK files for stuff intended to run or be accessed on an Apple II. For example, a game which includes a program file, text Readme file, and folder of pic files would be shrunked into an .SHK file. To facilitate server compatibility, it is usually best to place files with .shk, .sdk, .dsk, and similar Apple II-specific filetypes in a .zip file.

It is best to Shrink even compressed picture, small binary, and icon files and upload them as .SHK files because everyone is used to dealing with .SHK files and the filetype of shrunked files is preserved.

ProDOS diskettes should, usually, be uploaded as a collection of files in a regular .SHK file. This uses less space than a whole-disk archive file.

DOS 3.3 diskettes should be uploaded as whole-disk archive .SDK files. (That is, you have an .SHK whole-disk archive but you change its name to end with ".SDK".)

Pictures and diagrams you want to be both useable on an Apple II and viewable on-line should be converted to .GIF form (e.g. via Super Convert) and uploaded in this form.

If you have several pictures or diagrams you want to be accessible off-line on an Apple II as well as a PC, Mac, etc., you can convert them to .GIF form, place them all in a .ZIP file on your PC, and upload the .ZIP file.

All of the above would be uploaded in "binary" mode.

Text which is intended to be readable on-line should be uploaded as plain Text in "ASCII" or "Text" mode or, on most sites today, in binary mode.

Whenever you upload a game, utility, etc. to an ftp site, it's a good idea to also upload a brief Text file with a description of the uploaded item. For example, after uploading NARFGAME2.SHK (in binary mode), you could upload a brief description in a Text file named NARFGAME.TXT (in Text or binary mode).

## II. Asimov and other Apple II emulator ftp sites

Upload files will, generally, be individual DOS 3.3 or ProDOS disk image (.DSK) files created on an Apple II by DSK2FILE or ASIMOV. Upload in binary mode.

## III. Comp.binaries.apple2

Programs, etc. posted to this newsgroup are normally .SHK files which have been Binscii'd-- i.e. after Shrinking, the file is changed to Text form via a binscii utility.

## IV. Comp.sources.apple2

Source files posted to this newsgroup are normally plain Text.

---

From: Brian Hammack

## **006- How can I read & send email and newsgroup messages with my Apple II?**

You can use a program by Tom Larson named "2qwk!". Many PC-based BBS's and other servers have hidden among the door programs a "maildoor," which will package all unread messages in a user's chosen news groups and make them available for download as a single compressed file, called a QWK packet. (Hence "2qwk", QWK access for Apple II; get it?!)

So, you have a QWK packet sent to your machine, which takes a few seconds to a few minutes depending on how fast the modem is and how many messages there are. Then, you can go off-line and launch 2qwk!. Selecting "Archiver" lets you start the utility of your choice (such as Angel 0.81b, available separately) to unpack the QWK packet and return to 2qwk!.

Now, you may select "Messages" to view your news groups, scan messages by author and subject, and, finally, read individual messages. When you find a post that needs a reply, you can decide how much of the message to quote and type-in your words of wisdom. You can also haul in text from disk and, even, pick just the right tagline (snappy words at the very end of many messages seen on-line nowadays). Naturally, 2qwk! allows complete freedom to change a message title along with the group to which it is to be posted and to originate new messages.

When you are done reading and replying, you exit the program and it creates a reply file, called a REP packet. The next time you connect, you simply upload the REP to the maildoor. The maildoor will decide what goes where and your messages will enter cyberspace pronto!

To use 2qwk! you will need an enhanced Apple IIe, IIc, or IIgs, with at least 128k RAM and drive space to hold the QWK data. The program itself will fit on a 5.25" disk with plenty of room to spare. Of course, the server to which you connect must have a QWK-compatible maildoor. 2qwk! runs under ProDOS 2.x. It comes with QuickFix, a program to patch ProDOS, and other utility programs to handle MSDOS-legal names.

---

From: Richard Der

### **007- With a fast modem, how can the IIe connect to the internet?**

Get an Internet Service Provider that has the option of a text based shell account. For email, Proline and METAL BBS's work well too.

---

### **008- I'm on the Internet and running the Lynx web browser. It doesn't look like Netscape Navigator at all. Where do I put in the URL?**

Type "g" which will bring up a URL dialog. You can then type in the URL and hit return.

---

### **009- How do I download an .SHK file through Lynx? Selecting the link gives an unusable text dump.**

Just highlight the link, but do not press return. Press "d" instead, which will bring up the download dialog.

---

From: Rubywand

### **010- Can I send and receive FAXes using my Apple II?**

If your Apple II is a IIgs, yes. There are two GS FAXing programs: FAXination and PMPFAX.

---

## 011- What is a "Binary II" header?

A Binary II header is a small block of code tacked onto some Apple II files. Sometimes, this is referred to as a "binary wrapper". Mainly, the Binary II header contains filetype information. The purpose of Binary II is to allow Apple II users to download files and have them show up with the correct filetype. (Otherwise, a downloaded file tends to show up as a TXT type file.)

In order for a Binary II header to be recognized and used to supply the filetype info, the Apple II downloading software must have its "Binary Down" option set to ON. The problem with this is that, at least on a few popular telecom wares (like Spectrum), setting "Binary Down" to ON will turn OFF Resume Transfer, something you probably do not want to do when downloading over phone lines.

When you use a PC or Mac to handle downloads and, then, NULL-modem the files to your Apple, it makes sense to leave "Binary Down" ON for the telecom program running on the Apple II. Resume Transfer is not necessary because you have a direct, noise-free connection between two machines. Meanwhile, Binary Down will automatically recognize and strip-off any Binary II header and save the resulting file with the correct filetype.

---

## 012- Should I add a Binary II header to files I upload?

In general, no. Binary II is an Apple-only device which, today, is largely unnecessary and can cause problems. Virtually the only valid use for Binary II is to retain filetype information for .SEA self-extracting archives. (An .SEA file with a Binary II header is a .BSE file.) The only file which significantly benefits from a Binary II header is a self-extracting archive of GS-ShrinkIt.

---

From: Adalbert Goertz

## 013- How can I use my Apple II on the internet?

So, you have been told that you cannot get ftp or http files or images, right? Of course, you cannot read .pdf files either because you have an obsolete computer, right? Well, you are told wrong!

There is a list that you can subscribe to which tells you all you need to know about emailing efficiently. It is called "ACCMAIL". To subscribe write to [LISTSERV@LISTSERV.AOL.COM](mailto:LISTSERV@LISTSERV.AOL.COM) with message in body:

```
subscribe accmail your.id
```

and you should be on. You can change the setting to digest, too, (which I recommend).

So, how do you get ftp files? There are a number of addresses which will send you ftp files which accmail tells about. I use [bitftp@pucc.princeton.edu](mailto:bitftp@pucc.princeton.edu) to get

ftp files by email. I think that by sending HELP to that address you will get the rules of how to do it.

How about surfing the net? Well, I send messages to [www4mail@unganisha.idrc.ca](mailto:www4mail@unganisha.idrc.ca) or [www4mail@web.bellanet.org](mailto:www4mail@web.bellanet.org) with SUBJECT anything (it will be ignored) and message:

```
get http://www .... .html (i.e. the URL of the document)
```

You can expect to receive the www-document in your email box.

If you need to look at the source files of the www-page, send message:

```
get http://www .... .html
```

You also may simply send message HELP to the above addresses, if your request fails. This way you will find out whether or not you made a mistake in sending your request. If the http-URL is too long (more than one line), you may expect problems.

Some of the servers will send you image files, too, like .gif or .jpg files. I get these files as file attachments in my mailbox. You have to experiment to see what works for you. Some files are ready to use, others (uuencode or mime) need to be decoded with BISCIT.

Search engines? Yes, they are available, too.

You need to know about http-URLs on keyword1 and keyword2? Send message to [www@kfs.org](mailto:www@kfs.org). In the body write this:

```
search keyword1 keyword2
```

Voila, you are in business.

If the http-URL contains a pdf-file, send message to [pdf2txt@adobe.com](mailto:pdf2txt@adobe.com) or to [pdf2txt@sun.trace.wisc.edu](mailto:pdf2txt@sun.trace.wisc.edu) with message:

```
http://www .... .pdf
```

and you will get the file back in text format.

If you want the pdf-files back in html-format, that can be done by replacing "txt" in the URLs with "htm".

I use Proterm 3.1 for surfing by email and have my favorite addresses available as macros.

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From: Rubywand

**014- Why do I get bad .zip downloads? Is there a solution?**

You may have noticed that you get good IE downloads of .zip files from some sites-- WinZip unzips the files with no problem. But, from other sites, the .zip files cannot easily be unzipped or, sometimes, not at all.

One idea I've come across is that, starting with IE 6, Microsoft began to require that download sites provide information about .zip files, perhaps other kinds of files, too. If the information is supplied, the file arrives okay. If not, you get a 'bad' .zip file.

Either way, there is nothing wrong with the .zip file maintained on the site. The problem is with how IE treats .zip files.

What's happening is that the bad zip files have been gzipped and that is how they arrive, still with the ".zip" suffix. The good zip files are either not gzipped or, if they were, are successfully un-gzipped upon arrival.

WinZip, at least the versions I've tried, is confused by a gzipped file with a ".zip" suffix and will not unzip it. A solution that usually works is to rename the file, say "Narf.zip", to "Narf.gz". WinZip will ungzip the file and ask you to supply a suffix, which should be ".zip". Now, you have a .zip file which WinZip can unzip.

The above seems to work in most cases; but, not always. I've come across one case where either the initial file could not be unzipped or ungzipped or the resulting .zip file could not be unzipped. Via an ftp connection to the site, I downloaded the file; it unzipped with no problem.

Evidently, the gzipping may introduce an error, at least as far as WinZip and 7-zip are concerned.

A simple solution is to use some browser other than IE when planning on downloading .zip files. For instance, on my Windows ME computer, .zip file downloads from Apple II sites under Netscape 4.78 work fine. Firefox users report the same result.

Apple II Csa2 FAQs: Zip Drives & Tape, Part 23/25 Note from archiver<at>cs.uu.nl: This page is part of a big collection of Usenet postings, archived here for your convenience. For matters concerning the content of this page, please contact its author(s); use the source, if all else fails. For matters concerning the archive as a whole, please refer to the archive description or contact the archiver.

Subject: Apple II Csa2 FAQs: Zip Drives & Tape, Part 23/25  
This article was archived around: 07 Jun 2009 08:32:30 GMT  
All FAQs in Directory: apple2/faq  
All FAQs posted in: comp.sys.apple2  
Source: Usenet Version  
Archive-name: apple2/faq/part23  
Posting-Frequency: monthly  
Last-modified: 2009/06/01  
URL: <http://home.swbell.net/rubywand/A2FAQs1START.html>

The comp.sys.apple2 Usenet newsgroup Apple II FAQs originate from the II Computing Apple II site, 1997-2009.

Csa2 FAQs file ref: Csa2ZIPTF.txt rev135 June 2009

## **Zip Drives & Tape**

- 001- What is a "Zip drive"?
- 002- What is a "Zip disk"?
- 003- What do I need in order to use a Zip drive?
- 004- What kind of SCSI interface card do I need?
- 005- How do I install a Zip drive?
- 006- How do I get started using the Zip drive?
- 007- How does Zip Drive speed compare with a hard disk's speed?
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- 014- Should I let the Finder handle formatting of new Zip disks?
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- 016- The disk in my Zip Drive is not recognized. How come?
- 017- I added SCSI; now, my 3.5" drives often fail to work. Why?
- 018- Why do I get this "Ramfast/SCSI is searching SCSI bus" msg?
- 019- What's a good utility for doing tape backups on the GS?
- 020- What's needed to add a SCSI Tape backup unit?
- 021- What about tape backup on a IIe?
- 022- Does Apple's Hi-Speed SCSI card allow swapping Zip disks?
- 023- What can I do after the Zip on my Apple SCSI "sleeps"?
- 024- What is the "Click of Death"? Is there a fix?
- 025- What is a "Qic" tape? A friend needs to read a Qic-80 tape.
- 026- How do I restart my HS SCSI + Zip when the Zip deactivates?

Zip Q&A 001-008 info mainly from the 1996 II Alive review by Eric Dietrich

## **001- What is a "Zip drive"?**

The typical Zip drive is a 100MB removable media system. Cobalt blue in color, the popular external drive is compact and light-- about the same size as the newer external modems. The 100s "SCSI Zip" connects to the any computer with a SCSI port including the Apple IIgs or IIe equipped with a SCSI interface card.

The Zip drive is made by Iomega. Price for the 100MB external model is around \$130. This includes the drive, cable, information sheets, one disk with "Zip Tools", and a 3.5" installation diskette. (The material on the zip disk is PC/Mac compatible and the diskette is for MS-DOS. This stuff will come in handy should you wish to be able to use your Zip drive on a PC with a SCSI port or on a Mac. None of the software is required for using the Zip Drive on an Apple II.)

---

From: David Wilson

Below is updated information on available Zip Drive models:

100MB Zip Drive models now include ...

External- parallel, SCSI, "Plus" (SCSI/parallel), usb  
Internal- SCSI, IDE, and three ATAPI drives

250MB Zip Drive models include ...

External- parallel, SCSI, usb  
Internal- ATAPI

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## **002- What is a "Zip disk"?**

A Zip drive disk is a cartridge just a bit larger and thicker than the familiar 3.5" floppy diskette with a smaller shutter and no physical write-protect mechanism. It is rated as among the more rugged moderately-high- density removable disks.

100MB disks sell for around \$10. 250MB disks sell for around \$20.

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## **003- What do I need to use a Zip drive?**

You need an Apple IIgs or Enhanced IIe and a SCSI interface card.

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## **004- What kind of SCSI interface card do I need?**

There are three 'popular' options: The Apple Revision C, The Apple Hi-Speed, and the RamFAST. The Revision C is older and a bit slower because it does not utilize direct memory access (DMA), a feature that the Hi-Speed and RamFAST

have. The Apple cards are no longer made or supported; but, you may be able to buy one at a swap meet.

The Sequential Systems RamFAST has DMA plus an on-board cache of either 256kB or 1MB, making it the fastest interface available. RamFAST has a full set of utilities in ROM, so, it's easy to set up, too.

---

From: Willie Yeo

Apple Hi-Speed SCSI card users need to remember that these cards normally do not supply termination power. (RamFAST does; but, not the Apple Hi-Speed SCSI card.) To work properly with the GS, a Zip drive connected to the Apple Hi-Speed SCSI card requires either another device that can supply termination power, or requires a hardware hack on the Apple Hi-Speed SCSI card to provide the termination power.

Note: The Apple Hi-Speed SCSI card termination power modification is detailed in the Hard Drive and SCSI FAQs (file Csa2HDNSCSI.txt).

---

## 005- How do I install a Zip drive?

The main Zip installation step is plugging it in. The drive uses DB-25 connectors and, so, most likely, the cable will plug directly into your interface card with no need for an adapter. In case you need an adapter for an older 50-pin plug, these can be obtained from Alltech.

If you already have other SCSI devices, the one currently plugged into the interface can plug into the Zip. Or, the Zip can be plugged into a hard disk, CD-ROM, etc. at any point in the chain of SCSI devices.

Set SCSI ID Number- Every hard disk, CD-ROM drive, etc. on your SCSI chain needs its own ID number (0-7). While most devices are flexible and will allow you to choose any available ID, Zip gives you a choice of two: 5 or 6. If you are using an Apple Hi-Speed card and you already have a hard disk, you'll have to set the Zip to 5 in order to continue to boot off of your hard disk (which needs to be 6). The RamFAST is somewhat more flexible in that it doesn't take ID 7 for itself and will allow you to boot from any SCSI device.

Set Termination- Another consideration is termination. If all you have connected to your SCSI card is the Zip Drive, then you should set the switch on the back to turn ON the termination. If you have other devices that come after the Zip, then you should set it to OFF. (Actually, the Zip presents a light termination load and can be left with termination ON whether or not it is the last device.) The last device in the chain (the one farthest from the interface) should always have termination set ON.

Hardware-wise, that's it. In all likelihood, your setup will work fine. If not, you can get help from experts at Alltech, post a question on

comp.sys.apple2, or, even, read the documentation that came with your SCSI card (when all else fails ...).

---

## **006- How do I get started using the Zip drive?**

Once your drive is connected, its time to start your machine and prepare a Zip disk for use. The Advanced Disk Utility (on a IIgs) or the utility that came with your SCSI card can do formatting and set up partitions (i.e. create named "Volumes"). Usually, with new for-PC Disks, just partitioning is required for use under ProDOS. Each 100MB disk can hold three max-size (32MB) ProDOS partitions.

If your interface is a RamFAST rev. D 3.01f or later model, you will be able to treat Zip disks much like large floppies. They will mount and unmount properly in the GS Finder, etc..

Most other interface cards will want to treat your Zip Drive and disk like a hard disk. This is because the cards were designed before removable high-density R/W media became popular. You may be able to swap in a disk after booting; but, the new disk is likely to be treated as though it is the disk which was present during power-up. This could lead to messed-up partitions, lost files, and other problems. With such interface cards, the safe way to swap Zip disks is to turn OFF the computer.

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## **007-How does Zip Drive speed compare with a hard disk speed?**

Iomega claims 29ms average access time, which is slower than modern hard disks but, still, very speedy.

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## **008- Can I use Zip disks to transfer files to/from other computers?**

Mac--> IIgs

Yes. However, Macs put a driver on the disk as well as a partition map. Both look like partitions to the IIgs. Since the IIgs can't read them, it will ask you to format or eject. Here's a trick you can try: When you insert a Mac-formatted Zip, just click "eject" until the disk mounts. The IIgs will then ignore the extra Mac stuff, and mount just the legitimate volume(s). (E. D.)

---

From: Supertimer

Mac <--> IIgs

Shared HFS GS/Mac disks should be formatted on the IIGS because the IIGS tends to provide a format that is acceptable to both platforms while the Mac tends to ignore the needs of the IIGS.

Besides the standard Apple Disk Utility (ADU), you will need GenEx. GenEx extracts the generic Mac SCSI driver from ADU's resource fork and puts it into the IIGS' drivers folder. Thus, when ADU looks in that folder, it finds and installs the driver and does not give the "no mac driver found" error. You can download GenEx (GenEx.shk) and info (GenEx.shk.txt) from Ground at ...

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/upl98/Feb98/> .

Once you get GenEx, use the following procedure to prepare Zip disks:

o- Go to the Apple Advanced Disk Utility (ADU) on the IIGs and select Partition Drive. Delete all the partitions except one and resize that one partition to fill up the entire drive. Click on the button to repartition the drive. At this point, ADU will ask you if you want to low level format and warn you that it is going to take a long time. Click on Yes.

o- ADU will wipe the drive. By doing it this way, you are giving ADU a clean slate to install the GenericMacSCSI driver onto the drive.

o- Finally, initialize the HFS volume.

Surprise, the new Zip disk works on both the IIGS and Mac without annoying errors!

---

From: John Holmes and Tarage

PC--> IIGs (also, maybe, IIGs--> PC and PC <--> Mac)

DataViz sells a product called MacOpener 2000 for machines running Windows that actually allows you to use all HFS formats, except for 400K/800K floppies, on your PC while running Windows. This goes not only for reading the media but also writing and formatting as well.

I put a zip disk in my Parallel Port Zip drive on my PC and formatted it HFS and copied some of the //gs software I had downloaded. It worked on my IIGs (equipped with a SCSI zip 250 drive) like a charm!

---

From: Supertimer and Rubywand

PC<-->IIGs

You can use MUG! to R/W MS-DOS formatted Zip disks. Mug! (mug101.bxy) along with an info file is on Ground at ...

<http://www.apple2.org.za/mirrors/ground.icaen.uiowa.edu/apple16/System/Ndas/> .

MUG! is an NDA (New Desk Accessory) which must be started from the 'Apple menu' (click on the Apple symbol) available at the top of a typical GS 'desktop'-type display.

One thing to be aware of is that MUG! should be used from an application other than Finder (the usual main GS "desktop display"). The Finder and many other applications will do a drive check, find the MS-DOS Zip disk, and respond with something like: "Installed FSTs do not recognize disk, do you wish to format it or eject it?".

MUG! seems to work fine when selected from Platinum Paint or PMPUnZip. (If you start from Platinum Paint, be sure to go to 640 mode first in order to be able to see the entire MUG! display.) PMPUnZip is, probably, your best bet because it is a relatively small program. Once, say, PMPUnZip is started, you can insert your PC Zip MS-DOS Zip disk and start MUG!. Setting the Copy option to "to GS/OS", I copied several .shk, .wav, and .jpg files from the Zip Disk to /RAM5 RAM disk with no problem.

---

From: Rubywand

### **009- Sometimes I forget to set the termination switch correctly after using my Zip drive on another machine. Will this damage anything?**

If you normally connect your Zip drive somewhere in the middle of your Apple II SCSI chain and forget to turn OFF termination, it probably does no harm. The Zip is said to have rather "weak" termination-- i.e. its termination resistors present a relatively light load. This may explain why GS users report no data loss problems on Zip or other devices when Zip is located in the middle of a SCSI chain with termination set to ON.

If your Zip drive is normally connected at the end of your Apple II SCSI chain and you forget to set it to ON, there is a decent chance of Zip drive Read and Write errors.

---

From: The Mangler

### **010- How does Zip Drive perform with an Apple HS SCSI card?**

I had many problems when I first started with the Iomega Zip on my GS and it isn't the most reliable thing - But it works.

- 1.) Make sure that the Zipdrive is hooked directly to your HS Apple SCSI card.
- 2.) Chain your Zipdrive to the external HD which you will be using.
- 3.) Attach a terminator adapter to the back of the remaining port on your external HD - The Zipdrive has a weak termination and requires another terminator source.

As for getting your GS to recognize the Zipdrive in all applications:

- 1.) Turn on your Zipdrive
- 2.) Turn on your external HD
- 3.) Turn on the GS
- 4.) Put the Zipdisk in the drive before GSOS is booted so that it may be scanned and recognized.

Last, if you are working on the GS for a long time and suddenly the Zipdrive Icons don't pop up when you load Finder, simply eject the zipdisk and push it back into the drive.

---

From: Sloopy Malibu

### **011- Is a CMS SCSI interface card adequate for connecting a Zip drive?**

I have had a Zip Drive hooked to a CMS SCSI card (1990 ROM) for 2-3 years in my IIgs without a hitch. Basically you just go into the setup for the CMS card. It will partition the drive into 32 meg sections which you can access two at a time-- It makes three on a Zip disk. Then once GS/OS is booted it tells you that the disk is unreadable and asks if you want it formatted and you hit ok for each virtual drive and there you have it. (I never tried formatting it with HFS since I didn't need a partition larger than 32megs.)

The one thing to remember is DON'T EJECT THE DISK while booted. Go to shutdown first and, when it tells you to shut it off, then change disks.

---

From: David Empson

I would strongly discourage using the CMS card. It is designed to work with CMS hard drives. I don't know how well it can handle removable SCSI devices; and, it might not be able to handle more than 64 MB. So even if you can get the card to work with the ZIP drive, you may not be able to access all of the disk.

Another problem is that the CMS card doesn't support the standard partitioning scheme used by other Apple II SCSI cards. It uses a set of jumpers on the card to configure the partition sizes, and doesn't support the partition map mechanism at all. In other words, it uses "hard partitioning".

See if you can get hold of an Apple or RamFast SCSI card, which follow all the standards as far as partitioning goes.

---

From: Rubywand

## **012- Which SCSI interface works best with a Zip Drive?**

Your best choice is the version 3.01f RamFAST. Along with good speed, Direct Memory Access support, and on-ROM utilities, you also get an interface which permits ejecting a Zip disk and mounting a new Zip disk from the System 6 Finder. (There is no need to restart the system in order to swap disks.)

The RamFAST 3.01f also supports a variety of CD-ROM drives and hard disk drives.

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From: Supertimer

The same can be said of the Apple High Speed SCSI. With a partitioned Zip disk (or CD-ROM), you have to lasso or shift-click to highlight all the partitions and drag them to the trash to eject the disk. (As long as one partition remains on the desktop, the disk stays in.) There is no need to turn off the computer to swap disks. The interface is a bit slower than RamFAST. However, it actually supports MORE hard disk drives than the RamFAST.

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From: David Empson

The problem with non-support of removable devices only applies to the original Apple SCSI card, not the high-speed one, and even then it only applies underProDOS-8. You just need to be careful not to switch disks without rebooting, because it won't realize that a new disk (potentially with different partitioning) is in the drive.

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From: Rubywand

## **013- Will I be able to format and partition a Zip disk using the standard 6.0.1 tools disk?**

Yes.

If you have a RamFAST, you also have the option of using the RamFAST utilities. These are on ROM on the RamFAST board. They should be copied to disk or hard disk and run from there. RAMFAST.SYSTEM will handle ProDOS partitioning and low-level formatting.

Since Zip disks are already formatted, you will, mainly, be concerned with setting up partitions. On a 100MB Zip disk, the best partitioning is three 32MB ProDOS volumes. Setting up partitions takes less than a minute. A low-level reformat of a 100MB Zip disk may take 10 minutes or more.

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From: Rubywand

## **014- Should I just let the System Finder handle formatting of new Zip disks?**

If you are at the usual System Desktop display and insert a new, "blank" Zip disk, you will be told that the disk's format is not recognized and asked if you want to have it formatted. Assuming you want ProDOS volumes or multiple HFS volumes, you should answer "NO":

A new Zip disk is already formatted; what you need is to have it partitioned--good, because partitioning takes about 30 seconds whereas a format takes 9-10 minutes.

ProDOS is limited to 32,768kB ("32MB") per partition. The Finder does not know how to correctly format and partition a 100MB ProDOS disk.

Reminder: If you want a disk to be able to boot ProDOS or any version of GS/OS (as in System 6.0.1), at least the first partition must be formatted for ProDOS.

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From: Supertimer

I say "Yes", if you want one big HFS-formatted Zip disk. (Unlike ProDOS, HFS allows volumes larger than 32MB.) Letting the Finder format the Zip disk for HFS gives you a 96MB (partition-table-less) "diskette" that's faster than one that has been partitioned, even if the partition = the whole disk.

The "partitionless" HFS volume generated by formatting PC Zip disks from the Finder behaves just like a floppy and ejects and mounts like one (but with a hard disk icon).

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From: Rubywand

## **015- Can I format a Zip disk for HFS; and, can HFS and ProDOS volumes exist on the same Zip disk?**

Yes. System 6 with HFS.FST in the SYSTEM/FSTS folder supports Read, Write, Formatting, and Partitioning of HFS disks. The standard Apple Advanced Disk Utilities (ADU) program lets you set up a Zip disk as a single 100MB HFS volume or divide it into partitions.

Note: A "partition" is a "volume". In most respects, partitions on a Hard Disk or Zip disk are treated like separate disks. Each partition has its own volume name and appears on the System Finder display with its own icon.

You can, if you like, have ProDOS and HFS partitions on the same Zip disk. One easy way to do this is to set up, say, three ProDOS partitions and, then, have ADU "Initialize" a partition as HFS. If you want to be able to boot from the Zip disk, at least the first partition must be ProDOS.

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**016- Often, when I power-ON my computer, the disk in my Zip Drive is not recognized. What's the problem?**

Almost immediately after power-up, your SCSI interface begins checking for devices. Most likely, the problem is that your SCSI interface checks the Zip Drive before it is ready and decides no disk is present.

The cure is to put your Zip Drive, CD-ROM drive, etc. on a separate power line. These devices should be switched ON 5-10 seconds before powering- ON the computer. If you depend upon reading SCSI setup information from your Zip Drive-- like, if it is the only write-able device on the SCSI chain-- then a Zip disk on which the setup info has been saved should be inserted after the drive is switched ON and before powering-ON the computer.

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**017- Sometimes the 3.5" drives on my GS do not function correctly. This started after adding a SCSI interface card. Is there a fix?**

This problem seems to crop up from time to time when a SCSI interface is present, especially when no device is connected and recognized on the SCSI chain. Evidently, something (e.g. a register or softswitch) in the usual GS power-up routine relating to on-line devices gets messed up.

Inserting a 3.5" diskette into Drive 1 before or just after power-up usually forces recognition of 3.5" diskette drives and enables correct functioning.

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From: LJ Silicon

**018- I get this message 'Ramfast/SCSI is searching the SCSI bus for devices..etc.' Never had this problem before-- only does it on a cold boot.**

When you reinstalled the software, the RAMFast set itself for a long search. This is an option that you can change using the RAMFast utility. What it is doing is giving your scsi devices a chance to spin up. If you want a fast check, go to the options menu on the utilities and reset the Short Timeout option there to "YES".

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From: Dan Brown, KE6MKS

## **019- What's a good utility for doing tape backups on the GS?**

Here follows an unpaid testimonial: The Tim Grams GS desktop SCSI backup utility called "GSTape" works great! I got it for an old Apple Tape 40SC, did several backup/restores, and then ran across a 2GB DAT drive. Yep, it worked with no problems, too! (-:

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From: Devin Reade

As one of those very satisfied customers, I testify that for someone with a SCSI tape drive, GSTape is very much worth the money. It is reliable and simple to operate in both backup and restore mode. It has an appropriate script capability and, although I have not used this feature, it allows timed backups (so that you don't have to be present).

It is much better than the RAMFast built-in tape backup program. I currently use it to backup both SCSI and Vulcan (IDE) hard drives.

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From: Phil Abel

## **020- I have a IIgs ROM01 with system 6.0 and I am trying to add a SCSI Tape backup unit. I have an Apple Hi-Speed SCSI card and 2 drives connected currently. The tape drive is off an old unix box. I have the ID set to 3. I loaded the system 6.0 SCSI tape driver but nothing showed up on the desktop. What's wrong?**

I have recently gone thru this dilemma myself... First of all, I believe that the GS driver is partial to the 3M mechanism as found in the Apple SC40 tape unit. I tried a Tecmar drive (whatever mechanism that is) on my GS, and though it recognized the drive on boot as a SCSI device, when I went into archiver to try to back something up it didn't acknowledge the drive's presence, although the SCSITAPE device showed up in GS/OS. I later found a good deal on an SC40 and hooked it up and it works perfectly, though I am still curious about making the Tecmar work, though I doubt it will.

#1. I have read that you should set the SCSI ID on a tape drive to 0 (lowest priority) if this will help any... this seemed to eliminate annoying searching of the tape drive on boot.

#2. Another thing-- The tape drive will NOT show up on the System desktop. It does not work like a regular drive. You need a special program (aka Archiver in

GSOS or I believe there are some 8 bit programs, too) that knows how to store files on the tape.

Open Advanced Disk Utilities when in GSOS and see if the SCSITAPE unit is present-- then you will know the drive was identified ok. Then the next test-- see if you can backup. Open archiver, set your "backup to..." device as SCSITAPE and hit start.

When the thing says "insert first backup tape" you insert a tape and hit OK. If it starts giving you errors or repeating the message, then GS/OS doesn't like your tape unit. If it works... then go out for a pizza or something while the thing whiles away at your files. Try recovering selected files after the backup to make sure the archive went ok so you can begin trusting in your tape backups.

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From: Bill Harris

The device number (other than being unique) should not be relevant to backing up to tape. I've always used something in the middle range of numbers for my tape, typically id 3 or 4. This included when I was still using the RF prom for backup.

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From: Rubywand

RamFAST has a Backup function you can get to via Ramfast.system.

You need to have the "HD Backup" option under the [O]ptions menu set to "No" in order to use tape (instead of something like a Zip Drive) for backup. Then, you can select [B]ackup from the main menu bar.

Regarding the SCSI device number setting, 3 may be fine on a RamFAST. Probably, you would want to remove any Apple drivers named "SCSI ..." from the DRIVERS/ folder to eliminate possible conflicts with the Ramfast driver.

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From: Glynne Tolar

021- What about tape backup on a IIe?

The RamFAST has built-in volume image backup software (in background). The only backup software I know of for the //e for tape drives is by Tim Grams and it only works with an Apple Rev. C SCSI and the Apple Tape Backup 40SC (3m MCD-40). This software is no longer supported though.

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From: Supertimer

**022- I've heard that Apple's Hi-Speed SCSI card does not allow swapping Zip disks without turning OFF the computer.**

**Is this true?**

No. The Apple Hi-Speed SCSI interface allows ejecting and swapping removable disks. With a partitioned Zip disk (or CD-ROM), you have to lasso or shift-click to highlight all the partitions and drag them to the trash to eject the disk. (As long as one partition remains on the desktop, the disk stays in.) There is no need to turn off the computer to swap disks.

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From: Gareth Jones

**023- What can I do after the Zip drive connected to my Apple SCSI goes into Sleep Mode?**

A solution is "goosing" the drive by manually ejecting and reinserting it. Apparently, using the SCSI driver for the Apple Card that was sold by Tulin Technologies solves a lot of troubles with the Apple card and a Zip drive. You can get the Tulin SCSI driver from Mr. Wing Chung (104465.3171@COMPUSERVE.COM) for \$20.

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From: From: Tony Cianfaglione

**024- What is the "Click of Death"? Is there a fix?**

Your drive starts to make repeated clicking sounds and soon fails. Disks in a drive which Clicks may be corrupted and, if placed in a good drive, may cause a good drive to start Clicking.

If your Zip drive starts to do noticeable clicking, the standard advice is to immediately eject the disk or, if this is not possible, turn OFF power to the drive (or pull out the power connector on the side of the drive). This may save the drive if the disk is bad or save the disk if the drive has gone bad.

The reason for click death is that the lube on the two tiny square rails that the head assembly travels back and forth on dries out! (Evidently, Iomega's earlier machines used better quality lube than that used in some later production runs.)

When the head assembly can no longer reach track 0, the drive thinks it's there so it writes track 0 elsewhere on the disk. Later, when even that track 0 can't be found, the drive beats itself to death trying to find track 0. This is why click death disks can damage a good drive as the drives beat themselves to death trying to read track 0 on the bad disk. I've successfully repaired the drives by opening them up and relubing the rails with a good lube.

I've had success with repairing the directories on disks destroyed by 'click death' drives. I'd tried reformatting the disks on Win95 and 98 machines but the format utility (even long format with verify) gives up too quickly and reports the disk is either locked or damaged. Scandisk refuses to even look at the disks and reports there is something wrong with them.

Using the Win3.1 guiutil.exe on an old 486, I was able to reformat the disks and they now work fine on all the various machines I've tried them on. This may work with internal drives too but I use my good external parallel drive and click on the drive icon and select format from the menu. When the disk starts to click, press eject and a message will appear that the disk has a format and would you like to continue formatting with verify.

Re-inject the disk, select continue and the format/verify will run for 9 minutes and 27 seconds, successfully repairing the disk every time I've tried it this way (I've repaired 23 disks so far by this method including a couple my friend was ready to throw out as he had tried just about everything - even a Mac). Scandisk will even verify the disk is fine and I've had no further problems with any of the disks repaired in this manner. Is the older version a better program? I think it's that the Win3.1 guiutil.exe doesn't scrutinize the disks as much as the later versions do and simply does the deed, which is the best way.

This method shouldn't work either but it does. Give it a try before heaving your disks. I constantly use the repaired disks and have never had a repeat failure with them.

Note: There is no guarantee that every drive or disk can be repaired as described above. Some drives or disks may be too badly trashed.

Download guiutil.exe at ...  
[http://apple2.org.za/gswv/a2zine/Utils/ClickOfDthFix\\_guiutil.zip](http://apple2.org.za/gswv/a2zine/Utils/ClickOfDthFix_guiutil.zip)

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From: Scott Alfter

## **025- What is a "Qic" tape? A friend needs to read a Qic-80 tape.**

QIC-80 is a format, not a brand or a specifier of capacity. Uncompressed capacity for tapes in this format range from 60 megs (DC2120) to 250 megs (TR-1 Extra). It was preceded by QIC-40 and has since been superseded by QIC-3010, QIC-3020, and QIC-3095 (the latter format delivers 4 gigabytes (uncompressed) on a TR-4 tape, and is available in SCSI and IDE flavors for fast operation).

I'm not sure what format the 40-meg tape drive Apple used to sell used...it might've been QIC-80 with a shorter tape (they use DC2000 tapes), but it was probably different. I've never had one. For my GS, the tape drive I currently use is an Archive Viper 60S (QIC-24 format, SCSI interface, puts 60 megs on a DC600 cartridge).

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From: Supertimer

## **026- How do I restart my HS SCSI + Zip when the Zip deactivates?**

The problem is with the Apple SCSI driver. The Zip drive normally deactivates itself after a period of time to conserve energy. The Apple SCSI driver fails to reactivate the Zip when the IIGS tries to access it. If this happens in some programs, data can get corrupted. If it happens in the Finder, the Finder will ask you if you want to format the Zip disk.

You can reactivate your Zip by hitting the eject button and pushing the Zip disk back into the drive after it has ejected. People call this "goosing" the Zip drive. It works and reactivates the Zip.

One complete fix is to replace the Apple SCSI driver with the Tulin one. Some former Tulin employee on CompuServe sells it for \$20.

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