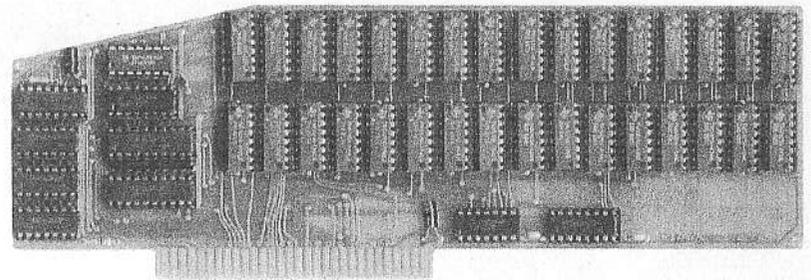


Super Expander™ E

User's Manual



USER MANUAL TABLE OF CONTENTS

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1.0 General Information

The Super Expander E fits the auxiliary slot of the U.S. and European IIe computers, and increases total memory to 1088K. Your new Super Expander E will replace any 64K/80 Column card (known as Extended 80 Column Card), in the auxiliary slot. The Apple IIe computer will see and use your new Super Expander E with all the same features as the 64K/80 Column card. Features such as softswitch selectable 40/80 columns and double high res graphics are all built into the Super Expander E.

As with any auxiliary memory board, software is required for the Apple IIe to see and use the extra memory beyond 64K. The AppleWorks Expansion software by has been included with the Super Expander E, to allow desktop expansion of AppleWorks.

Also included on the Utilities diskette is a ProDOS RAM disk Emulator program to make the Super Expander E act as a high speed solid-state disk drive, loading & saving program over 20 time faster than any conventional disk drive.

This user manual will provide detailed information for installation and operation of your new Super Expander E. Programming information for the advanced programmer is also included.

1.1 Super Expander E Installation

Installation of the Super Expander E is a relatively simple procedure. We recommend you read over this entire section first. When you are familiar with the complete instructions, go over a second time and install the board in your computer.

A FEW WORDS ABOUT STATIC ELECTRICITY!

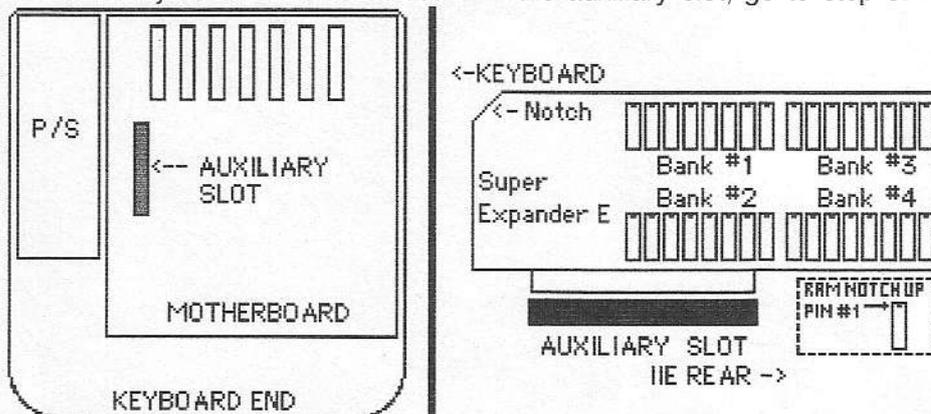
Static electricity is stored basic energy that anyone can build up by walking across carpeted areas. This static charge can cause damage to your computer. Before installing any new board or peripheral inside your computer, once you have taken the lid off the computer, discharge static electricity charges by touching the power supply. (The power supply is the large metal box at the inside left of the computer)

The following is a step by step procedure for installing your new Super Expander E.

1. TURN OFF THE POWER TO YOUR COMPUTER SYSTEM!!!
2. Remove the housing lid to allow access to the inside peripheral slots.
3. Discharge any static electricity by touching the power supply.

Note: At the rear of the IIe computer you will see 8 peripheral slots. There are seven slots together and one slot slot forward and to the left of the other slots. This slot is called the Auxiliary Slot. This Auxiliary slot is different than the other 7 slots in that it has 60 pins. The other seven slots are smaller and only have 50 pins.

You may or may not have a board already in this auxiliary slot for 80 columns, or 64K/80 columns. If you do not have a board in the auxiliary slot, go to step 5.



Note: European IIe model has Auxiliary slot more to the right.

1.1 Super Expander E Installation (cont)

4. If there is a board in the Auxiliary Slot remove it by gently but firmly, using a see-saw action, pulling the board up and out.
5. Install the Super Expander E with the notched end pointing toward
6. Re-install lid to the computer housing.
7. Restore power to the computer system. Installation complete.

2.0 General Operating Information

Your SUPER Expander E is 100% compatible with Apple's Extended 80 Column board. This means any software that may use 128K and /or 80 columns in the Apple IIe, will see the Super Expander E as the same board.

Beyond 128K, special drivers are required to use the memory. This is due to limitations of the Apple IIe, not added memory boards. Special drivers are like the PLUSWORKS-DT program included with your Super Expander E package. This RAM expansion software will reconfigure copies of your AppleWorks diskettes to see and use the memory of the Super Expander E up to 1.0 Meg., plus any one bank switched memory board up to 756K. The PLUSWORKS-DT will work for AppleWorks 1.0 thru 2.1.

New patches for AppleWorks higher than version 2.1 and GEOS are included on your Super Expander E utility diskette. To use any of these patches, boot your copy of the Utility diskette, select the proper patch from the main menu, and follow the easy instructions on the screen.

In addition, the Utilities Diskette ProDOS RAMDISK Emulator will speed up the loading and saving of all your programs under ProDOS, and the DSR COPY program will use the Super Expander for a single pass faster copying utility. Some programs that make use of a large memory board in the Apple IIe, do so through a ProDOS RAMDISK Emulator.

2.1 80 Column Operation

As with all 80 column boards, and extended memory 80 column boards, using 80 columns with the Super Expander E has a few differences with BASIC programming over 40 columns.

You can not use the command FLASH in 80 columns. It produces inverse characters with characters in between the words. If you have a 40 column program that uses FLASH, change this command to NORMAL or INVERSE.

The command INVERSE will work the same in 80 columns as it does in 40 columns. Both upper and lower case letters can be displayed in inverse.

Using the HTAB command will only work thru HTAB 40, beyond that, the curser will revert back to 40 columns. To place the cursor on a line beyond 40 columns, use POKE 36,X or POKE 1043,X (X is the horizontal position).

Just as any IIe 80 column board, you can invoke the 80 columns with: PR#3 <RETURN>. CONTROL-RESET will return you to 40 columns.

2.2 Escape Routines

Once the PR#3 command has been initiated, the following list of ESC sequences can be used.

- ESCA - Move the cursor one space right and turn escape off.
- ESCB - Move the curser one space left and turn escape off.
- ESCC - Move the curser one space up and turn escape off.
- ESCD - Move the curser one space down and turn escape off.
- ESCE - Clear the line from the curser position.
- ESCF - Clear the screen from the curser position.
- ESC I - Move the curser one space up and leave escape on.
- ESC J - Move the curser one space left and leave escape on.

2.2 Escape Routines (cont)

- ESC K - Move the curser one space right and leave escape on.
- ESC M - Move the curser one space down and leave escape on.
- ESC R - Turn on the UPPER-CASE ONLY mode.
- ESC T - Turn off the UPPER-CASE ONLY mode.
- ESC 4 - Switch from 80 columns to 40 columns.
- ESC 8 - switch from 40 columns to 80 columns.
- ESC : - Move the curser one space up and leave escape on.

ESC-CONTROL-Q will also turn off the 80 column mode.

Note: You will notice in the 80 column mode when the ESC key is pressed, the cursor turns to an inverse + character.

2.3 Call Routines

In both 40 & 80 column modes, certain call routines can be used to perform various functions:

- CALL-657 - Allow commas and colons in a string input.
- CALL-678 - Pause for the RETURN key.
- CALL-741 - Pause and wait for a keystroke.
- CALL-868 - Clear the line from the curser position.
- CALL-922 - Move the cursor one line down.
- CALL-926 - Line feed & Carriage Return.
- CALL-936 - Home the cursor and clear the screen.
- CALL-958 - Clear the screen from the cursor position.
- CALL-998 - Move the curser one line up.
- CALL-1008 - Move the curser one space to the left.
- CALL-1036 - Move the curser one space to the right.

2.4 Control Codes

The following control characters can be used in the 80 column mode:

- Control H - Move curser one space to the left.
- Control J - Move curser one space down.
- Control K - Clear screen from the cursor position.
- Control L - Home the cursor and clear the screen.
- Control M - Same as pressing the RETURN key.
- Control N - Set display to NORMAL.
- Control O - Set display to INVERSE.
- Control Q - Set display to 40 columns.
- Control R - Set display to 80 columns.
- Control S - Pause listing of a program.
- Control U - Set display to 40 columns and home cursor.
- Control V - Scroll down one line.
- Control W - Scroll up one line.
- Control Y - Home the cursor.
- Control Z - Clear line from the cursor to the right.

3.0 Adding Memory

If you already have a 1.0 MEG version of the Super Expander E, you will not need to read this section.

Section 1.1 under installation show the figure of the Super Expander E. In particular the RAM area is divided into four sections 1,2,3,4. Each section is a set of 8 chips called a bank or row of memory.

The Super Expander E uses 256Kx1 (CAS/RAS) memory chips for expansion (Manuf. Designation 41256). Any speed 100ns thru 180ns can be used. In the Apple environment it takes 8 chips to make one bank of memory. This why each section on the Super Expander E has 8 RAM chips or sockets for 8 RAM chips in each row or bank. DO NOT USE 64K RAM chips (4164) on the Super Expander E. The design is set for 256K RAM chips only.

One rule applies when adding memory to the Super Expander E. Each bank by number must be filled before adding memory to the next bank. That is to say bank 2 must be filled before adding memory to bank 3. Likewise, bank 2 and bank 3 must be filled before adding memory to bank 4.

If you install more memory in the Super Expander E, make sure you install all the RAM chips in the correct direction, and insure all pins of the RAM chips are in the sockets. Once you have added the RAM, you can use the MEMORY.CHECK program on the Utilities diskette to verify the memory.

4.0 Advanced Programming Information

If you are a BASIC programmer, or are little skilled in programming, this section is not for you. This section is not intended to teach methods of programming. It has been included for advanced programmers.

Since the 6502 can only address 64K of memory at one time, to program beyond the 64K will requires a bank switching technique. In the 40 column mode, all of an extra 64K bank may be used for programming. In the normal 80 column mode, a 64K/80 column board shares one half of it's memory on page 1X with one half of the main memory on page 1. Each corresponding sequential byte is displayed as two adjacent characters.

In the normal Double Hi-Res Graphics mode, the first 64K of the Super Expander E operates independent of the 40/80 column soft switches. To enable true 80 Column Double Hi-Res Graphics, the Annunciator 3, 80 Column, and Hi-Res switches must be enabled. (Apple II+ programs will not support this mode).

4.1 Aux Memory Operation

The soft switches can be set through a BASIC program, or an assembly language subroutine that can be accessed from BASIC with a call instruction. The video display pages are located as follows:

MODE	Main Page	Aux. Page
40 Column Text	1	-
40 Column Lo-res	1	-
80 Column Text	1	1X
Norm Hi Res	1,2	-
2X Hi-Res	1	1X

4.2 Display Switches

The display switches are set by reading or writing to that particular softswitch address. The value of the byte written is not important, only the address. The address for various soft switches are given in the following Table 1-1.

Use the - Decimal address for Integer BASIC, the + Decimal address for APPLESOFT BASIC, and the Hex address for assembly language.

The state of the switch is determined by the value of bit 7 the high order (sign) bit located at the corresponding address. If the byte is greater than \$128, the switch is on. Those switches which are denoted as READ ONLY or WRITE ONLY must be accessed accordingly or a program malfunction occurs.

4.2 Display Switches (cont.)

Table of display switches:

Switch Type	Function	Location			Notes
		HEX	+DEC	-DEC	
TEXT	ON: Display Text	\$C051	49233	-16303	
	OFF: Display Graphic	\$C050	49232	-16304	
READ:	\$C01A 49178 -16358				Read Only
MIXED	ON: Text & Graphic	\$C053	49235	-16358	* 1
	OFF: Full Graphic	\$C052	49234	-16302	* 1
	READ:	\$C01B	49179	-16357	Read Only
PAGE 2	ON: Display Page 2	\$C055	49237	-16299	* 2
	OFF: Display Page 1	\$C054	49236	-16300	* 2
	READ:	\$C01C	49180	-16356	Read Only
HI-RES	ON: Hi-Res	\$C057	49239	-16297	* 1
	OFF: Lo-Res	\$C056	49138	-16298	* 1
	READ:	\$C01D	49181	-16355	Read Only
80 COL	ON: Display 80 Col	\$C00D	49165	-16371	Write Only
	OFF: Display 40 Col	\$C00C	49164	-16372	Write Only
	READ:	\$C01F	49183	-16353	Read Only
80 STORE	ON: Store Aux Page	\$C001	49153	-16383	Write Only*3
	OFF: Store Main	\$C000	49152	-16384	Write Only*3
	READ:	\$C018	49176	-16360	Read Only

Notes:

*1 - Only effective when TEXT is off.

*2 - Different function when 80 Store is on.

*3 - Changes the function of PAGE 2.

Direct 80 Column Addressing

To store data directly into the display page, turn on 80 STORE soft switch. Then the PAGE 2 switch will be able to switch between PAGE 1 of main memory and PAGE 1X of AUX memory. For Double Hi-Res Graphics, turn on both 80 STORE & the HI-RES switches, and use the PAGE 2 switch as before.

4.3 Aux Memory Switching

Aux memory switching will not work on programs that use built in DOS I/O routines. The DOS I/O routines are locked out when the Aux memory is enabled. The 80-STORE and HI-RES soft switches must be correctly set before the other Aux switches will function correctly.

The switching of the 48K bank of normal program can be done by using the RAMRD and RAMWRT soft switches. Instructions fetched from one 48K space maybe stored in the other 48K memory space. If both 48K bank switches and the Display-Page Control switches are used, the later switches take priority. Therefore, if the 80-STORE switch is on, the RAMRD and RAMWRT have no effect on the display page. If 80-STORE is on, and HI-RES is off, then PAGE 2 controls text PAGE 1. If both 80-STORE and HI-RES are on then PAGE-2 controls text PAGE-1 and HI-RES Graphics PAGE 1.

4.3 Aux Memory Switching (cont)

The switching of the High Memory, Stack, and the Zero Page between the main memory and the Aux memory is accomplished by using the ALTZP softswitch. When the ALTZP switch is on, the Aux memory is used. The table below shows the Aux soft switches location and function. The + Decimal is used for APPLESOFT BASIC, - Decimal for Integer, & Hex for assembly.

Table of Auxiliary Soft Switches

SWITCH	FUNCTION	LOCATION			SPECIAL NOTES
		HEX	+DEC	-DEC	
RAMRD	ON: Read Aux 48K	\$C003	49155	-16381	
	OFF: Read Main 48K	\$C002	49154	-16382	
	READ:	\$C013	49171	-16365	Read Only
RAMWRT	ON: Write Aux 48K	\$C005	49157	-16379	
	OFF: Write Main 48K	\$C004	49156	-16380	
	READ:	\$C014	49172	-16354	Read Only
ALPZP	ON: Aux Memory	\$C009	49161	-16373	
	OFF: Main Memory	\$C008	49160	-16374	
	READ:	\$C016	49174	-16352	Read Only
80-STORE	ON: Access Page 1X	\$C001	49153	-16383	
	OFF: Use 48K Switch	\$C000	49152	-16384	
	READ	\$C018	49176	-16360	Read Only
PAGE 2	ON: Access AUX Mem	\$C055	49237	-16299	* 1
	OFF: Access Main Mem	\$C054	49236	-16300	* 1
	READ:	\$C01C	49180	-16356	Read Only
HI-RES	ON: Hi-Res Page 1X	\$C057	49239	-16297	* 2
	OFF: Use 48K switch	\$C056	49238	-16298	* 2
	READ:	\$C01D	49181	-16355	Read Only

Note 1 - When 80-STORE is on, PAGE 2 works as shown. When 80-STORE is off, PAGE-2 has no effect on Aux memory.

Note 2 - When 80-STORE is on, HI-RES switch allows you to use PAGE-2 to switch HI-RES PAGE 1 between Aux and Main memory.

Aux Memory Subroutines

The following built in subroutines are helpful in programming.

Subroutine	Location	Description
AUXMOVE	\$C311	Move data blocks between Main & Aux memory.
XFER	\$C314	Transfer control between

To use the AUXMOVE subroutine, you must first put the data addresses into byte pairs in Page Zero and set the Carry Flag to select the direction of transfer. The AUXMOVE cannot be used to transfer data from PAGE ZERO, PAGE 1, or from the Bank Switch memory (\$D000-\$FFFF). If the byte pairs are defined as A1, A2, and A4, the following will occur.

4.3 Aux Memory Switching (cont)

BYTE	LOCATION	PARAMETER PASSED
Carry		1 = move from Main to Aux 0 = move from Aux to Main
A1L	\$3C	Source starting address, low byte.
A1H	\$3D	Source starting address, hi byte.
A2L	\$3E	Source ending address, low byte.
A2H	\$3F	Source ending address, hi byte.
A4L	\$42	Destination start address, low byte.
A4H	\$43	Destination start address, hi byte.

The SEC instruction sets the Carry Flag and the CLC instruction clears the Carry Flag.

The XFER subroutine requires the following parameters:

BYTE	LOCATION	PARAMETER PASSED
Carry		1 = Transfer from Main to Aux 0 = Transfer from Aux to Main
Overflow		1 = Use Aux Page 0 and Stack 0 = Use Main Page 0 and Stack
	\$3ED	Program start address, low byte
	\$3EE	Program start address, hi byte

It is the programmers responsibility to save the current stack pointer before using XFER and to restore it after regaining control. Also it is better to pass control to the XFER subroutine by a JUMP instruction rather than a CALL.

4.4 Beyond 128K

The techniques of bank switching will work for any 64K bank of memory in the Apple IIe computer. The only difference in one bank over another is keeping track of which bank is being used at the time.

Address 49265 (HEX C071), on the Super Expander E is used for this purpose. By treating each 64K of board as its own bank, and writing the bank number to address 49265, the programmer can keep track of which bank is being used, and implement the softswitches of the IIe to read data, write data, or swap data between any aux 64K bank and the main 64K of the IIe. Transfer between any two aux 64K banks can also be done through the main 64K memory.

It should be noted that this address 49265 is also used as the paddle strobe address. This way, at system turn on, the address is always be set to zero. However, a small read error may occur for the paddles, if a paddle read routine is used in a program. For this reason, it is a good idea to write to the address 49265 first, then wait approximately 5 milliseconds, then enter the paddle read.

The maximum number of 64K banks that can be used on the Super Expander E is 16, numbered 0 through F. Each set of 256K is a set of four 64K banks as follows:

256K BANK 1 = 64K BANKS 0,1,2,3
256K BANK 2 = 64K BANKS 4,5,6,7
256K BANK 3 = 64K BANKS 8,9,A,B
256K BANK 4 = 64K BANKS C,D,E,F

5.0 Utilities Overview

Your Super Expander Utility diskette provides patches and programs for use with your Super Expander E. They include:

1. RAM Check
2. ProDOS RAM Disk Emulator
3. AppleWorks 1.0 thru 2.1 Patch Program
4. AppleWorks 3.0 Patch Program
5. GEOPUBLISH Patch Program

The Utility diskette is not copy protected, and you are free to make backup copies for your own use with the Super Expander E.

5.1 RAM Check

This program is mainly used when you add memory to your Super Expander E. The program will check the Super Expander and memory on board, reporting what is found. You should see 256K, 512K, 768K or 1024K, depending on the amount of memory on the Super Expander E.

If you get a different number, other than the four above, double check your installation of the memory chips (chips backwards, pins out of sockets, etc.).

5.2 ProDOS RAM Disk Emulator

A ProDOS RAM Disk Emulator program is included to make your Super Expander act as a high speed disk drive under ProDOS. A RAM disk drive is about 20 times faster than a mechanical disk drive.

The program is an auto-run selection from the main menu of the Super Expander Utilities diskette. Two selections for the ProDOS emulation are possible.

/RAM - Slot 3, Drive 2
/EXPAND - Slot 3, Drive 1

Some programs make use of large memory boards through use of a Pro-DOS emulator. This process generally requires soft booting. The Emulator program will drop you back into BASIC after configuration. From this point, using BASIC commands, you can soft-boot into your application program. Note: Do NOT reboot the system after running the ProDOS Emulator, as this will destroy the emulator.

5.3 AppleWorks 1.0 thru 2.1 Patches

PLUSWORKS-DT was written by NORWICH DATA SERVICES to expand AppleWorks beyond its normal limit. Without this software the AppleWorks program will not see the Super Expander E. All versions 1.0 thru 2.1 are supported by PLUSWORKS-DT. However, there is some limited support areas for the early versions. Most owners should be using versions 1.2 or greater.

For installing AppleWorks on a hard drive, first use the PLUSWORKS-DT diskette to make patches to the AppleWorks program on standard diskettes, then transfer the AppleWorks files to a ProDOS sub-directory on the hard disk (/HARD 1 for the SIDER) as described in the AppleWorks manual.

PLUSWORKS-DT includes a RAM DISK FEATURE that will load all modules of AppleWorks into unused desktop space each time you start the AppleWorks program. This feature saves time when switching from one module of AppleWorks to another. Instead of the timely delay of fetching modules from the disk drive, almost instant switching between modules is available under the RAM Disk Feature.

In addition to expanding the desktop space for AppleWorks, PLUSWORKS-DT also expands the database records to 4,222. Under PLUSWORKS-DT, up to 32K of desktop space can be reserved for popular AppleWorks enhancements such as PINPOINT (By Pinpoint Publishing Inc).

5.4 Installation of PLUSWORKS-DT

PLUSWORKS-DT requires that you start with new NOT MODIFIED copies of your AppleWorks startup and program diskettes. If you have copies with desktop accessories such as PINPOINT, or if you have copies that the main file names have been changed, PLUSWORKS-DT WILL NOT WORK!

Make copies of your AppleWorks startup and program diskettes from the originals. Then set the originals aside, you will not need them.

Place the Super Expander Utility Diskette into drive number one, and turn on computer system. Select AppleWorks Patches 1.0 thru 2.1 from the main menu.

You will see a title page that again tells you to use copies not originals, of your AppleWorks startup and program diskettes. The title page also informs that your PLUSWORKS-DT diskette can be used on the LASER 128 and FRANKLIN 2200 series computers. Because PLUSWORKS-DT is an extensive program that can be used with other computers as well as the IIe, the entire program has been left intact.

After the title page, when you press RETURN, you will see a message to place your COPY of AppleWorks STARTUP into either the built in drive 1 or first external drive 2. Do so then press the RETURN key.

The PLUSWORKS-DT will read from your startup diskette and announce the version of AppleWorks found.

The first question will ask if you have an extra bank switched memory board in your computer. THIS IS NOT THE SUPER EXPANDER E. If you have another bank switched memory board in another slot, and wish to use it as well as the Super Expander, answer with the slot the board is in.

PLUSWORKS-DT will see and use any bank switched memory board to 768K for a total of 1856K (if your Super Expander E is 1 MEG). If you do not have a bank switched memory board, answer this question N for None.

The next question will ask if you wish to leave part of desktop space for desktop accessories. If you are sure you will never use desktop accessories such as PINPOINT, answer the question 0. If you are using accessories or your not sure you will be using accessories in the future, it is a good idea to answer this question 1 for reservation of 16K. If you are a heavy user of desktop accessories, you may want to reserve 32K.

For those that are using desktop accessories. Install these accessories after making the PLUSWORKS-DT changes to the AppleWorks diskettes not before.

The next question concerning a printer interface is for the problems associated with earlier versions of AppleWorks. You may or may not want to use this printer option, if you have a grappler type board.

If your AppleWorks version is below 2.0, you have an option of selecting AUTO-LOAD or RAMDISK FEATURE at startup. For versions 2.0 and 2.1 this is an automatic feature.

Your options are simple.

1. Auto-load (RAMDISK FEATURE) default at startup. Every time you start AppleWorks, the RAMDISK feature will be invoked.
2. Regular load default. AppleWorks will load normally at startup everytime. However, when prompted for the AppleWorks program diskette, press the SPACE BAR instead of RETURN, and the auto-load (RAMDISK FEATURE) will take over.

After reviewing your options and your use of AppleWorks, if this question is still confusing, answer this question N. Then try loading the AppleWorks with and without the RAMDISK feature. You can always reconfigure your diskettes later for RAMDISK default.

You are now ready to configure your AppleWorks startup and program diskette. During the configuration, you will see the extra memory of the Super Expander E as aux-memory.

5.4 Installation of PLUSWORKS-DT (cont.)

Desktop space available will depend on your version of AppleWorks and how much space you reserve for desktop accessories. The following is a guideline for versions 2.0 (No desktop space for accessories being reserved). Similar results will be obtained from other versions of AppleWorks as well.

S.E.E Memory	A.W. 2.0 Desktop
256K	236K
512K	490K
768K	744K
1024K	998K

5.5 PLUSWORKS-DT Operation

The configuration of your AppleWorks startup and program diskettes only need to be done once. From that point each time you load and run the converted diskettes, AppleWorks will see and use the memory on the Super Expander E.

Under AppleWorks versions 1.0 through 1.3, when you boot the startup diskette, as always, AppleWorks ask you to install your AppleWorks program diskette and press return.

Depending on your configuration, if you have not requested the auto load as a default, you can press the <SPACE BAR> or <RETURN> key for the load feature.

If you press <RETURN>, from this point you will not see any difference in the operation of AppleWorks other than the added desktop memory.

If you press <SPACE BAR>, after inserting your AppleWorks program diskette instead of <RETURN>, you will notice an unusually long load time of the AppleWorks program. But after the load, switching from module to module is almost instant.

For versions 1.0 thru 1.3 pressing the <SPACE BAR> as described above, invokes the RAM Disk Feature. Pressing the <RETURN> key will cause AppleWorks not to use the RAM Disk Feature.

For version 2.0, the RAM Disk feature is automatically invoked. However, if you do not wish to wait for the load time, or if you do not wish to use the RAM Disk Feature, just press the <ESCAPE> key during the load. This will abort the RAM Disk Feature.

Using the RAM Disk Feature will dramatically reduce the disk access of the AppleWorks program diskette. However, in some cases it is not completely eliminated, and you must keep the program diskette in the disk drive.

5.6 PLUSWORKS-DT Patch problem when and if they occur.

Configuration problems that result in the "PRODOS error \$XX" message may be remedied by consulting the partial list of error codes as follows:

\$27	I/O Error
\$28	No Device Connected
\$2B	Write Protected
\$2E	Volume Switched
\$44	Nonexistent Path
\$45	Volume Not Mounted
\$46	File Not Found
\$4E	Access Error
\$51	File Count Bad
\$52	Not A ProDOS Disk
\$53	Bad Volume Bit Map

5.6 PLUSWORKS-DT Patch problem when and if they occur (cont)

If during the configuration, you should encounter an error message "UNSUPPORTED APPLEWORKS VERSION", and you know the version number is 1.0 thru 2.0, then your copies of AppleWorks have already been modified or changed in some way. Insure you are using original AppleWorks startup and program diskettes to make your copies from.

Printer difficulties are AppleWorks problems, and ARE NOT caused from PLUSWORKS-DT or the Super Expander E. While not all problem can be solved for every system, here are a few pointers that may help most users.

1. Configure your printer. Usually nothing will print correctly with the default selections. Read the sections on printing (Ch. 13 & Appendix B) in your AppleWorks Manual.
2. If your printer does not appear on the list of printers supported by AppleWorks, don't assume that you know which one to choose. Choose "Custom Printer" for yours and "REMOVE" the Apple DMP and ImageWriter. Make sure that your printer is selected as the OPEN APPLE - H (O.A.-H) printer. You can later install any special codes.
3. Ultimately, if nothing else works, get your printer printing properly under AppleWorks without the PLUSWORKS-DT changes first. Write down what you did to configure the AppleWorks program for your printer. Then configure new copies of AppleWorks with PLUSWORKS-DT and make the same printer modifications with the new copies.

5.7 AppleWorks 3.0 & 4.0 Patch Programs

The AppleWorks 3.0 patch program is for AppleWorks 3.0 only, and the AppleWorks 4.0 patch program is for AppleWorks 4.0 only. These patches should not be used for any other version of AppleWorks.

These programs will patch the proper version of AppleWorks to see and use the Super Expander E. Although there are several diskettes used in AppleWorks 3.0 & 4.0, the patches need only be done to the STARTUP diskette (For the 3.5" version, there is only one diskette).

Simply make a copy of your AppleWorks startup diskette (never patch your master diskettes), boot the Super Expander E Utilities Diskette, and select AppleWorks 3.0 Patch or Appleworks 4.0 Patch, for the matching version you are using. The program will auto-run, and tell you when it has finished.

This is a one time patch. Even if you add more memory to the Super Expander E, the once performed patch will automatically see the new added memory.

5.8 GEOPUBLISH Patch Program

This program is a patch for GEOPUBLISH to see and use the Super Expander E. Use this program only on the GEOPUBLISH program.

First, configure your GEOPUBLISH startup for the RAMWORKS (Applied Engineering) board.

Boot the Utilities Diskette, select GEOPUBLISH Patch from the menu, and just follow the instructions.

This patch only needs to be done once.