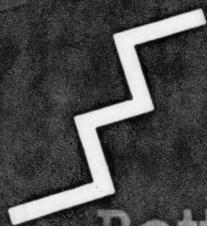


# WORD CHALLENGE



Better Than Boggle™!

Based On PROXIMITY Linguistic Technology

HAYDEN SOFTWARE

# WORD CHALLENGE™

The Ultimate Word Game

Apple  
User's Manual

Based on PROXIMITY Linguistic Technology

**HAYDEN SOFTWARE**

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# INTRODUCTION

**WORD CHALLENGE** is a sophisticated new word game designed especially for your microcomputer. Word games are a long-standing tradition in Western culture and now **WORD CHALLENGE** presents you with **LEX**, an electronic opponent of uncanny skill and intelligence. Test and improve your vocabulary skills by playing against **LEX** either alone or with your friends.

**WORD CHALLENGE** is easy to operate and fun to play. A variety of unique options allows you to construct a game suitable to your own competitive level. This user's manual provides step-by-step instructions and a detailed explanation of the special features in **WORD CHALLENGE**. If you are one of those inquisitive people who wants to know more about the inner mechanisms of the game or if you need some strategy tips to begin, special sections of the user manual will appeal to you.

## The Word Challenge Cast of Characters

- **LEX** — the expert and your opponent. **LEX** plays at 26 different difficulty levels and is a match for anyone from beginner to pro.
- **YOU** — the challenger.
- **Timer** — set it to the amount of time **YOU** need.
- **Scorekeeper** — keeps track of game and match totals. Choose among five scoring methods for the **Scorekeeper** to use.
- **Dictionary of 90,000 Words** — the **Scorekeeper's** reference for checking all the words **YOU** and **LEX** discover.

# PLAYING WORD CHALLENGE

## OBJECT

The object of WORD CHALLENGE is to compete against LEX, the dreaded Word Master, to find hidden words in a grid of letters. The player who accumulates the most points is the winner.

## HARDWARE REQUIREMENTS

To play WORD CHALLENGE, you will need an Apple II, ][ Plus or //e with at least 48 K of memory, one disk drive and a monochrome or color monitor.

## GETTING STARTED

WORD CHALLENGE is an autobooting disk. Insert the WORD CHALLENGE disk with the label side up into the disk drive and boot the system by turning ON the computer. You are now ready to play WORD CHALLENGE. **GOOD LUCK!!**

## FORMING WORDS

It's easy to find words in the WORD CHALLENGE grid. Look below at the sample square and connect the letters to form words using the following rules:

1. Letters may only be connected if they touch each other on any side or on any corner. For example, in the square below, the letter *I* adjoins *A*, *L* and *D*.
2. Words are legal only if the letters connect *in sequence*. Connecting letters in sequence means that each new letter must touch the previous letter in the word. In the sample square, the word *clad* is legal. You begin the *C*, then *L* touches *C*, then *A* touches *L*, then *D* touches *A*. However, you may not spell *cling*, since the *N* does not touch the previous letter *I*.
3. The same letter may be used only once in the construction of a single word. In the example, you can spell *sail*, but not *sails*, because the letter *S* would be used twice.
4. Legal words are made up of the combination of letters *A* through *Z*. Apostrophes and hyphens are not permitted.

5. Words must be at least three letters long to receive credit for them. For example, in this square the word, *as*, is not credited. (*The special case Qu, which appears in one box, counts as two letters in scoring and construction.*)

I	D	E
A	L	C
S	N	G

You can make 45 words from this simple square. (Try it.) Here are a few:

snail      glanced      sale      sail      dial

## THE STANDARD GAME

During a Standard Game, you play on a  $4 \times 4$  square for three minutes. LEX plays at difficulty level *T*, on a scale from *A* (most difficult) to *Z* (least difficult), and the Winning Score is set to 100 points.

### INTRODUCTORY DISPLAY

After the WORD CHALLENGE title screen has appeared, the following Introductory Display will appear:

WORD CHALLENGE

<b>S</b>	Standard Game suggested for beginners
<b>M</b>	Menu for changing options
Enter S or M: _____	

Press C for Color Display.

Select the Standard Game by entering *S*. (See Setting Game Options section for an explanation of the Options Menu.)

After entering *S*, the Introductory Display clears, a  $4 \times 4$  letter grid appears on the left side of the screen and the Timer starts.

## BEGINNING THE GAME

Begin typing your words as soon as the grid of letters appears on the screen. Words must be separated from each other by a *non-alphabetic* character. Therefore, you may separate words with **RETURN**, **SPACE**, **COMMA** or any other non-alphabetic character you choose.

Use **BACKARROW** (←) to correct any typing errors. Once you've pressed **RETURN**, you may not back up to a previous line.

While **YOU** and **LEX** look for words hidden in the square, the Scorekeeper searches the 90,000 word dictionary to determine all of the possible words in the square. The Timer posts the number of seconds remaining in the game at the top left-hand corner of your screen and visually counts down the remaining time in the game. When less than one minute is left, a graph appears at the top of your screen and begins shrinking by the second. Now the final countdown begins. The Timer beeps once per second for the last ten seconds of the game. When time runs out, play stops and the challenger box is cleared to begin scoring.

## SCORING

### First Phase

**Display Words.** Each word found by either player is shown on the screen. Next to each word, the Scorekeeper indicates who found the word by placing a **YES** in the **YOU** column, the **LEX** column or both.

**Spell Words.** In the Standard Game, you are given approximately three seconds to review each word displayed by the Scorekeeper. During that time, the Scorekeeper highlights the word in the square and will trace it out for you, if you press any key. (< and > will simultaneously trace out words and rotate the square. See Special Function Keys section for details.)

The Scorekeeper compares your list of words with **LEX**'s list of words and awards points as follows:

<b>YOU</b> have the word but <b>LEX</b> does not	— <b>YOU</b> receive credit
<b>LEX</b> has the word but <b>YOU</b> do not	— <b>LEX</b> receives credit
<b>YOU</b> and <b>LEX</b> both have the word	— No credit is given

The exact number of points awarded for each word depends on the length of the word and the Scoring Method you select. Basically, you receive more points for longer words. (See Setting Game Options section for an explanation of various scoring methods.)

## Second Phase

**Display Uncredited Words.** Although the Scorekeeper is very knowledgeable and knows 90,000 words, you may find a word it doesn't know. During the secondary scoring phase the Scorekeeper displays all uncredited words and you are given the chance to receive credit for them.

If you would like to receive credit for your word, enter *Y*. Do NOT press RETURN after you enter *Y*. If you decide not to receive credit for the word, press any key EXCEPT *Y*.

**Display Impossible Constructions.** During the secondary scoring phase the Scorekeeper also displays any words you typed that could not be constructed in the square.

**Display Scores.** The score of a game is displayed in the upper right-hand corner of the screen. For each game, the Scorekeeper displays the number of points earned by YOU and LEX and the number of points tied. The number of words in the square and the maximum number of points available in the square are displayed in the upper left-hand corner.

The running totals for a match are displayed at the bottom of the screen by two graphs labeled as follows:

YOU :	<input type="text" value="15"/>	15
LEX :	<input type="text" value="12"/>	12

During each game, the match totals are updated by the Scorekeeper.

## CONTINUING PLAY

When the Scorekeeper has finished tallying your game and match totals, you will be asked if you would like to continue play. You have two choices:

Press any key EXCEPT *M* to continue the match.

—or—

Enter *M* to see the Options Menu and change the setting of any option.

For the Standard Game, press **SPACE BAR** to continue the match.

## WINNING

A match is a series of games in which YOU and LEX compete to gain points toward the Winning Score. The Winning Score may be set to any number between 0 and 999. In the Standard Game, the Winning Score is set to 100 points.

The number of games in a match is not preset but varies with how many points YOU and LEX score on each word square. On the final board, the Scorekeeper continues to update game and match totals past the Winning Score, giving credit for all words found by each opponent. The player who has the most points at the end of a match — *not the one who reaches the Winning Score first* — is declared the **winner**. Then the Scoring Screen clears, the Introductory Display returns and you are ready to play another match of WORD CHALLENGE.

The following sections describe the special function keys and the Options Menu which can be used while playing WORD CHALLENGE.

## SPECIAL FUNCTION KEYS

There are three special function keys activated during play. The activated keys are shown at the bottom of your screen during play and scoring for easy reference.

### ROTATE SQUARE (< or >)

< and > rotate the grid counterclockwise and clockwise respectively, so you can look at the word square pattern from a different angle.

To rotate the square to the LEFT, press <.

N	Z	N
E	E	K
R	L	U

is rotated  
counterclockwise  
to become

N	K	U
Z	E	L
N	E	R

To rotate the square to the RIGHT, press >.

N	Z	N
E	E	K
R	L	U

is rotated  
clockwise and then  
becomes

R	E	N
L	E	Z
U	K	N

## START SCORING (?)

When you have found all the words you can in a square, press the ? key to stop the clock and begin scoring. You do not have to wait for time to run out to end the game. *Note: Scoring cannot begin until the Scorekeeper has finished searching through the dictionary.* Once you have pressed ?, the **START TYPING** message will disappear and you cannot type in any more words.

## SETTING GAME OPTIONS

**WORD CHALLENGE** is a very versatile game. You can determine the character of a game by changing any of the Standard Game settings. We refer to these variable settings as *options*. This section of the manual describes each option in detail.

For the most part, changing your options determines the difficulty of the game. **WORD CHALLENGE** is suitable for people of all ages and skills. As your vocabulary skills increase, you can play **WORD CHALLENGE** at more difficult settings.

### OPTIONS MENU SCREEN

To change a particular setting for any option, the Options Menu Screen must be displayed. You can go to the Options Menu Screen from the Introductory Display or between games.

From the Introductory Display, enter *M* to see the Options Menu.

At the end of ANY game in a match when you are asked if you would like to continue, enter *M* to see the Options Menu.

Changing the setting of any option on the menu causes the match to be played or continued under your rules.

### CHANGING A SETTING

To change the setting of any option, follow these steps:

1. Select an option. Enter the letter of the option you wish to change OR use the left and right arrows (to move up and down, respectively) to position the cursor on the corresponding letter of the option you are changing and press **RETURN**.
2. Type in one of the possible settings.
3. For Option H — Winning Score and Option I — Timer, an additional step is needed. If the number of points or seconds selected is less than three digits, you must press **RETURN**.

	Option	Standard Setting	Possible Settings
A	Difficulty Level	T	A — Z
B	List Mode	No	Y or N
C	Manual Board Entry	No	Y or N
D	Embedded Words	None	(N)one,(S)uffix, or (A)ll
E	Competition Mode	No	Y or N
F	Square Size	4 by 4	3,4, or 5
G	Scoring Method	B	A,B,C,D, or E
H	Winning Score	100 pts	0 — 999
I	Timer	180 secs	0 — 999
J	Display Speed	3 secs	0 — 5
K	Sound	Yes	Y or N
L	PLAY WORD CHALLENGE!		Type L to play

## EXPLANATION OF OPTIONS

### A. Difficulty Level

There are 26 difficulty levels at which your opponent, LEX, can play WORD CHALLENGE. Level A represents superior playing ability. At Level A, LEX will find all possible words in the square. Level Z represents the easiest level of play.

At lower levels, LEX is restricted in its knowledge to words of shorter length and simpler English construction. At lower levels, LEX is also restricted in the number of words it can process. Since changing levels alters both the kind and amount of words that LEX will find, you can adjust the ability of your opponent realistically.

### B. List Mode

During the scoring stage of a Standard Game, the Scorekeeper displays only those words that YOU or LEX find in the word square. Setting List Mode to YES indicates that *all* possible words in the square will be displayed, regardless of whether or not the word was found by YOU or LEX. List mode allows you to play competitively with LEX at your own skill level and still see all of the possible words that can be constructed in a square.

### C. Manual Board Entry

Setting this option to YES enables you to create your own square! During play, a blank square will appear on the screen. You select your letters, one by one, starting in the upper left-hand corner, typing from left to right in each row. If you make an error typing in your letters simply press **BACKARROW** until you have cleared your error for retyping.

Before play begins, you will be asked to verify your board. Enter *Y* if the board is correct. If there is still an error, enter *N* and go back and change it. Manual Board Entry enables you to play games from the newspaper by entering the desired letters.

#### D. Embedded Words

WORD CHALLENGE players will notice that often it is possible to type a word which has one or more other words contained within it. For example, in the word *strainers* we can find the following words:

- rain
- train
- trainer
- trainers
- strain
- strainer
- strainers

We refer to these words within words as embedded words.

During standard play, if you type in the word *strainers* you will receive credit for only one word, *strainers*. However by selecting the Embedded Words option you may receive credit for some or all of these embedded words.

By setting Option D to SUFFIX, you will receive credit for all embedded words that begin with the same letter sequence as your original word. So if you type in *strainers* you will receive credit for:

- strain
- strainer
- strainers

You will not receive credit for any embedded word that does not begin with the same first three letters of your entry. This is called SUFFIX mode because you are receiving the root word(s) free without using the additional time needed to type them in.

By setting Option D to ALL, you will receive credit for *all* words embedded in the original word. For the word *strainers*, you will receive credit for the following:

- rain
- train
- trainer
- trainers
- strain
- strainer
- strainers

WORD CHALLENGE players who just don't have enough time to type everything they find will learn to love this option.

### **E. Competition Mode**

Setting Option E to YES allows you to reproduce a square you have already played. If LEX is playing at the same difficulty level each time, even his responses will be reproducible!

If you select setting Y for Competition Mode, the first screen that appears is:

Enter board number: \_\_\_\_

Press <RETURN> to continue

By pressing RETURN without entering a board number, a new board will be drawn on the screen with an assigned number. The board number appears directly above the challenger box. This way if you want to replay the new board, you just have to remember the number assigned to it.

There are 65,536 distinct competition boards available for each square size. If you wish to replay a specific board in Competition Mode, simply type in the number of the desired board which is located above the word square. If your option settings are the same as before, WORD CHALLENGE will reproduce your previous game exactly.

Primarily, Competition Mode is used for those who wish to use the Scorekeeper as a referee between two competitors playing the same square or the same player playing the same square at different times. See if you can beat LEX at a certain level. When you have mastered that level, increase the level of difficulty and replay your sequence of boards to determine your progress.

### **F. Square Size**

This setting determines the size of the word square grid. A 3 × 3 square is the easiest square to play. A 4 × 4 square is the standard size. A 5 × 5 square is the most difficult to play.

### **G. Scoring Method**

Choose among five Scoring Methods. Use the method recommended for each board size. The methods available to you are alike in three aspects:

1. The Scoring Method chosen is used to add up both your points and LEX's.
2. Any words found by both YOU and LEX are not credited.
3. One and two letter words are not credited.

Each Scoring Method has a specific task for which it is best suited.

**Scoring Method A** — recommended for use with 3 × 3 board.

Word length	0-2	3	4	5	6	7	8-up
Points	0	1	2	4	7	10	12

**Scoring Method B** — recommended for use with 4 × 4 board.

Word length	0-2	3-4	5	6	7	8-up
Points	0	1	2	3	5	11

**Scoring Method C** — recommended for use with 5 × 5 board.

Word length	0-3	4	5	6	7	8	9	10	11-up
Points	0	1	2	3	4	6	8	10	11

**Scoring Method D** — rewards longer words. Players receive one point for each letter in any word found.

**Scoring Method E** — rewards the most words. Players receive one point for each word they find, regardless of length. **Hint:** When using this Scoring Method, concentrate on finding short words. The more words you find, the more points you accumulate!

#### **H. Winning Score**

The Winning Score determines when a match is over and may be changed to any number from 0 to 999 points. If the number of points selected is less than three digits, you must press RETURN after entering the number.

#### **I. Timer**

The Timer limits, in seconds, the amount of time you have to play a WORD CHALLENGE game. The Timer can be set to any number of seconds ranging from 0 to 999 seconds. You will usually want to allow more than 3 minutes on 5 × 5 squares, but less than 3 minutes on 3 × 3 squares. If the number of seconds selected is less than three digits, you must press RETURN after entering the number.

#### **J. Display Speed**

At the end of each game, the Scorekeeper displays each word that is found in the word square and pauses between them to allow each word to be examined. The Display Speed determines how long the Scorekeeper pauses. Setting this option to 5 allows the longest pause. You may ask the Scorekeeper to trace out each letter of a word by pressing any key during scoring. This will extend the amount of time for which a word is displayed.

### **K. Sound**

Your WORD CHALLENGE can beep and play the scale! During scoring, if you ask to have words traced out (by pressing any key), each letter will flash and play a musical note. Each letter of the alphabet is identified by a note, so every word creates a special musical tune. Soon you will be able to recognize words by the melodies they produce!

### **L. Play!**

To begin playing WORD CHALLENGE from the Options Menu Screen, enter *L*.

## **STRATEGY AND THE DICTIONARY**

The dictionary used in WORD CHALLENGE is a very specialized word list. It presents an accurate description of the English language and can be a significant tool in improving your vocabulary.

LEX is, *undisputably*, an expert. You will learn new words from LEX and improve your spelling skills. The dictionary your opponent uses includes many everyday words that you will easily recognize plus new terms that have recently been incorporated into English. Many of these new words still do not appear in the best paper-bound dictionaries! However, you can improve your game by knowing a few facts about the types of words in the WORD CHALLENGE dictionary.

### **VARIATIONS OF COMMON WORDS**

Words with suffixes make up a large portion of the dictionary. Words that end in *-ing*, *-ly*, *-er*, *-ers* and *-ness* account for more than 21,000 entries!

If you find a common root word like *help*, spend some time looking for some of its variants like *helps*, *helped*, *helping* and *helper*. You'll be surprised at how much mileage you can get out of a single root word by adding suffixes, if the letters are available in the grid.

### **COMMON LETTERS**

Every letter of the alphabet has a different number of words in its section of the dictionary. Far more words begin with the letters *c* and *s* than with any other letter. Words that begin with *c* and words that begin with *s* constitute more than one-fifth of the dictionary. In contrast to this, the letters *j*, *k*, *n*, *q*, *v*, *x*, *y* and *z* combined account for less than six percent.

Even though the English language does not treat all letters equally, the WORD CHALLENGE Scorekeeper does! So, try spending more time working with common letters like *c* and *s*, than, for instance, a more exotic letter like *x*. While words with *x* like *axolotl*, *calyx* and *xebec* may seem intriguing, they account for less than three percent of the dictionary.

The following chart indicates the approximate number of times each letter of the alphabet appears in the dictionary.

Letter	Number Occurrences	Letter	Number Occurrences
a	59.5	n	56.0
b	15.2	o	47.3
c	32.6	p	22.6
d	27.8	q	1.5
e	93.1	r	58.4
f	10.7	s	73.3
g	22.4	t	56.8
h	16.6	u	25.1
i	75.3	v	8.5
j	1.2	w	5.9
k	6.0	x	2.3
l	45.3	y	14.6
m	21.3	z	3.9

Occurrences represented in thousands.

## LONG WORDS

There are many long words in the WORD CHALLENGE dictionary, if you can only find them! Over half of the words in the dictionary are between seven and ten letters long. The average word has eight letters and the longest entry has twenty-four. The longest word in the English language has forty-five letters! It is *pneumonoultramicroscopicsilicovolcanoconiosis*.

Since each letter on a WORD CHALLENGE board can only be used once while forming a word, there is no need to have entries quite this long in the dictionary. Our longest entry is *transubstantiationists*. By forming just one word over seven letters long, you can add at least six points to your game score.

So, work with the letter combinations you find in each square to form longer words. Once you've found one word, try finding its variants. By adding a simple ending, you can transform a short word into a high scorer. Try switching letters' positions and see what new words can be made. You can gain easy points by utilizing a small set of letter combinations.

*Time Saving Tip* — Let WORD CHALLENGE do some of the work for you, with the Embedded Words option. You'll type less and gain points!

Try out these strategies...GOOD LUCK and HAVE FUN!

## INSIDE WORD CHALLENGE

If you have been wondering how WORD CHALLENGE works, here is a general overview. The WORD CHALLENGE dictionary is structured in a special manner, so that it is stored economically and can easily be searched by the WORD CHALLENGE Scorekeeper.

### STORING 90,000 WORDS

One of the great challenges faced in developing WORD CHALLENGE was to make the entire dictionary small enough so that it could be used on a personal computer. Normally, to store a list of words on a disk every character of each word would require a single byte of storage and the end of each word would be marked by the presence of a special byte. For example, the word *run* would require four bytes, one for each character and one to indicate the end of the word. An interesting fact is the average length of a word in the WORD CHALLENGE dictionary is eight characters. This means that your WORD CHALLENGE dictionary would need more than 800,000 bytes of storage and would take up five of these disks!

A compression scheme was engineered that shrunk this list of words so that it could fit onto one disk (the dictionary occupies only 93K bytes!). The secret of this amazing compression is the English language itself. In English, many words are formed by adding endings to a smaller set of common root words. For example, a common verb like *touch* is the basis of a large family of words which are created by adding suffixes like *-es*, *-ed* and *-ing*. Here is a list of the many words that can be traced back to the root word *touch*:

touch	touchy
touches	touchier
touched	touchiest
touching	touchily
touchingly	touchiness
toucher	touchless
touchers	touchable

One trick to compressing this list of words was to store the root word *touch* only once, then indicate by code what valid endings it could take. The result is a very compact but exhaustive list of words!

## SEARCHING FOR VALID WORDS

Just as most printed dictionaries are alphabetically ordered and include breaks for each letter of the alphabet, the WORD CHALLENGE dictionary is an alphabetic list divided into sections. A high speed search is conducted through the dictionary to find words that are hidden in each board.

When a board is drawn, the Scorekeeper systematically searches for viable two-letter combinations which can begin words. Once a combination is found, the Scorekeeper examines the letters around the combination to find a third letter it can add on. It continues to build words, letter by letter, constantly scanning through the dictionary looking for matches. Once it has exhausted one three-letter combination and found all the words it leads to, the Scorekeeper returns to the initial two-letter combination it found. It then looks for a new third letter to add on which will lead to a new avenue of valid letter combinations and words.

The Scorekeeper delivers words to LEX which agree with the level of difficulty selected. Each difficulty level reflects a realistic adjustment in linguistic intelligence. So, while LEX will find words such as *ice* and *wig* playing at level T, LEX will not find more complicated words such as *cede* and *geode* which would be found at a higher level of play. LEX's ability can be adjusted so that an adult and a third grader could each play the same board and find it competitively challenging.

The words you type in are simply compared against the Scorekeeper's list. If the Scorekeeper does not have the word, then the dictionary does not include the entry. However, you are given the option of receiving credit for words that are not on the Scorekeeper's list at the end of a game.

Now that you know how the Scorekeeper and LEX operate, try a new game!

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