

# **VIEWMAX-80**

**80-COLUMN VIDEO CARD  
FOR  
APPLE II**

USER MANUAL

**MICROMAX SYSTEMS**

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## INTRODUCTION

What is an 80-column board?

The Apple II normally displays a 24 X 40 upper case only screen. There are many products on the market that improve this rather simple arrangement. One of the simplest is a lower case adapter that simply improves the 24 X 40 Apple II screen to include both upper and lower case characters. These products always have some sort of software patch to get around another Apple weakness, the upper case only keyboard. Some word processors on the market make use of the Apple hi-resolution screen to attain upper and lower case as well as expanding the width of the screen to 70 columns. Some drawbacks to this method are that the characters are not very pleasing because of the small matrix used, scrolling is very slow, and the 70 column screen is available only under the word processor. The one product that has all the features but none of the drawbacks is an 80 column board.

The Viewmax-80 is such a product. It provides the Apple II user with a 24 X 80 screen. It has a full 128 character ASCII upper and lower case character set (both NORMAL and INVERSE) in a very pleasing 7 X 9 character matrix. It supports the one-wire shift key mod for upper and lower case operation with the shift key. It supports software switching of the 40 and 80 column screens. It supports all ESC cursor editing features of the Apple II including IJKM. It is fully compatible with most word processors that support or require an 80-column board including Wordstar, Apple PIE, Easywriter Professional, Letter Perfect and many others. It is fully compatible with all versions of CP/M and Pascal and supports Keypress, Typeahead and System Break in Pascal 1.1.

The Viewmax-80 was designed for the professional Apple II user and we at Micromax feel it will satisfy his or her most discriminating needs.

## INSTALLATION

At every step in the design of the Viewmax-80 the user was kept in mind. This includes the ease of installation. Pulling of motherboard chips, extra boards and wires were not considered a benefit so they were left out. As a result you will find the Viewmax-80 extremely easy to install. It is assumed the user has a video monitor with a cable terminating to an RCA male connector attached. If you don't already have this setup, you will have to acquire it.

Installation of the Viewmax-80 is very simple and straightforward. Just follow these simple steps:

1. Turn the power to the Apple ][ off. Whenever removing or inserting cards into the Apple ][ the power should be off to prevent damage to the Apple ][ or the circuit card.
2. Remove the lid by pulling up on the rear until each side pops, then slide it back and lift it off.
3. Notice that there are 8 edge card connectors or "slots" at the rear of the Apple ][. These are numbered from 0 to 7 from left to right with the keyboard nearest you. The Viewmax-80 can be installed in any slot except 0 but we recommend that slot 3 be chosen as this is the slot that CP/M and Pascal have reserved for the system console and many word processors expect to see the 80-column board in this slot also. All examples given in this manual will assume that the Viewmax-80 is installed in slot 3. Once you have decided on a slot, insert the Viewmax-80 into the edge card connector by pushing gently and firmly until it is fully seated.
4. Connect the cable nearest the bottom of the Viewmax-80 (marked E4 on the circuit card) to the Apple ][ video out jack on the back of the Apple ][.
5. Connect the cable nearest the top of the Viewmax-80

(marked E1 on the circuit card) to the free end of the cable connected to the video monitor. Make sure that both cables are led neatly out of the Apple ][ through one of the rear openings and that they don't interfere with any other board installed in the Apple ][.

6. Double check all installation steps for extra safety.
7. Reinstall the Apple ][ cover and arrange your machine as it was before.
8. The Viewmax-80 is now installed and ready for use.

## ADJUSTMENT PROCEDURE

The Viewmax-80 should interface nicely to most video monitors. The only operator adjustment necessary should be the vertical, horizontal, brightness and contrast controls on the video monitor. Follow the steps below to optimally adjust the video monitor to provide an acceptable display on both the Apple ][ 40 column and the Viewmax-80 display.

1. Turn the Apple ][ on and boot DOS into APPLESOFT BASIC. The Apple ][ 40 column screen should be active. Adjust the vertical and horizontal hold controls on the monitor to produce the optimum video picture. Then adjust the brightness control so that it is at it's maximum without creating a background video signal. The contrast control should then be adjusted to it's maximum without causing character bloom.

2. Type PR#3 and then <RETURN> to turn on the Viewmax-80.

3. Type this program in and then type RUN and then <RETURN>.

```
100 PRINT CHR$(12)
110 NORMAL
120 FOR I=32 TO 127
130 PRINT CHR$(I);
140 NEXT I
150 PRINT : PRINT
200 INVERSE
210 FOR I=32 TO 127
220 PRINT CHR$(I);
230 NEXT I
240 PRINT
250 END
```

Now adjust the monitor again as you did in step 1 above to obtain an acceptable video picture. This should not entail moving the monitor controls very far as they

should be very close from the adjustment performed in step 1.

4. Now type <CTRL-Z> and then 1. The display should switch to Apple 40 column video. Press <RETURN> now and a SYNTAX ERROR should result (this is normal). Inspect the display and readjust the monitor if it needs it. Now return to 80 column video by typing PR#3 and then <RETURN>. You may have to alternate between 40 and 80 column video and readjust the monitor until the display is good under both modes.

5. If you have gotten this far and are pleased with the display under both 40 and 80 column modes the Viewmax-80 is correctly installed and adjusted.

6. If a video signal cannot be seen at all, refer to Appendix A, "Troubleshooting".

## OPERATION

The Viewmax-80 will always default to the Apple II 40 column screen at power up and <RESET>. To activate the Viewmax-80 type PR#3 or IN#3 and then <RETURN>. To return to 40 column video type <CTRL-Z> then 1 then <RETURN>. A SYNTAX ERROR will always follow this and is normal. This section will contain detailed explanations on how to use the input and output features of the Viewmax-80.

## INPUT FEATURES

The Viewmax-80 supports keyboard entry of the entire 128 character ASCII set. Shift key support for upper and lower case depends on whether the one wire shift key mod is installed. This modification is detailed in Appendix B, "Shift Key Mod". If this modification is made (it is very simple and is highly recommended) then the Apple II keyboard will be transformed into a true typewriter keyboard with the shift key actually determining upper and lower case. If this modification is chosen not to be made, then upper and lower case operation is still retained using a software shift method. Both of these methods will be explained.

Upper and lower case operation  
With shift key mod:

Upon initialization the Viewmax-80 defaults to CAPS lock mode. This means that the keyboard is shift-locked for alphabetic characters only. The keycode to toggle between CAPS lock and upper/lower case mode is <CTRL-A>. To go into upper/lower case mode type <CTRL-A>. Now, if an alphabetic character is pressed it will be lower case, but if the shift key is pressed at the same time then it will be upper case. Note that to get ^, @ and ] the Viewmax-80 must be in CAPS lock mode. To return to CAPS lock mode type another <CTRL-A>.

Upper and lower case operation  
Without shift key mod:

Upon initialization the Viewmax-80 defaults to the upper case only mode. The keycode that will be used as both a software shift and a shift lock is <CTRL-A>. To go into lower case mode from upper case mode type <CTRL-A>. Now if an alphabetic character is pressed it will be lower case. To capitalize the next alphabetic character type <CTRL-A> and then the character. To return to upper case mode type <CTRL-A> twice in a row.

A note about the shift mod support:

On initialization, the Viewmax-80 attempts to determine if a shift mod is installed. This determines the function of <CTRL-A> as described above. However, if a game paddle set is not installed on the game I/O port, the Viewmax-80 will think that a shift mod is installed even if this modification is not present. This means that if you don't have the shift mod installed then your only access to upper and lower case will be the CAPS lock toggle. If this occurs a simple POKE will fix things.

To tell the Viewmax-80 that a shift mod IS installed:  
POKE 2043, 98

To tell the Viewmax-80 that a shift mod IS NOT installed:  
POKE 2043, 66

Remember that all examples given in this document assume that the Viewmax-80 is installed in slot 3.

## OUTPUT FEATURES

The Viewmax-80 has a set of control codes and character sequences that perform various display terminal functions such as clear screen, home cursor, erase to end of line and many others. For the most part these codes mimic the Datamedia terminal sequences as this is the protocol that Pascal must have. This insures that the Viewmax-80 will be fully compatible with the Pascal operating system and any future operating system on the Apple II. An explanation of these control codes and code sequences follows that gives the hexadecimal value preceded by a \$, the decimal equivalent in parentheses and the action taken by the Viewmax-80 upon receiving this value. To perform these functions you can use the CHR\$(X) function in APPLESOFT BASIC in PRINT statements or from Assembly language send the hexadecimal value in the Accumulator to COUT after a PR#3.

\$07 (07): BELL. This will cause the Viewmax-80 to activate the speaker for a short time at a tone lower than that usually heard on the Apple II. This difference in tone helps remind you that the Viewmax-80 is active.

\$08 (08): BACKSPACE. This will cause the cursor to move left one column without destroying the character it moves over.

\$0A (10): LINEFEED. This will cause the cursor to move down one line without changing column position. This will cause the screen to scroll if the cursor is currently on the bottom line.

\$0B (11): CLEAR TO END OF SCREEN. This will clear the screen from the present cursor position to the end of the screen. The cursor position will not change.

\$0C (12): FORMFEED. This will home the cursor and clear the entire screen.

\$0D (13): CARRIAGE RETURN. This will cause the screen to clear from the current cursor position to the end of the line and return the cursor to the left edge of the screen. This is the code Pascal and CP/M send to the Viewmax-80 as they add their own linefeeds to carriage returns.

\$8D (141): CARRIAGE RETURN + LINEFEED. This will cause the screen to clear from the current cursor position to the end of the line, return the cursor to the left edge of the screen and perform a linefeed. This is the code Integer and Applesoft BASIC send the Viewmax-80 as they expect devices to add their own linefeeds to carriage returns.

\$19 (25): HOME CURSOR. This will cause the cursor to return to the top left edge of the screen without destroying any screen information.

\$1A (26): LEAD-IN CODE. This character is the lead-in code for the following functions. Precede the following codes with this code to perform these functions:

\$30 (48): INITIALIZE BOARD. Clears screen and sets default parameters such as CAPS lock, shift key status, etc.

\$31 (49): EXIT VIEWMAX-80. Returns to Apple II default input and output devices. This means that a PR#0 and IN#0 are performed and the 40 column screen is switched in. Do not try and exit Viewmax-80 with a PR#0 as the output routine will be 40 column but the soft video switch will still show 80 column and you will be blind. If this happens hit <RESET> and you will also return to Apple II 40 column video.

\$32 (50): NORMAL VIDEO. Selects normal video for all subsequent characters.

\$33 (51): INVERSE VIDEO. Selects inverse video for all subsequent characters.

\$00 to \$1F (00 to 31): SHOW CONTROL. Displays a small representation of each of the control characters.

Remember the above codes must be preceded by \$1A (26) to work properly.

\$1C (28): FORWARD SPACE. This will cause the cursor to move right by one column without destroying the character it passes over.

\$1D (29): CLEAR TO END OF LINE. This will erase the characters from the current cursor position to the end of the line without changing the cursor position.

\$1E (30): CURSOR POSITIONING. This operation will force the Viewmax-80 to position the cursor according to the next two characters it is sent. The character after \$1E (30) is interpreted as the X value starting from a base of \$20 (32). The next character is interpreted as the Y value again starting from a base of \$20 (32).

An example in Applesoft BASIC follows below to demonstrate the use of the cursor positioning function. It is a cursor positioning subroutine that accepts as input X and Y as the cursor coordinates. Remember that the top left edge of the screen is 0,0.

```
1000 PRINT CHR$(30) CHR$(32+X) CHR$(32+Y);  
1010 RETURN
```

\$1F (31): REVERSE LINEFEED. This will cause the cursor to move up one line without changing the column position.

## SOFTWARE INTERACTION

The Viewmax-80 was designed to be as transparent to the user as possible. There are some commands in both Integer and Applesoft BASIC that the Viewmax-80 will not respond to. In most cases there is an equivalent function in the Viewmax-80 that will duplicate these commands. This section will deal with these discrepancies and provide examples for their solution.

HOME  
CALL -936

The HOME command in Applesoft or CALL-936 in Integer clear the screen and home the cursor. To copy this command on the Viewmax-80 simply replace all occurrences of HOME or CALL-936 with a PRINT CHR\$(12);. This will clear the Viewmax-80 screen and home the cursor.

GR  
HGR  
HGR2

There is also the problem of graphics commands such as GR, HGR and HGR2. These commands flip various Apple soft switches to turn the text screen into low or high resolution graphics screens. The problem is that when the Viewmax-80 is active the Apple 40 column video signal (which includes both text and graphics screens) is replaced with the 80 column video signal. The answer to this problem is to take advantage of the soft video switch on board the Viewmax-80. If you want to display the graphics screens then precede all instances of graphics routines with a POKE 49282 + SLOT \* 16 , 0. This will flip the switch to display the Apple video signal. Any subsequent output to the Viewmax-80 will automatically flip the switch to display 80 column video. The program below will demonstrate this technique:

```
100 SLOT = 3
```

```

110 D$ = CHR$(13) + CHR$(4) ; REM DEFINE DOS
STRING
120 PRINT D$ "PR#" SLOT ; REM SELECT VIEWMAX-80
130 PRINT CHR$(12) ; REM CLEAR SCREEN
140 VTAB 12
150 HTAB 24
160 PRINT "HELLO FROM THE 80 COLUMN SCREEN"
170 REM DELAY A FEW SECONDS
180 FOR I = 1 TO 2000
190 NEXT
200 REM SELECT FULL SCREEN GRAPHICS
210 HGR
220 POKE -16302,0
230 REM SELECT APPLE VIDEO
240 POKE 49282 + SLOT * 16 , 0
250 REM DRAW AN X ON THE HI-RES SCREEN
260 HPLOT 0,0 TO 277,191
270 HPLOT 277,0 TO 0,191
280 REM DELAY A FEW SECONDS
290 FOR I = 1 TO 2000
300 NEXT
310 REM NEXT OUTPUT SWITCHES BACK TO 80
COLUMN VIDEO
320 PRINT
330 HTAB 24
340 PRINT "WERE BACK TO 80 COLUMN VIDEO"
350 END

```

#### FLASH

The FLASH command will produce some strange characters on the Viewmax-80 due to the mapping of the characters in the Apple ][ character generator ROM and the absence of FLASHing character capability on the Viewmax-80. This command should be avoided when using the Viewmax-80.

## APPENDIX A TROUBLESHOOTING

This section is included to help the user if he/she cannot get the Viewmax-80 to operate at all or if the video image is very poor. If the problem cannot be solved then the board should be returned to the dealer and the problem fixed. Of course, if there is a problem with the product it is fully covered for parts and labor during the warranty period. If the problem falls under any of the categories below then follow the steps to correct it.

#### No Video Signal

This problem is probably the worst of all because it can be a number of things. Check these simple things first: Is the Apple ][ plugged in and turned on? Is the video monitor plugged in and turned on? Are all of the cables correctly attached and seated firmly into each other? Are the brightness and contrast controls turned to maximum? Is the Apple video level pot (near the game I/O port) turned to maximum (fully clockwise)? Check all of these things and chances are you will find the problem.

#### Weak Video Signal

Again, the problem is probably with the video level pot on the Apple ][. Make sure that it is adjusted for near maximum output if the display is weak. Also check the brightness and contrast controls on the video monitor. Suggested setting for these controls is near maximum on the brightness and just enough of the contrast control to produce a sharp image.

#### Unstable Display

This problem is usually caused by the vertical and horizontal controls not adjusted properly. Adjust each one separately until an acceptable display is attained.



### Non Rectangular Display

This is usually caused by an improper adjustment of the horizontal hold control on the monitor. To adjust the horizontal hold, put up a screenful of characters and adjust the control until the left edge is completely straight. This is a very fine adjustment so turn the control very slowly.

### Apple Video Only

Are you sure the Viewmax-80 is installed correctly? Is it in the slot you think it is? Double check the slot number and insure that you are typing the PR#N correctly (PR#3 for slot 3). If you feel confident enough, turn off the Apple ][ and remove the Viewmax-80. Check all I.C.s and make sure that each is firmly seated in it's socket. Check the gold fingers on the card. If they are dirty they can be cleaned with a new pencil eraser to insure good contact. Reinstall the Viewmax-80 board and seat it firmly.

## APPENDIX B SHIFT KEY MOD

The one wire shift key mod is the oldest and simplest fix that can be made to the Apple ][ to get true upper and lower case operation 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. It is highly recommended that this modification be made as you will find it very valuable not only for the Viewmax-80 but for many other applications as well. Simply follow these simple steps below to install the shift mod:

### Parts needed:

1 mini-grabette clip from Radio Shack , PN 270-370  
1 15 inch piece of small gauge wire  
1 16 pin DIP wire wrap socket (a normal 16 pin DIP socket may do)

1. Solder one end of the wire to the mini-grabette clip.
2. Cut each leg off of the 16 pin wire wrap socket so that only 1/4 inch is left on the socket. If you are using a normal 16 pin DIP socket don't cut the legs off.
3. Solder the other end of the wire to pin 4 of the 16 pin socket as close the body of the socket as possible.
4. You have just completed assembly of the "shift mod wiring harness". Now it must be installed on the Apple ][.
5. Turn the Apple ][ off and remove the cover.
6. Remove whatever is in the game I/O socket and lay it aside.

7. Attach the mini-grabette clip to pin 24 of the keyboard encoder connector. This connector is located inside the Apple directly underneath the <RESET> key. Pin 1 is nearest the power supply and pin 25 is nearest the right edge of the Apple II. Use the grabette clip to attach to standoff pin 24.

8. Lead the other end of the wire with socket attached along the right edge of the Apple II 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 Apple II.

9. Now reinstall whatever was in the game I/O port before the shift mod was installed. If you used a wire wrap socket then you can be sure that it will remain seated even if you are always plugging things into the game I/O port.

10. Replace the Apple II cover and the <SHIFT> key is ready for it's new job.

## APPENDIX C MARKET COMPATABILITY

The Viewmax-80 was designed to be as compatible as possible with all applications that use or require an 80 column card. What follows is a list of operating systems and software packages that work with the Viewmax-80 and any steps necessary (configuration options, pre-boot disk, etc) to insure proper operation of the system.

DOS 3.3, Integer and Applesoft BASIC  
Pascal 1.0 and 1.1  
CP/M from Microsoft and PCPI

Wordstar  
Zardax  
Easywriter Professional  
Apple PIE  
Letter Perfect  
Magic Window II  
ASCII Express Professional  
Transend  
dBASE II

Visicalc (Requires pre-boot disk)  
AppleWriter II (Requires pre-boot disk)

The Viewmax-80 is designed to be upward compatible with the Videx Videoterm 80 column board. If your software package displays an 80 column card selection menu, choose the Videx (Videoterm) option.