



# **THE VISION-80 VIDEO CARD**

**VIDEO ENHANCEMENT DEVICE  
FOR THE APPLE II  
MICROCOMPUTER**

**OWNER'S MANUAL**

# VISION-80 VIDEO CARD (tm)

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## Vision-80 VIDEO CARD (tm)

By simply plugging in the Vision-80 Video Card, any Apple II computer can display a full 80 column by 24 line screen, in upper and lower case, for word processing, communications and applications software.

The Vision-80 Video Card is the most sophisticated easily-installed (single circuit board) device available to enhance the video display capacity and capabilities of the Apple II computer.

By adding the Vision-80 Video Card's simple mnemonic command structure, complete adherence to Apple's hardware and software conventions, and numerous built-in advanced features to your Apple II computer, you now have a powerful yet easy-to-use peripheral with capabilities previously not available.

## FEATURES OVERVIEW

This section presents the features of the Vision-80 Video Card. Detailed operating instructions for the card and all features are found in Section Three. (Section Two will explain how to install the Vision-80 Video Card.)

### 1.1 FULL UPPER AND LOWER CASE CHARACTER SET

Character dot matrices are generated in 9\*10 (US) and 9\*11 (EURO) formats, providing 3 lines of dots for full descenders on lower case letters. The full ASCII set of 128 characters is standard, with an optional alternate character set or graphics set available.

### 1.2 SHIFT AND SHIFT LOCK

A minor keyboard modification allows the Apple II keyboard to function using the <SHIFT> key, similar to any typewriter or word processor when handling upper and lower case text. Shift acts as it does on a normal typewriter, and also acts as shift lock.

#### 1.2.1 ADDITIONAL KEYBOARD CHARACTERS

With the keyboard shift key modification installed 12 additional characters not normally available on the standard Apple keyboard are capable of being displayed. <BREAK> and <DEL> keys are available for communications.

#### 1.2.2 VISUAL SHIFT LOCK INDICATOR

Included with the keyboard shift key modification is an easily installed LED to indicate visually the shift lock and unlocked status of the keyboard.

### 1.3 COMPATIBILITY WITH OTHER APPLE II PERIPHERAL DEVICES

The Vision-80 Video Card is fully compatible with Apple II and other popular peripherals, including the Communications Card, CORVUS disk system, Language Card, CCS Serial Card, Z-80 (Microsoft) Card and Dan Paymar adaptor.

### 1.4 COMPATIBILITY WITH EXISTING APPLE II SOFTWARE

The Vision-80 Video Card is compatible with all existing Apple II BASIC software, and allows the introduction of 80 column upper and lower case text into programs written in :

- BASIC
- PASCAL
- FORTRAN
- CP/M (Microsoft)
- ASSEMBLER

## 1.5 SUPPORT OF APPLE II SYSTEM COMMANDS

The Vision-80 Video Card supports all (APPLESOFT) Apple II commands when in 80 by 24 mode:

- HOME - (replaces CALL-936)
- TEXT
- GR
- HGR
- HGR2
- APPLE "TEXT WINDOW" - <POKE> 32,33,34,35
- PR#0
- <ESC> <SHIFT> P
- <ESC> E
- <ESC> F
- TAB VTAB and HTAB
- ESC (I,J,K,M) & (A,B,C,D)
- stop List
- clear to end of line - CHR\$ (29)  
(replaces CALL-868)
- clear to end of screen - CHR\$ (11)  
(replaces CALL-958)
- inverse and normal (SI and SO)  
(highlight and lowlight in CP/M and PASCAL)

## 1.6 OPERATING MODES

The Vision-80 Video Card may be switched (by a simple software command) into the following operating modes:

- 80 column \* 24 line display
- 40 column \* 24 line display
- communications in 80\*24 display at up to 1800 baud. (in upper and lower case)
- 80 column BASIC listing
- normal character set
- alternate character set
- normal graphics set
- alternate graphics set
- debug on (i.e. control characters displayed)
- debug off

## 1.7 VIDEO MODE SWITCHING AND TWO-MONITOR OUTPUT

The Vision-80 Video Card treats both the 80\*24, 40\*24 and all graphics screens as completely independent display areas. On the 80-column monitor, this allows video source switching between:

- 80\*24 upper/lower case text normal character set.  
(9\*10) US or (9\*11) EURO
- 80\*24 upper/lower case text alternate character set.  
(9\*10) US or (9\*11) EURO
- 80\*24 GRAPHICS/TEXT normal character set.  
(8\*10) US or (8\*11) EURO
- 80\*24 GRAPHICS/TEXT alternate character set.  
(8\*10) US or (8\*11) EURO
- 40\*24 upper case text, or upper/lower case display with the Paymar or similar converter.
- APPLE LOW RES graphics including color.
- APPLE HI RES graphics including color.

Standard Apple video output is always available at the normal video output socket. This allows the use of two monitors, simultaneously displaying 40 or 80\*24 text or graphics on the Vision-80's monitor, and Apple video text or graphics (in color or black and white) on the other monitor or TV set.

## 1.8 VIDEO SOURCE SWITCHING

Allows display of 40\*24 text or graphics screen while simultaneously writing text to the 80\*24 screen using one monitor.

## 1.9 ALTERNATE OR GRAPHICS CHARACTER SET

The Vision-80 Video Card can have two different character sets on the card at any one time. A simple command can select either set instantly. For example, English as the normal character set, French as the alternate.

Instead of an alternate character set you may wish to have a graphics character set included. This can add a very professional look to your applications programs; for example, on screen forms generation for business applications. A program and instructions have been included to allow you to define your own personalized, alternate or graphics character sets.

## 1.10 INTELLIGENT TERMINAL (COMMUNICATIONS)

The Vision-80 Video Card's on-card communications driver software gives your Apple II the ability to be used as a true interactive intelligent terminal to mainframe computers or communication facilities.

Powerful new applications are possible for the Apple II through the combination of 80\*24 video display, interactive upper and lower case keyboard, including <BREAK> and <DEL> keys, local control that allows DOS commands to be issued, facilities for saving input data to disk, using LOGON (macro) files, transmitting data produced by programs or wordprocessors, and echoing data to a printer all while remaining in communications mode.

With appropriate hardware and the Vision-80 Video Card's remote commands in communications, you can have control of a remote Apple, to CATALOG floppy or hard disk drives, LOAD, TRANSMIT, SAVE, DELETE or RENAME FILES. The "paperless office" is now possible.

## 1.11 CURSOR DEFINITION

Simple commands allow the following cursors to be easily defined:

- |              |                |                 |
|--------------|----------------|-----------------|
| - full block | and either may | - non blinking  |
| - underscore | be set to:     | - fast blinking |
|              |                | - slow blinking |

## 1.12 TEXT WINDOW

The APPLE II standard text window is fully supported. e.g., POKE 32, POKE 33, POKE 34 AND POKE 35.

## 1.13 DISPLAY CONTROL CHARACTERS

An added feature is the ability to display control characters when in debug mode. These appear as upper case UNDERSCORED characters when using the normal character set, or you may redefine these yourself.

## 1.14 STOP LIST

This function allows program line listings to be interrupted during program editing.

## 1.15 80 COLUMN BASIC LISTING

The Vision-80 Video Card now allows listing of BASIC programs in 80 columns for faster and more efficient program editing.

### 1.16 FLUSH

This function allows screen output to be suspended while program operation continues.

### 1.17 50 OR 60 HERTZ OPERATION

No hardware modifications are required for 50 or 60 hertz operation. ROMs are available for 50 hertz (EURO) operation, as well as US standard 60 hertz.

### 1.18 RELIABILITY

While this is a large card in comparison to most APPLE II peripherals, an independent conservative estimate of M.T.B.F. (Mean Time Between Failure) is 30,000 HRS and M.T.T.R. (Mean Time To Repair) is estimated at 1.5 HRS.

Current drain on the +5VDC supply is approximately 550-575 mA.

### 1.19 WHAT IS INCLUDED

The Vision-80 Video Card comes complete with:

- 1 Vision-80 Video Card
- 2 video connector leads
- 1 keyboard modification cable  
(installation instructions in this manual)
- 1 Instruction manual including Schematics and programming examples
- 3 months parts and labour warranty.

## 2. INSTALLING THE Vision-80 Video Card.

This section will take you through the simple steps required to install your Vision-80 Video Card. Also covered is the installation of the keyboard modification wire that permits the card to display upper/lower case and the visual shift lock indicator to indicate the current keyboard mode.

Included with the package are two (2) cable assemblies one is used for connecting the video card to the video monitor and Apple video source the other is used for the keyboard modification and visual shift lock indicator.

Please read through all of the steps below before beginning the installation.

CAUTION: BE CERTAIN THE APPLE II IS TURNED OFF AND UNPLUGGED BEFORE PERFORMING THESE STEPS.

### 2.1 INSTALLING THE Vision-80 VIDEO CARD.

The Vision-80 Video Card is installed in Slot 3 of the Apple II's Peripheral Connectors, located at the back of the Apple II main circuit board. Cable connections are made to the main circuit board, and to a suitable video monitor. (A monitor with a bandwidth of at least 12 Megahertz is recommended).

Use the cable assembly with one end terminated in an RCA-type plug and a single wire and the other end terminated with a small rectangular socket. The RCA plug is for connection to the video monitor screen and the single wire is for the Apple video signal.

The other end connects to the Vision-80 Video Card.

Follow these steps to install the card :

(1) SWITCH OFF THE POWER TO THE COMPUTER!

(2) Open the cover and insert your Vision-80 into Slot 3 with firm downward pressure. Be sure the card is seated completely and squarely in the slot.

(3) Slide the RCA-type plug end of the cable into the second access slot from the right on the back of the Apple II's case. Orient the cable towards the front of the Apple. Connect the small socket to the edge connector pins on the Vision-80 marked OUT-IN-VIDEO with the two common coloured wires facing upwards.

(4) On newer Apples locate the frontmost four pin or two pin Video Output Connector at the back, right hand side of the main circuit board on older Apples this is a single pin (refer Apple II Reference Manual figure 10, p.89 and figure 15, p.98).

(5) Press the single wire on the RCA socket end of the cable onto the leftmost pin on the frontmost four pin or two pin connector or onto the single pin whichever is applicable. If your Apple does not have either of these two connectors then the single wire may be connected to the second pin from the left on the rearmost four pin connector. (Marked (VIDEO) figure 15, p.98 APPLE II reference manual.)

The Vision-80 Video Card is now installed.

## 2.2 KEYBOARD MODIFICATION.

To take full advantage of the upper and lower case features provided by the Vision-80, a minor modification to the Apple II keyboard is necessary. This modification allows the <SHIFT> key to operate like a normal <SHIFT> key and also to operate like the <SHIFT LOCK> key on a typewriter. Without this modification the card will not allow switching between upper and lower case and some functions will not be available to the user.

Use the cable assembly consisting of a 16 pin plug/socket, connected by two wires to a LED (Light Emitting Diode) and a single wire for connection to the keyboard encoder.

Before attempting this modification, bear in mind that it is easy to cause extensive damage to the Apple II by using tools not designed for digital circuitry or by making incorrect connections. If any doubt exists about making this modification, it may be prudent to check with your Apple service organization, and allow them to carry out the task.

To implement the SHIFT and SHIFT LOCK functions, the program on the Vision-80 must be able to sense the setting of the <SHIFT> key. This is achieved by connecting the key to a switch on the Game I/O Connector (see the Apple II Reference Manual, p.23). The result of the modification is to connect the <SHIFT> key to switch PB2.

NOTE : THIS MODIFICATION DOES NOT AFFECT NORMAL PADDLE OPERATION.

### 2.2.1 INSTALLING THE KEYBOARD MODIFICATION

The steps needed to make this modification differ depending on the version of the keyboard on your Apple II. On the newer Apples with a two-part keyboard, the changes can be made without any soldering or other warranty-voiding changes. On older machines, some simple soldering is required. Your dealer can make these changes for you, in roughly 15 minutes, if you prefer not to do the job yourself.

CAUTION: SWITCH OFF THE POWER BEFORE MAKING ANY MODIFICATIONS.

## NEWER APPLES:

(1) On newer Apples, there is a circuit board (the Keyboard Encoder card) mounted underneath the keyboard circuit board with 25 gold pins visible.

The pins on the Encoder card are numbered from 1 to 25 when facing the Apple II keyboard (i.e. the position when normally operating the system), pin 1 is on the left and pin 25 on the right.

(2) With a small pair of long nose pliers gently bend pin 24 (second from the right) of the Encoder card towards the back of the Apple at a 45 deg. angle and press the single wire socket over the pin.

Press the 16 pin plug into the socket marked GAME I/C - located on the right hand side of the Apple mother board with the bevelled corner facing towards the front and to the right of the socket.

The final connections are:

	ENCODER PIN	GAME CONNECTOR
SHIFT KEY	24	4 (PB2)

## OLDER APPLES:

On older Apples, there is no Encoder card, so the wire is connected directly to the keyboard. This alternative requires that you remove the case on your Apple II, and that solder connections be made.

Here are the steps:

(1) Remove the Apple's case, and disconnect the keyboard cable from the main circuit board (mother board).

(2) Remove the test clip from the end of the wire, strip the end, leaving no more than 1/8 inch of exposed wire.

(3) On the bottom of the Keyboard card, the <SHIFT> key is numbered 42. At the bottom of each key, there are two pins. Locate the right hand pin of key 42 (i.e. the pin that does not have a circuit board trace in common with all other keys).

(4) Solder the wire to the not common pin of key 42, the <SHIFT> key and press the 16 pin plug into the socket marked GAME I/O located on the right hand side of the Apple mother board with the bevelled corner facing towards the front and to the right of the socket.

The final configuration is:

	KEYBOARD PIN	GAME CONNECTOR
SHIFT KEY	42	4 (PB2)

NOTE: Some keyboard modifications used by some software use pin 24 or 42 to pin 2 of the game/io connector. To utilise this modification simply solder a jumper from pin 2 to pin 4 of the plug and pin 3 of the socket to pin 3 of the keyboard encoder card thus allowing the use of both types of modification.

### 2.2.2 VISUAL SHIFT LOCK INDICATOR

To install the visual shift lock indicator remove the Apple case and keyboard drill a 1/4" hole in a convenient position on the Apple case.

WARNING : REMOVE THE APPLE CASE AND KEYBOARD BEFORE DRILLING HOLE AS DAMAGE TO EITHER THE APPLE KEYBOARD OR MOTHERBOARD CAN RESULT.

Remove the plastic LED mount from the LED.  
Press the LED mount into the drilled hole.  
Press the LED into the hole from underneath the Apple case.  
Secure with super glue or similar if necessary.  
Press the 16 pin plug into the socket marked GAME I/O located on the right hand side of the Apple mother board with the bevelled corner facing towards the front and to the right of the socket.

The connection on the GAME I/O paddle is:  
Pin 1 of GAME I/O to (+) lead of LED  
Pin 15 of GAME I/O to 470 Ohm resistor to (-) lead of LED

NOTE: The Vision-80 input routine toggles AN0 on the GAME I/O.

The keyboard modification and visual shift lock indicator are now complete and ready for use.

### 2.3 VIDEO ADJUSTMENT.

During operation of the Vision-80 Video Card, the contrast, signal level and vertical height may require adjustment this can be made by adjustment of the following:

- Apple II video level potentiometer
- monitor contrast and brightness controls
- monitor height & vertical linearity
- monitor horizontal & vertical hold
- Vision 80 Card output potentiometer  
(marked "RV1" and located towards the front of the card).

REFER TO SECTION 8, "DIAGNOSTICS" FOR FURTHER INFORMATION IF YOU EXPERIENCE ANY DIFFICULTY.

### 3. OPERATING THE Vision-80 CARD

The sections below provide all the details needed to use your Vision-80 Video Card from either the keyboard or a program. The commands and features of the card are explained separately in these numbered sections. Within each section, special cautions or conditions are indicated in specific "NOTES."

#### 3.1 ACCESSING 80\*24 FORMAT.

The Vision-80 Card makes full use of Apple II and Applesoft commands for dealing with the screen and with graphics. Thus, the user should be familiar with APPLE II commands, DOS and APPLESOFT.

Once the Card has been installed in your Apple II, (refer to Section 2), it is accessed by issuing the command:

"PR#3" FROM THE KEYBOARD

or under program control

10 PRINT CHR\$(4); "PR#3"

When this command is executed the screen will immediately switch to 80\*24 format, and remain in this mode until:

- 1. an appropriate card control command is given (see 3.3 below)
- or
- 2. RESET (HARD EXIT) is pressed
- or
- 3. the command <CONTROL Z> <4> followed by "PR#0" and "IN#0" is executed (SOFT EXIT).

NOTE : IF A HARD EXIT <RESET> IS ISSUED WHEN IN 80\*24 MODE, THE <FP> <CR> COMMAND MUST BE GIVEN BEFORE ANY OTHER COMMAND IS ISSUED. TO RETURN TO 80\*24 FORMAT, ISSUE ANOTHER "PR#3" COMMAND.

NOTE : DOS MUST ALWAYS BE BOOTED WITH THE 40\*24 APPLE SCREEN DISPLAYED.

NOTE : A "PR#0" WILL RECONNECT YOU TO THE CURRENT ACTIVE SCREEN FOLLOWING A "PR#n" TO ANY OTHER SLOT WHICH IS NOT A DISK CONTROLLER.

NOTE : WHEN THE Vision-80 CARD IS ACTIVE, THE BELL CHARACTER <CONTROL G> SOUNDS DIFFERENT TO THE STANDARD APPLE BELL. IT HAS A MORE MUSICAL TONE.

### 3.2 UPPER AND LOWER CASE

Upper and lower case may be typed into the Apple with the keyboard modification of Section 2.1, above. The modification permits a closer emulation of standard typewriter shift and shift lock, allowing all the Vision-80 Video Card commands to function. After the keyboard modification has been installed, upper and lower case characters are generated under control of the <SHIFT> key similar to a typewriter.

With the modification, the card has two keyboard modes:

- "APPLE" keyboard mode (when locked in upper case)
- "TYPEWRITER" mode (when in upper and lower case).

Characters available differ in these two modes.

#### 3.2.1 SHIFTING WITH THE MODIFIED KEYBOARD

The <SHIFT> key is used to carry out the function of the "shift lock" key missing from the Apple II: When the <SHIFT> key is pressed and released without any other key being pressed, the keyboard will change into lower case, or "TYPEWRITER" keyboard mode, until the <SHIFT> is pressed and released a second time, which returns the keyboard to "APPLE" mode.

When in "TYPEWRITER" mode all ALPHA keys will be in lower case except when <SHIFT> and the appropriate key are simultaneously pressed.

When in "APPLE" mode the keyboard acts the same as a normal APPLE keyboard except that additional keyboard characters can also be entered (refer to Section 3.9, ADDITIONAL KEYBOARD CHARACTERS) by simultaneously pressing the <SHIFT> key and the appropriate key.

#### 3.2.2 VISUAL SHIFT LOCK INDICATOR

When installed this enhancement will cause the LED when in "APPLE" keyboard mode to be lit and unlit when in "TYPEWRITER" mode giving a visual indication of the keyboards current shifted status.

NOTE : CONTROL COMMANDS FOR THE Vision-80 Card MUST BE IN UPPER CASE. FOR EXAMPLE, THE "L" IN <CONTROL> Z L WILL BE INTERPRETED CORRECTLY ONLY IF YOU ARE IN "APPLE" KEYBOARD (SHIFT LOCK) MODE, OR HOLDING THE SHIFT KEY DOWN IF IN "TYPEWRITER" MODE.

### 3.3 VIDEO CARD CONTROL CODES

Upon entering one of the following CONTROL SEQUENCES, from the keyboard or under program control the Vision-80 Card will switch into a different operating mode or video display mode.

Examples of the use of Basic commands and Vision-80 commands are given in section 7 headed DEMONSTRATION PROGRAM.

The control sequence is:

```
<CONTROL Z> "CHR"
```

or

```
PRINT CHR$(26); "CHR"
```

where <CONTROL Z> is the character formed by pressing the <CONTROL> and <Z> keys simultaneously, and <CHR> is an upper case character, as follows:

- "4" Switch to APPLE 40\*24 format
- "8" Switch to 80\*24 format
- "9" Switch to 80\*24 9 dot character format (9\*11 EURO or 9\*10 US)
- "A" Switch to 80\*24 alternate character set
- "B" Block cursor
- "C" Switch to 80\*24 communications mode
- "D" Switch 80\*24 debug mode on
- "E" Non blink cursor
- "F" Fast blink cursor
- "G" Switch to 80\*24 GRAHICS 8 dot character format (8\*11 EURO or 8\*10 US)
- "L" List BASIC in 80 columns
- "N" Switch to 80\*24 normal character set and NORMAL mode
- "O" Switch 80\*24 debug mode off
- "S" Slow blink cursor
- "T" Toggle video source
- "U" Underscore cursor

These commands are discussed in detail in Sections 3.3.1 through 3.3.12 below.

### 3.3.1 <CONTROL Z> "4" Switch to 40\*24 format:

After the video card has been initialized (with PR#3) this control sequence displays and activates the standard 40\*24 screen. Activating the 40\*24 screen indicates that control or commands (e.g. TEXT) will now apply only to the 40\*24 screen. TEXT will now reset the 40 column screen and not return control to the 80 column screen as TEXT would do following GR from the 80 column screen.

NOTE : This also allows the keyboard modification to work on the 40\*24 screen to display upper and lower case with an appropriate character generator installed.

### 3.3.2 <CONTROL Z> "8" Switch to 80\*24 format:

Reactivates control to the 80\*24 screen following a <CONTROL Z> "4".

### 3.3.3 <CONTROL Z> "9" 9 dot character format:

Returns the Vision-80 card to 9 dot character format (9\*10 US or 9\*11 EURO) after selecting a <CONTROL Z> "G" (8 dot character format). Refer section 6.3, "Selecting Character Set and Format".

### 3.3.4 <CONTROL Z> "A" Alternate character set:

The Vision-80 Video Card can accommodate two (2) character sets, a normal and an alternate, either being available by selecting the appropriate command. <CONTROL Z> "A" selects the Alternate set but does not set the character format. Refer section 6.3, "Selecting Character Set and Format". Alternate character sets have not been included with the Vision-80 Card. Character sets are available from your local distributor as an additional option. Included in section 6 is a simple program that can be used to produce your own tailored character set.

### 3.3.5 <CONTROL Z> "C" Communications:

Refer to Section 4. for a complete description of the numerous communications features available.

### 3.3.6 <CONTROL Z> "D" Debug mode on:

This allows CONTROL CHARACTERS to be displayed but not activated. With the standard character set they appear as underscore uppercase characters. To list programs with debug on, set 80 column BASIC list on: <CONTROL Z> "L"  
i.e. <CR> or CARRIAGE RETURN would appear as M (CONTROL M), the appropriate control code for <CR>.

### 3.3.7 <CONTROL Z> "G" Graphics mode:

The Vision-80 Video Card can, instead of an alternate character set, display a graphics character set with an 8 dot character format (8\*10 US or 8\*11 EURO). This command sets the character format to 8 dots but does not select the appropriate character set. Refer section 6.3, "Selecting Character Set and Format". Graphics character sets have not been included with the Vision-80 Card, but are available from your local distributor as an additional option. (Or you may define your own, see section 6).

### 3.3.8 <CONTROL Z> "L" List BASIC in 80 column:

As the Vision-80 Video Card adheres to all APPLE standards, APPLESOFT BASIC cannot normally be listed in 80 column without affecting the operation of the commands TAB and HTAB. <CONTROL Z> "L" has been included to allow the listing of programs in 80 column format and allows the use of all screen editing commands.

To turn off 80 Column BASIC Listing, type <CONTROL Z> "L" a second time.

NOTE : THE 80 COLUMN BASIC LISTING MUST BE SWITCHED OFF BEFORE RUNNING A PROGRAM TO RESET TO APPLE STANDARDS.

### 3.3.9 <CONTROL Z> "N" Normal character set:

The Vision-80 Video Card can accommodate two (2) character sets, a normal or an alternate, either being available by selecting the appropriate command. <CONTROL Z> "N" selects the Normal or default character set following selection of the alternate character set but does not set the character format. Refer section 6.3, "Selecting Character Set and Format".

### 3.3.10 <CONTROL Z> "O" Debug mode off:

Switches debug mode off allowing normal operation of CONTROL CHARACTERS.

### 3.3.11 <CONTROL Z> "T" Toggle video source:

Because the Vision-80 Video Card has its own independent screen RAM and APPLE video pickup it does not interfere with the normal APPLE video screen in any way. This allows completely INDEPENDENT video screens to be selected. The TOGGLE VIDEO SOURCE control code <CONTROL Z> "T" has been included to allow switching between the 40 and 80 column screens without deactivating or taking control away from either screen.

<CONTROL Z> "T" acts as a toggle to switch display between the 40 and 80 column screens. The cursor and any program printed output remain on the current active screen, while the other is being displayed. You can, for example, write text to the 80\*24 screen while displaying Apple text or graphics on the 40 column screen.

NOTE : THIS COMMAND IS USED IN PASCAL AND CP/M TO DISPLAY GRAPHICS OR TEXT GENERATED IN THE APPLE SCREEN RAM WHEN ONE VIDEO MONITOR IS CONNECTED TO THE Vision-80. ALTERNATIVELY TWO MONITORS CAN BE USED SIMULTANEOUSLY, ONE CONNECTED TO THE Vision-80 Video Card DISPLAYING 80\*24 TEXT AND ONE CONNECTED TO THE NORMAL APPLE VIDEO OUT DISPLAYING GRAPHICS OR TEXT. THE DEMONSTRATION PROGRAM (SECTION 7) SHOWS THIS DUAL SCREEN FEATURE IN USE FROM BASIC.

### 3.3.12 CURSOR DEFINITION

Two types of cursor, block and underscore, are available with three blink modes.

These commands can be issued from the keyboard or under program control by issuing the appropriate command sequences.

To set the cursor type and mode use the following commands:

set cursor type:

```
<CONTROL Z> "B"  block
<CONTROL Z> "U"  underscore
```

set cursor mode:

```
<CONTROL Z> "E"  non blink
<CONTROL Z> "F"  fast blink
<CONTROL Z> "S"  slow blink
```

### 3.4 SCREEN CONTROL CODES.

The Vision-80 Video Card uses the following PROGRAM codes for screen control. These codes are effected by issuing the appropriate ASCII codes from within a program : i.e. PRINT CHR\$(nn) where "nn" is the appropriate ASCII value for the function required:

ASCII - NAME	DECIMAL VALUE	- FUNCTION
BEL	7	sound system bell
BS	8	non destructive back space
LF	10	line feed
VT	11	clear to end of screen
FF	12	form feed (equivalent to "HOME")
CR	13	carriage return
SI	14	set "NORMAL" display mode (LOWLIGHT TEXT in CPM)
SO	15	set "INVERSE" display mode (HIGHLIGHT TEXT in CPM)
EM	25	home cursor without clearing screen
FS	28	non destructive forward space
GS	29	clear to end of line
RS	30	GOTO XY lead in
US	31	reverse line feed

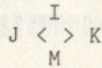
### 3.5 MONITOR ESCAPE CODES

The Vision-80 card uses the standard APPLE monitor escape codes obtainable only from keyboard input:

- <ESC> - A move cursor right
- <ESC> - B move cursor left
- <ESC> - C move cursor down
- <ESC> - D move cursor up

OR

<ESC> - followed by either I,J,K,M or multiples of any forming a diamond shape on the keyboard indicating the direction of cursor movement.



- <ESC> - E clear to end of line from current cursor position
- <ESC> - F clear to end of screen from current cursor position
- <ESC> - @ clear screen and home the cursor.

Two run time monitor control codes have also been included. They are:

<CONTROL S> - STOP LIST - This command suspends output to the screen and suspends program execution until any other key except <ESC>, <CTRL>, <SHIFT> or <RESET> is pressed, at which time normal processing will resume. It is commonly used to suspend a program listing during editing.

<CONTROL F> - FLUSH - This command allows the output to the screen to be halted without the running program being affected. It can be terminated by a second <CONTROL F>, otherwise it will be automatically terminated when a keyboard input is requested. It has been added to speed up the operation of a program having output to the screen where display may not be required continuously.

### 3.6 ADDITIONAL KEYBOARD CHARACTERS

Twelve additional keyboard characters are available when the Vision-80 Card is active and the keyboard modification is installed. The keyboard must be in "Apple" mode (i.e., locked in upper case) to obtain these characters:

- <SHIFT> <O> " " "
- <SHIFT> <K> "[ "
- <SHIFT> <M> "] "
- <SHIFT> <L> "\" "
- <SHIFT> <P> "@ "
- <SHIFT> <N> "^ "
- <SHIFT> <Q> "{" "
- <SHIFT> <S> "}" "
- <SHIFT> <R> "| "
- <SHIFT> <U> "DEL"
- <SHIFT> <T> "~ "
- <SHIFT> <V> "` "

### 3.7 USING THE Vision-80 CARD WITH BASIC

The Vision-80 Video Card may be used by most BASIC programs with little or no modification required in the program code. Sections 3.7.1 through 3.7.12 review the text and graphics commands available. Clear to end of line and clear to end of screen are supported by the Vision-80 Video Card, through control characters, replacing two CALLs normally used by Applesoft to perform these functions in BASIC programs.

NOTE : Examples of the use of Basic commands and Vision-80 commands are given in section 7 headed DEMONSTRATION PROGRAM. Other than the notes outlined in sections 3.7.1, 3.7.7 and 3.7.8 regarding the changes to CALLS all APPLESOFT and DOS COMMANDS will function and all APPLESOFT programs will run on the Vision-80 Video Card excepting that they may still only be formatted in 40 column. In this case TABS will need to be altered to utilise the 80 column screen.

The following APPLESOFT commands are FULLY supported by the Vision-80 card.

#### 3.7.1 - HOME imm & def

When in 80\*24 or 40\*24 mode the HOME command moves the cursor to the upper left screen position within the 80\*24 OR 40\*24 scrolling window and clears all text within the window. The Monitor escape equivalent is <ESC> <@>.

NOTE : "CALL-936" MUST BE REPLACED WITHIN A PROGRAM BY "HOME" IF THE 80\*24 SCREEN IS ACTIVE WHEN THE COMMAND IS ISSUED. "PRINT CHR\$(12)" - FORM FEED - MAY ALSO BE USED, AND WOULD NORMALLY APPLY IN INTEGER BASIC.

### 3.7.2 - TEXT imm & def

When either the 80\*24 or 40\*24 screen is ACTIVE, the TEXT command sets the active screen to full-screen text mode. The prompt and cursor are moved to the last line of the ACTIVE screen (equivalent to VTAB 24). If the text window has been set to anything other than full screen, TEXT resets it to FULL SCREEN.

e.g. If the <GR> command was issued from the 80\*24 screen then that is the ACTIVE screen and TEXT will return the cursor to the 80\*24 screen. If <CONTROL Z> "4" was issued from the 80\*24 screen then the 40\*24 screen is the ACTIVE screen. TEXT would then reset the 40\*24 screen.

### 3.7.3 - GR imm & def

When in 80\*24 or 40\*24 format, GR displays and sets the Apple screen to (40\*40) low-resolution GGraphics leaving 4 lines (40\*24) of text at the bottom. To return to the current ACTIVE screen type TEXT.

eg. If the <GR> command was issued from the 80\*24 screen then that is the ACTIVE screen and TEXT will return the cursor to the 80\*24 screen. If <CONTROL Z> "4" was issued from the 80\*24 screen then the 40\*24 screen is the ACTIVE screen. TEXT would then reset the 40\*24 screen.

### 3.7.4 - HGR imm & def

When in 80\*24 or 40\*24 format, HGR displays and sets the screen to (280\*160) high-resolution graphics screen one, leaving 4 lines (40\*24) of text at the bottom. A POKE -16302,0 will set the full 280\*192 HIRES screen. To return to the current ACTIVE screen type TEXT.

e.g. If the <HGR> command was issued from the 80\*24 screen then that is the ACTIVE screen and TEXT will return the cursor to the 80\*24 screen. If <CONTROL Z> "4" was issued from the 80\*24 screen then the 40\*24 screen is the ACTIVE screen. TEXT would then reset the 40\*24 screen.

### 3.7.5 - HGR2 imm & def

When in 80\*24 or 40\*24 format, HGR2 displays and sets the screen to full screen (280\*192) high-resolution graphics mode. To return to the current ACTIVE screen type TEXT.

e.g. If the <HGR2> command was issued from the 80\*24 screen then that is the ACTIVE screen and TEXT will return the cursor to the 80\*24 screen. If <CONTROL Z> "4" was issued from the 80\*24 screen then the 40\*24 screen is the ACTIVE screen. TEXT would then reset the 40\*24 screen.

### 3.7.6 - PR#0 imm & def

PR#0 returns output to the current ACTIVE screen, not slot 0. The ACTIVE screen is the one from which the original command was issued.

### 3.7.7 - CLEAR TO END OF LINE

A clear to end of line command is not supported by the APPLE. A CALL (-868) to a monitor routine is often used for this function. These calls MUST be replaced by PRINT CHR\$(29) if the 80\*24 screen is active when the command is issued.

Monitor escape equivalent is <ESC> <E>.

### 3.7.8 - CLEAR TO END OF SCREEN

A clear to end of line command is not supported by the APPLE. A CALL-958 to a monitor routine is often used. These calls MUST be replaced by PRINT CHR\$(11) if the 80\*24 screen is active when the command is issued.

Monitor escape equivalent is <ESC> <F> .

### 3.7.9 - UPPER AND LOWER CASE

All APPLESOFT BASIC commands must be typed in UPPER CASE. The contents of text strings may be in upper or lower case, however. Lower case will display correctly on the 80 column screen, and on the 40 column screen if a commercial lower case adapter (such as the Paymar) has been installed. Upper and lower case may be typed directly on the 40\*24 screen if the 80\*24 screen Video Card has been initialised and the command <CONTROL Z> "4" has been executed.

The following statement is correct:

```
10 PRINT "Zofarry Enterprises Pty. Ltd."
```

but

```
10 print "Vision-80 Card"
```

is incorrect.

### 3.7.10 - INVERSE NORMAL AND FLASH

INVERSE, FLASH and NORMAL commands are supported by the APPLE 40\*24 screen and by the Vision-80, however FLASH will be treated automatically as INVERSE on the Vision-80 card. INVERSE and NORMAL are treated the same way on the 80 column screen as they would be on the 40 column screen.

### 3.7.11 - GOTO X,Y

Direct screen addressing, GOTO followed by X,Y co-ordinates (where X and Y are single ASCII characters greater than 32), for absolute cursor screen positioning is supported in Basic when used with the Vision-80 Video Card, although this is normally a function of PASCAL, FORTRAN AND CP/M. It can be used with software developed using this capability.

### 3.7.12 - PARALLEL PRINTERS

This section has been included since several users have contacted us with problems using this type of printer interface. The problem has been defined thus:

The parallel printer when addressed (usually with a PR#1) from the 80\*24 screen has the PRINTER WIDTH set at 40 COLUMNS, and will print only 40 columns. Therefore a <CONTROL I> "80N" or similar command must be issued to the printer after the PR#1 to set the PRINTER WIDTH to 80 COLUMNS, as this is the output format from the Vision-80.

### 3.8 PASCAL, FORTRAN AND CP/M

Programs in these languages were originally formatted to use an 80\*24 line screen display. They use the Vision-80 Card automatically and require no modification except one in Pascal which you may or may not elect to do. That is change one (1) parameter in the SYSTEM.MISCINFO file on your Apple1 system disk.

Apple initially set the console screen width to 79 columns allowing abbreviated prompt lines on the 40\*24 screen. Executing the program SETUP.CODE supplied on the Apple3 diskette and setting the screen width parameter to 80 column will ensure that all prompt lines will appear in their unabbreviated form. This change if not done will in no way effect the operation of the Vision-80.

The Vision-80 Video Card will automatically switch to 80\*24 display on booting Pascal, FORTRAN or CP/M and will assume the role of a SYSTEM CONSOLE device, i.e. Datamedia terminal.

The Vision-80 Video Card's screen control codes, full upper and lower case keyboard including additional characters, cursor definition and all video control codes except communications are available for users of Pascal, CP/M and FORTRAN.

By converting Pascal, CP/M and FORTRAN files into APPLE DOS text files they can be transmitted using the Vision-80 communications facilities, or alternatively they can be saved as APPLE DOS text files and then converted.

Information is given in section 5 on how to link your program to the communications facility.

### 3.8.1 VIDEO CARD CONTROL CODES

Upon entering one of the following CONTROL SEQUENCES, from the keyboard or under program control, the Vision-80 Card will switch into a different operating mode or video display mode.

"4"	Switch to APPLE 40*24 format
"8"	Switch to 80*24 format
"9"	Switch to 80*24 9 dot character format (9*11 EURO or 9*10 US)
"A"	Switch to 80*24 alternate character set
"B"	Block cursor
"D"	Switch 80*24 debug mode on
"E"	Non blink cursor
"F"	Fast blink cursor
"G"	Switch to 80*24 GRAPHICS 8 dot character format (8*11 EURO or 8*10 US)
"N"	Switch to 80*24 normal character set and NORMAL mode
"O"	Switch 80*24 debug mode off
"S"	Slow blink cursor
"T"	Toggle video source
"U"	Underscore cursor

These commands are discussed in detail from Sections 3.3.1 through 3.3.12 above.

### 3.8.2 SCREEN CONTROL CODES.

The Vision-80 Video Card uses the following PROGRAM codes for screen control. These codes are effected by issuing the appropriate ASCII codes from within a program : ie. PRINT CHR\$(nn) where "nn" is the appropriate ASCII value for the function required:

ASCII - NAME	DECIMAL VALUE	FUNCTION
BEL	7	sound system bell
BS	8	non destructive back space
LF	10	line feed
VT	11	clear to end of screen
FF	12	form feed (equivalent to "HOME")
CR	13	carriage return
SI	14	set "NORMAL" display mode (LOWLIGHT TEXT in CPM)
SO	15	set "INVERSE" display mode (HIGHLIGHT TEXT in CPM)
EM	25	home cursor without clearing screen
FS	28	non destructive forward space
GS	29	clear to end of line
RS	30	GOTO XY lead in
US	31	reverse line feed

### 3.8.3 - GOTO X,Y

Direct screen addressing, GOTO followed by X,Y co-ordinates where X and Y are single ASCII characters greater than 32, for absolute screen cursor positioning is fully supported for PASCAL, FORTRAN AND CP/M.

### 3.8.4 - PASCAL GRAPHICS

#### ONE MONITOR DIPLAY

As PASCAL GRAPHICS commands cannot be detected by the Vision-80 card the <CONTROL Z> "T" command has been included. This allows PASCAL graphics to be displayed by switching the Vision-80 card's video source to the Apple video output.

Also refer section 3.3.11 <CONTROL Z> "T"

NOTE : THE FOLLOWING COMMAND SEQUENCE IS USED TO INVOKE PASCAL GRAPHICS USING ONE MONITOR.

```
"WRITE (CHR(26));"  
"WRITELN ('T');"  
"INITTURTLE"
```

to exit:

```
"WRITE (CHR(26));"  
"WRITELN ('T');"  
"TEXTMODE"
```

#### TWO MONITOR DISPLAY

Should you wish to use two monitors no change in software is required. Pascal graphics will automatically be displayed on the monitor connected to the normal Apple video output.

### 3.8.5 CP/M - GRAPHICS

#### ONE MONITOR DISPAY

To access graphics in CP/M the command <CONTROL Z> "T" must be issued before GR, HGR or HGR2 graphics commands.

Also refer to Section 3.3.11 <CONTROL Z> "T"

e.g. 10 PRINT CHR\$(26); "T" :GR  
ALLOWS GRAPHICS COMMANDS TO BE ISSUED

20 PRINT CHR\$(26); "T" :TEXT  
RETURNS TO THE 80 COLUMN SCREEN

#### TWO MONITOR DISPLAY

Should you wish to use two monitors no change in software is required. Graphics will automatically be displayed on the monitor connected to the normal Apple video output.

### 3.8.6 HIGHLIGHT TEXT, LOWLIGHT TEXT

This feature has been included to give both CP/M and PASCAL the capability to display text in both INVERSE and NORMAL. This is an added feature to Apple Pascal and enhances the use of CP/M. e.g. WORDSTAR, SELECT and SPELLBINDER wordprocessors utilise the HIGHLIGHT-LOWLIGHT TEXT capabilities.

SI CHR\$(15) LOWLIGHT TEXT in CP/M and PASCAL (NORMAL)

SO CHR\$(14) HIGHLIGHT TEXT in CP/M and PASCAL (INVERSE)

NOTE : YOU MAY NEED TO CHANGE THE ORDER OF (SI) AND (SO) IN CONFIGIO IN CP/M TO ACT IN THIS MANNER

### 3.8.7 WARM BOOT PASCAL AND CP/M

The Vision-80 Video Card supports the WARM BOOT <CTRL C> function in both PASCAL and CP/M. This means that the screen will not clear when a warm boot is effected. On a cold start first entry to the card the screen will be cleared and will operate as it should.

### 3.8.8 KEYPRESS AND THE TYPE-AHEAD BUFFER IN PASCAL

Since APPLE PASCAL considers the Vision-80 Card to be a High-speed Serial Interface connected to an external terminal it does not look at the APPLE keyboard, thus precluding the use of KEYPRESS and the TYPE-AHEAD BUFFER. The following listing is the function "PRESSKEY", which can be assembled for linkage to your host program as an "external" function. Follow the instructions provided with the example on pages 100-104d of the Pascal reference manual.

```
.FUNC PRESSKEY,0 ;0 words of parameters passed
;*****
;*
;* FUNCTION PRESSKEY: BOOLEAN; EXTERNAL
;*
;*****
RETURN .EQU 0 ;Storage for return address
KEYBOARD.EQU 0C000 ;Apple keyboard hardware
PLA
STA RETURN ;Get return address
PLA
STA RETURN+1 ;Repeat for high order
PLA
PLA
PLA
PLA ;Pop 4 bytes stack bias for function
LDA #0 ;Return MSB of zero
PHA
LDA KEYBOARD ;Check keyboard to see if key pressed
BMI TRUE ;Yes - set PRESSKEY = TRUE
LDA #0 ;No - set PRESSKEY = FALSE
BEQ PKDONE ;And go to common exit point
TRUE LDA #1 ;Set PRESSKEY = TRUE
PKDONE PHA ;Save PRESSKEY status
LDA RETURN+1 ;Reset return vector
PHA
LDA RETURN ;Repeat for low order
PHA
RTS ;And return to caller
.END
```

This brief program illustrates the use of PRESSKEY as an externally linked routine. Follow the instructions on pages 100-106 of the Pascal reference manual for assembling and linking external code.

```
PROGRAM PRESSTEST;
VAR I: INTEGER;
FUNCTION PRESSKEY:
    BOOLEAN; EXTERNAL;
BEGIN
    I:= 0;
    REPEAT
        WRITELN (I);
        I:=I+1;
    UNTIL PRESSKEY
    END.
```

#### 4. COMMUNICATIONS

The Vision-80 Card has one of the most powerful communications driver software programs available for microcomputers. The software is installed in firmware on the Card, to allow transmission, saving and printing of text from and to remote computers. Logon procedures and text files may be transmitted automatically to remote devices, or text (containing information received by your Apple during a terminal session) may be saved to disk or printed to a printer, all while remaining online with the host computer. Communications can be between two Apples, either hardwired or via phone link, or between an Apple and most mainframe computers that have communications capability and asynchronous transmission.

Your Apple must have at least 48K of RAM and DOS must be loaded before communications are initiated if you wish to use the save and transmit capabilities.

The Vision-80 Video Card can also be used without a Disk drive installed or DOS loaded with as little as 16K and can act as an Intelligent Terminal or Printer Terminal using the card's control codes.

The Vision-80 supports the communications protocols implemented on the Apple Communications Card or California Computer Systems serial card.

When communications mode is activated, the Vision-80 has a fully interactive upper and lower case keyboard and allows the use of DOS commands, screen control codes and all Vision-80 communications commands.

Text received from the host computer is stored in your Apple's RAM memory. This text "buffer" takes up all the available RAM in the machine, from \$800 (2048) up to HIMEM (35.8K). Commands are provided to save, print or append to this buffer. Obviously, the buffer will destroy any program in memory located below HIMEM when communications are initiated. By setting HIMEM programs can be run in FOREGROUND/BACKGROUND mode. E.g. Word Processing in FOREGROUND and Communications in BACKGROUND.

Communications can be used with an acoustic coupler or modem, with: Either the standard APPLE communications card or the CCS asynchronous serial card located in Slot 2. Floppy drives or Corvus hard disk. Any printer in another slot.

1800 BAUD is the maximum recommended without any loss of data.

NOTE : ANY SERIAL INTERFACE WITH THE SAME ADDRESSING PROTOCOLS AS THE CCS MAY BE USED. IF USING THE CCS INTERFACE, PIN 4 (RTS) AND PIN 20 (DTR) MUST BE CONNECTED TO PIN 6 (DSR) OR ANY OTHER LOGIC HIGH BY JUMPERS ON THE DB 25 CONNECTOR. REFER TO SECTION 5.12, "PROGRAMMERS INFORMATION", FOR FURTHER DETAILS.

#### 4.1 ENTERING COMMUNICATIONS MODE

To use communications follow these steps:

If you are NOT using DOS begin at section 4.1.2 and DISREGARD sections:

##### 4.1.1 BOOTING DOS

4.2.3 <CONTROL <SHIFT> D> - DOS

4.2.6 <CONTROL R> - REMOTE COMMAND

4.2.7 <CONTROL <SHIFT> S> <FILENAME> - SAVE A TEXT FILE

4.2.8 <CONTROL <SHIFT> T> <FILENAME> - TRANSMIT A TEXT FILE

##### 4.1.1 BOOT DOS from a diskette.

This disk may contain prepared sequential text files or logon files produced beforehand by either a program or word processor.

##### 4.1.2 INITIALIZE the Vision-80 Card with a "PR#3"

##### 4.1.3 SET COMMUNICATIONS MODE AND FORMAT

Type <CONTROL Z> "C" followed by a MANDATORY CONTROL CHARACTER.

<CONTROL Z> "C" initiates communications mode. The next control character sets the data format, i.e., the number of data bits, stop bits and parity. Many mainframe computers have input processors that automatically detect the format being used by terminals connected to them. Should you experience difficulty in connecting to the host, however, you should determine the format accepted.

The various data formats are set as follows, where CODE is the control character entered following the <CONTROL Z> "C" :

DATA FORMAT	CODE
7 BITS + EVEN PARITY + 2 STOP BITS	<CTRL A>
7 BITS + ODD PARITY + 2 STOP BITS	<CTRL E>
7 BITS + EVEN PARITY + 1 STOP BIT	<CTRL I>
7 BITS + ODD PARITY + 1 STOP BIT	<CTRL M>
8 BITS + 2 STOP BITS	<CTRL Q>
8 BITS + 1 STOP BIT	<CTRL U>
8 BITS + EVEN PARITY + 1 STOP BIT	<CTRL Y>
8 BITS + ODD PARITY + 1 STOP BIT	<CTRL> <SHIFT M>

#### 4.1.4 SET DUPLEX

Duplex default is HALF DUPLEX. Type <CONTROL <SHIFT> F> to set FULL DUPLEX. To return to HALF DUPLEX type <CONTROL <SHIFT> F> a second time.

#### 4.2 COMMUNICATIONS COMMANDS

You are now in communications mode, and the Apple will act as an 80-column terminal. All incoming text will be saved in the buffer unless the command <CONTROL <SHIFT> M> is issued to turn the buffer OFF.

The following additional commands are available:

##### 4.2.1 <CONTROL <SHIFT> B> - BREAK

If the host computer accepts a BREAK command, a <CONTROL <SHIFT> B> will stop transmission from that host and onto the screen (and into the buffer if the buffer was turned on). To continue transmission, type the data format code used when entering the card (see Section 4.1.3, above). A <CONTROL <SHIFT> B> does NOT clear the text buffer.

NOTE : IF THE TRANSMITTING DEVICE DOES NOT RECOGNIZE A <BREAK> (250 m/sec BREAK or SPACE on the serial I/O TRANSMIT LINE), DATA WILL CONTINUE TO BE TRANSMITTED AND WILL NOT BE SAVED IN THE TEXT BUFFER UNTILL THE DATA FORMAT CODE IS ISSUED.

##### 4.2.2 <CONTROL <SHIFT> C> CLEAR TEXT BUFFER

This command ONLY will clear the input text buffer. When the buffer is 256 bytes from being full a prolonged beep will be heard from the Apple speaker as a warning to either clear the buffer, save the buffer, or print the buffer. When the buffer is FULL then the prompt FILE- will appear on the screen. At this point the buffer may be either saved by typing in a FILENAME (if DOS has been booted) or a <CR> carriage return followed by <CONTROL <SHIFT> E> (ECHO BUFFER TO PRINTER) and a <CONTROL <SHIFT> C> (CLEAR TEXT BUFFER). This command MUST be issued to clear the current buffer.

Any data coming downline at this point will be ignored until the buffer is cleared.

##### 4.2.3 <CONTROL <SHIFT> D> - DOS

Allows you to enter local DOS commands: e.g. CATALOG, RENAME, DELETE etc. An example is:

<CONTROL <SHIFT> D> CATALOG,D1,S6,V23

This will catalog volume 23 on a Corvus hard disk located in slot six.

NOTE : It is recommended that a disk with sufficient capacity to hold the volume of text you anticipate receiving be used.

##### 4.2.4 <CONTROL <SHIFT> E> - ECHO BUFFER

On entering this command the current text buffer will be echoed or reviewed on the screen. <CONTROL S> will stop the listing, and a further <CONTROL S> will continue the review.

The contents of the buffer are not affected by the use of ECHO except that incoming data will not be stored in the buffer while this function is being performed. This command may also be used to dump the current text buffer to the printer by using the following command sequence :

<CONTROL <SHIFT> D> PR#n (where n is the slot number of your printer) followed by any printer control commands required (e.g. <CONTROL I> 80N)

<CONTROL <SHIFT> E>

To disconnect the printer type <CONTROL <SHIFT> D> PR#0 (Disconnect printer)

NOTE: The printer used in this mode only must not use the expansion ROM space (\$C800-\$CFFF) as this would conflict with the Vision-80 ROM. You may use any suitable word processor using standard DOS text files to edit or create files for use by the Vision-80 Video Card.

##### 4.2.5 <CONTROL <SHIFT> M> - MEMORY ON AND MEMORY OFF

The TEXT BUFFER may be turned ON or OFF at any point by issuing this command. You are able to tell if the buffer is ON by simply listening to the APPLE speaker when data is coming down the line. If the speaker clicks as characters appear on the screen then the buffer is ON. The buffer will NOT be cleared until a <CONTROL <SHIFT> C> (CLEAR BUFFER) command is issued. Data may therefore be appended for file saving or buffer printing.

The APPLE RAM is used as a 35.8K (35,800 character) TEXT buffer. The full RAM of the Apple is used, from \$800 (2048) to HIMEM. By setting HIMEM programs can be run in FOREGROUND/BACKGROUND mode. For example, by using the appropriate software WORDPROCESSING can be run in FOREGROUND and COMMUNICATIONS in BACKGROUND.

NOTE : ANY RESIDENT PROGRAM BELOW HIMEM WILL BE OVERWRITTEN BY THE VISION-80 COMMUNICATIONS BUFFER.

#### 4.2.6 <CONTROL R> - REMOTE. ((COMMUNICATING WITH ANOTHER Vision-80 Card)

This command allows you to control a remote Apple, providing it also is using a Vision-80 Card in communications mode. Control commands following the <CONTROL R> are sent to that remote Apple, to control the function of its Vision-80 card. You can catalog the disk on that computer, have it send you a text file, or save the buffer you have sent it as a text file on its disk.

Examples:

<CONTROL R> <CONTROL D> CATALOG,S6 <CR>

the remote Apple's disk drive will be cataloged and displayed on your screen.

<CONTROL R> <CONTROL T> SAMPLE FILE <CR>

This is used if you wish a text file on the remote Apple's disk (called "SAMPLE FILE") to be sent to you. The remote Apple's disk file "SAMPLE FILE" will be loaded from the remote disk and transmitted to your screen and text buffer. You may then save this with a local command <CONTROL <SHIFT> S> <FILENAME> <CR>.

NOTE : TEXT FILES MAY CONTAIN EMBEDDED SAVE AND TRANSMIT COMMANDS TO AUTOMATICALLY PERFORM THE APPROPRIATE COMMAND ON THE REMOTE OR LOCAL COMPUTER.

<CONTROL R> <CONTROL S> NEW FILE <CR>

This will store information you have sent to the remote Apple's buffer (by a previous <CONTROL <SHIFT> T>, or from your keyboard) on that Apple's disk, under the name "NEW FILE."

NOTE : YOU MAY SHARE A BASIC PROGRAM WITH A REMOTE APPLE, OR STORE IT IN A FILE ON A HOST MAINFRAME COMPUTER, BY FIRST CONVERTING THE PROGRAM TO A TEXT FILE ON YOUR DISK (REFER DOS MANUAL), THEN TRANSMITTING THE FILE. A REMOTE APPLE MAY THEN EXEC THE RECEIVED FILE, CONVERTING YOUR INPUT INTO A PROGRAM.

#### 4.2.7 <CONTROL <SHIFT> S> <FILENAME> - SAVE A TEXT FILE

This saves received data as a text file under <FILENAME> on your disk drive. The CURRENT Slot, Drive, and Volume will be used. To alter the Slot, Drive and Volume you must first do a CATALOG of the disk to setup the correct Slot, Drive and Volume you wish to save the data to.

On entering this command a prompt of "FILE-" will appear on the screen. You then enter the <FILENAME> under which you wish to save the buffer contents.

#### 4.2.8 <CONTROL <SHIFT> T> <FILENAME> - TRANSMIT A TEXT FILE

This command performs two functions. It allows the transmission of TEXT files and also allows for LOGONS or TEXT transmission where the host sends a PROMPT character before the next portion of text can be sent.

To use the LOGON or PROMPT character facility all that is required is for the first characters in the TEXT file to be a <CONTROL P> followed by the PROMPT character that will be sent by the host computer, followed by the TEXT you wish to transmit.

<CONTROL <SHIFT> T> <FILENAME> will load <FILENAME> text file from your disk and transmit it to the remote or host computer. If LOGON or PROMPT facility is used then the first line will be transmitted. It will then wait for the PROMPT character to be received before sending the next line.

On entering this command a prompt of "FILE-" will appear on the screen. You then enter the <FILENAME> you wish transmitted.

#### HALT TRANSMISSION

To HALT transmission at any point press the SHIFT key. This will cause the transmit buffer to be cleared and transmission to cease. To resend TEXT reenter <CONTROL <SHIFT> T>.

NOTE: REFER TO SECTION 7.1, "MACRO LOGON GENERATOR" FOR MORE DETAILS ON LOGON AND PROMPT CHARACTER TRANSMISSION.

#### 4.2.9 <SHIFT U> - DEL key

<SHIFT U> issues a DEL (destructive backspace) character to the host computer. Received DEL characters are not activated by the Vision-80 Card.

NOTE : WHEN USING (LOCAL) COMMUNICATIONS COMMANDS HOLD BOTH CONTROL AND SHIFT KEYS DOWN ALONG WITH THE APPROPRIATE CONTROL CODE. THIS ALLOWS THE Vision-80 CARD TO DETECT THE DIFFERENCE BETWEEN OUTPUT COMMANDS e.g. <CONTROL S>, WHICH MAY BE A STOP TRANSMISSION COMMAND, AND <CONTROL <SHIFT> S>, A SAVE TEXT COMMAND. THE ONLY EXCEPTION TO THIS RULE IS <CONTROL R>. "REMOTE" COMMANDS FOLLOWING THIS ONLY REQUIRE THE CONTROL KEY AND THE COMMAND. THE <SHIFT> KEY DOES NOT NEED TO BE PRESSED.

#### 4.3 <CONTROL <SHIFT> Q>. QUIT COMMUNICATIONS (SOFT EXIT)

To exit communications mode, type the following command:

<CONTROL <SHIFT> Q>

You will now be returned to normal APPLE and the Vision-80 Card.

#### 4.4 CONTROL CHARACTERS

As the Vision-80 Video Card in communications mode now has a fully interactive keyboard and acts as an intelligent terminal, all Control Characters, Screen Control Codes and Sequences are capable of being sent or received. However this may from time to time cause a problem due to incompatibility of different manufacturer's commands. Should you find that control characters are being transmitted and are causing adverse effects in communications, these may be eliminated by turning on DEBUG mode with a <CONTROL Z> <D>. This will cause control characters to be displayed as underscore upper case characters (normal character set) which are not activated. For example, carriage returns will appear as "M". To turn DEBUG off the sequence is: <CONTROL Z> <O>.

NOTE: ALL Vision-80 CONTROL CODES, e.g. (CURSOR DEFINITION) AND Vision-80 COMMUNICATIONS COMMANDS MAY BE INPUT WHILE IN COMMUNICATIONS MODE WITHOUT AFFECTING THE HOST COMPUTER. ALL KEYBOARD CONTROL CHARACTERS CAN ALSO BE SENT TO THE HOST FOR PROCESSING WITHOUT AFFECTING THE Vision-80.

#### 5. ASSEMBLER PROGRAMMER'S INFORMATION

The following general points are included to assist programmers using the Vision-80 Video Card in ASSEMBLER:

\* All STANDARD Apple II input/output and command conventions are used by the Vision-80 Video Card.

\* The Vision-80 Card uses no Apple RAM locations except screen variables in Page Zero (CH, CV, etc), and slot-dependent locations assigned and ALLOWED by Apple.

\* The standard Apple II text window is utilised, with screen RAM located sequentially from \$C800 to \$CF00.

\* To initialize the Vision-80 Video Card from assembler, use the instruction

JSR \$C300.

This will also set the I/O hooks.

\* To output a character to the screen without using the I/O hooks, use the following sequence:

LDA CHAR ; GET THE CHARACTER IN THE A REGISTER

JSR \$C305 ; OUTPUT TO SCREEN (PRESERVING ALL REGISTERS)

\* To read a character from the keyboard using the firmware routines without using the I/O hooks, use the following sequence:

JSR \$C307 ; READ A KEYBOARD CHARACTER AND RETURN IT IN THE A REGISTER

\* NOTE : ALL LOWER CASE CHARACTERS WILL HAVE BIT 7 RESET WHEN THIS ROUTINE IS USED

\* The Dan Paymar lower case adaptor can be used with this card to display lower case input from the Vision-80 Video Card onto the 40 column screen, or to allow typing directly on the 40 column screen in upper and lower case. Firstly initialise the card then issue the command <CONTROL Z> <4>.

5.1 Vision-80 Video Card CONTROL ROUTINES

The entry points and routines provided below are sufficient to allow assembler programs to link to the Vision-80 Card's ROM program. Note that these routines, and the ROM itself, are COPYRIGHT 1981 ZOFARRY ENTERPRISES.

5.1.1 PAGE ZERO UTILIZATION

CH	EPZ \$24	CURSOR H. POSN.
CV	EPZ \$25	CURSOR V. POSN.
BASL	EPZ \$28	BASE ADDRESS
BASH	EPZ \$29	HIGH ORDER
BAS2L	EPZ \$2A	ALTERNATE BASE ADDRESS
BAS2H	EPZ \$2B	HIGH ORDER

5.2 SLOT DEPENDENT LOCATIONS

CONFLG EQU \$47B CONTROL/DEBUG FLAG

BIT USAGE (BIT 7 MSB)

- BIT 7 - SHIFT LOCK FLAG - 1 = SHIFT LOCK
- BIT 6 - COMMUNICATIONS FLAG - 1 = COMMUNICATIONS
- BIT 5 - FLUSH FLAG - 1 = FLUSH ACTIVE
- BIT 4 - GRAPHICS/TEXT FLAG - 1 = GRAPHICS
- BIT 3 - ESCAPE FLAG - 1 = TERMINAL ESCAPE CURRENT
- BIT 2 - PASCAL CP/M FLAG - 1 = PASCAL CP/M MODE
- BIT 1 - 80/40\*24 FLAG - 1 = 40\*24 MODE
- BIT 0 - DEBUG FLAG - 1 = DEBUG MODE ON

CH80	EQU \$4FB	HPOSN. SAVE AREA (PASCAL CP/M)
CV80	EQU \$57B	VPOSN. SAVE AREA (PASCAL CP/M)
CURS1	EQU \$5FB	CURSOR START/TYPE (refer Section 5.9)
OLDCHR	EQU \$6FB	(INTERNAL USE ONLY)
INV80	EQU \$77B	NORMAL/INVERSE FLAG FOR PASCAL AND CPM
CNFLG2	EQU \$7FB	(INTERNAL USE ONLY)
CHSAVE	EQU \$67B	(INTERNAL USE ONLY)

5.3 VIDEO CARD DEVICE SELECT FUNCTIONS

(\$COB0 - COBF DEVICE ADDRESSES)

- \$COB0 - SET CRTC ADDRESS REGISTER
- \$COB1 - LOAD CRTC REGISTER
- \$COB2 - MAP RAM INTO \$C800-\$CFFF
- \$COB3 - MAP ROM INTO \$C800-\$CFFF
- \$COB4 - SWITCH APPLE VIDEO TO OUTPUT
- \$COB5 - SWITCH 80\*24 VIDEO TO OUPUT
- \$COB6 - ENABLE NORMAL CHARACTER SET
- \$COB7 - ENABLE ALTERNATE CHARACTER SET
- \$COB8-\$COBF PERFORM THE SAME FUNCTIONS AS \$COB0-\$COB7

NOTE : WHEN READ, \$COB0 CHECKS THE AVAILABILITY OF THE VIDEO RAM. IF RAM IS AVAILABLE BIT 7 WILL BE SET.

5.4 VIDEO RAM ADDRESS ORGANIZATION

The video RAM is located at \$C800 - \$CFFF, and is organized as a linear array, i.e. the first displayable position (line 1, character 1) is located at \$C800, and all addresses are sequential from that location. E.g. the first character of line 2 is located at \$C850.

5.5 INITIALIZING THE Vision-80 Card

This does not clear the screen.

CRTINT	EQU *	
	LDY #\$0F	SET INDEX
CRT01	EQU *	
	STY \$COB0	SET REGISTER ADDRESS
	LDA VARTAB,Y	GET REGISTER VALUE
	STA \$COB1	SET REGISTER VALUE
	DEY	DECREMENT LOOP COUNT
	BPL CRT01	LOOP UNTIL DONE
	LDA \$COB5	SET 80*24 VIDEO MODE
	LDA #\$00	CLEAR REGISTER
	STA CONFLG	AND SET CONTROL FLAGS
	RTS	AND RETURN

## 5.6 6845 VARIABLES

VARTAB EQU *		
NHT HEX 7F		HORIZONTAL TOTAL
NHDSP HEX 50		TOTAL HORIZ. DISPLAYED
NHSYNC HEX 60		HORIZONTAL SYNC POSITION
NHSWID HEX 29		HORIZONTAL SYNC WIDTH
NVTOT HEX 1B (US) HEX 19		VERTICAL TOTAL
NVADJ HEX 04 (US) HEX 02		VERTICAL ADJUST
NVDSP HEX 18		VERTICAL DISPLAYED
NVSYNC HEX 18		VERTICAL SYNC POSITION
MDMODE HEX 00		INTERLACE MODE
NSCANL HEX 0A (US) HEX 09		NUMBER OF SCAN LINES/ROW
NCSTRT HEX 20		CURSOR START LINE
NCEND HEX 0B		CURSOR END LINE
DSPADR HEX 0000		SCREEN RAM START ADDRESS
CURSAD HEX 0000		CURSOR ADDRESS

## 5.7 ROUTINE TO PLACE A CHARACTER ON THE SCREEN

This routine must be followed to place a character onto the screen to avoid screen interference, due to timing differences between the Apple and Vision-80 card.

The character to be displayed is in the A register. BASL and BASH contain the base address (the address of the first character on the line). CH contains the current cursor position.

PUTCHR EQU *		
BIT \$CFFF		DISABLE OTHER CARDS
LDY \$C300		ENABLE THE VIDEO CARD
LDY \$COB2		ENABLE RAM
LDY CH		CURSOR H. POSN. TO Y
NRDY01 EQU *		
LDX \$COB0		CHECK IF RAM AVAILABLE
BPL NRDY01		LOOP UNTIL AVAILABLE
STA (BASL),Y		PLACE CHAR ONTO SCREEN
LDX \$COB0		CHECK IF STILL OK
BPL NRDY01		LOOP UNTIL AVAILABLE
BIT \$COB3		ENABLE ROM
RTS		RETURN TO CALLING ROUTINE

## 5.8 ROUTINE TO READ A CHARACTER FROM THE SCREEN

This routine must be followed to read a character from the screen to avoid screen interference, due to timing differences between the Apple and Vision-80 card.

GETSCR EQU *		
LDX \$CFFF		DISABLE OTHER CARDS
LDX \$C300		ENABLE VIDEO CARD
LDX \$COB2		ENABLE RAM
GSCRO1 EQU *		
LDX \$COB0		CHECK IF RAM AVAILABLE
BPL GSCRO1		LOOP UNTIL OK
LDA (BASL),Y		GET CHARACTER FROM SCREEN
LDX \$COB0		CHECK IF STILL OK
BPL GSCRO1		TRY AGAIN IF NOT
BIT \$COB3		ENABLE ROM
RTS		RETURN TO CALLING ROUTINE

## 5.9 CURSOR CONTROL ROUTINES

The cursor format is set by the values loaded into registers \$0A and \$0B of the 6845. Register \$0A determines the cursor format and start line. The high-order nybble of \$0A sets the cursor type:

- \$0X - INVERSE CURSOR (NON-BLINK)
- \$2X - NO CURSOR
- \$4X - INVERSE CURSOR (FAST BLINK)
- \$6X - INVERSE CURSOR (SLOW BLINK) (DEFAULT)

The low-order nybble of \$0A sets the cursor start line:

- \$X0 - START AT LINE 1 (TOP LINE OF CHARACTER) (DEFAULT)
- \$XB - START AT LINE 12 (BOTTOM LINE OF CHARACTER)

These values may be put into \$5FB and will be automatically picked up by the on board routines.

Register \$0B sets the cursor end line (not used in on card routines):

- \$00 - END AT LINE 1 (TOP LINE OF CHARACTER)
- \$0B - END AT BOTTOM LINE OF CHARACTER

## 5.10 TURN CURSOR ON

```
CURSOR EQU *
LDA #$0F          GET REGISTER ADDRESS
STA $COB0         SET ADDRESS REGISTER
CLC
LDA BASL          GET LOW ORDER ADDRESS
ADC CH            ADD CURRENT CURSOR
STA $COB1         SET REGISTER
LDA #$0E          GET REGISTER ADDRESS
STA $COB0         SET ADDRESS REGISTER
LDA BASH          GET HIGH ORDER ADDRESS
ADC #$00          ADD IN CARRY (IF ANY)
AND #$07          MASK OUT HIGH ORDER BITS
STA $COB1         SET REGISTER VALUE
LDA #$0A          SET CRTC ADDRESS REGISTER
STA $COB0         SET ADDRESS REGISTER
LDA #$60          TURN CURSOR ON (MODIFY VALUE TO SUIT)
STA $COB1         SET REGISTER VALUE
RTS              RETURN TO CALLING ROUTINE
```

## 5.11 TURN CURSOR OFF

```
CURSOR EQU *
LDA #$0A          GET REGISTER ADDRESS
STA $COB0         SET ADDRESS REGISTER
LDA #$20          MAKE CURSOR INVISIBLE (MODIFY VALUE TO SUIT)
STA $COB1         SET REGISTER CONTENTS
RTS              RETURN TO CALLING ROUTINE
```

## 5.12 COMMUNICATIONS USAGE

In communications mode several additional page zero locations are used by the Vision-80 firmware :

```
PNTRL EPZ $06      ; LOW ORDER TEXT BUFFER POINTER (USED BY
COMMUNICATIONS FIRMWARE)
PNTRH EPZ $07      ; HIGH ORDER TEXT BUFFER POINTER (USED BY
COMMUNICATIONS FIRMWARE)
REMFLG EPZ $08     ; REMOTE COMMAND FLAG - 00 IF NO REMOTE COMMAND
RECEIVED
BUFLWR EPZ $09     ; POINTER TO BOTTOM OF SCROLL BUFFER
BUFTOP EPZ $19     ; POINTER TO TOP OF SCROLL BUFFER
DUPMOD EPZ $1A     ; DUPLEX FLAG
CURCMD EPZ $1B     ; CURRENT COMMAND BEING EXECUTED
REMPNT EPZ $1C     ; REMOTE COMMAND BUFFER POINTER
PRVOUT EPZ $1D     ; LAST CHARACTER OUTPUT
RMFLG2 EPZ $1E     ; REMOTE COMMAND FLAG
PROMPT EPZ $F7     ; PROMPT CHARACTER FOR LOGON MACRO
OPNTL EPZ $F8      ; OUTPUT BUFFER POINTER
OPNTH EPZ $F9      ; HIGH ORDER
BUFLG EPZ $FB      ; BUFFER ON/OFF FLAG
PRVIN EPZ $FD      ; LAST TRANSMITTED CHARACTER
IPNTL EPZ $FE      ; INPUT BUFFER POINTER
IPNTH EPZ $FF      ; HIGH ORDER
```

Other memory locations used are :

```
KEYBUF EQU $200    ; 256 BYTE KEYBOARD BUFFER
SCRBUF EQU $300    ; 256 BYTE SCROLL LOOK-AHEAD BUFFER
REMBUF EQU $900    ; 256 BYTE REMOTE COMMAND BUFFER
```

In accessing the communications card the following locations are referenced :

```
CSTAT EQU $COAE    ; ACIA STATUS REGISTER
CCHAR EQU $COAF     ; ACIA DATA REGISTER
```

These locations correspond to the CCS-7710 and Apple Communications Card. If your interface card follows this convention it can be used with no modification.

### 5.12.1 COMMUNICATIONS LOOK-AHEAD BUFFER

One of main problems faced when using communications is the fact that the program has very little control over the incoming data. This can lead to loss of data when doing time-consuming tasks such as clearing the screen or scrolling. To remedy these problems the Vision-80 Video Card uses a look-ahead scroll buffer to capture any data from the communications device whilst scrolling or clearing the screen.

### 5.12.2 USING THE LOOK-AHEAD BUFFER

If you wish to write a program which intercepts incoming data, processes it, and then passes it to the firmware you MUST follow these conventions:

1. Your program must start above \$800.
2. All input data from the communications interface must be obtained by your program.
3. Scroll buffering must be enabled by setting bit 6 of location \$47B and both BUFLWR and BUFTOP set to zero.
4. Output is passed to the Video Card as per the normal DOS conventions.
5. After passing a character to the Video Card the look-ahead buffer pointers MUST be checked to determine whether data was received while the character was being processed.
6. If BUFLWR and BUFTOP are equal no buffering was performed and your program may proceed normally.
7. If BUFLWR and BUFTOP are NOT equal, then data was received from the communications interface and must be processed BEFORE any further access is made to the communications interface.
8. Buffered data is stored in SCRBUF. BUFLWR/BUFTOP acts as indices to this page of memory. BUFLWR points to the first character received and must be incremented after this character is processed.
9. When processing buffered data and BUFLWR becomes equal to BUFTOP then the scroll buffer is empty and both BUFLWR and BUFTOP must be zeroed.

NOTE : WHEN USING THIS METHOD OF DRIVING THE Vision-80 Video Card THE REMOTE COMMAND BUFFER (\$900-\$9FF) AND THE TEXT BUFFER (\$A00-HIMEM) ARE NOT USED BY THE FIRMWARE.

### 5.13 USING PROGRAM LINE EDITORS

Most Program Line Editors (such as C.R.A.E and P.L.E) will NOT work with the Vision-80 Video Card because they modify the DOS hooks to point to themselves and then pass output directly to the 40\*24 screen-handling routines. However you may find it possible to modify these programs to utilise the Video Card routines.

### 5.14 TECHNICAL ASSISTANCE

Should you require any further technical information, please contact:

Customer Support Department  
Zofarry Enterprises Pty. Ltd.  
6A Burwood Rd.  
BURWOOD NSW 2134  
AUSTRALIA  
Phone (02) 745 1888

### 6. ALTERNATE CHARACTER SETS

#### 6.1 INSTALLING ALTERNATE/GRAPHICS CHARACTER SETS

The character generator is labelled U28 on the component side of the Vision-80 Video Card. It comes standard with a 2716 EPROM containing a single character set. To install an alternate character set or graphics character set this must be changed to a 2732A or 2532-35 type EPROM of at least 390 n.sec access time.

When installing one of these type EPROM's the following hardware changes must be made:

1. Located on the P.C.B. component side is a jumper block marked W3. This is used to change the character display matrix from 9 column to 8 column or 8/9 column display (refer note below). The set factory default is 9 column display.

#### NORMAL - ALTERNATE

These must be changed by soldering or unsoldering the appropriate jumper block.

The types of configurations are:

OPTION W3

9 column B to C soldered

8 column NO STRAPS

\* 8/9 PROG A to C soldered ie. ALTERNATE or GRAPHICS

NOTE : THE DIFFERENCE BETWEEN ALTERNATE AND ALTERNATE GRAPHICS CHARACTER SET IS THAT THE ALTERNATE CHARACTER SET ALLOWS TWO DIFFERENT NORMAL TYPE CHARACTER SETS TO BE ON THE CARD AT ONE TIME WITH THE SAME CHARACTER SPACING. THE NORMAL AND ALTERNATE SETS BOTH HAVE ONE SCREEN DOT SPACING ON ONE SIDE OF THE CHARACTER GENERATED BY THE CRT CONTROLLER. THIS DOT WOULD SHOW AS VERTICAL LINES WHEN THE GRAPHICS CHARACTER SET IS SELECTED. AS THIS IS PARTIALLY CONTROLLED BY HARDWARE, A MINOR HARDWARE CHANGE IS REQUIRED AND JUMPER BLOCKS HAVE BEEN INCLUDED ON THE CARD TO ALLOW THIS CHANGE. THEREFORE ONLY TWO TYPES OF CHARACTER SETS MAY BE PRESENT ON THE CARD AT ONE TIME.

Located on the back of the P.C.B. (the non component side) is a second jumper block marked W2. This is used for setting the type of EPROM used. The setting of the jumper block is:

OPTION W2  
 \* 2716-2 A to B and D to E soldered  
 2732A B to C and D to E soldered  
 2532-35 A to B and C to D soldered  
 NOTE : \* indicates DEFAULT factory option.

6.2 SELECTING A CHARACTER SET AND FORMAT  
 As there are several combinations of jumpering and EPROM types the following table shows the correct sequence to select a particular character set and format:

SET AND FORMAT REQUIRED				
OPTION W3 STRAPING	NORMAL 9*11 COMMANDS	NORMAL 8*11 COMMANDS	ALTERNATE 9*11 COMMANDS	ALTERNATE 8*11 COMMANDS
9 column	<CTL-Z> <N>	N/A	<CTL-Z> <A>	N/A
8/9 prog.	<CTL-Z> <N> <CTL-Z> <9>	N/A	N/A	<CTL-Z> <A> <CTL-Z> <G>
8 column	N/A	<CTL-Z> <N> <CTL-Z> <G>	N/A	<CTL-Z> <A> <CTL-Z> <G>

6.3 CHARACTER GENERATOR PROGRAM  
 The following program has been included to allow those who wish to define their own character sets to do so. The program was used by Zofarry Enterprises Pty. Ltd. to define the standard character set provided with the Vision-80 Video Card.

```

1  REM CHARACTER SET GENERATOR PROGRAM
2  REM SETS UP A CHARACTER SET IN RAM
3  REM FROM $1000 TO $17FF (BSAVE NAME,A$1000,L$800)
4  REM CAN ALSO BE USED AS AN EDITOR
5  REM THE BSAVED CHARACTER SET IS READY TO BURN INTO A 2716 EPROM
9  HIMEM: 4096
10 REM SET HIMEM TO PROTECT CHARACTER SET
11 ONERR GOTO 290
12 HOME : INPUT "10 OR 11 ROWS";NR
13 REM GET NUMBER OF ROWS
14 IF NR < > 10 AND NR < > 11 THEN 12
30 BA = 4096
40 DIM C(11): REM ARRAY OF CHARACTER ROW VALUES
45 DIM CS(8,11): REM ARRAY OF CHARACTER DOTS
50 PRINT "R 12345678": PRINT : REM PRINT ROW/COLUMN HEADER
51 FOR X = 1 TO NR: REM INPUT ROWS OF DATA
52 REM 1 MEANS DOT IS ON 0 IS OFF
55 C(X) = 0
60 PRINT X - 1;: IF X < 11 THEN PRINT " ": INPUT " ";X$
70 FOR Z = 1 TO 8: REM DECODE COLUMN INFORMATION
75 C$(Z,X) = MID$(X$,Z,1)
80 C(X) = C(X) + ((2^(8-Z)) * VAL(C$(Z,X))): REM CREATE ROW VALUE
90 NEXT Z
110 NEXT X
150 REM DISPLAY CHARACTER ON SCREEN
160 FOR X = 1 TO NR
165 PRINT
170 FOR Z = 1 TO 8
180 REM USE * FOR DOT ON AND : FOR DOT OFF
190 IF C$(Z,X) = "1" THEN PRINT "***";
200 IF C$(Z,X) < > "1" THEN PRINT " ";
210 NEXT
220 NEXT
221 PRINT
222 INPUT "OK ";X$: REM ASK IF CHAR OK
223 IF X$ = "N" THEN 50
224 INPUT "ASCII CODE ";X: REM GET ASCII CODE VALUE
250 PRINT :BA = 4096 + (16 * X): REM SET BASE ADDRESS
252 FOR X = 1 TO NR
255 POKE BA,C(X)
260 BA = BA + 1
265 NEXT
280 GOTO 50
290 STOP
310 END

```

## 7. DEMONSTRATION PROGRAM

The following program has been included to give some ideas on how the video card may be used and also how to use most of the commands of the Vision-80 Video Card.

This program should be available from your local dealer and may be copied onto your disk if you wish. If he does not have one and you wish a copy sent to you send a stamped self addressed envelope with a suitable diskette to either ELECTRONIC CONCEPTS PTY. LTD. or ZOFARRY ENTERPRISES PTY. LTD. and a copy will be forwarded by return post.

NOTE : THIS PROGRAM IS PUBLIC DOMAIN SOFTWARE AND MAY BE COPIED AND DISTRIBUTED IN ANY MANNER OR FORM.

```

9  REM SET HIMEM TO PROTECT PROGRAM
10 HIMEM: 16384
110 D$ = CHR$ (4)
150 REM LOAD PICTURE INTO HIRES PAGE 2
210 PRINT D$;"BLOOD LINE.PIC,A$4000"
220 REM ARRAY OF CONTROL CHARACTERS TO PRINT UNDERLINE
310 DIM C(30): DATA
26,44,15,06,01,18,18,25,32,5,14,20,5,18,16,18,9,19,5,19,32,16,20,25,46,32,
12,20,04,46
410 FOR X = 1 TO 30: READ C(X): NEXT X
510 DIM D(10): DATA 1,21,19,20,18,1,12,9,1,14
610 FOR X = 1 TO 10: READ D(X): NEXT X
710 CL(1) = 4:CL(2) = 13:CL(3) = 9:CL(4) = 1:CL(5) = 3:CL(6) = 2
720 REM INITIALISE CARD
810 PRINT : PRINT D$;"PR#3"
820 REM SET FULL WINDOW AND CLEAR SCREEN
910 TEXT : HOME
1010 SPEED= 255
1110 VTAB (1): HTAB (1)
1210 REM DO A BORDER OF INVERSE APPLES
1310 FOR X = 1 TO 80: PRINT CHR$ (127);: NEXT X
1410 FOR X = 2 TO 22
1510 VTAB (X): PRINT TAB( 80); CHR$ (127);
1610 VTAB (X): HTAB (1): PRINT CHR$ (127);
1710 NEXT
1810 VTAB (23): HTAB (1)
1910 FOR X = 1 TO 80: PRINT CHR$ (127);: NEXT X
2010 PRINT CHR$ (26);"D";: REM TURN DEBUG ON TO DISPLAY UNDERLINE
2020 REM PRINT UNDERLINE TEXT (CONTROL CHARACTERS)
2030 REM ** NOTE ** AFTER PRINTING CTL-Z PRINT A "D" TO TURN DEBUG ON
AGAIN
2110 VTAB (4): HTAB (26): FOR X = 1 TO 30: PRINT CHR$ (C(X));: NEXT X
2210 VTAB (2): HTAB (10): PRINT CHR$ (26);"O";: REM TURN DEBUG MODE
OFF
2310 VTAB (2): HTAB (10): PRINT " "
2410 VTAB (7): HTAB (36): PRINT "INTRODUCES"
2510 VTAB (9): HTAB (39): PRINT "THE"
2610 VTAB (11): HTAB (30): PRINT "VISION-80";: PRINT " ";: PRINT "VIDEO
CARD"
2710 VTAB (14): HTAB (26): PRINT "THIS SUPERB "; CHR$ (26);"D";: FOR X =
1 TO 10: PRINT CHR$ (D(X));: NEXT X: PRINT CHR$ (26);"O";: VTAB (14):
POKE 36,47: PRINT " PRODUCT"
2810 VTAB (16): HTAB (19): PRINT "IS THE MOST ADVANCED VIDEO ENHANCEMENT
DEVICE"

```

```

2910 VTAB (18): HTAB (21): PRINT "AVAILABLE FOR THE APPLE ][
MICROCOMPUTER"
3010 FOR X = 0 TO 8000: NEXT
3020 REM CLEAR SCREEN AND PRINT SECOND PAGE
3110 TEXT : HOME :SP = 6
3210 VTAB (1): HTAB (33): PRINT "FEATURES INCLUDE"
3310 VTAB (3): HTAB (SP): PRINT "** Full UPPER and lower Case in a 9*11
Dot Matrix (9*10 U.S.)
3410 VTAB (5): HTAB (SP): PRINT "** 128 Character Set with 3 Dot
Descenders"
3510 VTAB (7): HTAB (SP): PRINT "** BASIC PASCAL And FORTRAN Languages
Supported"
3610 VTAB (9): HTAB (SP): PRINT "** Z80 and CP/M (MICROSOFT) Fully
Compatible"
3710 VTAB (11): HTAB (SP): PRINT "** Compatible with all STANDARD APPLE
][ Peripherals"
3810 VTAB (13): HTAB (SP): PRINT "** Supports VTAB HTAB TAB TEXT GR HGR
HGR2 ";: INVERSE : PRINT "INVERSE";: NORMAL : PRINT " NORMAL and TEXT
WINDOWING"
3910 VTAB (15): HTAB (SP): PRINT "** Shift and lock for upper & lower
case"
4010 VTAB (17): HTAB (SP): PRINT "** Source switching between 40*24 and
80*24 (software and hardware)"
4110 VTAB (19): HTAB (SP): PRINT "** Optional alternate / graphic
character set"
4210 VTAB (21): HTAB (SP): PRINT "** PLUS MANY OTHERS"
4310 FOR X = 1 TO 10000: NEXT
4410 HOME : REM CLEAR TO 80*24 SCREEN
4510 REM DRAW AN OUTLINE (INVERSE SPACES)
4610 VTAB (1): HTAB (1): INVERSE : PRINT SPC( 80)
4710 FOR X = 1 TO 21
4810 VTAB (X + 1): HTAB (1): INVERSE : PRINT " ";: NORMAL : PRINT TAB(
79);: INVERSE : PRINT " ";
4910 NEXT
5010 VTAB (23): HTAB (1): INVERSE : PRINT SPC( 80);
5110 NORMAL
5210 VTAB (10): HTAB (37): PRINT "SUPPORTS"
5310 VTAB (12): HTAB (34): PRINT "LOW RESOLUTION"
5410 VTAB (14): HTAB (37): PRINT "GRAPHICS"
5420 VTAB (16): HTAB (32): PRINT "(INCLUDING COLOR)"
5510 FOR X = 0 TO 3000: NEXT X
5610 HOME : REM CLEAR 80*24 SCREEN
5710 X = PEEK (49236): REM SELECT PRIMARY PAGE
5810 GR : REM SELECT LO-RES GRAPHICS
6010 X = PEEK (49234): REM SELECT ALL GRAPHICS
6020 REM CLEAR BOTTOM 7 LINES OF LORES SCREEN
6110 COLOR= 0: FOR X = 40 TO 47: HLIN 0,39 AT X: NEXT X
6120 REM DRAW BACKGROUND
6210 FOR X = 1 TO 6
6310 COLOR= CL(X): REM SET LORES COLORS
6410 FOR Y = 1 TO 8
6510 HLIN 0,39 AT ((8 * (X - 1)) + Y - 1)
6610 NEXT Y
6710 NEXT X
6810 COLOR= 0
6910 K = 6
7000 REM DRAW A BLACK APPLE
7010 PLOT 25,4

```

```

7110 HLIN 23,25 AT 5
7210 HLIN 21,25 AT 6
7310 HLIN 20,25 AT 7
7410 HLIN 20,24 AT 8
7510 HLIN 20,22 AT 9
7610 HLIN 20,21 AT 10
7710 PLOT 20,11
7810 HLIN 28 - K,31 - K AT 13
7910 HLIN 11 + K,15 + K AT 14
8010 HLIN 26 - K,33 - K AT 14
8110 HLIN 9 + K,16 + K AT 15
8210 HLIN 24 - K,34 - K AT 15
8310 HLIN 7 + K,18 + K AT 16
8410 HLIN 23 - K,35 - K AT 16
8510 HLIN 6 + K,35 - K AT 17
8610 HLIN 5 + K,33 - K AT 18
8710 HLIN 4 + K,31 - K AT 19
8810 HLIN 4 + K,30 - K AT 20
8910 HLIN 3 + K,30 - K AT 21
9010 HLIN 3 + K,29 - K AT 22
9110 HLIN 2 + K,29 - K AT 23
9210 HLIN 2 + K,29 - K AT 24
9310 HLIN 2 + K,29 - K AT 25
9410 HLIN 2 + K,29 - K AT 26
9510 HLIN 2 + K,29 - K AT 27
9610 HLIN 2 + K,30 - K AT 28
9710 HLIN 2 + K,30 - K AT 29
9810 HLIN 3 + K,31 - K AT 30
9910 HLIN 3 + K,33 - K AT 31
10010 HLIN 3 + K,36 - K AT 32
10110 HLIN 4 + K,36 - K AT 33
10210 HLIN 4 + K,36 - K AT 34
10310 HLIN 4 + K,36 - K AT 35
10410 HLIN 5 + K,35 - K AT 36
10510 HLIN 5 + K,35 - K AT 37
10610 HLIN 6 + K,35 - K AT 38
10710 HLIN 6 + K,34 - K AT 39
10810 HLIN 7 + K,33 - K AT 40
10910 HLIN 8 + K,19 + K AT 41
11010 HLIN 24 - K,32 - K AT 41
11110 HLIN 9 + K,17 + K AT 42
11210 HLIN 27 - K,30 - K AT 42
11310 HLIN 11 + K,15 + K AT 43
12210 FOR X = 0 TO 3000: NEXT X
12310 REM REVERT TO 80*24 TEXT AND CLEAR SCREEN
12410 TEXT : HOME
12510 REM DRAW ANOTHER BORDER
12610 VTAB (1): HTAB (1): INVERSE : PRINT SPC( 80)
12710 FOR X = 1 TO 21
12810 VTAB (X + 1): HTAB (1): INVERSE : PRINT " " ;: NORMAL : PRINT
TAB( 79);: INVERSE : PRINT " ";
12910 NEXT
13010 VTAB (23): HTAB (1): INVERSE : PRINT SPC( 80);
13110 NORMAL
13210 VTAB (11): HTAB (32): PRINT "AND HIRES GRAPHICS"
13310 FOR X = 1 TO 2000: NEXT
13410 PRINT CHR$( 26); "T": REM TOGGLE TO 40*24 PAGE
13510 X = PEEK (49234): REM SET DISPLAY ALL TEXT

```

```

13610 X = PEEK (49237): REM SET DISPLAY SECONDARY PAGE
13710 X = PEEK (49239): REM SET DISPLAY HI-RES GRAPHICS
13810 X = PEEK (49232): REM SET GRAPHICS DISPLAY
13910 FOR X = 1 TO 4000: NEXT
13920 HOME
14000 REM TOGGLE BACK TO 80*24
14010 PRINT CHR$( 26); "T"
14110 TEXT : REM REVERTS TO 80*24 SCREEN
14310 VTAB (1): HTAB (25): PRINT "SUPPORTS 80 COLUMN BASIC LISTING"
14410 PRINT " 1 2 3 4
6 7 8"
14510 VTAB (3)
14610 PRINT
"123456789012345678901234567890123456789012345678901234567890123
4567890"
14710 POKE 34,3: REM SET TOP LINE TO PROTECT HEADING
14810 VTAB (4)
14910 PRINT CHR$( 26); "L": REM SELECT 80 COLUMN LISTING MODE
15010 LIST 10,5110
15110 PRINT CHR$( 26); "L": REM TURN OFF 80 COLUMN LIST
15210 FOR X = 1 TO 8000: NEXT
15220 X = PEEK (49238):X = PEEK (49236):X = PEEK (49232)
15310 HOME
15410 VTAB (1): HTAB (1): PRINT SPC( 60)
15510 VTAB (1): HTAB (26): PRINT "SUPPORTS FULL TEXT WINDOWING"
15610 FOR T = 1 TO 7
15710 HOME
15810 REM SET RANDOM TEXT WINDOWS AND SCROLL INSIDE THEM
15910 X = INT ( RND (1) * 60)
16010 Z = INT ( RND (1) * 100)
16110 IF Z > 50 THEN Z = 20: GOTO 16410
16210 IF Z < 51 THEN Z = 22: GOTO 16410
16410 W = INT ( RND (1) * 4)
16510 Z = Z + (21 * W)
16610 IF X + Z > 80 THEN 15910
16710 Y = INT ( RND (1) * 17) + 3
16810 POKE 32,X: REM SET LEFT MARGIN
16910 POKE 33,Z: REM SET WINDOW WIDTH
17010 POKE 34,Y: REM SET TOP EDGE
17110 POKE 35,Y + 5: REM SET BOTTOM EDGE
17210 VTAB (Y + 1): HTAB (1): REM GO TO TOP LEFT EDGE
17310 SPEED= 230
17410 N = RND (1) * 100
17510 IF N > 50 THEN NORMAL
17610 IF N < 51 THEN INVERSE
17710 FOR Q = 1 TO 30
17810 PRINT "VISION-80 VIDEO CARD ";
17910 NEXT Q
18010 FOR X = 1 TO 1000: NEXT
18110 NEXT T
18210 SPEED= 255: TEXT : NORMAL
18211 HOME : REM CLEAR FULL SCREEN
18212 VTAB (4): HTAB (1): PRINT " 1 2 3 4"
18213 VTAB (5): HTAB (1): PRINT
"123456789012345678901234567890123456789012345678901234567890123
4567890"
18214 VTAB (1): HTAB (16): PRINT "SUPPORTS SPLIT-SCREEN LISTING (USING
TEXT WINDOW)"

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18215 POKE 34,4: REM SET TOP EDGE TO PROTECT HEADING
18216 POKE 32,0: POKE 33,33: REM SET FIRST COL
18217 VTAB (6): HTAB (1): LIST 1,300
18218 POKE 32,40: POKE 33,33: REM SET SECOND COLUMN
18219 VTAB (6): HTAB (1): LIST 300,600
18220 FOR X = 1 TO 10000: NEXT X
18221 TEXT : HOME : VTAB (12): HTAB (14): PRINT "**** COMPLETELY
INDEPENDENT SCREENS ****"
18310 FOR X = 1 TO 2000: NEXT
18410 X = PEEK (49236): REM SELECT PRIMARY PAGE
18510 X = PEEK (49234)
18610 X = PEEK (49238): REM DISPLAY LORES GRAPHICS
18710 X = PEEK (49232)
18810 PRINT CHR$ (26); "T": REM DISPLAY GRAPHICS PAGE
18910 FOR X = 1 TO 1000: NEXT
19010 X = PEEK (49237): REM SELECT SECONDARY GRAPHICS PAGE
19210 X = PEEK (49239): REM SELECT HIRES GRAPHICS
19310 X = PEEK (49232)
19410 FOR X = 1 TO 1000: NEXT
20005 X = PEEK (49236): REM SELECT PRIMARY PAGE
20006 X = PEEK (49238)
20009 FOR X = 1 TO 1000: NEXT
20010 PRINT CHR$ (26); "4": REM SELECT 40*24 SCREEN
20120 X = PEEK (49333)
20125 TEXT : HOME
20130 FOR X = 1 TO 2000: NEXT
20140 INVERSE
20310 VTAB (2): HTAB (9): PRINT "THE VISION-80 VIDEO CARD"
20320 FLASH
20410 PRINT : HTAB (7): PRINT "NOT JUST ANOTHER VIDEO CARD": PRINT
20420 NORMAL
20509 PRINT SPC( 3);
20510 PRINT "CONVERTS YOUR APPLE INTO A TRUE"
20511 PRINT SPC( 6);
20610 PRINT "80 COLUMN * APPLE ][ PLUS."
20710 PRINT : PRINT "NO EXTERNAL DRIVING SOFTWARE REQUIRED.": PRINT
20810 PRINT "ADD THE VISION-80 VIDEO CARD'S SIMPLE"
20910 PRINT "MNEMONIC COMMAND STRUCTURE, COMPLETE"
21010 PRINT "ADHERENCE TO APPLE'S HARDWARE AND"
21110 PRINT "SOFTWARE CONVENTIONS AND NUMEROUS"
21210 PRINT "ADVANCED FEATURES AND YOU WILL HAVE A"
21310 PRINT "POWERFUL YET EASY TO USE PERIPHERAL."
21410 PRINT : PRINT
21510 PRINT "COMBINE THIS SECOND GENERATION STATE OF"
21610 PRINT "THE ART DEVICE AND WATCH AS A NEW ERA"
21710 PRINT "OF INFORMATION PROCESSING POWER UNFOLDS."
21910 PRINT CHR$ (26); "8": REM SELECT 80*24 SCREEN
22000 X = PEEK (49332): REM DISPLAY 40*24
22010 FOR X = 1 TO 9000: NEXT
22110 HOME : REM CLEAR 80*24
22210 VTAB (1): HTAB (27): PRINT "COMMUNICATIONS FACILITIES"
22220 PRINT
22230 PRINT "The VISION-80 VIDEO CARD has a powerful easy to use inbuilt
communications driver"
22240 PRINT "which allows for transmission, saving and printing of text
files (including"
22250 PRINT "LOGIN files) and AUTOMATIC saving or sending of files to
remote APPLES."

```

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22260 PRINT : PRINT "Communications can be APPLE to APPLE or APPLE to
most mainframe computers"
22270 PRINT "with asynchronous communications capabilities."
22275 PRINT
22280 PRINT "SOURCE, PRIME, COM-LINE and CERNET have been tested with
the VISION-80 CARD."
22290 PRINT : PRINT "When communications mode is activated (DOS must be
loaded) the VISION-80 has"
22300 PRINT "a fully interactive keyboard which allows the use of DOS
commands (local and "
22310 PRINT "remote), screen control codes and the full upper/lower case
keyboard."
22320 PRINT : PRINT "Communications may be used with either the APPLE
communications card or the"
22330 PRINT "CCS asynchronous serial card (located in slot 2) at up to
1800 baud."
22440 PRINT : PRINT "A single keystroke sets parity, number of data bits
and number of stop bits."
22450 PRINT : PRINT "When saving or transmitting files slot, drive, and
volume may be specified"
22455 PRINT "allowing full flexibility for use with floppy disks or
CORVUS hard disks."
22470 X = PEEK (49333): REM SWITCH BACK TO 80*24
22480 FOR X = 1 TO 11000: NEXT
22490 TEXT : HOME : REM CLEAR 80*24 SCREEN
22500 VTAB (1): HTAB (34): PRINT "OTHER FEATURES"
22510 S2 = 10
22520 VTAB (3): HTAB (S2): PRINT "** Additional keyboard characters \ [ {
| } ~ _ "
22530 VTAB (5): HTAB (S2): PRINT "** Industry standard BREAK and DEL keys
(communcations)"
22540 VTAB (7): HTAB (S2): PRINT "** Cursor definition (2 types * 3
modes)
22550 VTAB (9): HTAB (S2): PRINT "** All monitor escapes supported "
22560 VTAB (11): HTAB (S2): PRINT "** 8 operating modes"
22570 VTAB (13): HTAB (S2): PRINT "** Stop-list "
22580 VTAB (15): HTAB (S2): PRINT "** 80 column BASIC listing/editing"
22590 VTAB (17): HTAB (S2): PRINT "** 50/60 Hertz operation"
22600 VTAB (19): HTAB (S2): PRINT "** Supports DATAMEDIA control codes"
22610 REM DISPLAY FULL CHARACTER SET
22699 REM RE-ENABLE DEBUG MODE AFTER PRINTING CTL-Z
22700 VTAB (21): HTAB (1): PRINT CHR$ (26); "D";
22800 FOR X = 0 TO 127
22900 PRINT CHR$ (X);
22910 IF X = 26 THEN PRINT "D";
22920 NEXT X
22930 INVERSE
22940 FOR X = 0 TO 127
22950 PRINT CHR$ (X);
22960 IF X = 26 THEN PRINT "D";
22970 NEXT X
22980 PRINT CHR$ (26); "O";
22990 NORMAL
23000 FOR X = 1 TO 12000: NEXT
23100 GOTO 810

```

## 7.1 LOGON MACRO GENERATOR

This small program is included to enable you to create your own LOGON file for use with any systems that you may wish to communicate with.

```

10 REM LOGON GENERATOR
20 TEXT : HOME
30 PRINT "THIS PROGRAM CREATES A LOGON FILE FOR USE WITH THE VISION-80
CARD"
40 PRINT "IT IS USED AS FOLLOWS :-"
50 PRINT "WHEN ASKED FOR THE PROMPT CHARACTER YOU MERELY TYPE IT (DONT
HIT RETURN)"
60 PRINT "IF THE PROMPT CHARACTER HAS NOT CHANGED JUST PRESS RETURN"
70 PRINT "IF NO PROMPT IS REQUIRED TYPE SPACE"
75 PRINT "THEN ENTER THE REQUIRED RESPONSE"
80 PRINT "WHEN YOU HAVE ENTERED ALL YOUR DATA TYPE CTL-C WHEN ASKED FOR
A PROMPT"
90 PRINT : PRINT : ONERR GOTO 200
95 REM ARRAYS FOR PROMPTS AND RESPONSES
100 DIM P$(30),R$(30)
110 D$ = CHR$(4)
120 FOR X = 1 TO 30
130 P$(X) = CHR$(13)
140 PRINT "ENTER PROMPT : ";: GET P$(X): PRINT P$(X)
145 IF P$(X) = CHR$(3) THEN P$(X) = CHR$(13): GOTO 200
150 PRINT "ENTER RESPONSE : ";: GOSUB 400
160 NEXT
200 INPUT "ENTER FILENAME : ";F$
210 PRINT D$;"OPEN";F$
220 PRINT D$;"WRITE";F$
221 REM CREATE THE LOGON FILE
222 REM **** NOTE ****
223 REM A CHANGE IN PROMPT MUST PRECEDE THE CARRIAGE RETURN OF THE
PREVIOUS RESPONSE
224 REM
230 FOR Y = 1 TO X - 1
240 IF P$(Y) < > CHR$(13) AND Y < > 1 THEN PRINT CHR$(16);P$(Y)
250 IF P$(Y) < > CHR$(13) AND Y = 1 THEN PRINT CHR$(16);P$(Y);
260 IF P$(Y + 1) < > CHR$(13) THEN PRINT R$(Y);
270 IF P$(Y + 1) = CHR$(13) THEN PRINT R$(Y)
280 NEXT
290 PRINT D$;"CLOSE ";F$
300 END
310 REM INPUT ROUTINE TO ALLOW FOR COMMAS, COLONS, AND LEADING SPACES
400 H% = PEEK(36)
410 VTAB ( PEEK(37) + 1): POKE 36,H%: GET X$: PRINT X$;
420 IF X$ < > CHR$(13) THEN R$(X) = R$(X) + X$:H% = H% + 1: GOTO 410
430 RETURN

```

## 8. DIAGNOSTICS TROUBLESHOOTING

This section is included to help correct common errors made in installation and use of your Vision-80 Video Card. Please read it carefully if you find that you cannot obtain the correct output from the card.

IF AFTER TRYING ALL OF THESE SUGGESTED FIXES YOU STILL CANNOT OBTAIN SATISFACTORY OPERATION PLEASE RETURN THE Vision-80 CARD TO THE DEALER YOU PURCHASED IT FROM

### 8.1 NO DISPLAY ON SCREEN IN ANY MODE

- \* Is your Apple ][ plugged in.
- \* Is it turned on.
- \* Is your monitor plugged in and turned on.
- \* Is the Vision-80 Video Card seated firmly in slot 3.
- \* Are both the Apple and Vision-80 video level pots turned to a sufficiently high setting.

### 8.2 WEAK OR LOW CONTRAST VIDEO

- \* Check the video level pots on both the Apple and Vision-80 card.
- \* Check the monitors brightness and contrast controls.

### 8.3 ROLLING DISPLAY (HORIZONTALLY AND/OR VERTICALLY)

- \* Check the video level pots on both the Vision-80 card and the Apple as too low a video level will not allow your monitor to "lock" onto the video signal.
- \* Adjust the horizontal and/or vertical hold controls of your monitor until a stable and centered display results.

### 8.4 BENT OR TORN DISPLAY

- \* This usually occurs in the top left corner of the display and may be corrected by adjustment of the monitor's horizontal hold control and/or the video level adjustment pots.

### 8.5 APPLE VIDEO BUT NO Vision-80 VIDEO

- \* Check that the Vision-80 Video Card is plugged into slot 3 of your Apple.
- \* Check that the monitor is connected to the cable supplied with the card.
- \* Check that your program is issuing the correct PR# or IN# command to access the Vision-80 card.
- \* Turn the video level pot on the Vision-80 card clockwise.

## 8.6 Vision-80 VIDEO BUT NO APPLE VIDEO

- \* Ensure that the single wire from the Vision-80 cable is connected to the Apple video output pin.
- \* Turn the Apple video level pot clockwise.

## 8.7 ERRATIC OPERATION OF THE Vision-80 card

- \* Turn off the power to your Apple.
- \* Gently remove your Vision-80 card.
- \* Using moderate pressure press down on all the Integrated Circuits on the Vision-80 card.
- \* Clean the gold "fingers" (the part that goes into the slot) of the card with a NEW pencil eraser to ensure good electrical contact.
- \* Re-install the card in slot 3 and ensure that it is firmly seated.
- \* Ensure that your program is not overwriting any of the slot-dependent locations assigned to the Vision-80 card.

## 8.8 "FUZZY" CHARACTERS WHEN IN 80-COLUMN MODE

- \* The most common cause of fuzziness is the use of a monith Ah insufficient bandwidth. Colour television sets are particularly prone to this problem.
- \* Use of an RF modulator will cause this problem as most modulators do not have sufficient bandwidth to correctly process the 12 MHz video signal from the Vision-80 card.
- \* The video level from your Vision-80 card may be set too high.

## 8.9 MISSING LINES AND/OR CHARACTERS IN 80-COLUMN MODE (OVERSCANNING)

- \* If you find that you are missing lines from the top or bottom of the screen adjust your monitor's vertical height and linearity controls until all 24 lines are visible and evenly proportioned.
- \* If you are losing characters from the edges of the screen adjust your monitors width, centering, and horizontal hold controls until the full line length is visible in the center of the screen.

## 8.10 PROGRAM CORRUPTION WHEN IN 80-COLUMN MODE

- \* This is caused by the program issuing one or more of the following commands:

### 8.10.1 BASIC

CALL -936	CLEAR SCREEN
CALL -958	CLEAR TO END OF SCREEN
CALL -868	CLEAR TO END OF LINE

### 8.10.2 ASSEMBLER

JSR \$FC58	CLEAR SCREEN
JSR \$FC9C	CLEAR TO END OF LINE
JSR \$FC9E	CLEAR TO END OF LINE
JSR \$FC42	CLEAR TO END OF SCREEN

The reason programs become corrupt is that the Vision-80 card sets the "text window" width to 80 characters and the monitor ROM routines then attempt to clear 80 character lines in 40 column screen area. This causes other parts of memory (possibly including your program) to be overwritten with spaces.

## 8.11 SYSTEM "HANGING" WHEN ATTEMPTING TO USE ANOTHER SLOT WHEN IN 80 COLUMN MODE

- \* The most likely cause of this is an interface which does not follow APPLE conventions on the use of the expansion ROM and does NOT turn other cards off before it enables itself, thereby causing an addressing conflict with the Vision-80 card.

## 8.12 LOSS OF DATA WHEN IN COMMUNICATIONS MODE

- \* You are using too high a data rate. (1800 baud maximum).

## 8.13 ERRATIC SCREEN OPERATION DURING COMMUNICATIONS

- \* The host computer is most likely sending video control characters to the Vision-80 card.

## 8.14 SYSTEM HANGS IN COMMUNICATIONS MODE WHEN ATTEMPTING TO PRINT A FILE

- \* Check that there is an interface card in slot 1.
- \* Check that the printer is online.
- \* Ensure that your interface does not use the expansion ROM.

## 8.15 "GARBAGE" CHARACTERS OR NO RESPONSE IN COMMUNICATIONS MODE

- \* Check that there is a suitable interface card in slot 2.
- \* Check that you have entered the correct control character for selecting the data format.
- \* If using an acoustic coupler ensure that there are no extraneous noises and that you are in the correct mode (answer or originate).
- \* The host system may be reacting to control characters. All control characters (other than <CNTRL> <SHIFT> commands) are sent to the communications interface.

## 8.16 DUPLICATED CHARACTERS WHEN IN COMMUNICATIONS

- \* Ensure that you have set the duplex mode correctly.

## 8.17 "GARBAGE" CHARACTERS APPEAR ON THE 40\*24 SCREEN AFTER <CTNRL Z "4">

\* You are in "typewriter" keyboard mode and do not have a lowercase adaptor.

## 8.18 NO GRAPHICS DISPLAY WHEN USING PASCAL CP/M OR INTEGER BASIC

\* A video source toggle command, <CNTRL Z "T">, must be issued when using these languages to enable display of the Apple graphics screen.

## 8.19 LOSS OF SYNC WHEN GRAPHICS MODE SELECTED

\* NORMAL character set <CNTRL Z "N"> uses the first of the two matrix values.

\* ALTERNATE character set <CNTRL Z "A"> uses the second of the two matrix values.

\* GRAPHICS mode <CNTRL Z "G"> uses an 8 dot matrix.

\* NORMAL mode <CNTRL Z "9"> uses a 9 dot matrix.

\* REFER SECTION 6 CHARACTER SETS FOR MORE INFORMATION.

## 8.20 ERRATIC OPERATION WHEN USING A PARALLEL PRINTER

The most common cause of this is the fact that when a printer control (normally a PR#1) is issued to a parallel printer the print width is set to 40 columns, while the output format of the Vision-80 is 80 column. Therefore a <CONTROL I> "80N" or similar command must be issued to the printer following initialization to set the print width to 80 column.

## 9.1 Vision-80 Hardware General Description

9.1.1 The Vision-80 card is a specialised peripheral adaptor for use in APPLE microprocessor systems.

All features are implemented with particular compatibility for operation with other APPLE peripheral adaptors.

9.1.2 The Vision-80 card contains its own private display refresh RAM, and is fitted with firmware to provide users with standard access mechanisms for the features of the card. Address space of the APPLE main memory is only occupied when the card is accessed, using RAM and PROM bank-switching in accordance with APPLE standards.

9.1.3 Resident firmware includes all initialisation required to precondition the display for European standards (50 Hertz frame, 15625 Hertz line). Alternate firmware is provided for U.S. markets.

9.1.4 Switching between the normal APPLE video source and the Vision-80 video is accomplished electronically under firmware control. Power-on reset always defaults to the normal APPLE video source.

9.1.5 One or two character fonts may be supplied, and the second font, when fitted, is selected with firmware as required. The font is provided in EPROM, so that end users may readily adapt custom fonts as required.

## 9.2. CIRCUIT DESCRIPTION

9.2.1 The APPLE memory address bus is multiplexed with the CRTC (6845) controller address bus using 74LS157 multiplexors. This action produces the private RAM address bus MA00:MA10 which is applied to the private RAM bank. Memory READ/WRITE control also passes through the multiplexor array (U8,U22,U24).

9.2.2 Multiplexor control is achieved with the selection signal RAMSEL0, developed elsewhere. Using a mixture of hardware and software techniques, this signal forms part of a contention resolution network which prevents processor access to the private RAM whenever the CRTC is using the RAM to generate display information.

9.2.3 I/O access to the card slot occupied by the Vision-80 is decoded by 74LS138 (U17) into eight control strobes coincident with DEVSEL0. The following table notes the actions invoked by these strobes.

ADDRESS	READ FUNCTION	WRITE FUNCTION
0	DCR STATUS	LOAD CRTC SELECT REGISTER
1	CRTC STATUS	LOAD CRTC FILE REGISTER
2	-	SELECT RAM MAP
3	-	SELECT ROM MAP
*4	-	SELECT APPLE VIDEO
5	-	SELECT 80*24 VIDEO
6	-	SELECT ALTERNATE FONT
*7	-	SELECT NORMAL FONT

The functions marked (\*) default on power-up or reset.

9.2.4 The I/O read function on address 0 returns Display Contention Resolver (DCR) status on MSB (D7) of the data bus. The signal Display Enable (DISPEN) indicates screen activity. Combined with READ in U16 and DCRSEL in U17, the signal is applied to the private I/O data bus on CD7 via D3. If this status is active (1), the processor may attempt to operate the private display RAM. The protocol for access requires re-testing after access, on a byte by byte basis. If this status is lost following access, the user must poll for its return and retry the access procedure. The standard firmware provided on the Vision-80 card includes utilities which implement these procedures so that the user does not need to create such routines separately.

9.2.5 When the private display RAM or local firmware PROM have been selected, they may be de-selected, in accordance with APPLE standards, by any memory reference to location X'CFFF'. This is partly decoded in U25, using IOSTB0 which is active for addresses X'C800': X'CFFF'. A network (R65,C11) is used to remove "glitches" in the deselect signal CFFX0 because of poor timing margins in the APPLE bus system.

9.2.6 One gate in U19 (74LS86) and one flop in U15 (74S74) are spare. Daisy chain priority resolution for interrupts and DMA are linked through the Vision-80 card since they are unused.

9.2.7 The Vision-80 card uses +5V and +12V supplies only. Power rail noise is controlled with TAG TANTALUM electrolytic capacitors (C1, C9) and monolithic ceramic capacitors at strategic locations.

9.2.8 Local firmware is provided in EPROM U23 (2532) and is selected in two banks. Initialisation routines occupy one bank, while I/O driver routines occupy the other bank. The user I/O driver routines respond to IOSEL0 for the card slot occupied by the Vision-80 over an address span of 256 bytes. The initialisation routines require bank-switching to activate ROMSEL0. Not all of the address space of the firmware EPROM (U23) is occupied, since not all of it may be accessed.

9.2.9 The APPLE data bus D0:D7 is buffered in two parts via bus transceivers U26 and U27 (DP8304 or i8286). U26 develops the access path for private display RAM (MD0:MD7), while U27 develops the access path for I/O and firmware (CD0:CD7). Bus direction is controlled by the APPLE bus signal READ.

9.2.10 Whenever I/O access to the occupied card slot generates IOSEL0, the card select flop U3 (74LS74) generates CARSEL, which in turn enables RAM or ROM bank mapping in the space X'C800' : X'CFFF' via gates U17 (74LS00). Card select is disasserted on RSTO or any access to X'CFFF'.

9.2.11 ROM or RAM bank mapping is determined by U2 (74LS74), which has been set up by appropriate device selection (see 9.2.3). By default on power-up or reset, ROM is selected and firmware initialisation routines are accessible in U23. When RAM is selected, I/O driver routines (over a span of 256 bytes) are also accessible in U23. Such access is dependent on the card being selected. IOSTB0 is used as an address qualifier (X'C800' : X'CFFF').

9.2.12 Selection of firmware EPROM or I/O driver access enables the firmware EPROM (U23) with ROMENB0 from U16 (74LS08). This also enables bus transceiver U27 to switch the data path, which is also enabled by device access DEVELS0 via U16.

9.2.13 Selection of private display RAM is subject to qualification by DISPEN (inactive). Processor access to display RAM is inhibited when the CRTC (U6) is actively generating displays. In concert with firmware support (see 9.2.4), this prevents bothersome display interference without need for complex hardware contention controls.

9.2.14 The flop U3 (74LS74) may be firmware controlled to generate NORMAL (for standard font) or ALT (for secondary font). This should only be employed for cards equipped with 32Kbit (2732A) character generator PROM (U28). Results in ALT mode are undefined with 16Kbit (2716-2) character generator PROM. Power-on and RSTO default to NORMAL, which supports 9\*11 character dot matrix. In ALT mode, the character dot matrix is optionally 8\*11, thus permitting the implementation of "chunky" graphics in the alternate font. This must be applied with reinitialisation of the CRTC to modify the line frequency divider (display start address).

9.2.15 The flop U2 (74LS74) may be firmware controlled to switch the bilateral CMOS switch U1 (4016) which selects the display video source. The selection defaults to APPLE-source on power-up or RSTO. The switch output is buffered with a Darlington-configuration emitter coupler (Q4, Q5) and AC-coupled for convenience.

9.2.16 The APPLE video source is protected from mild electrical abuse with R9,D1,D2. Video CVID1 from the CRTC is mixed with composite sync CYSYNCO at Q3, and is provided with an independent level control RV1 prior to the video switch U1 (4016). Composite video is available with negative sync and an amplitude of approximately 1 Volt P/P at an impedance of approximately 75 Ohms at the VIDEO OUT pin.

9.2.17 The private display RAM is implemented with 2114AL static RAMs, with access time of better than 350 nSec. The display is arranged as a contiguous 2048 byte array (U9, U10, U11, U12) with common addressing MA00:-MA10 and control MREAD derived from the address multiplexor (see 9.2.1). The private display RAM data bus MD0:MD7 may be read or written by the processor via bus transceiver U26 (DP8304 or i8286). The data bus is only read by the CRTC, and display refresh data is buffered in octal pipeline register U13 (74LS374).

9.2.18 A master crystal clock of 18.0 MHz is implemented with Q1, Q2, XL1 and other discretes, to generate DOTCLK from buffer U17 (74LS00). DOTCLK advances the dot raster row data serialiser register U14 (74165), staticises the current video dot in U15 (74S74) and advances the character dot counter register U20 (74LS163A).

9.2.19 DOTCLK is divided by 9 (for normal font) or 8 (optionally for alternate font) in counter U20 (74LS163). On the "ninth" count, a synchronous load resets the starting count to 0 or 1, depending on font selection ALT via W3. The "fourth" count provides a convenient character clock reference CRTCLK for the CRTC U6 (6845).

9.2.20 The synchronous reset cycle of U20 provides a convenient pipeline staticiser clock for raster row pipeline register U13 and raster row data register U14. This clock loads a new character from refresh memory, and transfers the current row data (translated via PROM U28) to the serialising register U14, from which it is emitted at DOTCLK rate.

9.2.21 The CRTC U6 (6845) is essentially an array of linked programmable dividers, generating appropriate display refresh memory addresses GA00:GA10, raster row addresses RA0:RA3 for each row of characters) plus

sync and control signals. The dividers are programmed initially and thenceforth need no further attention. During such firmware access, clock Q3 is used to strobe divider data and selection data into the device.

9.2.22 Horizontal and vertical sync pulses are combined in U5 and U16 as CSYNCO for use in the composite video mixer (see 2.16). The signal DISPEN defines the horizontal and vertical extent of the active display. A programmable cursor may be implemented with CURSOR to provide a fixed or blinking underscore at the current location.

9.2.23 Character generator EPROM U28 (2716-2) maps character data (from U13) and a current row selection (from RA0:RA3) into a current raster row data segment. This data segment is staticised in U14 and then serialised at DOTCLK rate. The EPROM has its low-order address inputs occupied by RA0:RA3 to simplify its programming. Higher order addresses are controlled by the applied data from U13. The most significant address is switched from NORMAL/ALT to access an alternative font ONLY when a 27632A is installed.

9.2.24 Because of access time limitations, display RAM data is pipelined through U13. The pipelined data provides almost a complete character time (approx. 440 nSec) for EPROM translation in U28. Hence U28 requires a minimum access time of 390 nSec to guarantee data stability, setup and hold times for the serialiser U14 (74165).

9.2.25 The standard character generator EPROM U28 is type 2716-2, programmed with a full ASCII character set equipped with descenders and displayable control codes. Only 7-bit data is presented to the character generator, giving the user the alternative of an INVERSE characteristic in the most significant bit (D7) of each display character.

9.2.26 The pipeline clock is also applied to the status staticiser register U21 (74LS174) which ensures the proper synchronisation of status controls CURSIR, DISPEN and INVERSE to the video after it has traversed the "pipeline" effects of U13 and U14. CURSOR and DISPEN require two delay periods because the CRTC U6 (6845) can be two characters ahead of the video data.

9.2.27 The serialised video data VIDDOT from U14 may be complemented in U19 (74LS86) by delayed INVERSE, and is then OR'd with delayed CURSOR before staticising in U15 (74S74) with DOTCLK. This last staticising guarantees clean video transitions at DOTCLK time only. The staticised CVID1 video signal may be inhibited by delayed DISPEN by a direct reset on U15. The signal CVID1 is processed with composite sync CSYNCO in the mixer stage (see 9.2.16) to produce a composite video analog signal.

9.2.28 Optional PROM types used for the firmware PROM U23 may be selected through option field W1. If a socket is employed at U23, it should be an open-frame type to allow access to W1. Character generator PROM U28 option field W2 is on the PCB writing side and remains accessible.

## PARTS LIST - VISION-80

### 10.1 INTEGRATED CIRCUITS

U 1	4016	CMOS QUAD BILATERAL SWITCH
U 2	74LS74	DUAL D FLOP
U 3	74LS74	DUAL D FLOP
U 4	74LS08	QUAD GATE (AND)
U 5	74LS04	HEX INVERTER
U 6	6845	CRTC (MOTOROLA)
U 7	74LS138	1 OF 8 DECODER
U 8	74LS157	4-BIT MULTIPLEXOR
U 9	2114L	1024*4 STATIC RAM (350 nSEC ACCESS)
U 10	2114L	1024*4 STATIC RAM (350 nSEC ACCESS)
U 11	2114L	1024*4 STATIC RAM (350 nSEC ACCESS)
U 12	2114L	1024*4 STATIC RAM (350 nSEC ACCESS)
U 13	74LS374	OCTAL PARALLEL REGISTER
U 14	74615	OCTAL SERIAL REGISTER
U 15	74S74	DUAL D FLOP (SCHOTTKY)
U 16	74LS08	QUAD GATE (AND)
U 17	74LS00	QUAD GATE (NAND)
U 18	74LS32	QUAD GATE (OR)
U 19	74LS86	QUAD GATE (XOR)
U 20	74LS163A	(SIGNETICS) OR.....
	74LS163	4-BIT SYNCHRONOUS COUNTER (FAIRCHILD)
U 21	74LS174	HEX PARALLEL REGISTER
U 22	74LS157	4-BIT MULTIPLEXOR
U 23	2716	OR.....
	2732	OR.....
	2532	16K/32K EPROM (5V ONLY) FIRMWARE
U 24	74LS157	4-BIT MULTIPLEXOR
U 25	74LS30	OCTAL GATE (NAND)
U 26	DP8304	OR.....
	18286	OCTAL BUS TRANSCEIVER
U 27	DP8304	OR.....
	18286	OCTAL BUS TRANSCEIVER
U 28	2716-2	OR.....
	2732A	OR.....
	2532-35	16K/32K EPROM (5V ONLY) PATTERN GENERATOR
		(NOTE: 390 nSEC MAXIMUM ACCESS TIME)

### 10.2 TRANSISTORS AND DIODES

D 1	IN914	GP Si SWITCHING DIODE
D 2	IN914	GP Si SWITCHING DIODE
D 3	IN914	GP Si SWITCHING DIODE
D 4	IN914	GP Si SWITCHING DIODE
D 5	IN914	GP Si SWITCHING DIODE
Q 1	2N4258	PNP GP Si SWITCH
Q 2	2N4258	PNP GP Si SWITCH
Q 3	BC337	NPN GP Si SWITCH
Q 4	2N4258	PNP GP Si SWITCH
Q 5	2N4258	PNP GP Si SWITCH

### 10.3 RESISTORS

R 1	10R	RG 1/4 (CR25)
R 2	2K7	RG 1/4 (CR25)
R 3	2K2	RG 1/4 (CR25)
R 4	1K5	RG 1/4 (CR25)
R 5	47R	RG 1/4 (CR25)
R 6	390R	RG 1/4 (CR25)
R 7	22R	RG 1/4 (CR25)
R 8	220R	RG 1/4 (CR25)
R 9	22R	RG 1/4 (CR26)
R 10	1K5	RG 1/4 (CR25)
R 11	150R	RG 1/4 (CR25)
R 12	47R	RG 1/4 (CR25)
R 13	330R	RG 1/4 (CR25)
R 14	470R	RG 1/4 (CR25)
R 15	4K7	RG 1/4 (CR25)
R 16	470R	RG 1/4 (CR25)

### 10.4 CAPACITORS

C 1	4u7	35V TAG	TANT ELECTRO
C 2	100nF	50V Z5U	MONO CERAMIC
C 3	100nF	50V Z5U	MONO CERAMIC
C 4	100nF	50V Z5U	MONO CERAMIC
C 5	100nF	50V Z5U	MONO CERAMIC
C 6	100nF	50V Z5U	MONO CERAMIC
C 7	100nF	50V Z5U	MONO CERAMIC
C 8	100nF	50V Z5U	MONO CERAMIC
C 9	4u7	35V TAG	TANT ELECTRO
C 10	100nF	50V Z5U	MONO CERAMIC
C 11	100pF	25V	DISC CERAMIC
C 12	47u	6VW TAG	TANT ELECTRO
C 13	100pF	25V	DISC CERAMIC

### 10.5 HARDWARE

VISION-80 PRINTED CIRCUIT BOARD

24 PIN AUGAT AG-524-10D

ELCOMA 10TP220 TRIMPOT

CRYSTAL 18.0 MHz HC 18/U

I.C. SOCKET

RVI

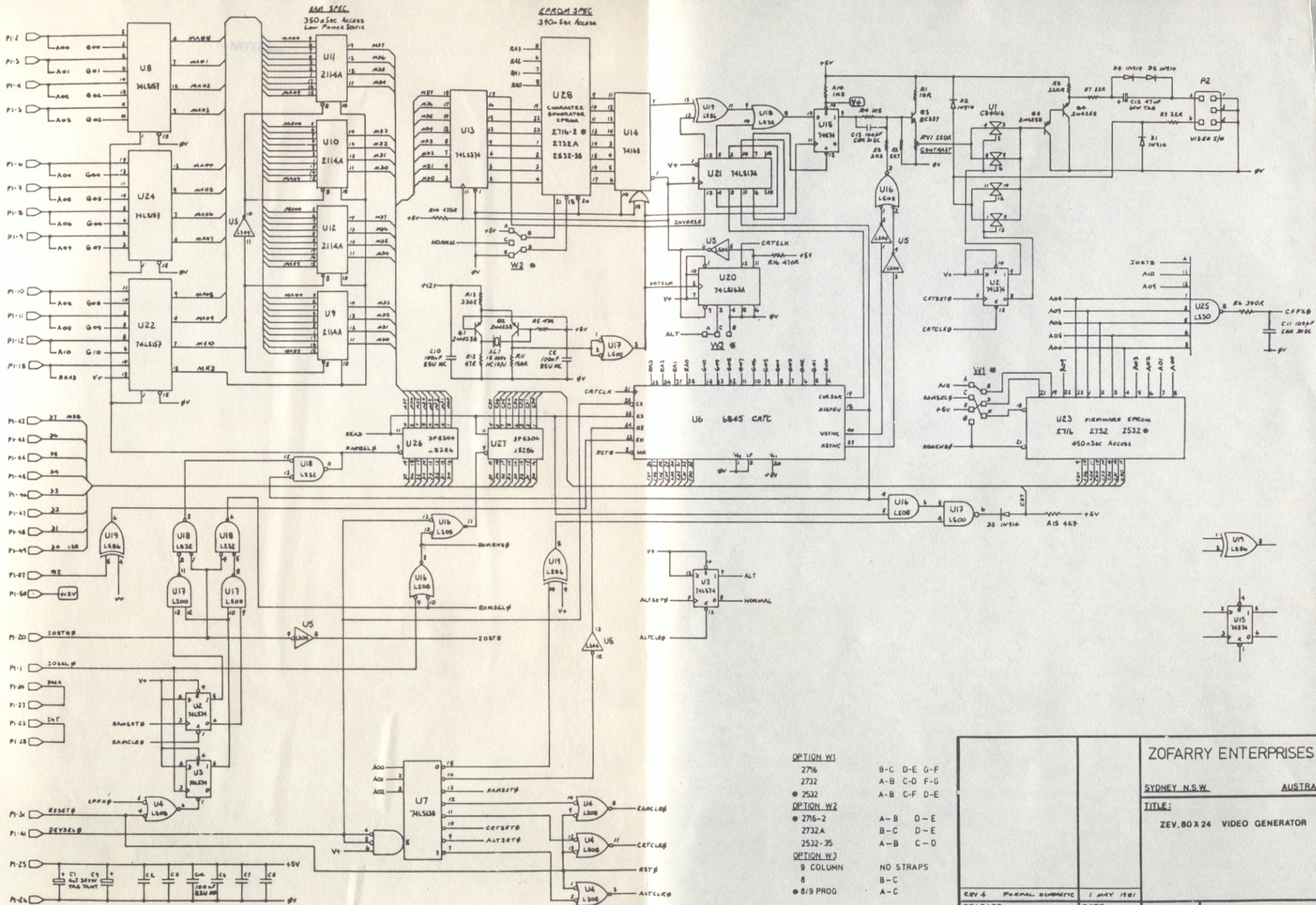
XL1

1 OFF

2 OFF

1 OFF

1 OFF



*Photo from eBay  
listing*

