TEKNIKA

MA-RGB7 MANUAL

FOR THE APPLE][AND APPLE //e COMPUTERS

TEKNIKA ELECTRONICS CORPORATION

Notice

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Radio and Television Interference

The equipment described in this manual generates radio-frequency energy. If not installed properly it may cause interference with radio and television reception.

The RGB monitor you purchase must comply with the limits for Class B computing device in accordance with the specifications in Subpart J, Part 15, of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation.

The cable connection between the computer and the monitor must be a coaxial cable with the shield properly grounded.

You can determine if your equipment is the cause of interference by turning it off. If the interference stops, it was probably caused by the computer or the monitor. To correct the problem try:

1. Turning the TV or radio antenna until the interference stops.
2. Moving the computer to one side or the other of the TV or radio.
3. Moving the computer farther away from the TV or radio.
4. Plugging the computer into an outlet that is on a different circuit breaker or fuse other than the TV or radio.
5. Installing a rooftop antenna connected to your TV and radio with a coaxial cable.
6. Narrowing down the offending piece of hardware by selectively turning them off one at a time and checking for interference.

If necessary, you should consult your computer dealer for additional suggestions. You may find the booklet "How to Identify and Resolve Radio-TV Interference Problems" prepared by the Federal Communications Commission helpful. The booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402, stock number 004-000-00345-4.

MA-RGB7

TABLE OF CONTENTS

CHAPTER 1

1.1 MA-RGB7 Features

1.1.1 Video Modes

The MA-RGB7 faithfully reproduces in RGB monitors the video modes that your computer is capable of displaying in NTSC or composite monitors. The RGB output of the MA-RGB7 improves the video quality of your Apple computer by removing the extraneous colors that occur during color transitions in LORES and in mix mode text, and allowing you to select the text color by setting switches on the board (see section 1.1.4). The MA-RGB7 generates the following video modes:

1. 40 column switch-selectable color text.
2. 80 column switch-selectable color text.
3. 16 color LORES with option of mixing mode 1.
4. 16 color LORES with option of mixing mode 2.
5. 6 color HIRES with option of mixing mode 1.
6. 6 color HIRES with option of mixing mode 2.
7. 16 color MERES with option of mixing mode 2.
8. 16 color 140X192 (color double HIRES) with option of mixing mode 2.
9. 2 color 280X192 (monochrome HIRES) with option of mixing mode 1.
10. 2 color 560X192 (monochrome double HIRES) with option of mixing mode 2.

Modes 2,4,6,7,8 and 10 are available only in Apple //es with an 80 column card installed in the Auxiliary slot. Modes 8 and 10 are available only if the 80 column card has 64K of resident RAM.

1.1.2 New Video Modes

Whenever text is present in the HIRES mode it appears "tinged" with extraneous colors. The MA-RGB7 generates two new video modes, the monochrome HIRES and the Dot HIRES, to get rid of or partially solve the "tinged" text problem.
The monochrome HIRES is essentially HIRES as seen in a monochrome monitor so that the above anomaly is not present, and thus, HIRES generated text becomes legible. However, only one color (the color selected by the color switch) is displayed. The monochrome HIRES mode may be mixed with 40 column text in the lower four screen lines.
The Dot HIRES video mode is a partial color fill of the video, to remove partially the "tinge-ing" of HIRES generated text. The Dot HIRES mode may be mixed with either 40 or 80 column text in the lower four screen lines. This mode is useful for HIRES-generated text and 6 color graphics at the same time.

1.1.3 Software Compatibility

The MA-RGB7 is 100% compatible with all Apple][40 column software. In Apple //es, the MA-RGB7 uses the resident Apple //e 80 column firmware for complete 40 and 80 column software compatibility with all existing (Applesoft, Apple DOS, Apple Pascal, CPM, Apple Writer //e, Quick File //e, etc.) and future Apple //e software.

1.1.4 Color Switches

With RGB monitors the MA-RGB7 simulates monitors of different color phosphorous. If you are accustomed to doing your word processing in either green, amber, or white, you may select that text color or others from a palette of 15 colors by setting the first four switches on the board as follows:

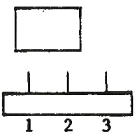
4	3	2	1	40 or 80 column text color
on	on	on	off	Magenta
on	on	off	on	Dark Blue
on	on	off	off	Purple
on	off	on	on	Dark Green
on	off	on	off	Grey
on	off	off	on	Medium Blue
on	off	off	off	Light Blue
off	on	on	on	Brown
off	on	on	off	Orange (amber)
off	on	off	on	Grey
off	on	off	off	Pink
off	off	on	on	Green
off	off	on	off	Yellow
off	off	off	on	Aqua
off	off	off	off	White

IMPORTANT NOTE: **DO NOT** set all switches to the "on" position because this will result in no video being displayed at all.

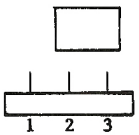
Text will now be displayed in the color of your choice. If at any future time you decide to change the text color, be sure to power down the computer before removing the MA-RGB7 to change the switch positions.

1.1.5 Computer Selection Jumper Block

The Jumper Block on the board selects the computer revision you own. Improper selection of the Jumper Block will cause your computer to display the wrong colors. If this problem is encountered, change the state of the Jumper Block.



Insert jumper block between pins 1 and 2 for Apple //e REV B.



Insert jumper block between pins 2 and 3 for Apple][s.

WARNING: The MA-RGB7 comes with the jumper block inserted for Apple //e REV B computers. If your computer is not an Apple //e REV B you must move the jumper block as shown above.

IMPORTANT WARNING: THE MA-RGB7 IS INCOMPATIBLE WITH APPLE //e REV A. THESE COMPUTERS LACK TWO SIGNALS IN SLOT 7 REQUIRED BY THE MA-RGB7.

Present Apple policy dictates that a Rev A mother board will be replaced by a REV B by your dealer free of charge if you purchase an extended 80 column card. Check with your dealer on the availability of this free upgrade.

1.2 Installation

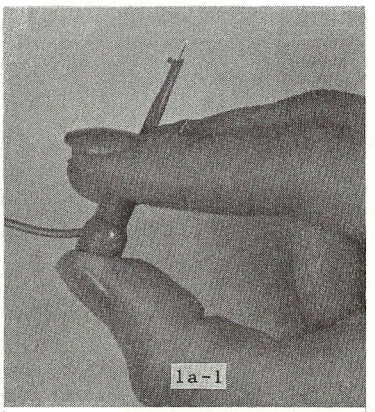
Your MA-RGB7 kit should include the following items:

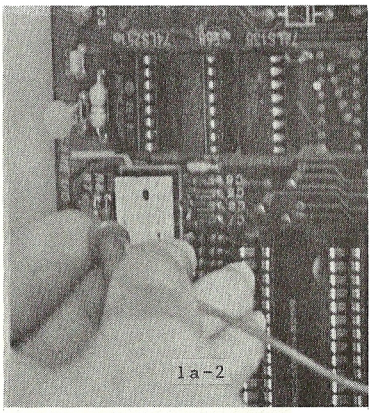
1. The MA-RGB7.
2. A cable with 2 micro-probes.
3. A DB-15 cable kit assembly.
4. A bracket with 3 screws and nuts.
5. This manual.

If any of the above items are missing, please contact your dealer.

To install the MA-RGB7 in your computer, carry out steps 1 through 10 listed below.

1. Remove the cover from your computer by pulling up on the rear edges until the cover snaps off.
2. Touch the power supply cover (the big gold or silver metal box to the left of the auxiliary slot) to discharge any static charge you may have accumulated on your clothes or body.
3. Make sure the power to your computer has been turned off.
4. Set the text color switches to the desired color, and the computer type Jumper Block to the revision code of your computer as explained earlier in this chapter.
5. Attach the micro-probes as shown in Figure 1.
6. Attach the DB-15 cable to the MA-RGB7 as shown in Figure 2.
7. Install the MA-RGB7 in slot 7. Make sure that the components are to your right as you install it (see Figure 2).
8. Plug the micro-probe connector into connector J1 of the MA-RGB7 as shown in Figure 2.
9. Attach the DB-15 connector to the back of your computer as shown in Figure 3.
10. Replace the cover of your computer by inserting the front tip of the cover and pushing down firmly on its back corners until you feel it snap into place.
11. Connect your monitor cable to the DB-15 connector.





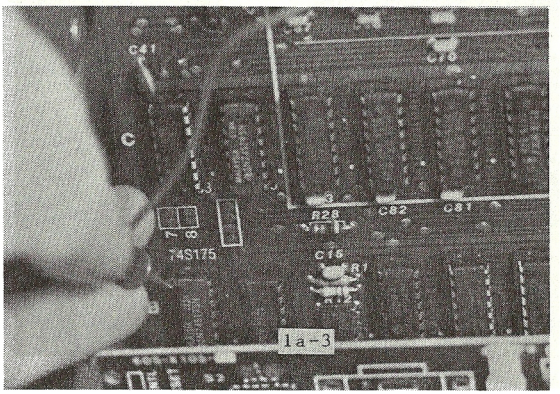


Figure 1a. Attaching the micro-probes to the Apple][series.

1. Hold clip and apply pressure to release micro-probe. Releasing pressure once the probe is positioned will secure the clip.
2. Connect red jumper to bottom side of 1.5K resistor (R7).
3. Connect blue jumper to pin 9 of 74S175 chip at location B1.

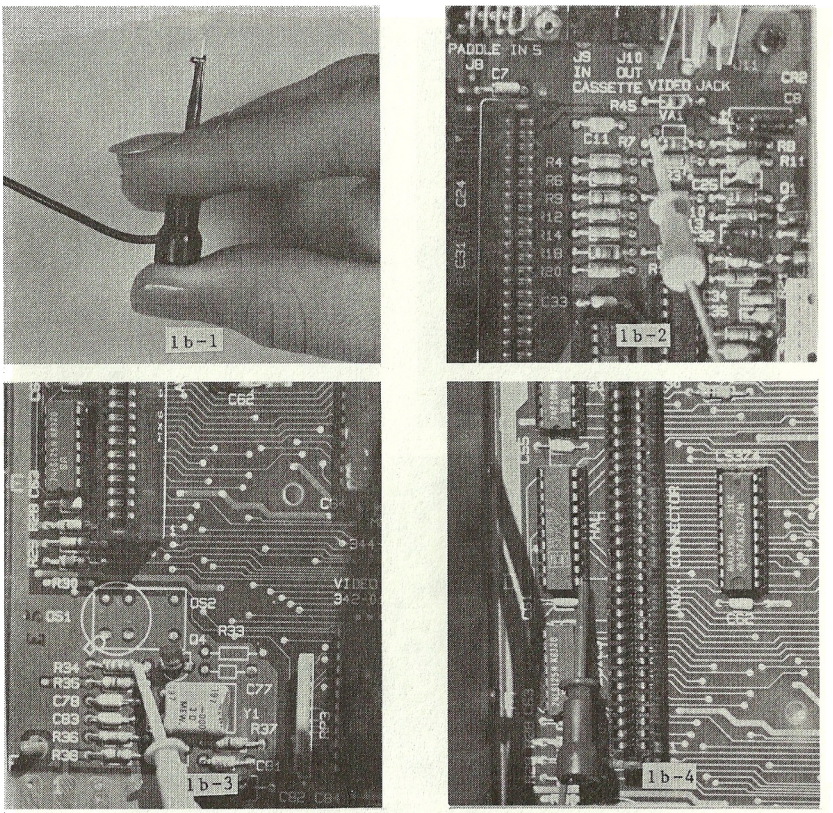


Figure 1b. Attaching the micro-probes to the Apple //e REV B series.

1. Hold clip and apply pressure to release micro-probe. Releasing pressure once the probe is positioned will secure the clip.
2. Connect red jumper to the left side of resistor R7.
3. Connect blue jumper to the right side of resistor R34.
4. Alternate way of connecting blue jumper. Use this method only if your computer does not have resistor R34. Connect blue jumper to pin 1 of the HAL at location D1.

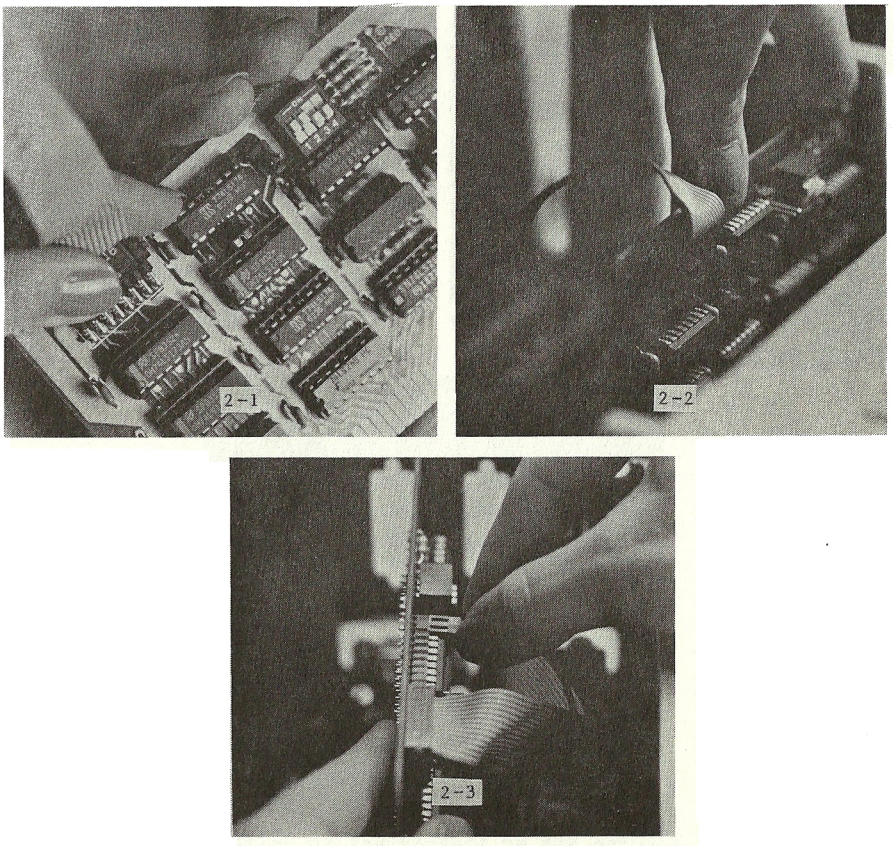
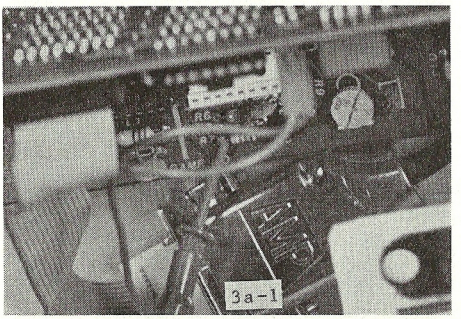
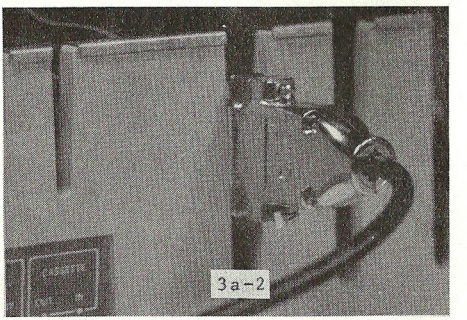


Figure 2. Attachment of cable and installation of the MA-RGB7.

1. Plug ribbon cable into location J3.
2. Plug card into slot 7 on the mother board.
3. Plug micro-probe connector to connector J1 of the MA-RGB7.





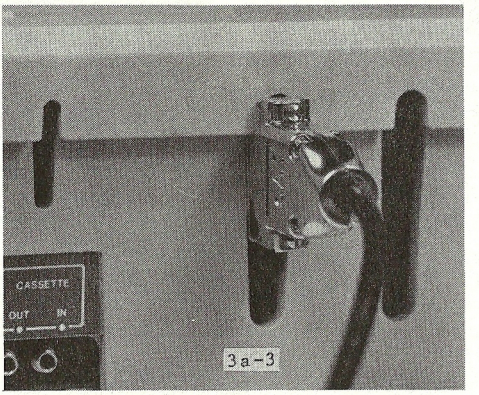


Figure 3a. Installation of the MA-RGB7 to your monitor. (Apple][series)

1. Mate the 2 DB-15 cable connectors so they appear as shown.
2. Place the DB-15 connector firmly between the grooves in the rear of the case as shown.
3. Snap down the lid to secure the connector as shown.

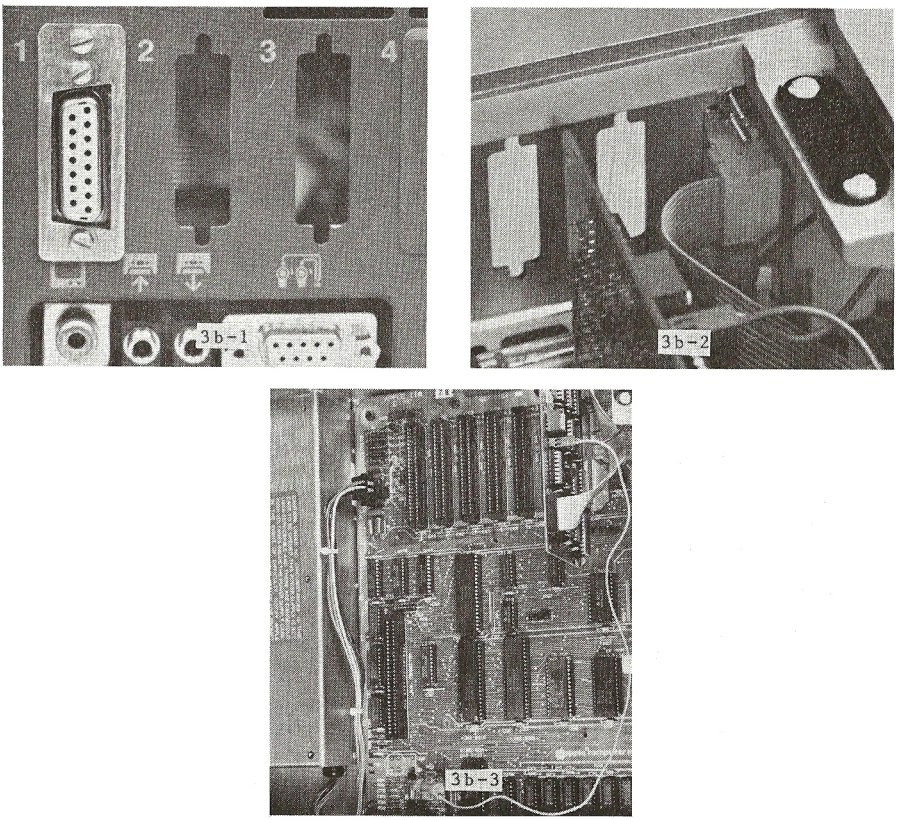


Figure 3b. Installation of the MA-RGB7 to the monitor. (Apple //e REV B series)

1. Attach the bracket to the backplane of your computer as shown.
2. View of the bracket assembly from the inside.
3. Top view of interior installation.

CHAPTER 2

2.1 Introduction

The MA-RGB7 enhances the existing video of any Apple computer by interfacing it to an RGB monitor. It does not add any new video modes besides those that already exist in the particular Apple revision, as shown below:

VIDEO-MODE	APPLE][PLUS	APPLE //e REV B
40-column text	yes	yes
16 color LORES	yes	yes
6 color HIRES	yes	yes
6 color Dot HIRES	yes	yes
80-column text	no (1)	yes (3)
280 X 192 B/W	yes (2)	yes (2)
560 X 192 B/W	no	yes (2,4)
16 color 140 X 192	no	yes (4)
16 color MERES	no	yes (4,5)

(1) 80-column cards in this revision are not supported.
(2) HIRES as seen on a monochrome monitor.
(3) This mode requires an Auxiliary slot 80-column card or extended 80-column card.
(4) These modes require an Auxiliary slot extended 80-column card (64K).
(5) A modified (connect slot pins 50 and 55) 80-column card can also generate this mode.

2.2 Apple][and //e Video Flags.

The following is a list of the hardware locations that software must use in order to produce the various video modes:

VIDEO MODE	TEXT	HIRES	80COL	AN3	AN2
40 COLUMN TEXT	1	X	0	X	X
80 COLUMN TEXT	1	X	1	X	X
16 COLOR LORES (mix 40)	0	0	0	X	X
16 COLOR LORES (mix 80)	0	0	1	1	X
16 COLOR MERES (mix 80)	0	0	1	0	X
6 COLOR HIRES (mix 40)	0	1	0	1	1
6 COLOR HIRES (mix 80)	0	1	1	1	1
6 COLOR DOT HIRES (mix 40)	0	1	0	1	0
6 COLOR DOT HIRES (mix 80)	0	1	1	1	0
2 COLOR 280X192 (mix 40)	0	1	0	0	1
2 COLOR 560X192 (mix 80)	0	1	1	0	1
16 COLOR 140X192 (mix 80)	0	1	1	0	0

These hardware locations are set or cleared as follows:

MODE	SET=1	RESET=0	POWER-UP	CTRL-RESET
TEXT	$C051 (-16303)	$C050 (-16304)	0	1
HIRES	$C057 (-16297)	$C056 (-16298)	0	0
MIX	$C053 (-16301)	$C052 (-16302)	0	X
AN3	$C05F (-16289)	$C05E (-16290)	0	1
AN2	$C05D (-16291)	$C05C (-16292)	0	1
80-COL	$C00D (-16371)*	$C00C (-16372)*	0	0

* These locations must be written to; ie, there must be a write instruction by the microprocessor (a POKE from BASIC).

CHAPTER 3

3.1 The Apple //e New Video Modes

This chapter describes the new video modes generated by the Apple //e (REV B only) as they relate to the MA-RGB7. To obtain any of the new modes the AN3 must be reset. Text mixing in the lower four lines of a graphics display will be in hard switch-selectable color on black background.

3.2 The MERES Mode

This video mode is only available for Apple //es (REV B or later) with a modified 80 column card (connect auxiliary pins 50 and 55 on the card) or expanded 80 column card. In this video mode the screen is divided into 80X40 pixels, any one of which can be 16 different colors. The extension RAM is used to generate the color pixels in even columns, while the resident RAM is used to generate the color pixels in odd columns. The video mapping is identical to that of page one LORES, that is, from $400 through $7FF. The most significant nibble of each byte contains the color information for the even rows while the least significant nibble contains the color information for the odd rows. Text mixing in the lower four lines will be in an 80-column format.

The Apple //e must be in the LORES video mode with the 80 column video switches in the following states:

80 column switch:	set
80 store switch:	set
PG2 switch:	used as pointer: when set, even horizontal pixels are accessed; when reset, the odd ones are accessed.

3.3 The AN2 Switch

The Apple //e does not make use of the AN2, but the MA-RGB7 utilizes this flag to distinguish between the 560 and 140 modes. To choose the 560 mode a microprocessor read or write to location $C05D must be performed, while to choose the 140 mode a microprocessor read or write to location $C05C must be performed. The state of the flag comes up in the 560 mode on power up or during a system reset.

3.4 140X192 Mode

This video mode is available only in Apple //es (REV B or later) with an expanded 80 column card. This mode separates the horizontal width into 140 locations, any one of which can have 16 colors. Four bits are used to generate the 16 colors but only 7 bits out of each byte are actually used for display. Even bytes are retrieved from extension RAM while the odd bytes are retrieved from resident RAM. The table below shows how the first 10 pixels are retrieved from memory.

Table 1

Pixel	Bits	Byte	Extension	Resident
1	0-3	1	X	
2	4-6	1	X	
	0	1		X
3	1-4	1		X
4	5-6	1		X
	0-1	2	X	
5	2-5	2	X	
6	6	2	X	
	0-2	2		X
7	3-6	2		X
8	0-3	3	X	
9	4-6	3	X	
10	0	3		X
	1-4	3		X

The color code of each nibble must be rotated right one bit to maintain the same color as they are placed horizontally across the screen. The Apple //e flags must be in the following states:

AN2 flag:	reset
AN3 flag:	reset
80 column flag:	set
80 store flag:	set
PG2 flag:	used as a pointer to access odd bytes when set and even bytes when reset.

3.5 560X192 Mode

This video mode is available only in Apple //es (REV B or later) with an expanded 80 column card. This video is "bit mapped," that is, any bit within the byte which is set to a logic "one" will generate a color pixel. The color displayed is the switch color for bits set to a logic "one" and black for the bits that are set to a logic "zero." Only seven bits (bits zero through 6) of each byte are used to generate video, with the least significant bit of each byte being displayed first, and bit 6 being displayed last. The even groups of seven bits are retrieved from extension RAM, while the odd groups of seven bits are retrieved from resident RAM. In the mixed mode, the text in the lower four lines will be 80 columns of switch-selectable color.

This mode is the default double HIRES video mode upon power up. The Apple //e flags must be in the following states:

AN2 flag:	set
AN3 flag:	reset
80 column flag:	set
80 store flag:	set
PG2 flag:	used as a pointer to access odd bytes when set and even bytes when reset.

3.6 A New Standard

Neither the 560 nor the 140 mode utilizes the most significant bit of each video byte. Consequently, it is desirable to default them in a consistent manner. For future hardware compatibility it is suggested that the software always reset the most significant bit (to a logic "0") for the 560 mode and set it (to a logic "1") for the 140 mode.

TEKNIKA ELECTRONIC CORPORATION LIMITED WARRANTY

Teknika Electronics Corporation, warrants this Teknika product to be free from defects in materials and workmanship for a period of 90 days to commence on the date of purchase by the original user. Within this period Teknika Electronics Corporation, will repair or replace, at its option and without charge to the owner, for replacement parts or labor or service, all parts which are defective in materials and workmanship. This warranty gives you specific legal rights. In the event of a problem with warranty service or performance, you may be able to go to small claims court, a State Court or a Federal Court.

TO MAKE THIS WARRANTY EFFECTIVE, YOU MUST

1. Save the Sales receipt showing your name, the product model number and the date of purchase by the original owner. This receipt must be used to establish that you are the original owner and to establish the date you purchased the product which is the date the limited warranty period begins.

2. To obtain warranty service, please contact us at the address shown below for the address of our repair center. **DO NOT SEND THE PRODUCT** to this address for any reason unless specifically authorized by Teknika. The product must be sent to the address specified by Teknika properly packed to avoid damage, with a copy of the proof of purchase and a description of the problem.

NOTE: THIS WARRANTY DOES NOT COVER

A. Any owner other than the original owner.
B. Installation or connection to other equipment.
C. Failure caused by improper installation.
D. Transportation charges incurred in connection with warranty service.
E. Any failure, loss, damage or personal injury due to accident, neglect, or abuse by the user, or to improper operation, maintenance or storage or to alteration or to failure to follow normal procedures as outlined in this manual.
F. Repair or replacement of warrantied parts by other than service centers authorized by Teknika.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. If there is any disagreement about repairs under the warranty you may write to:

Teknika Electronics Corporation
Customer Service Department
353 Route 46 West
Fairfield, NJ 07006

Teknika Electronics Corporation
353 Route 46 West
Fairfield, New Jersey 07006