

ADI

MicroScan 5A

Intelligent Display Systems

Service Manual

Engineering Specifications

The MicroScan is a series of microprocessor-based, intelligent scanning color monitors best suited for various applications from word processing to spreadsheets to CAD/CAE. Its microprocessor intelligence provides a wide range of signal compatibility and allows easy adjustment of screen configurations with various display modes. This section describes the engineering specifications of the MicroScan 3G, 4G, and 5A.

1. Cathode Ray Tube (CRT)

Size	:	14 inch (MicroScan 3G) 15 inch (MicroScan 4G) 17 inch (MicroScan 5A)
Pitch	:	0.28 mm (MicroScan 3G and 4G) 0.26 mm (MicroScan 5A)
Deflection angle	:	90 degrees
Neck diameter	:	29 ϕ
Phosphor	:	medium long or medium short
Faceplate treatment	:	dark glass, non-glare

2. Power Requirements

Power source	:	100 - 240 Volts universal power supply
Power consumption	:	85 Watts (MicroScan 3G and 4G) 125 Watts (MicroScan 5A)

3. Deflection Characteristics

1. MicroScan 3G

Horizontal frequency	:	30 - 57 KHz
Vertical frequency	:	50 - 100 Hz

2. MicroScan 4G and 5A

Horizontal frequency	:	30 - 64 KHz
Vertical frequency	:	50 - 100 Hz

4. Video Response

1. MicroScan 3G

Bandwidth	:	65 MHz
Horizontal resolution	:	640 / 800 / 1024 pixels

Vertical resolution : 480 / 600 / 768 lines

2. MicroScan 4G

Bandwidth : 65 MHz
Horizontal resolution : 640 / 800 / 1024 / 1280 pixels
Vertical resolution : 480 / 600 / 768 / 1024 lines

3. MicroScan 5A

Bandwidth : 70 MHz
Horizontal resolution : 640 / 800 / 1024 / 1280 pixels
Vertical resolution : 480 / 600 / 768 / 1024 lines

5. Recommended Resolution

- 640 x 480 (60, 72 Hz)
- 800 x 600 (56, 72 Hz)
- 1024 x 768, interlace
- 1024 x 768 (60, 70 Hz)
- 1280 x 1024 (60 Hz) (MicroScan 4G and 5A only)

6. Input Signal

Type : analog
Video signal : 0.7 V_{p-p}
Sync signals : separate sync, TTL level

7. Display Size

1. MicroScan 3G

- 250 x 187.5 mm (default setting)
- 270 x 202 mm (full screen)
- Both display sizes dependent upon signal timing used

2. MicroScan 4G

- 267 x 200 mm (default setting)
- 280 x 210 mm (full screen)
- Both display sizes dependent upon signal timing used

3. MicroScan 5A

- 300 x 225 mm (default setting)
- 316 x 237 mm (full screen)
- Both display sizes dependent upon signal timing used

8. Operator Controls

- Power On/Off
- Brightness
- Contrast
- Reset button
- Degauss (MicroScan 5A only)
- H-width
- H-phase
- V-size
- V-shift

9. Video Cable Input Signals

Pin 1 : Red
Pin 2 : Green
Pin 3 : Blue
Pin 4 : Ground
Pin 5 : Self test
Pin 6 : Red ground
Pin 7 : Green ground
Pin 8 : Blue ground
Pin 9 : No connection
Pin 10 : Ground
Pin 11 : Ground
Pin 12 : No connection
Pin 13 : H-sync
Pin 14 : V-sync
Pin 15 : No connection

10. Display Modes

LED Display	Preset mode	f_H, f_V	Polarity	Remarks
1	640 x 350	31.5 KHz, 70 Hz	+, -	
2	640 x 400	31.5 KHz, 70 Hz	-, +	
3	640 x 480	31.5 KHz, 60 Hz	-, -	
4	800 x 600	35.2 KHz, 56 Hz		
5	1024 x 768	35.5 KHz, 87 Hz, Interlaced		
6	640 x 480	37.8 KHz, 72 Hz		
7	1024 x 768	48.9 KHz, 60 Hz		
8	800 x 600	48 KHz, 72 Hz		
9	1024 x 768	57 KHz, 70 Hz		
A	1280 x 1024	64 KHz, 60 Hz		4G and 5A only

11. Dimension (W x H x L)

- 370 x 362 x 386 mm (MicroScan 3G)
- 370 x 372 x 386 mm (MicroScan 4G)
- 410 x 400 x 445 mm (MicroScan 5A)

Display and Color Adjustments

1. Microprocessor Digital Control System

The MicroScan has a microprocessor-based digital control system with memory to store display information for each of the supported display modes. The display information stored includes the following:

- H-phase
- H-width
- V-size
- V-shift
- V-linearity
- V S-correction
- V-compensation
- H-compensation
- E-W corner
- E-W parabola
- Trapezium
- H-frequency

1. Preset and User Modes

When the monitor is powered on, previously stored display information of different modes such as VGA, S-VGA, 8514A, 1024 x 768, and 1280 x 1024 modes (MicroScan 4G and 5A only), will be automatically recalled.

The monitor incorporates 10 preset modes and eight user modes. The front panel LED display indicates the display mode currently in use according to the following table:

Mode No.	Preset mode	f_H, f_V	Polarity	Remarks
1	640 x 350	31.5 KHz / 70 Hz	+, -	
2	640 x 400	31.5 KHz / 70 Hz	-, +	
3	640 x 480	31.5 KHz / 60 Hz	-, -	
4	800 x 600	35.2 KHz / 56 Hz		
5	1024 x 768	35.5 KHz / 87 Hz, Interlaced		
6	640 x 480	37.8 KHz / 72 Hz		
7	1024 x 768	48.9 KHz / 60 Hz		
8	800 x 600	48 KHz / 72 Hz		
9	1024 x 768	57 KHz / 70 Hz		
A	1280 x 1024	64 KHz / 60 Hz		4G and 5A only

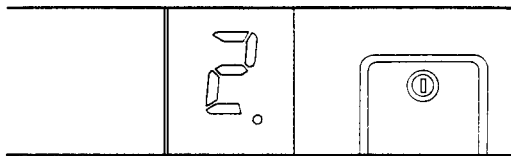


Fig. 2.1. The LED mode number with an adjacent dot indicates a user mode.

2. Signal Identification Flowchart

Input H-frequency

25 KHz < H-freq < 33 KHz

H (+)	→	Display mode	:	VGA, 720 x 350
		H / V frequency	:	31.468 KHz / 70.08 Hz
H (-) / V (+)	→	Display mode	:	VGA, 720 x 400
		H / V frequency	:	31.468 KHz / 70.08 Hz
H (-) / V (-)	→	Display mode	:	VGA, 640 x 480
		H / V frequency	:	31.468 KHz / 59.94 Hz

33 KHz < H-freq < 41 KHz

V-freq = 56 Hz	→	Display mode	:	SVGA, 800 x 600
		H / V frequency	:	35.156 KHz / 56.249 Hz
V-freq = 67 Hz	→	Display mode	:	
		H / V frequency	:	
V-freq = 87 Hz	→	Display mode	:	8514/A, 1024 x 768 (I)
		H / V frequency	:	35.52 KHz / 87.065 Hz
V-freq = 59 Hz	→	Display mode	:	800 x 600
		H / V frequency	:	37.87 KHz / 59.824 Hz
V-freq = 60 Hz	→	Display mode	:	1024 x 768 (NI)
		H / V frequency	:	48.653 KHz / 60.363 Hz
V-freq = 70 Hz	→	Display mode	:	800 x 600
		H / V frequency	:	48.412 KHz / 72.69 Hz

52 KHz < H-freq < 60 KHz

Display mode	:	1024 x 768
H / V frequency	:	57 KHz / 70 Hz

> 60 KHz

Display mode	:	1280 x 1024
H / V frequency	:	64 KHz / 60 Hz

3. Timing limits

The monitor will accept all timings within the following limits:

	Horizontal	Vertical
Frequency	30 - 64 KHz (57 KHz for the 3G)	50 - 100 Hz
Blanking	> 3.0 usec	≥ 0.6 msec
Back porch	≥ 1.3 usec	≥ 0.5 msec
Front porch	≤ Back porch	≤ Back porch
Sync width	≥ 1.2 usec	≥ 0.045 msec

4. Automatic Frequency Control

The monitor will automatically lock into the input H-sync within a specified range, without the need of H-hold controls.

2. Display Adjustment Controls

The MicroScan contain preset display information on all of the available display modes. Normally, no user-adjustment is required. However, if necessary, the front panel push buttons may be used for display adjustment in any of the display modes. Once set, the settings will be automatically saved and recalled each time a mode change is effected.

When shipped from the factory, the front panel push buttons may be used to perform the following adjustments:

1. **H-phase.** Used to adjust the proper horizontal display position.
2. **H-width.** Used to adjust the pictured width to the desired level.
3. **V-size.** Used to adjust the overall picture to the preferred height.
4. **V-shift.** Used to adjust the proper vertical display position.
5. **Func / Reset.** This button performs two functions:
 - Press and release the <Func / Reset> button to set the front panel controls to the alternate mode for picture geometry and color adjustments. Refer to Section 6.1 for more information on the alternate modes.
 - Hold down the <Func / Reset> button for about 5 seconds to return the display parameters of the current display mode to the factory default settings. The LED display blinks two times indicating that the settings have been changed to default.

Please note that the Reset button will only recall the factory defaults of the display mode currently in use. The other display modes are not affected.

6. **Degauss.** This control eliminates build-up of stray magnetic fields which affect the purity of screen colors, focus, and convergence. This button is available on the MicroScan 5A only.

Warning: Do not hold down the Degauss button continuously to avoid damage to the monitor.

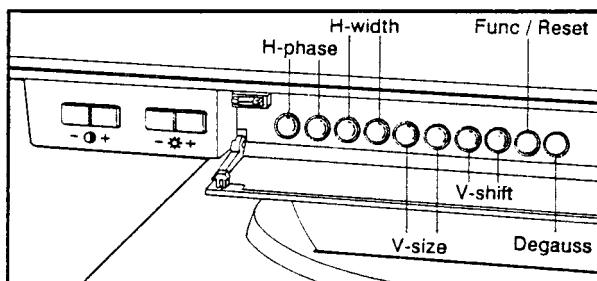


Fig. 2.2. Front panel display adjustment controls. Please note that the Degauss button is available on the MicroScan 5A only.

3. Geometry Adjustment Controls

This section explains the features and functions of MicroScan display adjustment systems. It includes a list of the front panel alternate modes for ready reference as well as a step-by-step guideline on how to adjust picture geometry, vertical and horizontal picture linearity, and color display.

Warning: The manufacturer does not recommend that users perform these adjustments all by themselves. Specific test patterns and some service experience may be required to perform some of these adjustments. If any problems are encountered while adjusting the service controls, just press <Func / Reset> and start all over again.

1. Using the Func / Reset Button

The <Func / Reset> button acts as a toggle between function/reset because it enables users not only to reset to factory default settings but also to enter the alternate modes. For simplicity, this button will be referred to as the <F> button in the succeeding sections.

The <F> button performs either of the following functions:

1. To enter the alternate modes.

The user presses <F> and either of the Brightness and Contrast controls to enter the alternate modes.

The available alternate modes are listed as follows:

Press these buttons:	To change to these alternate modes:	To perform the following functions:
 + 	Geometry Controls 1	E W-Corner E W-Parabola Trapezium
 + 	Geometry Controls 2	V Linearity V S-Correction V-Regulation H-Regulation
 + 	User-defined Color Setting 1	Red driver Green driver Blue driver
 + 	User-defined Color Setting 2	Red driver Green driver Blue driver

								Func. Recall
	+ Corner -	+ Pin -	+ Trap. -					Func. +  -
Default colors: press Func. + 	+ V.Lin -	+ S-Corr. -	+ V-Reg. -	+ H-Reg -				Func. +  +
	+ R -	+ G -	+ B -					Func. +  -
	+ R -	+ G -	+ B -					Func. +  +

Fig. 2.3. The front panel controls include four alternate modes which allow the user to make picture geometry and color adjustments.

2. Sets the display parameters back to the factory default.

To reset to default, press and hold down the <F> button for 3 to 5 seconds. This brings the user back to the factory settings of the display mode currently in use. The LED display blinks two times indicating that the settings have been changed to default

Please note that the <F> button will recall the factory defaults of all the 12 user and geometry parameters. You may have to start adjusting all the parameters all over again in the current mode once <F> is pressed.

The <F> button will only recall the factory defaults of the mode currently in use; settings on the other display modes will not be affected.

2. Geometry Control 1

By pressing <F> and  (refer to Section 2.3.1), the front panel control functions may be changed to perform the following adjustments:

1. East-west corner / east-west parabola (pin)

Together with the East-west parabola (pincushion) control, this control may be used to correct pincushion and barrel distortions.

2. Trapezium Correction

Minimizes the trapezium distortion of the display area.

Display performance correction is microprocessor-controlled; once set, the settings are automatically saved and can be recalled each time a mode change is affected.

To access the Geometry Control 1, follow the steps outlined below:

1. Press the <F> button once.
2. The LED on the front panel shows a "E" which indicates that the monitor is in the alternate mode. The monitor waits for a second button to be pressed.

If no other button is pressed within 3 seconds, the monitor automatically shifts back to the default front panel functions.

3. Press  to activate the Geometry Controls 1.
4. The LED on the front panel shows "E" and "1" blinking alternately. This indicates that the user has successfully entered the Geometry Control 1 setting. For the MicroScan 3G, this mode mode is indicated by a blinking LED.

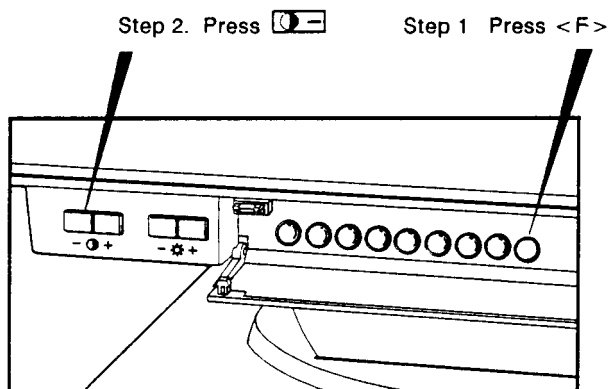


Fig. 2.4. Front panel controls for Geometry Control 1.

5. The user may now use the corresponding < + > and < - > keys to adjust the display image according to individual preference. Every adjustment made will be automatically saved.
6. To exit, press < F > .

To reset to the factory defaults:

1. Hold down < F > for 5 seconds.
2. The LED will blink twice to indicate that it has switched back to the factory settings. Release the < F > button

3. Geometry Control 2

By pressing < F > and  (refer to Section 2.3.1), the front panel control functions may be changed to perform the following adjustments:

1. Vertical linearity

If a cross hatch pattern is displayed on the screen, equal spacing between the horizontal bars at the top and bottom of the screen indicates good linearity. However, if the horizontal bars appear to be crowded at the top or bottom, the vertical linearity control may be used to correct such symptom.

2. Vertical S-Correction

For a cross-hatch pattern displayed on the screen, if the horizontal bars appear to be crowded near the center but are of equal spacing at the top or bottom, the vertical S-correction control may be used to correct such symptom.

3. Vertical static regulation compensation

Together with the Horizontal static regulation compensation control, this control minimizes the “breathing” effect when the Brightness control is turned up or down with the Contrast control set to maximum.

To access Geometry Controls 2, follow the guidelines stated below:

1. Press < F > +  to select.
2. The LED shows “E” and “2” blinking alternately. This indicates that the user has successfully activated Geometry Controls 2.

For the MicroScan 3G, this mode mode is indicated by a blinking LED.

3. The user may now use the corresponding < + > and < - > keys to adjust the display image according to individual preference. Every adjustment made will be automatically saved.
4. To exit, press < F > again.

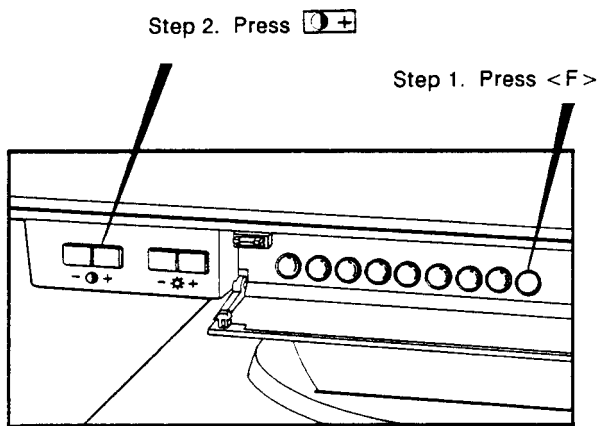


Fig. 2.5. Front panel controls for Geometry Control 2.

To reset to the factory defaults:

1. Hold down <F> for 5 seconds.
2. The LED will blink twice to indicate that it has switched back to the factory settings. Release the <F> button.

4. Making Color Adjustments

The color display adjustment system of the MicroScan includes one factory default color setting and two user-defined color settings. The following table shows how each of the color settings may be selected:

To select:	Press:
User-Defined Color Setting 1	<F> - [0-] - <F>
User-Defined Color Setting 2	<F> - [0+] - <F>
Factory-default Color Setting	<F> - <V-shift down>

5. Changing User-Defined Color Setting 1

In order to change the User-defined Color Setting 1, follow the steps outlined below:

1. Press <F> + [0-] to select.
2. The mode status LED display shows "E" and "3" blinking alternately. This designates that the user is currently in the User-defined Color Setting 1.

For the MicroScan 3G, this mode mode is indicated by a blinking LED.

3. The user may now use the corresponding < + > and < - > keys to change the individual red, green, and blue colors according to individual preference. Every adjustment made will be automatically saved.

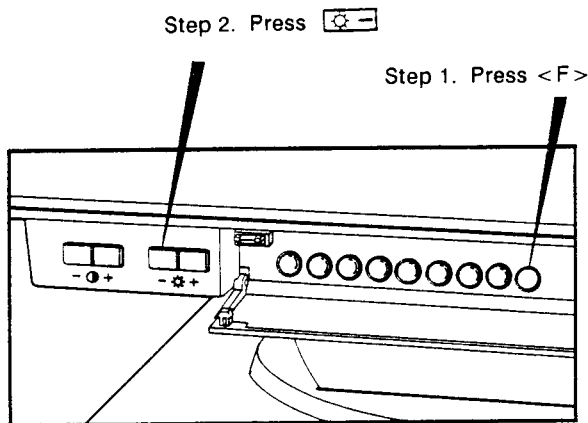


Fig. 2.6. Front panel controls for User-Defined Color Setting 1.

4. To exit, press <F> again.
5. The User-defined Color Setting 1 is now adjusted to the color of your choice.

Note: *Adjustments you make in color affects the entire image. For example, any decrease in red will affect the overall intensity of the image. Should you encounter any problems while making color adjustments, simply reset to the factory defaults and start all over again.*

To reset to the factory defaults:

1. Press <F> and to enter the User-Defined Color Setting 1.
2. Hold down <F> for 3 to 5 seconds. Release. The User-Defined Color Setting 1 now switches back to the factory settings.
3. Press <F> again to exit User-Defined Color Setting 1.

6. Changing User-Defined Color Setting 2

In order to change the User-defined Color Setting 2, follow the steps outlined below:

1. Press <F> + to select.
2. The mode status LED display shows "E" and "4" blinking alternately. This designates that the user is currently in the User-defined Color Setting 2.

For the MicroScan 3G, this mode mode is indicated by a blinking LED.

3. Follow the steps outlined in Section 2.3.5 to make adjustments for the User-Defined Color Setting 2.

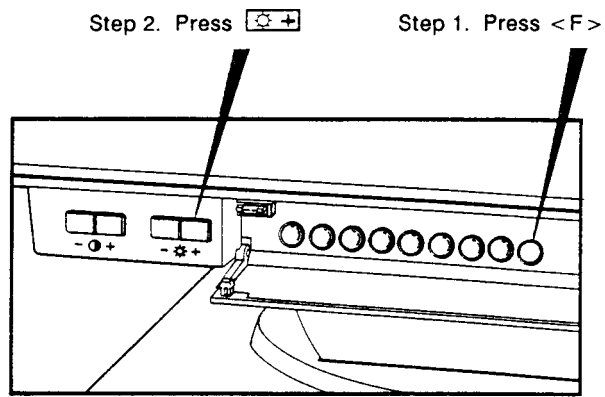


Fig. 2.7. Front panel controls for User-Defined Color Setting 2.

7. Selecting the Factory-Default Color Setting

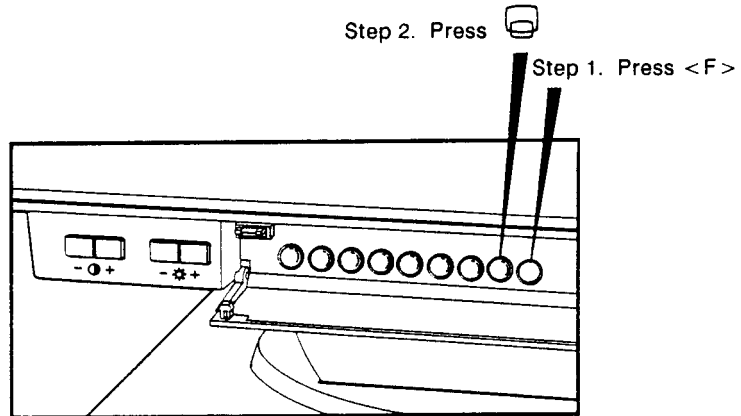


Fig. 2.8. Press <F> + <V-shift-down> to select the factory-default color settings.

Changing the Default Display Information

The monitor contains preset display information for each of its supported display modes. Section 2 describes how to make individual adjustments according to the users' specific needs. Pressing the <Func / Reset> button will return the user adjustments back to the factory defaults.

However, if a different set of display information is needed, the factory preset may also be changed accordingly. Changing the default display information may be done in either of the two ways:

- through the I²C bus interface located at the rear of the monitor housing
- through the front-panel control buttons

1. Functions of the I²C Bus

The I²C bus allows the servicemen to use a PC to program or download display parameters from the monitor. These parameters will be stored as the factory default settings and recalled each time the <Reset> button is pressed. This helps to maintain consistent image quality since all display settings are computerized and stored in the monitor's non-volatile memory.

The I²C bus also eliminates the need for manual picture alignments and saves the service time required to align a large batch of monitors. It also allows the monitor to be programmed to accept non-standard display timings.

1.1. I²C Bus Interface and Video Card Requirements

An interface cable and a utility program (G-TRANS.EXE) are required for use with the I²C bus. Just plug the interface cable into your PC's parallel port and run the utility program. With these, you can program display parameters into the monitor or download parameters from the monitor.

The G-TRANS.EXE program also requires a display card based on the ET-4000 with maximum resolution of 1024 x 768 at 57 KHz.

1.2. Using the I²C Bus

Programming through the I²C bus may be done in either of two ways:

- making individual adjustments using the utility program (G-TRANS.EXE)
- uploading the display parameters to the MicroScan from a disk file

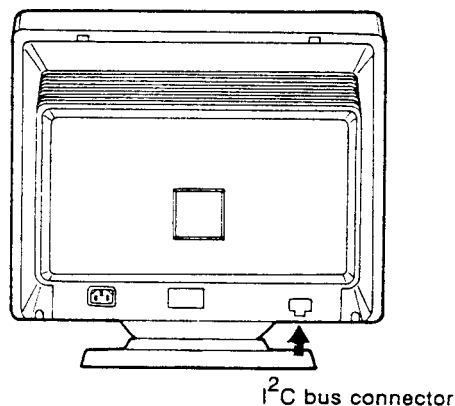


Fig. 3.1. I^2C bus connector at the rear of the MicroScan.

2. Running G-TRANS.EXE

To make display adjustments using the G-TRANS.EXE utility program, proceed as follows:

1. From the default drive, run G-TRANS.EXE.
2. The following control menu will appear:

SM-55XXG TRANSFER CONTROL PROGRAM. (C)Copyrights ADI Corporation. 1992.										
VERSION : 1.4A	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10
WRITER : DAVID	350	400	480	600	35k	38k	48k	48k	57K	64k
H-FREQUENCY	--	--	--	--	--	--	--	--	--	--
H-PHASE	1F	1F	1F	25	26	29	29	2E	34	33
PICTURE HIGHT	2A	1	Please select type. F1. SM-5517G 5A F2. SM-5515G 4G F3. SM-5514G 3G				0F	17	0E	11
V-LINEARITY	10	1					15	13	12	20
V-S CORRECTION	--	--					--	--	--	1D
V-SHIFT	2C	2					28	1E	28	28
V-COMPENSATION	--	--					--	--	--	--
PICTURE WIDTH	18	1					25	24	21	23
E_W PARABOLA	0D	0					0B	0D	0E	11
E_W CORNER	--	--					--	--	--	--
TRAPEZIUM	15	0F	13	10	15	08	0F	20	0B	16
H_COMPENSATION	--	--	--	--	--	--	--	--	--	--
CONTRAST			R - Bias		LOW-Freq.		35K HI-Wi.			
BRIGHTNESS			B - Bias		HI-Freq.		48K LO-Wi.			
TOP - CONTRAST			R - DRIVER		31K LO-Wi.		48K HI-Wi.			
TOP - BRIGHT			G - DRIVER		31K HI-Wi.		57K LO-Wi.			
COLOR_STATUS			B - DRIVER		35K LO-Wi.		57K HI-Wi.			

Press the function key corresponding to the type of monitor you are working on. While in the control menu, you can:

- use the front panel controls to make the display adjustments
- make adjustments by directly changing the display parameters
- upload the display parameters from disk

Caution: Please use these functions with care, as the factory defaults for all display modes are overwritten and can not be recovered anymore.

1. Display Adjustments Using the Front Panel Controls

1. Press <F1>, <F2>, or <F3> to display any of the following test patterns:

Press this key	To display a test pattern under the following resolution:
<F1>	640 x 480 cross-hatch pattern
<F2>	1024 x 768, 35.5 KHz cross-hatch pattern
<F3>	1024 x 768, 48.9 KHz cross-hatch pattern

2. Use the front panel push-button controls to make appropriate picture size, position, and geometry adjustments for each of the three modes corresponding to <F1>, <F2>, and <F3>.
3. After the proper adjustments have been made, press <F5> to return to the control menu.
4. At this point, the three modes corresponding to <F1>, <F2>, and <F3> have their proper display information set. The MicroScan can make use of display information from these three modes to calculate the display parameters for the other display modes.
5. Press <F6> to let the MicroScan automatically calculate the display information for the other modes. These display information are automatically stored in the MicroScan.
6. When done, press <R> to read the current values to the PC. Then press <I> to write these values to the monitor. These values will then replace the factory defaults of all display modes.

Step 5 describes a method in which the user makes adjustments for three display modes first and lets the MicroScan calculate the display information for the other modes. Slight variations may occur, and the user may use the following steps to double check the settings and make the necessary adjustments:

1. Under the control menu, press <F1>, <F2>, or <F3> to display any of the three test patterns.
2. With the test pattern displayed, press "<" or ">" to change between display modes.

The following display modes are available while using G-TRANS.EXE:

Resolution	H-frequency	LED Mode number (MicroScan 4G and 5A only)
640 x 350	31.5 KHz	1
720 x 400	31.5 KHz	2
640 x 480	31.5 KHz	3
800 x 600	35.2 KHz	4
1024 x 768	35.5 KHz	5
640 x 480	38 KHz	6
1024 x 768	48.9 KHz	7
800 x 600	48 KHz	8
1024 x 768	57 KHz	9

3. Check the display performance under each of the display mode and use the front-panel controls to make the proper adjustments if necessary.
4. When done, press <R> to read the current values to the PC. Then press <I> to write these values to the monitor. These values will then replace the factory defaults of all display modes.

2.2. Making Adjustments by Changing the Display Parameters

To make adjustments by directly changing the display parameters:

1. Use the <up>, <down>, <left>, and <right> arrow keys to move between different fields in the control menu.
2. Use the "<" and ">" keys to change the value within the current field.
3. When done, press <R> to read the current values to the PC. Then press <I> to write these values to the monitor. These values will then replace the factory defaults of all display modes.

2.3. Uploading the Display Parameters from Disk

Uploading the display parameters from a disk file requires having a set of display parameters stored on disk and running the utility program (G-TRANS.EXE). If you do not already have a file containing the desired parameters, you may:

1. Use the front panel controls to perform the display adjustment for the different display modes as desired.
2. Run the utility program (G-TRANS.EXE) after the adjustments are set.
3. Connect the interface cable from the PC's parallel port to the I²C bus connector at the rear of the MicroScan.
4. Press <R> to read all the display parameters from the MicroScan.

5. Use the <W> option to save the parameters to disk. A filename eight characters long should be specified.

These parameters may now be uploaded to the other MicroScan using the same utility program (G-TRANS.EXE).

1. Remove the I²C bus interface cable from the first MicroScan monitor.
2. Connect the I²C bus interface cable to the another MicroScan which needs alignment.
3. Power on the MicroScan. Use the <L> option to load the desired file from disk.
4. Use the <I> option to write all of the display parameters in all display modes to the MicroScan.
5. Repeat the same procedures for the other MicroScans.

2.4. Summary of G-TRANS Function Keys

Key	Function performed:
<R>	Reads the current display parameters to the PC.
<I>	Writes the display parameters in all display modes to the MicroScan.
<F10>	Performs the <R> and <I> functions simultaneously.
<W>	Saves the display parameters to disk.
<L>	Load the desired file from disk.
<V>	When a test pattern is displayed, press <V> to shift into the V-linearity adjustment mode. Use the <left> and <right> arrow to make adjustments.
<F8>	When a test pattern is displayed, press <F8> to shift into the barrel adjustment mode. Use the <left> and <right> arrow to make adjustments.
<?>	Displays a help menu.
<Esc>	Exits G-TRANS.EXE.

3. Advanced Front Panel Control Functions

The front panel controls also features additional functions to perform the following:

- R, G, B drive adjustment
- R, B bias, and sub-bright adjustment
- H-frequency adjustment
- total copy
- width limit
- total recall

For simplicity, the additional functions will be referred to as follows:

These buttons	will be represented as:
 + 	F + <5>
 + 	F + <6>

The advanced front panel control functions may be summarized as follows:

	H-Phase  		H-width  		V-size  		V-center  		Reset
F + <5>									
Drive	+ R	- R	+ G	- G	+ B	- B		Select	
Bias	+ R	- R	+ B	- B	Sub-bright				
F + <6>									
All modes	f _H (+)	f _H (-)	H-sync off	H-sync on					
F + 6 (31 K)					Total copy		← Width limit →		
F + 6 (64 K)					Total reset				

To prevent accidental or unintended erasures of the default settings, the F + <5> and f + <6> functions can only be accessed as follows:

1. Power on the monitor while holding down the <Func / Reset> button.
2. Press <F> + <5> or <6> button to enter the desired function.

3.1. F + <5> Control Functions

F + <5> offers two functions:

- adjustment of the R, G, B drive
- adjustment of the R, B bias, and sub-bright

The corresponding front panel controls perform the following functions under F + <5>:

F + 5	H-Phase		H-width		V-size		V-center		Reset
									
Drive	+ R	- R	+ G	- G	+ B	- B		Select	
Bias	+ R	- R	+ B	- B	Sub-bright				

Unlike the color adjustment functions provided by F + <3> and F + <4>, the F + <5> functions are for experienced service personnels and not intended for use by end users.

A brief description of the items included in the above table follows:

- **Drive.** Drive allows adjustment of the video color; the raster color is not affected. Under F + <5>, the H-phase controls may be used to adjust the R-drive, the H-width controls the G-drive, and the V-size controls the B-drive.
- **Bias.** Bias allows adjustment of the raster color; the color of the characters displayed on screen are not affected. Under F + <5>, the H-phase controls may be used to adjust the R-bias, and the H-width controls may be used to adjust the B-bias. The G-bias is factory preset and can not be adjusted.
- **Sub-bright.** This refers to the raster brightness. Under F + <5>, the V-size control buttons may be used to alter the raster brightness.
- **Select.** Since F + <5> offers two functions, the V-center button (Select) may be used to choose between functions.

3.2. F + <6> Control Functions

F + <6> offers the following functions as described in the following table:

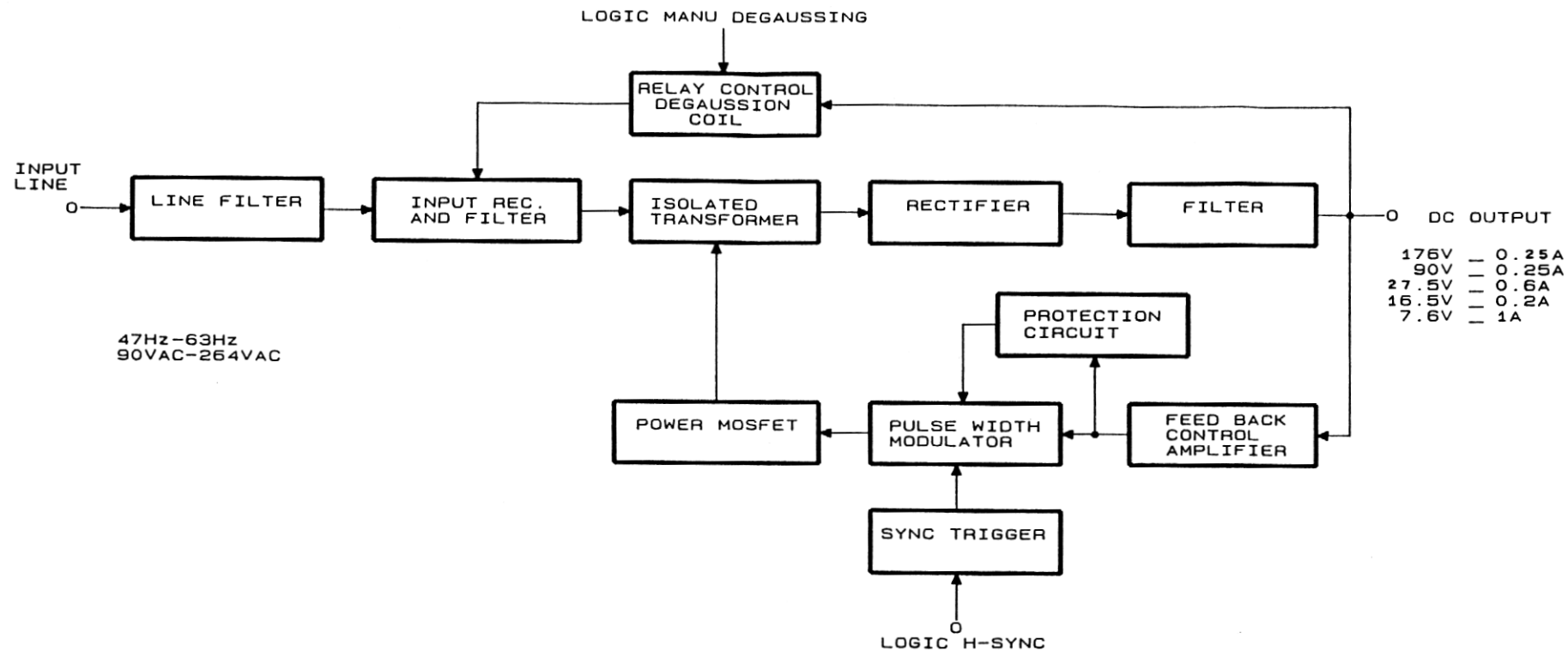
F + 6	H-Phase		H-width		V-size		V-center		Recall
									
All modes	f _H (+)	f _H (-)	H-sync off	H-sync on					
F + 6 (31 K)					Total copy	Width enable	← Width limit →		
F + 6 (64 K)					Total reset				

- **H-sync off/on.** Turns the horizontal synchronization off/on. When off, the H-frequency may be adjusted to meet user's specific needs.
- **f_H (+ / -).** Used to adjust the H-frequency may be adjusted to meet user's specific needs.
- **Total copy.** This function has the same effect as loading the display information through the I²C bus. Pressing V-size under the F + <6> function will replace the factory defaults with the user settings for all display modes. This function may only be activated when the monitor is displaying the 31.5 KHz VGA mode.

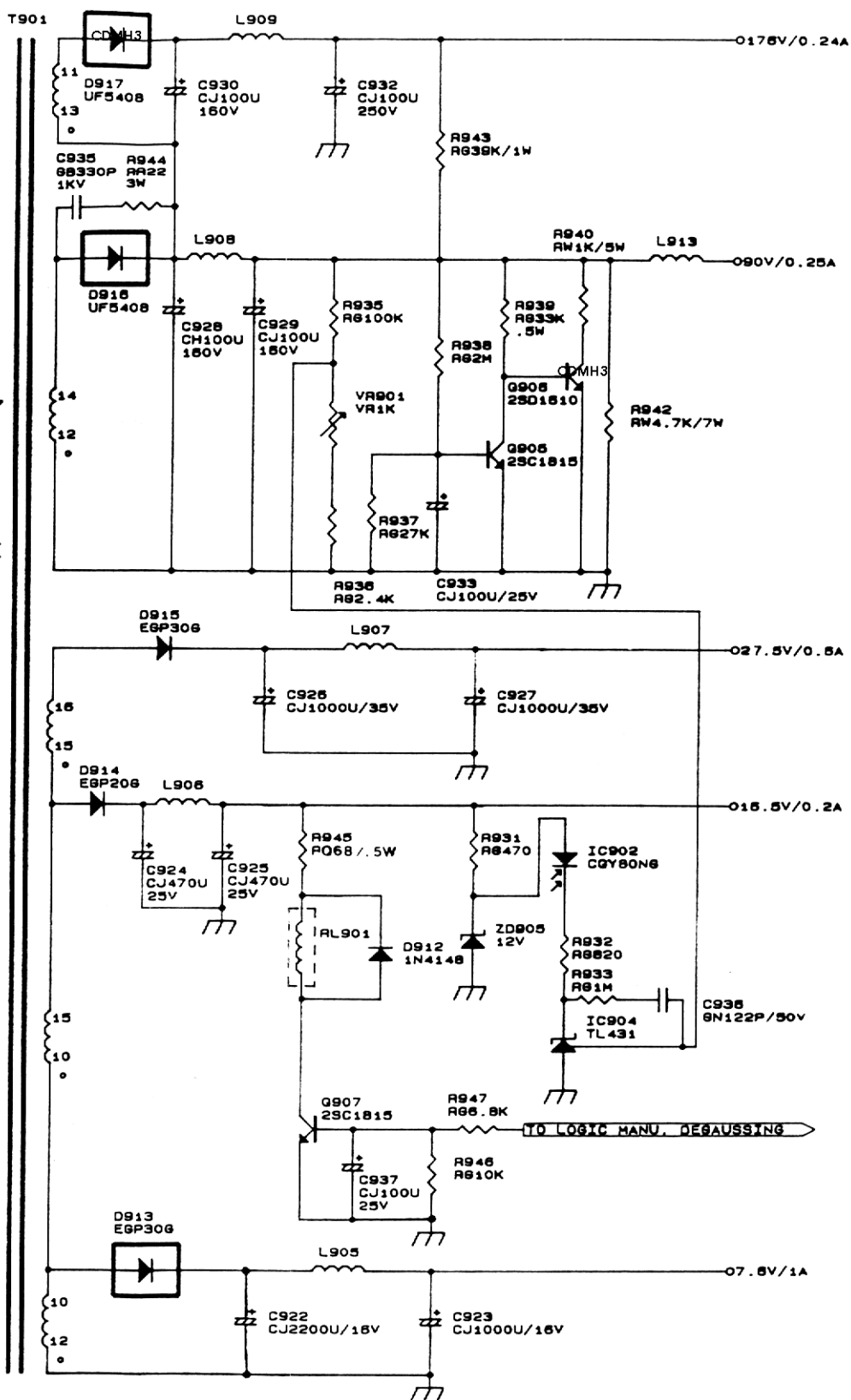
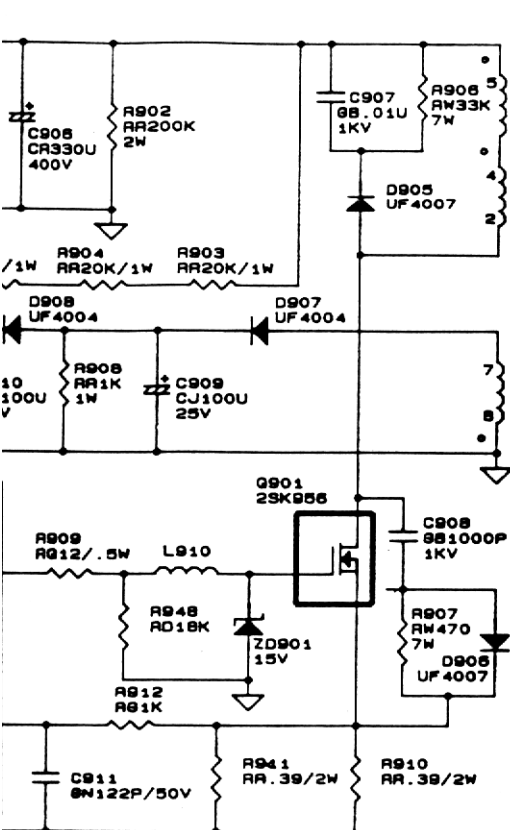
Caution: Please use this function with care, as the factory defaults for all display modes are overwritten and can not be recovered anymore.

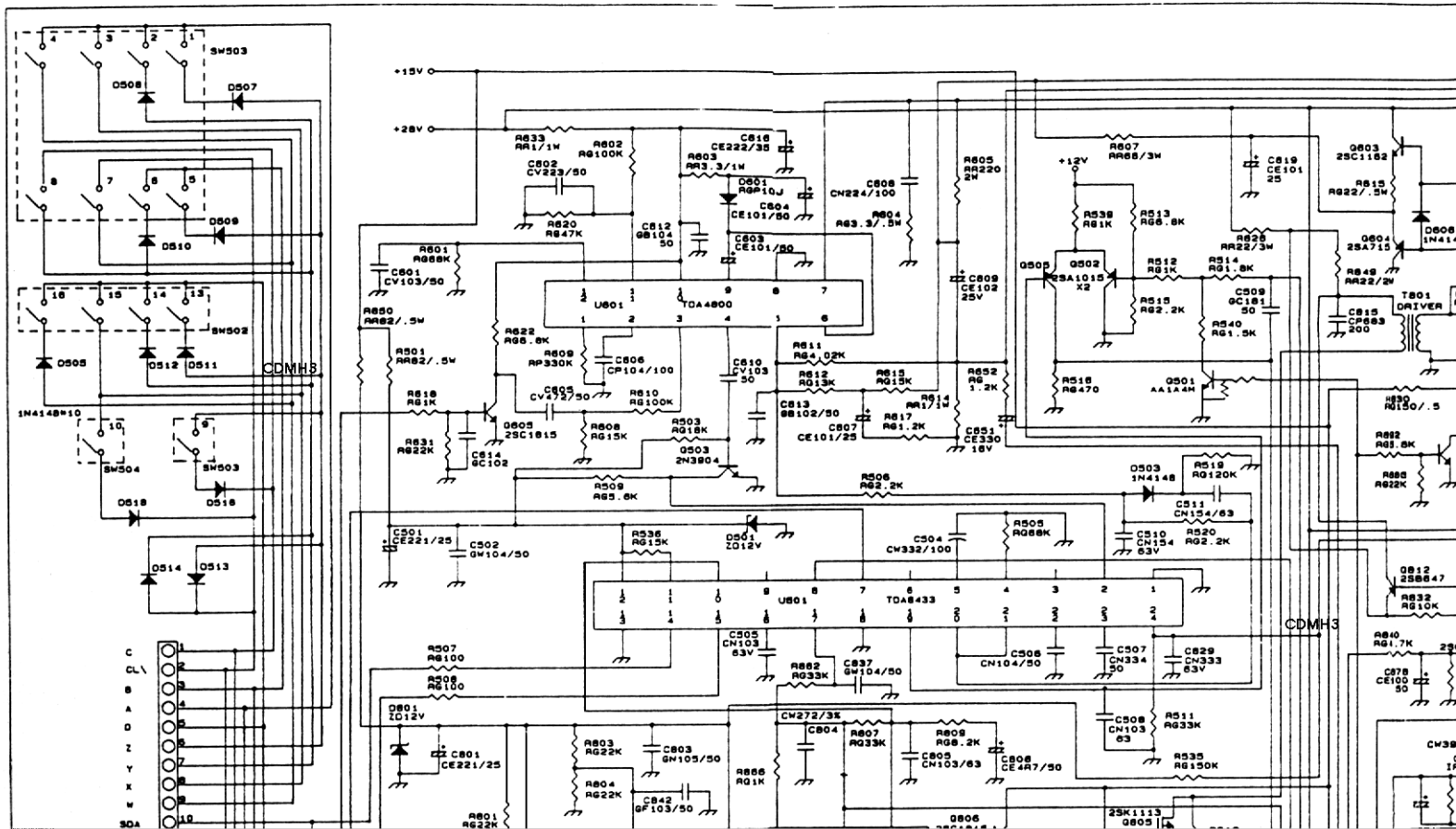
- **Width enable.** Press this key is used to enable the Width Limit function. This function may only be activated when the monitor is displaying the 31.5 KHz VGA mode.

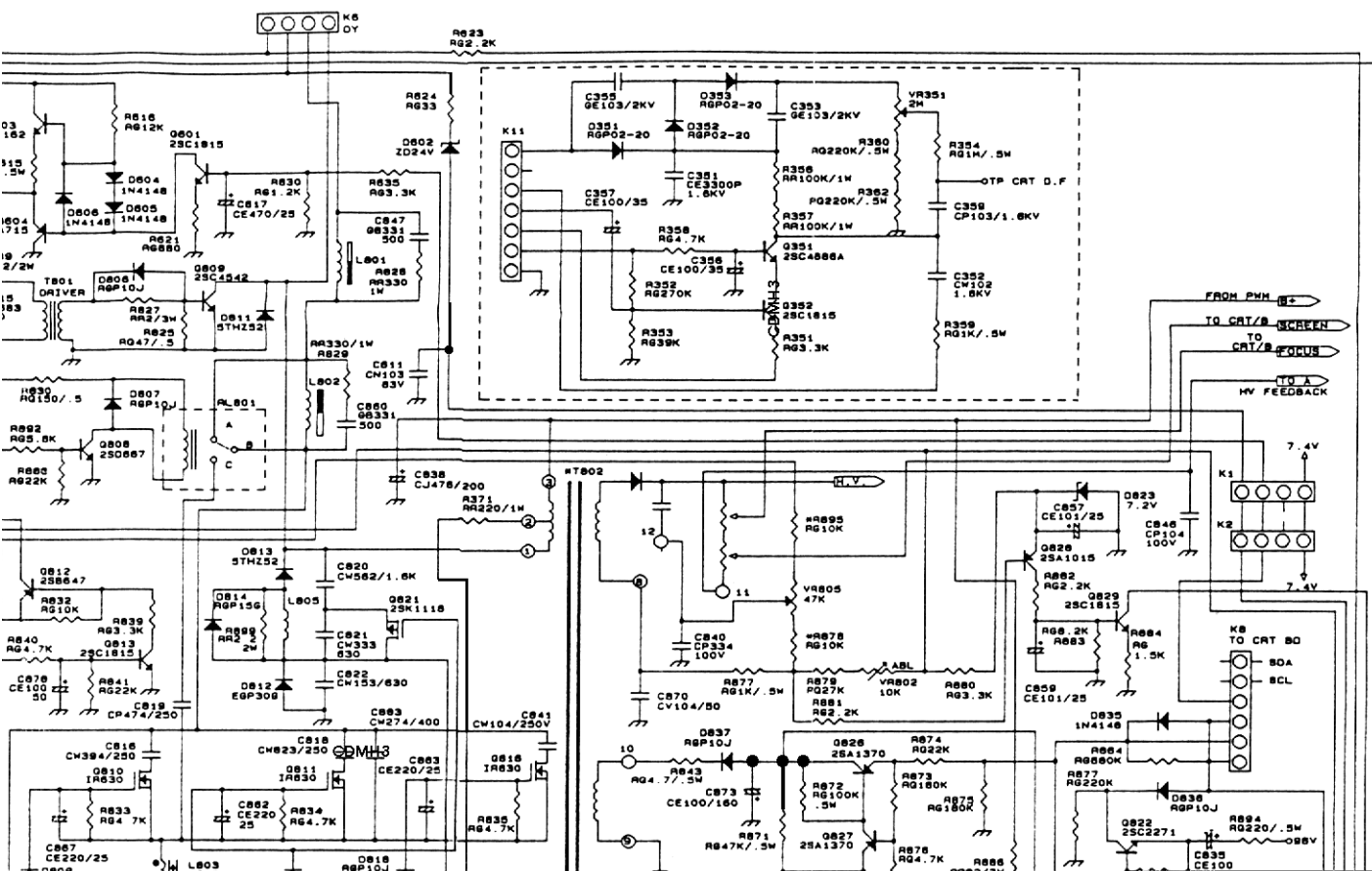
- **Width limits.** Limits the H-width adjustment range. This function may only be activated when the monitor is displaying the 31.5 KHz VGA mode.
- **Total Reset.** This function, active only if the monitor is displaying 64 KHz signal, resets all the user adjustments for all display modes back to the factory defaults.

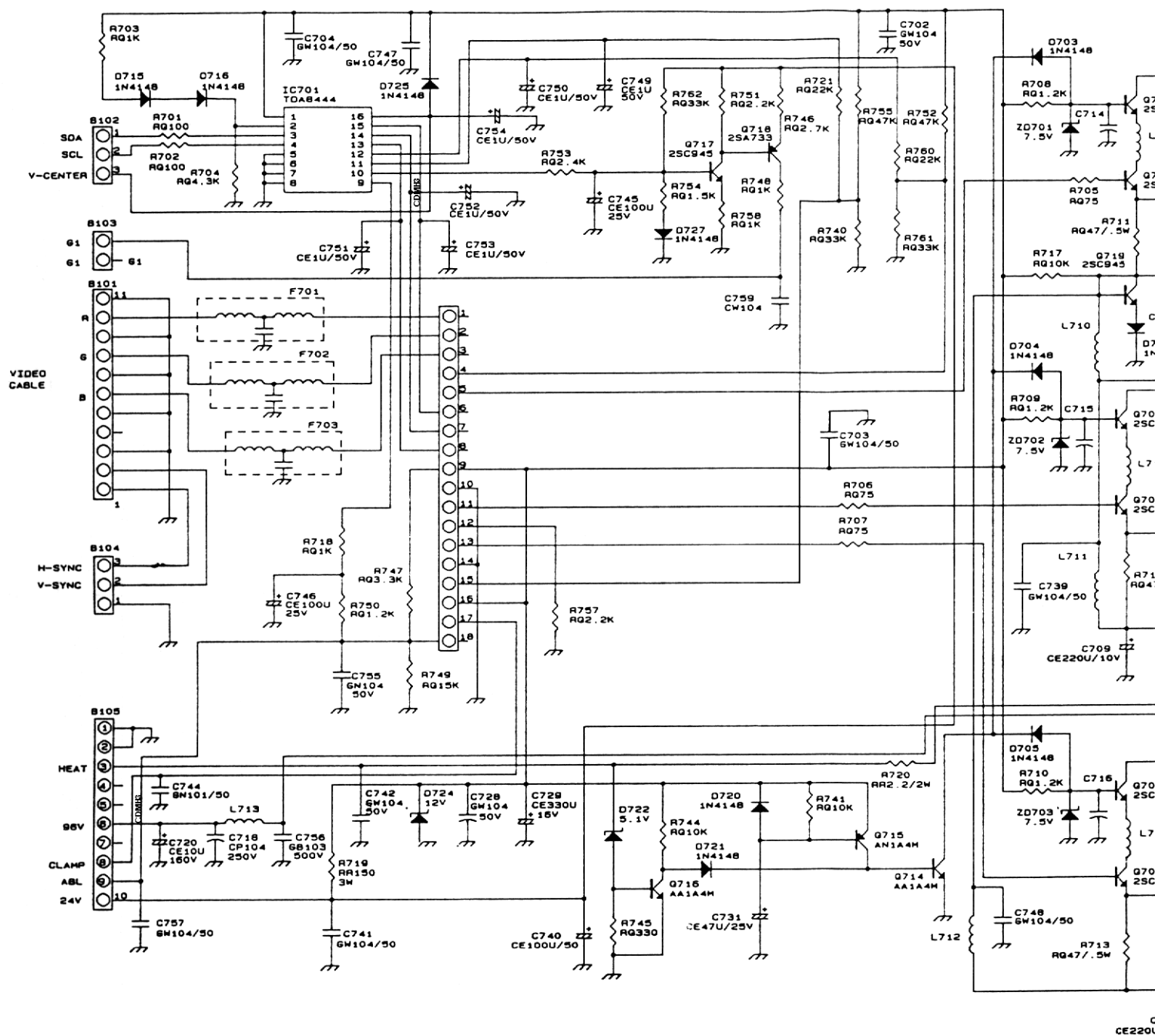


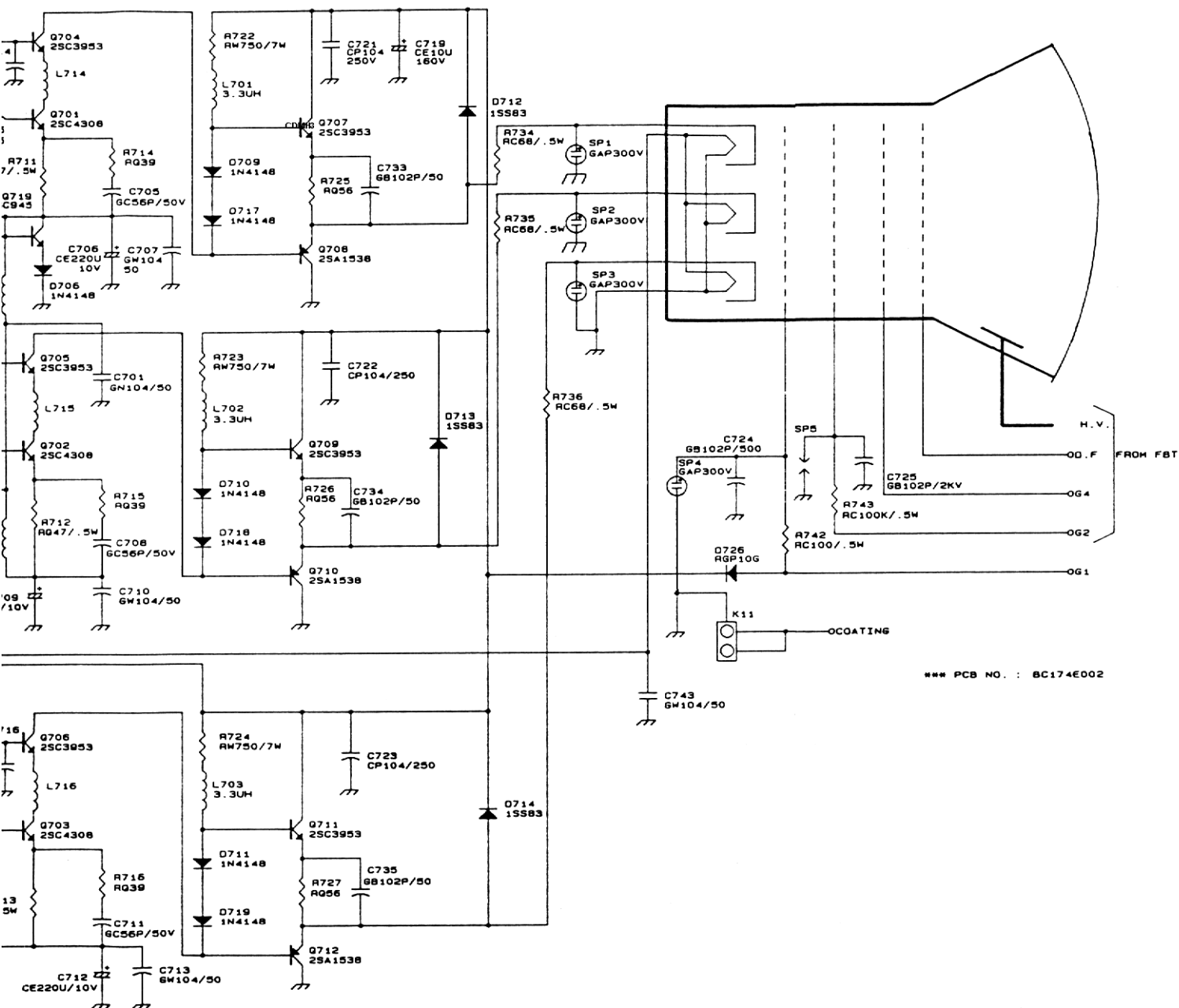
Title		
SM-5517 S.P.S. BLOCK DIAGRAM		
Size		REV
Date:	June 16, 1992 Sheet	



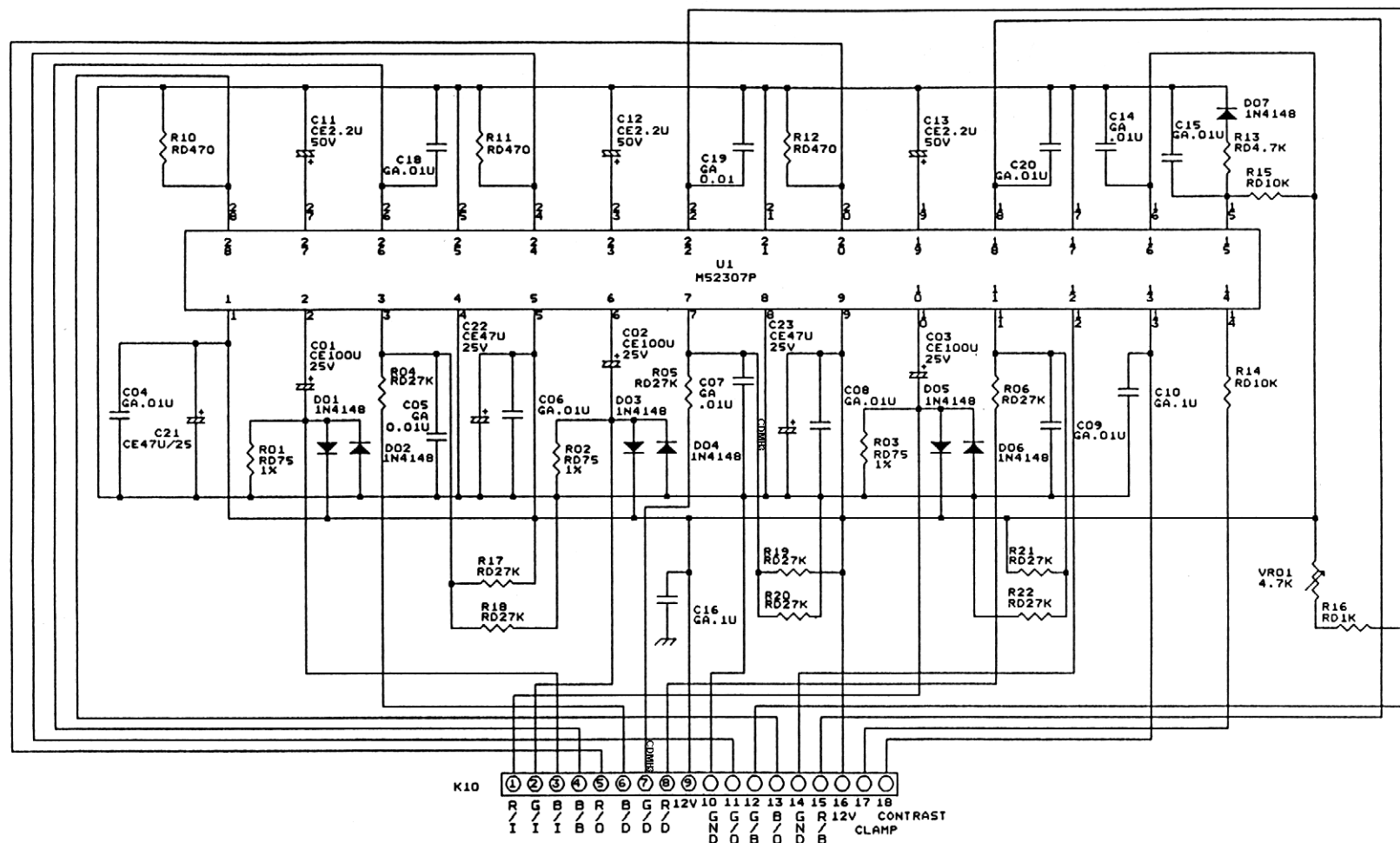


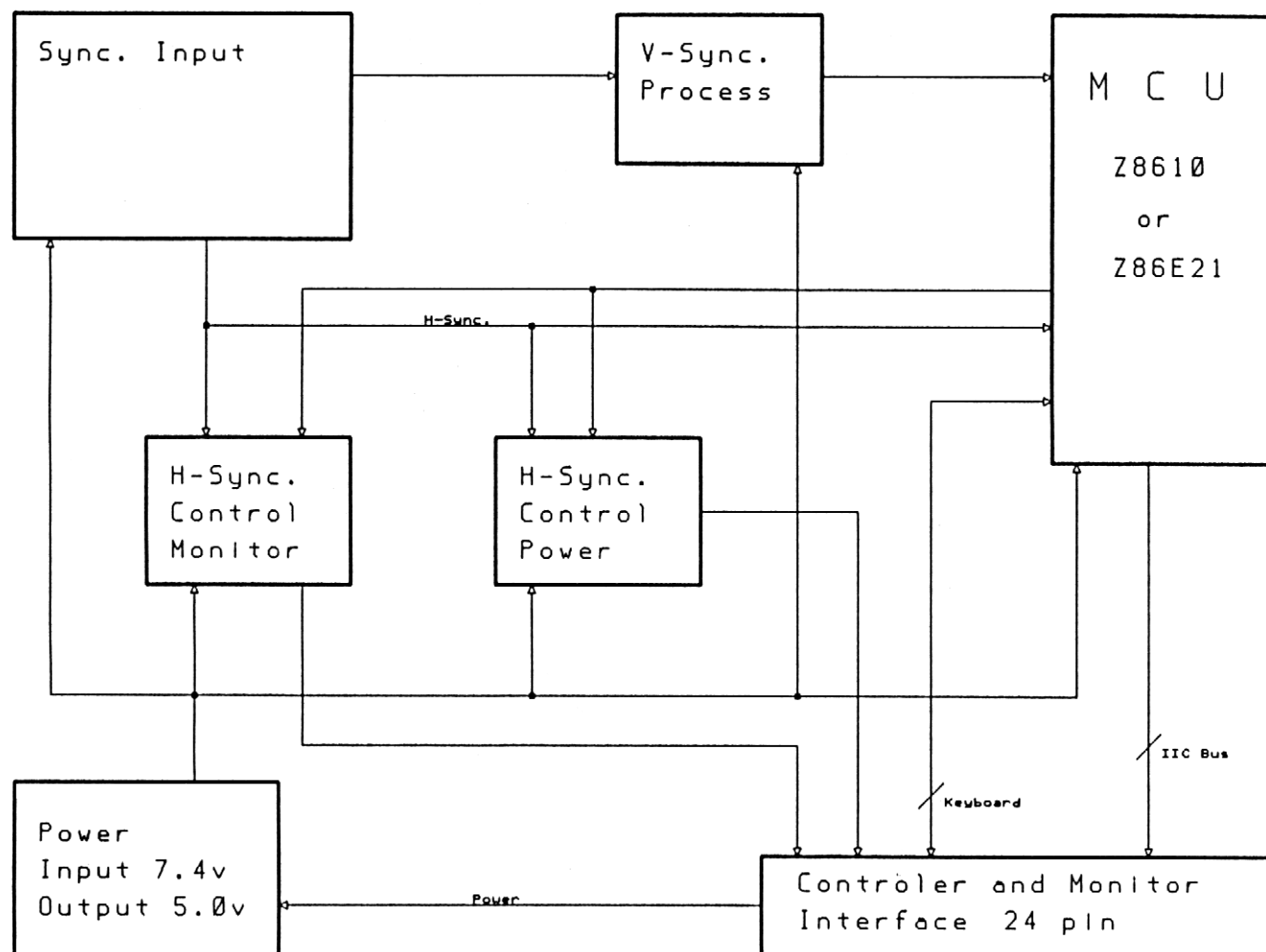


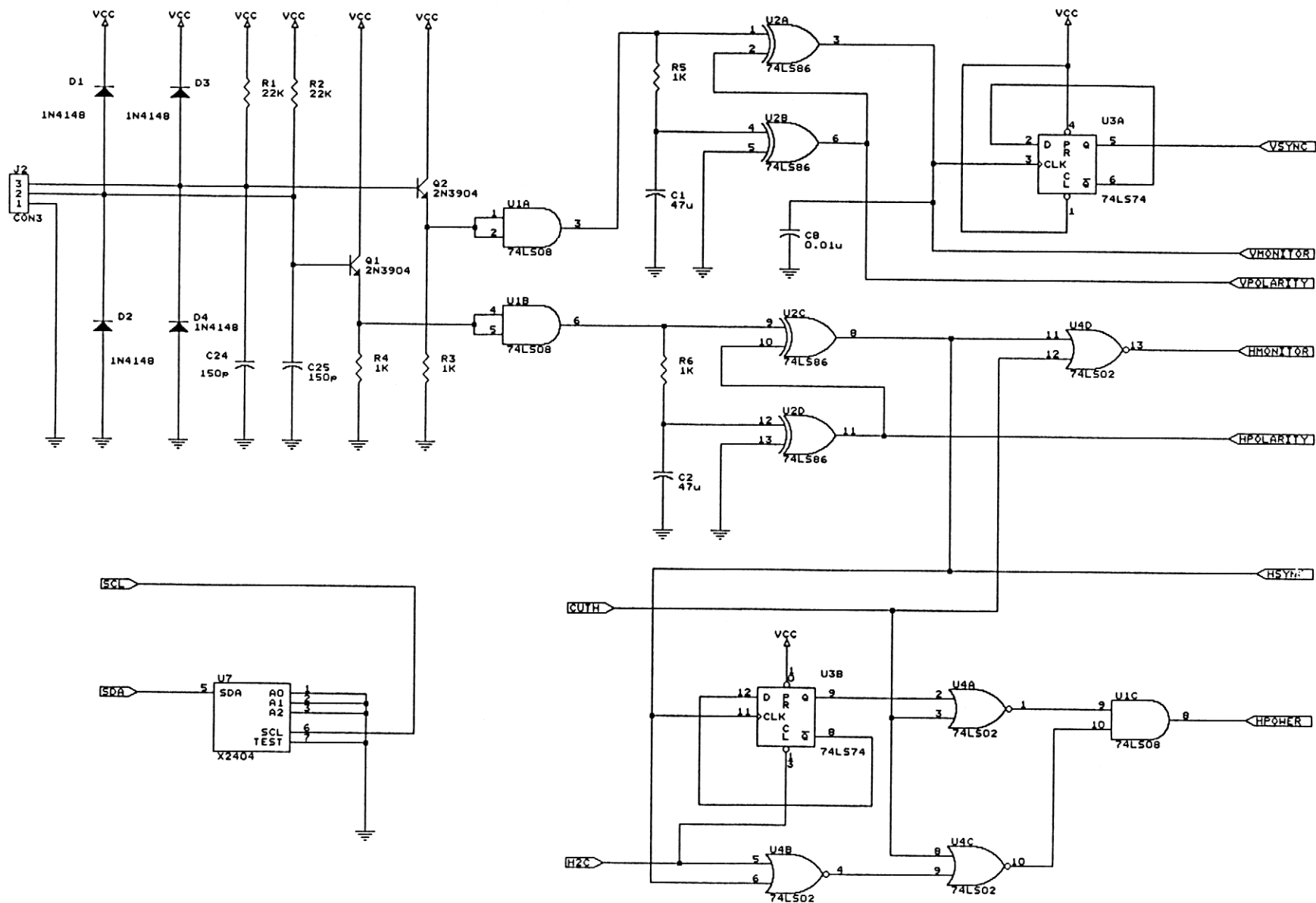




ADI CORP.		
Title	SM-5517AH, SM-5517AH/LR (CRT BOARD) SM-5517AT, SM-5517AT/LR (CRT BOARD)	
Size		REV
C		
Date:	January 15, 1993 Sheet	



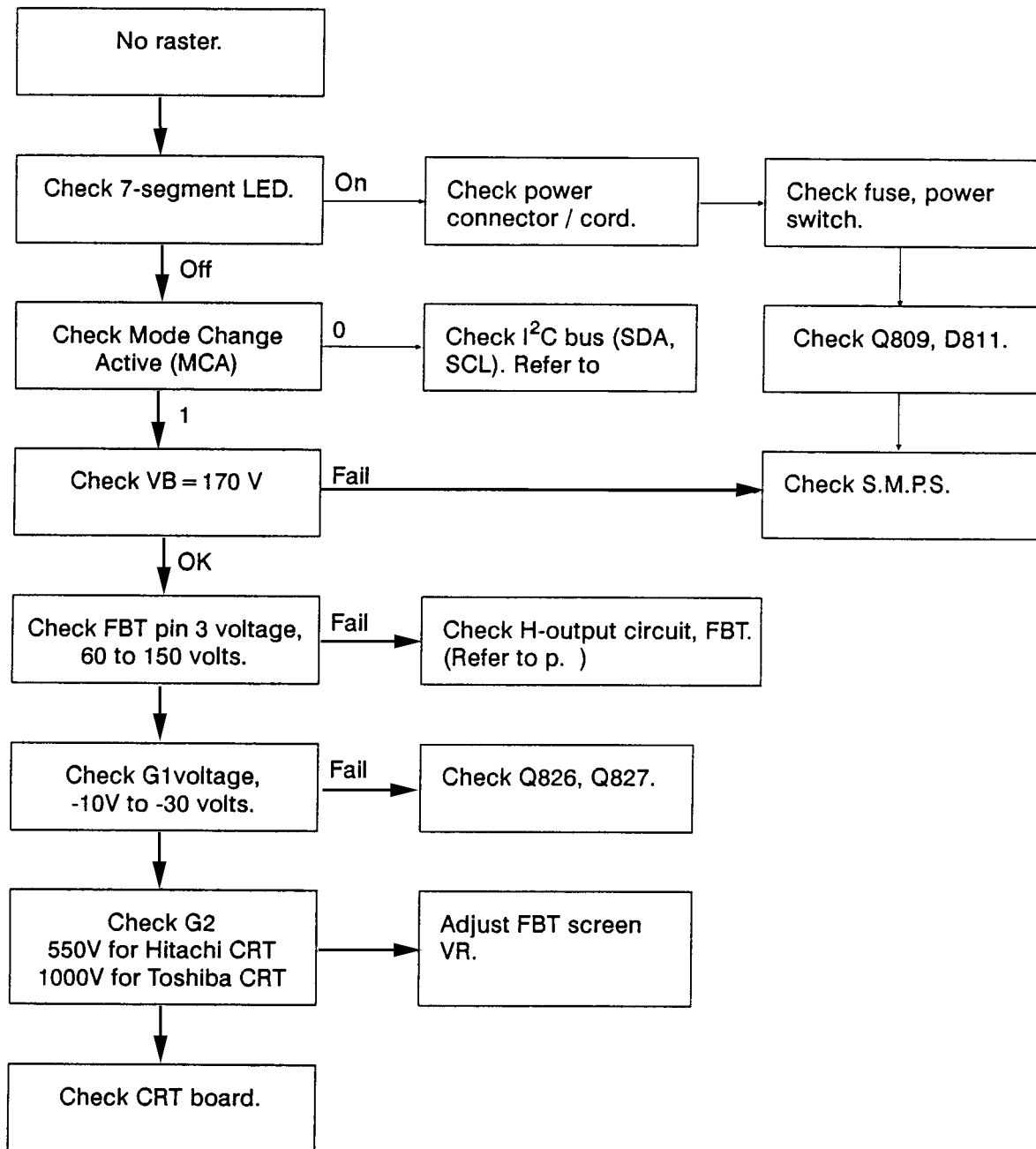




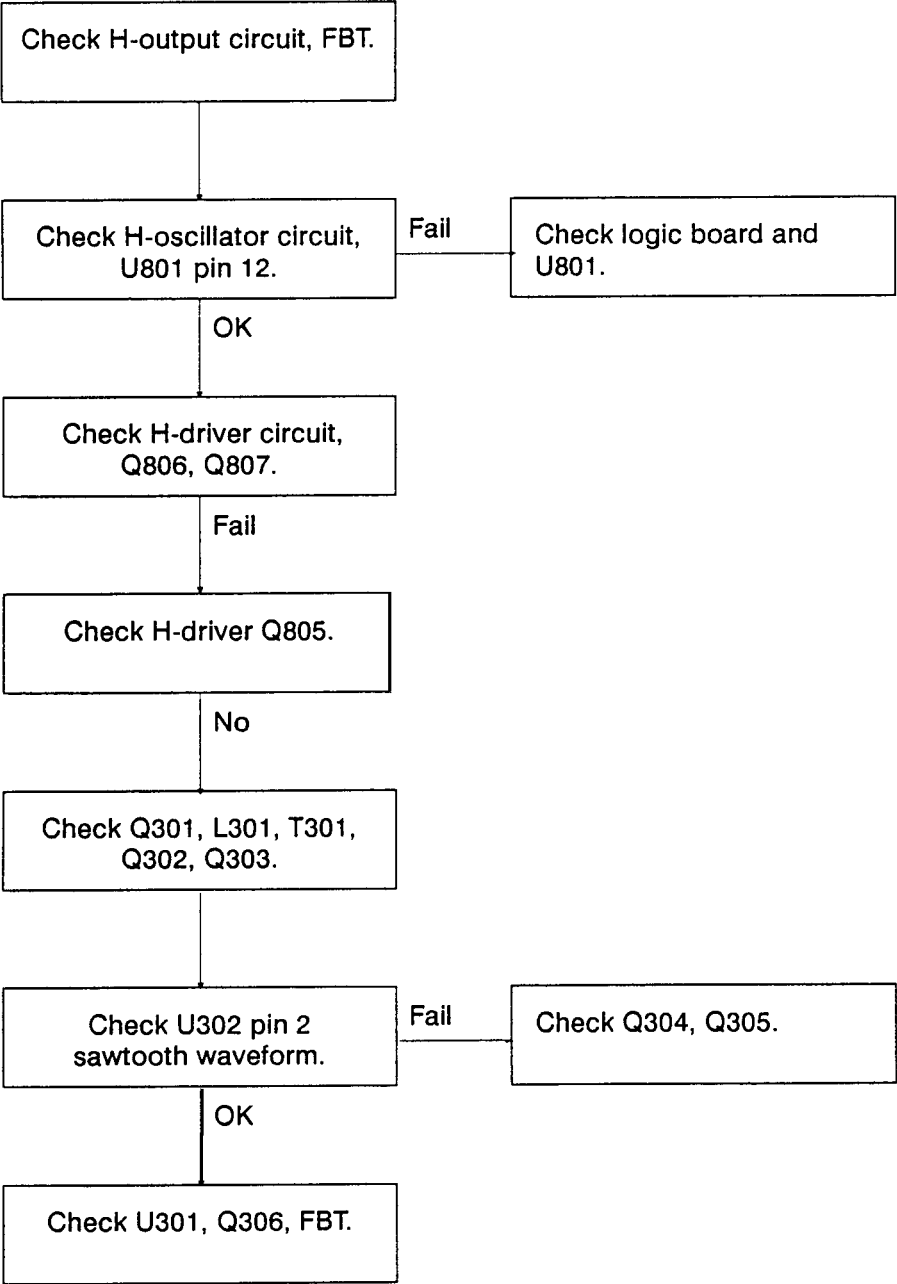
PCB No. BC174D2075 - 5

ADI.		
Title	SM-5514G / 15G / 17 Logic Controller.	
Size	B	REV
Date:	July 1, 1992	B

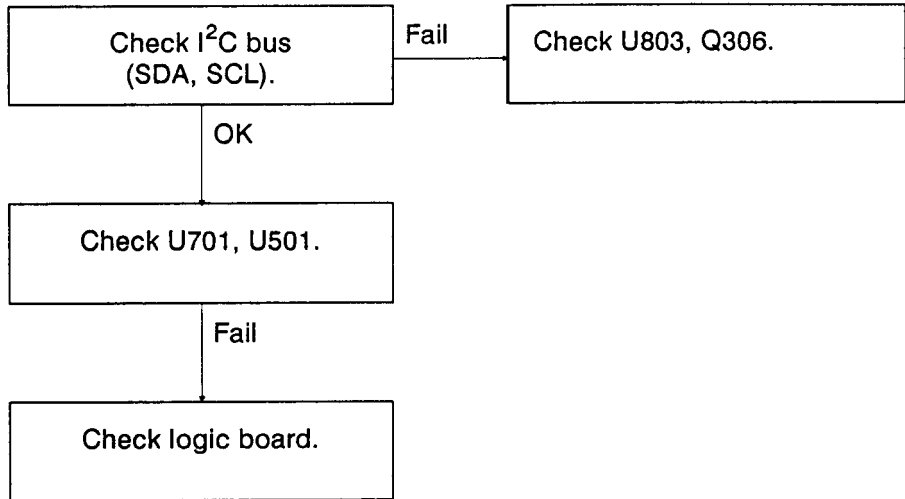
No raster



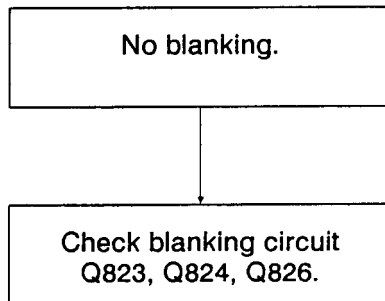
Defective H-output circuit.



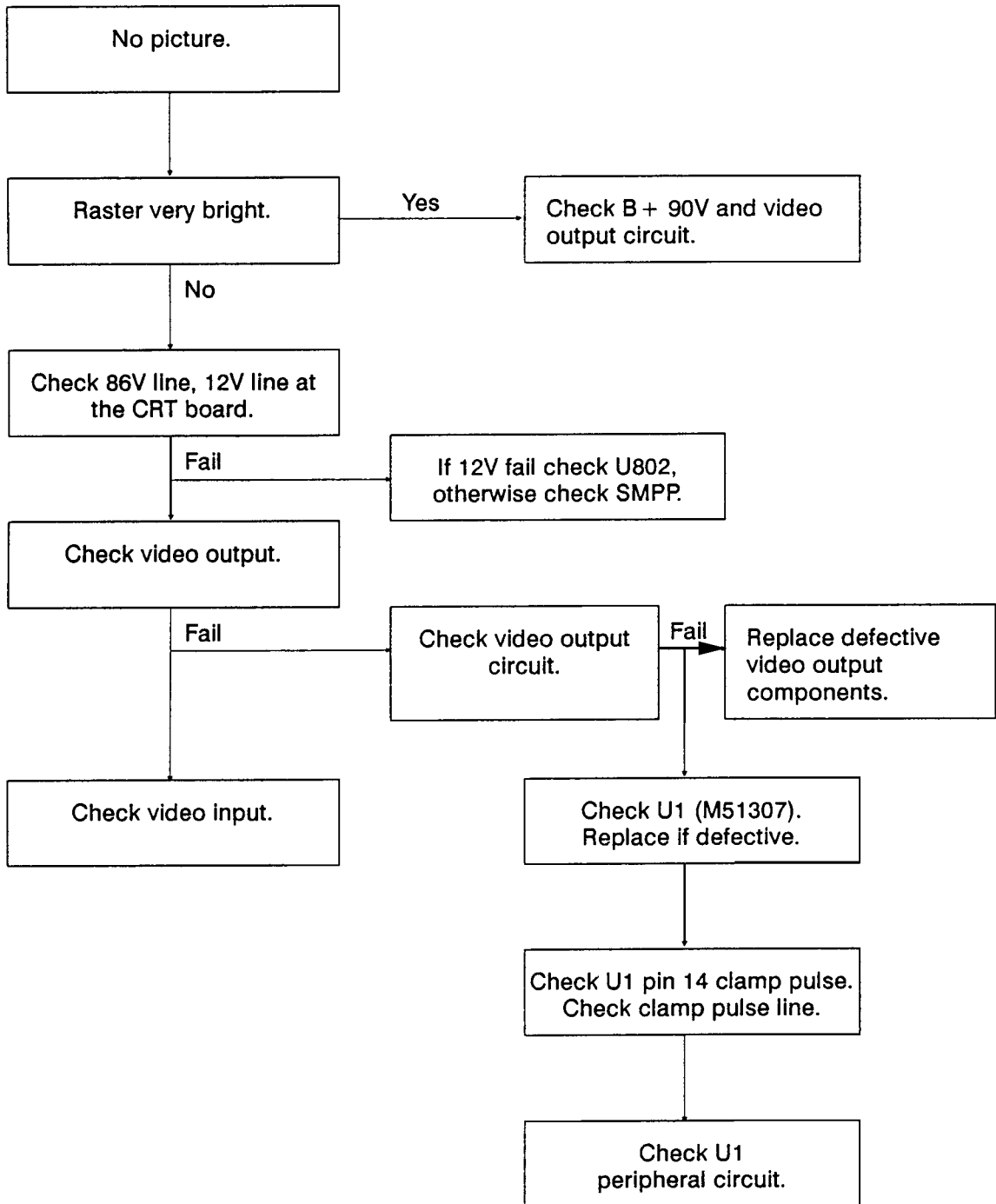
Defective MCA.



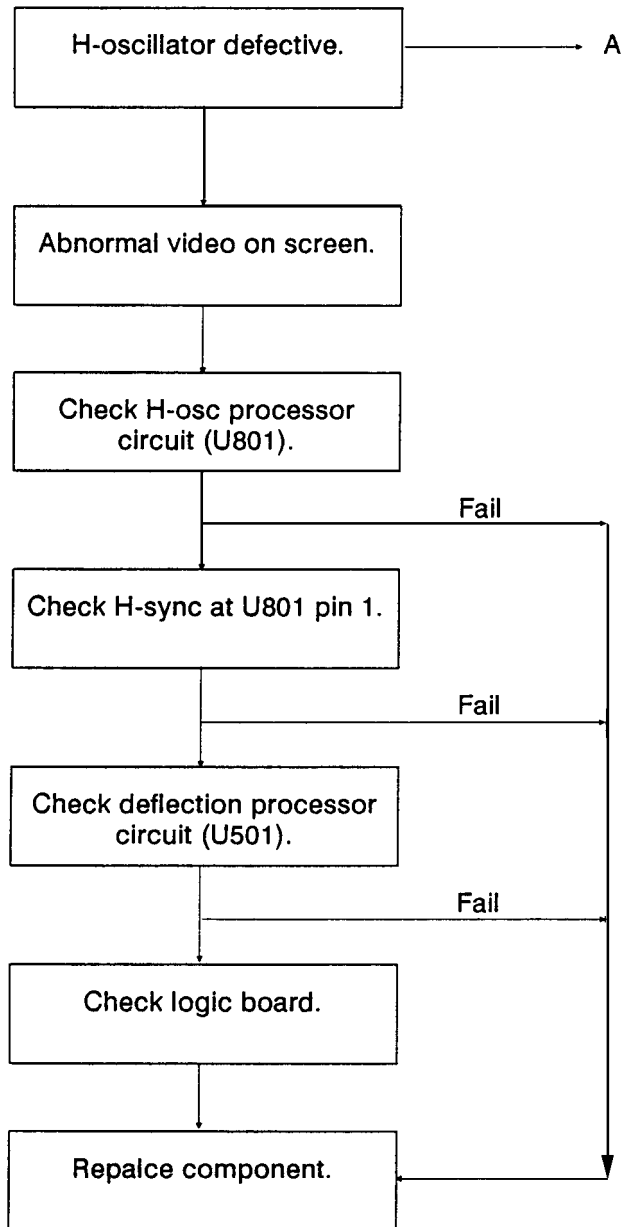
No blanking.



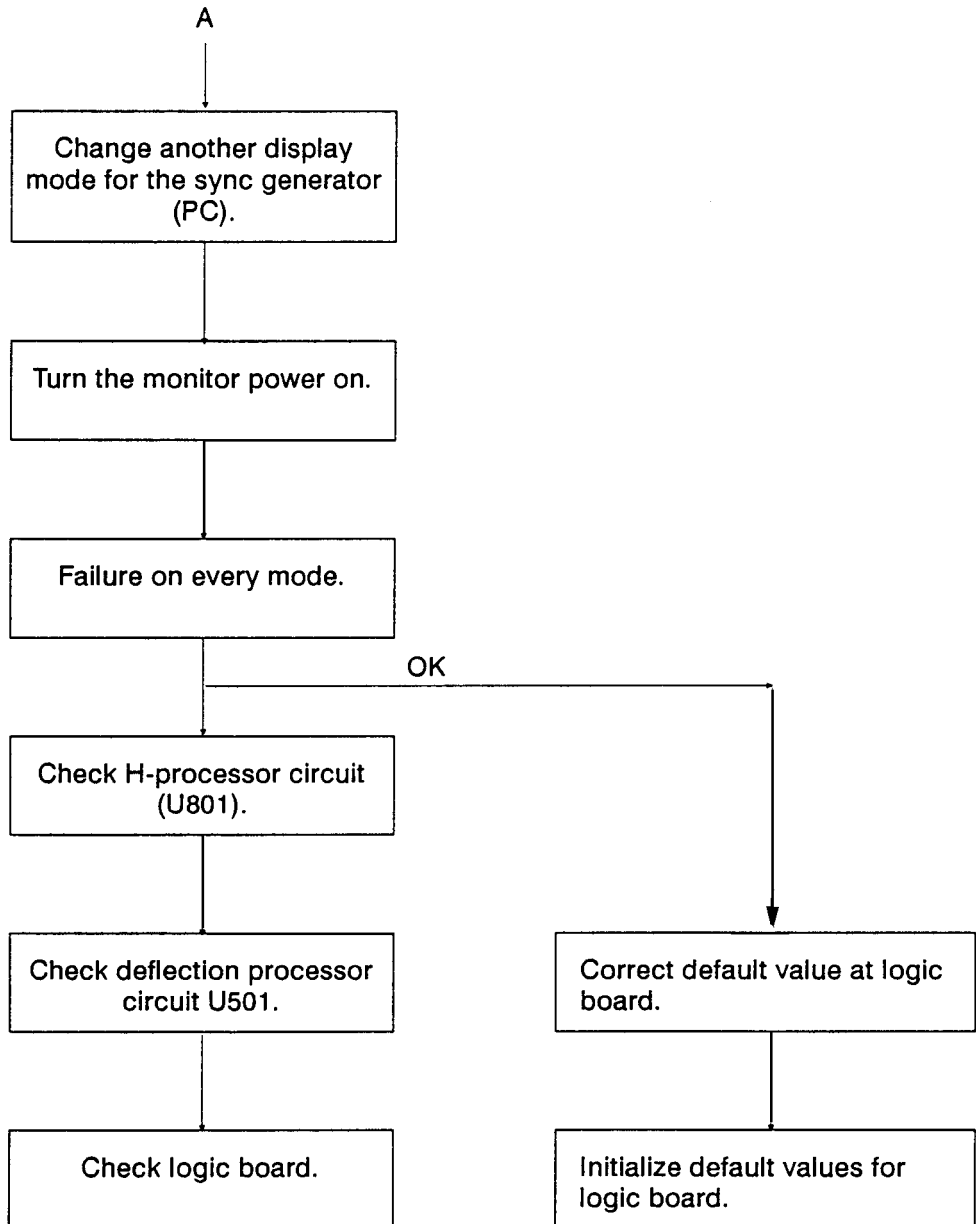
No picture, raster only.



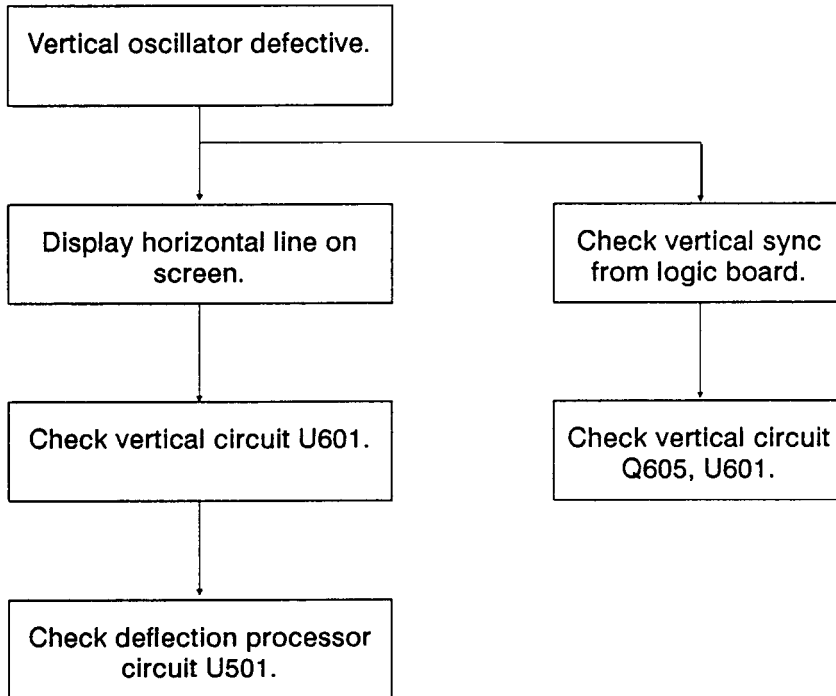
H-oscillator defective.



H-oscillator defective (con't).



Vertical oscillator defective.



Failure while changing mode.

