AMPRO CORPORATION

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AMPRO 3300 / 4300 Service Manual

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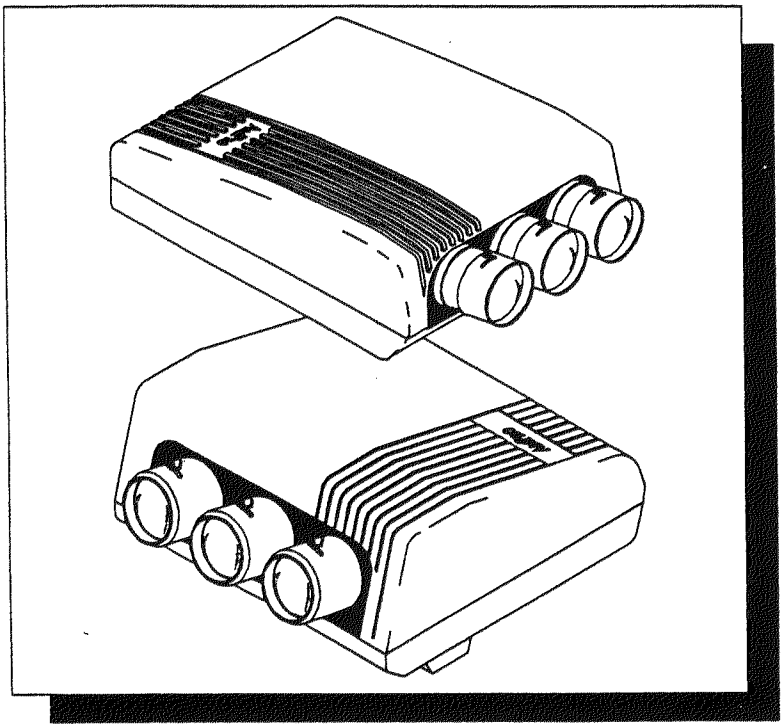

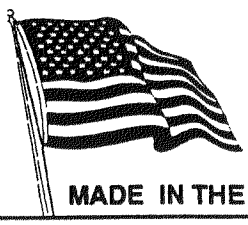

MADE IN THE U.S.A.

PLEASE FOLLOW ALL NOTES AND WARNINGS.	
BEFORE	Operating this Video/Computer Graphics Display System, please read this manual carefully and completely. This manual will provide you with a full understanding of the many functions and special features, and the necessary instructions for adjustments and operation of this equipment.

NOTE	Data presented in this manual has been carefully reviewed for accuracy and reliability; however, no responsibility is assumed for inaccuracies. The information contained in this manual is subject to change without prior notice. All material contained in this manual is proprietary data and may not be used or disclosed without written permission from AMPRO Corporation.

WARNING	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION	Shielded interconnect cables must be employed with this equipment to insure compliance with the pertinent RF emission limits governing this device.

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NOTES:

Section 1

Features / Specifications / Warnings and Precautions

The AmPro 3300 and 4300 Series of Computer Data/Graphics display systems offers superior resolution of 1600 x 1280 lines for the 3300 Series and 2500 x 2000 lines for the 4300 Series. The 3300 include three 8 in. (20.3 cm) magnetically focused liquid-cooled CRTs, and the 4300 Seires include, three 9 in. (22.8 cm) magnetically focused liquid-coupled lenses. Both systems incorporate "Scheimpflug" focal plane adjustment which allows precise edge-to-edge resolution. The AmPro 3300/4300 Series have as standard equipment many functions not found in even the most expensive systems.

1.1 . . . . . Features:

1.1.1 . . . . . Autolock:

The autolock feature is the ability to automatically lock the horizontal and vertical circuits to the input sync signals. This capability is invaluable in any system where more than one signal will be utilized.

1.1.2 . . . . . .Remote Control:

The remote control is extremely user friendly, for all AmPro Computer Data/Graphics display systems. The microprocessor used in the system allows a vast array of information to be controlled by the remote control. Within the standard remote control is a large 16 X 2 character LCD read-out which gives the operating and diagnostics status of the unit. The remote control is available in three versions: a full function hard-wired with an LCD read-out, a infrared TECHNICIAN, and an infrared EXECUTIVE with On/Off/Standby and eight channel selection only.

1.1.3 . . . . . .Store/Recall:

The AmPro series of Computer Data/Graphics display systems automatically stores and recalls each of the image, raster alignment, phasing settings, picture settings, mode of operation, remote focus and all registration settings via the remote control for ANALOG RGB, and VIDEO inputs. Any combination of up to 50 ANALOG RGB, TTL and VIDEO inputs may be stored in memory and recalled by the remote control.

By using an internal code command, the channel status such as, channel validation, horizontal and vertical setup frequencies and more, may be displayed on-screen.

1.1.4 . . . . . .Channel Auto-Search Mode:

The Auto-search mode of operation is a toggle function which allows the system to operate in an auto channel selection mode. As the incoming video signal changes in either or both horizontal and vertical scan rates, the system will automatically detect the change and re-configure the display parameters by using the validated channel list.

1.1.5 . . . . . Self Diagnostic:

The system constantly monitors all major voltages and signals and provides a plain English operational status on a large 16 x 2 LCD display located on the standard hard -wired remote control.

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1.1.6 . . . . RS-232:

The AmPro 3300/4300 Series Computer Data/Graphics display systems offers full duplex, bi-directional RS-232 communications and networking capability. The systems can be controlled from the remote control, a computer terminal or through a third party control system using RS-232. Systems can be looped through so that multiple systems can be addressed individually or globally (as one) and controlled by one central source.

1.1.7 . . . . . Lenses:

The AmPro 3300 has f/1.15 high resolution (10 lp/mm full field @ >50% MTF), reflective coated, six element, hybrid lenses utilizing both glass and acrylic elements which can be used with screen sizes from 48 in. (1.2m) to 240 in. (6.1m) picture width. The AmPro 4300 has a series of lenses which have a f/1.15 high resolution (10 lp/mm (HD-10/HD-10L) and 12 lp/mm (GT17/26 series) liquid-coupled hybrid lens for image widths ranging from 43 in. (1.1m) to 240 in. (6.1m).

1.1.8 . . . . . .Internal Help Screens:

The software incorporated into the AmPro system allows the user the capability of using the internal help system for instruction on the step-by-step setup, alignment,registration, operation and special features of the AmPro Computer Data/Graphics display systems.

1.1.9 . . . . . Digital Registration:

The AmPro system alignment and registration is totally controlled by remote control. The software incorporated in the AmPro Computer Data/Graphics display system permits either a controlled (guided) or random static and dynamic registration of the system. An internal HELP MENU guides the first time user through a step-by-step procedure. All registration settings are channel sensitive, meaning that each individual source may be precisely aligned to its particular parameters.

1.1.9.1 . . . . . .Automatic Convergence Scaling:

"A.C.S.", Automatic Convergence Scaling provides the 3300/4300 Display Systems with the ability to calculate registration settings of a new source based upon exisiting setup and validated channel settings. The command interprets between the closest lower "validated" channel and the closest higher "validated channel. The "A.C.S." greatly reduces setup time for new sources.

1.1.9.2 . . . . . .Convergence On Green:

Convergence on green provides for the green image all the dynamic registration adjustments normally only available on red and blue. This feature is necessary for applications where extremely precise image alignment is desired, i.e., superimposing multiple projected images to provide extra brightness or jointing multiple projected images side-to-side to form one continuous image.

1.1.9.3 . . . . . .Intensity Modulation (optional):

Intensity modulation allows the contrast and color balance of the top, bottom, left, right and all four quadrants (corners) of the projected image to be adjusted individually.

1.1.10. . . . . .User Adjustable Color Temperatures:

Remote user adjustable color temperature with factory pre-set(s) of 3600°K, 6500°K, 9300°K and user settings available. User setting allows user variation of the red, green and blue sub-bright and gain controls for an infinite range of color temperature settings. Color temperature is saved as a channel parameter.

1.11 . . . . . .Gamma Correction (optional):

This optional feature electronically compensates for differences in beam current vs. light output differences between the red, green and blue phosphors. Provides accurate grayscale tracking at all image brightness settings.

1.2 . . . . . .Optional Inputs:

1.2.1 . . . . . Quad Video Decoder / S-Video - 1 (optional):

This *optional module* has a built in capability which automatically senses and decodes any of the four international standards of video information that is applied to the composite video input. The auto select capability can be manually overridden, if desired, via the remote control. Another feature of the Quad Standard Module is the S-Video input. Selection between the Composite Video input and the S-Video input is accomplished via the remote control.

1.2.2 . . . . . .Quad Video Decoder / S-Video - 2 (optional):

In addition to the above mentioned optional Quad Video Decoder module a second Quad Video with S-Video may be installed in the system which allows the user to have the capability of two video decoders and two S-Video inputs. It should be noted that the second Quad Video Decoder module will only work in the Auto-select mode of operation and cannot be manually overridden as in the first Quad Video Decoder module.

1.2.3 . . . . . .Analog RGB - 2 (optional):

The AmPro 3300/4300 systems have the capability to include an additional Analog RGB module. The second Analog RGB2 module enables you to switch between two separate Analog RGB sources (3 or 4 wire operation) via the remote control.

1.2.4 . . . . . .Analog RGB - 3 (optional):

The AmPro 3300/4300 system in addition to the above mentioned second Analog RGB has the capability to include a third Analog RGB module.

☐ NOTE: Up to two optional modules of any type may be installed at a time.

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1.3 . . . . . Specification Chart:

SPECIFICATIONS		AmPro 3300	AmPro 4300
CRTs:		8" magnetically focused liquid-cooled CRTs with refractive hybrid f1.10 air-coupled lenses and Scheimpflug adjustments.	9" magnetically focused liquid-coupled CRTs with refractive hybrid f1.10 liquid-coupled lenses and Scheimpflug adjustments.
Resolution:	RGB	1600 x 1280 lines	2500 x 2000 lines
	Video	650 lines	
Light Output: (ANSI)		175 lumens	215 lumens
Screen Size:		4ft. (1.2m) to 20ft. (6.1m) picture width	
Scan Frequencies:	Horizontal	15kHz - 90kHz	
	Vertical	40 - 150Hz	
RGB Bandwidth:		100MHz	
Minimum Retrace:	Horizontal	< 3µS	
	Vertical	< 400µS	
Inputs: (module)	Standard	Analog RGB1	
	Optional	(1) Quad Video Decoder w/S-VHS - 1, (2) Quad Video Decoder w/S-VIDEO-2 (3) Analog RGB - 2, (4) Analog RGB -3	
Remote Control:	Standard	Hardwired with 25ft. (7.6m) cable and back-lit LCD read-out	
	Optional	Infrared Executive or Technician Remote Control Kits.	
Remote Control Operates:		Image Quality adjustments, raster alignment, on/off, stand-by, blanking, test patterns, and all static and dynamic registration. Store and recall of all settings, up to 50 channels of any one of the mode of operations. Optional 8 channel RS-232 switcher.	
Special Features:		Bi-directional RS-232 Communications and networking, digital registration, Automatic Convergence Scaling, Auto-Search mode, Guided Help System.	
Power Source:		110/220 Vac 50/60Hz	
Maximum Power:		800 watts	
Weight:		120 lb. (54.4 kg.)	175 lb. (79.3 kg.)
Operating Ambient Temperature:		+32°F to 97°F (0°C to 36°C)	
Operating Ambient Humidity:		20% to 80% (Non-condensing)	
Part Number:		69475	69495/69480/69481/69482[1]

[1] Depends on lens type installed.

TABLE 1-1

1.4 . . . . . Shipping Carton Contents:

Save the shipping carton, surrounding foam inserts and lens covers. The original carton and foam inserts must be used for shipping. It is specifically designed to minimize potential damage during shipment.

☐ NOTE: An optional shipping / carrying case is available for mobile applications.

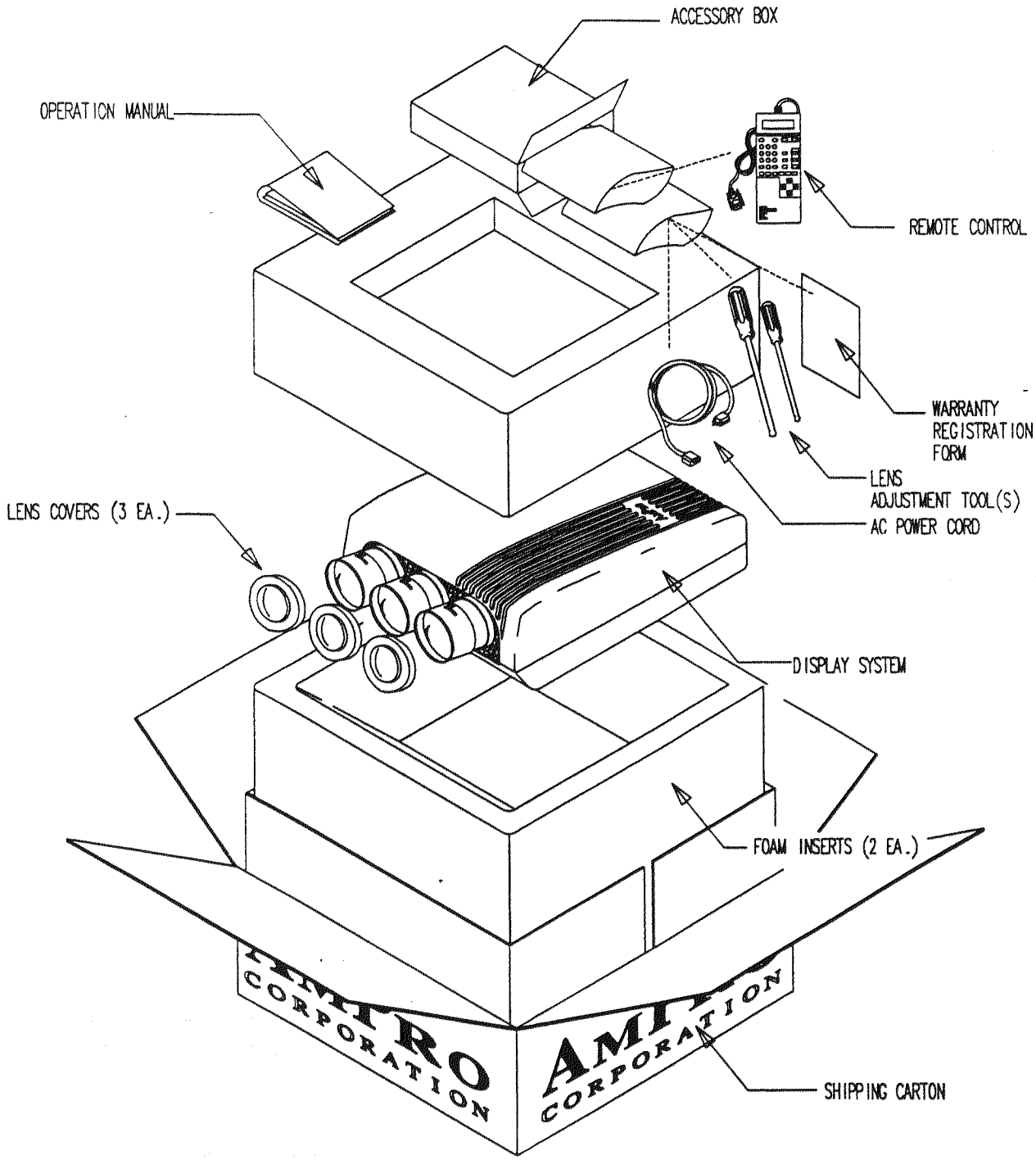

FIGURE 1-1. SHIPPING CARTON CONTENTS.

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1.5 . . . . . Warnings and Precautions

CAUTION

RISK OF ELECTRICAL SHOCK DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRICAL SHOCK
DO NOT REMOVE COVER
NO USER SERVICEABLE PARTS INSIDE
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL

This symbol is intended to alert the user that parts inside this product are a risk of electrical shock to persons.

This symbol is intended to alert the user that important operating and servicing (maintenance) instructions are in the literature accompanying this product.

1.5.1 . . . . . X-Radiation:

During the operation of any solid state Data/Graphics display system, the picture tube is a primary source of x-radiation. The projection tubes in the AmPro 3300/4300 incorporate leaded glass to safeguard against the leakage of x-rays. AmPro projectors comply with all U.S. Department of Health and Human Services rules governing the emission of x-radiation. **FOR CONTINUED X-RADIATION PROTECTION THE USER SHOULD NEVER ATTEMPT TO REPLACE THE PROJECTION TUBES OR OTHER ELECTRONIC COMPONENTS.** Instead, all service to the system should be performed by a qualified service technician.

X-RAY SHIELD
DO NOT REMOVE

"WARNING"
COMPONENTS FOR X-RAY SAFETY ARE CONTAINED IN THIS POWER SUPPLY RETURN COMPLETE HIGH VOLTAGE MODULES TO FACTORY FOR REPLACEMENT AND CONTINUED SAFETY

NOTE
THE DEFLECTION YOKES MUST BE FIRMLY AGAINST THE BELL OF THE CRT TO PREVENT X-RADIATION.

"WARNING"
BACKWARD MOVEMENT OF THE YOKE RESULTS IN PICTURE DEGRADATION AND LOSS OF RADIATION PROTECTION

X-RAY WARNING!
DO NOT OPERATE THE SYSTEM WITH THE LENS(ES) REMOVED!

1.5.2 . . . . . .High Voltage:

The projection display system contains high voltage derived from supplies capable of delivering **LETHAL** quantities of energy. To avoid serious personal injury, only a qualified technician should service and adjust the internal modules within the unit. There are no user serviceable parts in the AmPro system. All internal servicing must be performed by a qualified technician.

HIGH VOLTAGE

THIS UNIT OPERATES AT 34KV

1.5.3 . . . . Exposure to Rain or Moisture:

To reduce FIRE or SHOCK HAZARD, never expose the system to rain or moisture. If this happens inadvertently, do not use the system until it has been inspected and/or serviced by a qualified technician.

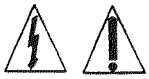
1.5.4 . . . . . .Projection Tubes:

The projection tubes inside the system enclose a high vacuum. Care must be taken to ensure that the system is not dropped or otherwise subject to violent blows.

WARNING

ATTEMPTS TO ALTER THE SEALED FACTORY-SET INTERNAL CONTROLS OR TO CHANGE OTHER SETTINGS NOT SPECIFICALLY DISCUSSED IN THIS MANUAL CAN LEAD TO PERMANENT DAMAGE TO THE PROJECTION SYSTEM AND VOID THE WARRANTY.

1.5.5 . . . . . .A.C. Line / Electrical Grounding of Equipment:



The AmPro projection system is configured for 115V or 230V operation and supplied with one of four standard power cords, as specified at the time the system is ordered. To change configurations, refer to Section 4. For your safety and proper operation, the system **MUST** be connected to a properly wired and grounded outlet. An improperly grounded system can place **HAZARDOUS VOLTAGES** on accessible metal parts of the system chassis and voids the Warranty due to potential damage to the system.

FOR INTERNAL ADJUSTMENTS OR SERVICE REFER TO QUALIFIED PERSONNEL. THE POWER CORD PROTECTIVE GROUNDING CONDUCTOR MUST BE CONNECTED TO EARTH GROUND. FOR CONTINUED SAFETY AND PROTECTION REPLACE FUSE WITH SPECIFIED TYPE: 110-120V 8 AMP AGC SLO-BLO 220-240V 4 AMP AGC SLO-BLO

1.5.6 . . . . . CRT Phosphor Life Criteria:

The phosphor coating on the face of the CRT has a given useful life and will provide satisfactory performance under normal usage. Since the phosphor efficiency decreases throughout its use at a rate which is a function of the beam intensity, the useful life of the CRT is determined by the application and the usage at high intensities.

Consequently, the continuous use at high brightness, and in particular prolonged use of a fixed pattern at high intensity, will adversely affect the useful life of the CRT. Continuous or repetitive use with a high-intensity fixed pattern will ultimately result in the "*etching*" of that pattern into the phosphor as a result of accelerated degradation in the area of the pattern. In the case of fixed pattern applications, the life is optimized by repositioning the pattern from time to time or by limiting the brightness when not in active use.

1.5.7 . . . . . .Ceiling Mount Precaution:

In a ceiling-mount application, the strength and rigidity of the ceiling are very important. The location should be carefully checked before hand to determine that the installation will safely support the weight of the system.

NOTE

AmPro Corporation IS NOT RESPONSIBLE FOR INJURY OR DAMAGE CAUSED BY AN IMPROPERLY INSTALLED SYSTEM.

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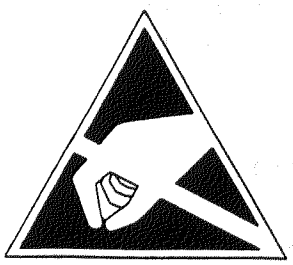
1.5.8 . . . . Electrostatic Discharge "ESD":



CAUTION
ELECTROSTATIC
SENSITIVE
DEVICES

For most of the components used in today's electronics, static electricity can zap and destroy some semiconductors, particularly MOSFET and CMOS ICs.

Use the following procedures when troubleshooting, repairing and handling electronic printed circuit boards.

- 1. Before handling these devices, the user or the equipment should momentarily contact a metal object at electrical ground potential so that any static charges will be removed.
- 2. Soldering-iron tips should be electrically grounded before soldering any wire or metal objects that are directly or indirectly connected to the device.
- 3. The same electrical ground potential should be applied to any lead-shorting and device shrouding materials and to the device case when possible.
- 4. Use properly grounded conductive table tops, floor mats, and chairs.
- 5. Provide personnel grounding to the extent that grounding wrist straps and heel protectors are used to achieve the required electrical ground.
- 6. In the handling for assembly into printed circuit boards, transportation of parts and PCBs, storage, assemblies into the systems and package of MOSFET and CMOS devices, use electrically conductive bags or packages.

WARNING!

When using conductive materials, clothing, straps, grounding leads to avoid static discharge, be particularly careful to prevent electrical shock from conventional sources as the extensive use of conductive material increases the possibility of shock.

1.5.9 . . . . Warning/Caution Label(s) Locations (typical).

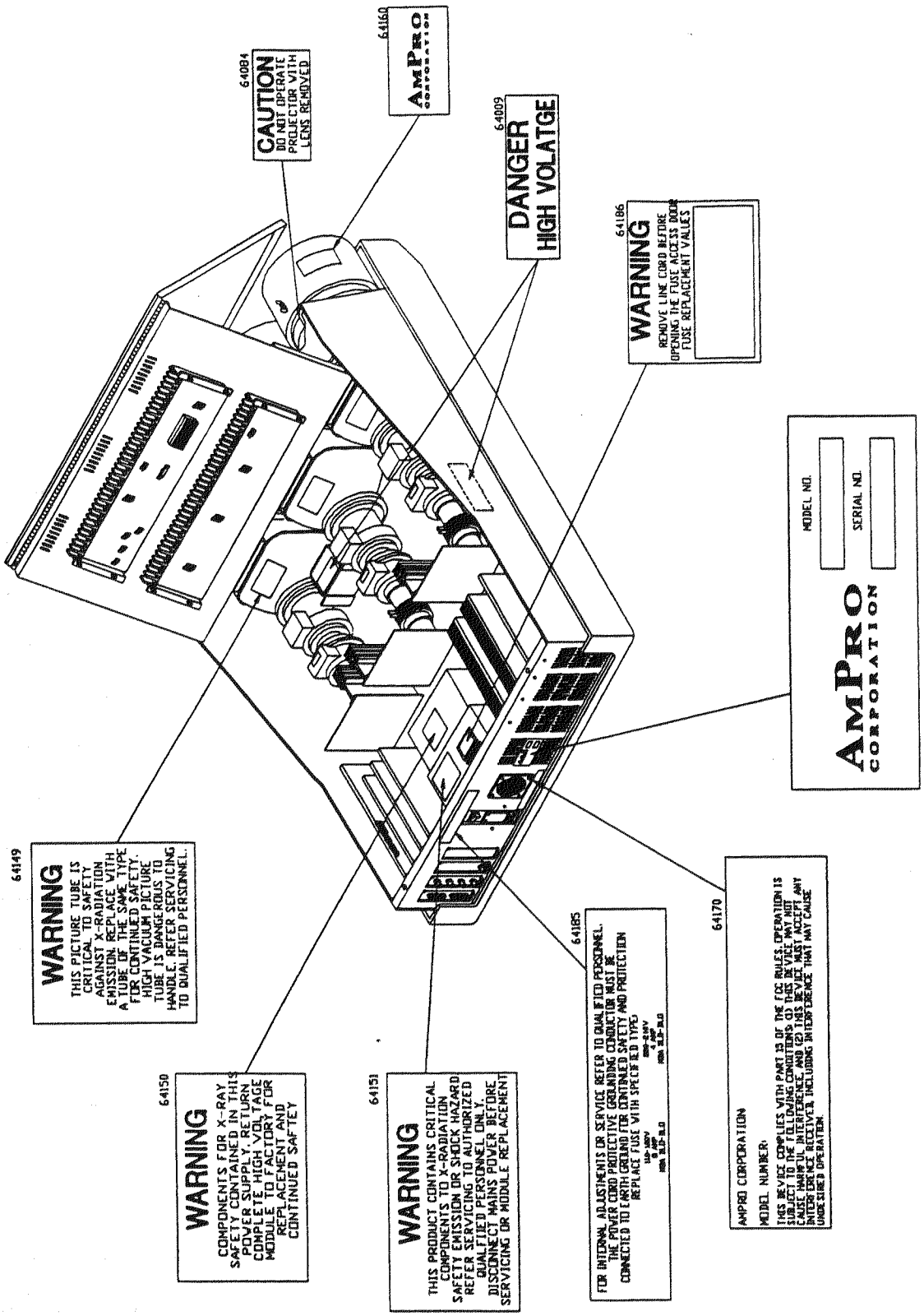


FIGURE 1-2. WARNING/CAUTION LABELS LOCATION (TYPICAL).

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NOTES:

Section 2

Limited Warranty

AmPro Corporation warrants this product to be free from defects in material and workmanship under normal use, subject to the limitations provided below.

2.1 . . . . . Warranty Period:

For the first twelve (12) months after the date of installation, but limited to a maximum of 15 months from date of shipment from the factory, AmPro Corporation will repair or replace any defective part, exclusive of the CRT for degradation of the phosphor coating, without charge for labor or parts. Replacement parts will be covered by this limited warranty for the remainder of the warranty period. This Limited Warranty applies only to parts supplied or designed by AmPro Corporation.

2.2 . . . . . Date of Installation:

To establish the date of installation, the AmPro Corporation Certificate of Registration should be completed, signed and returned to AmPro Corporation, postmarked no later than thirty (30) days from the date of installation. If the AmPro Corporation Certificate of Registration is not returned within such time, AmPro Corporation will use the date that the system was shipped from the factory as the date of installation.

2.3 . . . . . .Original Purchaser:

This Limited Warranty is limited to the original purchaser (end user) of this product from either AmPro Corporation or AmPro Corporation authorized dealer, distributor or agent.

2.4 . . . . . Warranty Service:

For servicing under this Limited Warranty, this product must be presented to AmPro Corporation, an authorized AmPro Corporation service center or the authorized AmPro Corporation selling dealer.

2.5 . . . . . .Shipping:

Prior to shipping this product or any sub-assembly to AmPro Corporation, a Return Authorization Number must be obtained from the AmPro Corporation Customer Service Department. The product must be shipped in the manufacturer's original shipping carton or other AmPro Corporation approved packaging. All freight and shipping charges to AmPro Corporation must be prepaid by the purchaser. Damage resulting from abuse in shipment of this product is not covered by this Limited Warranty. AmPro Corporation approved shipping cartons are available from AmPro Corporation for a nominal charge.

2.6 . . . . . .Environmental Damage:

This Limited Warranty does not cover damage or repairs that are necessary due to floods, winds, fires, lightning, accidents, corrosive atmosphere, excessive exposure to water (moisture) or heat, or any other conditions beyond the control of AmPro Corporation.

2.7 . . . . . .Serial Number Defacement:

This Limited Warranty is void for the product if the serial number has been changed, removed or defaced.

2.8 . . . . . Misuse:

2

This Limited Warranty does not cover repairs that are necessary due to:

- incorrect installation;
- voltage conditions, blown fuses, open circuit breakers or any other inadequacy or interruption of properly grounded electrical service;
- misapplication, abuse, improper servicing, or any other improper operation, including mis-adjustments of any control;
- defects in or caused by associated equipment; or
- repair and/or modification of a sub-assembly performed by other than AmPro Corporation factory personnel.

Normal maintenance as outlined in the installation and servicing instructions of this Operator's Manual will be the responsibility of the purchaser.

AMPRO CORPORATION MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, IN CONNECTION WITH THIS PRODUCT EXCEPT AS HEREINABOVE PROVIDED. IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ARISING FROM A COURSE OF DEALING OR USAGE OF TRADE ARE SPECIFICALLY EXCLUDED. SHOULD THIS PRODUCT PROVE TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP, THE PURCHASER'S SOLE REMEDY SHALL BE SUCH REPAIR OR REPLACEMENT AS HEREINABOVE EXPRESSLY PROVIDED AND UNDER NO CIRCUMSTANCES SHALL AMPRO CORPORATION BE LIABLE FOR ANY LOSS, OR DAMAGE, DIRECT, INCIDENTAL OR CONSEQUENTIAL, INCLUDING LOSS, OR LOSS OF PROFITS OR BUSINESS OPPORTUNITIES, RESULTING FROM DEALER OR DISTRIBUTOR INSTALLATION OR SERVICES.

Some states do not allow the exclusion of incidental or consequential damages, so the above limitation may not apply to you. This Limited Warranty gives you specific legal rights, and you may also have other rights which may vary from state to state or country. NO other person is authorized to assume for AmPro Corporation any additional obligations beyond those provided herein.

Section 3

Rear Panel Description

3.1 . . . . . General:

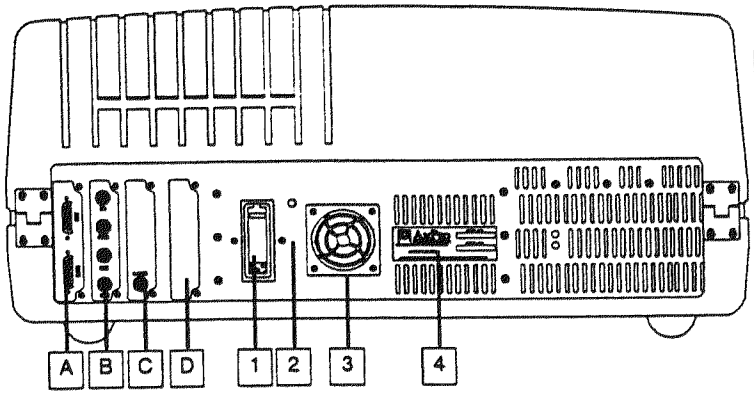
This section of the manual will familiarize you with the connections, controls and parameters available for operation of your system. It should be all you need to operate your system once it has been installed and set up (focused and registered).

The way in which your system operates will, in some ways, depend on the application. This means, for instance, that a system installed with direct signal inputs will not operate exactly the same as a system with a special options such as an RGB/VIDEO Switcher. If your installation has special options, refer to the technical data furnished with the options for additional information.

3.2 . . . . . Rear Panel Description:

The rear panel of the system is where all connectors are located. Also located on the rear panel are several other devices, such as, the power rocker switch and access to the main power fuse and voltage select barrel , etc. Refer to Figure 3-1.

AMPRO 3300 Rear Panel



REAR PANEL DESCRIPTION				
SLOT	MODULE		ITEM	DESCRIPTION
	STANDARD	OPTIONAL		
A	CPU	NONE	1	MAIN AC LINE/FUSE
B	ANALOG RGB1	NONE	2	RUNNING INDICATOR (LED)
C	VERTICAL DRIVE PANEL	SEE BELOW	3	REAR FAN
D	BLANK	SEE BELOW	4	SERIAL / MODEL NUMBER

OPTIONAL SLOT(S) CONFIGURATION	
SLOT C	SLOT D
VERTICAL DRIVE PANEL (STANDARD)	QUAD VIDEO DECODER MODULE 1 (QVD1)
ANALOG RGB2 MODULE	VERTICAL DRIVE PANEL FROM SLOT C
QUAD VIDEO DECODER MODULE 2 (QVD2)	QUAD VIDEO DECODER MODULE 1 (QVD1)
ANALOG RGB2 MODULE	QUAD VIDEO DECODER MODULE 1 (QVD1)
ANALOG RGB2 MODULE	ANALOG RGB3 MODULE

AMPRO 4300 Rear Panel

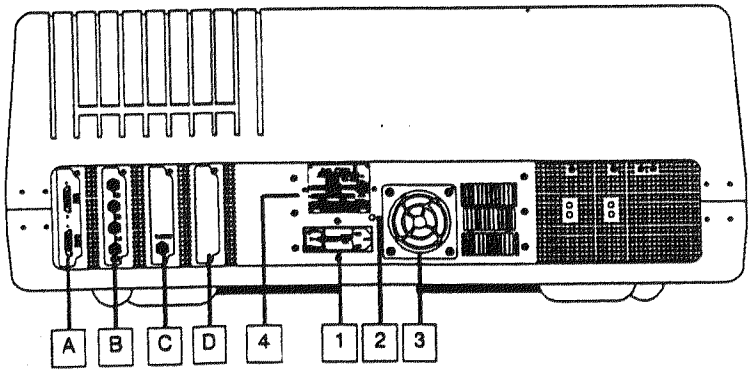


FIGURE 3-1. REAR PANEL ILLUSTRATIONS.

3.3 . . . . . Input Signals:

3.3.1 . . . . . .CPU Module (Slot A):

3

RS232 Communication: All RS232 communication both to and from the projector is processed by the CPU via the "HOST" and "SLAVE" ports located at the rear panel. Serial data arriving at the projector from the remote control or alternative external RS232 control system enters the CPU for processing through the "HOST" port and is simultaneously echoed through buffers to the "SLAVE" port for additional projectors or RS232 controlled accessories. Please refer to Section 4 for additional information about the projector's RS232 control and communications.

Storage Of Channel Data: One of the functions performed by the CPU is channel storage and recalling. The CPU uses battery backed up memory for storing the adjustment values for each of the 50 channel locations. These values are automatically recalled each and every time a channel location ("**n**" **[CHAN]**) has been selected.

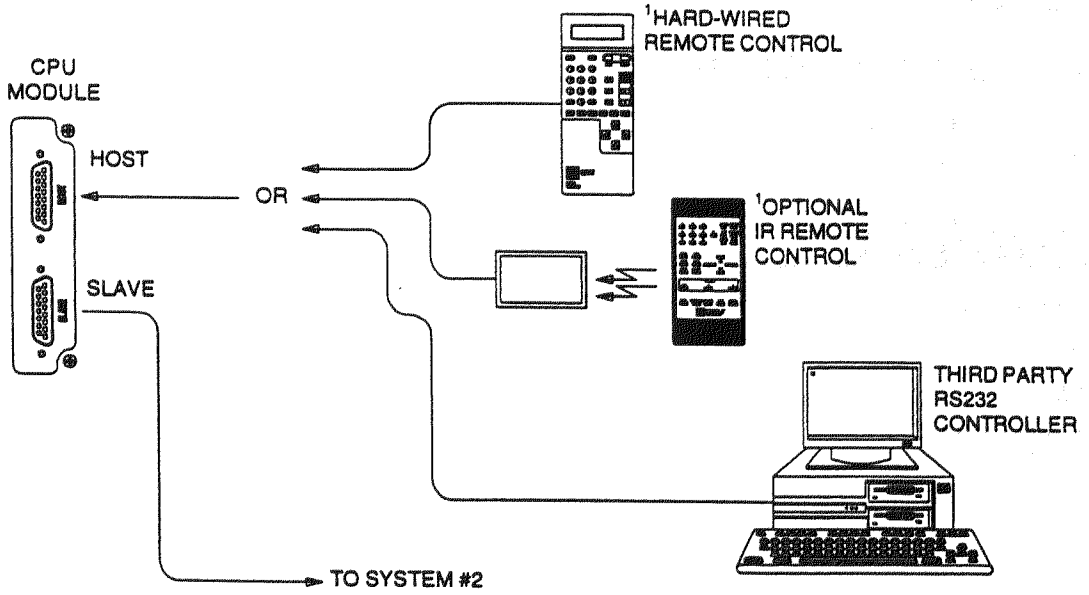


FIGURE 3-2. REMOTE CONTROL (RS232) CONNECTIONS.

[1]The standard wired remote control and IR remote control may be simutaneously connected via the "Y" adapter. See Figure 3-3.

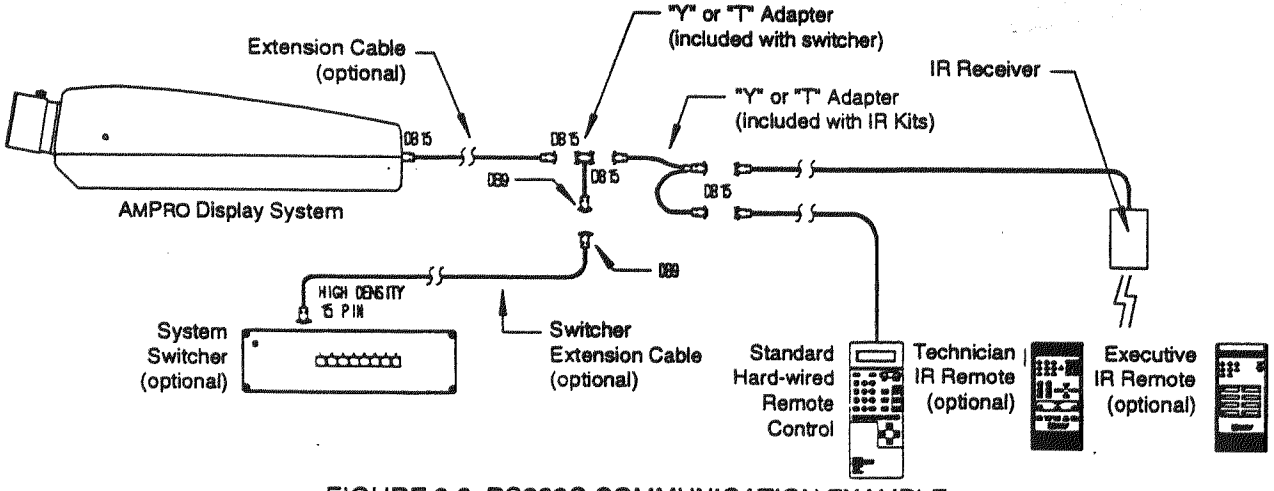


FIGURE 3-3. RS232C COMMUNICATION EXAMPLE.

3.3.2 . . . . RGB1 Module / RGB Analog Input (Slot B):

The Analog RGB sources are connected to the RGB1 module via BNC connectors. There are connectors for Red, Green, Blue video input signals, plus separate connectors for Composite / Horizontal Sync. A connector is provided for separate Vertical Sync and is located on the Vertical Drive panel, which is right next to the Analog RGB1 module.

The Analog RGB1 input falls into three major categories, three- wire, (sync on green), four-wire (composite sync), and five-wire (separate horizontal and vertical sync). The AmPro Display System will automatically configure itself properly for any one of the above conditions, including sync input and polarity.

A optional Analog RGB2 and RGB3 module are available and can be installed into Slot C and Slot D respectfully . The second and third Analog RGB inputs can only be used with three or four - wire RGB sources.

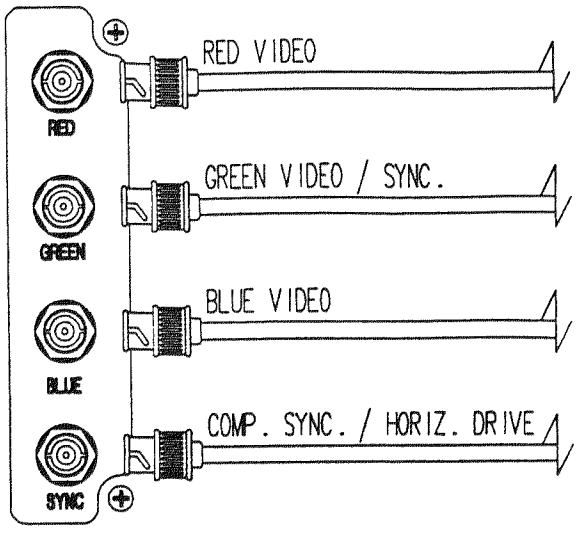


FIGURE 3-4. ANALOG RGB1 MODULE.

If both universal slots are being used for RGB, the Analog RGB1 will operate only in the 3 or 4 wire RGB mode of operation. If 5-wire operation is required while both universal slots are being used, a sync combiner will be required.

To access the Analog RGB1 mode of operation press, **[RGB]**, to access the optional RGB2 mode of operation press, **[A]** and to access the optional RGB3 mode of operation press, **[B]**.

3.3.2.1 . . . . . .RGB Signal Specifications

- ☐ VIDEO: RS-170 COMPATIBLE, 0.7vp-p ~ 5vp-p, 75 Ω TERMINATED
- ☐ SYNC: COMPOSITE H/V, SEPARATE H/V, OR SYNC ON GREEN; AUTO DETECT, 0.3vp-p ~ TTL LEVELS, 75 Ω TERMINATED. USER SELECTED SYNC TIP OR BACK-PORCH CLAMPING

3.3.2.2 . . . . . .RGB Brightness Clamping:

The Analog RGB1, RGB2 and the RGB3 have the ability to toggle the black level clamp point from "back-porch" to "sync- tip" by entering 48 **[CODE]**, and may be preset into a channel location. Typically "back-porch" clamping is used and is the factory default settings for all channel locations. Refer to Section 7 for additional information on this and other codes.

3.3.2.3 . . . . . RGB Level Adjustments:

The typical operator controls that affect the Analog RGB1, RGB2 and the RGB3 levels are brightness [BRITE] and contrast [CONT] controls via the remote control and are usually set to the desired light output.

Color Balance: The AmPro 3300/4300 have the capability to set the individual color levels for the Red, Green and Blue inputs for all three Analog RGB input modules and may be set and selected on a channel-to-channel basis for a custom or desired color balance setting of the particular input, or if so desired select one of the internal color temperatures of 9300 °Kelvin, 6500 °Kelvin or 3600 °Kelvin.

3.3.3 . . . . Optional Source Module Configurations:

3.3.3.1 . . . . . Slot C :

3

Standard Configuration: If no optional source modules are to be used with the AmPro 3300/4300 a Vertical Drive Panel (VDP) is provided and is used in combination with the Analog RGB1 module when 5-wire RGB operations are required.

Optional Configuration 1: The Vertical Drive Panel may be removed and the optional Analog RGB2 module may be installed in its place. The Vertical Drive Panel may then be reinstalled into the Slot D position to maintain the 5-wire capability of the Analog RGB1 module.

Optional Configuration 2: If the optional Quad Video Decoder 1 (QVD1) is installed in the Slot D location then Slot C may be used as an additional Quad Video input and is designated as Quad Video Decoder 2 (QVD2). The optional QVD2 source module may only be used in the Quad Auto select mode of operation, whereas manual selection of the various video modes is not possible. Refer to Section 2.3.4 for additional information.

Source Selection: Regardless of the module installed in the Slot C position, source selection (module selection) is accomplished by pressing the [A] button on the remote control.

3.3.3.2 . . . . . .Slot D:

Standard Configuration: Blank Panel.

Optional Configuration 1: Slot D may be used for the optional Quad Video Decoder 1 (QVD1) module regardless of what module is being used in the Slot C position. Refer to section 3.4 for information regarding the operation of the Quad Video Decoders.

Optional Configuration 2: With the optional Analog RGB2 installed in the Slot C position, Slot D may be used for the Analog RGB3 mode of operation. With both of the optional Analog RGB2 and RGB3 modules installed the system can only operate with 3 or 4-wire RGsB/S operations.

Source Selection: Regardless of the module being used in the Slot D position, source selection (module selection) is accomplished by pressing the [B] button on the remote control.

3.3.4 . . . . Quad Video Decoder Module 1 and 2 Description:

3.3.4.1 . . . . . .Input 1: Composite Video Input:

The composite video input will automatically decode any of the quad standards. The four standards are NTSC 3.58, NTSC 4.43, PAL and SECAM. For the Quad Video Decoder 1 (QVD1) module the automatic selection process may be overridden via the remote control by pressing the appropriate numeric key followed by the [B] button. The Quad Video Decoder 2 (QVD2) module will only operate in the Auto-select mode of operation and is selecting by using the [A] button.

The composite video input for either of the the QVD modules is a standard BNC connector with loop through capability. To loop a signal through the system, install a BNC "T" connector to the Video "IN" BNC, switch the termination switch located beneath the Video "IN" BNC from "IN" (down) to "OUT" (up) and connect to any 75 Ω terminated load. If the loop through is not being used, the termination switch must remain in the "IN" position or loss of the picture quality will occur. Refer to Figure 3-5.

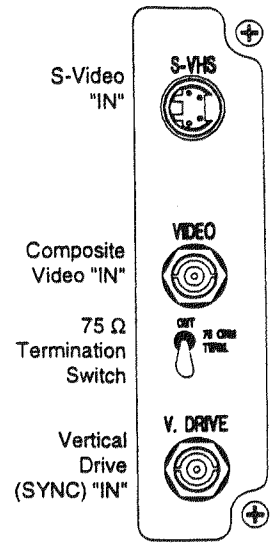


FIGURE 3-5. QVD1 AND QVD2 MODULE.

3.3.4.2 . . . . .Input 2: S-Video Input:

The S-Video input for either the QVD1 or QVD2 module, utilizes a mini "D" 4 pin connector which is the standard for this input. The connector and plug are keyed to ensure proper connection. The switching between the S-Video and the composite video input is accomplished by the remote control. Refer to Figure 3-6 for the pin-out /description for the female (rear panel) S-Video connector and Figure 3-5 for location.

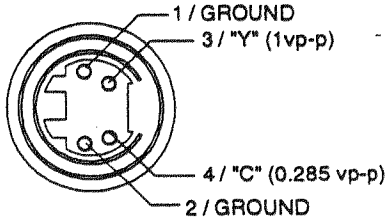


FIG. 3-6. S-VIDEO CONNECTOR.

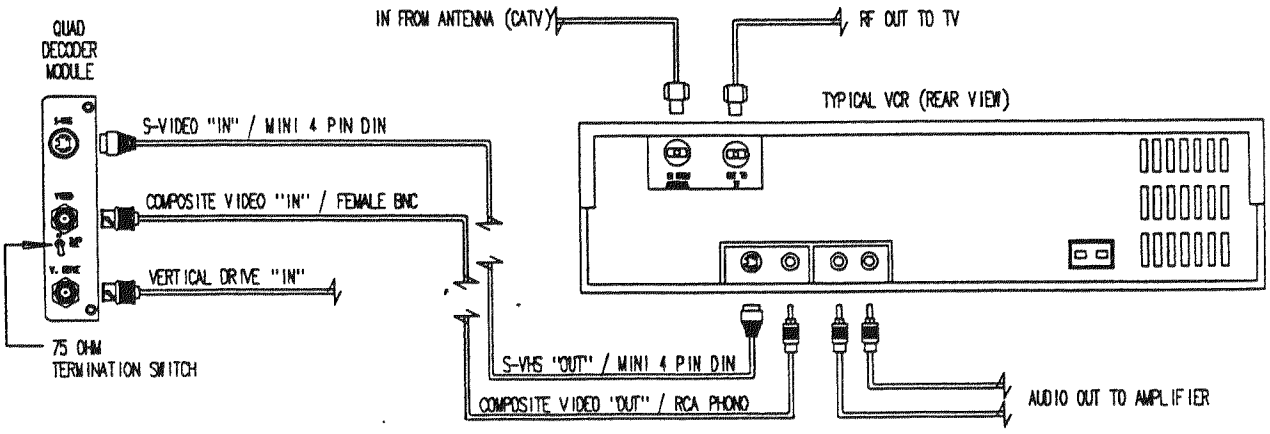


FIGURE 3-7. VCR - COMPOSITE VIDEO / S-VIDEO IN (TYP.).

3.3.4.3 . . . . .Vertical Drive Input:

This connector is used with an RGB analog input in Slot B that requires a separate vertical sync input (i.e., five - wire RGB). Refer to Figure 3-5 for location information. If both the QVD1 or QVD2 modules are installed at the same time, only one active Vertical Drive may be applied to either of the two modules. If the Quad Video Decoder 1 or 2 module or the Analog RGB2 module is not being utilized, a module with the VERTICAL DRIVE input is provided.

NOTES:

Section 4

System Configuration / Installation

4.1 .....Changing A.C. Line Operation (115V - 230V):

Unless specified at the time ordered, all AMPRO 3300 / 4300 systems are shipped from the factory configured for 115 Volt, 50/60 Hz operation with a standard US power cord. To change the system so that you can apply a different line voltage, perform the following steps and refer to Figure 4-1.

- STEP 1. Remove the power cord from the back of the unit.
- STEP 2. Open the door above the power plug. Using a small screwdriver, gently push down on the door latch and pop it open to access the fuse and voltage select barrel.
- STEP 3. The voltage select barrel will indicate the present voltage selected. If it is not the desired voltage, pull the barrel straight out , rotate it and plug it back so that it reads the correct voltage.
- STEP 4. Replace the fuse with the proper size for the voltage selected. (8 Amp MDASlow blow for 115v and 4 Amp MDA Slow blow for 230v). Ensure arrows line up.
- STEP 5. Ensure that the correct power plug is installed for the respective country.
- STEP 6. Plug the proper cord back into the rear of the system.

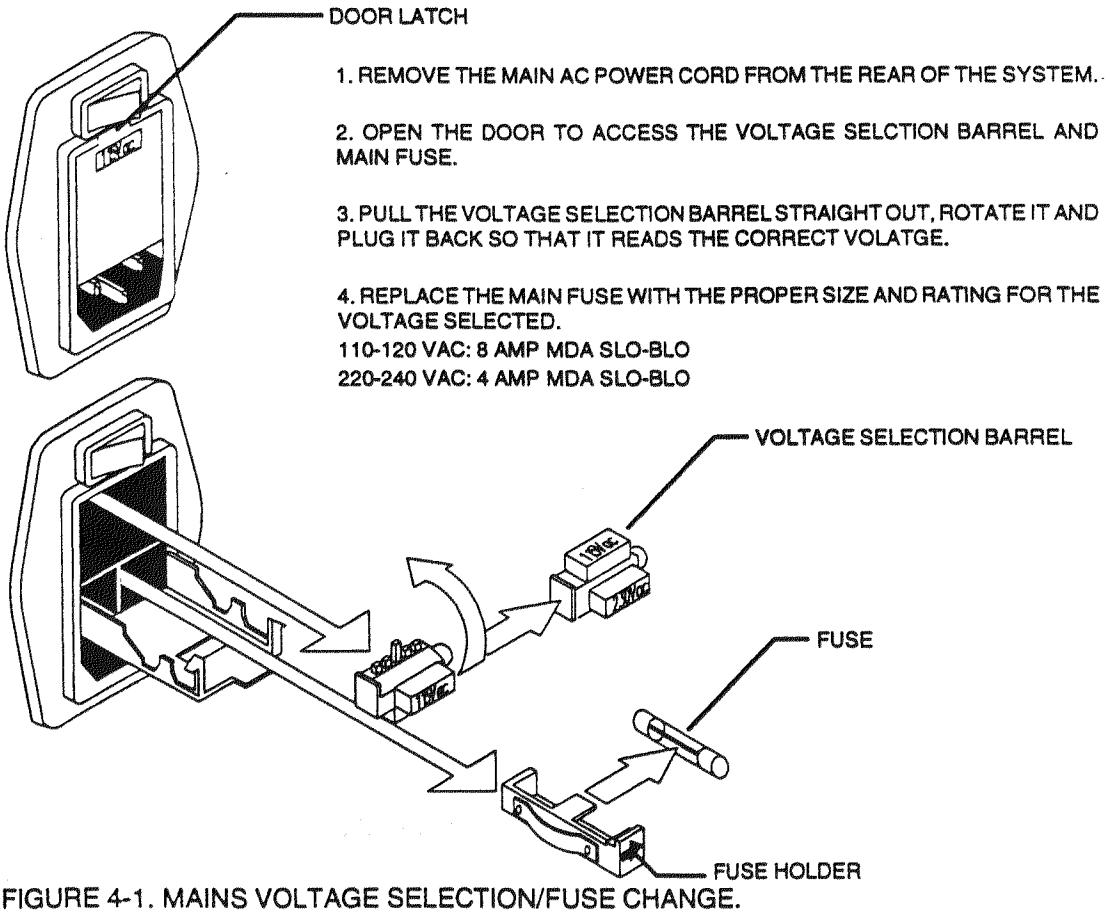


FIGURE 4-1. MAINS VOLTAGE SELECTION/FUSE CHANGE.

4.2 . . . . . Sweep Reversal Procedures:

4.2.1 . . . . . Accessing The Sweep Reverse Card:

WARNING

DO NOT PERFORM THE SWEEP REVESAL PROCEDURE WHILE THE SYSTEM IS ENERGIZED. IF THE SWEEP CARD(S) ARE REMOVED WHILE THE SYSTEM IS ENERGIZED, HIGH VOLTAGE SHOCK WILL RESULT AND THE SYSTEM WILL BE DAMAGED.

- STEP 1. Open the top cover. The top cover may be lifted by (1): turning 2 ea. 1/4 turn fasteners located on both sides of the bottom cover towards the front of the system. (2): pull and lock the hinges located on both sides of the top towards the rear of the system. See Figure 4-2.

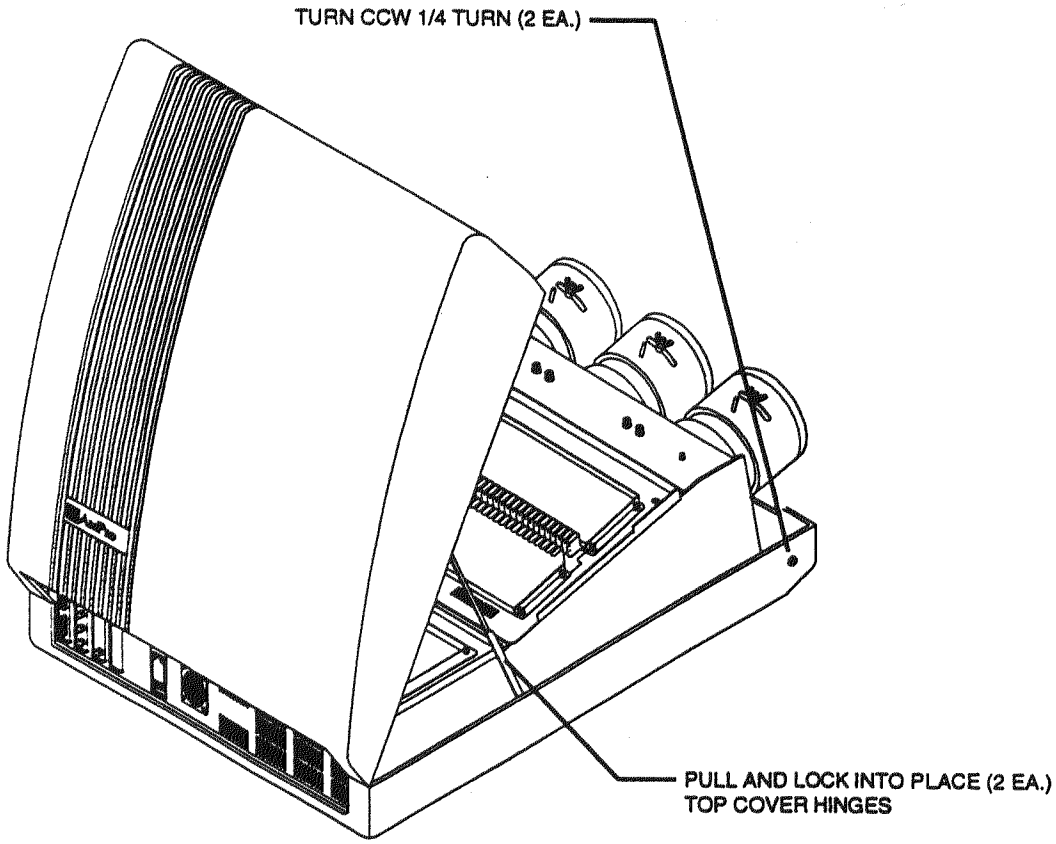


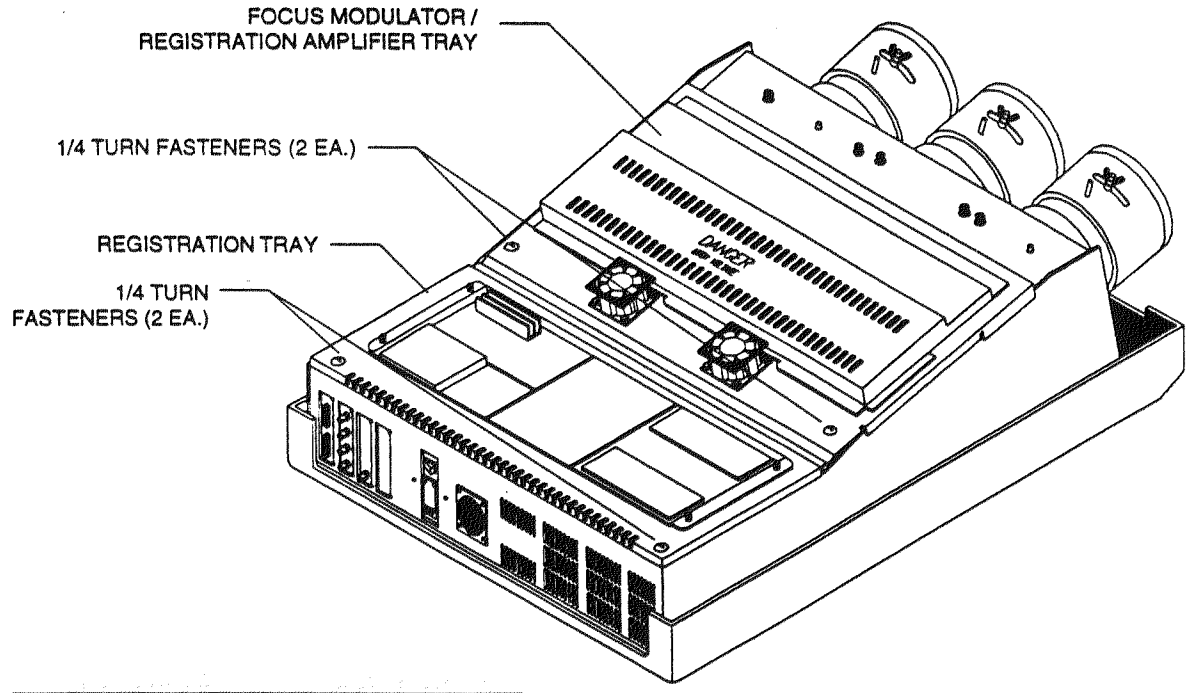
FIGURE 4-2. OPENING THE TOP COVER.

¤ NOTE: AMPRO 3300 shown, AMPRO 4300 similar operation.

4.2.1 . . . . Accessing The Sweep Reverse Card: (continued)

- STEP 2. Unlock and tilt up the registration tray assembly and the registration amplifier / focus modulator tray assembly. See Figure 4-3.

AMPRO 3300



AMPRO 4300

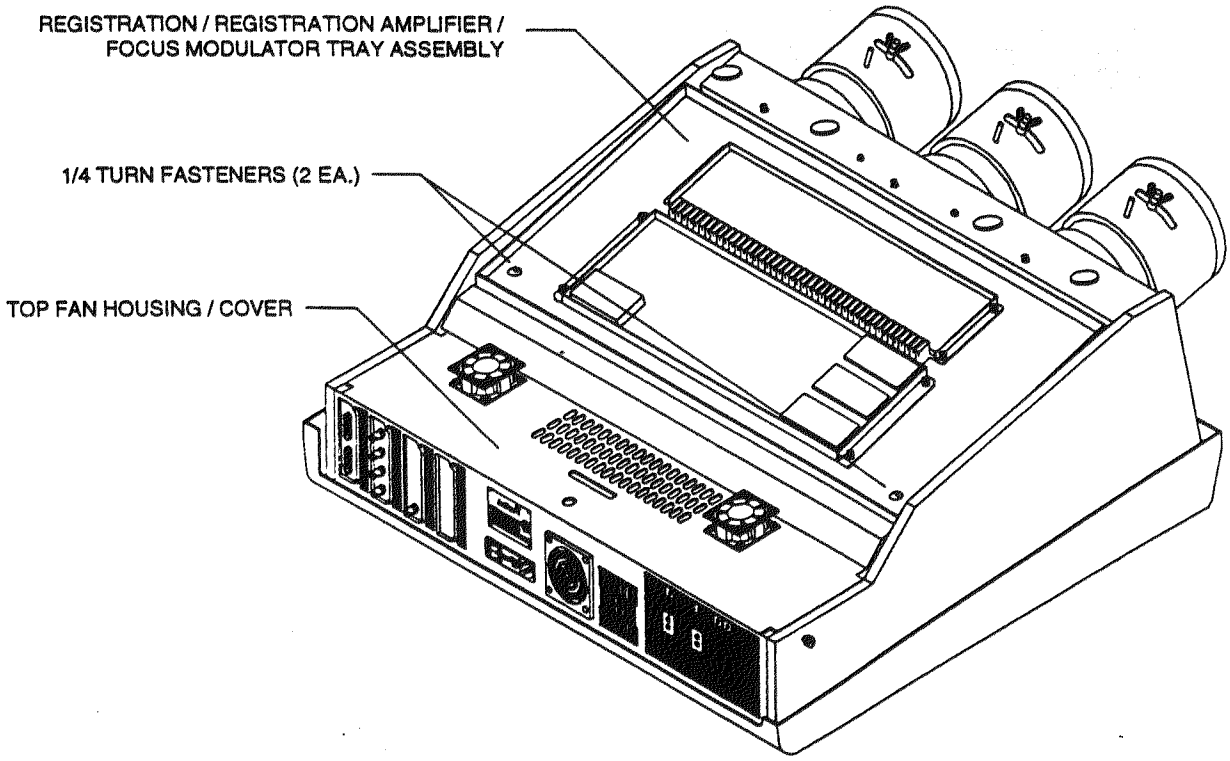


FIGURE 4-3. ACCESSING THE YOKE INTERFACE BOARD.

4.3 . . . . . AMPRO 3300/4300 Sweep Reversal Procedures:

WARNING

DO NOT SERVICE THE HORIZONTAL OR VERTICAL SWEEPS WHILE THE SYSTEM IS ENERGIZED. IF THE SWEEP CARD(S) ARE REMOVED WHILE THE SYSTEM IS ENERGIZED, HIGH VOLTAGE SHOCK WILL RESULT AND THE SYSTEM WILL BE DAMAGED.

4

4.3.1 . . . . . Horizontal Sweep Reversal Procedure:

TO REVERSE THE HORIZONTAL SWEEP / REGISTRATION, DE-ENERGIZE THE SYSTEM AND DISCONNECT THE POWER CORD.

- STEP 1. Horizontal sweep and registration reversal is accomplished by reversing the configuration of the horizontal sweep/registration reverse card located on the Yoke Interface board which is located inside the system, between the Green and Red CRTs..
- STEP 2. Note the position of the "O" and "X" located on the reversal card, see Figure 4-4. Pull the horizontal sweep/registration reverse card out, turn it end-for-end (180°) and plug it back in. See Figure 4-5. Note: the sweep reverse card connector is keyed between pins 4 and 5.

¤ NOTE 1: Recheck the raster centering. If re-adjustment is required, refer to Chapter 7, Master **STATIC** shift operations.

¤ NOTE 2: If necessary, refer to Section 4.3.2 (below) for the Vertical Sweep reversal procedure.

- STEP 3. If Vertical sweep reversal is not required, lower and lock the registration trays and then lower and lock the top cover into place.

4.3.2 . . . . . .Vertical Sweep Reversal Procedure:

TO REVERSE THE VERTICAL SWEEP / REGISTRATION, DE-ENERGIZE THE SYSTEM AND DISCONNECT THE POWER CORD.

- STEP 1. Vertical sweep and registration reversal is accomplished by reversing the configuration of the Vertical sweep/registration card located on the Yoke Interface board.
- STEP 2. Note the position of the "O" and "X" located on the reversal card, see Figure 4-4. Pull the vertical sweep/registration card out, turn it end-for-end (180°) and plug it back in. Refer to Figure 4-5. Note: the sweep reverse card connector is keyed between pins 4 and 5.

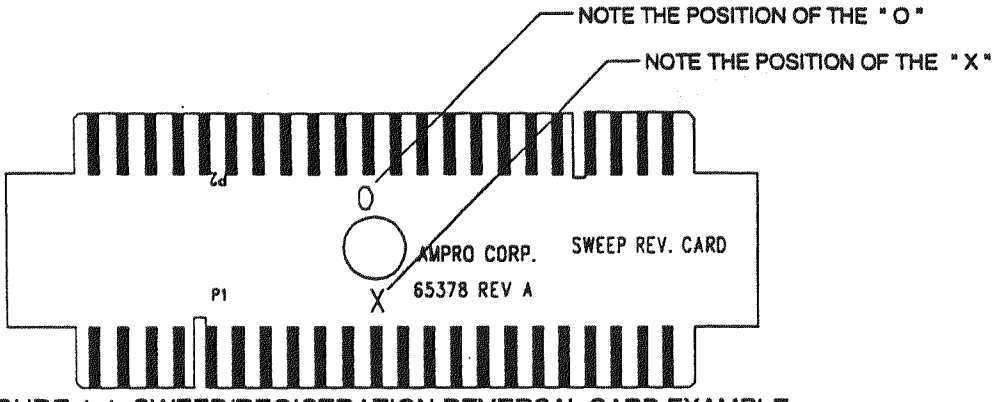
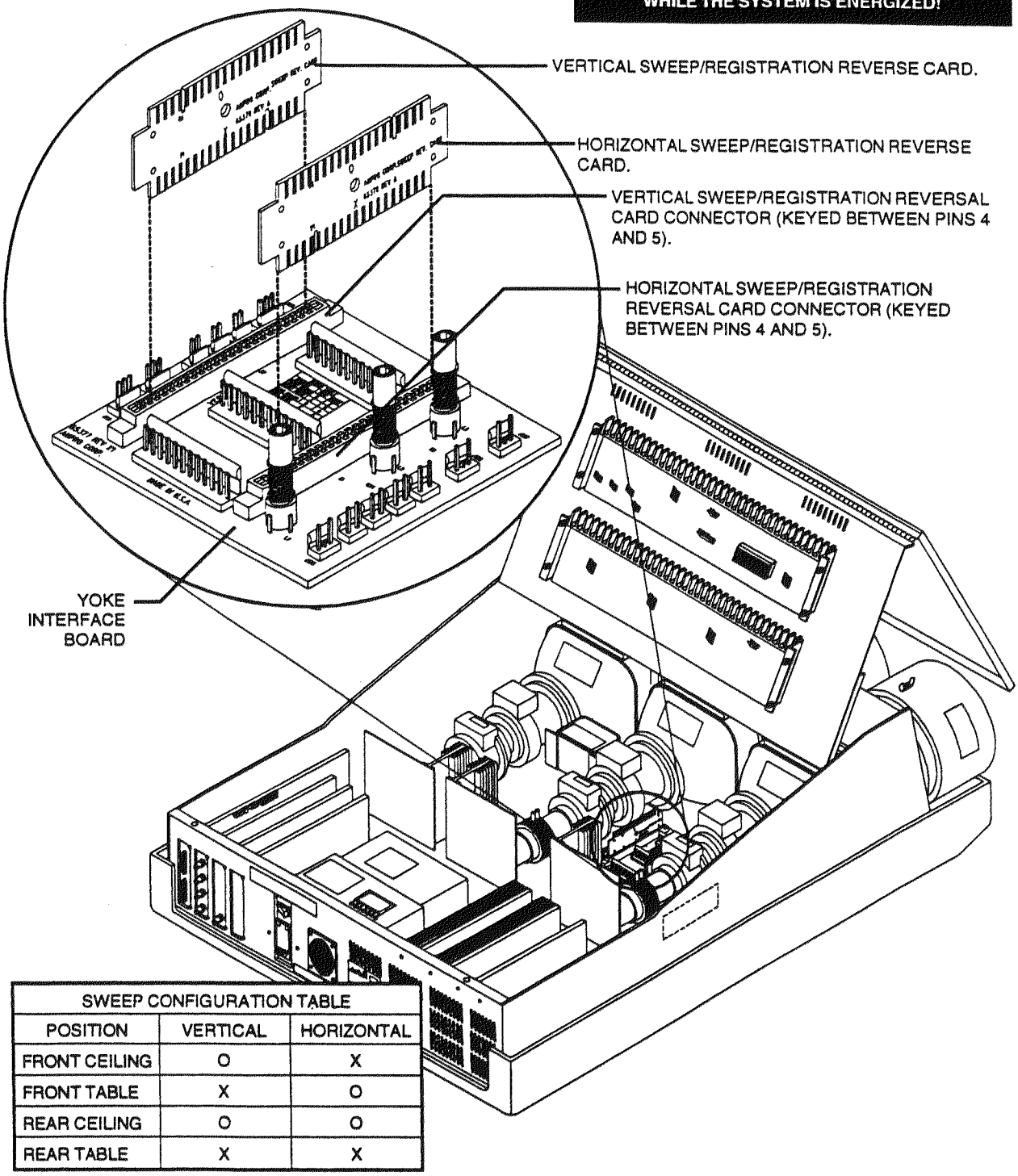


FIGURE 4-4. SWEEP/REGISTRATION REVERSAL CARD EXAMPLE.

4.3.3 . . . . Yoke Interface / Sweep Reverse Card(s) Location:

DO NOT CHANGE THE SWEEP CONFIGURATION WHILE THE SYSTEM IS ENERGIZED!



SWEEP CONFIGURATION TABLE		
POSITION	VERTICAL	HORIZONTAL
FRONT CEILING	O	X
FRONT TABLE	X	O
REAR CEILING	O	O
REAR TABLE	X	X

FIGURE 4-5. SWEEP/REGISTRATION REVERSAL CARD LOCATION.

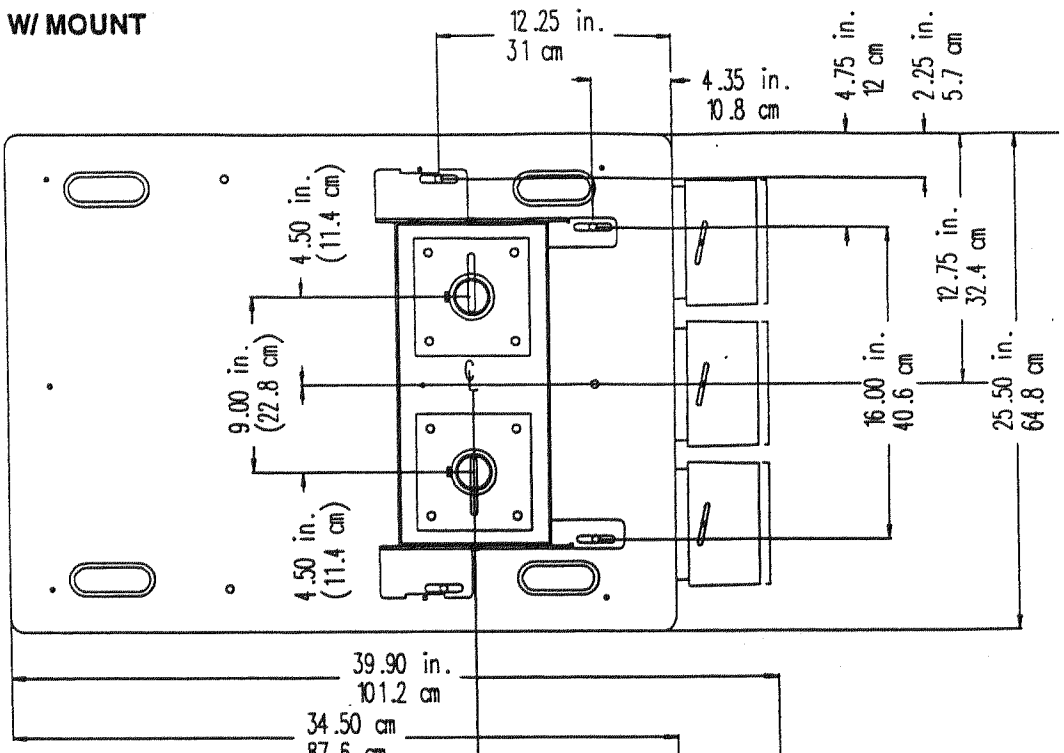
NOTE: AMPRO 3300 shown.

4.4 . . . . . Ampro 3300 Installation Guidelines:

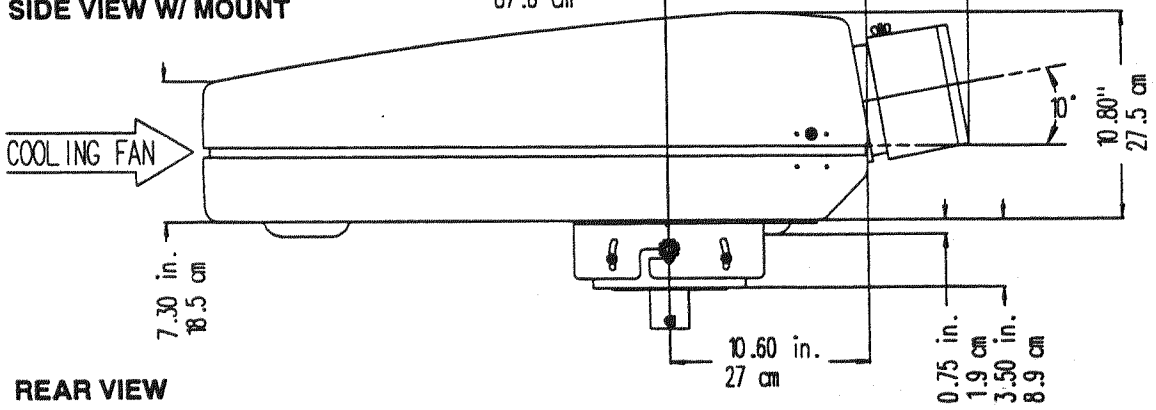
4.4.1 . . . . . AMPRO 3300 Dimensions:

4

BOTTOM VIEW W/ MOUNT



SIDE VIEW W/ MOUNT



REAR VIEW

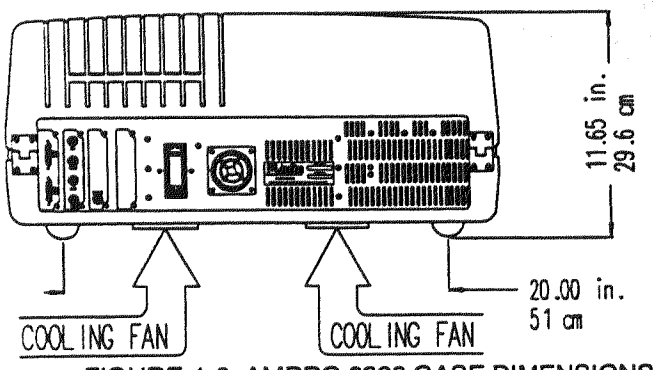


FIGURE 4-6. AMPRO 3300 CASE DIMENSIONS

4.4.2 . . . . AMPRO 3300 Ceiling Mount Description / Hardware:

PART LIST			
ITEM	DESCRIPTION	P/N	QTY
01	UNIVERSAL BASE PLATE	62466	1
02	L/R MOUNTING BRACKETS	69408	2
03	PIPE FLANGE (COUPLER)	62467	4
04	2" IMC RIIGD PLUMBING PIPE (NOT INCLUDED)	N/A	2
05	5/16-18 X 1" HEX BOLT	52126	6
06	.375 X .875 X .10 THK WSHR	53085	6
07	.562 X 1.375 X .25 THK WSHR	53086	2
08	.25 X .5 X .06 FLT WSHR	53068	4
09	1/4-20 X 1/2 HEX BOLT	52143	8
10	5/16 SPLIT LOCK WSHR	53088	4
11	3/16-16 X 1" HEX BOLT STL	52218	12
12	7/16 X 1" X .09 THK WSHR	53087	24
13	3/8 SPLIT LOCK WSHR	53067	12
14	3/8 HEX NUT STL	54030	12

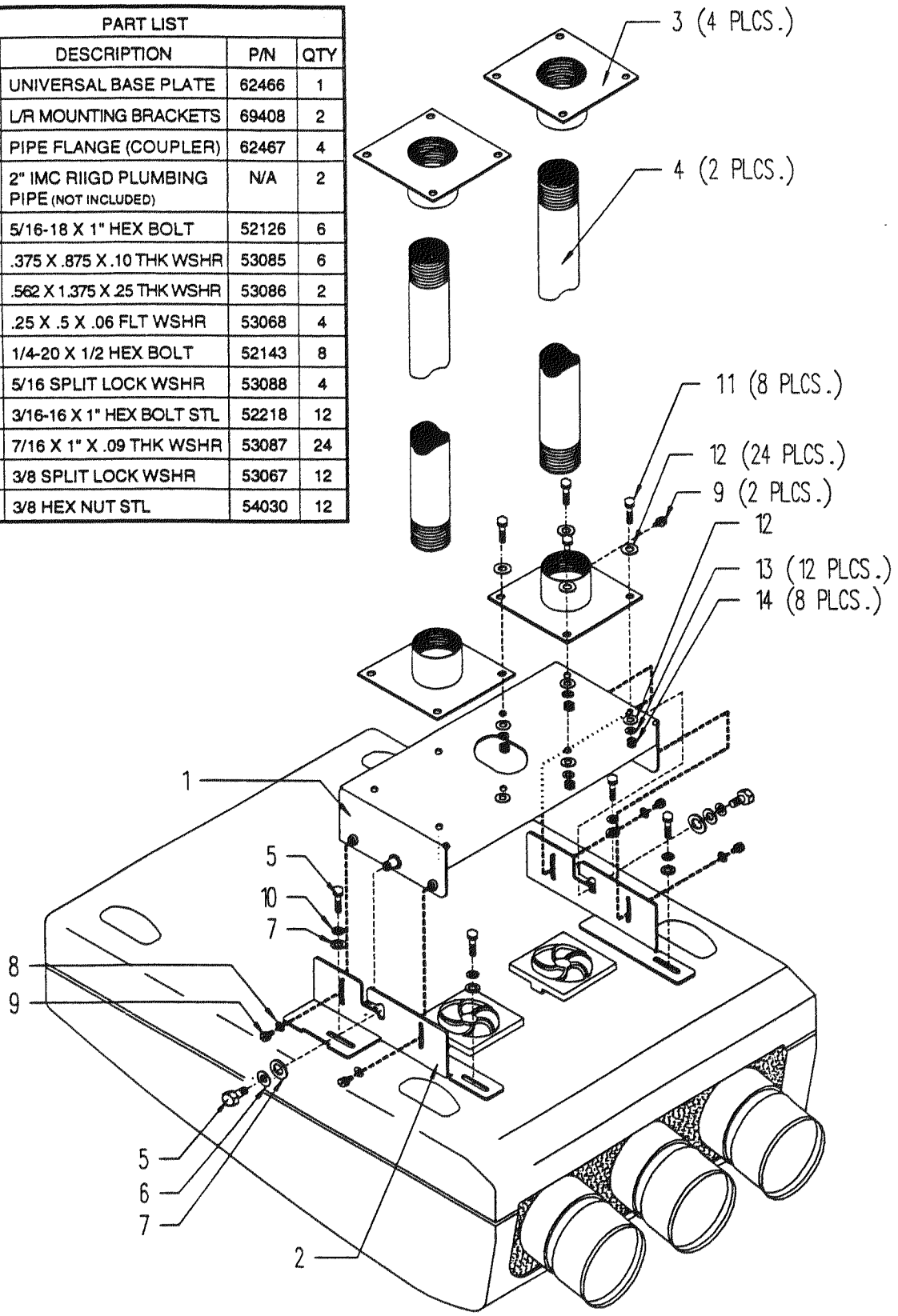


FIGURE 4-7. AMPRO 3300 CEILING MOUNT (69512).

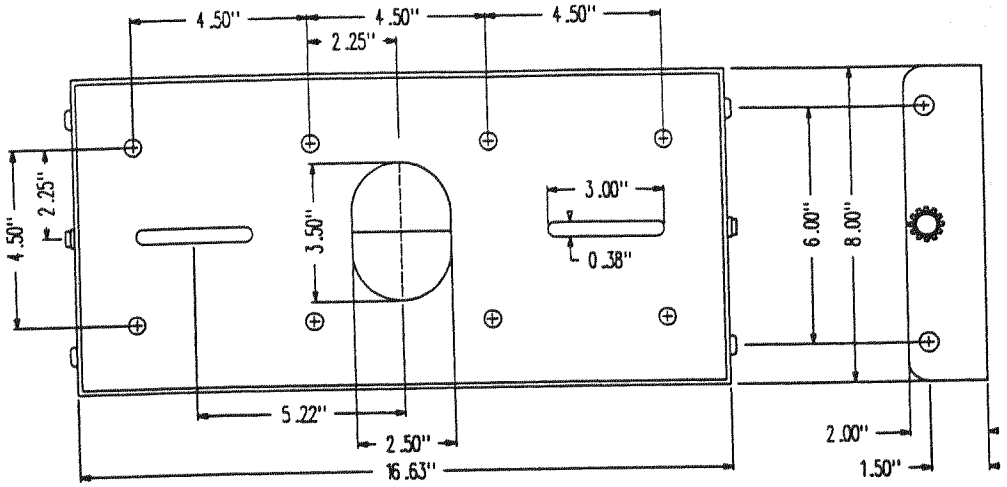
4.4.3 . . . . AMPRO 3300 Ceiling Mount Dimensions:

WARNING !

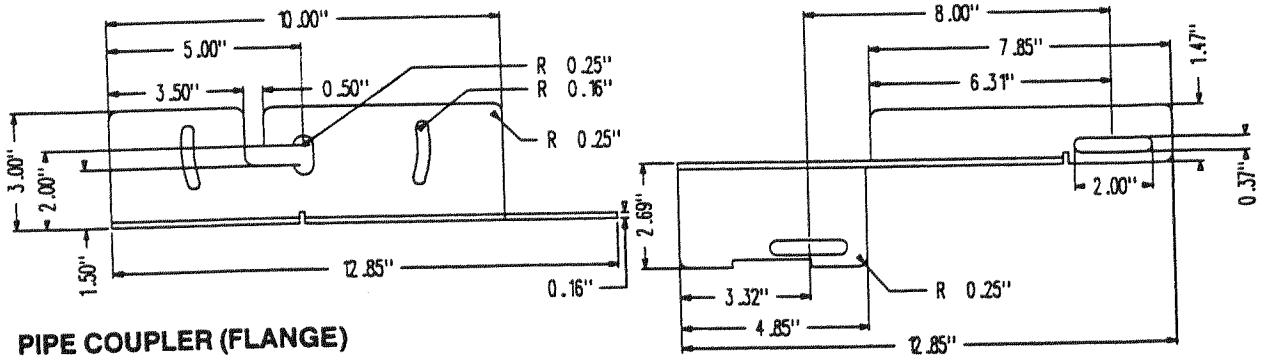
For proper installation, the ceiling for mounting the AMPRO 3300 must be capable of supporting at least 575 lb. (261 kg.). If it cannot, the ceiling must be reinforced. Improprer installation may result in serious persinal injury.

4

BASE PLATE



MOUNTING BRACKET



PIPE COUPLER (FLANGE)

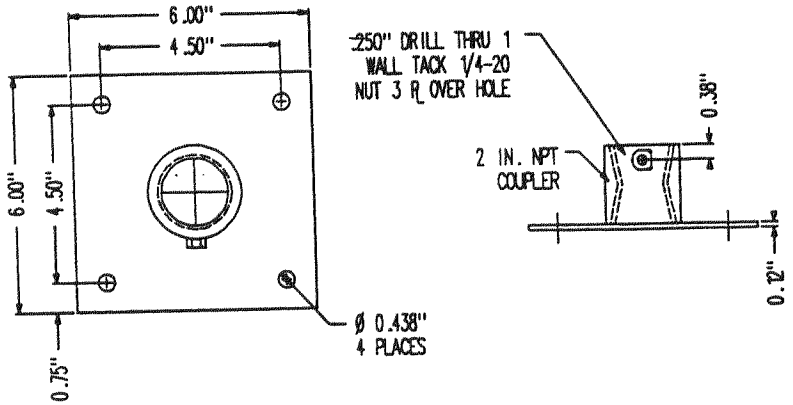


FIGURE 4-8. AMPRO 3300 CEILING MOUNT DIMENSIONS.

4.4.4 . . . . AMPRO 3300 Installation Guidelines

This information is for the AMPRO 3300 Series installation using the HD-8B lenses with an **aspect ratio of 4:3, 5:4 or 16:9 (picture width vs. height), an optimum 10 ° off-axis projection and using the maximum CRTs usable area to optimize the picture size .** If for some reason your installation does not meet the criteria just described, please contact your selling dealer or the factory for assistance. Please refer to Section 4.4.5 for definitions, Section 4.4.6 for the calculations required and Section 4.4.7 for examples. Refer to Table 4-1 for some common size screens and mounting distance.

Due to different aspect ratios and/or differences between video information ("active time") and raster time ("available active time") and your particular screen size, it may not always be possible to fill the entire projection screen with your image(s).

4.4.5 .....Definitions:

- **A**, refers to the mounting distance, ("throw distance") required.
- NOTE 1: For table mount configuration, The "throw distance" is measured from the screen surface to the front of the system.
- NOTE 2: For ceiling mount configuration, The "throw distance" is measured from the screen surface to the center of the ceiling mount. (℄)
- **B**, refers to the distance measured from the floor to the screen center, or for ceiling mount, **B** refers to the distance from the screen center to the ceiling.
- **C**, refers to the required table height for floor mounting or for ceiling mount configuration the required pipe length. NOTE: For ceiling mount applications, dimension **C** includes .75" (1.9 cm), top and bottom for pipe engagement.

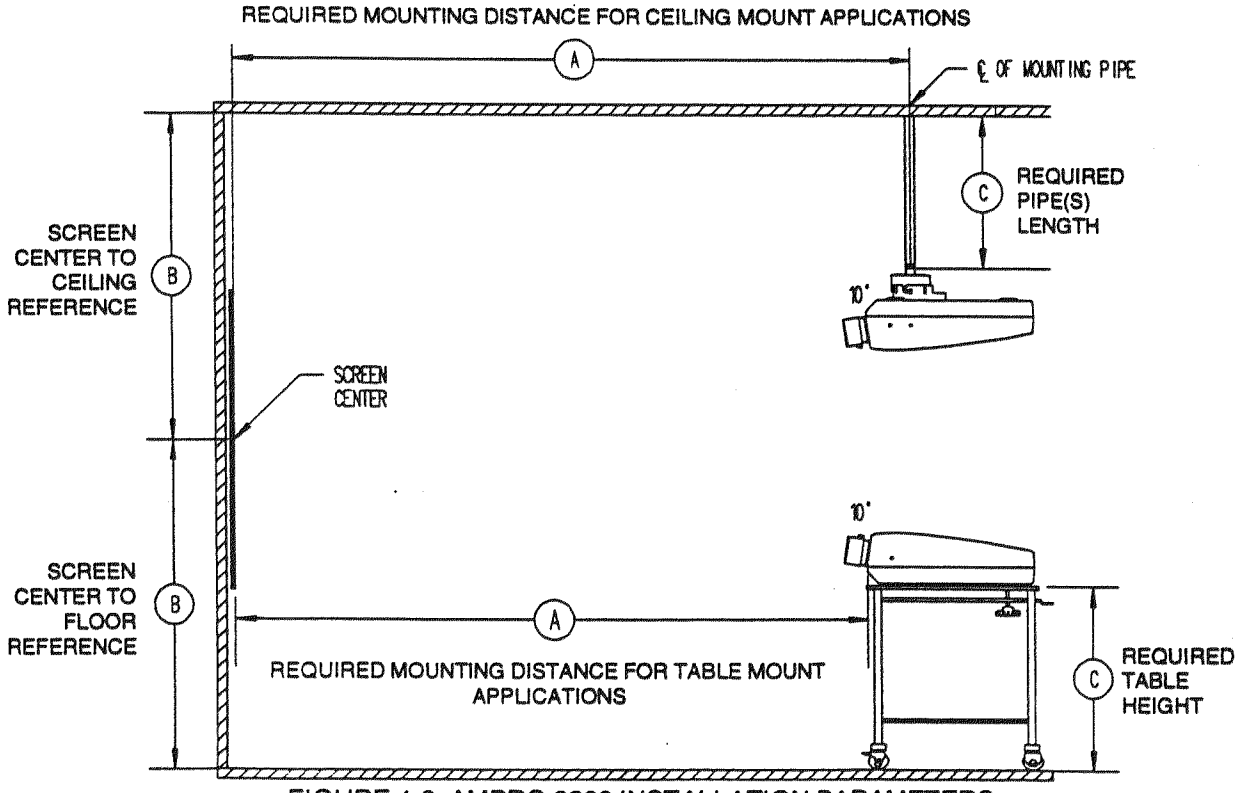


FIGURE 4-9. AMPRO 3300 INSTALLATION PARAMETERS.

4.4.6 . . . . AMPRO 3300 Lens Specification \ Mounting Distance Calculations \ Tal

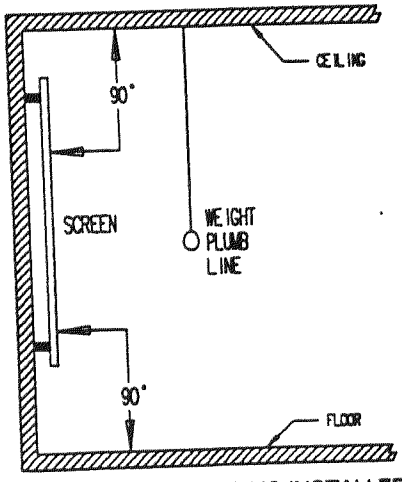
SPECIFICATIONS	
MODEL NUMBER: 69475	
MAGNIFICATION: 9.5X to 52X	
SCREEN WIDTHS: 1.0m (42 in.) to 5.9m (233 in.)	
RESOLUTION: 10 lp/mm / Air coupled	
TABLE MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.2 X SWmm + 330mm	Ain = 1.2 X SWin. + 13.0in.
Bmm = Distance from screen center to floor in millimeters.	Bin = Distance from screen center to floor in inches.
Cmm = Bmm - [0.212 X SWmm] - 234mm	Cin = Bin. - [0.212 X SWin.] - 9.25in.
CEILING MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.2 X SWmm + 597mm	Ain = 1.2 X SWin. + 23.5in.
Bmm = Distance from screen center to ceiling in millimeters.	Bin = Distance from screen center to ceiling in inches.
Cmm = Bmm - [0.212 X SWmm] - 374mm	Cin = Bin - [0.212 X SWin.] - 14.75in.
NOTE: SW refers to Screen Width	

MOUNTING DISTANCE TABLE

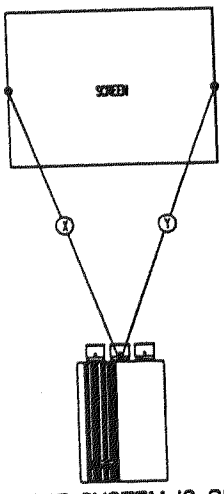
SCREEN WIDTH		MOUNTING DISTANCE			
		TABLE		CEILING	
mm	in	mm	in	mm	in
1219	48	1793	70.50	2060	81.00
1524	60	2159	85.00	2426	95.50
1829	72	2525	99.50	2792	110.0
2032	80	2768	109.0	3035	119.5
2134	84	2891	114.0	3158	124.5
2438	96	3256	128.0	3523	138.5
2743	108	3622	142.5	3889	153.0
3048	120	3988	157.0	4255	167.0
3353	132	4354	171.5	4621	182.0
3658	144	4720	186.0	4987	196.5
3962	156	5084	200.0	5351	210.5
4267	168	5450	214.5	5717	225.0
4572	180	5816	229.0	6083	239.5
4877	192	6182	243.5	6449	254.0
5182	204	6548	258.0	6815	268.5
5486	216	6913	272.0	7180	283.0

THE MOUNTING DISTANCE IS BASED ON AN ASPECT RATIO OF 4:3, 5:4 OR 16:9 AND 10° OFF-AXIS PROJECTION.

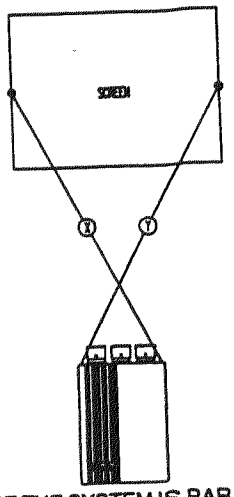
4.4.7 .....System Positioning:



ENSURE THE SCREEN IS INSTALLED AT A 90° ANGLES RELATIVE TO THE CEILING AND FLOOR.



ENSURE THE SYSTEM IS CENTERED ON THE SCREEN. DIMENSIONS X AND Y SHOULD BE EQUAL IN LENGTH.



ENSURE THE SYSTEM IS PARALLEL TO THE SCREEN. DIMENSIONS X AND Y SHOULD BE EQUAL IN LENGTH.

4.4.8 . . . . AMPRO 3300 Installation Example: 60 in. (1524mm) H x 80 in. (2032mm) W:

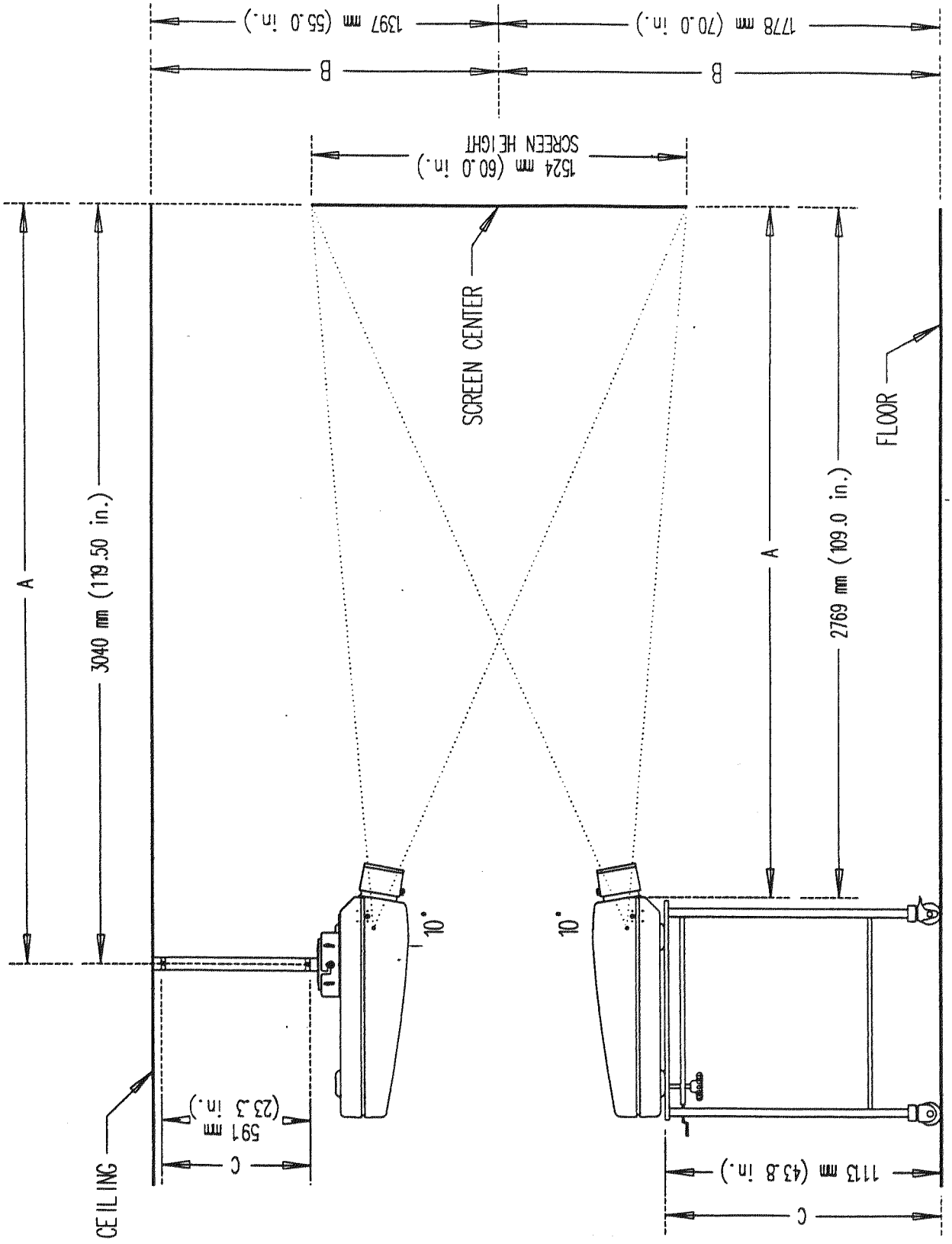


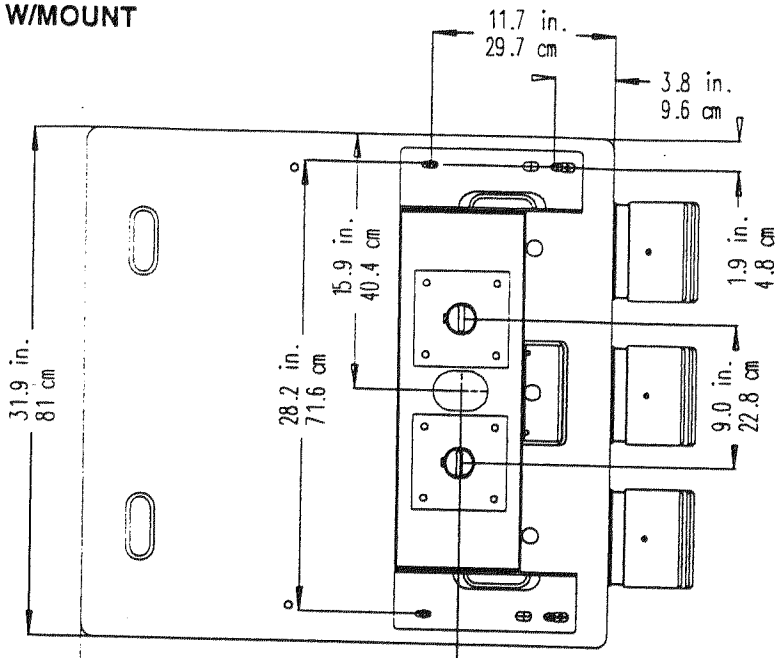
FIGURE 4-10. AMPRO 3300 INSTALLATION EXAMPLE.

NOTES:

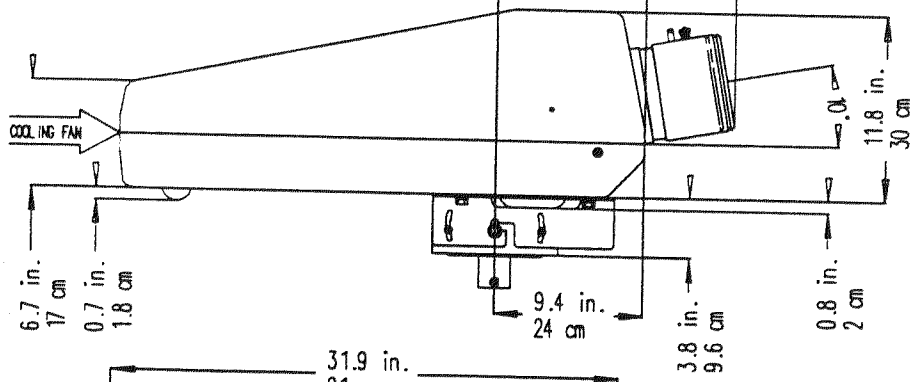
4.5 . . . . . .AMPRO 4300 Installation Guidlines:

4.5.1 . . . . . .AMPRO 4300 Dimensions:

BOTTOM VIEW W/MOUNT



SIDE VIEW W/MOUNT



REAR VIEW

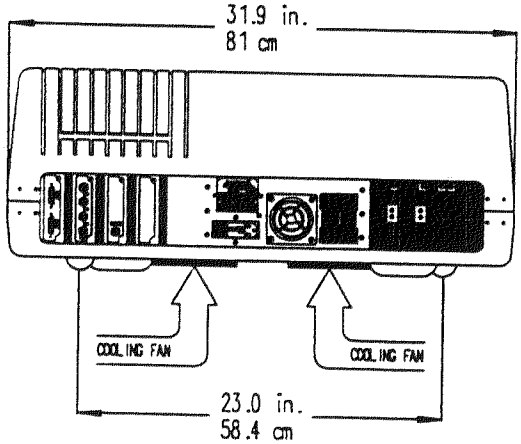


FIGURE 4-11. AMPRO 4300 SYSTEM DIMENSIONS.

4.5.2 . . . . AMPRO 4300 Ceiling Mount Description / Hardware:

PART LIST			
ITEM	DESCRIPTION	P/N	QTY
01	UNIVERSAL BASE PLATE		1
02	L/R MOUNTING BRACKETS		2
03	PIPE FLANGE (COUPLER)	62467	4
04	2" IMC RIIGD PLUMBING PIPE (NOT INCLUDED)	N/A	2
05	5/16-18 X 1" HEX BOLT	52126	6
06	.375 X .875 X .10 THK WSHR	53085	6
07	.562 X 1.375 X .25 THK WSHR	53086	2
08	.25 X .5 X .06 FLT WSHR	53068	4
09	1/4-20 X 1/2 HEX BOLT	52143	8
10	5/16 SPLIT LOCK WSHR	53088	4
11	3/16-16 X 1" HEX BOLT STL	52218	12
12	7/16 X 1" X .09 THK WSHR	53087	24
13	3/8 SPLIT LOCK WSHR	53067	12
14	3/8 HEX NUT STL	54030	12

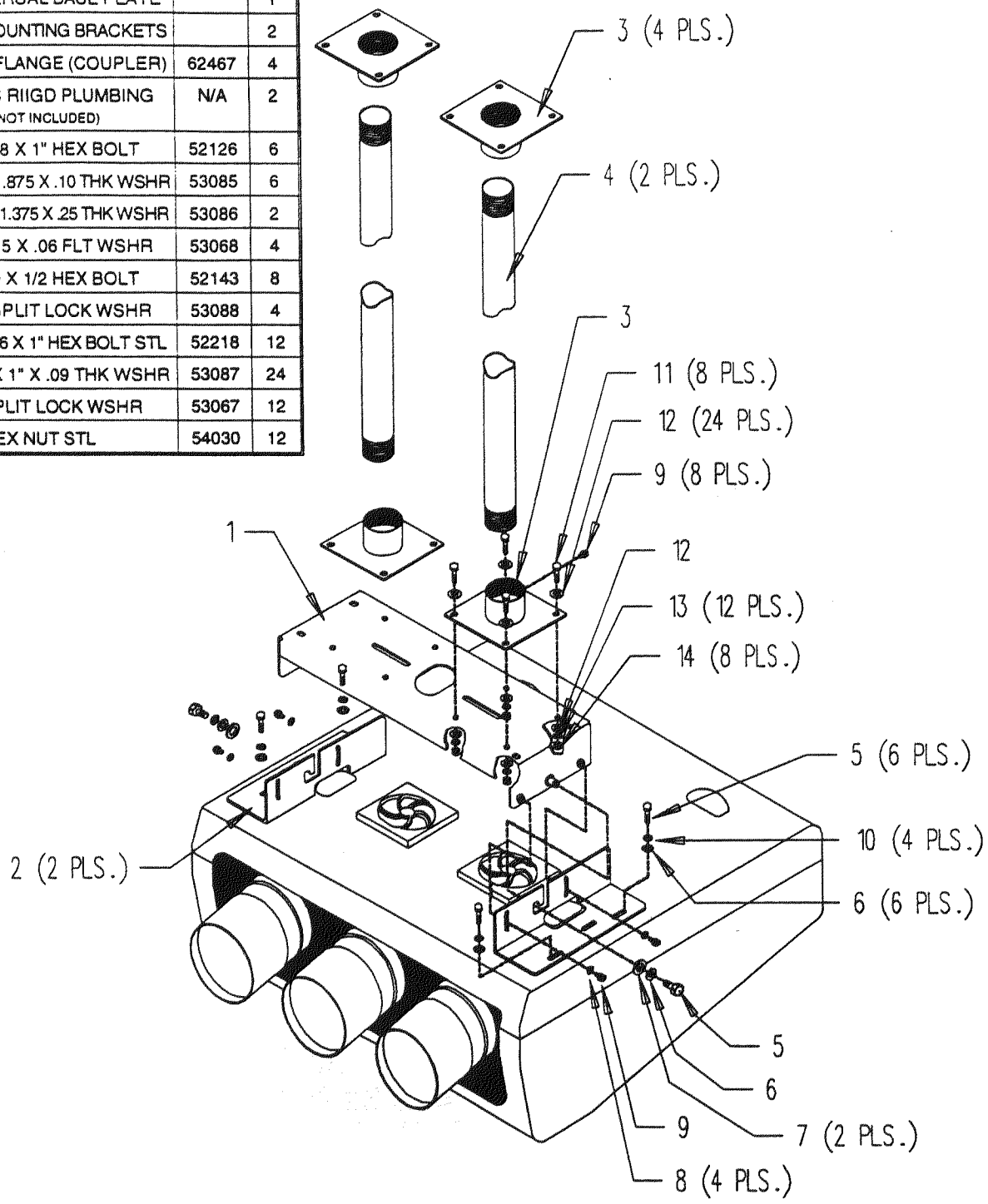


FIGURE 4-12. AMPRO 4300 CEILING MOUNT (P/N 69362).

4.5.3 . . . . Ceiling Mount Dimensions:

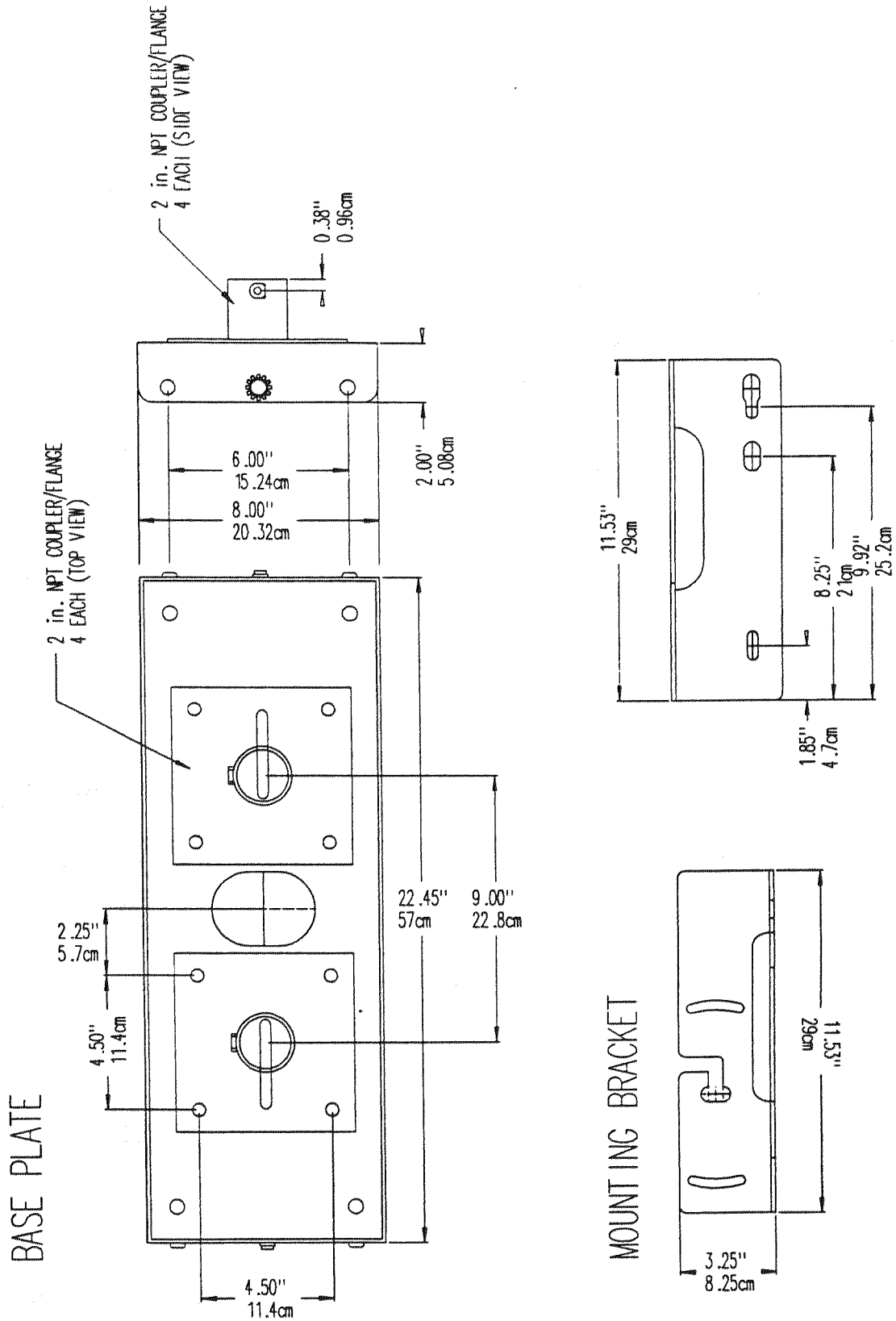


FIGURE 4-13. AMPRO 4300 CEILING MOUNT DIMENSIONS.

4

4.5.4 . . . . AMPRO 4300 Installation Guidelines:

This information is for the AMPRO 4300 Series installation with an **aspect ratio of 4:3, 5:4 or 16:9 (picture width vs. picture height) an optimum 10 ° off-axis projection and using the maximum usable area of the CRTs to optimize the picture size and resolution.** If for some reason your installation does not meet the criteria just described, please contact your selling dealer or the factory for assistance. Please refer to Figure 4-12, and Section 4.5.5 for definitions, and the appropriate Sections for the specification, calculations, mounting distance table and examples.

Due to different aspect ratios and/or differences between video information ("active time") and raster time ("available active time") and your particular screen size, it may not always be possible to fill the entire projection screen with your image(s).

4.5.5 . . . . . .Definitions:

- **A**, refers to the mounting distance, ("throw distance") required.
- ¤ NOTE 1: For table mount configuration, The "throw distance" is measured from the screen surface to the front of the system.
- ¤ NOTE 2: For ceiling mount configuration, The "throw distance" is measured from the screen surface to the center of the ceiling mount.
- **B**, refers to the distance measured from the floor to the screen center, or for ceiling mount, **B** refers to the distance from the screen center to the ceiling.
- **C**, refers to the required table height for floor mounting or for ceiling mount configuration the required pipe length. NOTE: For ceiling mount applications, dimension **C** includes 0.75 in. (19 mm) top and bottom for pipe engagement.

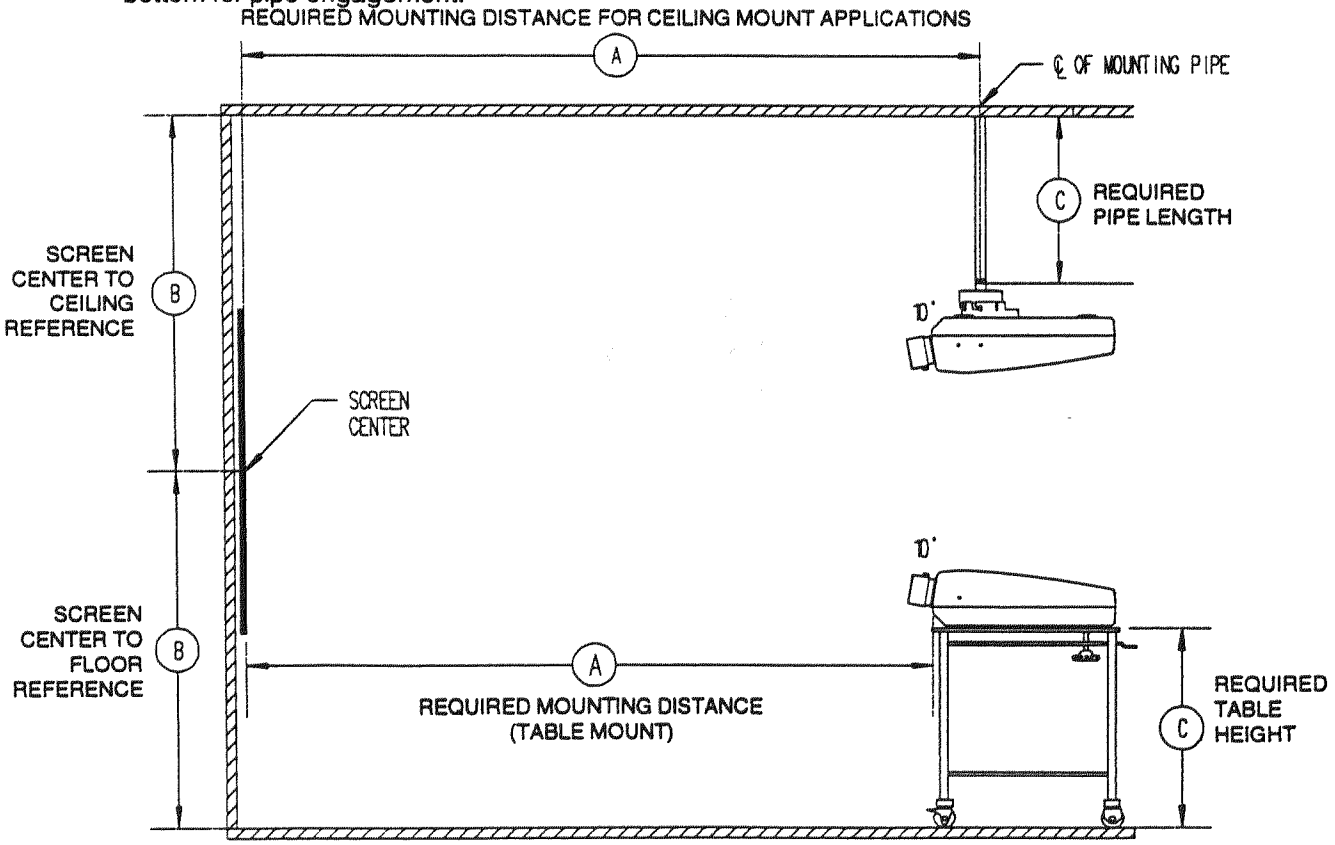


FIGURE 4-14. INSTALLATION PARAMETERS.

4.5.6 . . . . HD-10L Specifications / Installation Calculations / Table:

SPECIFICATIONS	
Model Number: 69481	
Magnification: 9X to 11X , **Screen Widths:** 1.2m (46.0in.) to 1.5m (60.0in.)	
TABLE MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.38 X SWmm + 163mm	Ain = 1.38 X SWin. + 6.5in.
Bmm = Distance from screen center to floor in millimeters.	Bin = Distance from screen center to floor in inches.
Cmm = Bmm - [0.244 X SWmm] - 214mm	Cin = Bin. - [0.244 X SWin.] - 8.5in.
CEILING MOUNT CONFIGURATIONS	
MILLIMETERS	INCHES
Amm = 1.38 X SWmm + 402mm	Ain = 1.38 X SWin. + 15.75in.
Bmm = Distance from screen center to ceiling in millimeters.	Bin = Distance from screen center to ceiling in inches.
Cmm = Bmm - [0.244 X SWmm] - 360mm	Cin = Bin - [0.244 X SWin.] - 14.2in.
NOTE: SW refers to Screen Width	

MOUNTING DISTANCE TABLE

SCREEN WIDTH		MOUNTING DISTANCE			
		TABLE		CEILING	
mm	in	mm	in	mm	in
1270	50	1916	75.50	2155	84.75
1524	60	2266	89.25	2505	98.50

4.5.6.1 . . . . . .HD10L Installation Example: 45.0in.(1143mm)(H) x 60.0in (1524mm)(W):

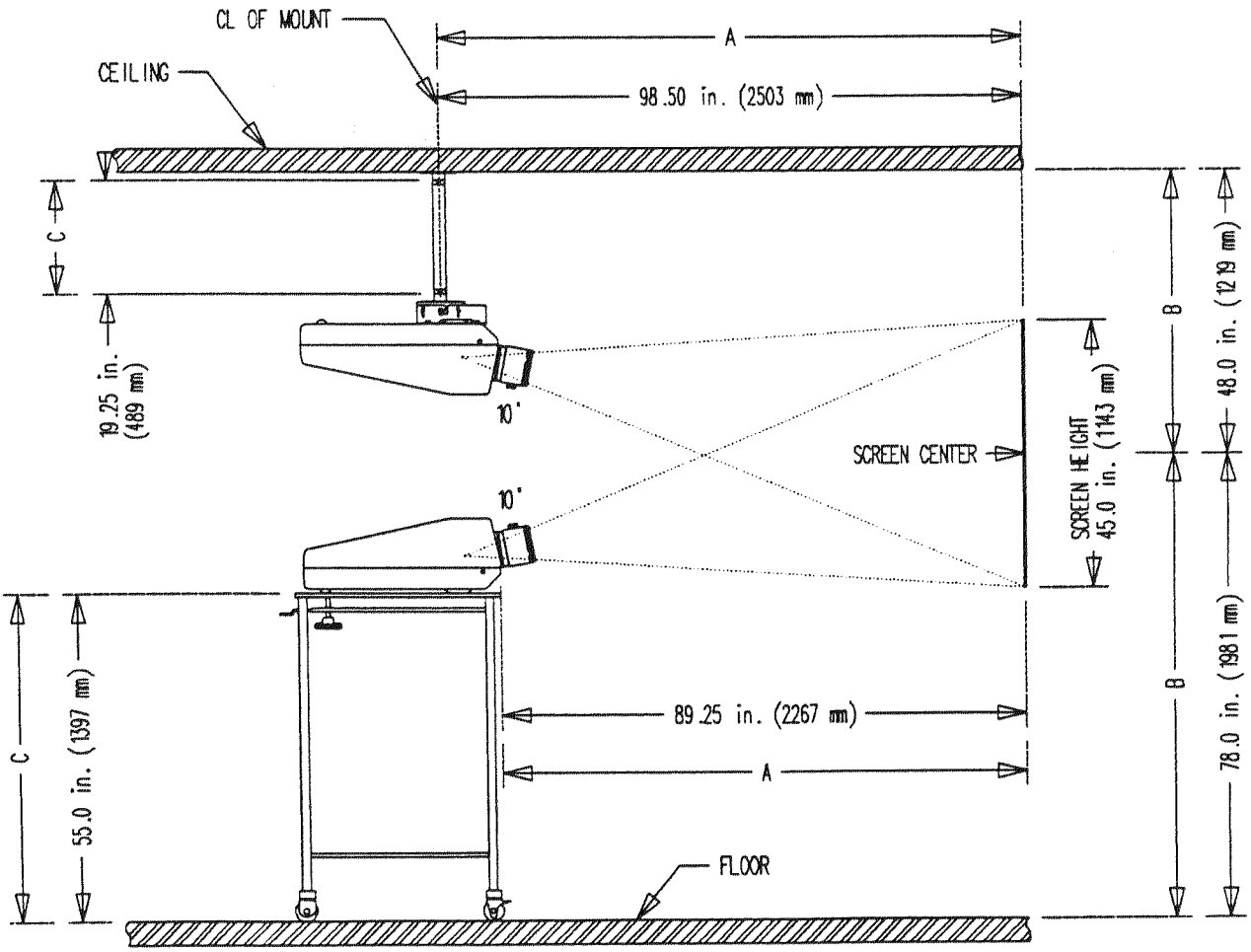


FIGURE 4-15. HD-10L INSTALLATION EXAMPLE.

4

4.5.7. . . . . HD-10 /GT17/GT26 Specifications / Calculations / Table:

SPECIFICATIONS					
Magnification: Model 69459 (HD-10GT17): 14X to 20X, optimum @ 16X, **Screen Widths:** 72in. (1.8m) to 102in (2.6m)					
Magnification: Model 69480 (HD-10): 14X to 45X, **Screen Widths:** 72in. (1.8m) to 230in. (5.8m)					
Magnification: Model 69482 (HD-10GT26): 21X to 30X, optimum @ 26X **Screen Widths:** 107in. (2.7m) to 154in. (3.9m)					
TABLE MOUNT CONFIGURATIONS					
MILLIMETERS			INCHES		
Amm = 1.3 x SWmm + 230mm			Ain = 1.3 x SWin. + 9.0in.		
Bmm = Distance from screen center to floor in millimeters.			Bin = Distance from screen center to floor in inches.		
Cmm = Bmm - [0.229 x SWmm] - 226mm			Cin = Bin. - [0.229 x SWin.] - 9.0in.		
CEILING MOUNT CONFIGURATIONS					
MILLIMETERS			INCHES		
Amm = 1.3 x SWmm + 470mm			Ain = 1.3 x SWin. + 18.5in.		
Bmm = Distance from screen center to ceiling in millimeters.			Bin = Distance from screen center to ceiling in inches.		
Cmm = Bmm - [0.229 x SWmm] - 372mm			Cin = Bin - [0.229 x SWin.] - 14.6in.		
MOUNTING DISTANCE TABLE					
SCREEN WIDTH (SW)		MOUNTING DISTANCE			
		TABLE		CEILING	
mm	in	mm	in	mm	in
[1,2]2032	80	2872	113.00	3111	122.50
[1,2]2438	96	3399	134.00	3639	143.25
[1,3]3048	120	4192	165.00	4432	174.50
[1,3]3353	132	4589	180.50	4829	190.00
[1,3]3658	144	4985	196.25	5225	205.75
[1]3962	156	5381	212.00	5621	221.25
[1]4267	168	5777	227.50	6017	237.00
[1]4572	180	6174	243.00	6414	252.50
[1]4877	192	6570	258.50	6810	268.00
[1] INDICATES HD-10 APPLICATIONS / [2] INDICATES HD-10GT17 APPLICATIONS / [3] INDICATES HD-10GT26 APPLICATIONS					

4.5.7.1 . . . . . HD10/GT17 Installation Example : 60.0in. (1524mm)(H) x 80.0in. (2032mm)(W):

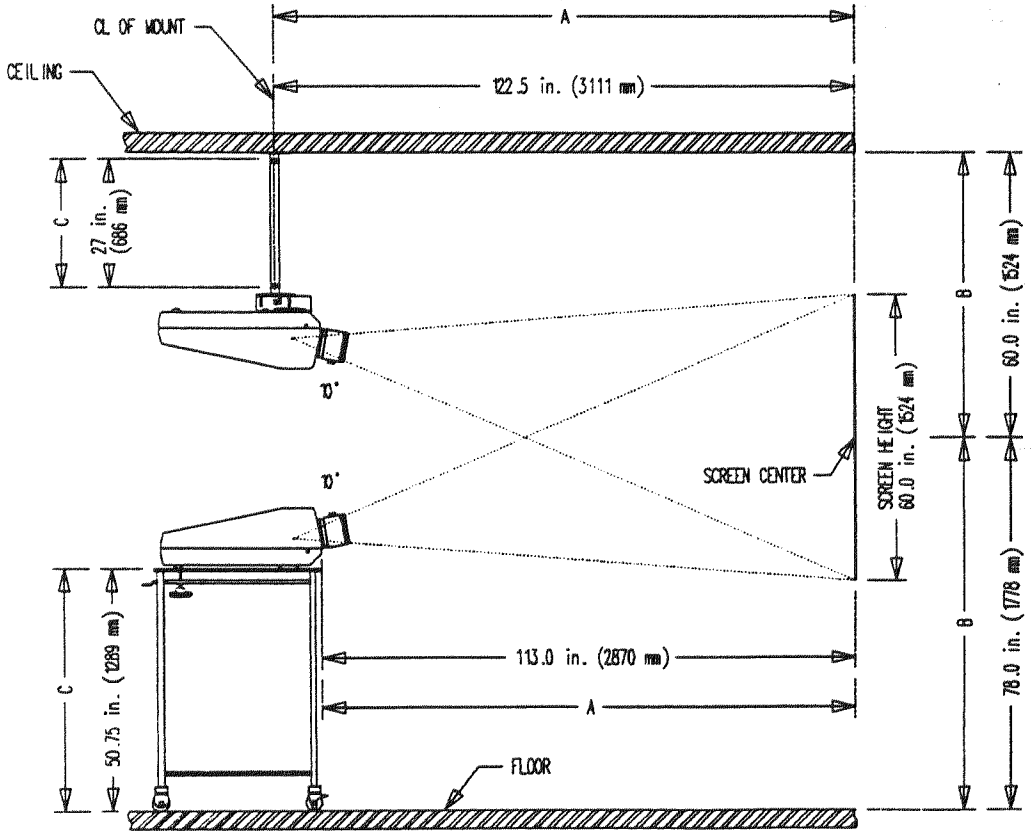


FIGURE 4-16. HD-10/GT17 INSTALLATION EXAMPLE.

Section 5

Lens Focusing and Positioning

5.1 .....Getting Started:

In order to focus and position the lenses it will be necessary to unlock and tilt-up the top cover, which is secured with two ¼ turn fasteners located on the front of the bottom cover.

- STEP 1. To unlock, simply turn the fasteners ¼ turn counterclockwise with a phillps blade screwdriver.
- STEP 2. Lift the top cover upward and lock into place using the two locking hinges located on both sides.
- STEP 3. Once the top cover has been lifted and locked, the lenses will be exposed.

NOTE: The tool(s) required to focus and position the lenses is provided and located within the accessory box.

5.2 .....Required Test Patterns / Using The Help Programs:

To focus and position the lenses you will use the crosshatch and crosshair test patterns or utilize the internal Help System and screens. See Section 6 for more information on the Help System.

If you are not using the internal help system perform the following steps .

- Each lens should be focused individually.
- Use the **[CUTOFF]** , then the **[GREEN]**, **[RED]**and **[BLUE]**buttons to cutoff the images not being focused.
- Use the **[TEST]** and **[STEP]** buttons for selecting the internal test patterns and frequency (see Section 6, section 7.2.12.). Turn registration "OFF" using 55 **[CODE]** .

Or enter the Internal Help System for a step-by-step instruction, perform the following:

- Press the **[HELP]** button, then
- Enter SYSTEM SETUP MENU, subject 2, then;
- Select either one of the Guided Setup Programs (1 or 2). NOTE: In either case the programs will automatically turn Registration "OFF."

Once your unit has been installed for your particular requirements, you are now ready to perform the first stage of alignment, lens focusing and positioning.

5.3 . . . . . .Lens Types:

There are several different types of lenses that may be used on your display system. The lenses used on the AmPro 3300/4300 are determined by the magnification factor in which the system will be used. The lens may be identified by the label located on the top of each lens assembly.

5.3.1 . . . . . .AMPRO 3300 Lens Type / Specificiations:

HD-8B: f/number: 1.15 ± 2% @ ∞, Magnification factor: 9.5X to 52X, Screen Widths: 42 in (1066 mm) to 233 in. (5918 mm), Resolution: 10 lp/mm - air coupled.

5.3.2 . . . . . .AMPRO 4300 Lens Types / Specifications:

- ☐ **HD-10L**: f/number: f/1.15 ± 2%, Magnification factor: 9X to 11X, 43.0in. (1.1m) to 53.0in. (1.3m) picture width. Resolution: 10 lp/mm full field @ >50% MTF.
- ☐ **HD-10**: f/number: 1.15 ± 7% @ infinity, Magnification range: 14X to 45X, 67.0in. (1.7m) to 216.0in (5.5m) picture width. Resolution: 10 lp/mm @ >50% MTF.
- ☐ **HD-10GT17**: f/number: 1.15 ± 7% @ infinity, Magnification range: 14X to 20X, 67.0in. (1.7m) to 96.0in (2.4m) picture width, optimum at 16X, 77.0in (1.9m) picture width. Resolution: 12 lp/mm @ >50% MTF.
- ☐ **HD-10GT26**: f/number: 1.15 ± 7% @ infinity, Magnification range: 21X to 30X, 100.0in. (2.5m) to 145.0in (3.7m) picture width, optimum at 26X, 125.0in. (3.2m) picture width. Resolution: 12 lp/mm @ >50% MTF.

Regardless, of the type of lens being used, the focus procedure remains the same.

5.3.3 . . . . . .Focus Procedure/Lenses:

When using the dual adjustment type lenses, adjust the primary and secondary focus adjustment for the best focus as outlined in Table 5-1, Step 1 for your particular configuration. You may be required to go back and forth between the two adjustments.

- STEP 1. Loosen the rearmost wingnut, located on the top of the lens.
- STEP 2. Using the wingnut (knob), rotate the focus barrel until the center of the image appears to be in focus.
- STEP 3. Following the same method described in Step 2, repeat for the outermost focus barrel until the edges of the image appear to be in focus.....Repeat for each lens.

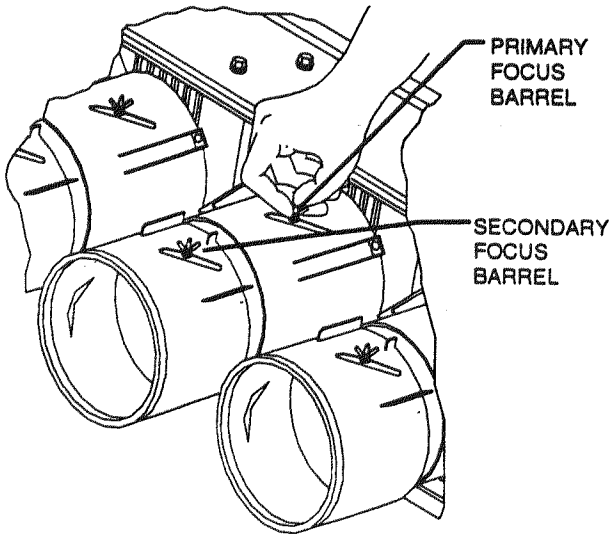


FIGURE 5-1. LENS FOCUS (INITIAL).

5.4 . . . . . Initial CRT Focus Procedure:

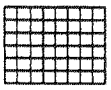
Prior to performing the mechanical lens adjustment, ensure that the CRT magnetic focus has been pre-set to approximately 50% for the STATIC adjustments and 77% for the dynamic adjustments. Perform the following Steps;

- STEP 1. STATIC FOCUS: Enter **[98] [CODE]**, select one color at a time and using the [RED], [GREEN] or [BLUE] BUTTONS. Using the UP or DOWN arrow keys adjust the static focus for 50% of its range for each color.
- STEP 2. DYNAMIC FOCUS: Enter **[99] [CODE]**, then select a color. Using the LEFT and RIGHT arrow keys adjust the horizontal (left-to-right) dynamic focus for 77% and using the UP and DOWN arrow keys adjust the vertical (top-to-bottom) dynamic focus for 77% for each color.

Once the above procedure has been performed, you may proceed to the lens focusing and positioning procedure.

5.5 . . . . . .Lens Focus and Positioning:

NOTE: The following procedure is outlined for a **FRONT/CEILING MOUNT INSTALLATION.** Reference is as viewed from the front of the unit. Refer to Table 5-1 page 5-5 for procedures on other installation configurations.

¤ CROSSHATCH PATTERN REQUIRED. 

- STEP 1. Tighten all three lens adjustments, then turn counterclockwise ¾ of a turn. Refer to Figure 5-2.
- STEP 2. Adjust the primary and secondary lens barrel until the lower right corner of the projected image is focused.
- STEP 3. Repeat step 1 and 2 for each color.
- STEP 4. **GREEN ONLY !** Adjust the lower right lens adjustment until the upper right corner of the image is focused. See Figure 5-2. Repeat lens focus procedure if necessary at this time.
- STEP 5. **GREEN ONLY !** Adjust the upper left lens adjustment for side to side focus. See Figure 5-2

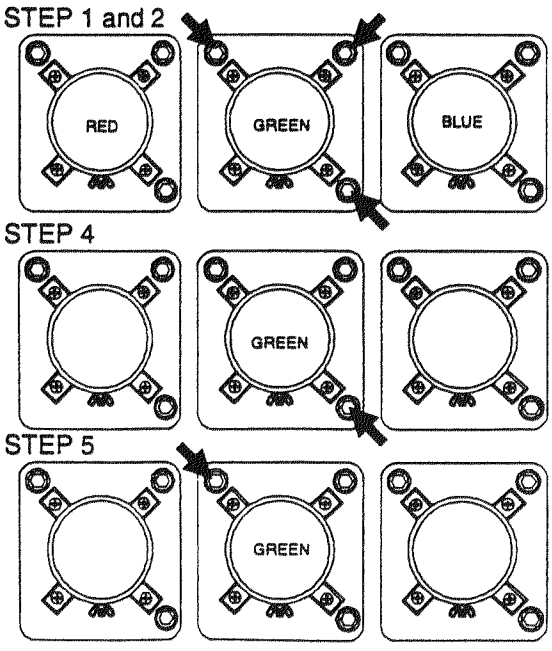


FIGURE 5-2.

5.5 . . . . . Lens Focus and Positioning: (continued)

¤ CROSSHAIR PATTERN REQUIRED.

- STEP 6. RED to GREEN lens positioning. **3300:** Loosen the 3/16 lens positioning hex head screw **4300:** loosen the two lens positioning knobs, located directly behind the RED LENS/CRT assembly. Figure 5-3.
- STEP 7. Carefully pivot the RED LENS/CRT assembly until the center vertical line in the RED image exactly overlays the center vertical line in the GREEN image.
- STEP 8. Once the lens is in the proper position, tighten the 3/16 lens positioning hex head screw or knobs.

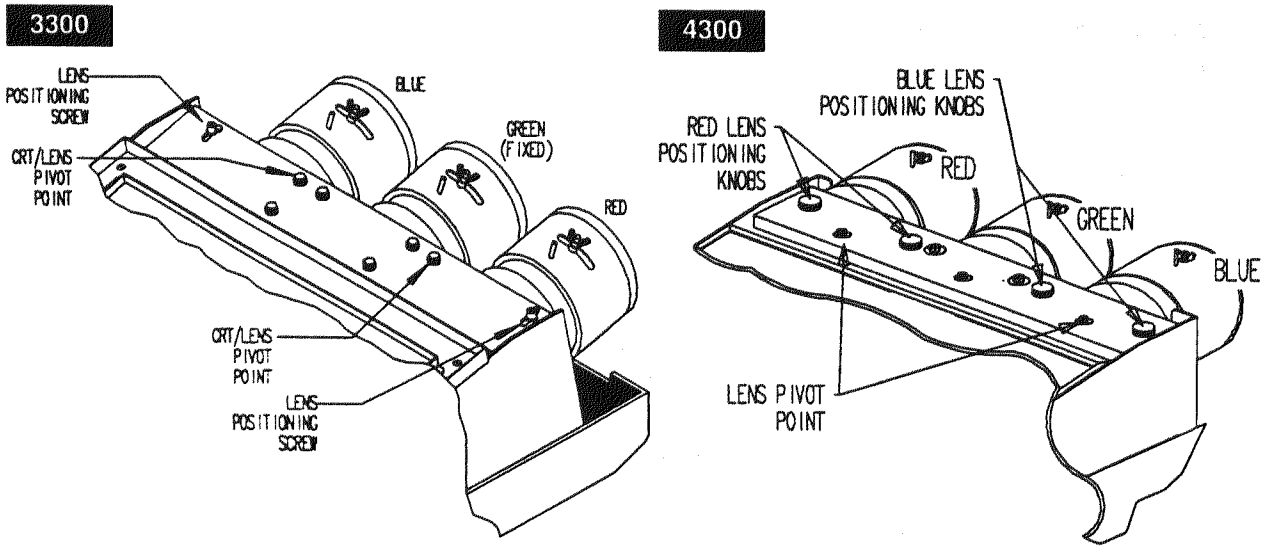


FIGURE 5-3. POSITIONING THE LENSES.

- STEP 9. With Registration "off" and using the crosshatch pattern, perform the STATIC Red and Blue shift operations as required until the center horizontal line of the selected color overlays the center horizontal line of the reference color. Use the following CODES to perform the STATIC shift operations.

¤ 40 [CODE]-Red Vertical Shift (STATIC) AND 41 [CODE] -Blue Vertical Shift (STATIC).

¤ CROSSHATCH PATTERN REQUIRED.

- STEP 10. RED ONLY ! Adjust the lower right lens adjustment until the upper right corner of the image is focused. See Figure 5-4.
- STEP 11. RED ONLY ! Adjust the upper left lens adjustment for side to side focus. See Figure 5-4.
- STEP 12. Re-focus and pivot the lens as required.
- NOTE: Perform the Static Red and Blue Shift operations as often as necessary.

REPEAT STEPS 6 THROUGH 12 FOR **BLUE** TO **RED** ALIGNMENT.

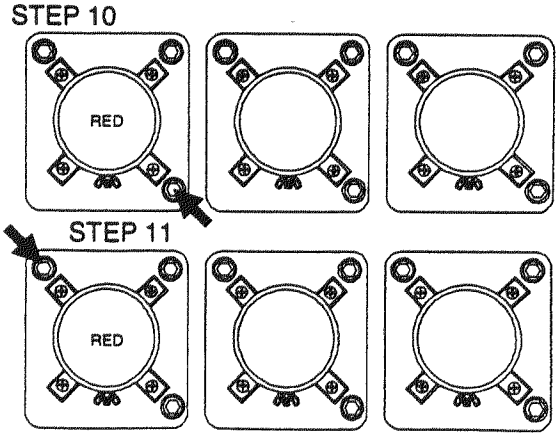


FIGURE 5-4.

5.6 . . . . . Magnetic CRT Focus Procedure:

To best achieve a precise CRT focus, the AmPro 3300/4300 incorporates magnetically focused CRTs which are controlled and set by the remote control. Each channel (source) may have independent focusing settings.

The magnetic focus is set for each individual color and for each channel location or source being used. Perform the following Steps to optimize the CRT focus.

5.6.1 . . . . . .CRT Static Focus:

- STEP 1. Select a channel location, i.e., **[1] [CHAN]**. **ENSURE** channel brightness and contrast have been set to the desired operating levels.
- STEP 2. Cutoff two of the three colors.
- STEP 3. Displaying the external source, enter **[98] [CODE]** and select the color to be adjusted.
- STEP 4. Use the UP and DOWN arrow keys to adjust the static focus for best overall (primarily center) focus. REPEAT.....Steps 3 through 5 for each color.

5.6.2 . . . . . .CRT Dynamic Focus:

Like the static focus, the dynamic focus is set for each individual color on a channel-to-channel basis. Additionally, the dynamic focus provides both horizontal (side-to-side) and vertical (top-to-bottom) focusing capabilities.

- STEP 1. Perform Steps 1 and 2 from above.
- STEP 2. Enter **[99] [CODE]**, select the color under adjustment, and use the UP and DOWN arrow keys for the vertical (top-to-bottom) dynamic focus and use the LEFT and RIGHT arrow keys for the horizontal (side-to-side) dynamic focus. REPEAT..... Step 2 for each color.

¤ NOTE: Repeat both the Static and Dynamic focus procedures as often as necessary to optimize the projected image.

5.7 . . . . . Lens Focus / Adjustment Reference Table 5-1:

The following table will indicate the relationship in mounting configurations and lens focus adjustments. Using the following table, "look up" your particular installation. Note the adjustment locations indicated and follow procedure outlined in section 5.5.

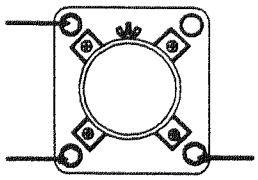
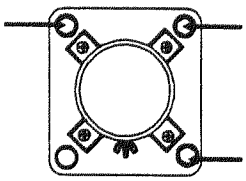
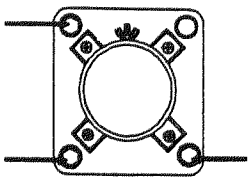
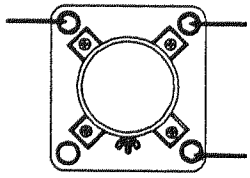
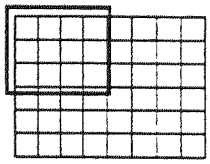
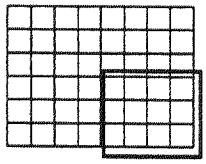
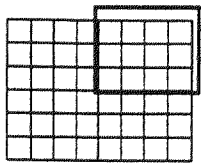
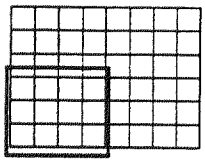
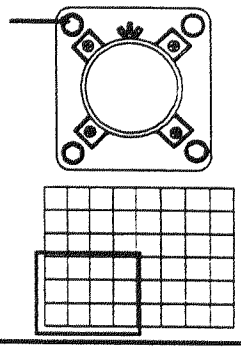
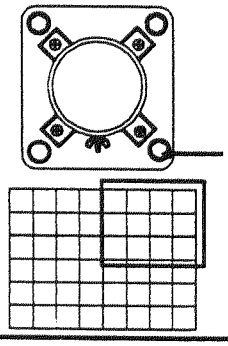
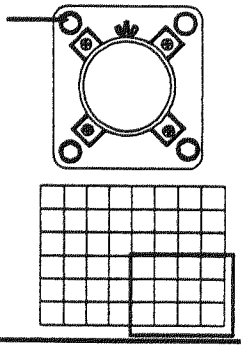
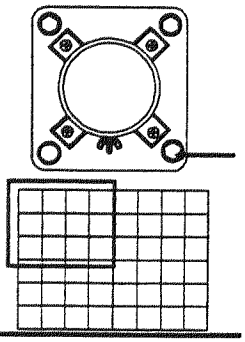
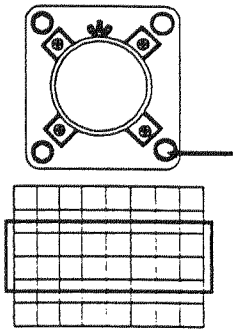
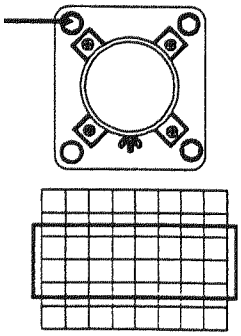
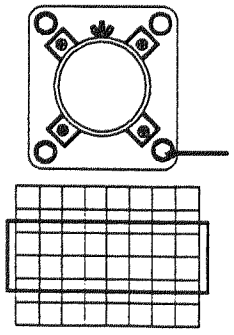
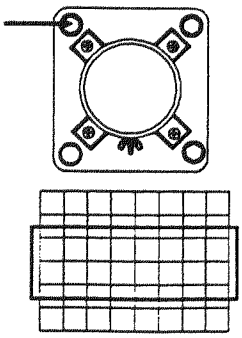
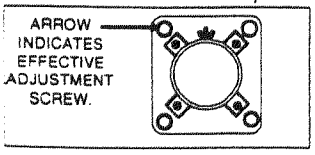
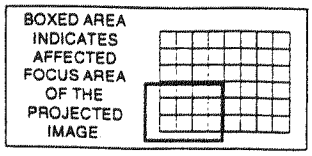
STEP	FRONT/TABLE	FRONT/CEILING	REAR/TABLE[1]	REAR/CEILING[1]
1. Tighten ALL three lens adjustments. Then turn (CCW) 3/4 of a turn.				
2. Adjust lens focus barrel(s) until the indicated corner of the projected image is optimized				
3. Adjust indicated screw to optimize corner focus of figure shown below.				
4. Adjust indicated screw to optimize focus from side to side of figure shown below.				

TABLE 5-1. LENS FOCUS/ADJUSTMENT REFERENCE TABLE.

NOTES:

1. [1]Rear screen reference of affected focus area is as viewed from the adjustment point; from the rear of the screen area.
2. Repeat above steps for all three colors.
3. Refer to section S2.2, steps 6, 7, and 8 for LENS/CRT positioning.





Section 6

Remote Control Summary / System Codes Summary / Quick Registration Guide

6.1 . . . . . .Remote Control Summary:

The hard-wired remote control unit incorporates a 16 X 2 LCD read-out which indicates the operation and diagnostics status of the system. The hard-wired remote comes standard with a cable length of 25ft. (7.6m), which can be extended in increments of 50ft. (15.2m) or 100ft. (30.5m).

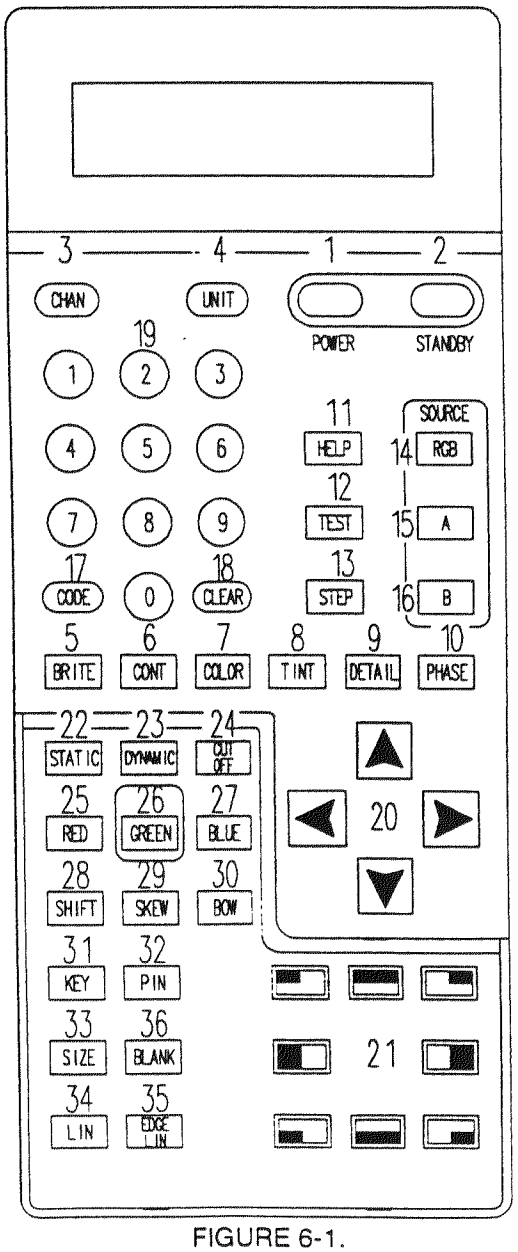


FIGURE 6-1.

NO.	BUTTON	DESCRIPTION
1	POWER	Toggles power On/Off.
2	STANDBY	Toggles the projected image On/Off.
3	CHANNEL	Inputs/selects channel designations.
4	UNIT	Inputs/selects unit numbers.
5	BRITE	Selects brightness function.
6	CONT	Selects contrast function.
7	COLOR	Selects color function.
8	TINT	Selects tint (hue) function.
9	DETAIL	Selects detail (peaking) function.
10	PHASE	Selects phase function.
11	HELP	Selects internal help mode of operation.
12	TEST	Toggles into/out of internal test mode of operation.
13	STEP	Cycles through test pattern selection. While in HELP, advances pages.
14	RGB	Selects RGB1 mode. Selects 62.5kHz internal test mode.
15	A	Selects optional mode (RGB2 or QVD2). Selects 31kHz test internal mode.
16	B	Selects optional mode (RGB3 or QVD1). Selects 15kHz internal test mode.
17	CODE	Inputs code (system commands) assignments.
18	CLEAR	Removes an incorrect entry. Reset functionality of arrow keys in HELP.
19	NUMERIC KEYS	Used to set/select channels, and percentage settings of image controls.
20	ARROWS	Used to adjust image and registration settings.
21	AREA KEYS	Quadrants or Edge selection.
22	STATIC	Selects the static registration functions.
23	DYNAMIC	Toggles between FINE or COURSE registration adjustment mode.
24	CUTOFF	Toggles selected color On/Off.
25	RED	Enables red only functions, i.e., Cutoff Red.
26	GREEN	Enables green only functions, i.e., Cutoff Green.
27	BLUE	Enables blue only functions, i.e., Cutoff Blue.
28	SHIFT	Enables shift functions.
29	SKEW	Enables skew functions.
30	BOW	Enables bow functions.
31	KEY	Enables keystone functions.
32	PIN	Enables pincushion functions.
33	SIZE	Enables size functions.
34	LIN	Enables linearity functions.
35	EDGELIN	Enables edge linearity functions, left or right only.
36	BLANK	Enables blanking, top, bottom, left or right.

6.2 . . . . . AMPRO 3300/4300 Code Summary:

CODE	FUNCTION	LCD READ-OUT : OPERATION
10	DISPLAY DAY/TIME[1]	DAY / 00:00 : Displays Day and time
11	SET TIME[1] OF DAY	ENTER TIME: Enter H:M: (Hour:Min.)
12	ENABLE TIMER	ALARM ENABLE : Enables the timer function
13	DISABLE TIMER	ALARM DISABLE : Disable the timer function
14	DISPLAY "ON" TIME[1]	TIME 00:00 : Displays the time set for auto-on operation.
15	SET TIMER "ON" TIME[1]	00:00 : Enter "auto-on" time
16	DISPLAY "OFF" TIME	TIME 00:00 : Displays the time set for auto-off operation
17	SET TIMER "OFF" TIME[1]	00:00 : Enter "auto-off" time
18	SET DATE (DAY)	IS TODAY MONDAY: Use the UP arrow to scroll through the days of the week and press [CODE] to select proper day.
19	SELECT 5 OR 7 DAY OPERATION (TOGGLE)	TIMER SETTINGS 5 DAYS SETTING (7 DAYS SETTING): Use the UP arrow to toggle between the two day setting modes and press [CODE] to select.
20	CHANNEL WRITE-PROTECT (TOGGLE)	CHANNEL WRITE PROTECT ON or OFF: Protects a channel from changes being made to channel of pre-set adjustments.
21	ACTIVATE "A.C.S." Automatic Convergence Scaling	LCD PROMPT: ACTIVATE ACS ARE YOU SURE? Press **[CODE]** for *YES*, any other key for *NO*. Automatically searches through the pre-set "validated" channel table and copies the channel that matches the active channel signal parameters (within ± 30Hz- Horizontal and ± 3Hz.-Vertical). In the event that there are no validated channels lower or higher or no validated channels then the new channel, A.C.S. will respond with "NO VALIDATED DATA".
22	COPY CHANNEL "TO"[1]	COPY CHANNEL TO (ENTER 1-50): Copies the active channel settings into the desired channel.
23	COPY CHANNEL "FROM"[1]	COPY CHANNEL FROM (ENTER 1-50): Copies channel settings from the selected channel into the active channel.
24	VALIDATE CHANNEL	FREQ VALIDATED: This command is used to confirm that a channel has been set and adjusted. Once validated, this command writes the channel's horizontal and vertical frequency into a "look-up" table for the A.C.S. command (21 CODE) and A.S.M. (see below) to use. If a channel has not been validated, it can not be used with the A.C.S. or A.S.M. command. NOTE; 24 CODE additionally activates the channel write-protect command - 20 CODE.
25	TEST CHANNEL FOR VALIDATION	Displays the frequency validated (stored) within the selected channel location. **NOTE**; if the channel has not been validated a "NOT VALIDATED" message will be displayed on the LCD.
26	DISPLAY SYSTEM / CHANNEL / INFO PAGES	Once activated, the system will display four (4) informational pages which include data on channel setup, timer enabled / disabled, internal temperature, etc.
27	ACTIVATE AUTO-SEARCH MODE "A.S.M." (TOGGLE)	AUTO SEARCH ON: This command allows the system to constantly monitor the incoming signal for changes. If a change is detected, such as the horizontal and/or vertical frequency, the system uses the table of validated channels and automatically re-configures the channel parameters for the best possible display. Helpful when changing between video modes (VGA - SVGA) from a signal source. Works in all modes of operation.
28	COPY CHANNEL "ALL"	LCD PROMPT: COPY CHAN ALL ARE YOU SURE?: Press **[CODE]** for *YES* or any other key for *NO*. Copies the active channel into ALL 50 channel locations.
29	CLEAR ACTIVE CHANNEL	LCD PROMPT: CLEAR CHAN ARE YOU SURE?: Press **[CODE]** for *YES* or any other key for *NO*. Clears or nulls all settings of the active channel location.
30	DISPLAY DIAGNOSTICS	ENABLES ERROR DIAGNOSTICS: Display all appropriate error messages or simply "SYSTEM OK".
31	DISPLAY "TOT"	Displays the "Total Operating Time" in, DAYS:HOURS:MINUTES
32	DISPLAY CRT TIME	Displays the CRTs total elapsed time in, DAYS:HOURS:MINUTES
33	DISPLAY ORIENTATION	Displays the projection mode, i.e., Floor Mount / Front Projection
34	DISPLAY BOARD STATUS	Displays the available input modules installed.
35	DISPLAY ROM REVISION AND SERIAL NUMBER	Displays the current revision level of the operating system and the serial number of the system..
36	DISPLAY FREQ COUNTER	Displays the horizontal scan rate and vertical period of the incoming signal for the active channel.

6.2 . . . . . AMPRO 3300/4300 Code Summary: (continued)

CODE	FUNCTION	LCD READ-OUT : OPERATION
37	ENABLE EXECUTIVE MODE	EXEC MODE ON: This command limits the operation of the system to; Power, Standby, and 8 channel selections.
38	DISPLAY HV RESET COUNT	Displays the number of times high voltage has cycled on and off.
39	DISPLAY INTERNAL TEMPERATURE	"xxx C": On the first line of the read-out is displayed the system temperature and on the second line, the power supply temperature.
40	ADJUST RVS	Activates the Red Static Vertical Shift operation. RVS must be performed with registration "off".
41	ADJUST BVS	Activates the Blue Static Vertical Shift operation. BVS must be performed with registration "off".
42	ADJUST LCD BACK LIGHT	LCD PROMPT: ENTER LITE LEVEL: Enter 0 (off) through 4 (max.).
43	TEST REMOTE CONTROL	Test/verify remote control LCD operation.
44	READ SWITCHES	Reads/displays settings of the baud rate and address switches.
45	DISABLE REG. KEYS	KEYS DISABLED: This command allows the user to lock-out the convergence keys.
46	ENABLE REG. KEYS	KEYS ENABLED: Activates keys placed inactive by 45 CODE.
47	ENABLE GUIDED REG.	Enters the complete guided registration mode of operation. Use CODE to exit at any time.
48	TOGGLE BLACK LEVEL CLAMP POINT	Toggle the black level clamp point from "back-porch" to "sync-tip" mode of operation on a channel- by-channel basis. System will default to "back-porch" clamping.
49	TOGGLE MONOCHROME	MONOCHROME MODE or COLOR RESTORED: Turns the color level on or off (Video Mode Only).
50	N-S CORNER PINCUSHION	N-S CORNER PIN : Special corner pincushion.
55	TOGGLE REGISTRATION ON/OFF	REGISTRATION ON or REGISTRATION OFF: Turns registration off when performing the mechanical (STATIC) alignments and turn registration on when performing the dynamic alignment functions.
70	UPDATE MODULE STATUS	Use this command in conjunction with Supplement 5 when adding or removing an input module.
77	INITIALIZE INTERNAL TEST / HELP SCREENS	Used to establish screen parameters for the internal test and help screens.
79	RESET INTERNAL SCREENS	Used to reset the test and help screens settings to factory preset conditions for brightness, contrast, size, etc..
90	DISABLE HDTV (HD3300)	Used to disable the HDTV mode of operation.
91	ENABLE HDTV (HD3300)	Used to enable the HDTV mode of operation.
92	ENABLE INTENSITY MODULATION (Optional)	Used to activate the intensity modulation mode of operation. Acts as an intensity modulation key.
93	CLEAR INTENSITY SETTINGS (Optional)	LCD PROMPT: NULL INTENSITY ARE YOU SURE? Enter **[CODE]** for *YES* or any other key for *NO*. This code will reset intensity modulation settings to 50%.
94	ENABLE SUB-CONTRAST ADJUST MODE	This command will re-map some of the remote control keys and enable the user to adjust for individual contrast level. Which may be adjusted for each channel location.
95	ENABLE SUB-BRITE ADJUST MODE	This command is like the above command accept it will enable the user to adjust for individual brightness levels.
96	SELECT COLOR TEMPERATURE	This command will enable you to choose between three factory preset values for color temperatures. See Appendix B for more information on setting and selecting color temperatures.
97	GAMMA CORRECTION ON/OFF (TOGGLE) (Optional)	GAMMA ON or OFF. This internal optional feature corrects for the inherent non-linearity between the incoming signal (source) and the output of the CRT (light output).
98	ENABLE STATIC FOCUS	SELECT COLOR: Enables the static focus control which provides an overall focus adjustment (primarily center) for individual color and channel locations.
99	ENABLE DYNAMIC FOCUS	SELECT COLOR: Enables the dynamic focus control which provides for a side-to-side and top-to-bottom focus for individual color and channel location.
900	DISABLE QUIET MODE	Disables the quiet mode of operation and returns the system back to its normal communication mode of operation.
901	ENABLE QUIET MODE	Enables the quiet mode of operation and disables the normal "remote messages" .
909	DISABLE EXECUTIVE MODE	EXEC MODE OFF: Exits the executive mode of operation and resumes normal (full) remote control operation.

6.3 . . . . . Internal Help Menus:

Incorporated in the AMPRO Display Systems are several on-board help menus. The internal menus are provided to inform and guide you through the operation and set-up of the system. To enable the internal help system, simply press [HELP] and select one of the five topics shown on the main menu.

6.3.1 . . . . . .Main Menu Index

The main menu is provide to select one of the following subjects; (see Figure 6-2).

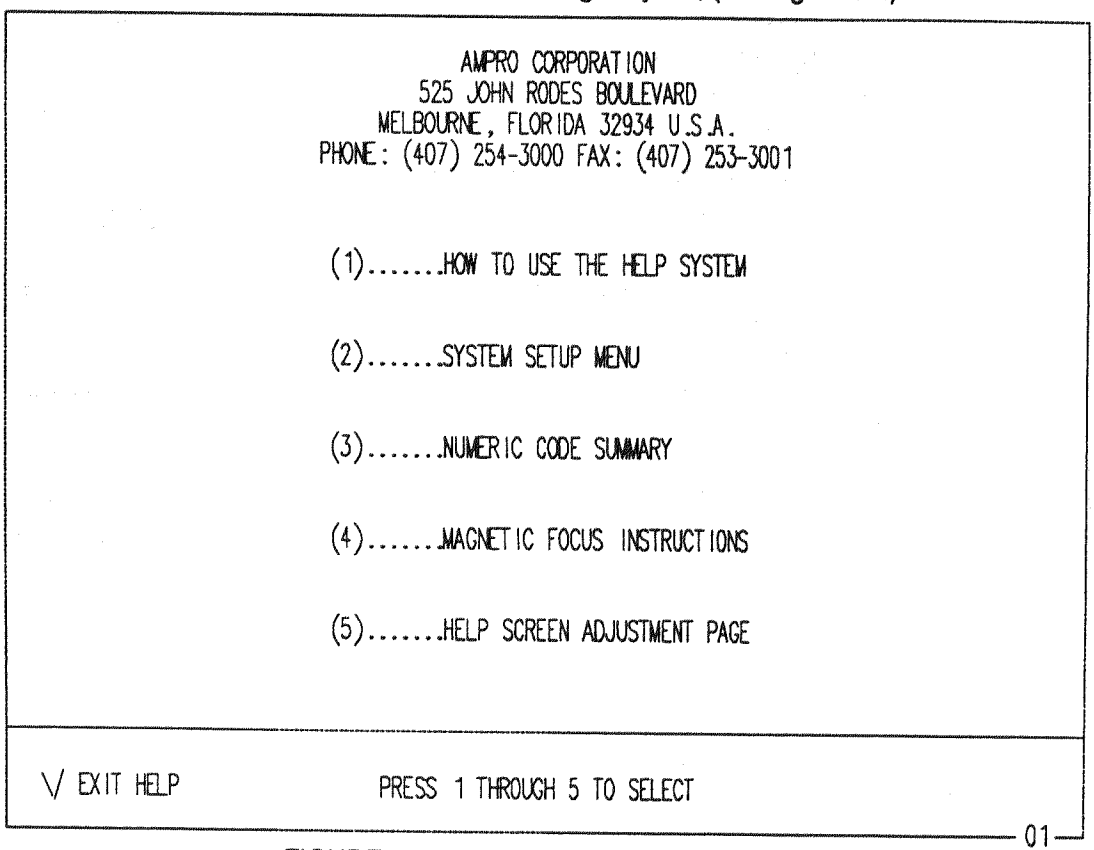


FIGURE 6-2. HELP SCREEN - MAIN MENU.

- (1) HOW TO USE THE HELP SYSTEM: This selection provides the basic instructions on how to use the help system, the active keys while in help, e.t.c...
- (2) SYSTEM SETUP MENU: This selection will provide an additional menu for the selections of the various setup programs.
- (3) NUMERIC CODE SUMMARY: This selection will provide two on-screen pages for a quick reference of the internal code commands.
- (4) MAGNETIC FOCUS INSTRUCTIONS: The magnetic focus pages provides on-screen instruction on how to best set-up or perform the STATIC and DYNAMIC focus procedures.
- (5) HELP SCREEN ADJUSTEMENT PAGE: This screen is required to perform the image quality adjustments, i.e., brightness, contrast, phase, blanking and green geomerty. All adjustments are made using the random setup mode.

6.3.2 . . . . Internal Help System Flow Chart 1: Main Menu Selections:

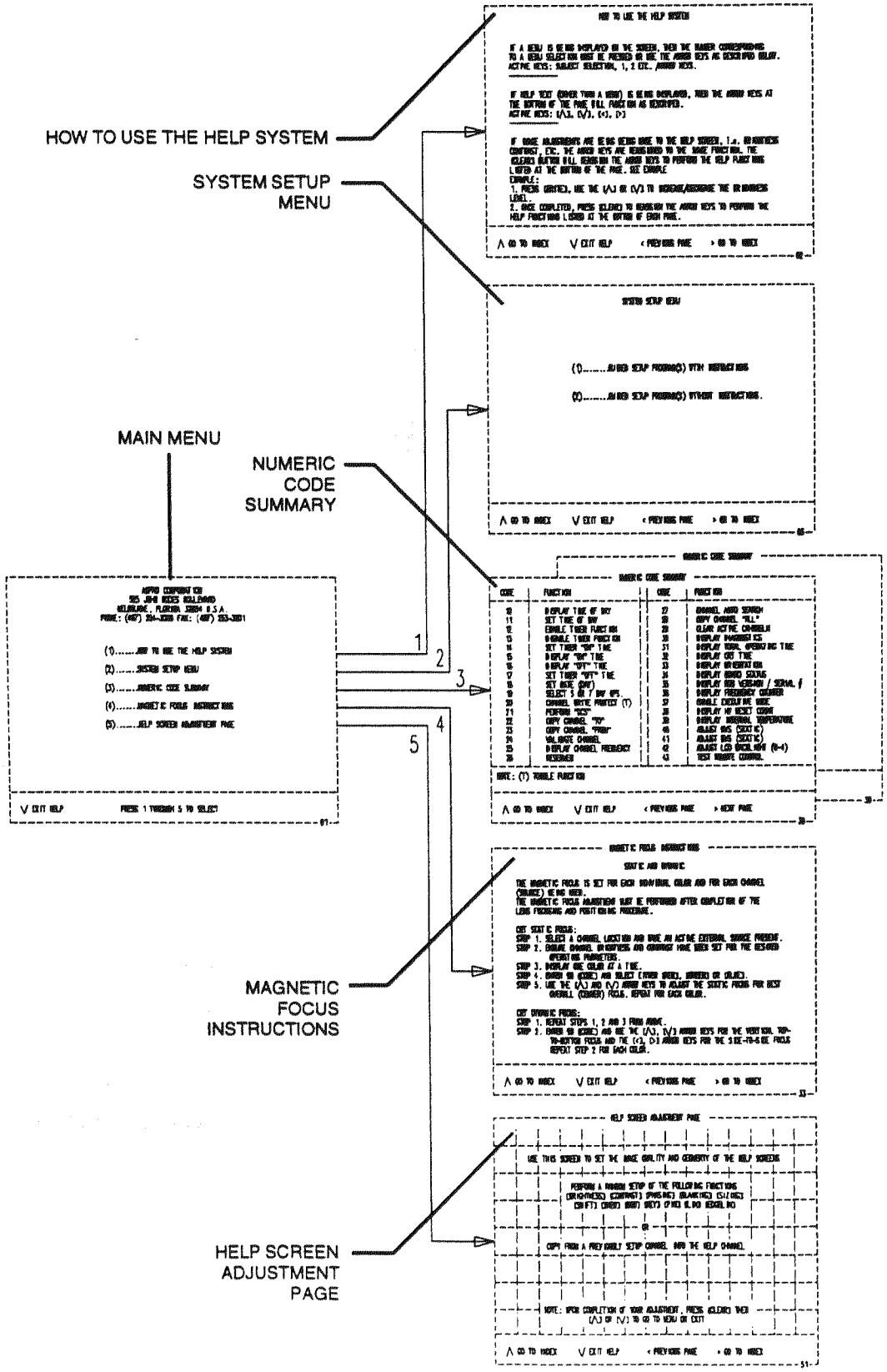
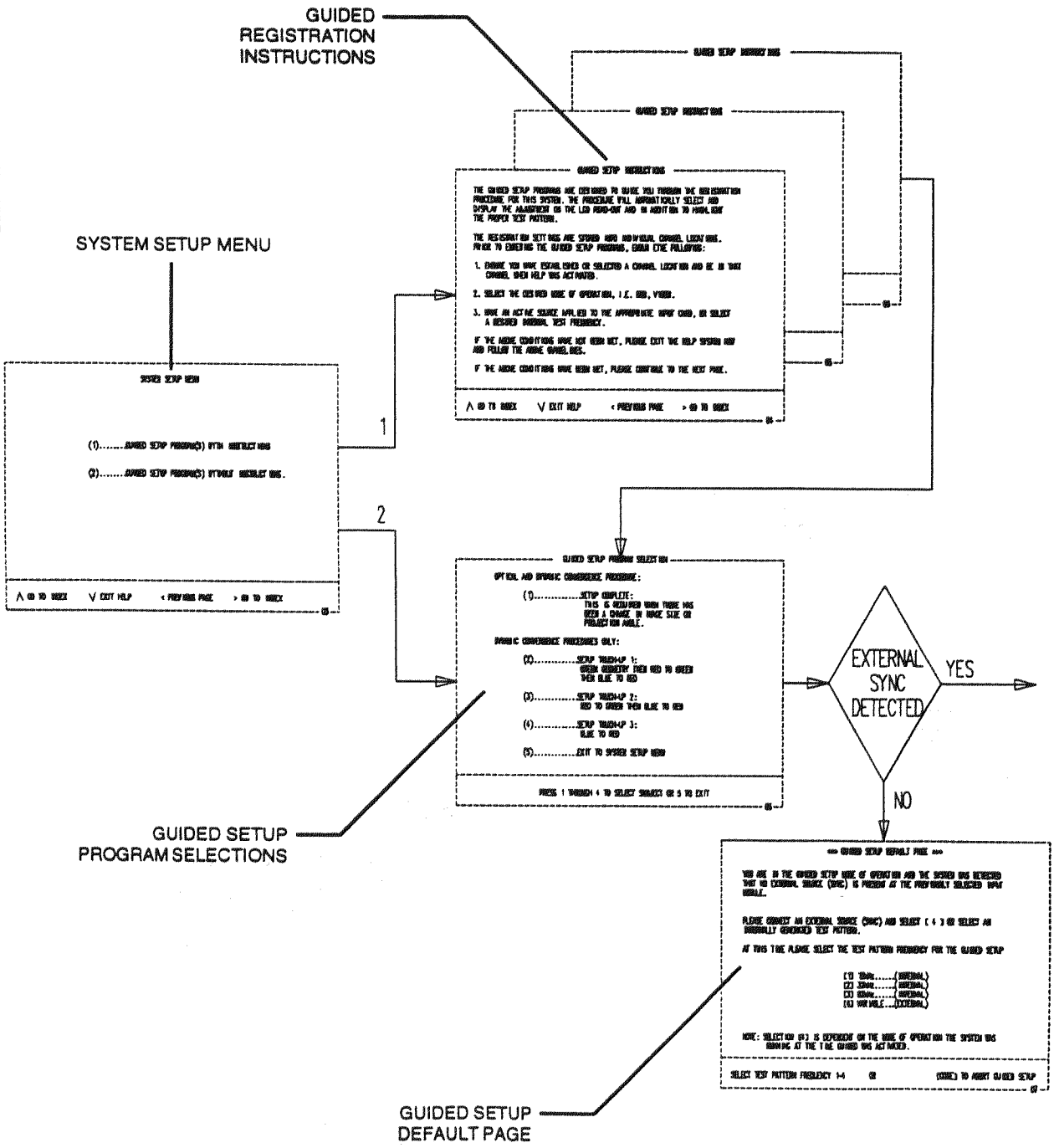
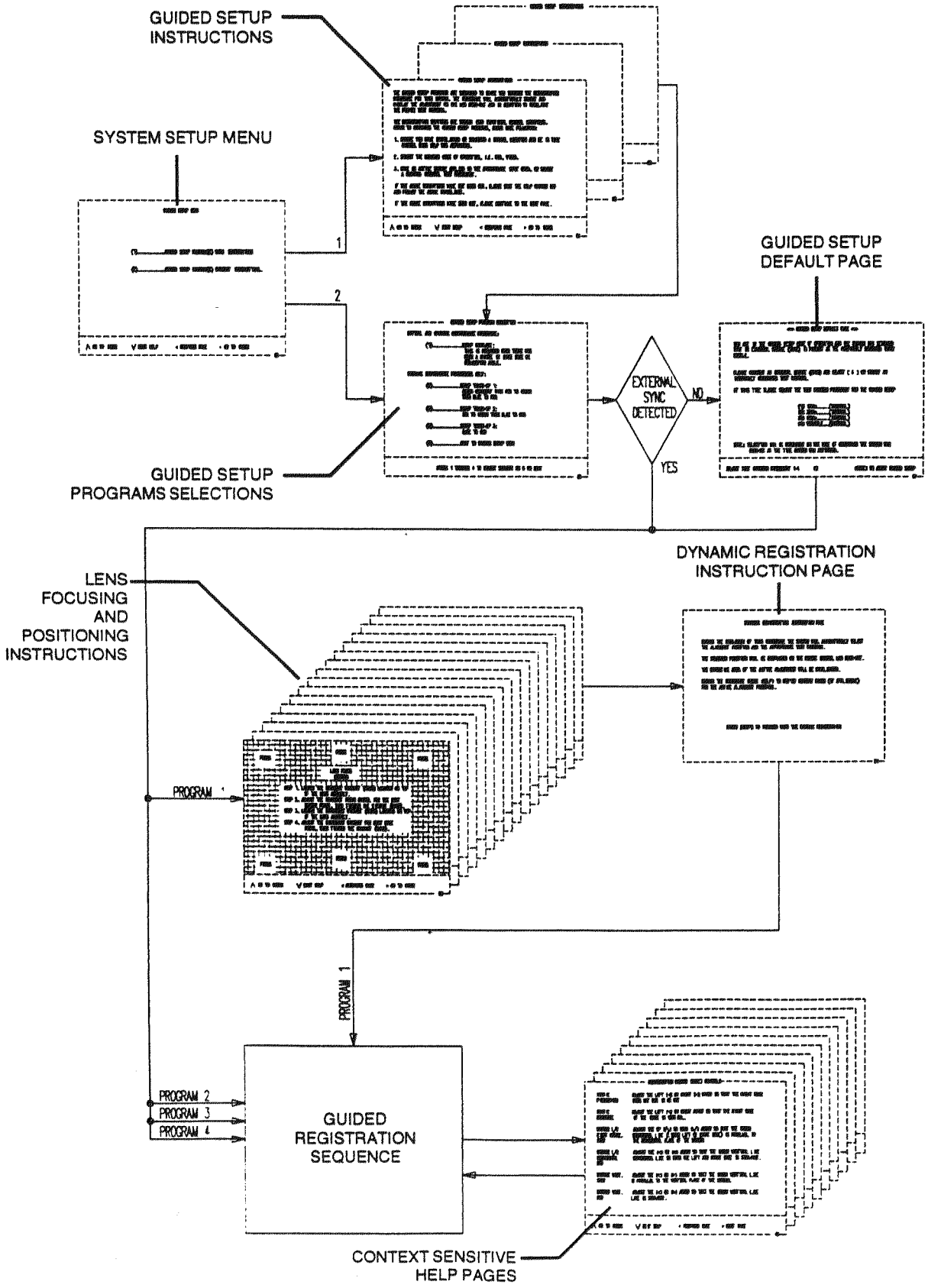


FIGURE 6-3. HELP FLOW 1.

6.3.3 . . . . Internal Help System Flow Chart 2: System Set-up Menu:



6.3.4 . . . . Internal Help System Flow Chart 3: Guided Set-up Programs:



6.4 . . . . . Registration as a Channel Parameter:

All registration functions are handled as individual channel parameters. This will allow you to precisely set each individual source for optimum registration. To perform a random setup of a new, or modify an existing channel location, the following conditions must exist prior to building or changing parameters of a channel.

- STEP 1. Select the channel you wish to adjust, i.e., **[1] [CHAN], [2] [CHAN], [3] [CHAN]** etc.
- STEP 2. For building a new channel, select the appropriate mode of operation, i.e., RGB, VIDEO etc.
- STEP 3. If the channel had been previously built and write-protected, enter **[20] [CODE]** to toggle the write- protect "OFF" , this will allow you to make the adjustments you want to make.
- STEP 4. Set channel parameters such as brightness, contrast, blanking and phasing prior to performing channel registration. If the internally generated/external sync test mode is to be used, set brightness and contrast to ≈ 70/50 respectfully.
- STEP 5. Select the test function method, i.e. Internal Test/Internal Sync or Internal Test/External Sync or an independent test pattern externally generated applied to the appropriate card (slot).
- STEP 6. Perform the necessary changes or setup as outlined in Sections 8.4.1.1 and 8.4.1.2, or use one of the copy channel commands, or the "A.C.S." command, refer to Section 6.
- NOTE: If the sweep reversal procedure(s) have been performed, it may be necessary (or easier) to perform a "null" channel command.....29 **[CODE]**.

6.4.1 .....FACTORY ALIGNED CHANNEL SETTINGS

To provide a quick start with your registration alignment and channel settings, several Video/RGB formats have been pre-aligned at the factory. All pre-aligned channels are based on a 60in.(H) x 80in. (W) screen size and have been validated and write-protected (24 [CODE]). You can use these pre-aligned channels with the various copy channel commands, such as "Activate A.C.S." or the copy "TO" and "FROM" commands.

CHANNEL	MODE	CHANNEL	MODE	CHANNEL	MODE	CHANNEL	MODE
1 - 39 and 48	RGB (31.5kHz)	42	Optional Input	44	RGB (15kHz)	47	RGB (54kHz)
40	Optional Input	43	RGB (90kHz)	45	RGB (80kHz)	49	RGB (21kHz)
41	Optional Input	44	RGB (86kHz)	46	RGB (64kHz)	50	Video (NTSC)

6.4.2 .....AUTOMATIC CONVERGENCE SCALING (A.C.S.):

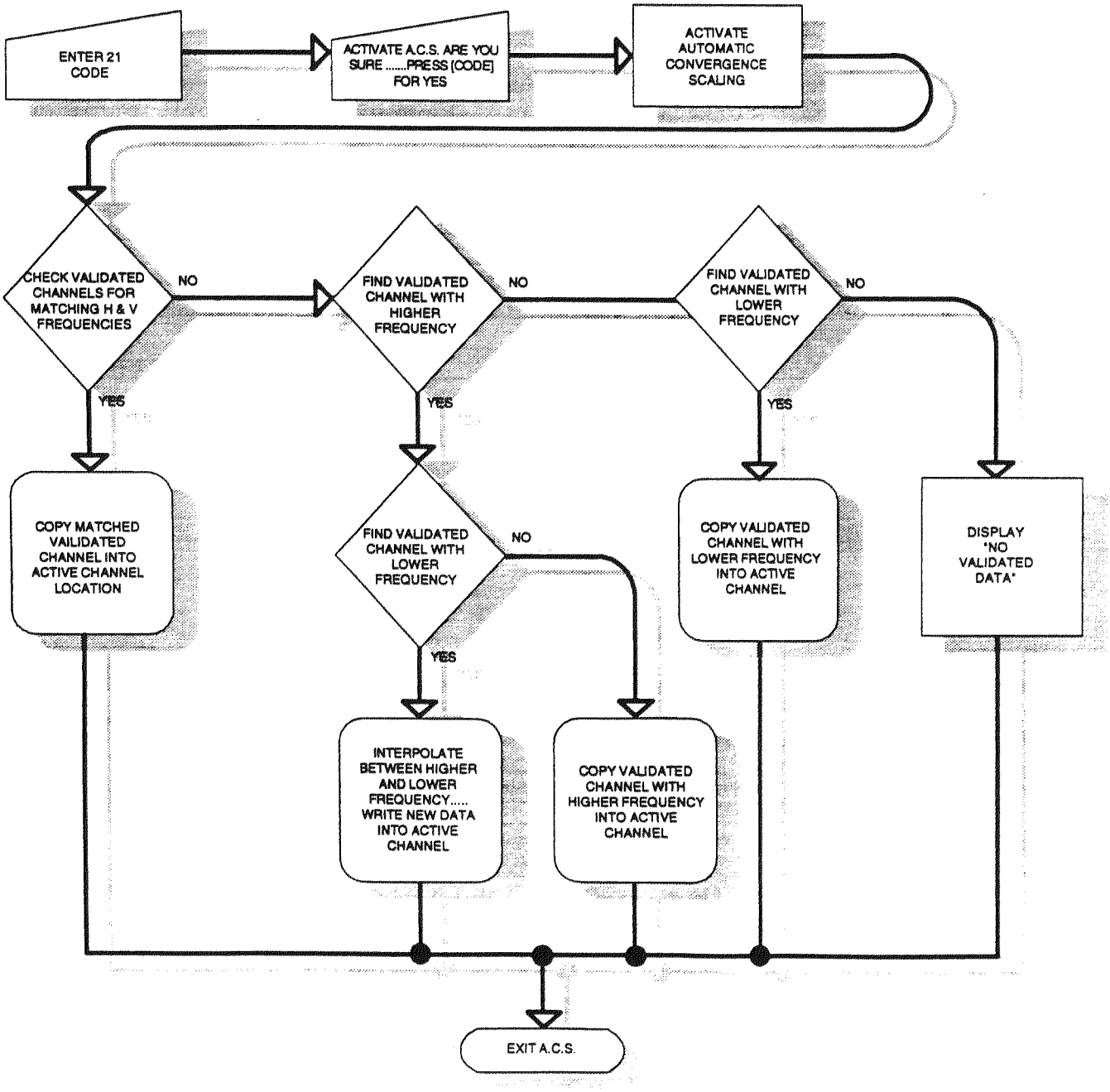
A.C.S. provides the display system with the ability to calculate registration settings for a new channel setup by interpolating between existing data of higher "validated channels"[1] and lower validated channels.

A.C.S. fist scans the table of validated channels for a matching horizontal and vertical frequencies of the new source. If a match exist, A.C.S. will copy the matched channel data into the new channel location. If no matches exist, then A.C.S. uses the horizontal frequency of validated channels directly lower and higher than the new or present channel to interpolate the new setup data. In the event that the table of validated channels contains more than one validated channel with the same horizontal frequency, A.C.S. will then reference the vertical frequency of the new source against the vertical frequency of the validated channels to decide on the best channel to use. If no matches or higher/lower validated channels exist, A.C.S. will display "NO VALIDATED DATA. See flow chart opposite page. NOTE: The greater the number of validated channels, the more accurate A.C.S. will work.

[1]Validated Channels; are channels that has been previously setup and saved by using **24 [CODE]**.

6.4.3 . . . . Using A.C.S.:

To use the A.C.S., establish or select a new channel location, i.e. 5 [CHAN], select mode of operation, connect your source to the appropriate input video model and enter 21 [CODE], activate A.C.S.. Once the translation is completed, you may be required to fine tune the registration by performing a random or guided setup. See flow chart below.



6.5 . . . . . Fundamental Registration Guide:

Registration Procedures:

The registration of the system (channel) can be divided into four basis stages in the following order; ① Focus and Positioning of the lenses ② Sizing and optimizing the geometry of the GREEN image ③ Aligning the RED image to exactly overlay the GREEN image and ④ Aligning the BLUE image to exactly overlay the RED image. To accomplish a random setup of a new or existing channel location, perform the following operation;

IMPORTANT: Allow the system to run and stabilize for approximately 15 minutes before performing any adjustments.

6

Pre-adjustment Requirements	
KEYSTROKE(S)	FUNCTION
[nn], [CHAN]	SELECTS DESIRED CHANNEL TO SETUP OR MODIFY
[RGB], OR [B], OR [A]	SELECTS DESIRED CHANNEL MODE OF OPERATION
[1] OR [2] OR [3]OR [4] [TEST]	[1]SELECTS DESIRED TEST MODE FOR SETUP
[1]NOTE: TO ACHIEVE THE MOST ACCURATE SETUP, IT IS RECOMMENDED TO HAVE AN ACTIVE SOURCE APPLIED TO THE ABOVE SELECTED INPUT MODULE AND USE THE [4] [TEST] MODE FOR YOUR SETUP.	

Green Geometry Adjustments			
KEYSTROKES	ADJUST	FUNCTION	PATTERN
[STATIC] [SIZE]	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL PROPER HEIGHT AND WIDTH IS ACHIEVED.	EXTERNAL VIDEO SIGNAL
[STATIC] [SHIFT]	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE IMAGE IS VERTICALLY AND HORIZONTALLY CENTERED ON THE SCREEN (DO NOT OVER-SCAN THE CRT).	
[PHASE]	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE IMAGE IS VERTICALLY AND HORIZONTALLY CENTERED ON THE SCREEN (DO NOT OVER-SCAN THE CRT).	
[BLANKING] 	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE ACTIVE VIDEO IS VISIBLE OR TO CUTOFF ANY UNWANTED VIDEO IN THE TOP, BOTTOM LEFT AND RIGHT EDGES OF THE VIDEO IMAGE.	
[STATIC] [LIN]	[⇑] [⇓]	**"REGISTRATION OFF"** ADJUST UNTIL THE SQUARES FROM TOP TO BOTTOM ARE EQUAL IN HEIGHT.	CROSSHATCH
[STATIC] [SHIFT]	[⇑] [⇓] [⇐] [⇒]	REPEAT SHIFT OPERATIONS.	EXTERNAL VIDEO SIGNAL
[STATIC] [PIN]	[⇐] [⇒]	**"REGISTRATION OFF"** ADJUST UNTIL THE RIGHT EDGE DOES NOT BOW IN OR OUT	CROSSHATCH
[STATIC] [KEY]	[⇐] [⇒]	**"REGISTRATION OFF"** ADJUST UNTIL THE RIGHT EDGE IS PARALLEL TO THE VERTICAL PLANE OF THE SCREEN.	
[STATIC] [SIZE]	[⇑] [⇓] [⇐] [⇒]	REPEAT SIZE OPERATIONS	EXTERNAL VIDEO SIGNAL
[GREEN] [SKEW]	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE CENTER HORIZONTAL AND VERTICAL LINE IS PARALLEL TO THE HORIZONTAL / VERTICAL PLANE OF THE SCREEN	CROSSHAIR
[GREEN] [BOW] 	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE CENTER HORIZONTAL AND VERTICAL LINE IS STRAIGHT AND DOES NOT BOW UP/DOWN OR LEFT/RIGHT.	CROSSHAIR

6.5 . . . . . Fundamental Registration Guide: (continued)

Green Geometry Adjustments (continued)			
KEYSTROKES	ADJUST	FUNCTION	PATTERN
[GREEN] [PIN] 	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE TOP/BOTTOM HORIZONTAL LINE DOES NOT BOW UP OR DOWN AND THE OUTERMOST LEFT/RIGHT VERTICAL LINES DO NOT BOW IN OR OUT	CROSSHATCH
[GREEN] KEY] 	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE TOP/BOTTOM HORIZONTAL LINES AND THE OUTERMOST LEFT/RIGHT VERTICAL LINES ARE PARALLEL TO THE SCREEN	
[5] [0] [CODE] (N-S CORNER PIN)	[⇑] [⇓]	**"REGISTRATION ON"** : N-S CORNER PINCUSHION: OBSERVE THE UPPER LEFT/RIGHT AND LOWER LEFT/RIGHT CORNERS. USING THE UP AND DOWN ARROW KEYS, ADJUST UNTIL THE CORNERS OF THE PROJECTED IMAGE APPEAR TO BE STRAIGHT AND FLAT OR PRODUCES A GEOMETRICAL PINCUSHION, THEN READJUST USING THE [STATIC] [PIN] FUNCTION TO STRAIGHT THE TOP AND BOTTOM EDGES.	
Green, Red and Blue Adjustments			
[1,2][GREEN] [RED] [BLUE] [SHIFT]	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE CENTER HORIZONTAL LINE AND VERTICAL LINE EXACTLY OVERLAYS THE REFERENCE COLOR.	CROSSHAIR
[GREEN] [RED] [BLUE] [SKEW]	[⇐] [⇒]	ADJUST UNTIL THE CENTER VERTICAL LINE EXACTLY OVERLAYS THE REFERENCE COLOR.	
[GREEN] [RED] [BLUE] [BOW] 	[⇐] [⇒]	ADJUST UNTIL THE CENTER VERTICAL LINE IS STRAIGHT AND OVERLAYS THE REFERENCE COLOR	
[GREEN] [RED] [BLUE] [SKEW] 	[⇑] [⇓]	ADJUST UNTIL THE CENTER HORIZONTAL LINE IS STRAIGHT AND OVERLAYS THE REFERENCE COLOR IN EACH EDGE.	
[GREEN] [RED] [BLUE] [SIZE] 	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE TOP/BOTTOM INNER 2/3 OVERLAYS THE REFERENCE COLOR AND ADJUST UNTIL THE LEFT/RIGHT INNER 2/3 OVERLAYS THE REFERENCE COLOR.	CROSSHATCH
[GREEN] [RED] [BLUE] [LIN] 	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE TOP/BOTTOM, LEFT/RIGHT EDGES OVERLAY THE REFERENCE COLOR.	
[GREEN] [RED] [BLUE] [EDGELIN] 	[⇐] [⇒]	ADJUST UNTIL THE OUTER MOST LEFT/RIGHT EDGES EXACTLY OVERLAY THE REFERENCE COLOR	
[GREEN] [RED] [BLUE] [PIN] 	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE TOP/BOTTOM HORIZONTAL, OR THE OUTER MOST LEFT/RIGHT VERTICAL LINES DO NOT BOW UP/DOWN, LEFT/RIGHT AND OVERLAY THE REFERENCE COLOR IS THEIR RESPECTIVE CORNERS.	
[GREEN] [RED] [BLUE] [KEY] 	[⇑] [⇓] [⇐] [⇒]	ADJUST UNTIL THE TOP/BOTTOM OUTER MOST HORIZONTAL AND THE OUTER MOST VERTICAL LINES ARE STRAIGHT AND OVERLAY THE REFERENCE COLOR IN THEIR RESPECTIVE CORNERS.	
[1]NOTE: [GREEN] OR [RED] OR [BLUE] NEED ONLY BE PRESSED ONCE, UNLESS ANOTHER COLOR KEY IS PRESSED.			
[2]NOTE: ADJUSTMENTS BEING MADE TO THE GREEN IMAGE WILL SIMULTANEOUSLY EFFECT RED AND BLUE.			

NOTES:

Section 7

RS- 232C Interface Data

7.1 .....General:

The AMPRO 3300/4300 Series Display Systems, features duplex RS232C communication network capability. The projectors can be controlled from a remote, a computer or a third party controller using RS-232C and ASCII characters. Display systems can be looped together so that multiple display systems and switchers can be addressed and controlled by one central source. Refer to Figure 7-1 for network configuration example.

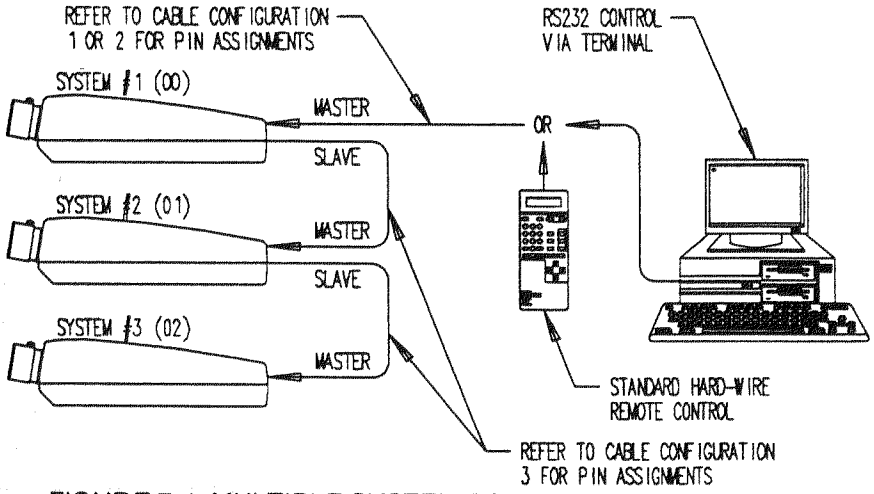


FIGURE 7-1. MULTIPLE SYSTEM CONTROL CONFIGURATION.

7.2 .....Hexadecimal Switch Configurations:

The 3300/4300 systems have two hexadecimal rotary switches and an 8 switch DIP located on the CPU module, Figure 7- 2, and are accessed by lifting the top cover assembly. The switches are labeled SW1, SW2 and SW3. The two rotary swicthes closest to the rear panel, (SW1 and SW2), are used to assign the individual projector number to each system installed within a network of projectors. Refer to table 7-1 for setting SW1 and SW2. The third switch from the rear panel is SW3 (8 switch DIP), position 7 and 8 are used to set the communication baud rate and position 2 (SW3) will either enable or disable the handshaking, the standard wired remote control does not required handshaking acknowledgment. See Table 7-2 for baud rate settings.

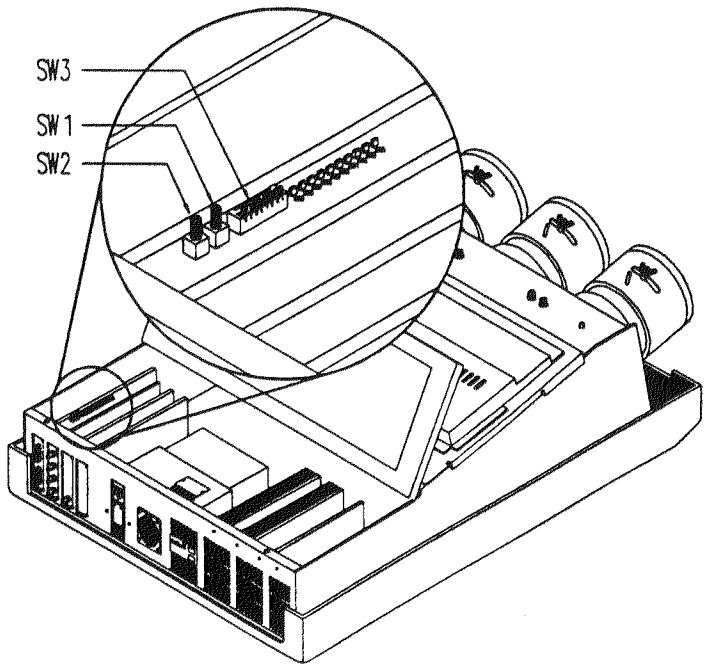


FIGURE 7-2. SW1, SW2, SW3 LOCATIONS (3300 SHOWN).

7.2.1 . . . . Address Switches SW1 and SW2:

As mentioned previously, SW1 (MSB) and SW2 (LSB) are used to assign the individual unit number, which is required when using one or multiple systems. In a singular system configuration or a multiple system network, the first unit address switches must be set at 0 (SW1) and 0 (SW2). Refer to Table 7-1 for multiple system numbering.

☐ NOTE 1: To determine the presently active unit, simply press the [UNIT] button.

☐ NOTE 2: Table 7-1 shows a 32 unit numbering sequence out of a maximum of 256 systems. Refer to a decimal-to-hexadecimal conversion chart for higher hexadecimal equivalents.

NETWORKING ON/OFF: On the CPU module, ensure SW3, switch 1 is set to the "ON" position when networking multiple systems, otherwise, SW3-1 should be left in the "OFF" position.

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UNIT NUMBER	POSITION		UNIT NUMBER	POSITION		UNIT NUMBER	POSITION		UNIT NUMBER	POSITION	
	SW 1	SW2		SW 1	SW2		SW 1	SW2		SW 1	SW2
1	0	0	9	0	8	17	1	0	25	1	8
2	0	1	10	0	9	18	1	1	26	1	9
3	0	2	11	0	A	19	1	2	27	1	A
4	0	3	12	0	B	20	1	3	28	1	B
5	0	4	13	0	C	21	1	4	29	1	C
6	0	5	14	0	D	22	1	5	30	1	D
7	0	6	15	0	E	23	1	6	31	1	E
8	0	7	16	0	F	24	1	7	32	1	F

TABLE 7-1

7.2.2 . . . . . .Baud Rate Switches SW3 positions 7 and 8 Configuration:

The table below shows the projector's (CPU) baud rate switch(es) settings for a variety of baud rates. Under normal conditions, CPU and the remote control should always be set to communicate at the baud rate value, factory settings is 9600, handsaking disabled. However, limitations of the overall RS-232 network, i.e., slower devices connected to the network or lengthy cabling may require that hte baud rate for the CPU and the remote control be reduced.

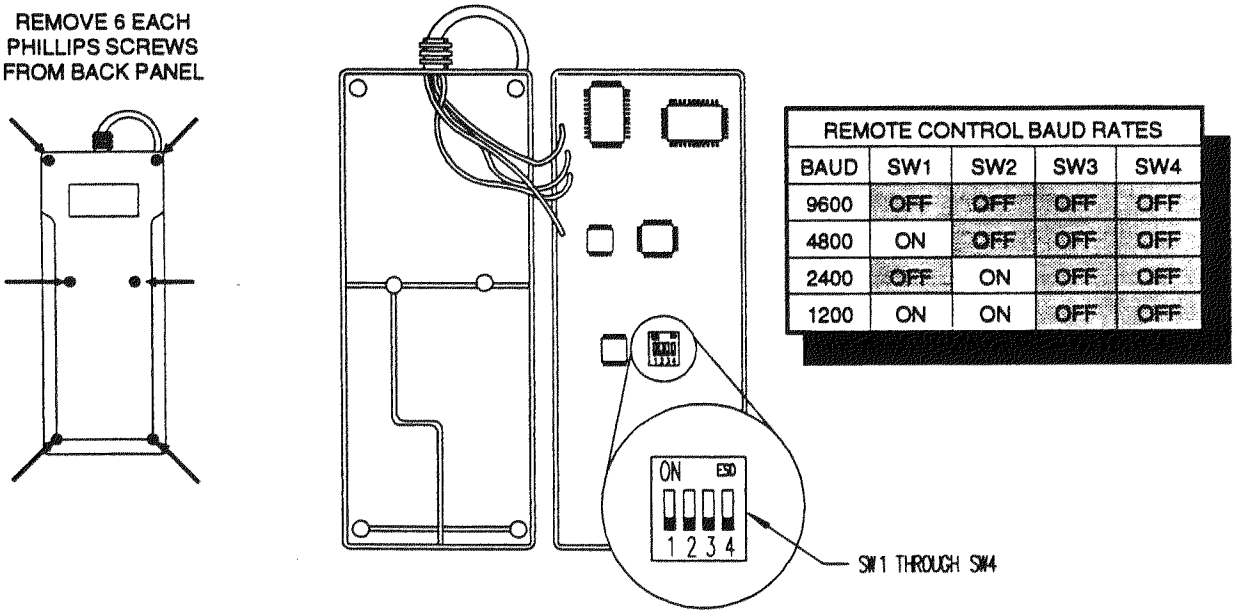
The top cover and the registration tray assemblies of the 3300, (top cover and rear fan cover for the 4300) system must be unlocked and tilted to gain access to the multi-purpose 8 position DIP switch SW3. SW3 position 7 and 8 will select the operating baud rate, and SW3 position 2 will select either hanshaking protocol enabled or disabled, See Figure 7-2. If the baud rate of the system (CPU) is changed, then the baud rate for the remote control must also be changed to matched that of the CPU. Refer to Table 7-2 for setting the baud rate of the display system and Section 7.2.3 for accessing and changing the baud rate for the standard wired remote control.

SYSTEM (CPU) BUAD RATES		
BAUD RATE	SW3-7	SW3-8
9600	OFF	OFF
4800	OFF	ON
2400	ON	OFF
1200	ON	ON

TABLE 7-2

7.2.3 . . . . Remote Control Baud Rate Reference Table:

The back cover of the wired remote control must be removed to access the remote control baud rate switches SW1 through SW4. These switches are housed in a 4 switch DIP package and are labeled 1 through 4, left-to-right. See Figure 7-3



REMOTE CONTROL BAUD RATES				
BAUD	SW1	SW2	SW3	SW4
9600	OFF	OFF	OFF	OFF
4800	ON	OFF	OFF	OFF
2400	OFF	ON	OFF	OFF
1200	ON	ON	OFF	OFF

FIGURE 7-3. REMOTE CONTROL BAUD RATE CONFIGURATION.

7.2.4 . . . . . Hardware Handshaking Protocol:

To acknowledge or establish communications between a terminal (host unit) and receiver (display system).

Located on the CPU module are two jumpers labeled LK2 and LK3. These jumpers are used for simulating the DTR - DSR handshaking signal. When using one system or in a multiple system configuration, LK2 and LK3 are installed in the individual unit or in the last unit of the network. See Figure 7-4 for location of LK2 and LK3.

One example of using LK2 and LK3 in a network is to ensure the integrity of the cabling between systems. With LK2/LK3 installed in the last system of the network and no handshake response is reflected to the host unit, this is seen as a cabling fault within the network.

NOTE: Refer to your particular host unit requirements for the proper LK2/LK3 configuration.

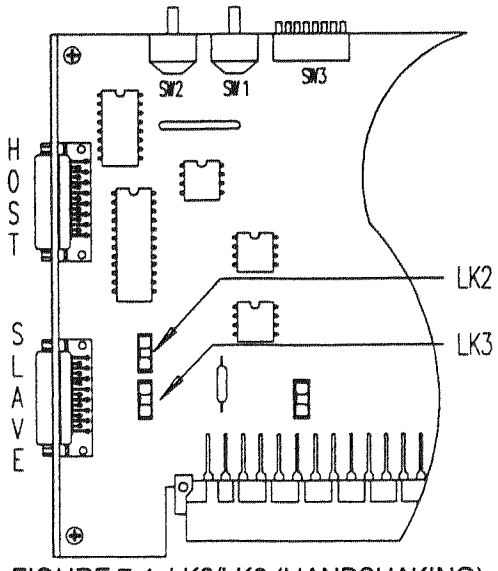


FIGURE 7-4. LK2/LK3 (HANDSHAKING).

7.3 . . . . . MASTER/SLAVE PORT AND RS-232C CABLE PIN ASSIGNMENTS:

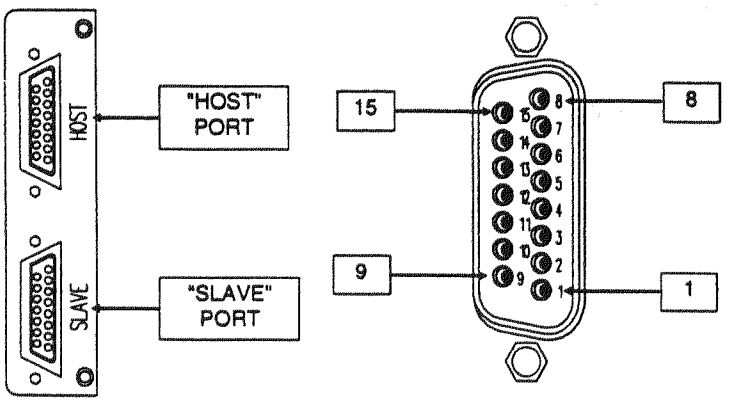


FIGURE 7-5.

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PIN	HOST	SLAVE	PIN	HOST	SLAVE
1	GND	GND	9	N/C	N/C
2	TXD	RXD	10	N/C	N/C
3	RXD	TXD	11	Vraw	N/C
4	RTS	CTS	12	Vraw	N/C
5	CTS	RTS	13	N/C	N/C
6	DTR	N/C	14	N/C	N/C
7	GND	GND	15	DSR	DSR
8	DCD	DCD			

TABLE 7-3

7.3.1 . . . . . CABLE CONFIGURATION 1: HOST TO PROJECTOR:

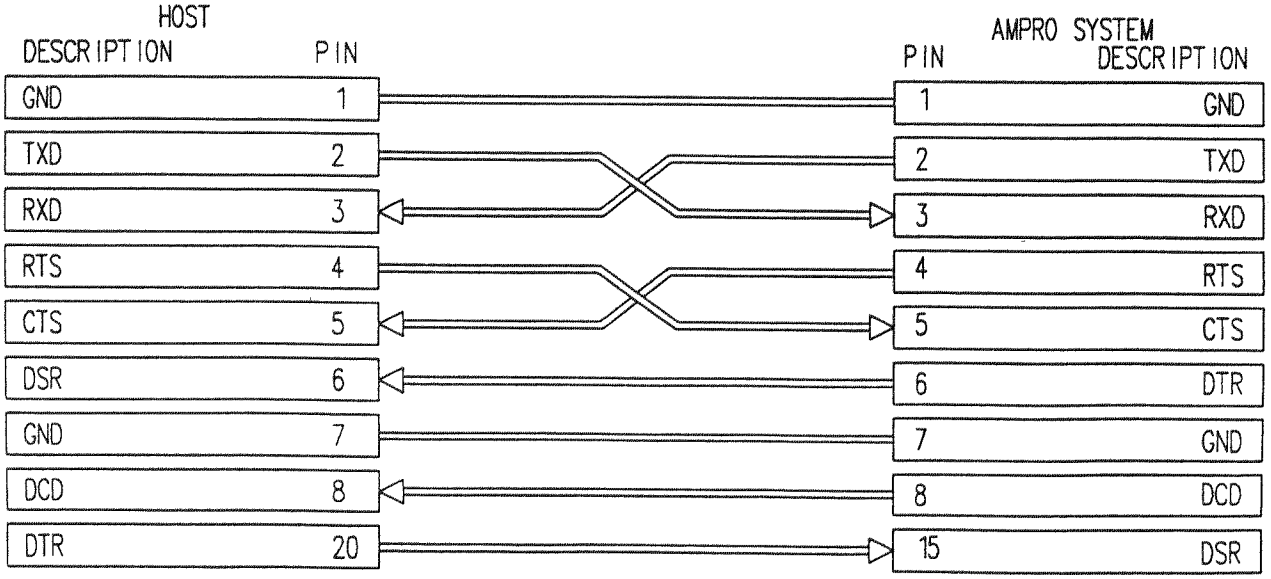

TABLE 7-4. DB25 (HOST) TO DB15 (PROJECTOR) CABLE.

7.3.2 . . . . CABLE CONFIGURATION 2: IBM® PC TO PROJECTOR:

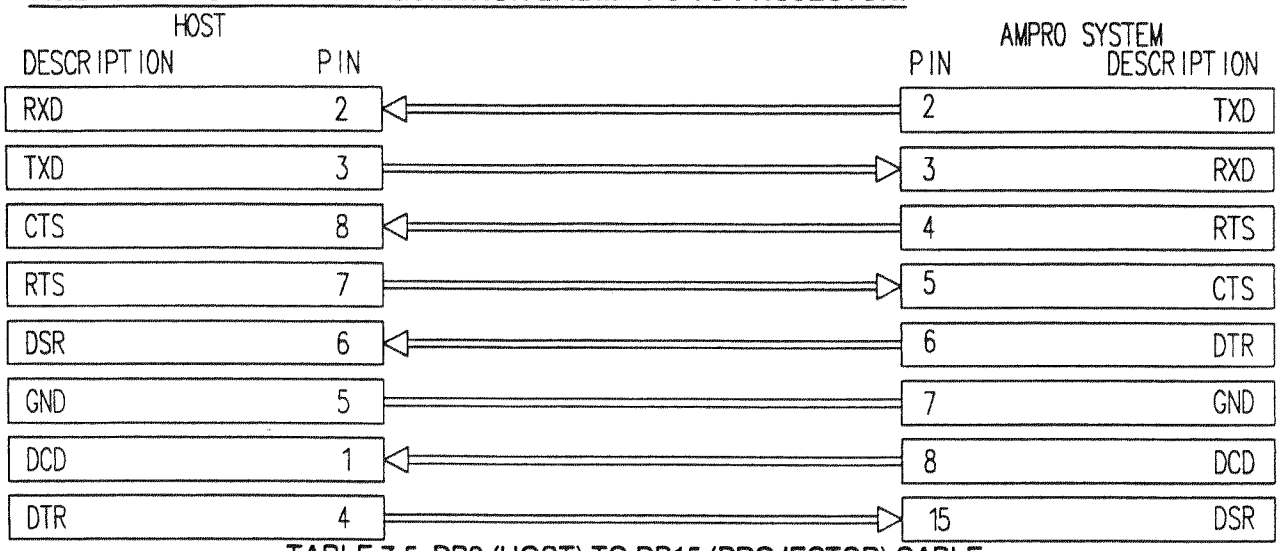

TABLE 7-5. DB9 (HOST) TO DB15 (PROJECTOR) CABLE.

7.3.3 . . . . . .CABLE CONFIGURATION 3: PROJECTOR TO PROJECTOR

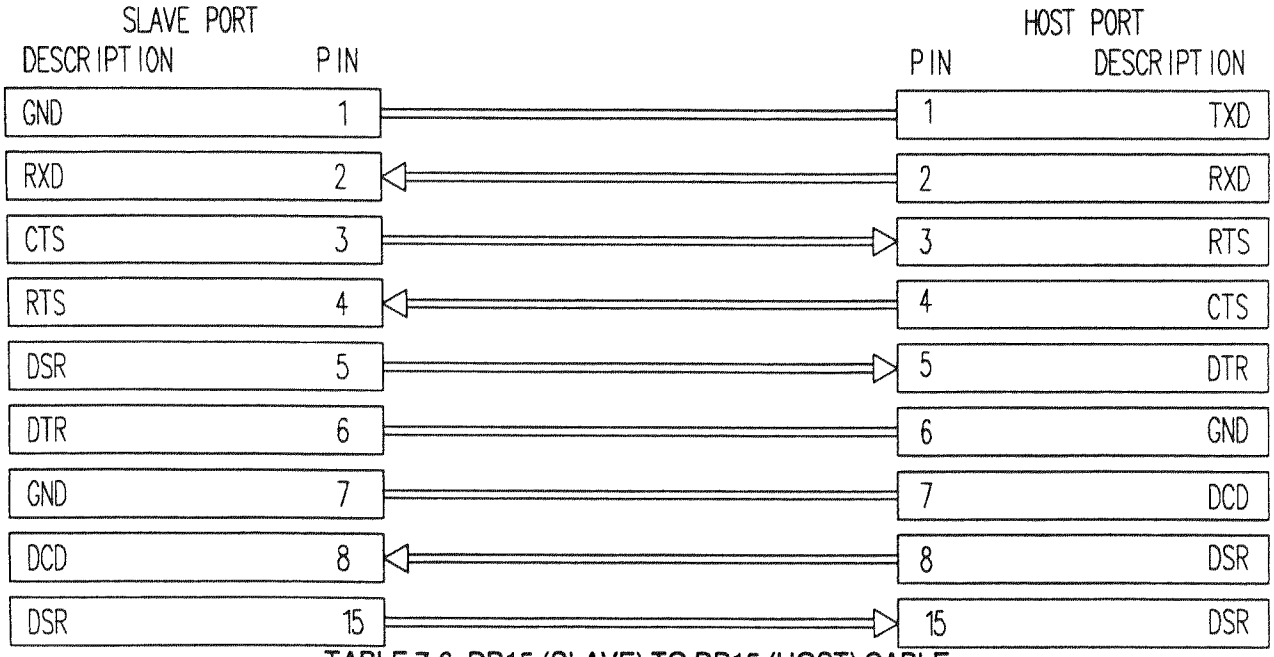

TABLE 7-6. DB15 (SLAVE) TO DB15 (HOST) CABLE.

7.3.4 . . . . . .ALTERNATIVE 3-WIRE CABLE CONFIGURATION:

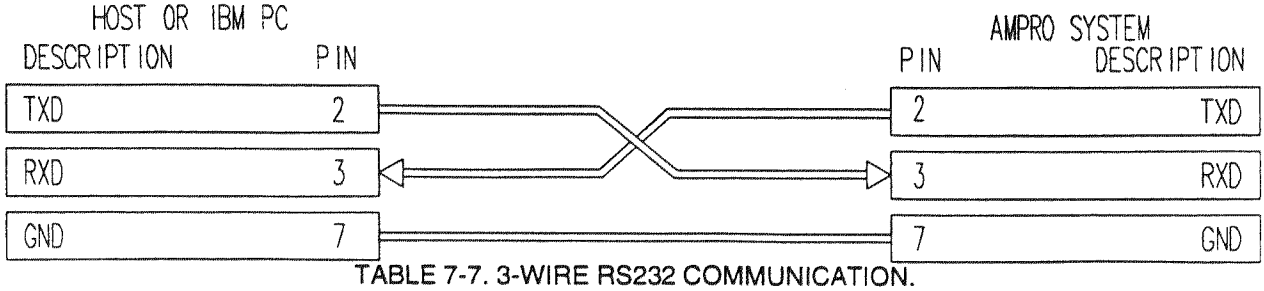

TABLE 7-7. 3-WIRE RS232 COMMUNICATION.

7.4 . . . . . RS-232C Operation:

7.4.1 . . . . . .Protocol:

The AMPRO systems utilizes the standard RS232 communication format; 8 Data Bits, No Parity, 1 Stop Bit.

7.4.2 . . . . . Mode Selection Commands:

Command	Function	Command	Function
A	Analog RGB mode	R	Test mode
T	QVD[1] or RGB[3] mode	$	Help mode
V	QVD[2] or RGB[2] mode		

7.4.3 . . . . . Adjustment Mode Commands:

Command	Function	Command	Function	Command	Function	Command	Function
B	Brightness	E	Phase	+	Up arrow	-	Down arrow
C	Color	H	Tint	<	Left arrow	>	Right arrow
D	Detail	P	Contrast				

The adjustment mode commands have two modes of operation. The first uses the arrow keys to increment or decrement the adjustment which has been selected previously by one of the above keys. For example, if you wish to increase the brightness level, transmit a B, then transmit + until you have the desired brightness level. **NOTE:** When one of the adjustment mode select commands is received, the system responds by transmitting the present level of the desired adjustment.

The second mode of operation allows you to set the level of the desired adjustment directly by transmitting an integer value in the range **0 - 100** followed by the appropriate adjustment character. For example, to set the tint level to a 75% level, you would transmit **75H. NOTE:** Due to limitations, rounding of the actual entry may occur, i.e. 75%= 74% .

7.4.4 . . . . . .Toggle Commands:

Command	Function
c	Cutoff command. This command is used in conjunction with one of the color keys e.g. **cd**, Cutoff Red CRT. To restore the Red CRT transmit **cd** a second time. Use **ce** for green and **cf** for blue cutoff commands.
K	Registration ON/OFF command. With registration on, the first **K** will turn registration "OFF" and the second **K** will turn registration "ON."
O	Power ON/OFF command. If the system is "OFF": the first **O** will turn the system "ON" and the second **O** will turn the system "OFF."
Q	Channel write-protect command. This allows the user to protect the settings stored in a particular channel location.
X	RED CUTOFF command. This command is similar to the previous command cd. The first **X** will turn the RED CRT "OFF", presuming it was on, and the second **X** will turn the RED CRT "ON."
Y	GREEN CUTOFF command. This is similar to using the **ce** command. Use the **Y** character to toggle the GREEN CRT "ON and OFF."
Z	BLUE CUTOFF command. This command is the same as using the **cf** command. Toggle the BLUE CRT "ON and OFF" using the **Z** character.
?	Display diagnostic status. This command is used to display the diagnostic capability of the system. Transmit the **?** character a second time to disable the diagnostic display.

7.4.5 . . . . Numeric Commands:

Command	Function
!	CHANNEL command. This command is preceded by an individual channel location number.
#	CODE command. This command is preceded by an specific code. Refer to Section 6, for code identification and operation, e.g. to display the ROM revision, transmit **35#**.
=	UNIT command. This command is used to address an individual unit number or use command **256=** to address all systems in a network.

7.4.6 . . . . . .Network Commands:

Command	Function
:	Global listen command. Causes all projectors in a network to listen and respond to commands at the same time. This mode of operation continues until another projector is selected to listen, or until a global un-listen command is received. When in the global mode, only the projector with address "01" (switch settings "00") will respond with messages.
;	Global un-listen command. All projectors are commanded to not respond until a unit number has been selected or a global listen command is given.

7.4.7 . . . . . .Explicit Commands:

Command	Function
(	STANDBY "ON" command. This character is used to place the system into a standby mode of operation.
)	STANDBY "OFF" command. This character is used in conjunction with the STANDBY "ON" command).
[	POWER "ON" command. This command will enable you to turn "ON" the system.
]	POWER "OFF" command. This command is used in conjunction with the POWER "ON" command [.

7.4.8 . . . . . .Registration Commands:

The registration commands listed in RS-232C Command table, page 7-8, are used in the same manner as outlined in Section 9 of the Operation Manual(s). The lower case letters from "**a**" through "**w**" are assigned for registration commands.

The adjustment method is performed by using the +, -, < or > characters, e.g. to adjust the right edge linearity of the red image transmit "**dms**", then adjust by transmitting "<" or ">" characters (dms<) or (dms>).

¤ NOTE: When using the registration commands, the system will respond with the selected area of adjustment, selected color and selected function.

7.4.9 . . . . Miscellaneous Commands:

Command	Function
L	Display ROM revision level and date of the operating system and system's serial number.
N	Next test pattern command. This command is used in conjunction with the "R" command (TEST mode of operation.).
U	Display active unit number. See [UNIT] command.
\n	CLEAR command (LINEFEED). This character emulates the CLEAR key on the remote control.

7.5 . . . . . .RS-232C Commands Table :

ASCII	COMMAND	REMOTE KEY	ASCII	COMMAND	REMOTE KEY
A	RGB MODE	[RGB]	i	BOW	[BOW]
B	BRIGHTNESS	[BRITE]	j	KEYSTONE	[KEY]
C	COLOR	[COLOR]	k	PINCUSHION	[PIN]
D	DETAIL	[DETAIL]	l	SIZE	[SIZE]
E	PHASE	[PHASE]	m	EDGE LINEARITY	[EDGELIN]
F	RED SHIFT	[RED] [SHIFT]	n	LINEARITY	[LIN]
G	BLUE SHIFT	[BLUE] [SHIFT]	o	BLANKING	[BLANK]
H	TINT	[TINT]	p	TOP EDGE	
I	BLUE STATIC VERTICAL SHIFT	40 [CODE]	q	BOTTOM EDGE	
J	RED STATIC VERTICAL SHIFT	41 [CODE]	r	LEFT EDGE	
K	REGISTRATION ON/OFF (toggle)	55 [CODE]	s	RIGHT EDGE	
L	DISPLAY ROM REVISION & S/N	35 [CODE]	t	TOP LEFT QUADRANT	
M	MONOCHROME MODE (toggle)	49 [CODE]	u	TOP RIGHT QUADRANT	
N	NEXT TEST PATTERN	[STEP]	v	BOTTOM LEFT QUADRANT	
O	POWER ON/OFF (toggle)	[POWER]	w	BOTTOM RIGHT QUADRANT	
P	CONTRAST	[CONT]	x	NOT USED	NOT USED
Q	CHANNEL WRITE-PROTECT (toggle)	20 [CODE]	y	NOT USED	NOT USED
R	TEST MODE	[TEST]	z	NOT USED	NOT USED
S	STANDBY (toggle)	[STANDBY]	\n	CLEAR	[CLEAR]
T	QVD[1] or RGB[3]	[B]	!	CHANNEL	[CHAN]
U	DISPLAY ACTIVE UNIT	[UNIT]	#	CODE	[CODE]
V	QVD[2] OR RGB[2] MODE	[A]	$	HELP	[HELP]
W	NOT USED	NOT USED	(	STANDBY "ON"	N/A
X	RED CUTOFF (toggle)	[CUTOFF] [RED]	)	STANDBY "OFF"	N/A
Y	GREEN CUTOFF (toggle)	[CUTOFF] [GREEN]	+	UP ARROW	
Z	BLUE CUTOFF (toggle)	[CUTOFF] [BLUE]	-	DOWN ARROW	
a	STATIC	[STATIC]	<	LEFT ARROW	
b	DYNAMIC	[DYN]	>	RIGHT ARROW	
c	CUTOFF	[CUTOFF]	:	GLOBAL LISTEN	256 [UNIT]
d	RED	[RED]	;	GLOBAL UN-LISTEN	[UNIT]
e	GREEN	[GREEN]	=	UNIT	[UNIT]
f	BLUE	[BLUE]	?	DISPLAY DIAGNOSTIC (toggle)	30 [CODE]
g	SHIFT	[SHIFT]	[	POWER "ON"	N/A
h	SKEW	[SKEW]	]	POWER "OFF"	N/A

Section 8

Special Features

8.1 .....Internal Timer Operation:

The internal timer is capable of turning the projection system "on" and/or "off" at a predetermined time according to your particular requirements. The internal timer operation is based on the 24 hour clock format and either a 5 or 7 day occurrence. If no internal timer operation is desired, the timer may be total disable. The three modes of operation are explained below.

To use this special feature, you must first verify the setting of the internal clock for the appropriate time according to your particular time zone.

¤ NOTE 1: The internal clock is factory pre-set for Eastern Time (E.T.).

8.1.1 .....Display Time of Day:

- STEP 1. Using the numeric keypad, enter [10] [CODE] to verify the time of day.

¤ If incorrect, refer to the set time of day procedure.

¤ If the time of day is correct, please refer to the desired mode of operation and perform the steps listed.

8.1.2 .....Set Time Of Day / Day / 5 or 7 Day Operation:

- **Set Time Of Day:** Enter [11] [code]. At the LCD prompt, enter Hour : Min, i.e., 2:00 p.m. will be entered as 14:00.
- **Set Day:** If required, set the day of the week by entering [18] [CODE]. LCD. prompt, IS TODAY MONDAY, use the UP arrow key to scroll through the days of the week and press [CODE] to select proper day.
- **Select 5 or 7 Day Operation:** Enter [19] [CODE]. At the LCD prompt, use the UP arrow to toggle between 5 or 7 day operation, press [CODE] to select.

8.1.3 .....Timer Modes of Operation:

8.1.3.1 .....Auto "ON" Operation:

- STEP 1. Set timer "on" time. Enter [15] [CODE] and at the LCD prompt, enter desired time, i.e., for a turn-on time of 8:00a.m., enter 08:00.
- STEP 2. Set timer "off" time. Enter [17] [CODE] and at the LCD prompt, enter 0000 or simply press the [CLEAR] button to reset the display to 00:00.
- STEP 3. Enable timer operation. Enter [12] [CODE].

8.1.3.2 .....Auto "OFF" Operation:

- STEP 1. Set timer "on" time. Enter [15] [CODE]. At the LCD prompt, enter 0000 or press [CLEAR] to reset the display to 00:00.
- STEP 2. Set timer "off" time. Enter [17] [CODE] and at the LCD prompt, enter desired time. i.e., for a turn off time of 5:00 p.m., enter 1700 (17:00).
- STEP 3. Enable timer operation. Enter [12] [CODE].

8.1.3.3 . . . Auto "ON/OFF" Operation.

- STEP 1. Set timer "on" time. Enter [15] [CODE] and at the LCD prompt, enter desired turn on time, i.e. 8:00 a.m. is entered as 0800.
- STEP 2. Set timer "off" time. Enter [17] [CODE] and at the LCD prompt, enter desired "off" time, i.e., 5:00 p.m. is entered as 1700.
- STEP 3. Enable timer operation. Enter [12] [CODE].

8.1.4 .....Verifying Your Settings:

- STEP 1. Display time/day. Enter [10] [CODE].
- STEP 2. Display timer "on" time. Enter [15] [CODE].
- STEP 3. Display timer "off" time. Enter [16] [CODE].

OR

- Enter [26] [CODE], display system / channel status information page. See Section 8.3

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8.1.5 .....Notes:

- NOTE 1: To disable the timer operation, enter [13] [CODE].
- NOTE 2: Be sure to leave the main ac power switch located on the rear panel in the "ON" position.

8.1.6 .....Timer Quick Reference Table:

CODE	FUNCTION	LCD READ-OUT : OPERATION
10	DISPLAY DAY/TIME[1]	DAY / 00:00 : Displays Day and time
11	SET TIME[1] OF DAY	ENTER TIME: Enter H:M: (Hour:Min.)
12	ENABLE TIMER	ALARM ENABLE : Enables the timer function
13	DISABLE TIMER	ALARM DISABLE : Disable the timer function
14	DISPLAY "ON" TIME[1]	TIME 00:00 : Displays the time set for auto-on operation.
15	SET TIMER "ON" TIME[1]	00:00 : Enter "auto-on" time
16	DISPLAY "OFF" TIME	TIME 00:00 : Displays the time set for auto-off operation
17	SET TIMER "OFF" TIME[1]	00:00 : Enter "auto-off" time
18	SET DATE (DAY)	IS TODAY MONDAY: Use the UP arrow to scroll through the days of the week and press [CODE] to select proper day.
19	SELECT 5 OR 7 DAY OPERATION (TOGGLE)	TIMER SETTINGS 5 DAYS SETTING (7 DAYS SETTING): Use the UP arrow to toggle between the two day setting modes and press [CODE] to select.

8.2 . . . . . Channel Color Balance:

The AmPro 3300/4300 provide the capability to pre-set the color balance for each external source being used. The black and white levels may be controlled by the remote control and pre-set into individual channel locations.

Along with the capability to pre-set custom color temperatures, the AmPro 4300 has three factory pre-set color temperature values, 9300°K, 6500°K and 3600°K. These factory pre-sets may be used with anyone of your external sources providing they are at the 1vp-p. (700mvp-p) signal level. Additionally, the factory pre-sets may be modified to conform to your requirements.

☐ NOTE 1: The control of the contrast (signal level) is restricted to attenuating signal level and provides no signal gain capability.

☐ NOTE 2: This procedure makes the assumption that the AmPro system has been properly installed and correctly aligned.

Perform the following steps to setup and save color temperatures

8.2.1 . . . . . .Pre-adjustment Requirements:

- INPUT: Desired external source (displaying multiple colors or grayscale pattern).
- CLAMPING: Set to or select Back-porch clamping (48 [CODE]).
- CHANNEL: Any channel setup for your particular source, i.e., mode of operation, convergence, etc..
- REMOTE SETTINGS: Set brightness [BRITE] and contrast [CONT] to desired operating level.

8.2.2 . . . . . .Adjustment Procedure:

This procedure is based on a visual acceptance of the black and white levels. As mentioned previously the level controls are provided to balance and/or attenuate any signal level above 1Vp-p (700mvp- p), and are factory pre-set for unity drive (1v "in" / 1v "out").

- STEP 1. Perform a visual evaluation of the displayed image.
- EXAMPLE: If the black level of the displayed image appears to be red in color, adjust the Red brightness by entering 95 [CODE] (Enable Sub-Brite), then select [RED]. Use the up and down arrow keys to increase or decrease the Red black level. NOTE: To select a different color, simply press the desired color button. Perform this process for each color until desired results are achieved.
- STEP 2. To set or reset the master brightness while in the Sub- Brite mode, simply press [BRITE], and again using the up/down arrow keys increase or decrease the master brightness level.
- STEP 3. As with the black level adjust, the individual contrast levels are set using a similar method, enter 94 [CODE] (Enable Sub-Contrast), select the desired color and use the up/down arrows to adjust.
- STEP 4. Adjust the individual contrast levels for desired white or color levels without causing the de-focusing of the adjusted color or the entire displayed image.
- STEP 5. To adjust master contrast while in the Sub-Contrast mode, press the [CONT] button and adjust using the up/down arrow keys.

Continue with the above steps until a visually acceptable color balance is achieved.

8.2.3 . . . . Using The Factory Presets:

There are three commonly used settings that have been factory pre-set and may be accessed without losing any previously set custom or user defined color balance.

☐ NOTE 1: The factory presets are based on input signals of 1vp-p (700mvp- p) and effect only the contrast level of the signal.

- STEP 1. Enter the channel you wish to adjust and have an active source applied to appropriate module.
- STEP 2. With the image being displayed, enter 96 [CODE] (Select Color Temperature). Once activated, the channel location will be automatically set to the 9300°K settings and the previous channel values will be moved into the "USERS COLOR TEMP" selection.
- STEP 3. Use the up/down arrow keys to scroll through the available selections. NOTE: Every time you scroll through the listings of the available values the channel will be updated to that value.
- STEP 4. With the desired value being displayed in the LCD read- out, press the [CODE] button to select. **NOTE:** Once the [CODE] button has been pressed and the user defined value was not the value selected (the value currently being displayed in the LCD read-out), any user defined or custom channel settings will be lost.

8.2.4 . . . . . .Color Temperature Command(s) Summary

COMMAND	FUNCTION
48 [CODE]	TOGGLES BLACK LEVEL CLAMP POINT FROM BACK-PORCH TO SYNC-TIP
94 [CODE]	ENABLE SUB-CONTRAST MODE
95 [CODE]	ENABLE SUB-BRITE (BRIGHTNESS) MODE
96 [CODE]	ENABLE COLOR TEMPERATURE SELECTION
[CODE]	SELECTS DESIRED COLOR TEMPERATURE
[RED], [GREEN], [BLUE]	SELECT COLOR TO BE ADJUSTED
[BRITE]	SELECTS MASTER BRIGHTNESS CONTROL
[CONT]	SELECTS MASTER CONTRAST CONTROL
▲ ▼	INCREASE/DECREASE SELECTED FUNCTION, SCROLL THROUGH AVAILABLE COLOR TEMPERATURES.

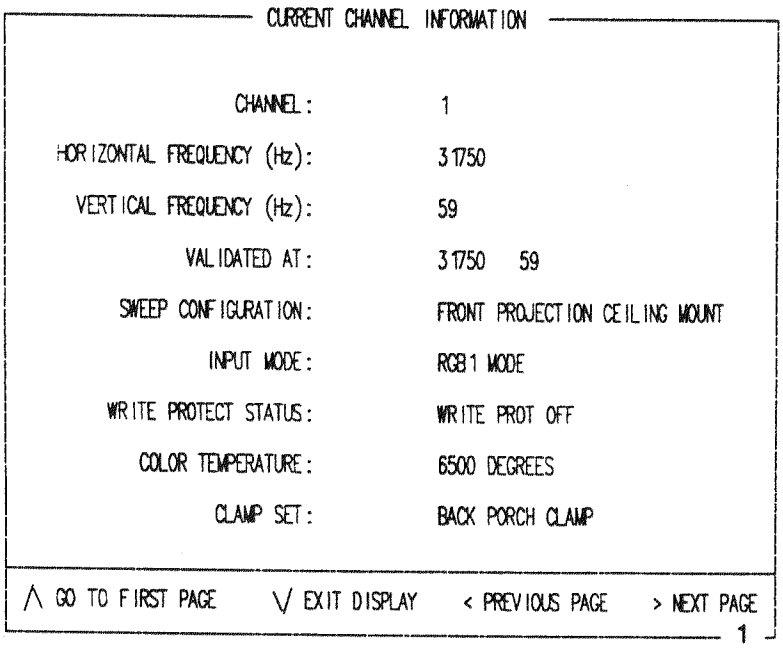
8.3 . . . . . System / Channel Status Pages

8.3.1 . . . . . .General:

The internal system status pages are accessed by entering [26] [CODE] and contain four (4) informational pages, which indicate the operational status and condition of the various system features. The four internal pages are described below. NOTE: To move between status pages use the UP, DOWN, LEFT and RIGHT arrow keys. See legend at bottom of information pages.

8.3.2 . . . . . .Current Channel Information:

The first status page consist of current channel information. This page will indicate all of the configuration parameters associated with the current (active) channel. The active channel being the channel the system was in when 26 CODE was initiated. See Figure below.



REFERENCE	DESCRIPTION	REFERENCE CODE (KEY)
CHANNEL	Indicates the active channel number.	[CHAN]
HORIZONTAL FREQUENCY (Hz)	Display the horizontal frequency of the incoming signal for the active channel.	36
VERTICAL FREQUENCY (Hz)	Displays the vertical frequency of the incoming signal for the active channel.	36
VALIDATED AT	Indicates the horizontal and vertical frequencies that have been validated (stored) for the active channel. If not validated, then "NOT VALIDATED" will be indicated.	25
SWEEP CONFIGURATION	Displays the projection mode, i.e. FRONT PROJECTION CEILING MOUNTED.	33
INPUT MODE	Indicates the mode of operation for above channel location.	[CHAN]
WRITE PROTECT STATUS	Indicates whether channel write-protect is on or off. The write-protect features prevents changes from being made to a previously established channel location.	20
COLOR TEMPERATURE	Displays the current color temperature for the active channel. Select from either 3600°K, 6500°K, 9300°K or user's custom setup.	96
CLAMP SET	Signifies whether back porch or sync tip black level clamp is selected	48

8.3.3 . . . . Channel Validation Status:

The second page of the system/channel status page(s) is the "CHANNEL VALIDATION STATUS". This page provides a quick reference whether a channel is validated or not validated.

There are two methods to validate a channel, 1.) enter 24 [CODE] at the end of your setup and alignment, or 2.) perform a complete guided setup in which at the end of the guided setup sequence, the system will automatically "VALIDATE" the channel.

Once a channel is validated, the horizontal and vertical frequencies are written into a "look-up" or channel reference table. The look-up table provides reference setups for the A.C.S. command to use, Additionally the "AUTO-SEARCH" mode utilizes the same "look-up" table to perform it's routine.

Channel location that indicated the horizontal scan rate / vertical frame rate, e.g. 31250 / 60 are VALIDATED channels. Channels that are not validate will be left blank with no indication. Although, a channel that is not validated does not indicated whether the channel is in use or not. Refer to Figure below.

8

CHANNEL VALIDATION STATUS

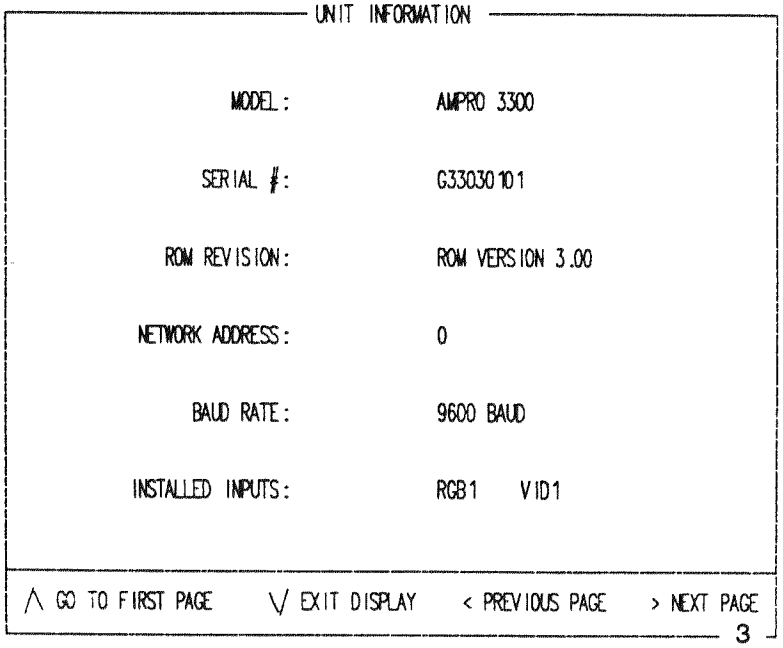
CHANNEL 1: 15750 / 60	CHANNEL 18:	CHANNEL 34:
CHANNEL 2: 31250 / 60	CHANNEL 19:	CHANNEL 35:
CHANNEL 3:	CHANNEL 20:	CHANNEL 36:
CHANNEL 4:	CHANNEL 21:	CHANNEL 37:
CHANNEL 5: 63350 / 66	CHANNEL 22:	CHANNEL 38:
CHANNEL 6: 89300 / 63	CHANNEL 23:	CHANNEL 39:
CHANNEL 7:	CHANNEL 24:	CHANNEL 40:
CHANNEL 8:	CHANNEL 25:	CHANNEL 41:
CHANNEL 9:	CHANNEL 26:	CHANNEL 42:
CHANNEL 10:	CHANNEL 27:	CHANNEL 43:
CHANNEL 11:	CHANNEL 28:	CHANNEL 44:
CHANNEL 12:	CHANNEL 29:	CHANNEL 45: 80000 / 60
CHANNEL 13:	CHANNEL 30:	CHANNEL 46: 64000 / 60
CHANNEL 14:	CHANNEL 31:	CHANNEL 47: 54000 / 60
CHANNEL 15:	CHANNEL 32:	CHANNEL 48: 31500 / 60
CHANNEL 16:	CHANNEL 33: 31500 / 70	CHANNEL 49: 21000 / 60
CHANNEL 17:		CHANNEL 50: 15750 / 60

∧ GO TO FIRST PAGE ∨ EXIT DISPLAY < PREVIOUS PAGE > NEXT PAGE

2

8.3.4 . . . . Unit Information Page:

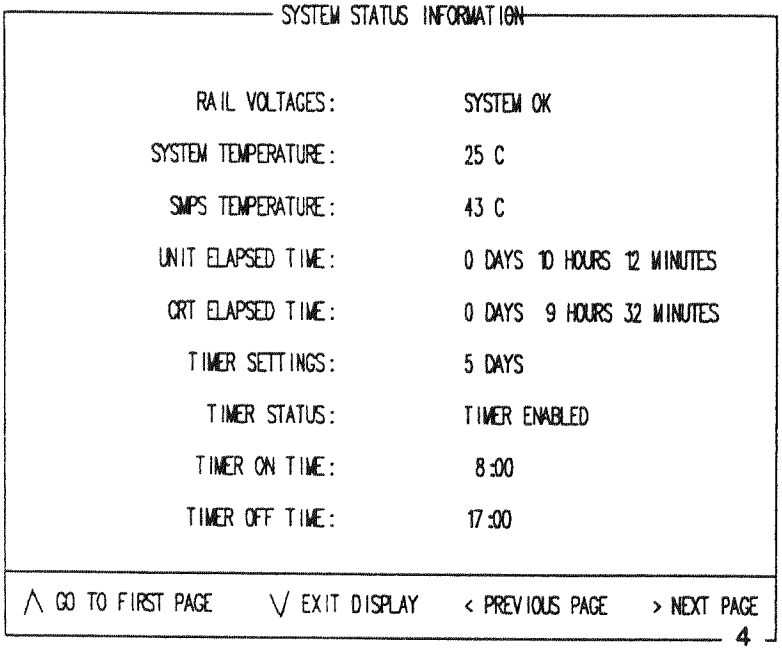
The third status page consist of general unit information, which include system identification, firmware revision level, communication baud rate and available source input modules. See Figure below for additional informaiton.



REFERENCE	DESCRIPTION	REFERENCE CODE (KEY)
MODEL	Refers to the model (make) of the AmPro display system	N/A
SERIAL #	Refers to the serial number of this particular AmPro display system.	35
ROM REVISION	Indicates the current revision level of the CPU operating system.	35
NETWORK ADDRESS	Indicates the Unit address number. Network Address 0 indicates UNIT # 1	44
BAUD RATE	Display the communication baud rate the system is set at.	44
INSTALLED INPUTS	This will indicate the available standard and optional input modules.	34

8.3.5 . . . . System Status Page

The fourth and final status page indicates the operating condition, internal temperature and the status for the special features of the display system. See Figure below.



REFERENCE	DESCRIPTION	REFERENCE CODE (KEY)
RAIL VOLTAGES	This will indicate the operational status of the system. If no failure is detected, the respond will be simply "SYSTEM OK". If an error is detected the message will read "ERROR FOUND CHECK 30 CODE.	30
SYSTEM TEMPERATURE	Displays the housing temperature in degrees Celsius (°C)	39
SMPS TEMPERATURE	Display the low voltage power supply (SMPS) internal operating temperature. NOTE: SMPS maximum temperature limitation of (70 °C). Please contact the factory in SMPS temperature exceeds 70°C (158 °F).	39
UNIT ELAPSED TIME	Display the total operating system "on" time in DAYS:HOURS:MINUTES	31
CRT ELAPSED TIME	Displays the total operating CRT "on" time in DAYS:HOURS:MINUTES	32
TIMER SETTINGS	Indicates whether the 5 or 7 day operation has been selected for the internal timer setup.	19
TIMER STATUS	Indicates whether the internal timer is enabled or disabled	12 / 13
TIMER ON TIME	Indicates the desired time set for auto-on operation.	14
TIMER OFF TIME	Indicates the desired time set for auto-off operation.	16
Fahrenheit Conversion	°F = 1.8 x °C + 32	16

8.4 . . . . . Intensity Modulation

Intensity modulation provides the ability to increase or decrease the contrast/color level over the entire image or just portions of the projected image presenting an "even field" of white from the center to the edges of the image. Intensity modulation is useful to overcome possible shading of the image, when using curve, high gain screens causing "hot spots" and overlaying of multiple projected images.

Intensity modulation allows the contrast and color balance of the top, bottom, left, right and all four corners of the projected image to be adjusted individually. The center of the image serves as a reference point for the surrounding zones and can only be adjusted with the master contrast control. As with the other adjustments on the Ampro systems, intensity modulation is designated within a channel location. Each channel may have unique intensity modulation settings. Use the following procedure to perform intensity modulation adjustments for the active channel.

☐ NOTE: The following procedure makes the assumption that the system has been completely and correctly installed , aligned and an acceptable grayscale has been achieved.

☐ PATTERN REQUIRED: White field at the desired frequency.

☐ TEST EQUIPMENT: Light meter /photometer i.e., Tektronix® J16 photometer , Photo Research® PR650 SpectraColorimeter™ or equivalent.

8.4.1 . . . . . .Procedure:

- STEP 1. Divide the white field pattern into 9 zones. Refer to Figure 8-1. Note the area selection keys and the affected zone.
- STEP 2. Select desired mode of operation with a white field input.
- STEP 3. Using the remote control set brightness to 75% and contrast to 65%

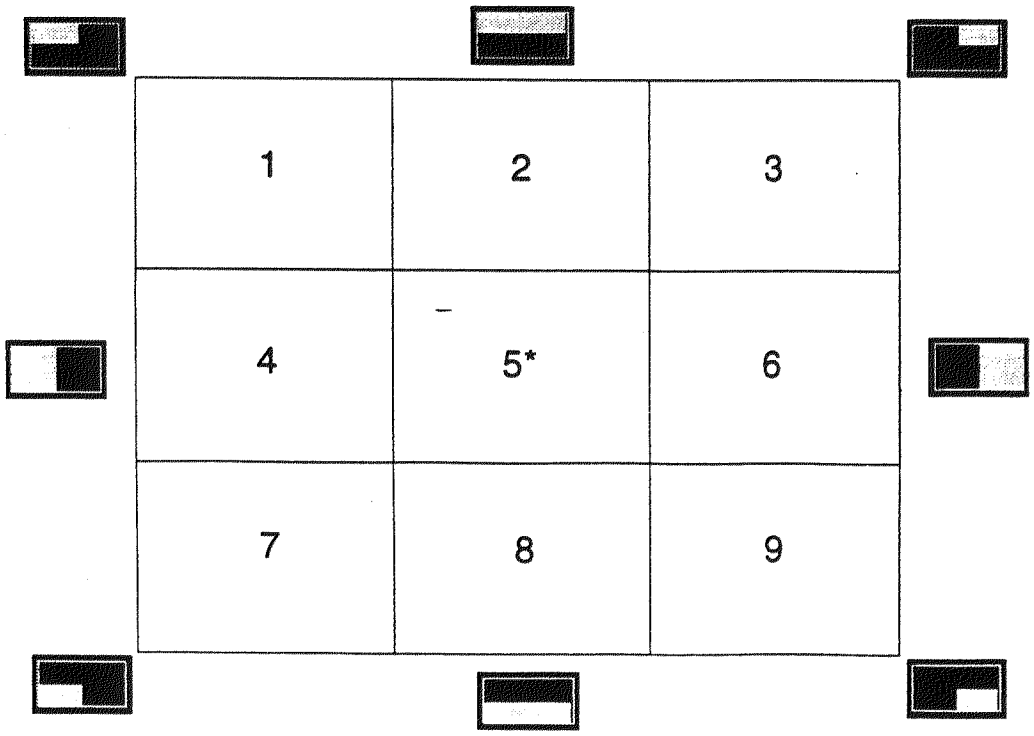


FIGURE 8-1

* Zone 5 (center of image) serves as a reference point for the surrounding zones, and can only be adjusted by using the master contrast [CONT] control.

8.4.1 . . . . Procedure: (continued)

- STEP 4. Turn the Red and Blue CRTs "OFF".
- STEP 5. GREEN ONLY! Measure and record the readings of each zone indicated in Figure 8-1.
- STEP 6. Set zone 5 (Figure 8-1) to the lowest reading (recorded above), with the **[CONT]**button.
- STEP 7. Enter 92 **[CODE]** , to enable intensity modulation operation.
- STEP 8. Select **[GREEN]**, then select an EDGE and use the [↑] and [↓] down arrow keys to adjust zone 2, 4, 6, and 8 light levels to equal the light level of zone 5.
- STEP 9. Once the edges have been set, select and adjust the QUADRANTS for zones 1, 3 , 7 and 9 to equal that of zone 5 as in Step 8.
- STEP 10. RED ONLY then BLUE ONLY . Measure the light level of zone 5 of the red and set all other zones of the red image to equal zone 5. Repeat the process for the blue image.

¤ Start your adjustments with the edge controls for zones 2, 4, 6 and 8, as the settings of these edges will affect the light level of the quadrants (corners), i.e., the setting of zone 2 will affect the levels of zone 1 and zone 3 and always finish your adjustments with the quadrant controls for zones 1, 3, 7, and 9.

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8.4.2 . . . . . .Notes:

- Enter 92 **[CODE]** to enable intensity modulation adjustment for the active channel. If any other adjustment other than Master brightness and contrast is made , 92 **[CODE]** will have to be re-entered.
- Pressing the **[GREEN]** (MASTER) button will select simultaneous adjustment of RED, GREEN and BLUE intensity. Press the **[RED]** or **[BLUE]** button to select individual adjustment of the RED or BLUE intensity.
- Use the edge and quadrant keys to select the desired side or corner of the projected image to be adjusted. Always start your adjustments with the edge controls and finish with the quadrant controls.
- Use the Up or Down arrow key to increase or decrease the level of the selected intensity modulation adjustment.
- Enter 93 **[CODE]** to null the process or reset (set to 50%)the settings for the intensity modulation.
- Use the following template to record your readings.

R = G = 1 B =	R = G = 2 B =	R = G = 3 B =
R = G = 4 B =	R = G = 5 B =	R = G = 6 B =
R = G = 7 B =	R = G = 8 B =	R = G = 9 B =

Section 9

Preventative Maintenance And System Error Diagnostics

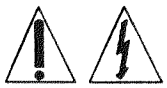
9.1 .....Preventative Maintenance:

- 1. Avoid direct sunlight, moisture, heat and improper mounting.
- 2. Provide sufficient ventilation to the rear and bottom two fans to avoid overheating of internal components.
- 3. Clean and maintain the three fans , one on the rear panel and two on the bottom side, to avoid restriction of air flow and overheating of the system.

NOTE: Filters are provided for all three fan locations, 2 each bottom fans and 1 each rear panel fan. Refer to section 9.2 for removing and cleaning of the filter media inserts.

- 4. Adjust your cleaning schedule according to your particular environment.
- 5. The Data/Graphic Display System may be kept in good condition by wiping it with a clean, soft, dry cloth. See section 9.3 for special lens care and cleaning.
- 6. For general safety, the system should be cleaned internally only by an authorized AmPro Corporation service technician.
- 7. Do not place magnetic equipment near the system.

9.1.1 ..... Precautions:



- 1. Secure service any time the Data/Graphics display system is damaged or fails. An obvious change in performance may also indicate a need for service.
- 2. Do not attempt to service this system yourself by opening or removing covers that may expose you to dangerous voltages or other hazards. Refer all servicing to qualified service personnel.
- 3. Remove the power plug from the wall socket when the Data/Graphics Display System is not functioning properly.

9.2 . . . . . Fan Filters Removal And Cleaning:

The two filters on the bottom of the system are reusable and are provided to maintain a clean environment within the system. Please check the filters periodically and adjust your cleaning periods accordingly. In areas of heavy dust, smoke, or other environmental contaminants, the system will require more frequent cleaning periods, i.e. weekly, biweekly, monthly, etc. To remove and clean the filter media, follow the steps listed below.

- STEP 1. Remove the filter retainer by pulling the sides with the catch apart, then remove the filter media from between the retainer and the guard. Refer to Figure 9-1.
- STEP 2. Clean the filter media by shaking or blowing or washing. If washed, ensure the filter media is completely dry prior to reinserting.
- STEP 3. Repeat steps 1 through 3 for each filter.
- STEP 4. Place the filter media between the filter guard and the retainer. Push the retainer until the catches lock in place.

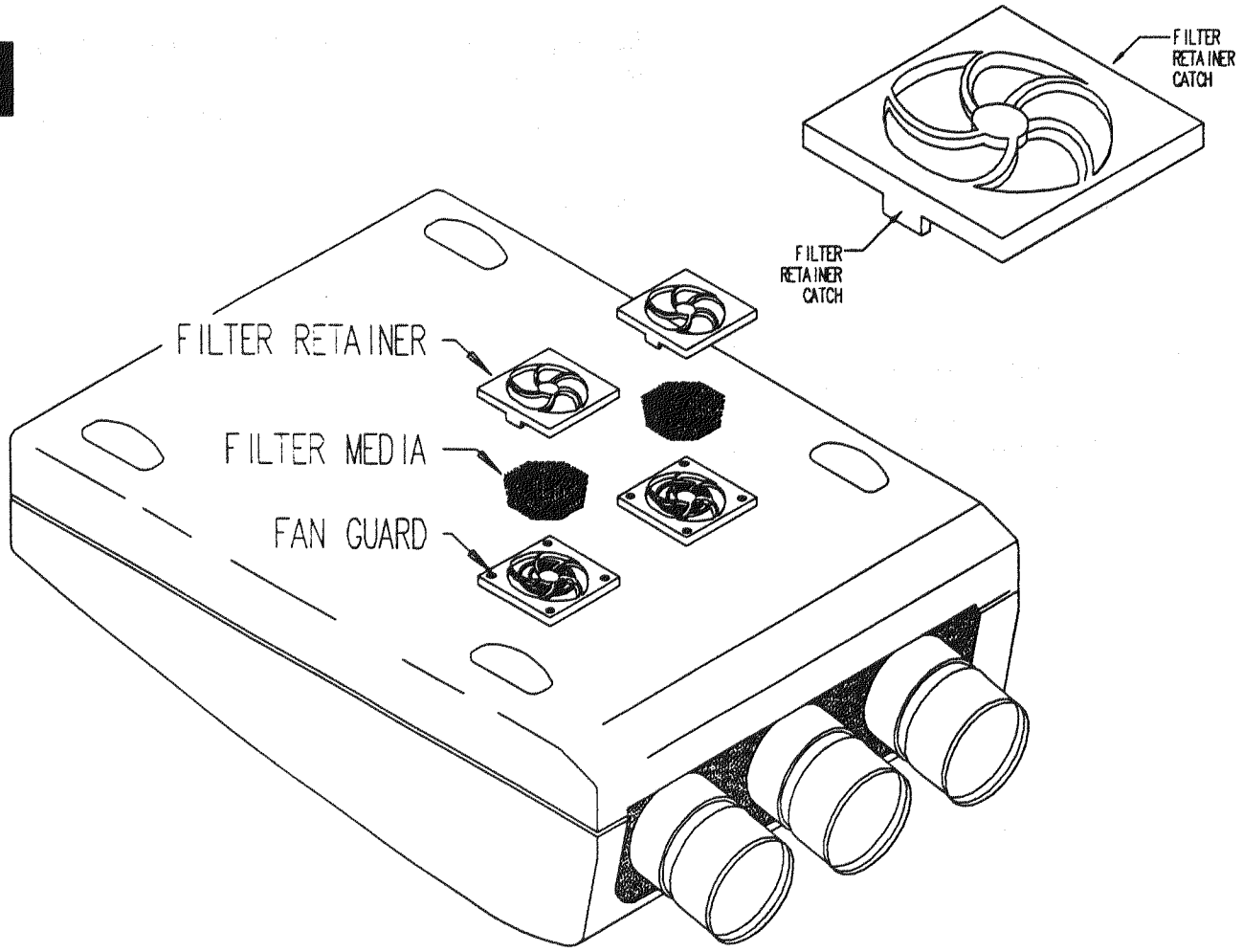


FIGURE 9-1.

BOTTOM FAN ASSEMBLIES (2 EA.).

9.2.1 . . . . Rear Panel Filter Removal:

Like the two bottom fans, the filter for the rear panel fan is reusable and is provided to maintain a clean environment within the system. To remove and clean the filter media, follow the steps listed below.

- STEP 1. Remove the filter retainer by gently pulling it out of the filter housing.
- STEP 2. Remove the filter media from between the retainer and guard.
- STEP 3. Clean the filter media by shaking, or washing. If washed, ensure the filter media is completely dry prior to reinserting the filter media.

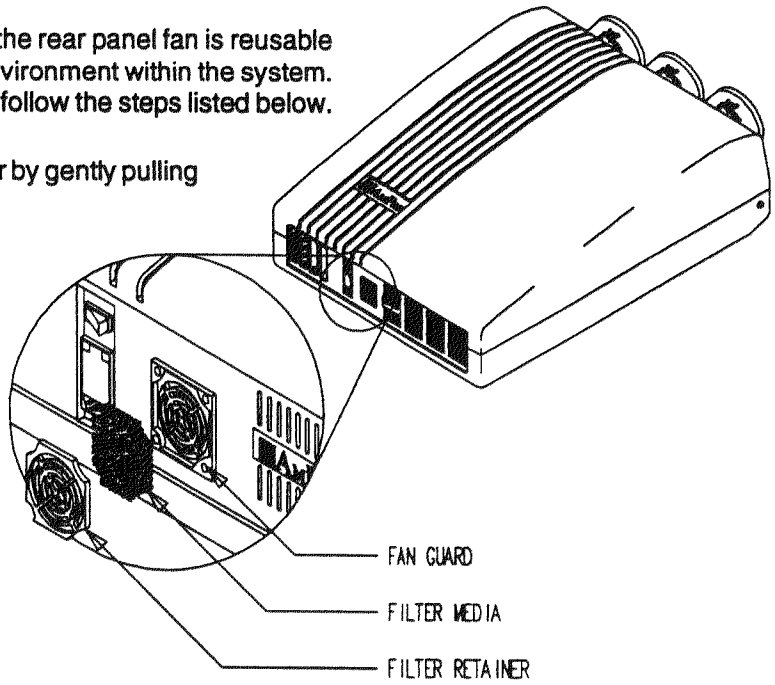


FIGURE 9-2. REAR FAN FILTER.

9.3 . . . . . .Lens Care And Cleaning:

When your Data/Graphics Display System is not being used for prolong periods of time, please cover the lenses with the lens covers provided with the system.

To minimize the possibility of damage to the optical coating or scratching the exposed lens surface, we recommend you first try to remove any material from the lens by blowing it off with deionized air or lightly brushing it with a soft camel's hair brush.

9.3.1 . . . . . .LENS CLEANING:

- 1. Do not spray any type of fluid directly on the lens surface.
- 2. Do not use any dry material to clean the surface (dry rag, tissue, etc.)
- 3. Use a commercial liquid window cleaner (e.g. Windex, Easy Off or Glass Plus). Do not use an aerosol. Other cleaning agents, such as laboratory grade acetone or ethyl-ether (70% - 30%) may also be used. If you are not sure of the cleaning agent, experiment with a small area of the lens first.
- 4. Use a lens tissue, a soft cotton cloth, or any soft facial tissue.
- 5. When using a window cleaner, moisten the tissue or cloth and lightly wipe the surface. Then dry with a new tissue.
- 6. When using acetone or ethyl-ether mixture, proceed as follows:

Fold the tissue or cloth several times to form a pad. Soak the folded end of the pad in the acetone. Starting at the diameter opposite to you immediately wipe the coated lens, with very little pressure, toward you in a straight line equal to the evaporation rate. This is important to prevent streaking and spotting. Start your wiping at one side of the lens and, with successive wipes, move to the other side. Turn the pad over for each wipe, then inside out. Do not make more than one wipe per clean area of pad. Be careful of the painted edge of the lens, since acetone will soften it.

9.4 . . . . . Trouble Shooting:

Symptom	Possible Cause	Solution
The unit is connected to an active AC outlet, the rocker switch is in the "ON" position, but there is no LCD read-out and no LCD backlight.	Faulty line cord	Replace line cord
	Open main fuse	Check and/or replace main fuse
	Wrong voltage selected	Check and/or select proper voltage and main fuse.
	Hard-wired remote control is not connected.	Connect hard-wired remote control to "HOST" port on the CPU.
	Faulty remote control or cable.	If available, replace remote control/cable.
No LCD read-out on the remote control, but the LCD back light functions properly.	Unit's address switches are not set properly.	Refer to Supplement 3 (operation manual) for proper switch configuration.
	Baud rate switch is not set properly.	Refer to Supplement 3 (operation manual) for proper switch configuration.
	System is in the "Quiet" mode of operation.	Enter 900 [CODE] and press any key....repeat if necessary.
	CPU lock-up	Toggle the main AC rocker switch and retry....repeat if necessary.
The LCD indicates the model, but the system does not turn on when the [POWER] button is depressed.	Remote control may be faulty.	If available, try another remote control.
	If an extended cable is being used.	Remove extension cable from the system and retry.
The system is on, no error messages are displayed, but no image is projected.	Lens covers are still installed.	Remove lens covers.
	Unit is in the standby mode of operation.	Depress the [STANDBY] button.
	Wrong mode of operation selected.	Select the proper mode of operation.
	Source is not turned on.	Enable source or select internal test.
	Contrast and/or brightness levels are too low.	Increase contrast and brightness levels.
	Blanking is not set properly.	Enable and set top, bottom, left and right blanking.
	System needs to be in the diagnostics mode.	Enter 30 [CODE] to enable error messages.

TABLE 9-1

9.5 . . . . . Error Messages:

The AMPRO 3300/4300 systems provide three sets of diagnostics messages which are displayed on the LCD read-out located on the standard hard-wired remote control to provide information about the internal communications between modules, projector mode and operational status.

One set of error messages that may be displayed are mode status error messages. Mode status error messages indicate a wrong function has been selected for the current mode of operation or the selected function can not be entered. An example of a mode status error message is as follows. When a particular channel number has been selected and an attempt to adjust brightness is made, an error message "WRITE PROTECTED" is displayed. This error message refers to a particular channel location and that the parameters of this channel have been established and placed inactive to avoid unwanted adjustments. Refer to section 9.5.1, table 9-2 for additional mode status error messages.

The second set of error messages provided are operational status messages. This type of message provides information about the projector in case of a malfunction for either a voltage or wave form error.

When the system is connected to an active A.C. source and the rocker switch on the rear panel is turned on, the LCD will display "AMPRO 3300 (AMPRO 4300) ". When the [POWER] button on the remote control is pressed, the system's LCD read-out will display "INITIALIZING," then display the last mode of operation used when the system was de-energized, if there are no malfunctions.

If there is a malfunction of the equipment the system will display an error message. An example of the sequence of messages you would get if the - 20V rail was missing is as follows. After the power button on the remote control is pressed, the first read-out would be "INITIALIZING" then "-20 VOLTS LO". This error process continues to cycle through all error messages applicable.

If for some reason the system has been turned on, the desired mode of operation has been selected and the appropriate source is active; however, no image is being projected and there are no diagnostic error messages being displayed on the LCD, use the enable diagnostics command **30 [CODE]**. Refer to section 9.5.2 for additional operational status error messages.

The last type of error messages that made be displayed are I^2C error messages. These type of messages indicate some type of communication failure between internal modules, typical the CPU (master) and another module (slave), and are displayed on the LCD read-out such as; ERROR 20 AT 4E. The first number indicates the type of communication error and the second numeric/alpha indications the address of the failed device. Refer to Section 9.5.3, for address indentification.

9.5.1 . . . . . .Mode Status Error Messages:

ERROR MESSAGE	POSSIBLE CAUSE	SOLUTION
AUTO RESTART	System has momentarily loss A.C. line voltage or system was de-energized by main rocker switch.	System should power up as normal.
BAD NUMERIC CODE	Numeric code outside of range entered.	Enter numeric code within range.
BAD TTL MODE	TTL mode of operation outside of range entered .	Enter proper mode of operation.
BAD VIDEO MODE	Video mode of operation outside of range entered.	Enter proper Video mode of operation.
CHOOSE EDGE	Wrong area of adjustment selected for desired function.	Select proper area key for desired function.

TABLE 9-2

9.5.1 . . . . Mode Status Error Messages:

ERROR MESSAGE	POSSIBLE CAUSE	SOLUTION
DYNAMIC FUNCTION	Wrong operation for selected function.	Select proper function.
ERROR # AT # (I^2C ERROR)	Communication failure between internal modules.	See Section 9.5.3, Table 9-3.
ERROR CODE 1000	In-compatibility between internal modules has occurred.	Call factory
ERROR CODE 1001	In-compatiblility between internal modules has occurred.	Call factory
ERROR CODE 1002	In-compatiblility between internal modules has occurred.	Call factory
HI BEAM CURRENT	CRT protection mode of operation.	Toggle main power rocker switch OFF/ON. Restart system. If continuous, contact a service technician.
HVPS RESTART	Momentary protection from high voltage arcing occurred.	If continuous, contact a service technician.
HVPS SHUTDOWN	Loss of high voltage has occurred.	Contact a service technician.
INVALID	Unrecognized command.	Retry command.
INVALID CHANNEL	Channel number outside of range (1-50) entered.	Enter channel number within given range.
INVALID TEST	Test number outside of range entered.	Select proper test mode (1 - 4)
INVALID TIME	Time outside of range entered.	Enter time within range (24 hour clock)
INVALID VALUE	Value outside of range (0-100) entered.	Enter value between 0-100.
KEYS DISABLED	Registration adjustments are being attempted with "lock-out" feature activated.	To enable registration keys, enter 46 [CODE].
MEMORY FAILURE	Loss of data occurred.	Re-enter all settings, channel numbers, registration settings, etc.
MUST BE IN NTSC	Function entered operates in the NTSC modes only.	Select Video (NTSC) mode of operation
MUST BE IN RGB	Function entered pertains to the RGB mode of operation only.	Enter RGB and retry function.
MUST BE IN VIDEO	Function entered operates in the Video modes of operation only.	Enter Video mode and retry.
NETWORK DISABLED	Unit number other than 1 has been entered, with the network capability disabled.	See Section .
NOT INSTALLED	Optional mode selected with no optional module installed.	Refer to the respective replacement procedure, Section
OPEN INTERLOCK	Missing or loose module/connector.	Verify or re-seat all modules / connectors.

TABLE 9-2 (continued)

9.5.1 . . . . Mode Status Error Messages: (continued)

ERROR MESSAGE	POSSIBLE CAUSE	SOLUTION
OVER FREQUENCY	Source selected outside of specified frequency range.	System in operating out of specified range.
RED OR BLUE ONLY	Wrong area of adjustment selected for desired color.	Select proper area key for desired function.
RIGHT OR LEFT ONLY	Wrong area of adjustment selected for desired function.	Select proper area key for desired function.
SELECT QUADRANT	Wrong area of adjustment selected for desired function.	Select one of four quadrant keys.
WRITE PROTECTED	Attempts to adjust predetermined parameters are being made to a channel location.	Enter 20 [CODE] to disable write-protect function
WRONG DIRECTION	Wrong adjustment arrow selected for desired function	Select correct arrow key for desired function.

TABLE 9-2 (continued)

9.5.2 . . . . . Operational Status Error Messages "VOLTAGE ERROR":

The following low voltages are generated by the SMPS (Switch Mode Power Supply) and may be verified by removing the fuse cover plate. See Illustration 9-3, Page 9-15 for L.E.D. layout and assignments. Grid 1, Grid 2 and High Voltage are developed on the HVPS (High Voltage Power Supply).

FUSE / VOLTAGE		MODULE														NOMINAL RESISTANCE 4	
FUSE	VOLT	CPU	ANALOG RGB1	OPTION SLOT 1	OPTION SLOT 2	CRT AMP CARD and CRT	VERTICAL DEFLECTION	H.O.T. POWER	HORIZONTAL CONTROL	H.O.T. OUTPUT	REGISTRATION	REGISTRATION AMP	FOCUS MODULATOR	HVPS	FANS	3300	4300
F1	FIL					■										170k	88k
F2	-9	■	■				■				■					1k	269
F3	-20	■	■	■	■	■	■		■		■		■	■	■	393	398
F4	-25	■										■				10k	2k8
F5	+9	■	■				■		■		■					28k	32k
F6	+20	■	■	■	■	■	■	■	■	■	■		■	■		1k	978
F7	+25	■								■		■				9k9	9k9
F8	+40	■											■			205k	197k
F9	+180	■						■		■						9k2	9k2
N/A	-50												■			N/A	
N/A	G1					■										N/A	
N/A	G2					■										N/A	
N/A	HV					■										N/A	

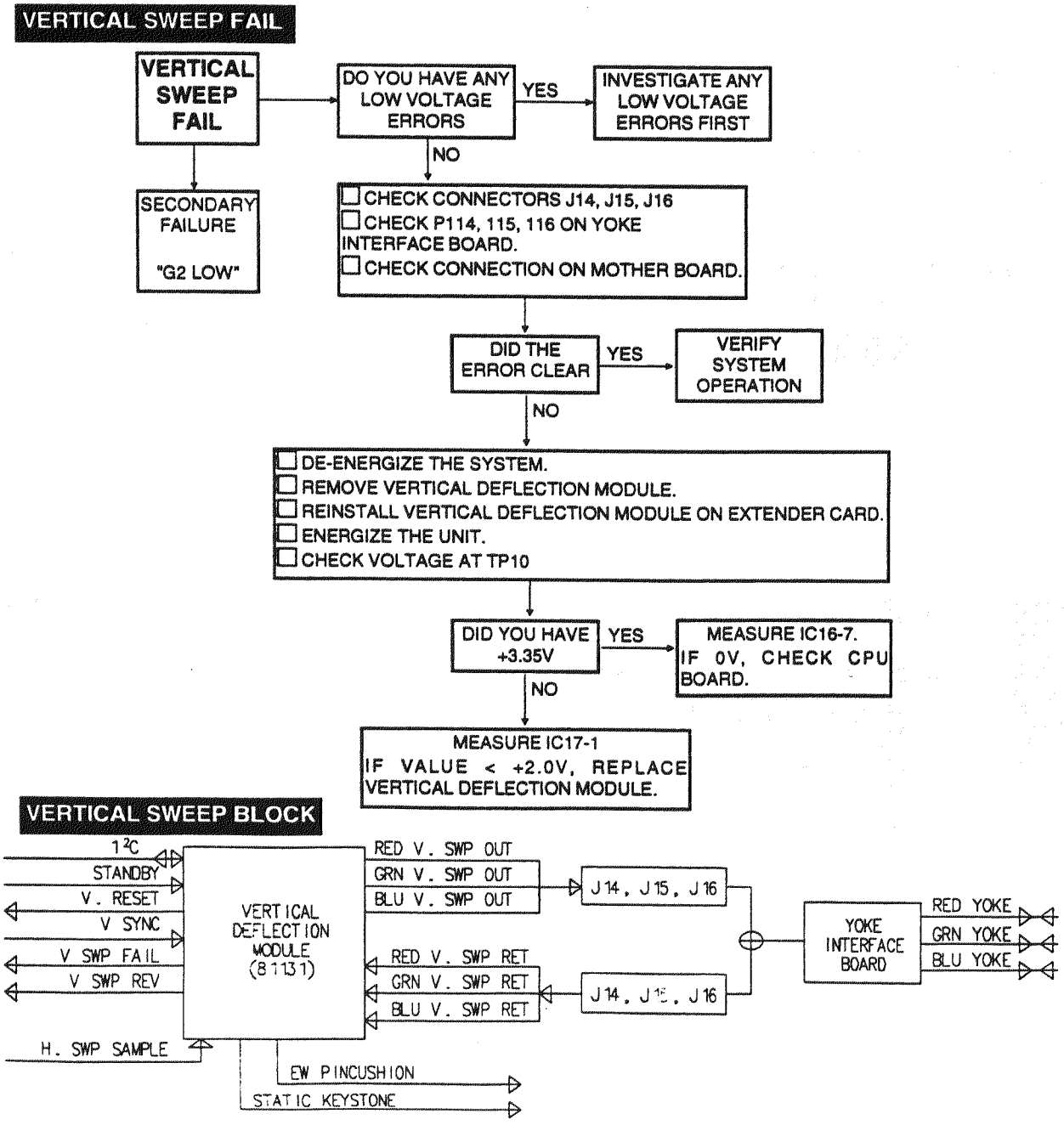
ISOLATE SHORTED RAILS BY DE-ENERGIZING UNIT, REMOVING THE POWER PLUG AND REPLACING ANY BLOWN FUSES. MEASURE RESISTANCE TO GROUND, THEN REMOVE THE APPROPRIATE MODULE(S) ONE AT A TIME UNTIL THE SHORT CLEARS.

9.5.3 . . . . Operational Status Error Messages: "WAVEFORM ERRORS"

The following is a list of possible waveform error messages that may appear on the LCD readout and the related trouble shooting guide for each.

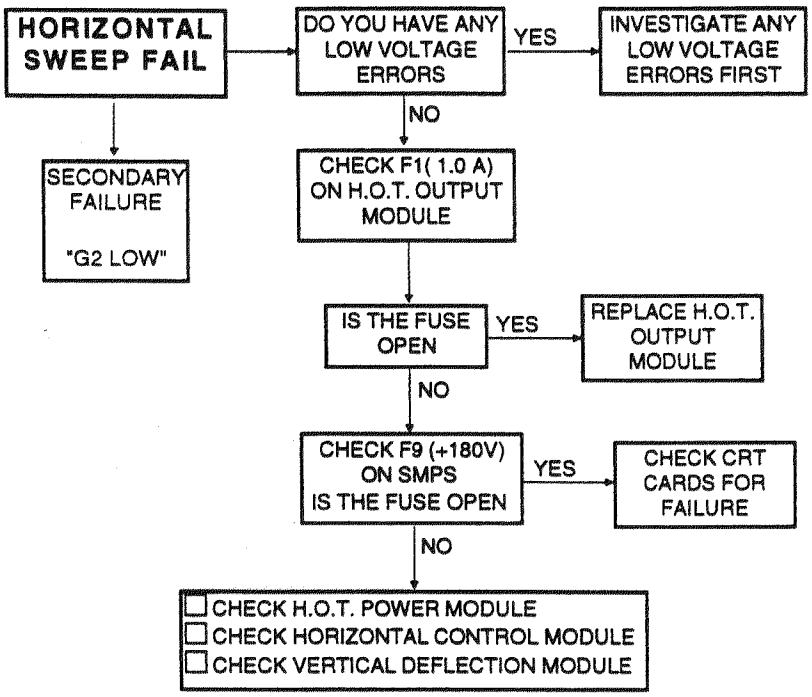
WAVEFORM ERROR MESSAGES	
"NO H SYNC" (No Horizontal Sync)	"NO H RESET" (No Horizontal Reset Pulse).
"NO V SYNC" (No Vertical Sync)	"NO V RESET" (No Vertical Reset Pulse)
"H SWEEP FAIL" (Horizontal Sweep Fail)	"G1 FAIL LOW" (Grid 1 Voltage Low).
"V SWEEP FAIL" (Vertical Sweep Fail)	NO INPUT (Check Source).

9.5.3.1 . . . . . .Vertical Sweep Failure:

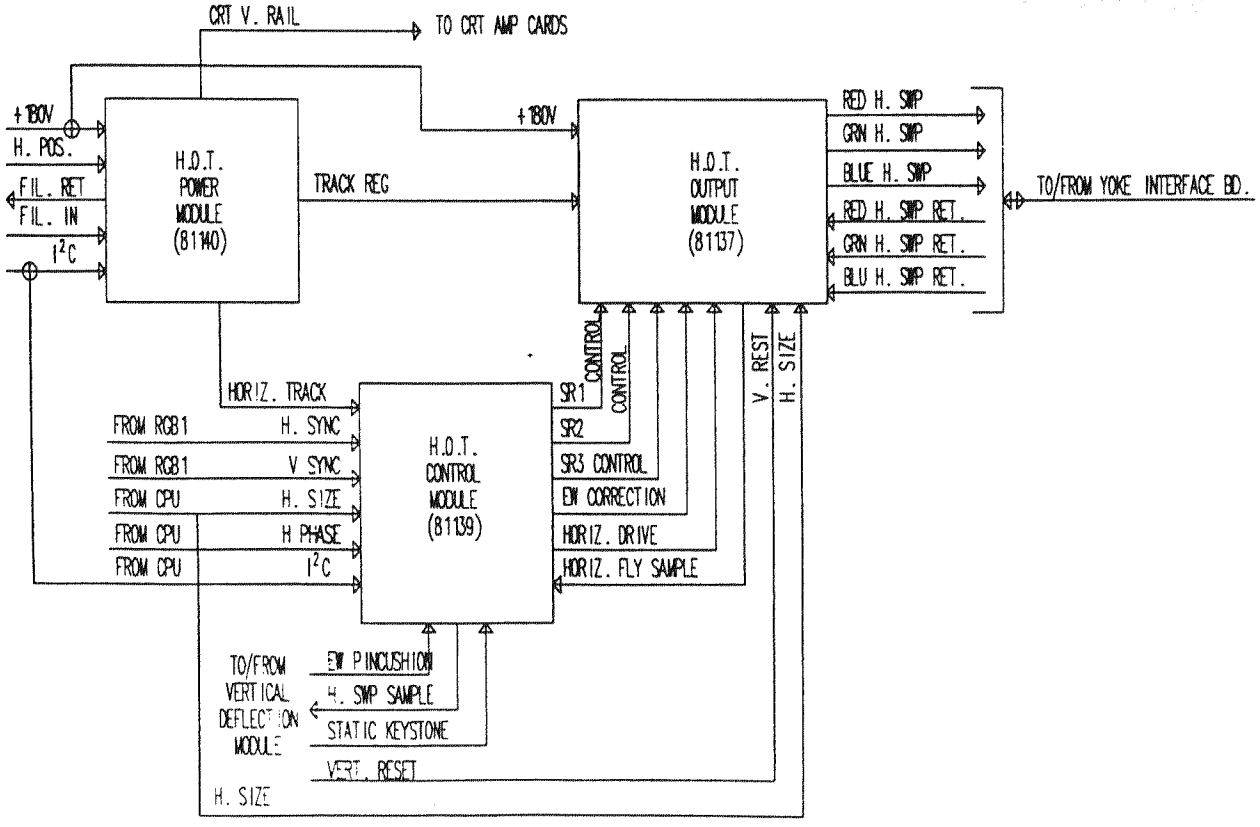


9.5.3.2 . . . Horizontal Sweep Failure:

HORIZONTAL SWEEP FAIL



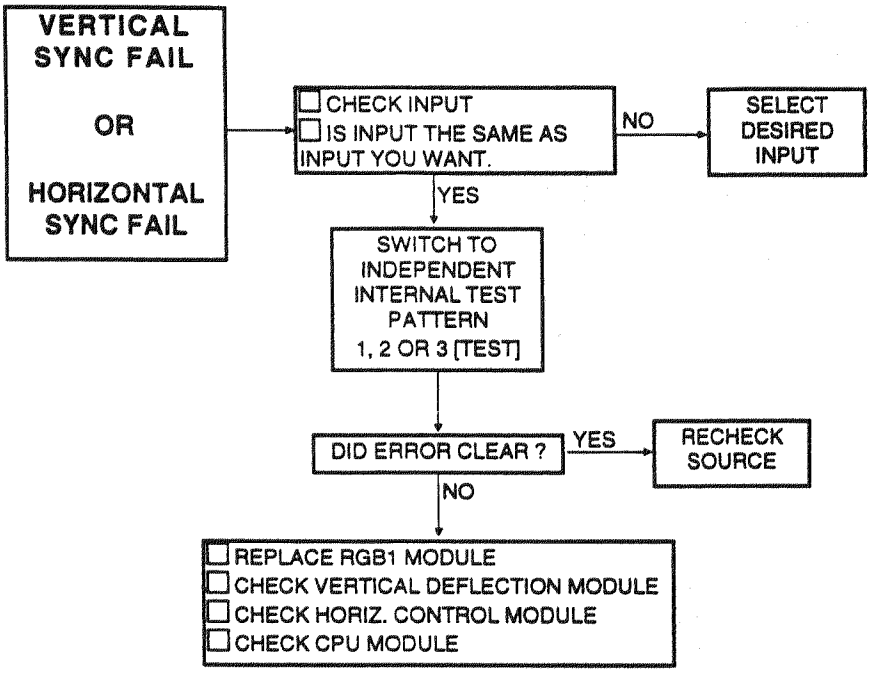
HORIZONTAL SWEEP BLOCK



9.5.3.3 . . . No Horizontal or Vertical Sync:

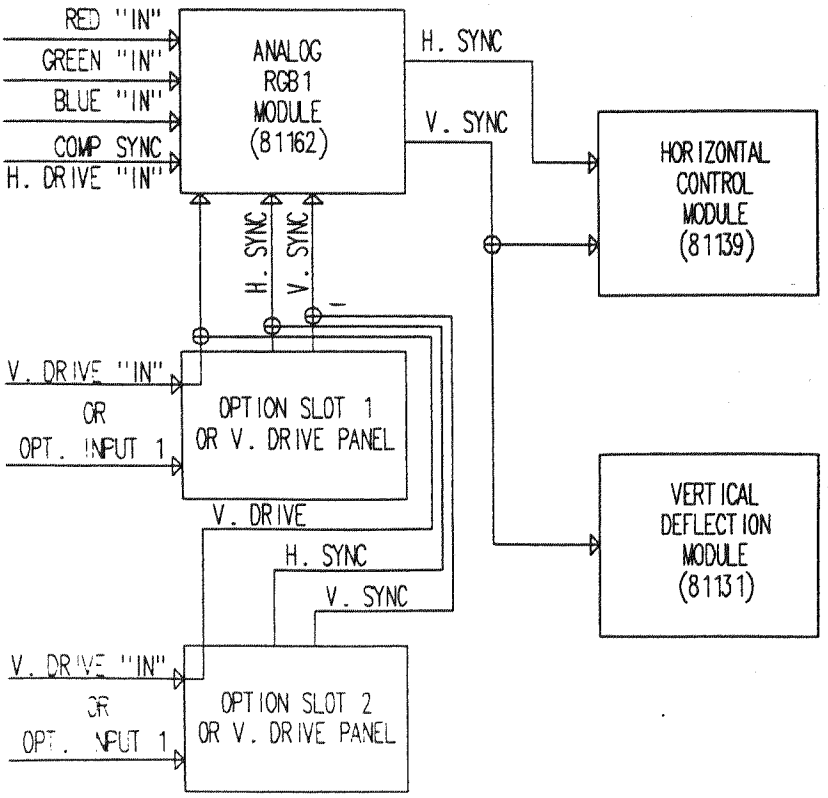
NO VERTICAL SYNC

NO HORIZONTAL SYNC



9

H&V SYNC BLOCK



9.5.3.4 . . . No Horizontal or Vertical Reset:

NO H. RESET

DO YOU HAVE ANY LOW VOLTAGE ERRORS — YES → INVESTIGATE ANY LOW VOLTAGE ERRORS FIRST

NO →

- ☐ DE-ENERGIZE THE UNIT
- ☐ DISCONNECT P51 (RIBBON) FROM REISTRATION.
- ☐ ENERGIZE THE UNIT
- ☐ DID THE ERROR CLEAR

YES → CHECK J71 FOR MISSING +/- 9V AND 20V
CHECK THE FOLLOWING VOLTAGES ON THE REGISTRATION BOARD.
- ☐ TP1 / +5V
- ☐ TP2 / +5V
- ☐ TP3 / +12V
- ☐ TP5 / +10V
- ☐ TP7 / -10V
- ☐ TP8 / -5V
- ☐ TP9 / +2.5V
- ☐ TP10 / -2.5V

IF MISSING ANY OF THE ABOVE VOLTAGES; REPLACE REGISTRATION BOARD

NO →

CHECK / REPLACE
- ☐ HORIZONTAL CONTROL MODULE
- ☐ CPU MODULE

NO V. RESET

DO YOU HAVE ANY LOW VOLTAGE ERRORS — YES → INVESTIGATE ANY LOW VOLTAGE ERRORS FIRST

NO →

- ☐ DE-ENERGIZE THE UNIT
- ☐ DISCONNECT P51 (RIBBON) FROM REISTRATION.
- ☐ ENERGIZE THE UNIT
- ☐ DID THE ERROR CLEAR

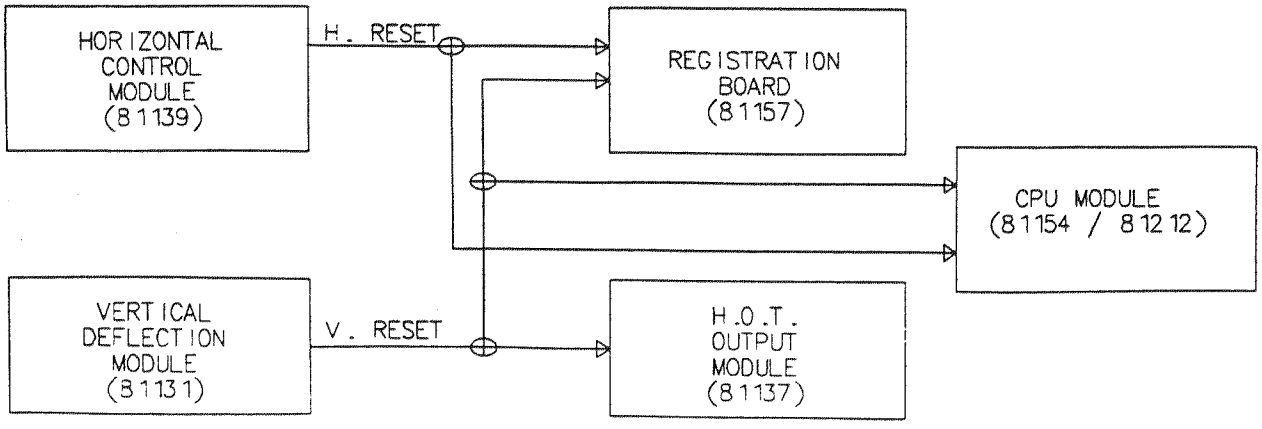
YES → CHECK J71 FOR MISSING +/- 9V AND 20V
CHECK THE FOLLOWING VOLTAGES ON THE REGISTRATION BOARD.
- ☐ TP1 / +5V
- ☐ TP2 / +5V
- ☐ TP3 / +12V
- ☐ TP5 / +10V
- ☐ TP7 / -10V
- ☐ TP8 / -5V
- ☐ TP9 / +2.5V
- ☐ TP10 / -2.5V

IF MISSING ANY OF THE ABOVE VOLTAGES; REPLACE REGISTRATION BOARD

NO →

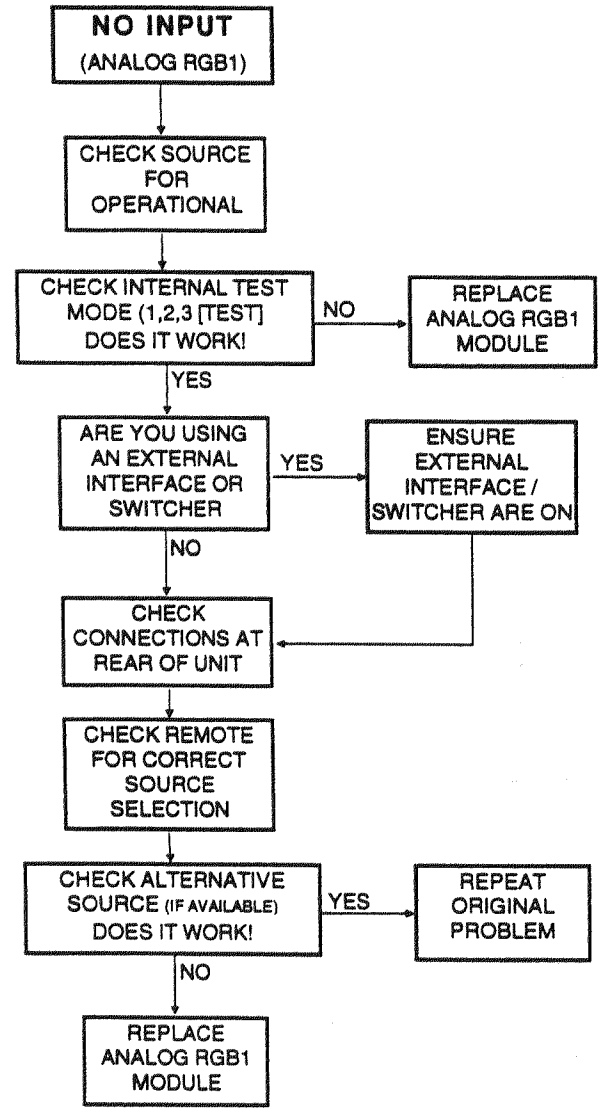
CHECK / REPLACE
- ☐ H.O.T. MODULE
- ☐ VERTICAL DEFLECTION MODULE
- ☐ CPU MODULE

H & V RESET BLOCK

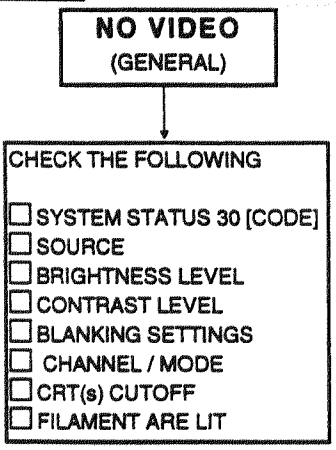


9.5.3.5 . . . No Input / No Video:

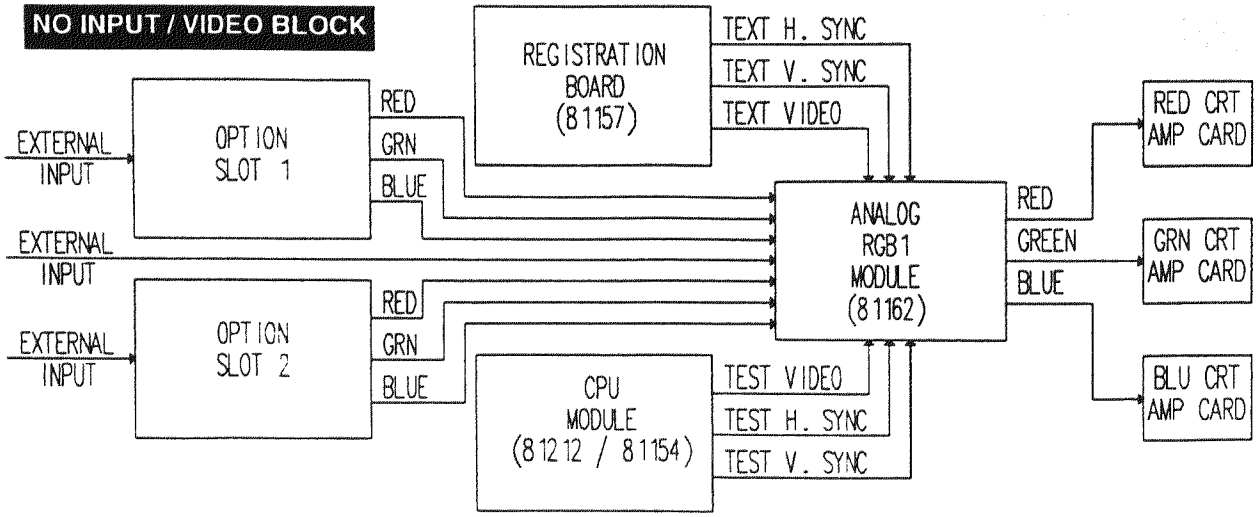
NO INPUT



NO VIDEO

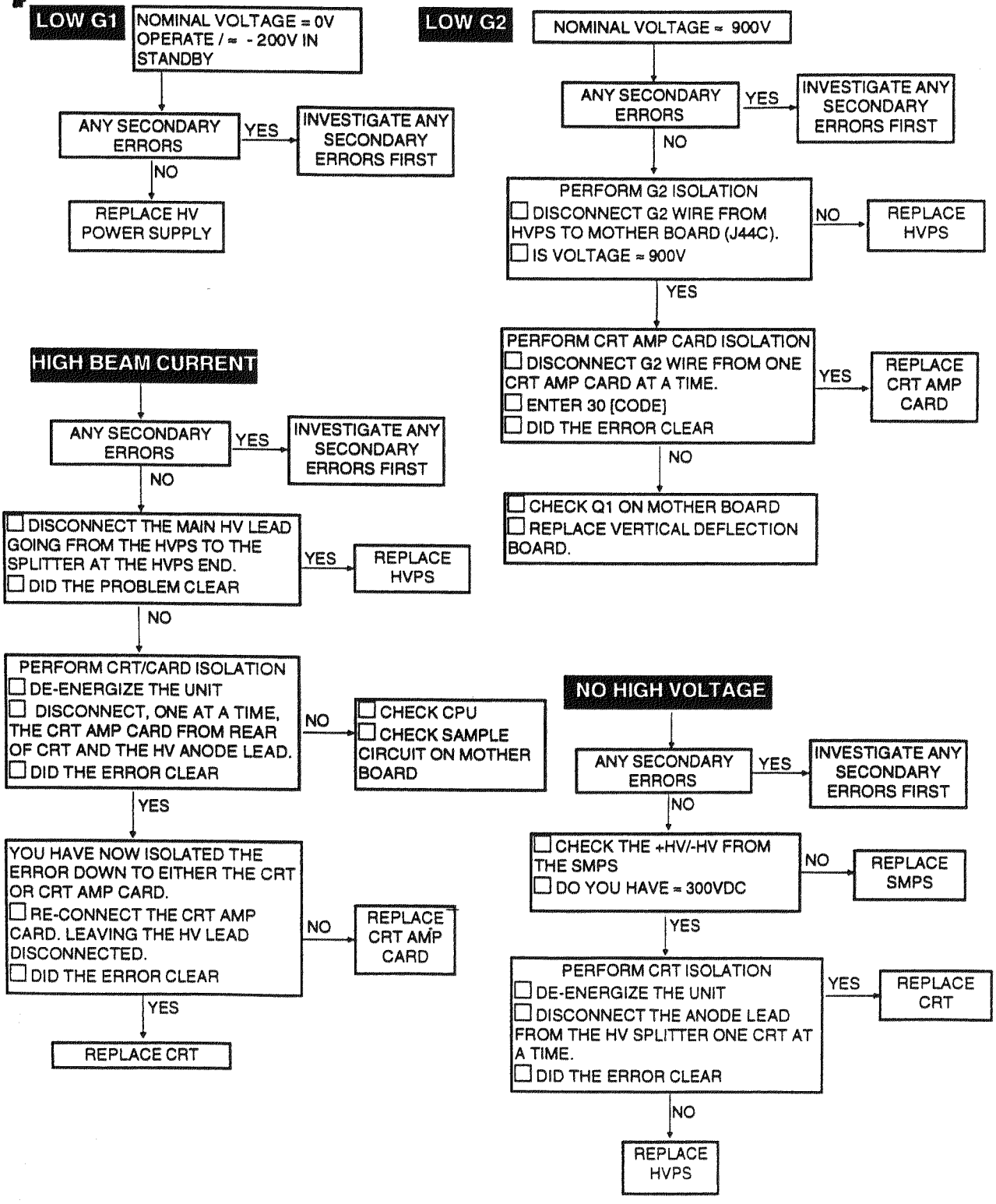


NO INPUT / VIDEO BLOCK



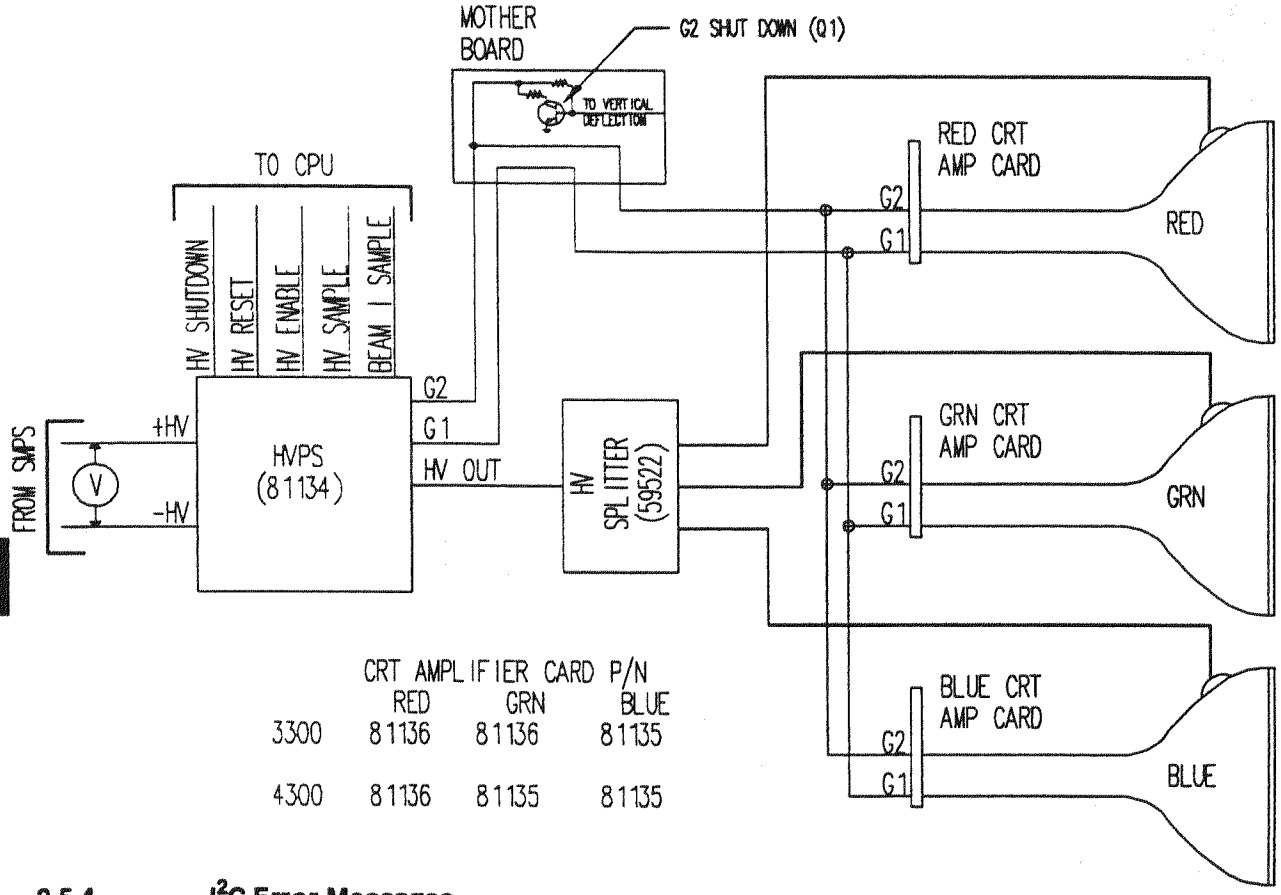
9.5.3.6 . . . Low or No G1 , G2 and/or High Voltage / High Beam Current (SEE BLOCK NEXT PAGE):

Remember! When disconnecting and reconnecting components, ALWAYS de-energize the system



9.5.3.6 . . . Low or No G1 , G2 and/or High Voltage / High Beam Current (CONTINUED):

LOW G1 / G2 / HV / HI BEAM I BLOCK



CRT AMPLIFIER CARD P/N			
	RED	GRN	BLUE
3300	81136	81136	81135
4300	81136	81135	81135

9.5.4 . . . . . .I²C Error Messages

I²C ADDRESS REFERENCE TABLE				
ADDRESS	MODULE	REFERENCE	DEVICE	DECRIPTION
A0	CPU	IC5	PCF8583D	RAM/CLOCK
A2	CPU	IC7	24C02AT	SERIAL EEPROM
40	CPU	IC37	TDA8444AT	OCTAL DAC
A6	MOTHER	IC1	24CO2	SERIAL EEPROM
A4	HORIZONTAL	IC15	X2402	SERIAL EEPROM
44	VERTICAL	IC8	TDA8444	OCTAL DAC
54	RGB1	IC15	87c751	MICROPROSSOR
74-30,32,34,36	REGISTRATION	IC21	PCF8577	LCD CONTROLLER
74-38,3A,3C,3E	REGISTRATION	IC28	PCF8577	LCD CONTROLLER
56	REGISTRATION	IC69	87c751	MICROPROSSOR
46	FOCUS MODULATOR	IC6	TDA8444	OCTAL DAC
48	FOCUS MODULATOR	IC7	TDA8444	OCTAL DAC
ERROR TYPE	DESCRIPTION			
08	NO ACKNOWLEDGE FROM I²C DEVICE			
00	OTHER ERRORS			

9.6 . . . . . Internal LED Error Indicators:

9.6.1 . . . . . .SMPS Low Voltage Indicators:

The DC outputs of the switch mode power supply are fused and indicated by the LEDs located on the upper cover of the module. Additionally, these voltages are monitored by the CPU's diagnostics routine and may be addressed by entering **[30] [CODE]**. See Figure 9-3. NOTE: All LEDs are normally "ON".

9.6.2 . . . . . .CPU LED Error Indicators:

Located on the CPU Module is a row of ten (10) mini LEDs. (CR35 through CR44) which indicate any CPU related problems, such as failure of the internal I^2C or external RS232 communications. CR43 and CR44 indicate the standby voltage conditions which are illuminated when the main AC is applied and the main toggle switch is in the "ON" position. Refer to Figure 9-3 for the operating conditions of the remaining LEDs..

CR35 - CR44 DESCRIPTION		
CR	FUNCTION	NORM
35	REGISTRATION ON/OFF	ON
36	RS232 HALT	OFF
37	RS232 FAULT	OFF
38	I^2C FAULT	OFF
39	I^2C BUSY	FLASH
40	RESERVED	OFF
41	RESERVED	OFF
42	RESERVED	OFF
43	+5V ALWAYS	ON
44	+12V ALWAYS	ON

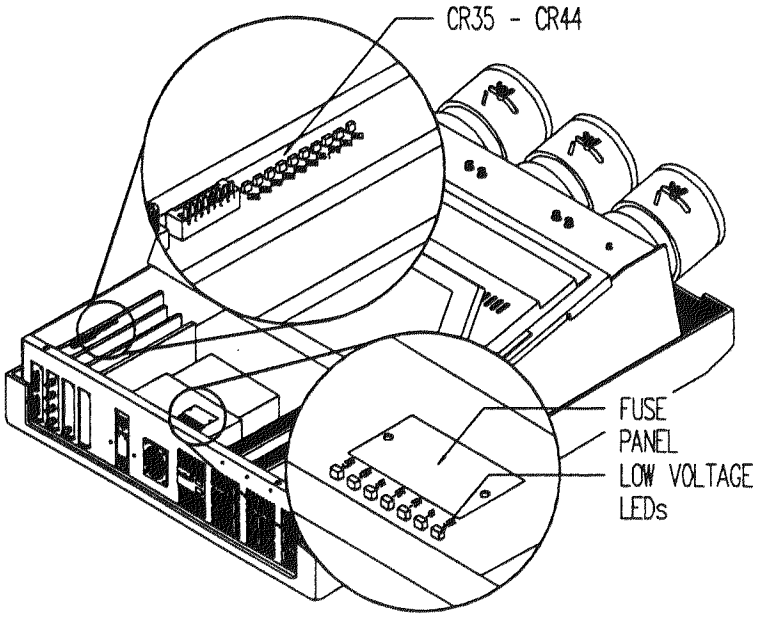


FIGURE 9-3.

9.7 . . . . . Servicing Policy:

Repair of the AmPro modular designed systems shall be accomplished exclusively through a factory sub-assembly module exchange program. Servicing by a AMPRO Corporation Service Center or by an AMPRO Corporation selling dealer, is limited to failure diagnostics, registration alignment, and replacement of CRT assemblies, lenses, and sub-assembly modules.

No material and/or labor credit will be granted for an exchange sub-assembly, if it has been repaired, reworked or modified. The warranty is voided if a repair, rework and/or modification of a sub-assembly module is performed other than by AMPRO Corporation.

To return a sub-assembly module for exchange a Return Authorization number (RA number) must be obtained from the AMPRO Corporation Customer Service Department. To obtain an RA number for exchange of a sub-assembly module it will be necessary to have the following for the Customer Service Representative.

- ☐ Particular Symptom(s)
- ☐ Model Number
- ☐ Serial Number

9

AMPRO
CORPORATION

TECHNICAL SERVICE DEPARTMENT
525 JOHN RODES BOULEVARD
MELBOURNE, FLORIDA 32934
VOICE (407) 254-3000 ♦ FAX (407)253-3001 ♦ 800-254-3001

Section 10

Module Identification / Replacement

10.1 . . . . . Opening the Top Cover:

To access the internal modules and perform the various procedures, the top cover of the system must be unlocked and tilted up, see Figure 10-1. In addition to the opening the top cover, Tray 1 and or Tray 2 will have to be unlocked and tilted-up, see Section 10.2.

- STEP 1. The top cover is lifted by; (1) turning the two each 1/4 turn fasteners located on both sides of the bottom cover, towards the lens end of the system. (2) pull and lock the two top cover hinges located on both sides towards the rear of the system.

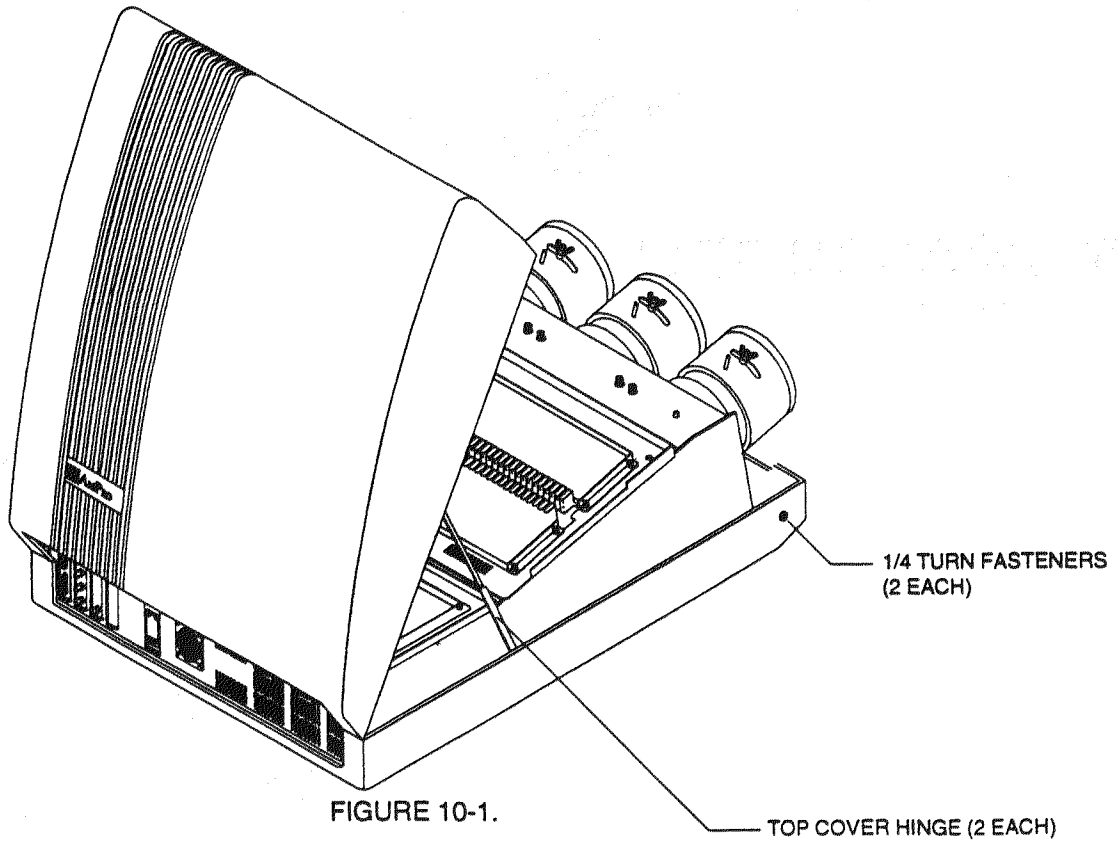
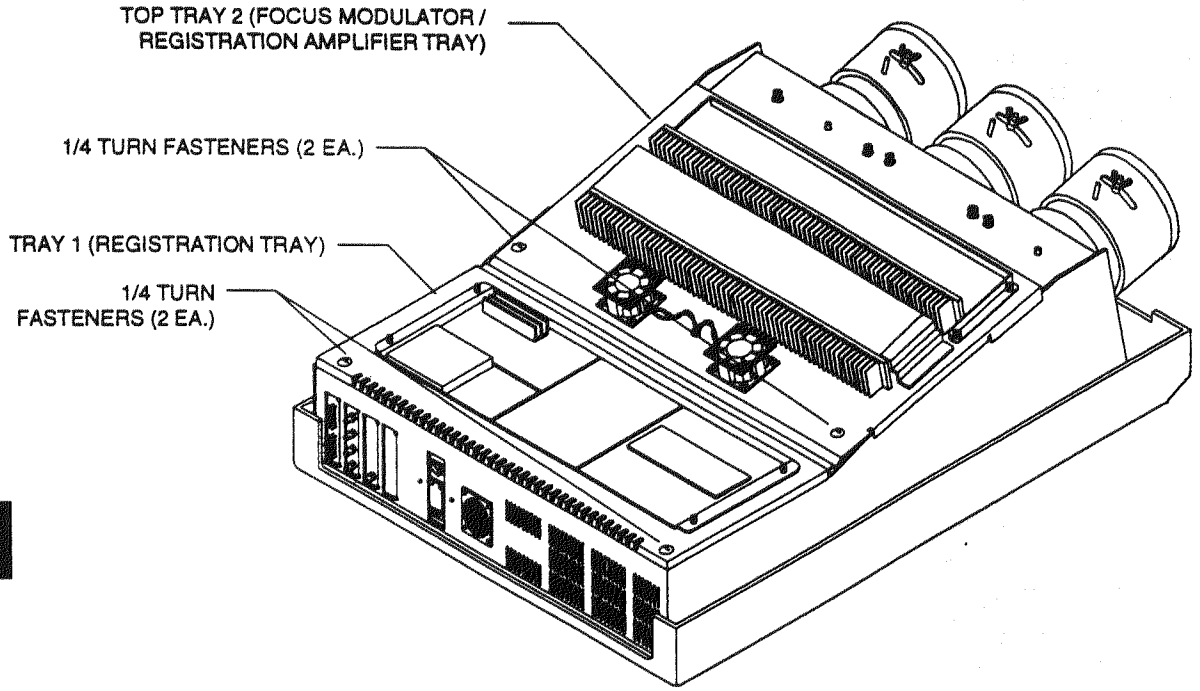


FIGURE 10-1.

10.2 . . . . Top Tray 1 and Tray 2 Assemblies.

- STEP 2. Unlock and tilt up the registration tray assembly and the registration amplifier / focus modulator tray assembly. See Figure 10-2.

AMPRO 3300



AMPRO 4300

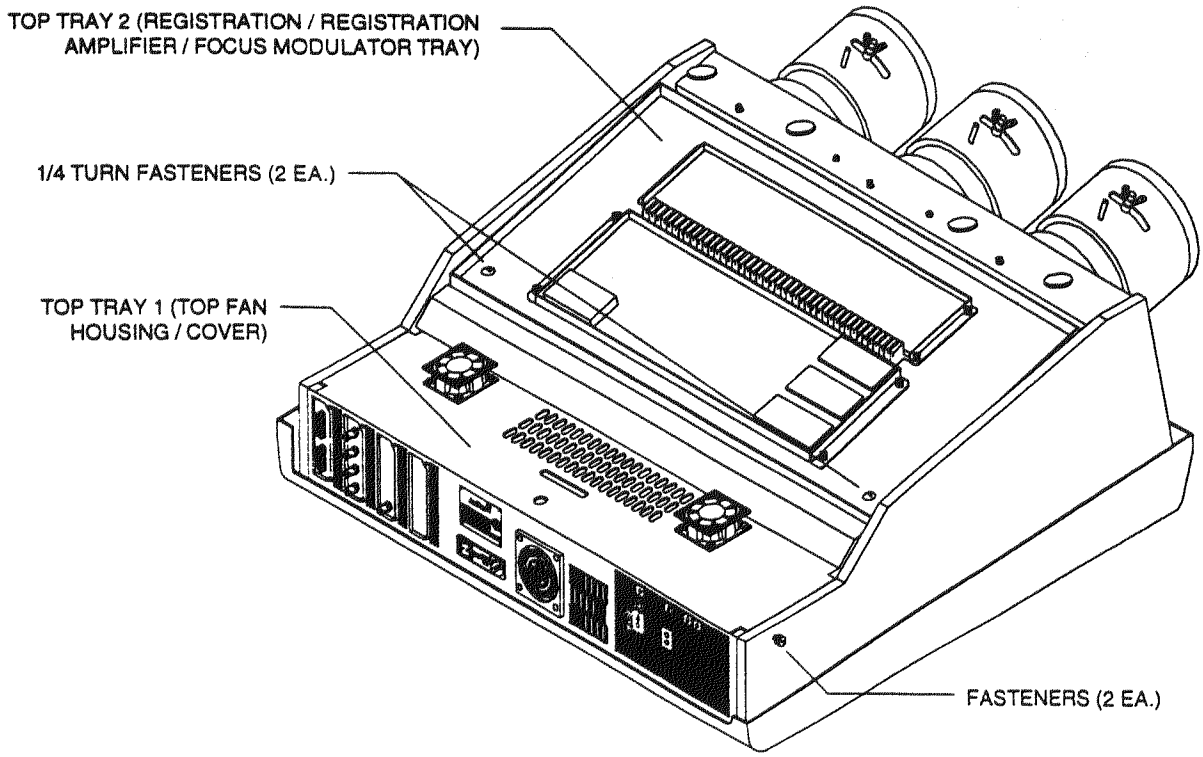
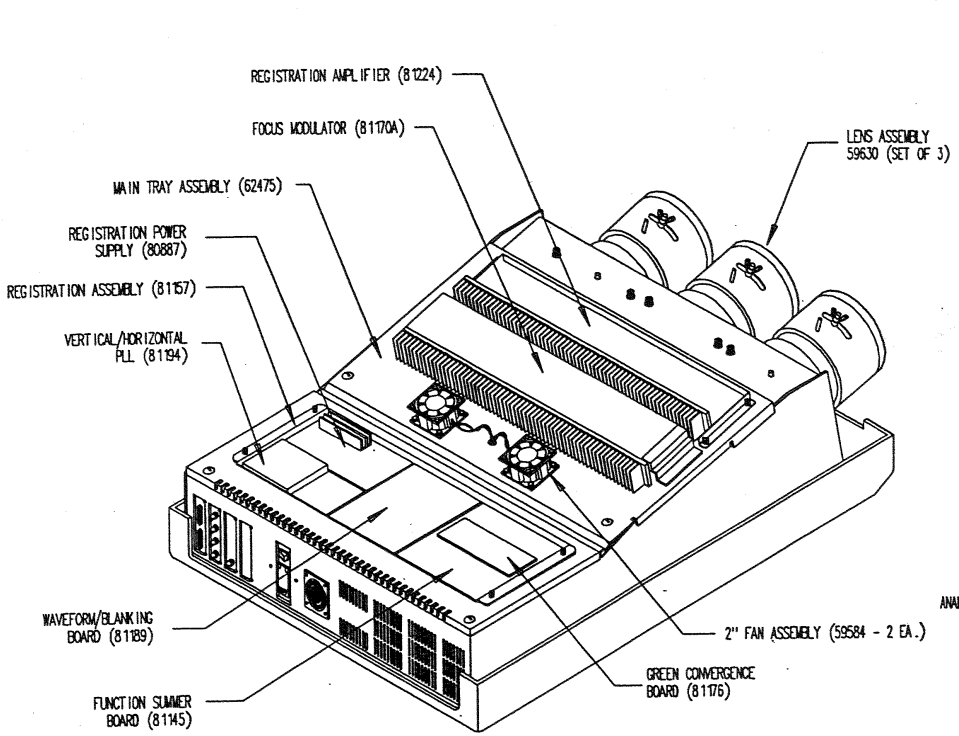
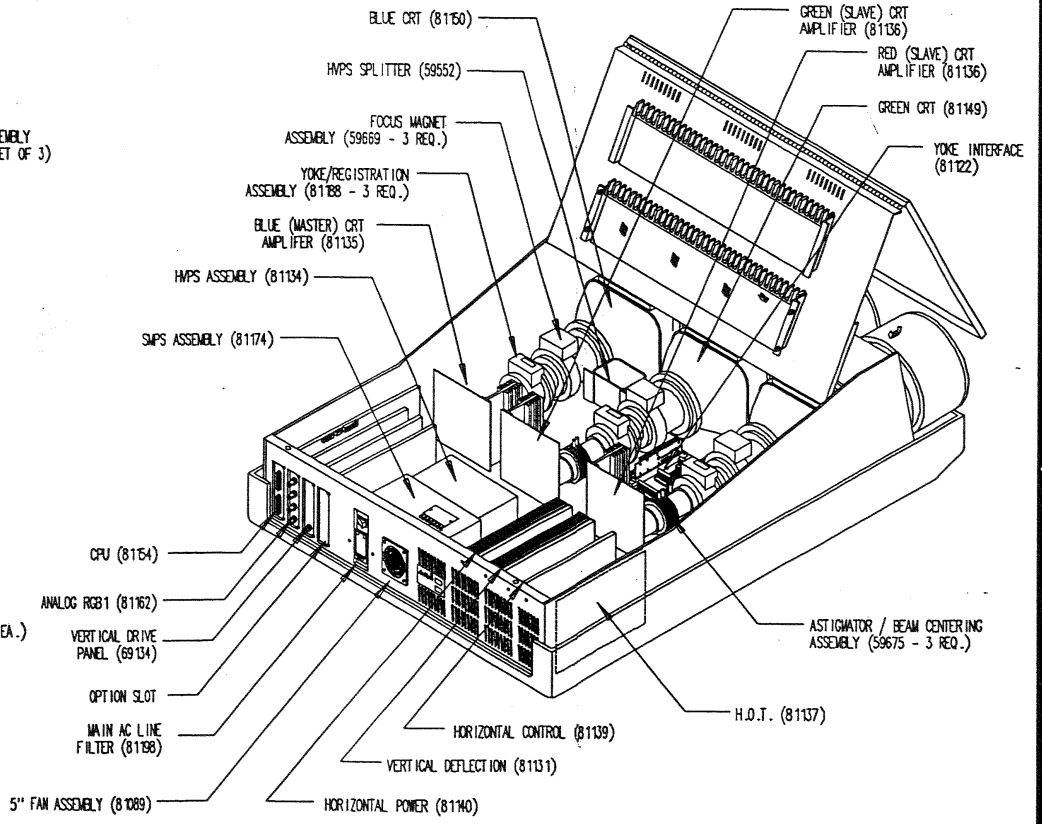


FIGURE 10-2. LOCATION/ACCESSING TOP TRAY 1 AND 2.

10.3 . . . . . .Module Identification: AMPRO 3300:



*81157 ASSEMBLY INCLUDES: 80887, 81145, 81176, 81189 AND 81194



10.5 Module Replacement Procedures:

10.5.1 CPU Module: 3300 (81154) / 4300 (81153):

Tools Required

☐ SLOTTED SCREWDRIVER ☐ SMALL PHILLIPS SCREWDRIVER

Replacement Procedure

NOTE 1: Refer to the technical data of the Upload/Download program for downloading (storing) of pre-established channel data.

- STEP 1. Disconnect the main A.C. power cord, and lift the top cover up.
- STEP 2. Disconnect all connectors from the "HOST" and "SLAVE" ports on the CPU module.
- STEP 3A. On the 3300, Unlock and tilt-up the back half of the main tray assembly.
- STEP 3B. On the 4300, unlock and tilt-up the main tray, (fan housing/cover) assembly.
- STEP 4. Remove the single 4-40 phillips screw securing the CPU module to the left side of the chassis, as viewed from the rear.
- STEP 5. Remove the two (2 each) 4-40 phillips screws, mounting the CPU module to the rear panel.
- STEP 6. Carefully remove the CPU from the chassis.
- STEP 7. Install the replacement module and secure with the previously removed hardware. Perform Steps 1 through 3A/3B in reverse order.

NOTE 2: Ensure the the address switches (SW1/SW2) and the baud rate switch (SW3-7/SW3-8) and handshaking enable/disable (SW3-2) and networking switch (SW3-1) are set to the desired positions.

NOTE 3: Refer to the technical data furnished with the upload/download program for restoring pre-established channel data.

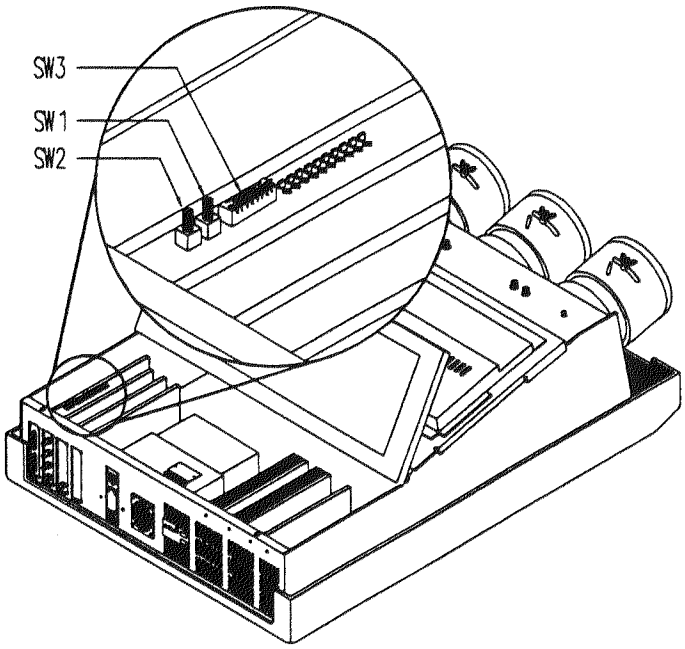


FIGURE 10-3. CPU REPLACEMENT.

NOTES:

10.5.2 . . . Analog RGB1 Module (81162) Replacement Procedure:

Tools Required

☐ Small Slotted and Phillips screwdriver ☐ 120MHz dual trace oscilloscope and probes

☐ NTSC color bar video generator ☐ 1 "in" / 3 "out" distribution amplifier

Replacement Procedure

- STEP 1. Disconnect the main A.C. power cord and unlock/tilt-up the top cover assembly.
- STEP 2. Unlock and tilt-up the main tray assembly.
- STEP 3. On the RGB1 module (second module from the left, as viewed from the rear). Remove the three (3) mini coax cables located midway on the module. See Figure 10-4.
- STEP 4. Remove the two (2) each 4-40 phillips screws securing the RGB1 module to the rear panel, lift the RGB1 module straight up and out.
- STEP 5. Install the replacement RGB1 module and secure with the hardware previously removed.
- STEP 6. Re-connect the three (3) mini coax cables, in their proper order to their respective connectors on the RGB1 module. See Figure 10-4.

NOTE: White dot on side of P6, P7 and P8 faces board.

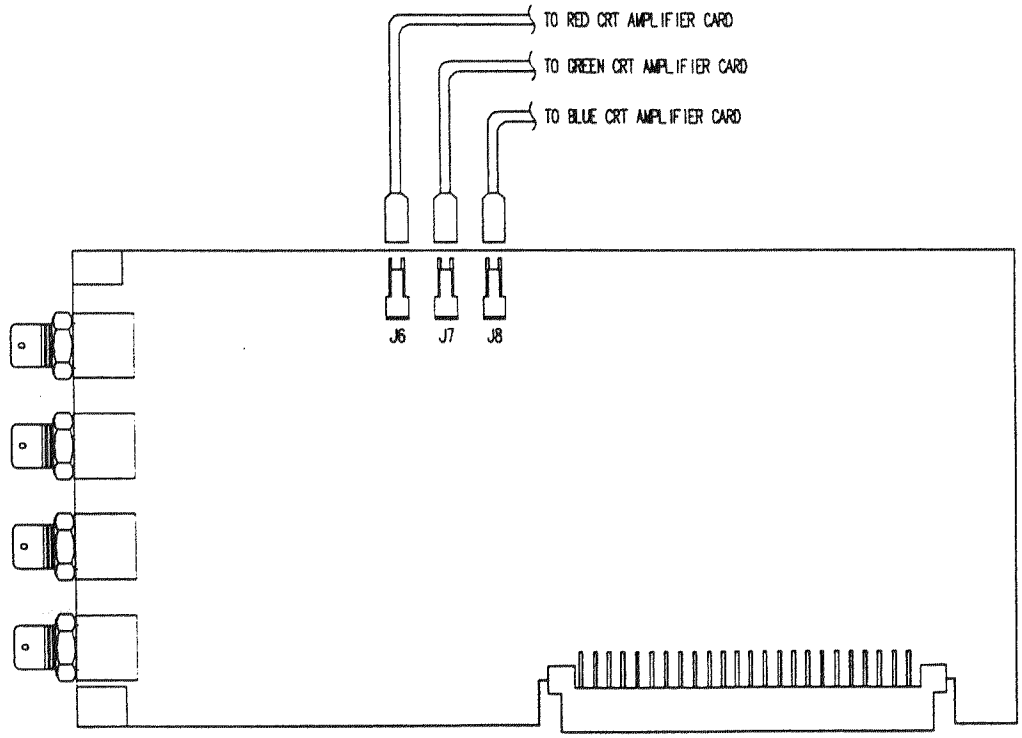


FIGURE 10-4. RGB1 module replacement.

Analog RGB1 Verification Test

Since the operating parameters of the RGB1 module are digitally controlled by the remote and stored on the CPU module within individual channel locations, it is not required to set-up the operating parameters of the RGB1 module. A verification of operation is only required.

Analog RGB1 Operation Verification Prerequisites

- ☐ INPUT: 1vp-p color bars w/IWQ, burst and chroma off.....into a 1 "in" - 3 "out" video distribution amplifier, connected to the Red, Green and Blue inputs located on the rear panel of the RGB1 module.
- ☐ CLAMPING: select back-porch clamping, [48] [CODE].
- ☐ CHANNEL: any channel not presently assigned or used.
- ☐ MODE: RGB mode of operation, preferable set (converged) for 15kHz.
- ☐ REMOTE SETTINGS: brightness [BRITE] and contrast [CONT] at 95%. Set left blanking to 5% and right blanking to 95%

Analog RGB1Operation Verification Procedure: (Refer to Figures 10-5 and 10-6)

- STEP 1. Set the CRT cutoffs;

  A.) Cutoff all three CRTs using the remote control [CUTOFF] [RED] [GREEN] [BLUE].

  B.) Look into each lens and adjust the CRT G2 control R2, on each CRT Amplifier Card so that there is no raster visible, restore CRT cutoffs.

10

- STEP 2. Verify grayscale or operation of the RGB1 module. NOTE: all test points (TP) reference in the procedure are located on each individual CRT Amplifier Card.

  A.) GREEN VIDEO: With the oscilloscope, probe TP4 on the Green CRT amplifier Card, set Green Sub-brite (black level) to +170V above ground (zero) reference using [95] [CODE] [GREEN]. Set green Sub-contrast for peak white of +40v above ground (zero) reference using [94] [CODE] [GREEN]. Toggle Green CRT off.

  B.) RED VIDEO: probe TP4 on the Red CRT Amplifier Card, set Red Sub-brite [95] [CODE] [RED], to +170v above ground and Sub- contrast [94] [CODE] [RED] for peak white of +40V above ground. Toggle the Red CRT off.

  C.) BLUE VIDEO: probe TP4 on the Blue CRT Amplifier Card, set Blue Sub-brite [95] [CODE] [BLUE], to +170v above ground and Sub- contrast [94] [CODE] [BLUE] for peak white of +40V above ground. Toggle the Blue CRT off.

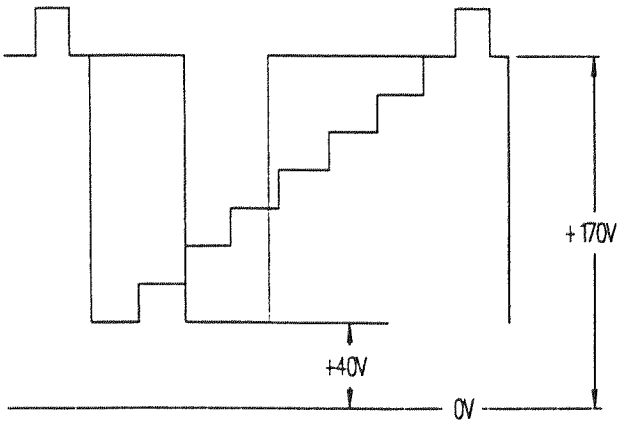


FIGURE 10-5. Video setup waveform.

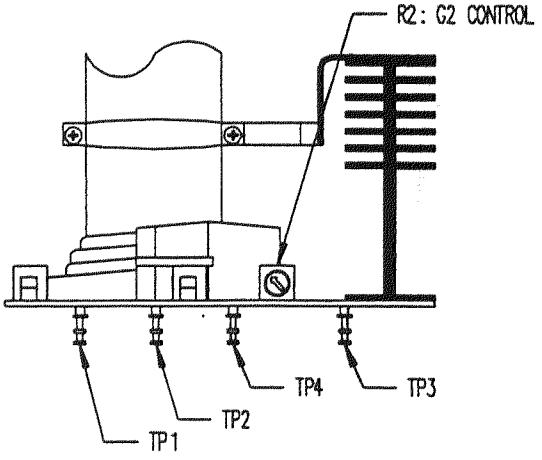


FIGURE 10-6. CRT card (top view). (Blue CRT card)

10.5.3 . . . Quad Video Decoder 1(81083A), (69409) Replacement Procedure:

Tools Required

☐ SMALL SLOTTED SCREWDRIVER ☐ SMALL PHILLIPS SCREWDRIVER

☐ DUAL TRACE OSCILLOSCOPE(PROBES) ☐ NTSC COLOR BAR GENERATOR

Replacement Procedure

- STEP 1. Disconnect the main AC power cord, unlock and tilt up the Registration Tray assembly.
- STEP 2. Remove the two each 4-40 phillips screws and washers securing the QVD module to the rear panel and lift this module straight up and out.
- STEP 3. Install the replacement QVD module and secure with the hardware previously removed.

Pre-adjustments Requirements

☐ INPUT: 1vp-p color bars with IWQ, burst and chroma "off".

☐ CHANNEL: Any channel setup for NTSC 3.58 video operation, write protect "off" [20] [CODE].

☐ REMOTE SETTINGS: Set brightness [BRITE] and contrast [CONT] to 95%.

NOTE: On the QVD module, ensure that the 75 ohm termination switch placed to the "IN" position.

Adjustment Procedure: (Refer to Figures 10-7, 10-8 and 10-9)

ENSURE THAT THE ANALOG RGB1 MODULE HAS BEEN PROPERLY ADJUSTED BEFORE CONTINUING WITH THIS PROCEDURE.

- STEP 1. Apply AC power and energize the system.
- STEP 2. GREEN VIDEO: probe TP4 on the CRT Amplifier Card.
- STEP 3. Set Master Sub-brite (R111) to +170V above ground reference and Master Sub-contrast (R91) for peak white of +40v above ground reference.
- STEP 4. RED VIDEO: probe TP4 on the Red CRT amplifier Card, set Red Sub-brite (R86) for peak white of +40v above ground reference.
- STEP 5. BLUE VIDEO: probe TP4 on the Blue CRT Amplifier card and set Blue Sub-brite (R98) for peak white of +40v above ground reference.
- STEP 6. ALL COLORS ON: select an "off-the-air" composite video signal and enable monochrome mode of operation (no color) by entering [49] [CODE].
- STEP 7. Optimize the grayscale as necessary by further adjustments of the Red and Blue Sub-brite(s).

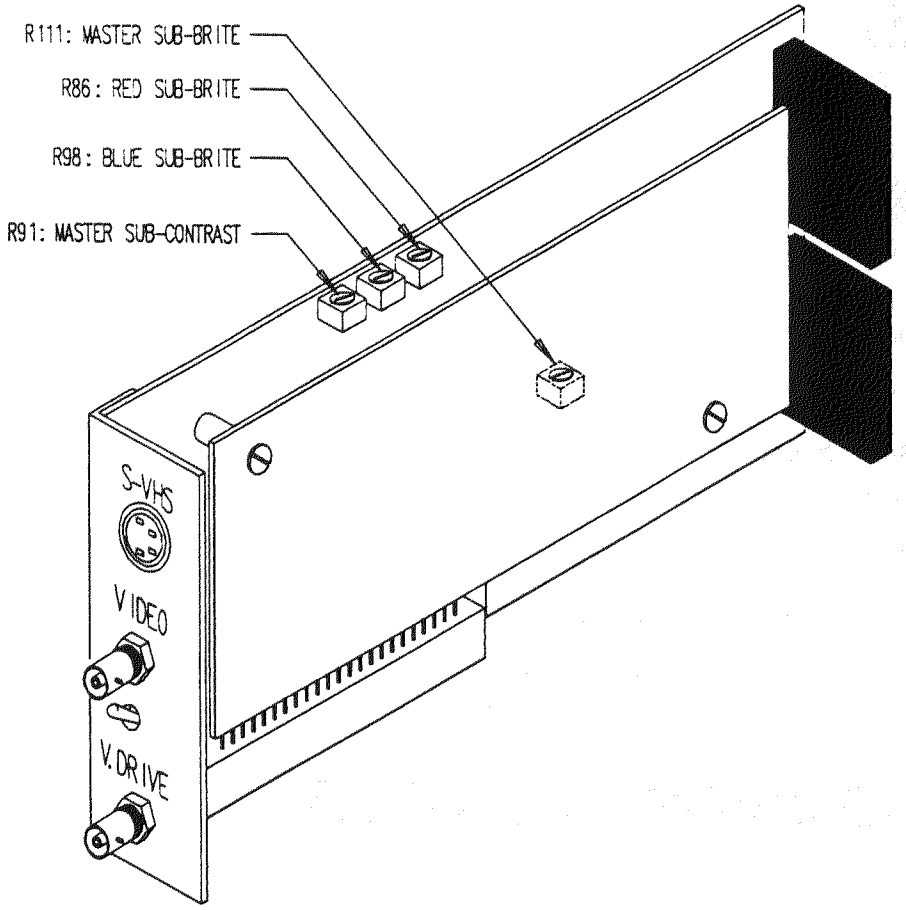


FIGURE 10-7. QVD1 ADJUSTMENT LOCATIONS.

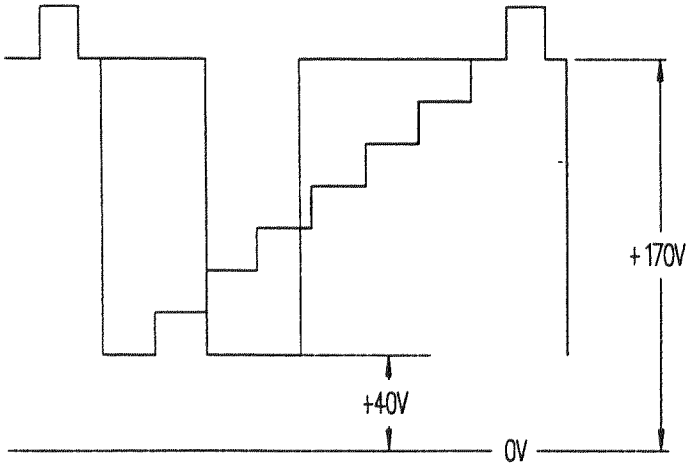


FIGURE 10-8. VIDEO SETUP WAVEFORM.

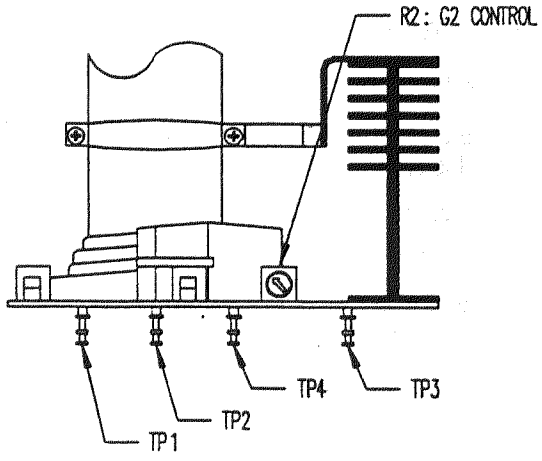


FIGURE 10-9. CRT CARD TOP VIEW.
(BLUE CRT CARD SHOWN)

10.5.3.1 . . . QVD1 (69409) Module Installation Supplement:

This section provides the necessary information for installing, as a new addition, the optional Quad Video Decoder 1 module for the AmPro 3300 and 4300 Display Systems.

For the following procedure the top cover and the Registration Tray (Main Tray) assembly must be unlocked and tilted up.

Refer to Section 3 for the installation location of the Quad Video Decoder 1 (QVD1) module.

Installation Procedure

- STEP 1. De-energize the system and remove the main AC power cord.

☞ If the third slot is empty, then;

- STEP 2. Remove the existing module or panel from the third slot from the left, as viewed from the rear-table mounted, by removing the two each 4-40 phillip screws and washers.
- STEP 3. With the third slot empty, install the QVD1 module and secure with the hardware previously removed.

☞ If the third slot is used, then perform Steps 2 and 3 using the fourth slot from the left, as viewed from the rear - table mounted.

- STEP 4. Locate SW3 (8 position DIP) on the CPU module. Switch SW3-6 to the "on" position. Replace the power cord and energize the system. Refer to Figure 10-10
- STEP 5. Once the system has been initialized, use the numeric keypad and enter [70] [CODE].
- STEP 6. Upon entering 70 CODE, the LCD read-out will display the current module configuration. Use the [⇑] and [⇓] arrow keys to scroll through the module listings until the proper (new) module configuration is display in the LCD read-out. Press [CODE] to select.

☐ **NOTE**: All 50 channels locations will be automatically reset to operate in the Analog RGB1 mode, Channel "mode" reassignment may be required.

- STEP 7. Return SW3-6 to the "off" position and enter [44] [CODE], (READ SWITCHES).
- STEP 8. To verify your installation enter [34] [CODE], and view the LCD read-out.
- STEP 9. Lower and lock the Registration Tray (Main Tray) and top cover assemblies into place.

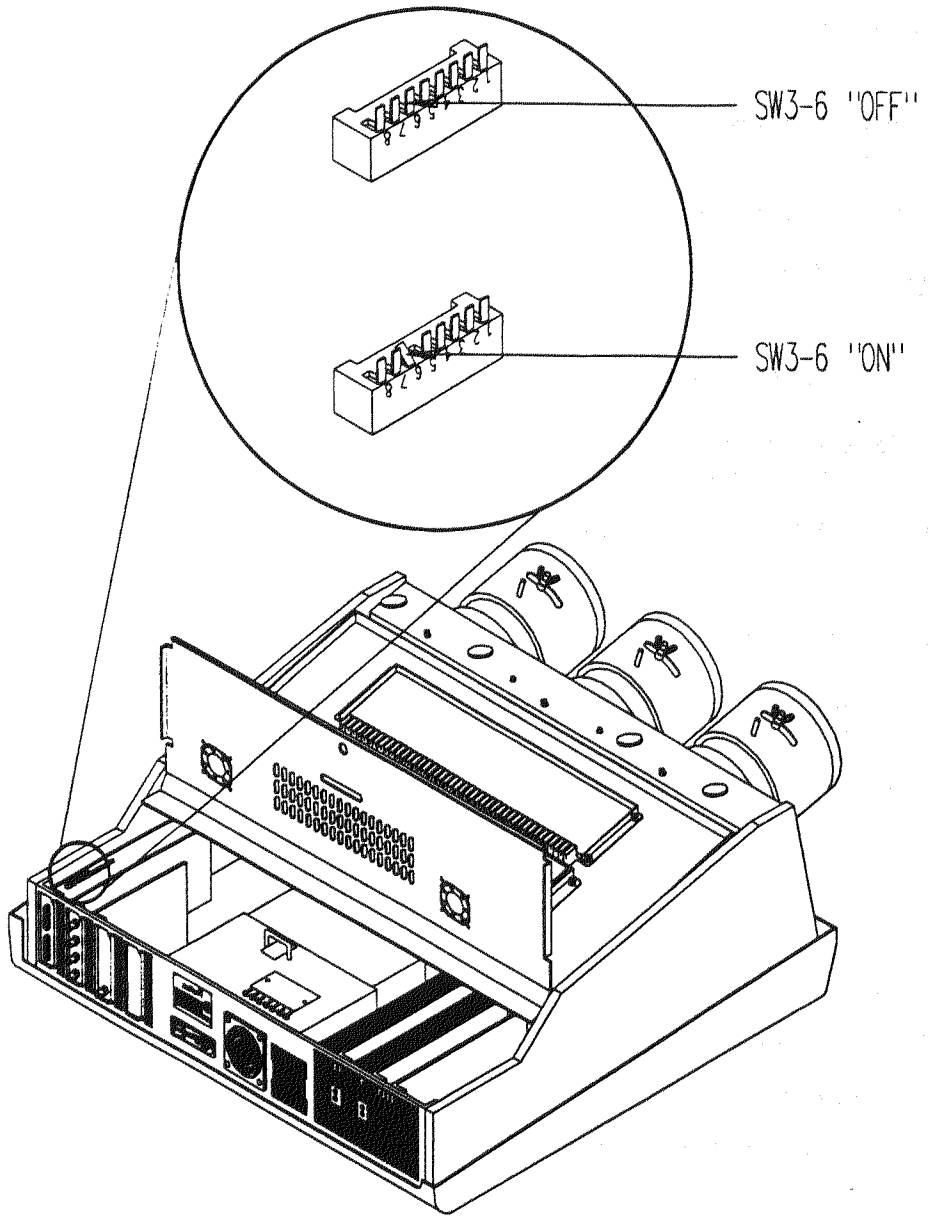


FIGURE 10-10. DIP SW3 position 6 (SW3-6) LOCATION.

(AMPRO 4300 SHOWN)

10.5.4 . . . . CRT Amplifier Card (81135)/(81136) Replacement Procedure:

Tools Required

☐ Phillips Screwdriver ☐ Small Slotted/Phillips Alignment Tool

☐ Multi-frequency RGB Video Generator w/High Frequency Resolution Pattern - SMPTE 133.

Replacement Procedure

- STEP 1. De-energize the system, remove the main AC power cord.
- STEP 2. Unlock and tilt-up the top cover assembly.
- STEP 3. 3300: unlock and tilt-up the main tray assembly, 4300: unlock and tilt-up the Main tray and Tray 1 assembly.
- STEP 4. On the CRT Amplifier Card to be replaced; disconnect J7, J8, the ground lead and the G2 in-line connectors.
- STEP 5. Loosen the CRT Amplifier clamp screws (2 each) which secures the card to the tube.
- STEP 6. Carefully slide the Amplifier Card back and off the CRT.
- STEP 7. Install the replacement CRT Amplifier Card reversing steps 6 through 4.

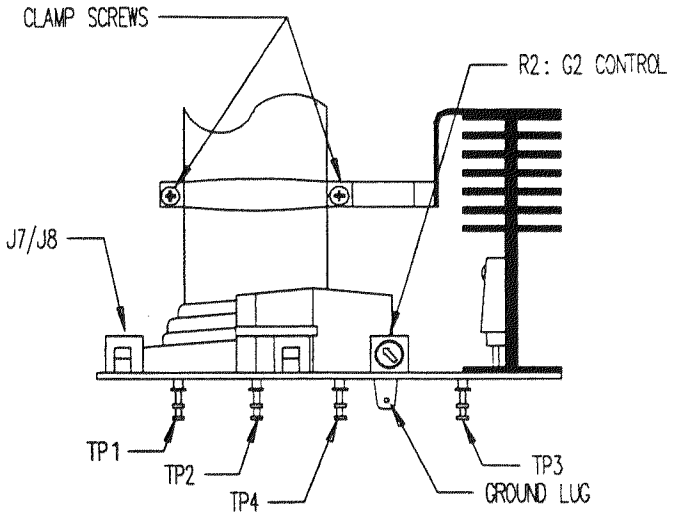


FIGURE 10-11. CRT AMPLIFIER CARD TOP VIEW.

Adjustment Procedures

- STEP 1. Apply the main AC power and initialize the system.
- STEP 2 Cutoff ([CUTOFF]) CRT under test.
- STEP 3. G2 ADJUSTMENT: Looking into the lens of the CRT under test, adjust the respective G2 control until a raster is barely visible, then turn the control CCW until the raster just goes black.

CRT Amplifier Card Adjustment Procedures: (If Required)

The CRT Amplifiers cards are preset at the factory for optimum frequency response. If it becomes necessary to adjust the CRT Amplifier Card follow Step 4.

- STEP 4. Verify High Frequency Response:
  - Select the SMPTE 133 high resolution test pattern - 1280 X 1024 at 64kHz. Observe the resolution blocks in the middle of the test pattern. Verify that the black resolution lines in the high frequency resolution blocks black levels are equal.
  - **If necessary,** adjust trimmer capacitor, C28 on the Amplifier Card (component side) under test to obtain equal levels (balance) of the black resolution lines in both the vertical and horizontal resolution blocks. See Figure 10-12.
- STEP 5. De-energize the system, and remove the main AC power cord.
- STEP 6. Lower and lock the tray assemblies into place.

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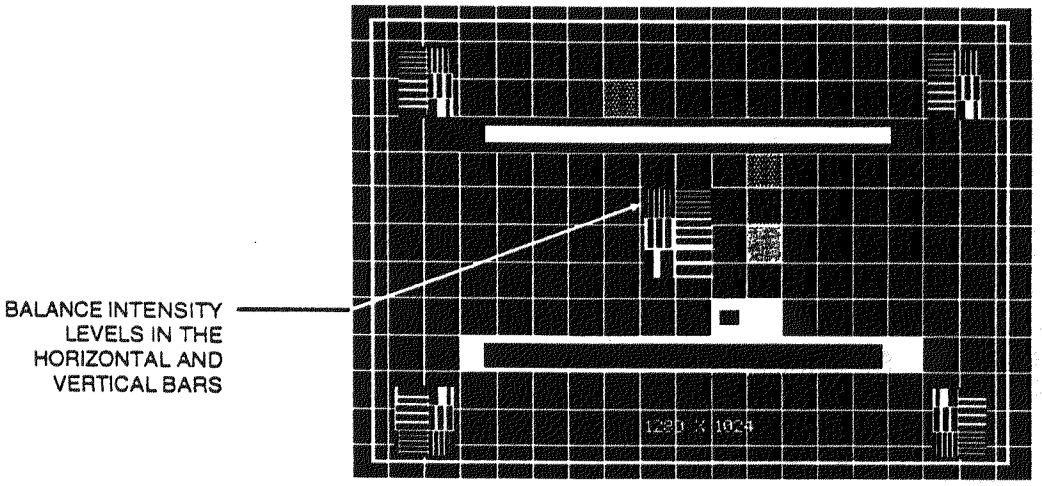

FIGURE 10-12. SMPTE 133 RESOLUTION PATTERN.

10.5.5 . . . . Vertical Deflection Module (81131) Replacement:

Tools Required

☐ Small Slotted Screwdriver ☐ Small Phillips Screwdriver

☐ Small Slotted Alignment Tool

Replacement Procedure

- STEP 1. De-energize the system and remove the main AC power cord.
- STEP 2. Unlock and tilt-up the top cover assembly
- STEP 3. 3300: Unlock and tilt-up the rear section of the main tray. 4300: Unlock and tilt-up the main tray assembly (Registration board).

The Vertical Deflection Module is located in the thrid slot from the right, as viewed from the rear, table mounted.

- STEP 4. Remove the single 4-40 phillips screw and lock securing the Vertical Deflection Module to the rear panel.
- STEP 5. Install the replacement Vertical Deflection Module and secure with the hardware previously removed.
- STEP 6. Lower and lock the tray and top cover assemblies in place.

Adjustment Procedure

- STEP 1. Connect the main AC power cord and initialize the system.
- STEP 2. Select the internal 15kHz crosshatch test pattern - ([1] [TEST]).
- STEP 3. Disable Registration - [55] [CODE].
- STEP 4. Cutoff the Blue image, (leaving only Red and Green "on").
- STEP 5. Using the Green image as your reference, adjust the Red Vertical Height control to overlay or equal but opposite the error from top to bottom, concentrating on the top and bottom outermost horizontal lines. See Figure 10-13.
- STEP 6. Using Green or Red as your reference color, adjust the Blue Vertical Height control as described in STEP 5. See Figure 10-13

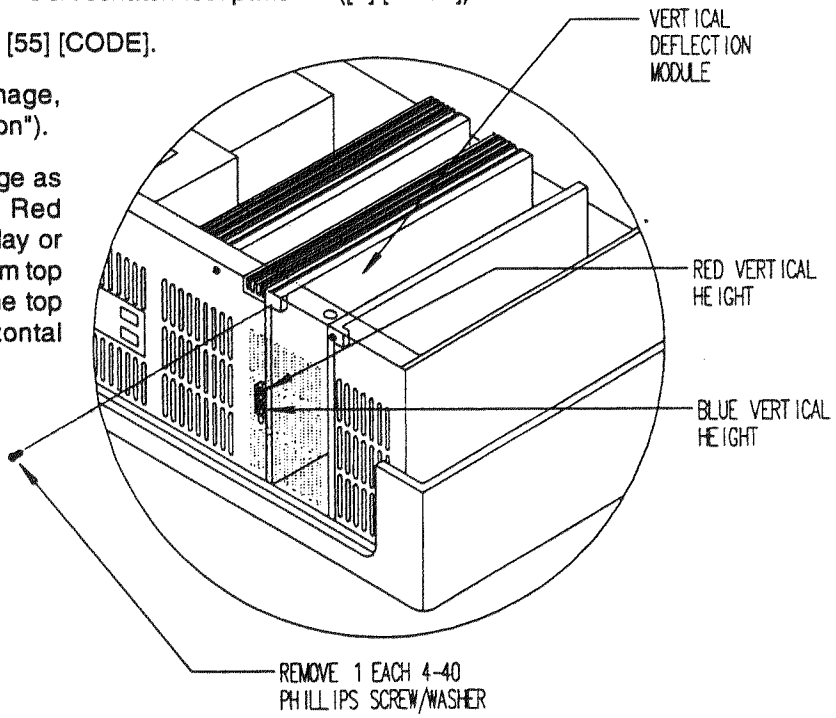

FIGURE 10-13. VERTICAL DEFLECTION MODULE REPLACEMENT.

NOTES:

10.5.6 . . . . H.O.T. Power Module (81140) Replacement Procedure:

Tools Required

☐ Small Phillips Screwdriver

Replacement Procedure

- STEP 1. De-energize the system and remove the main AC power cord.

⚠ CAUTION ⚠
THE MAIN AC POWER CORD MUST BE REMOVED PRIOR TO REMOVING AND REPLACING THE H.O.T. MODULE.

- STEP 2. Unlock and tilt-up the top cover tray assemblies.

☞ The H.O.T. PowerModule is located in the fourth slot from the right as viewed from the rear, table mounted.

- STEP 3. Remove the single 4-40 phillips screw and lock washer securing the H.O.T. Module to the rear panel. See Figure 10-14 below.
- STEP 4. Pull the H.O.T. module straight up and out of the chassis.
- STEP 5. Install the replacement module and secure with the hardware previously removed.
- STEP 6. Lower and lock into place the Tray assemblies and the top cover.
- STEP 7. Apply main AC power and initialize the system.

Adjustment Procedure

- None required.

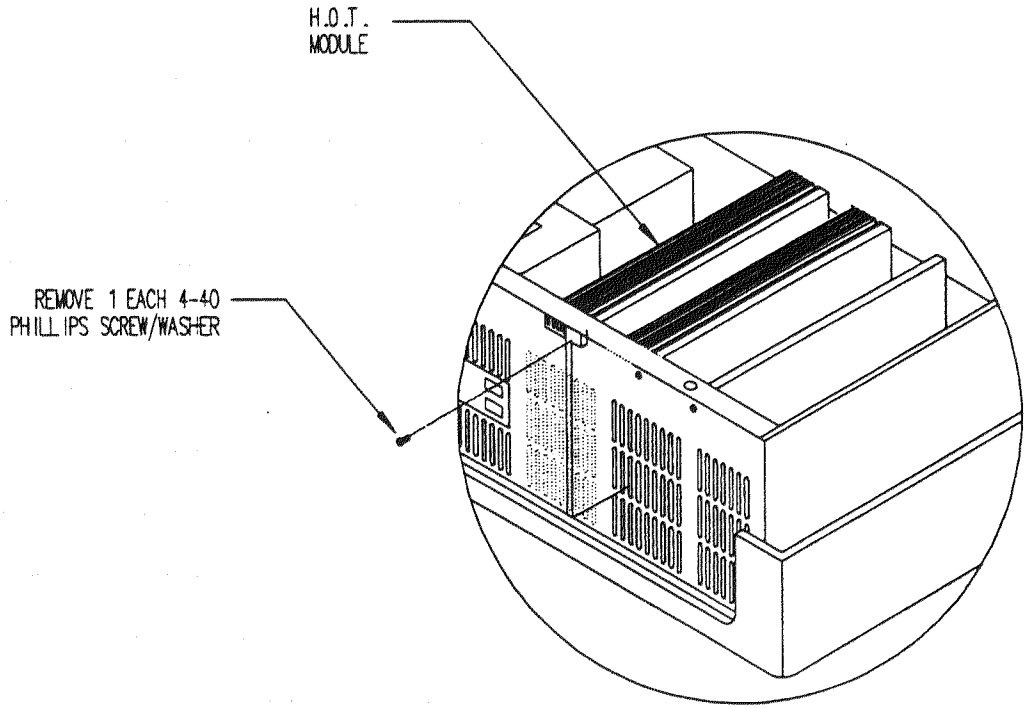

FIGURE 10-14. H.O.T. MODULE REPLACEMENT.

NOTES:

10.5.7 . . . Horizontal Control Module (81139) Replacement Procedure:

Tools Required

Slotted Screwdriver Small Phillips Screwdriver

Replacement Procedure

- STEP 1. De-energize the system and unlock/tilt-up the top cover and Tray Assemblies.

The Horizontal Control Module is located in the second slot from the right, as viewed from the rear, table mounted.

- STEP 2. Remove the single 4-40 phillips screw and lockwasher securing the Horizontal Control Module to the rear panel. See Figure 10-15
- STEP 3. Carefully lift the module up and out of the chassis.
- STEP 4. Install the replacement module and secure with the hardware previously removed.
- STEP 5. Lower and lock the Tray assemblies and top cover in place.
- STEP 6. Connect the main AC and initialize the system.

Adjustment Procedure

- None required.

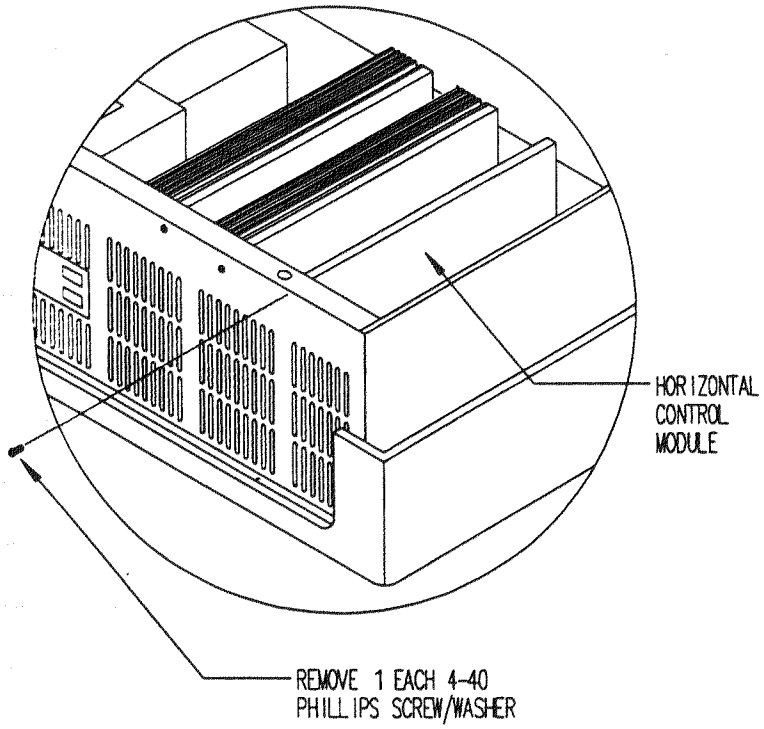

FIGURE 10-15. HORIZONTAL CONTROL MODULE REPLACEMENT.

NOTES:

10.5.8 . . . . H.O.T. Output Module (81137) Replacement Procedure:

Tools Required

☐ Standard Phillips Screwdriver ☐ Small Phillps Screwdriver

☐ Multi-Frequency RGB Video Generator w/Standard Linearity Pattern

Replacement Procedure

- STEP 1. De-energize the system and remove the main AC power cord.
- STEP 2. Unlock and tilt-up the top cover and tray assemblies.
- STEP 3. The H.O.T. Output module is located to the extreme right of the main chassis as viewed form the rear, table mounted. See Figure 10-16.
- STEP 4. Disconnect the four following plugs for the H.O.T. Output Module; **P55**: Blue horizontal output, **P56**: Green horizontal output, **P57**: Red horizontal output and **P58:** Horizontal sweep reverse sense. See Figure 10-16
- STEP 5. Remove the 3 each 4-40 phillips screws and washers which fasten the H.O.T. Output module to the right side of the main chassis. See Figure 10-16
- STEP 6. Install and firmly seat the H.O.T. Output module to the mother board connector and fasten with the hardware previously removed.

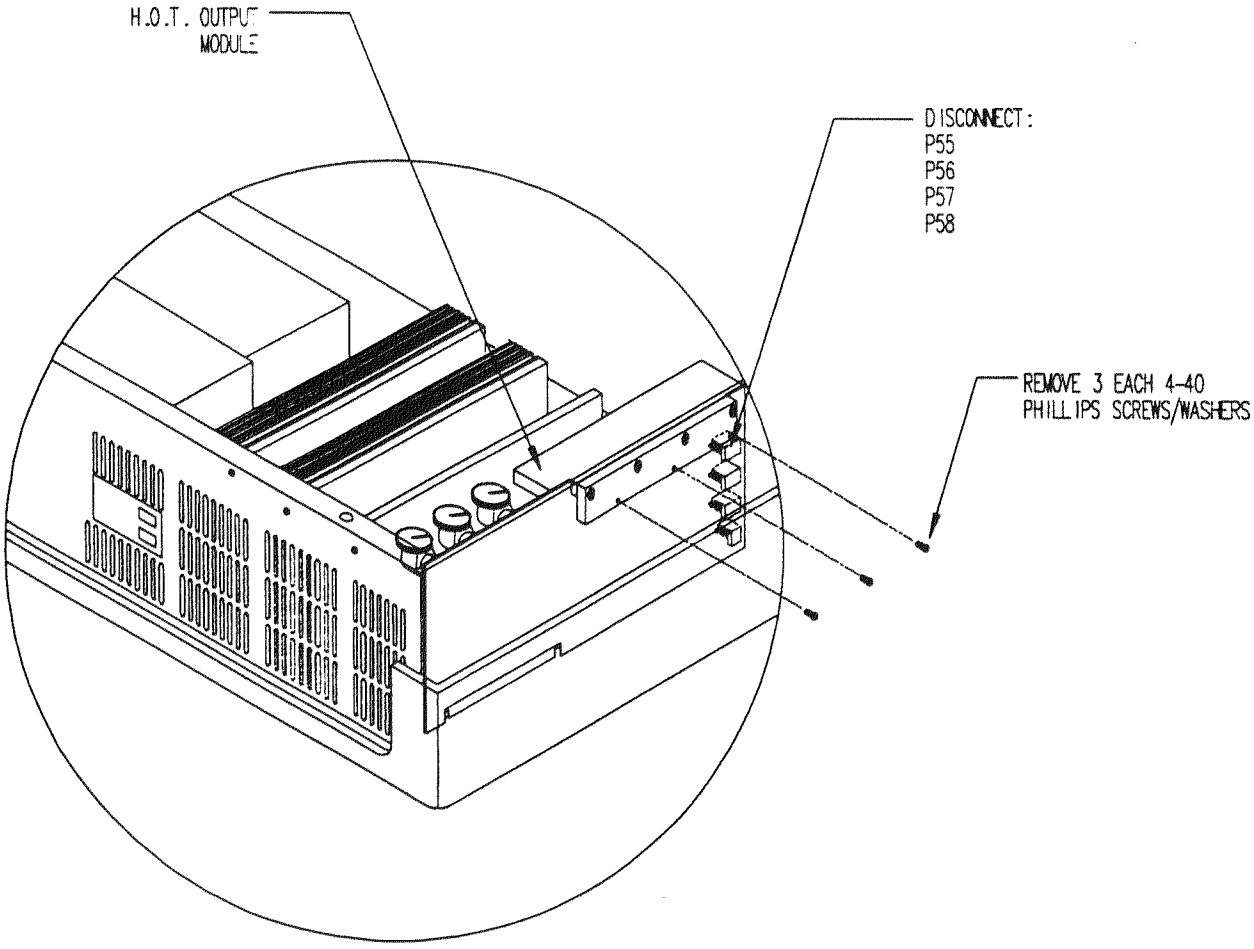

FIGURE 10-16. H.O.T. OUTPUT MODULE REPLACEMENT.

H.O.T. Output Module Adjustment Procedure

- STEP 1. Once the H.O.T. Output module has been firmly seated and properly connected, energize and initialize the system.
- STEP 2. Select the RGB mode of operation, display green only and turn Registration "off", [55] [CODE].
- STEP 3. Select an external **64kHz** linearity pattern w/circles and using the adjustment wheel, carefully adjust **SR3** for optimum round circles.
- STEP 4. Select an external **21kHz** linearity pattern w/circles and using the adjustment wheel, carefully adjust **SR2** for optimum round circles.
- STEP 5. Select an external **15kHz** linearity pattern w/circles and using the adjustment wheel, carefully adjust **SR1** for optimum round circles.

Repeat Step 3 through 5 for optimum overall horizontal linearity.

NOTE: Do not adjust a saturable reactor (SR) outside of it's speciifed range.

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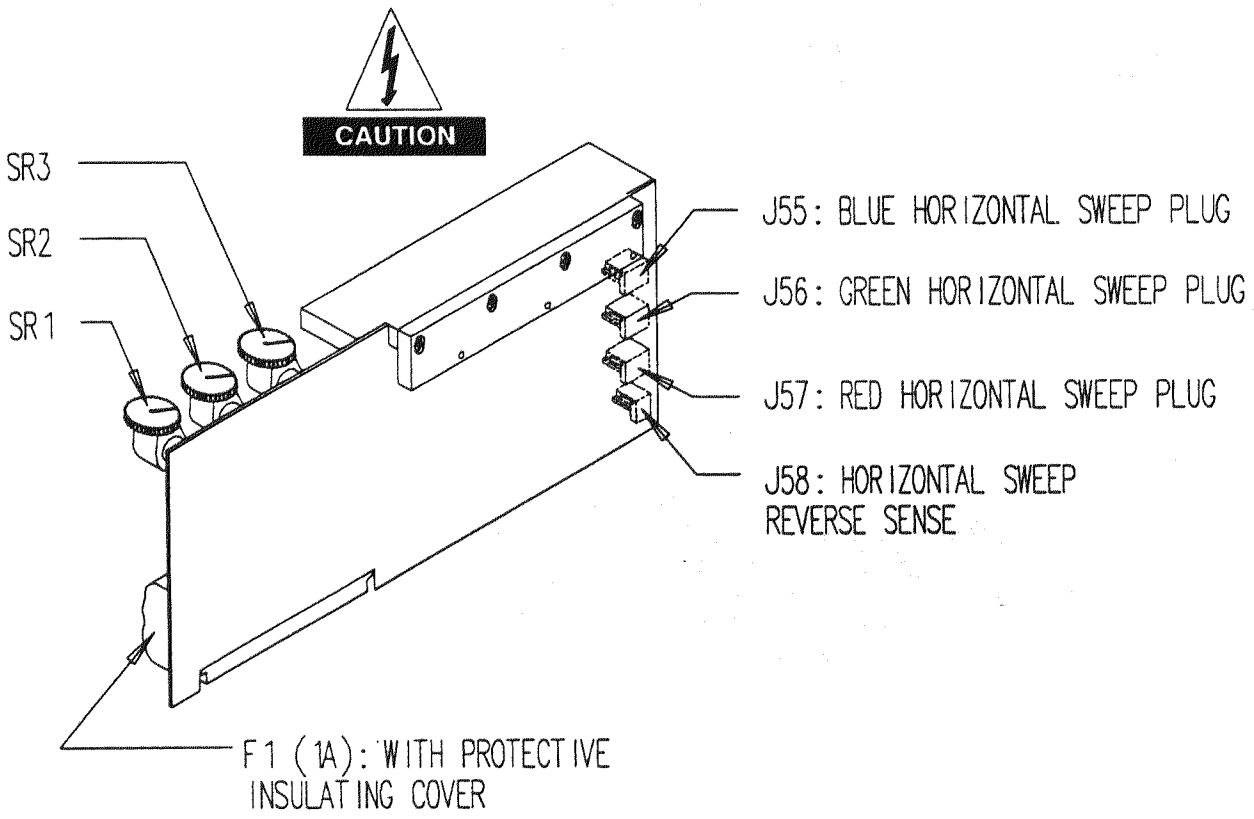


FIGURE 10-17. H.O.T. OUTPUT MODULE ADJUSTMENT.

10.5.9 .....Switch Mode Power Supply (SMPS) (80615) Replacement Procedure:

Tools Required

☐ Slotted Screwdriver ☐ Stubby Phillips Screwdriver

Replacement Procedure

- STEP 1. De-energize and disconnect the main AC plug from the system.
- STEP 2. Unlock and tilt-up the top cover and tray assemblies.
- STEP 3. As required; remove the two 4-40 phillips screws/washers securing any one of the optional modules located in the fourth slot from the left, as viewed from the rear, table mounted and remove module.
- STEP 4. If required, remove the Horizontal Power module from the fourth slot from the right, as viewed from the rear, table mounted.
- STEP 5. Loosen, do not remove, the four each phillips screws located at both sides of the SMPS. Gently lift the SMPS straight up and out of the SMPS housing.
- STEP 6. Remove the four phillips screws and washer from the old SMPS and install into the replacement SMPS.
- STEP 7. Install and firmly seat the SMPS back into the housing and secure with the four mounting screws previously loosened.
- STEP 8. If required, reverse Steps 3 and 4.
- STEP 9. Apply the main AC power cord and energize the system.

NOTE: Ensure that all low voltage LEDs located on the top of the SMPS are illuminated.

- STEP 10. Lower and lock into place the tray and top cover assemblies.

Adjustment Procedure

- None Required

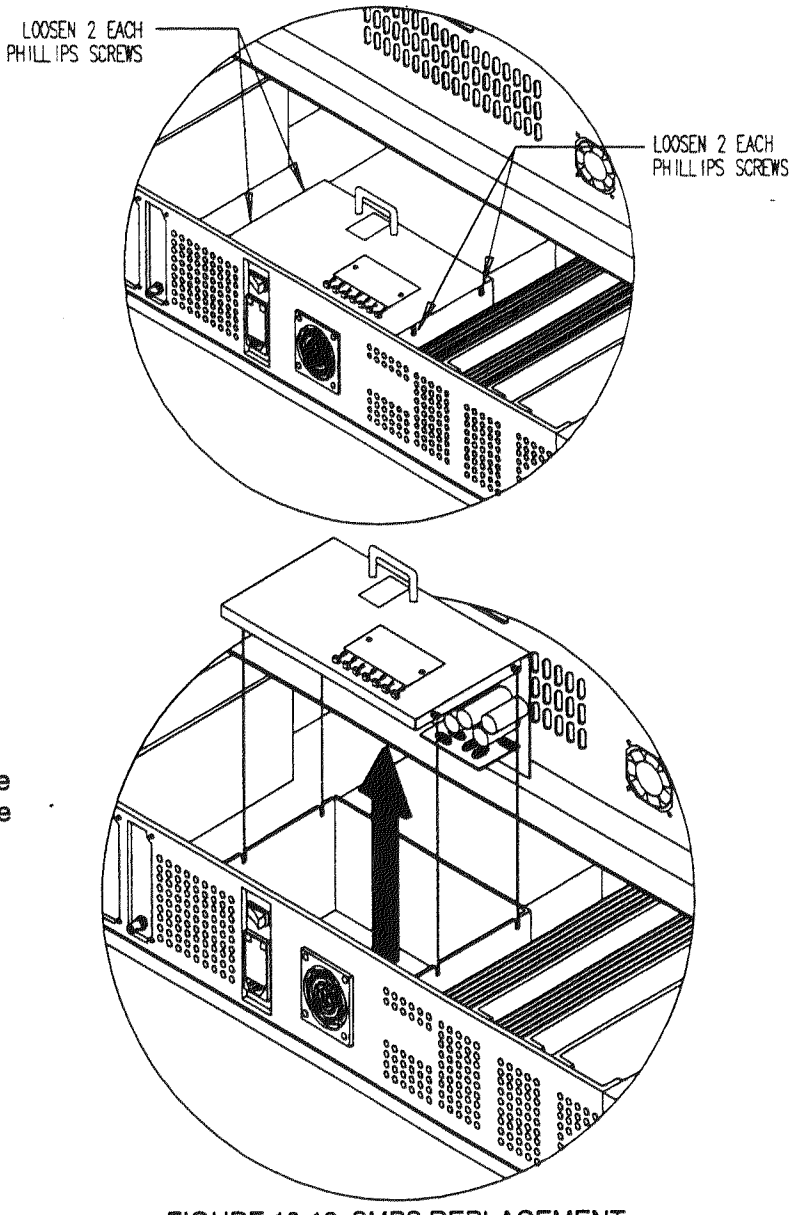


FIGURE 10-18. SMPS REPLACEMENT.

NOTES:

10.5.10 . . . High Voltage Power Supply (HVPS) (81134) Replacement Procedure:

Tools Required

☐ Standard Phillips Screwdriver ☐ Small Phillips Screwdriver

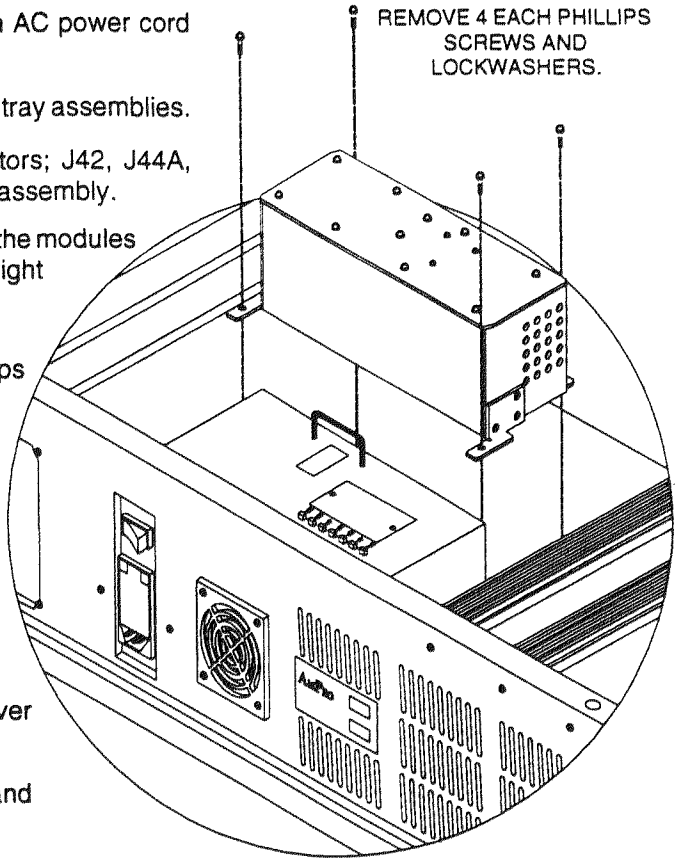
Replacement Procedure

- STEP 1. De-energize and remove the main AC power cord form the system.
- STEP 2. Unlock and tilt-up the top cover and tray assemblies.
- STEP 3. Disconnect the following connectors; J42, J44A, J44B, J44C and the HV lead from the splitter assembly.

NOTE: It may become necessary to remove the modules located in the fourth slots from both left and right as viewed from the rear, table mounted.

- STEP 4. Remove the four (4) each phillips screws and lockwasher located at the front of and at the sides(rear) of the HVPS. Lift out the HVPS
- STEP 5. Install the replacement HVPS and secure with the hardware previously removed.

  STEP 6. Reconnect; J42, J44A, J44C, J44C and the HV lead to the splitter.
- STEP 7. Lower and lock the tray and top cover assemblies into place.
- STEP 8. Connect the main AC plug and energize the system.



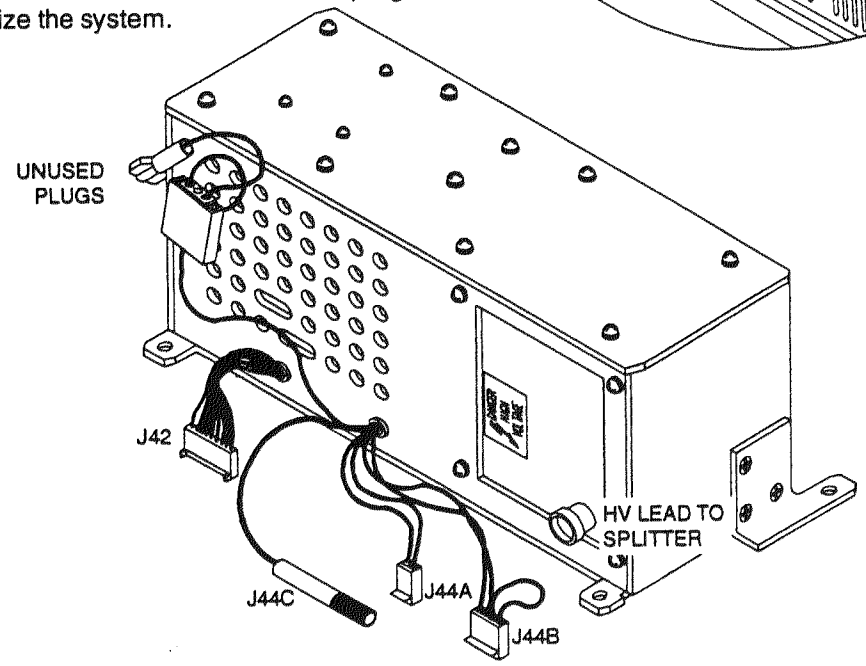


FIGURE 10-19. HVPS REMOVAL/CONNECTORS.

NOTES:

10.5.11 . . . Registration Board (81157) Replacement Procedure:

Tools Required

☐ Slotted Screwdriver ☐ Small Phillips Screwdriver

Replacement Procedure

- STEP 1. De-energize the system and remove the main AC power cord and unlock and tilt-up the top cover assembly.
- P 3. Unlock and tilt-up the Registration Tray assembly; The Registration tray assembly is secured by two ¼ turn fasteners located at the rear of this assembly. See Figure 10-20A and 10-20B.
- STEP 4. On the underside of the Registration assembly, disconnect J51, J72, the ground lead (via spade lug, and the ground lead secured by the 4-40 phillips screw. See Figure 10-21A and 10-21B.
- STEP 5. 3300: Loosen the two ¼ turn fasteners located at the rear of the Main Tray assembly and tilt-up. See Figure 10-20A. 4300: Loosen the two ¼ at the rear of Tray assembly 1, see Figure 10-20B.
- STEP 6. On the Focus Modulator board, disconnect J1, J2 and J3. See Figure 10-22A (3300) and Figure 10-21B (4300).
- STEP 7. Lower the tray assemblies, loosen the four captive thumb screws located on both sides of the Registration assembly (Figure 10-20A-3300 and Figure 10-20B-4300), and lift the assembly out
- STEP 8. Install the replacement assembly reversing the replacement procedure.
- STEP 9. Lower and lock the top cover in place.

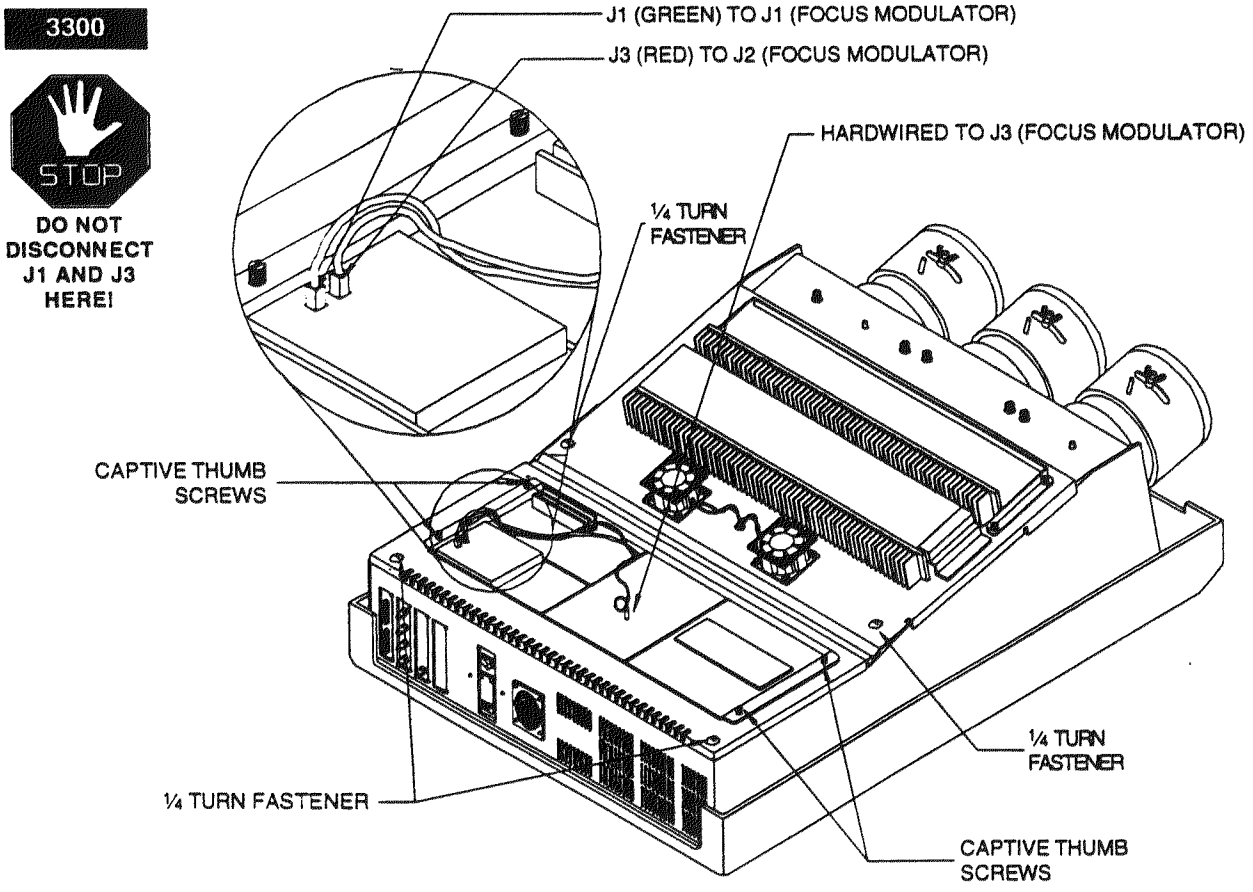


FIGURE 10-20A. REGISTRATION REPLACEMENT (3300).

10.5.11 . . . Registration Replacement (CONTINUED):

4300

DO NOT DISCONNECT J1 AND J3 HERE!

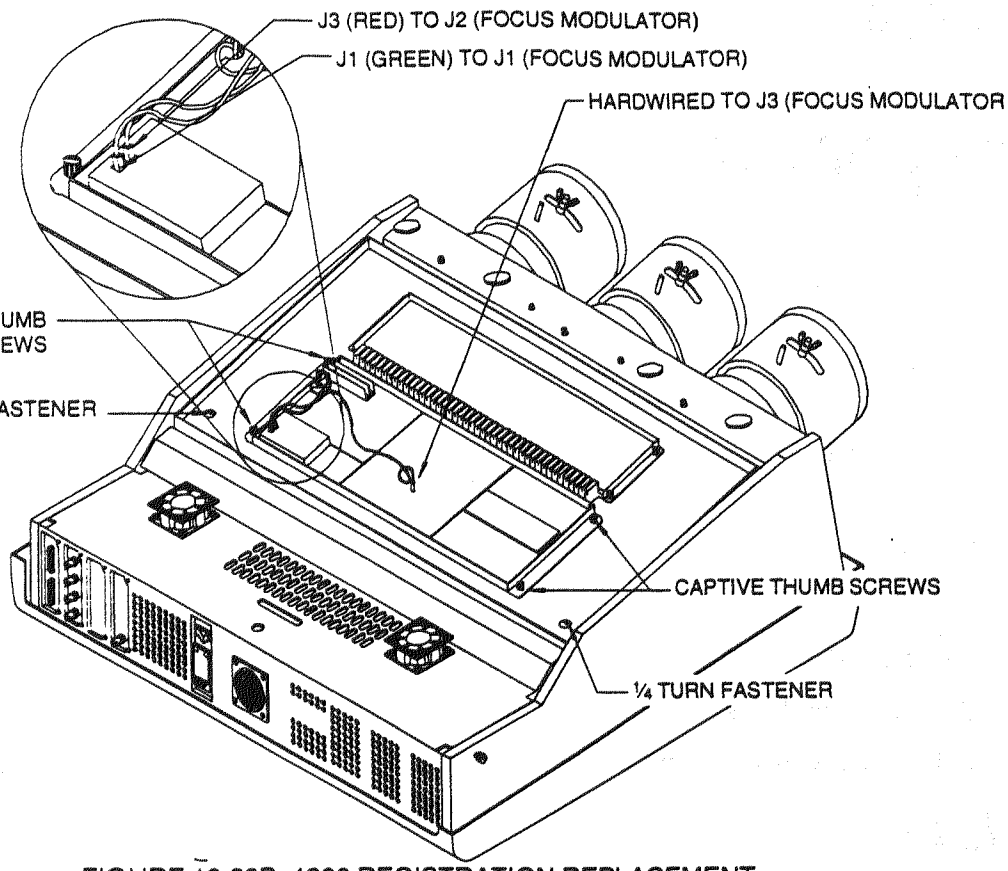


FIGURE 10-20B. 4300 REGISTRATION REPLACEMENT.

3300

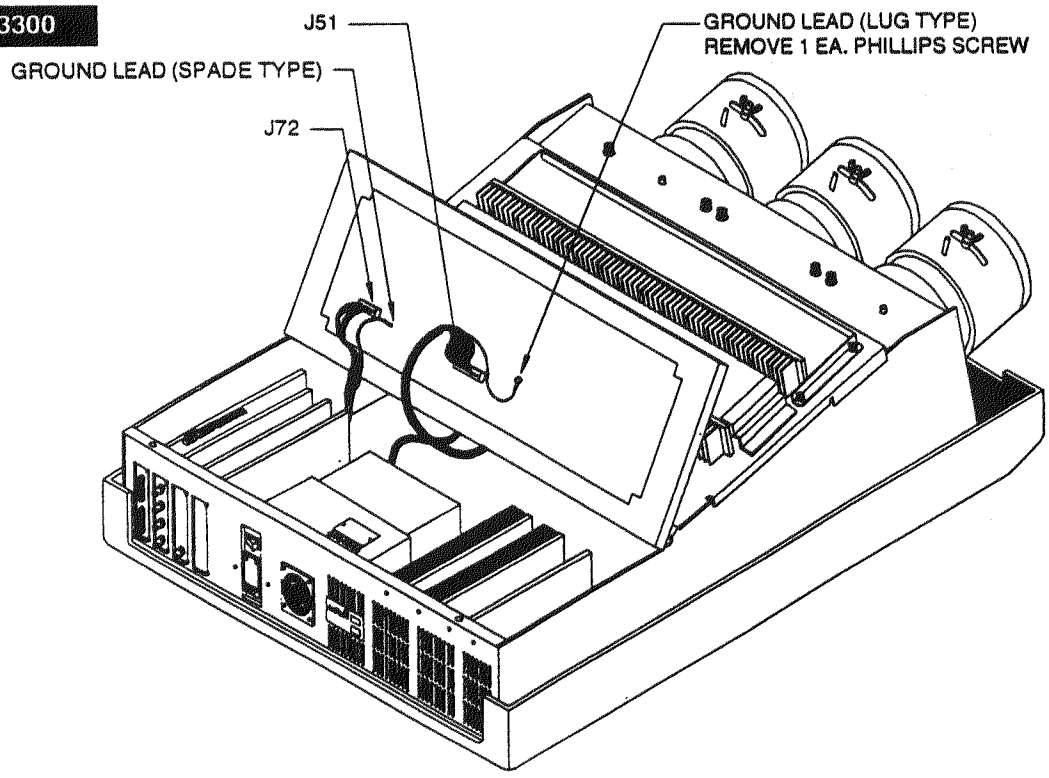


FIGURE 10-21A. 3300 REGISTRATION REPLACEMENT.

10.5.11 . . . Registration Replacement (continued):

4300

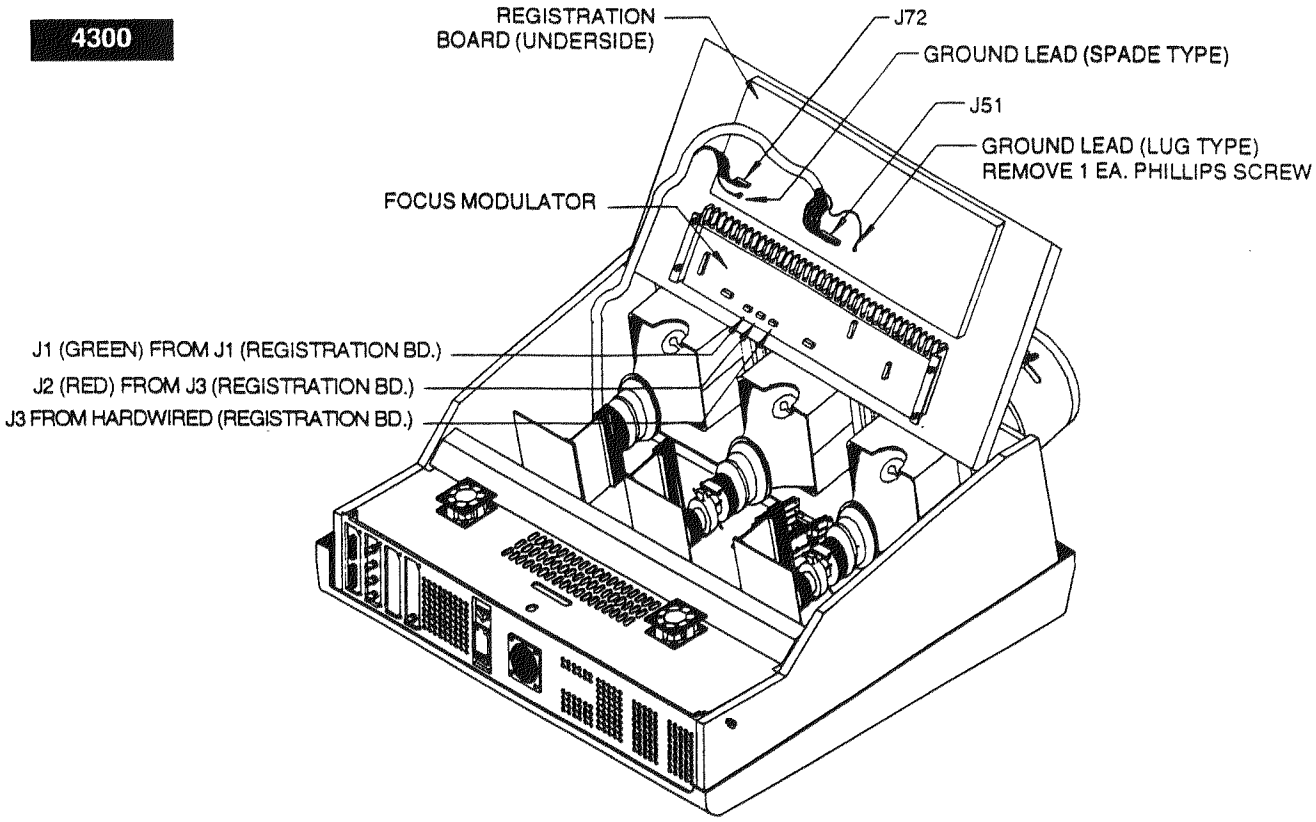


FIGURE 10-21B. 4300 REGISTRATION REPLACEMENT.

3300

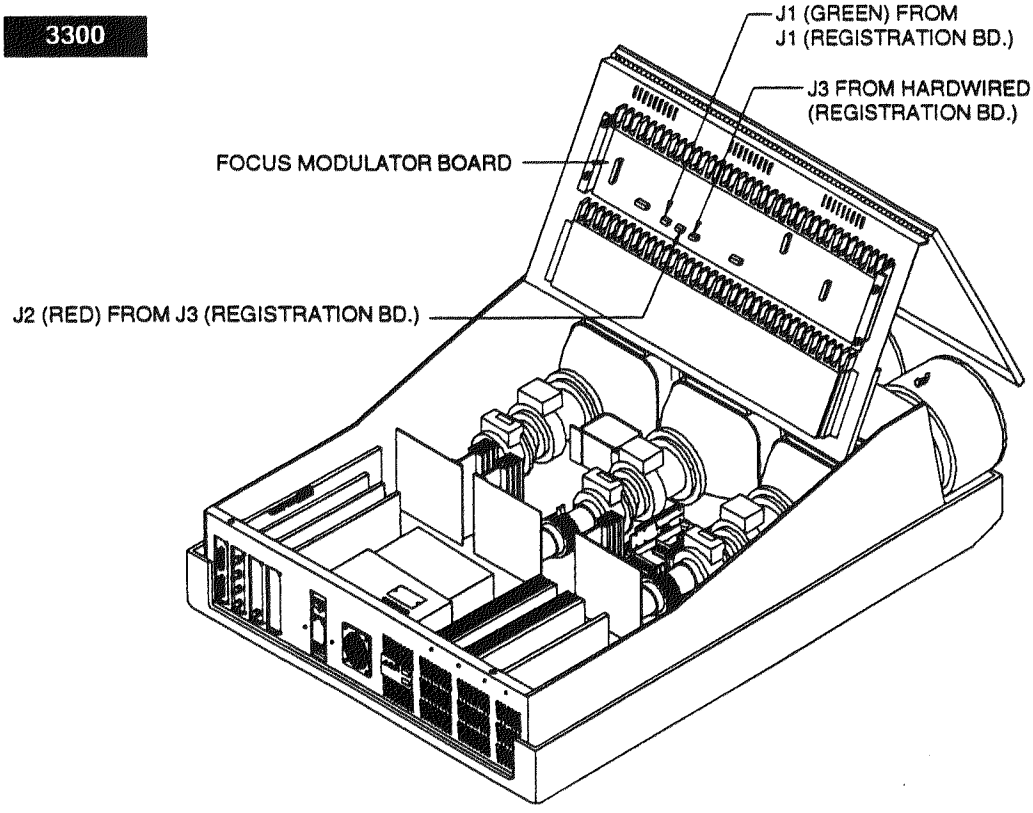


FIGURE 10-22. 3300 REGISTRATION REPLACEMENT.

10.5.11.1 . . Registration and Focus Phasing Adjustments: (3300 and 4300)

Registration Phasing

Prerequisites

- Unlock and open the top cover assembly.
- Remove the four (4) phillips screws securing the shield covering the PLL board and locate R4 and R44, see Figure 10-23, (PLL board is a smaller assembly of the Registration board and is located in the lower left corner of this assembly, as viewed from the rear when table mounted).
- Energize the system.
- Select an unused channel location.
- Null the channel.....[29] [CODE]. At the LCD prompt enter [CODE].
- Select internal 62kHz crosshair pattern.....[3] [TEST]
- Adjust left and right blanking for full raster, [LEFT EDGE] [BLANK] [⇐] / [RIGHT EDGE], [BLANK] [⇒].
- Adjust Master skew fully up, [GREEN] [SKEW] [⇑], adjust Red left skew fully up [RED] [SKEW] [⇑], and adjust Red right skew fully down [RED] [SKEW] [⇓]
- Cutoff the green and blue images....[CUTOFF] [BLUE] / [CUTOFF] [GREEN].

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Adjustment Procedure

- STEP 1. While observing the projected image, adjust R4 (Figure 10-23) until a upward bow is produced in the red horizontal center line on the right side of the image, then adjust R4 in the opposite direction until the bow or curvature is minimized on the left and right sides of the projected image.
- STEP 2. Select a preset channel and verify that the image has no undesired curvatures on either the left or the right sides of the projected image.....If necessary repeat this procedure.

Focus Phasing

Prerequisite / Adjustment

- Select 62kHz internal crosshatch pattern.
- Cutoff the Red and Blue images. [CUTOFF] [RED], [CUTOFF] [BLUE].
- STEP 1. Slightly defocus the green image [98] [CODE] [⇑], until the center horizontal line is about ¾ inch thick at the widest spot.
- STEP 2. Adjust R44 (Figure 10-23) on the registration PLL board so that the line is of equal thickness from left to right.
- STEP 3. De-energize the system and replace and secure the shield for the PLL board.

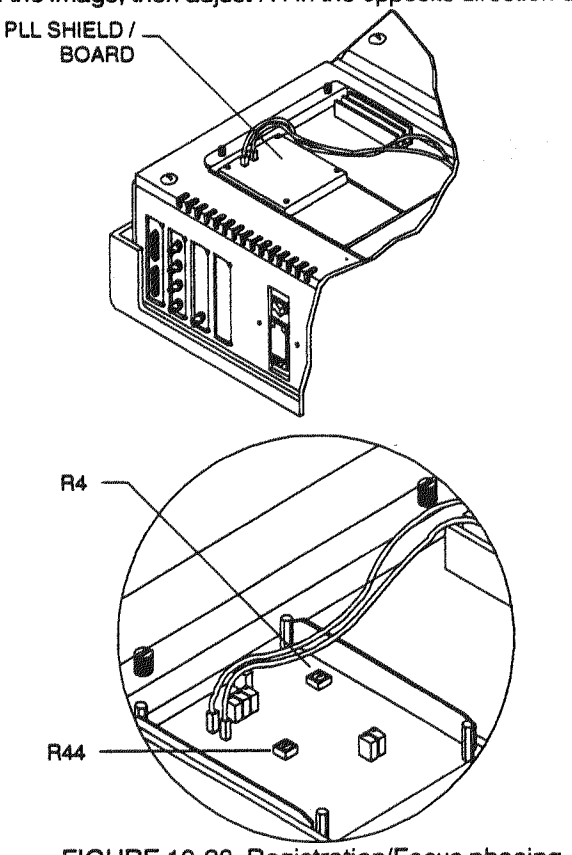

FIGURE 10-23. Registration/Focus phasing.

10.5.12 . . . Registration Amplifier (81010 / 81224) Replacement Procedure:

Tools Required

☐ Slotted Screwdriver

Replacement Procedure

- STEP 1. De-energize the system and remove the main AC power cord.
- STEP 2. Unlock and tilt-up the top cover assembly.
- STEP 3. On the Registration Amplifier board disconnect the following plugs; J4, J46, J48, J49, J50 and the ground lead. See Figure 10-24 (3300) and/or Figure 10-25 (4300).
- STEP 4. Loosen the four (4) each captive thumb screws located on both sides of the Registration Amplifier board and lift this assembly out.
- STEP 5. Install the replacement procedure and secure with the four (4) captive thumb screws.
- STEP 6. Reconnect the above mentioned plugs.
- STEP 7. Lower and lock the top cover into place.

3300

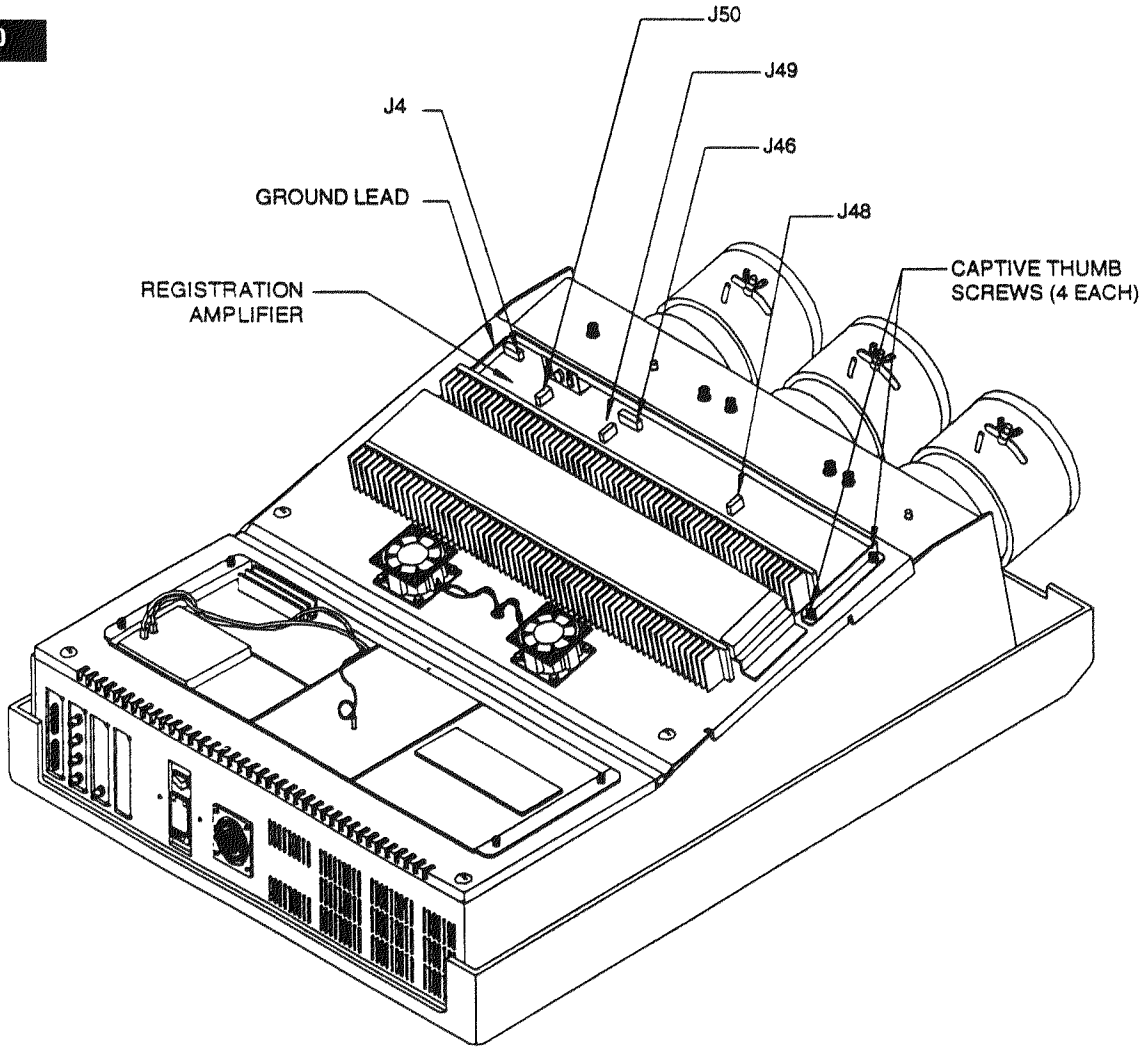

FIG. 10-24. 3300 REGISTRATION AMPLIFIER REMOVE/REPLACE.

10.5.12 . . . Registration Amplifier (81010 / 81224) Replacement Procedure: (CONTINUED)

4300

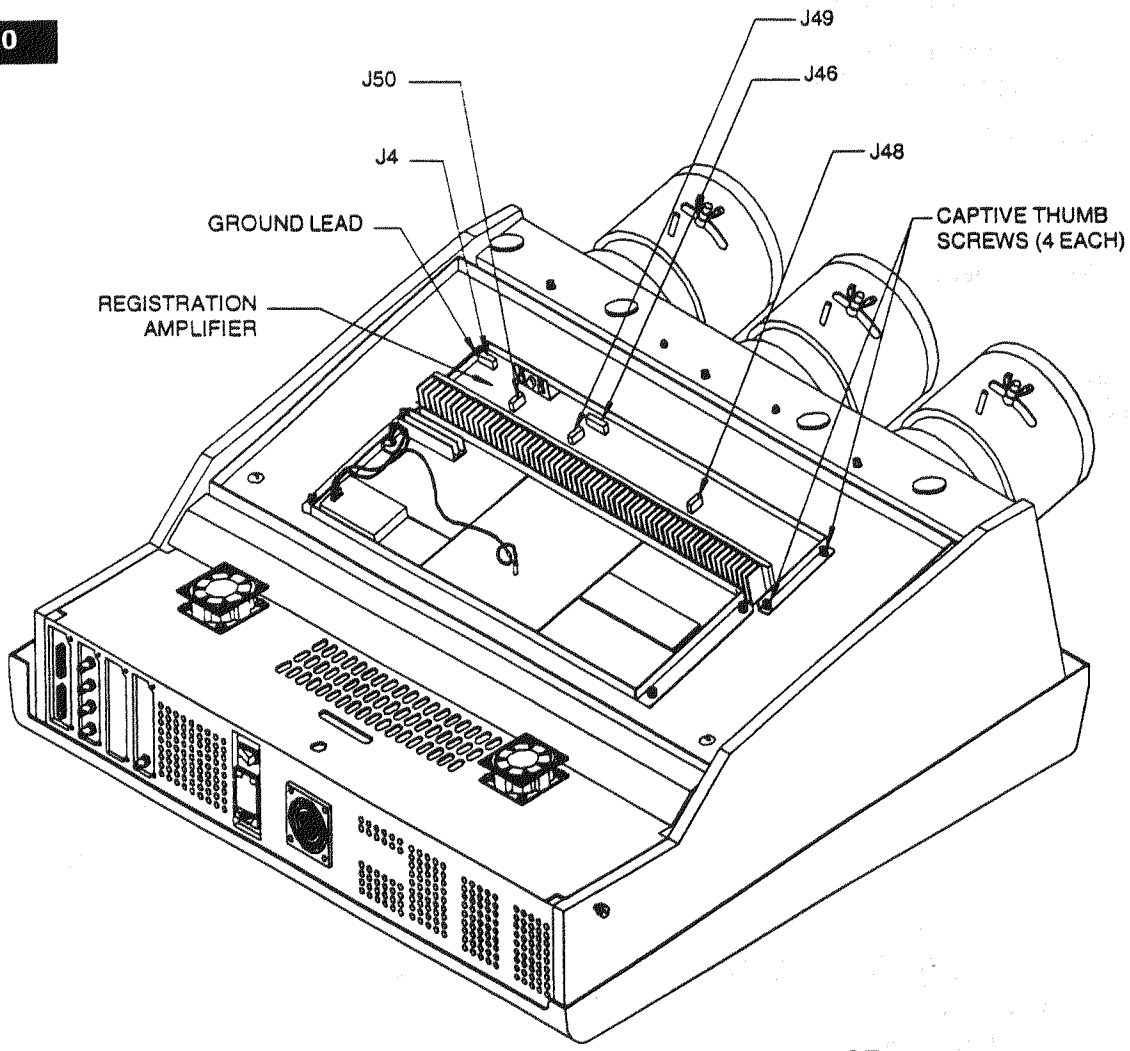

FIG. 10-25. 4300 REGISTRATION REMOVE/REPLACE.

10

10.5.13 . . . Focus Modulator (81170A) Replacement Procedure:

Tools Required

☐ Slotted Screwdriver

Replacement Procedure

- STEP 1. De-energize the system and remove the main AC power cord.
- STEP 2. Unlock and tilt-up the top cover and tray assembly 1 for both the models 3300 and 4300.
- STEP 3. On the component side of the Focus Modulator board, disconnect the following; J1 through J8 and the ground lead. See Figure 10-26 (3300) and/or 10-27 (4300).
- STEP 4. Loosen the four (4) captive thumb screws located on both sides of this assembly.
- STEP 6. Install the replacement board, secure and reconnect all plugs.
- STEP 7. Lower and lock the tray and top cover assembly.

3300

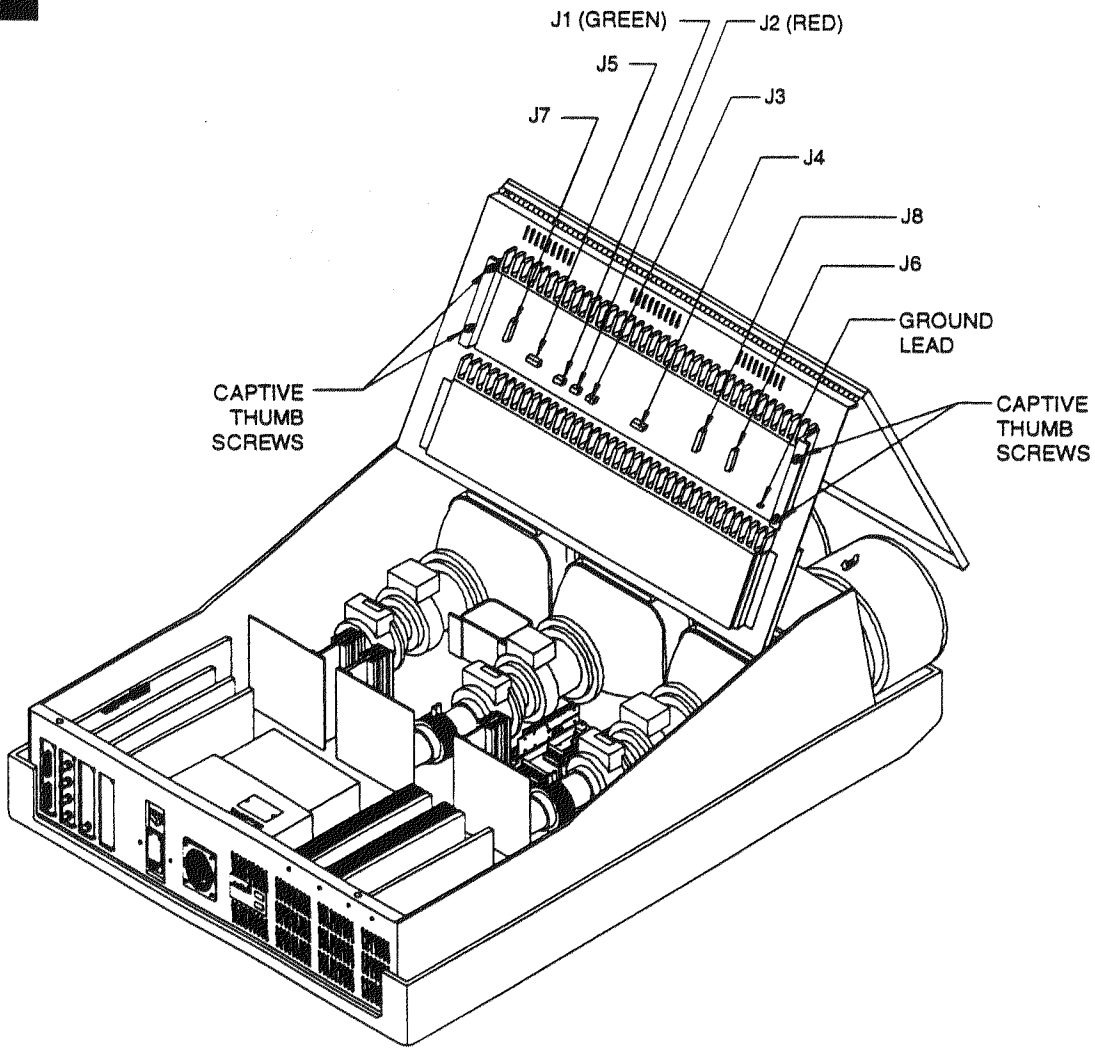

FIG. 10-26. 3300 FOCUS MODULATOR BOARD REPLACEMENT.

10.5.13 . . . Focus Modulator (81170A) Replacement Procedure: (continued)

4300

Disconnect the following connections;

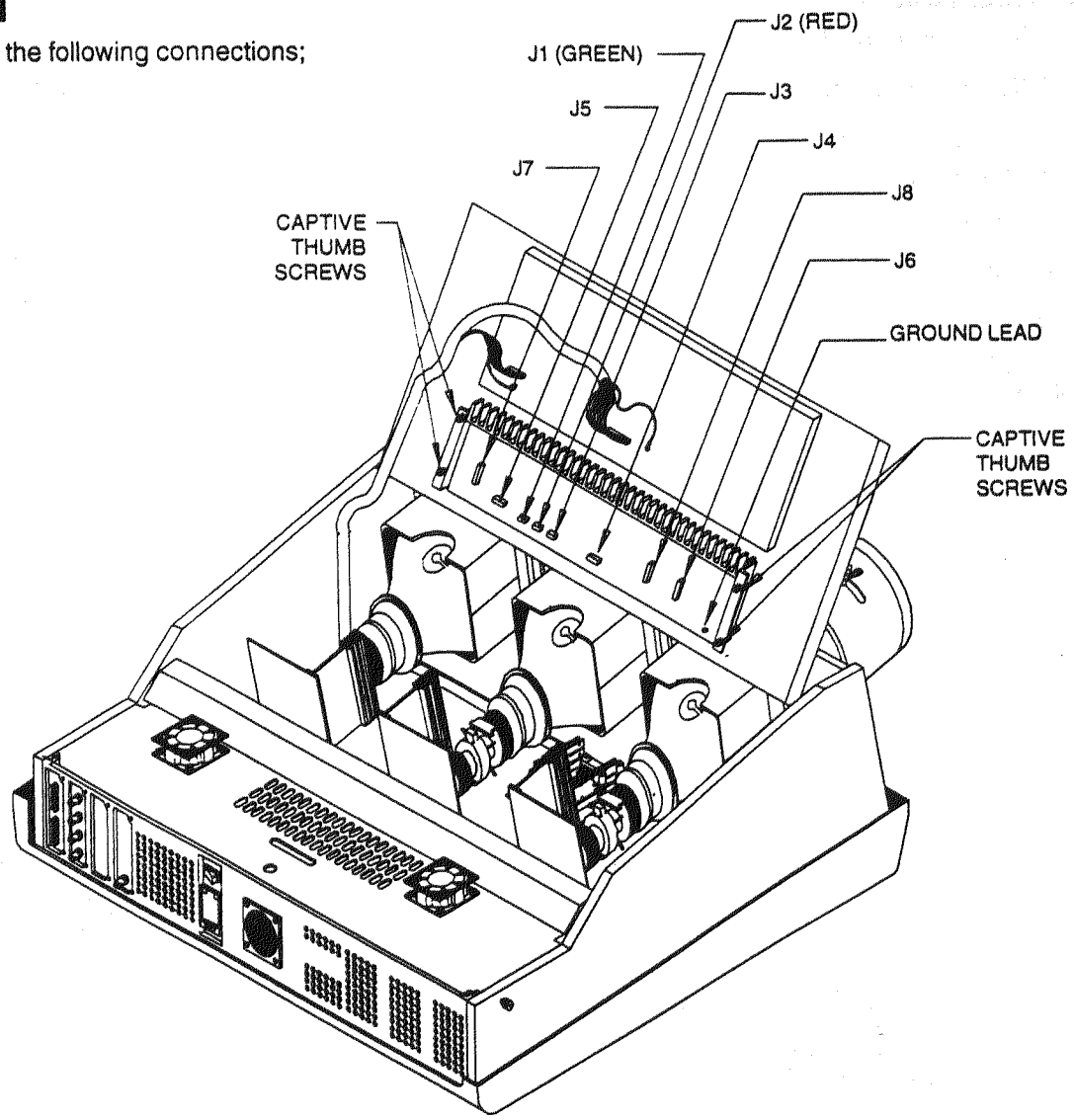

FIG. 10-27. 4300 Focus modulator board replacement.

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10.6 .....AMPRO 3300 8" Magnetic Focus CRT Removal/ Replacement Procedure:

10.6.1 .....8" CRT Removal Procedure:

Tools Required

☐ Protective eyeglasses / gloves

☐ 3/16 Ball Hexdriver (lens adjustment tool)

☐ Phillips / slotted screwdriver

☐ 9/16 Hex wrench/socket

Replacement Procedure

- STEP 1. De-energize the system and remove the main A.C. power cord.
- STEP 2. Unlock and tilt-up the top cover and tray assemblies.
- STEP 3. On the CRT to be replaced, disconnect the following CRT ground connections from the magnetic focus assembly clamp, astigmator assembly clamp and the amplifier card. Loosen or remove the top section of the amplifier clamp, then carefully slide the amplifier card off the CRT. See Figure 10-28.

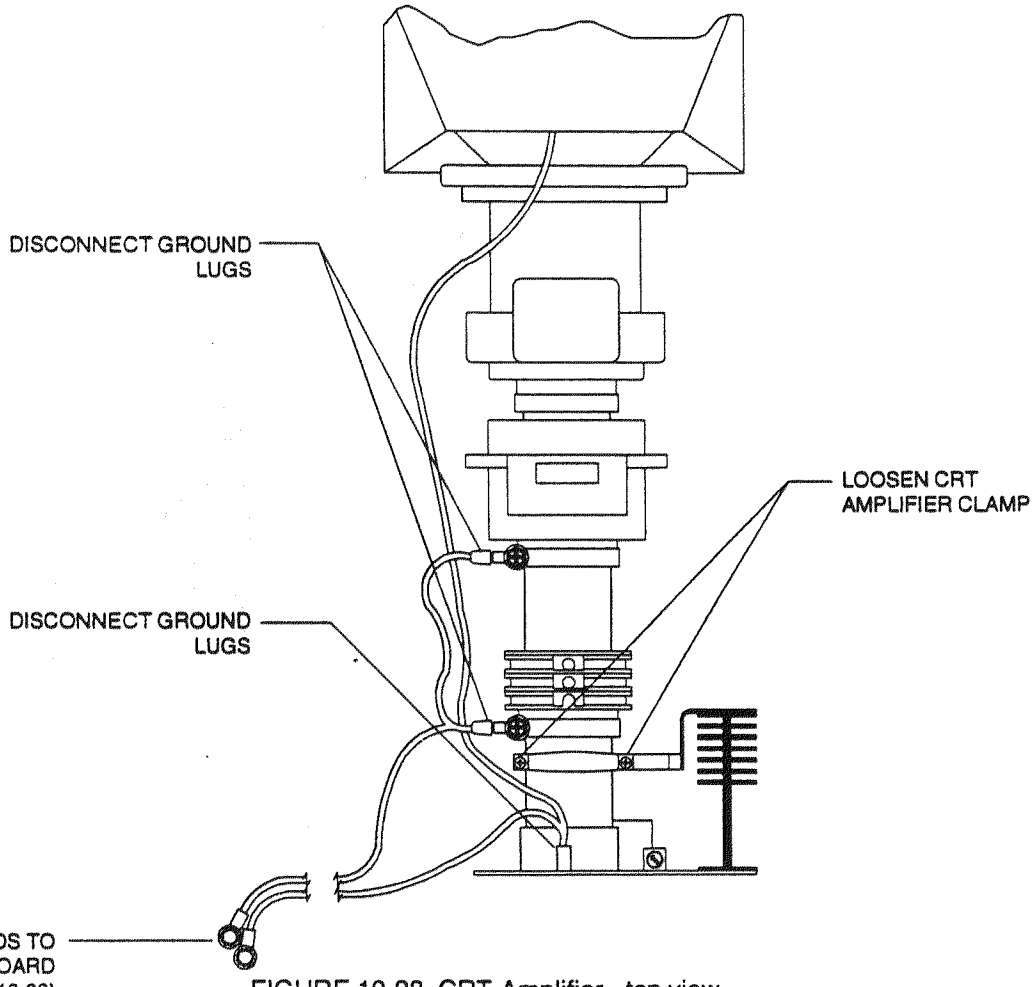


FIGURE 10-28. CRT Amplifier - top view.

10.6.1 . . . . 8" CRT Removal Procedure: (CONTINUED)

- STEP 4. On the defective CRT disconnect the following; ① High Voltage anode lead, ② Focus magnet cable connector, ③ ground harness from the mother board location and ④ the respective sweep/convergence plug from the yoke interface board. See Figure 10-29.

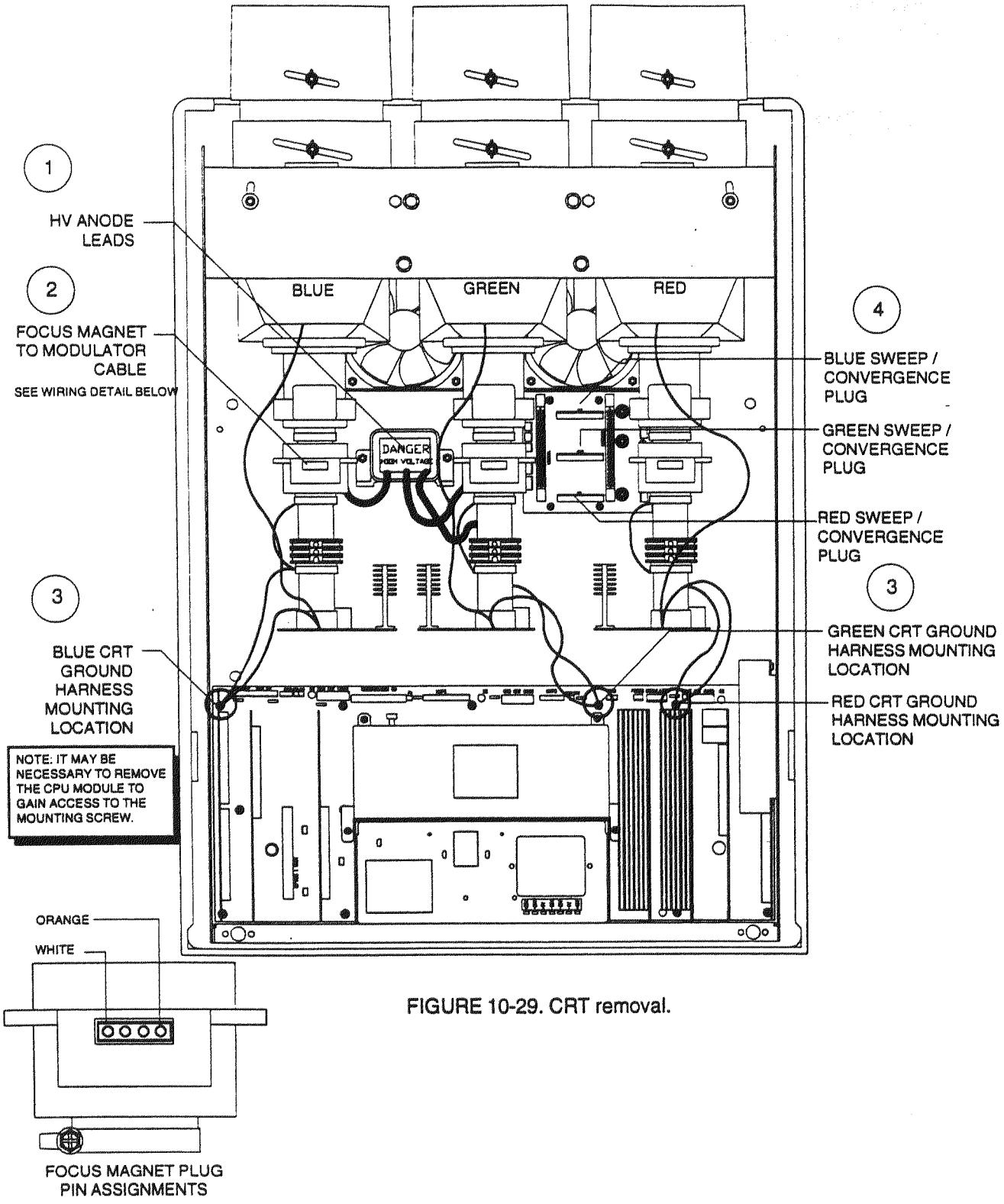
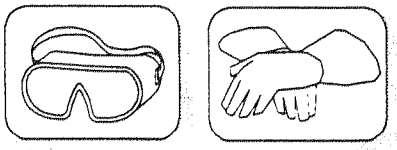


FIGURE 10-29. CRT removal.

10.6.1 . . . . 8" CRT Removal Procedure: (CONTINUED)

- STEP 5. Remove the CRT mounting head hardware on the CRT to be replaced. See Figure 10-30.
- STEP 6. With the appropriate protective eye wear and gloves on, carefully slide the defective Lens/CRT assembly through the head and out of the chassis.



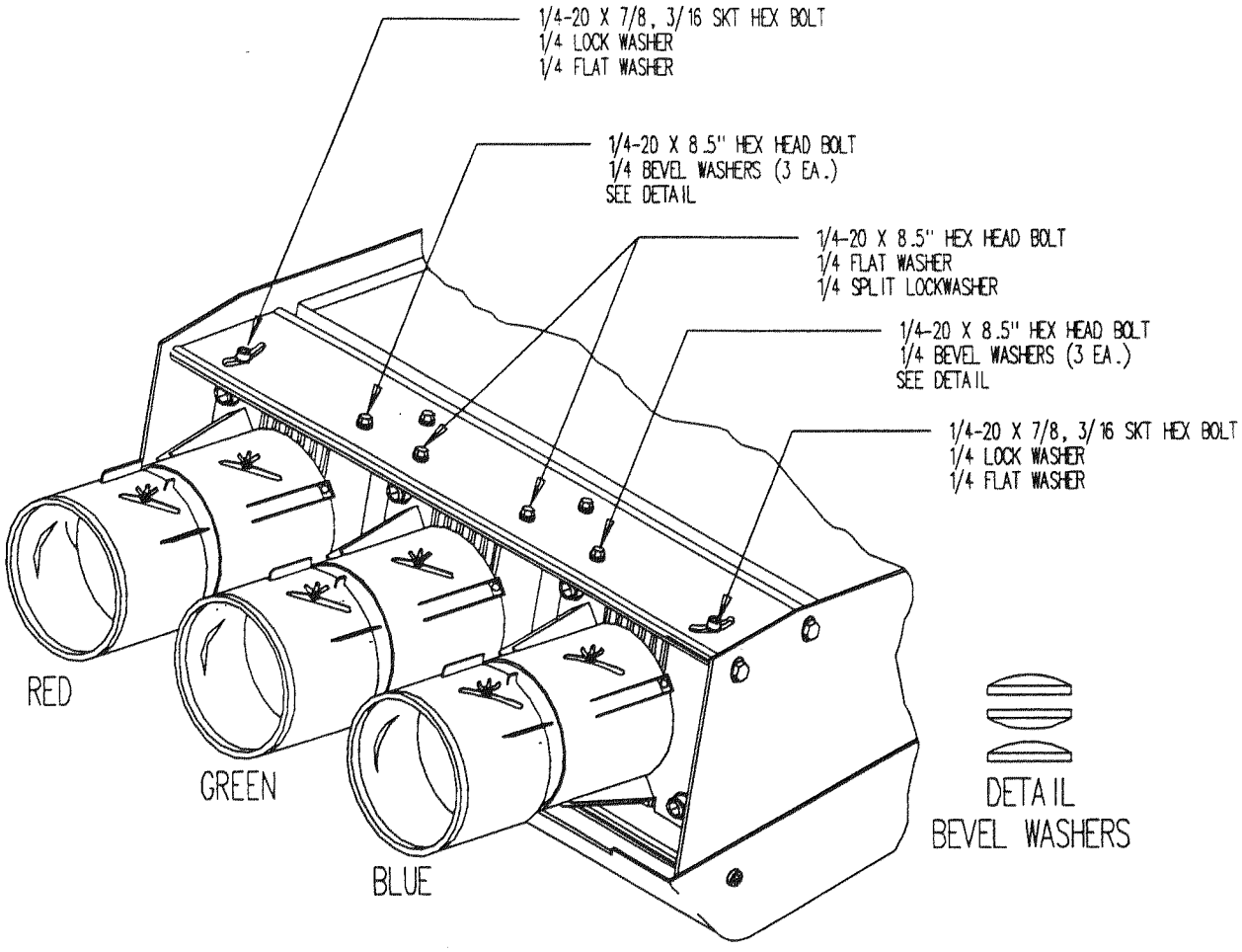


FIGURE 10-30. CRT mounting hardware.

10.6.1 . . . . 8" CRT Removal Procedure: (CONTINUED)

- STEP 7. **REMOVE LENS ASSEMBLY:** Using a 3/16 lens adjustment tool and a 9/16 wrench, remove the three (3) swivel screws, three (3) bevel washer sets, three (3) springs and the three (3) 9/16 self-locking nuts. See Figure 10-31.

- STEP 8. **CRT NECK COMPONENTS:** Loosen the Yoke/Convergence assembly clamp, Focus magnet assembly clamp and retainer ring and the Astigmator assembly clamp. Slide each component off the neck of the CRT. See Figure 10-31.

The Yoke/Convergence coils are mated with epoxy, ensure that the Yoke/Convergence assembly remains mated.

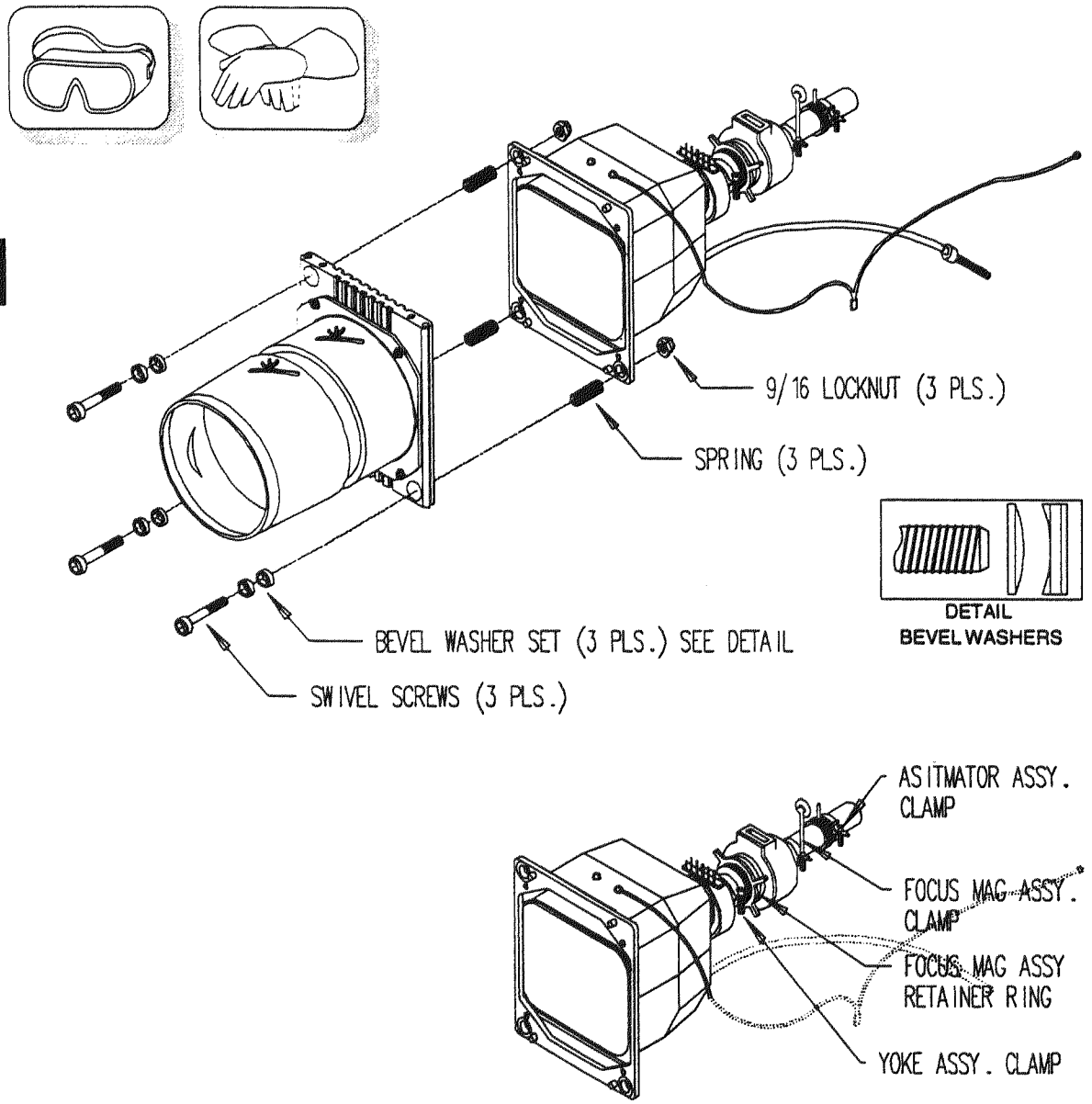


FIGURE 10-31. AMPRO 3300 CRT replacement procedure.

10.6.2 . . . . 8" CRT Replacement Procedure:

10.6.2.1 . . . . .Replacement Notes:

☐ Reverse the order of the removal procedure when installing the replacement CRT.

☐ Ensure the Yoke/Convergence assembly is pushed as far up onto the bell of the CRT.

☐ Slide Focus Magnet assembly up to Yoke/Convergence assembly and tighten retainer ring and clamp.

☐ Ensure all ground connections have been re-established.

*** WARNING ***

TO PREVENT X-RAY LEAKAGE, DEFLECTION YOKES MUST ALWAYS REMAIN FIRMLY AGAINST THE BELL OF THE CRT.

☐ Prior to installing the lens assembly, remove any smudges or finger prints from the face of the CRT, using Windex and a clean soft cloth.

☐ **DO NOT** touch or try to clean the coated rear element of the lens assembly !

☐ **DO NOT** operate the system with the lens assembly(ies) removed !

☐ **RECHECK YOUR WORK !!!**

Once all connections have been re-established and verified, apply the appropriate A.C. power to the system and energize the system.

10.6.2.2 . . . . .Yoke Rotation Adjustment:

- STEP 1. Select external or internal 32kHz crosshair pattern.
- STEP 2. Ensure Registration is "off".....55 [CODE]
- STEP 3. Cutoff one of the CRTs not under test. Leaving the replacement CRT and a reference color "on".
- STEP 4. Loosen the Yoke clamp of the replacement CRT.
- STEP 5. "CAREFULLY " rotate the yoke assembly under adjustment until the center horizontal line is parallel to the center horizontal line of the reference color or adjust until the center horizontal line is level. Tighten Yoke clamp.

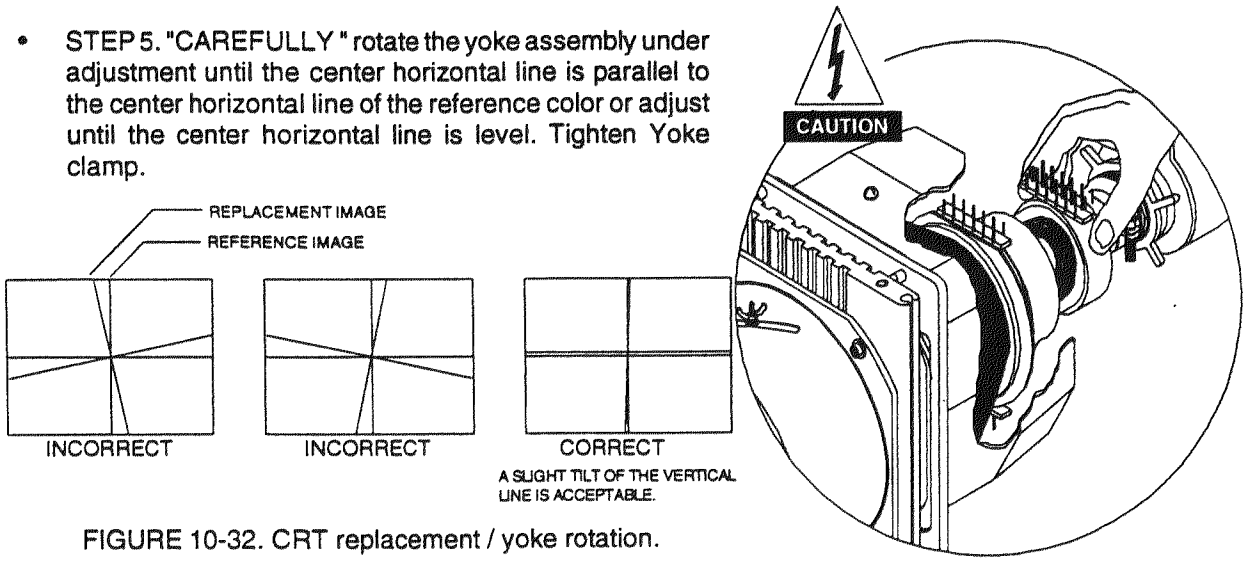


FIGURE 10-32. CRT replacement / yoke rotation.

10.6.2.3 . . . Focus Magnet Position and Lens Focus:

- STEP 1. Position Focus magnet under adjustment fully forward, straight up and down and tighten.
- STEP 2. Select internal 15kHz. crosshatch pattern.
- STEP 3. Using the remote control set the following controls for the color under adjustment;
  - Brightness [BRITE]75%
  - Contrast [CONT]65%
  - Static Focus 98 [CODE]50%
  - Dynamic Focus 99 [CODE]87% (horizontal - [↔]) / 15% (vertical - [↕])
- STEP 4. Ensure G2 cutoff is adjusted properly;
  - Select internal 62kHz crosshatch.
  - Cutoff CRT under test.
  - Set contrast and brightness to minimum.
  - Looking into the lens of the CRT under adjustment, adjust R2 on the CRT amplifier card so that the raster is just barely visible.
  - Restore CRT cutoff.
- STEP 5. Perform a lens focus and focal plane (*scheimpflug*) adjustment. For detail instructions refer to Section 5.
- STEP 6. **IF REQUIRED!:** Generally the Focus Magnet assembly is positioned straight up and down, fully forward up against the Yoke/Convergence assembly, but if necessary perform the following.
  - Loosen the focus magnet under adjustment.
  - Slide the focus magnet on the CRT until preliminary focus is achieved in the center of the projected image. Note, recheck lens focus.
  - Tighten the focus magnet clamp(s). **BE CAREFUL** not to rotate or slide the focus magnet.

10.6.2.4 . . . Astigmator/Beam Centering Prerequisites and Adjustments:

- STEP 1. Check and position the astigmator/beam centering assembly. The clamp used for securing the assembly should be in-line with the end of the G1 electrode located inside and at the rear of the CRT neck. See Figure 10-33.

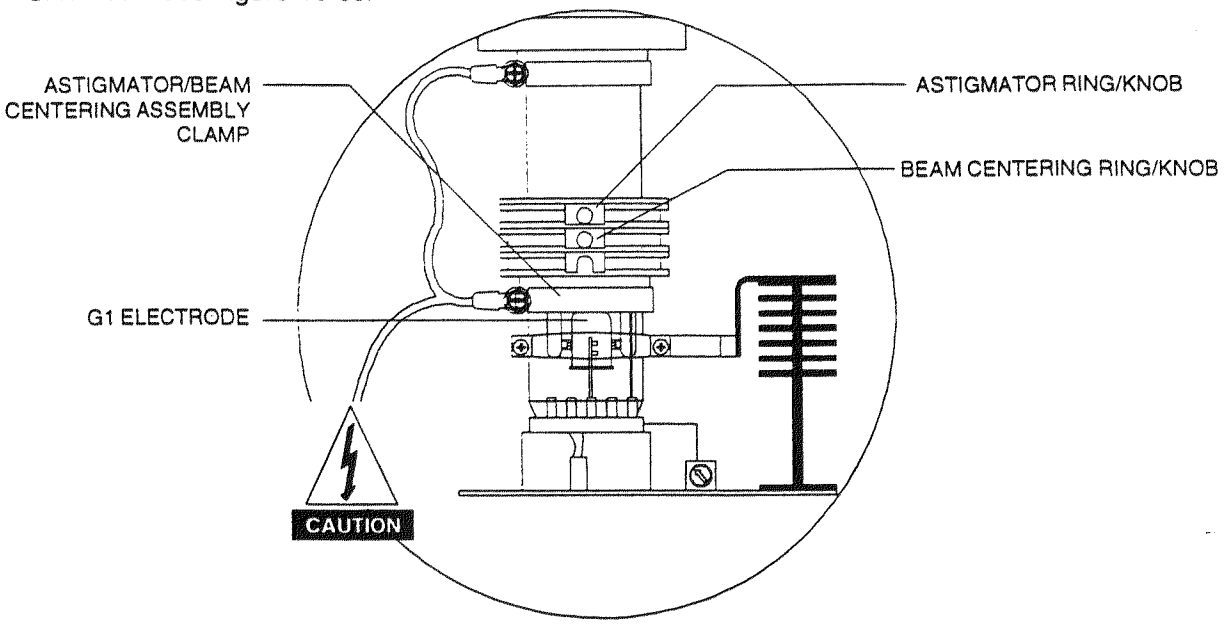


FIGURE 10-33. Asigmator/Beam centering assembly poistion

- STEP 2. Using the remote control perform and set the following;
  - ¤ Select internal 15kHz crosshatch pattern
  - ¤ Brightness to 95%.....Contrast to 95%
  - ¤ Sub-brightness (95 [CODE]) to 50%.....Sub-contrast (94 [CODE]) to 80%
  - ¤ Static Focus (98 [CODE]) to 50%,
- STEP 3. **BEAM CENTERING:** Decrease Static Focus (98 [CODE].....⇓) until a bright line is visible within the de-focused line, then;
  - ¤ Adjust the beam center ring, closest to the CRT amplifier (Figure 10-33), by rotating and turning the knob until the bright vertical and horizontal lines in the crosshatch pattern are centered within the de-focused crosshatch pattern or halo. See Figure 10-34.

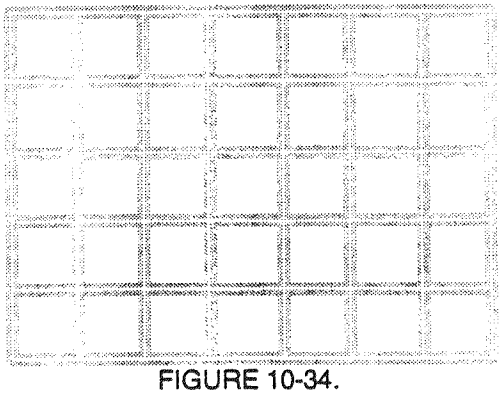
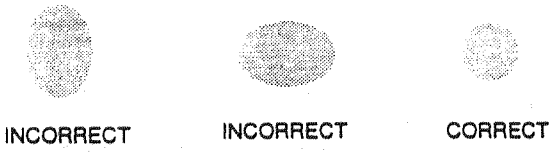


FIGURE 10-34.

Beam centering adjustement pattern.

10.6.2.4 . . . Astigmator/Beam Centering Prerequisites and Adjustments: (CONTINUED)

- STEP 4. Select internal 15kHz dot pattern.
- STEP 5. **ASTIGMATOR ADJUSTMENT**: Increase static focus (98 [CODE] / ⇑) until the dots are uniformly de-focused.
  - ¤ Adjust the astigmator ring, (one closest to the lens end), by rotating and turning the knob for best roundness of the dots. See Figure 10-35
  - ¤ Repeat Steps 2 through 5 until optimum results are achieved.
- STEP 6. Re-focus the image.



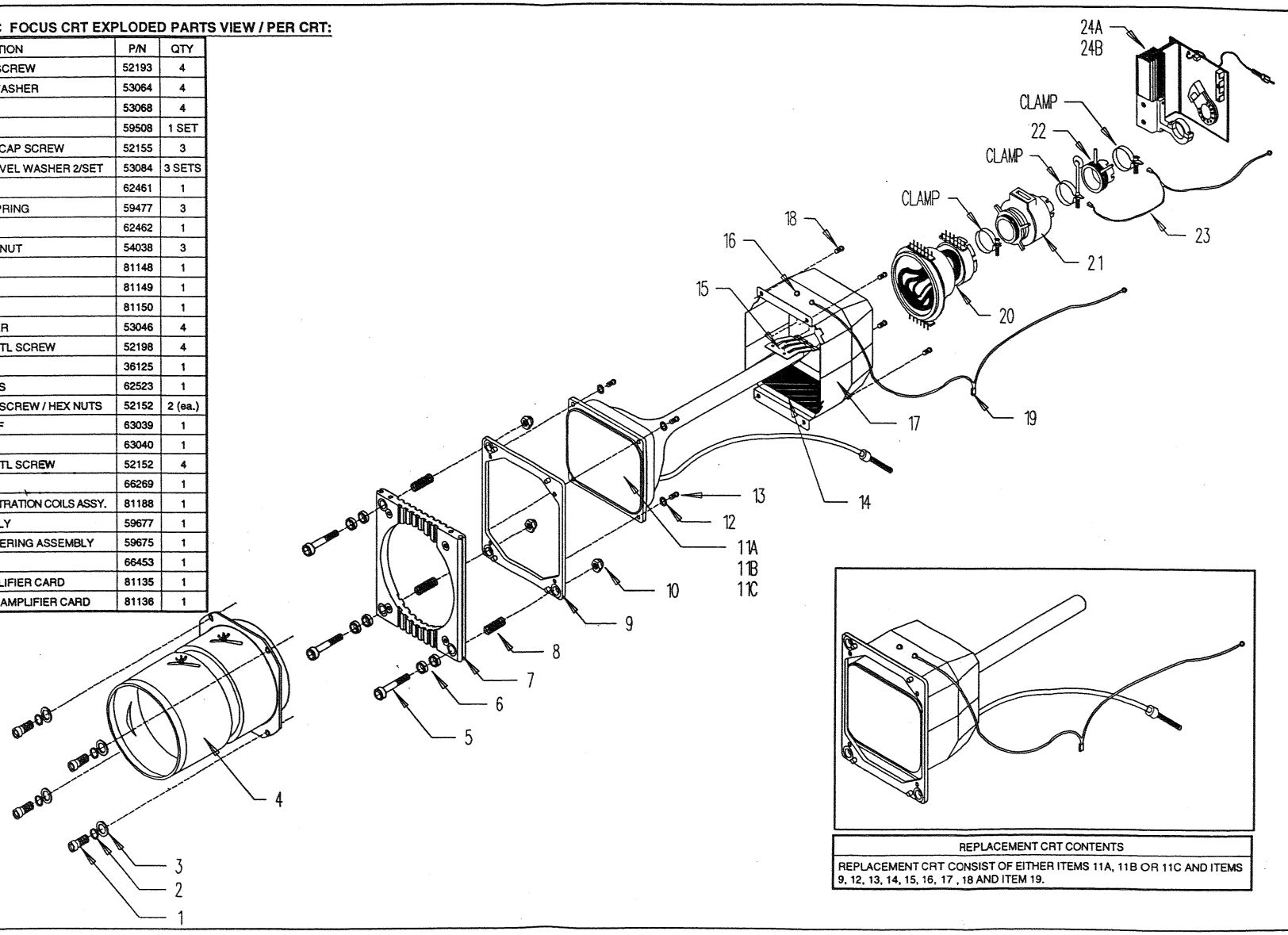
10

FIGURE 10-35. Asigmator adjustment pattern.

Once all aspects of the replacement CRT testing and adjustments have been satisfied, perform a complete mechanical and electronic setup for all sources and channels used as outlined in Sections 5 and 6 of this manual.

10.6.3 .....8" MAGNETIC FOCUS CRT EXPLODED PARTS VIEW / PER CRT:

ITEM	DESCRIPTION	P/N	QTY
1	1/4 - 20 X 7/8 SOCKET HD SCREW	52193	4
2	1/4 I.D. X .375 O.D. LOCK WASHER	53064	4
3	1/4 STL FLAT WASHER	53068	4
4	HD8-B LENS (SET OF 3)	59508	1 SET
5	3/8-24 X 2-1/2 SOCKET HD CAP SCREW	52155	3
6	3/8 I.D X 11/16 O.D. SS SWIVEL WASHER 2/SET	53084	3 SETS
7	LENS MOUNTING PLATE	62461	1
8	.38 I.D X .75 O.D. X 1-1/4 SPRING	59477	3
9	CRT MOUNTING PLATE	62462	1
10	3/8-24 SELF LOCKING STL NUT	54038	3
11A	RED CRT ASSEMBLY	81148	1
11B	GREEN CRT ASSEMBLY	81149	1
11C	BLUE CRT ASSEMBLY	81150	1
12	1/4 STL PLIT LOCK WASHER	53046	4
13	6-32 X 1-1/2 FH PHILLIPS STL SCREW	52198	4
14	CRT ANODE INSULATOR	36125	1
15	CRT GROUNDING FINGERS	62523	1
16	6-32 X .25 PNHD PHILLIPS SCREW / HEX NUTS	52152	2 (ea.)
17	CRT SHIELD - FRONT HALF	63039	1
	CRT SHIELD - BACK HALF	63040	1
18	6-32 X 1/4 SEM PHILLIPS STL SCREW	52152	4
19	GROUND HARNESS	66269	1
20	DEFLECTION YOKE / REGISTRATION COILS ASSY.	81188	1
21	FOCUS MAGNET ASSEMBLY	59677	1
22	ASIGMATOR / BEAM CENTERING ASSEMBLY	59675	1
23	GROUND HARNESS	66453	1
24A	MASTER (BLUE) CRT AMPLIFIER CARD	81135	1
24B	SLAVE (RED/GREEN) CRT AMPLIFIER CARD	81136	1



REPLACEMENT CRT CONTENTS
REPLACEMENT CRT CONSIST OF EITHER ITEMS 11A, 11B OR 11C AND ITEMS 9, 12, 13, 14, 15, 16, 17 , 18 AND ITEM 19.

10.7 . . . . . .AMPRO 4300 9" Magnetic Focus CRT Removal/ Replacement Procedure:

10.7.1 . . . . . .9" CRT Removal Procedure:

Tools Required

- ☐ Protective eyeglasses / gloves
- ☐ Phillips / slotted screwdriver
- ☐ 5/16 Ball Hexdriver (lens adjustment tool)
- ☐ 3/16 Ball Hexdriver or 3/16 Allen Wrench

Replacement Procedure

- STEP 1. De-energize the system and remove the main A.C. power cord.
- STEP 2. Unlock and tilt-up the top cover and top tray assemblies.
- STEP 3. On the front of the 4300, remove the four (4) each phillips screws securing the front plate to the chassis. See Figure 10-36

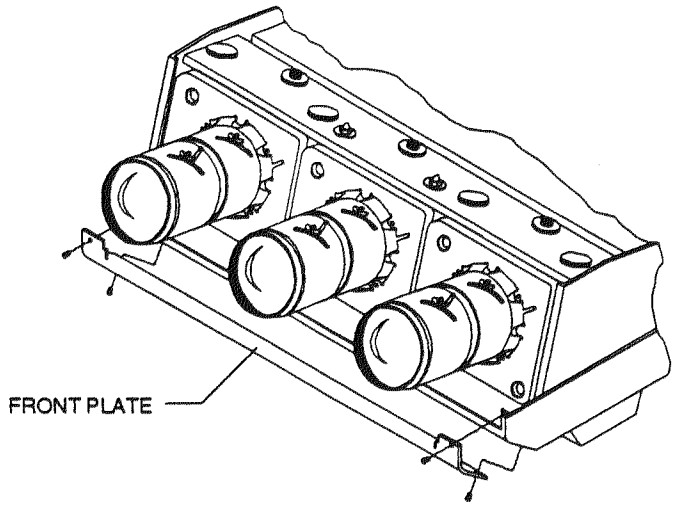


FIGURE 10-36. AMPRO 4300 front plate removal.

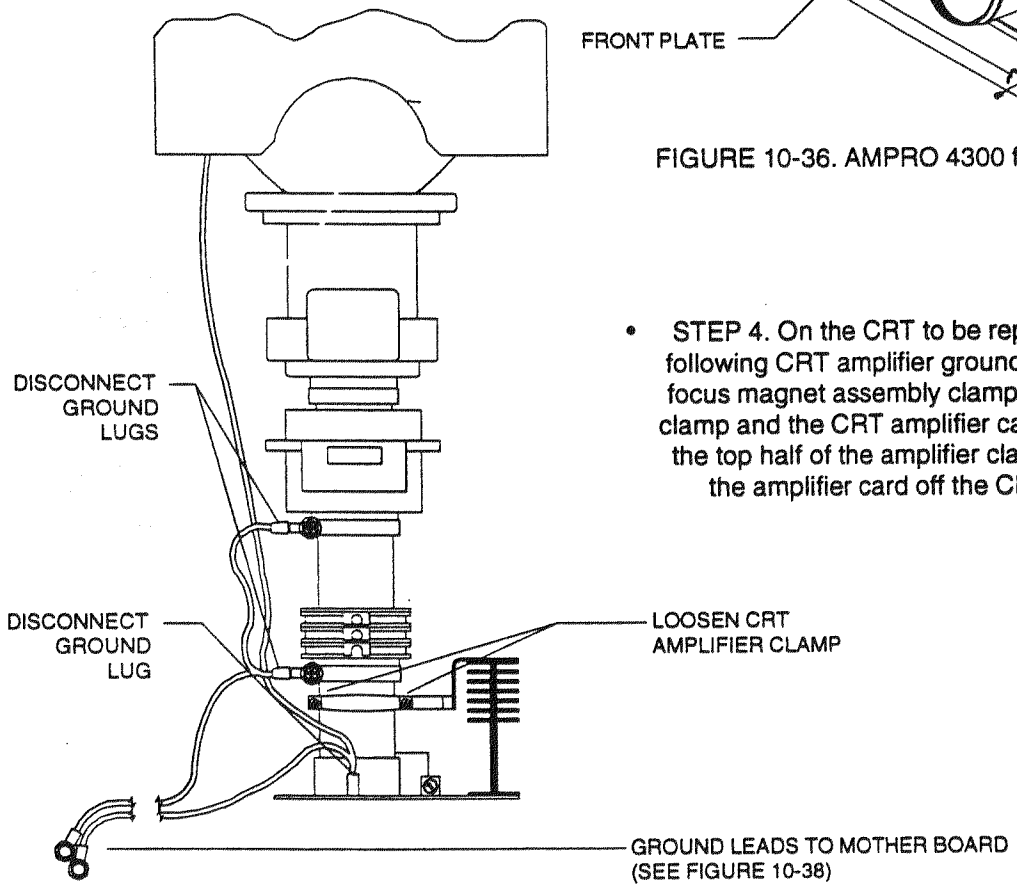


FIGURE 10-37. CRT Amplifier - top view.

- STEP 4. On the CRT to be replaced, disconnect the following CRT amplifier ground connections from the focus magnet assembly clamp, astigmator assembly clamp and the CRT amplifier card. Loosen or remove the top half of the amplifier clamp and carefully slide the amplifier card off the CRT. See Figure 10-37.

10.7.1 . . . . 9" CRT Removal Procedure: (CONTINUED)

- STEP 5. On the defective CRT disconnect the following; ① High Voltage anode lead, ② Focus magnet connector, ③ ground harness from the mother board location and ④ the respective sweep/convergence plug from the yoke interface board. See Figure 10-38.

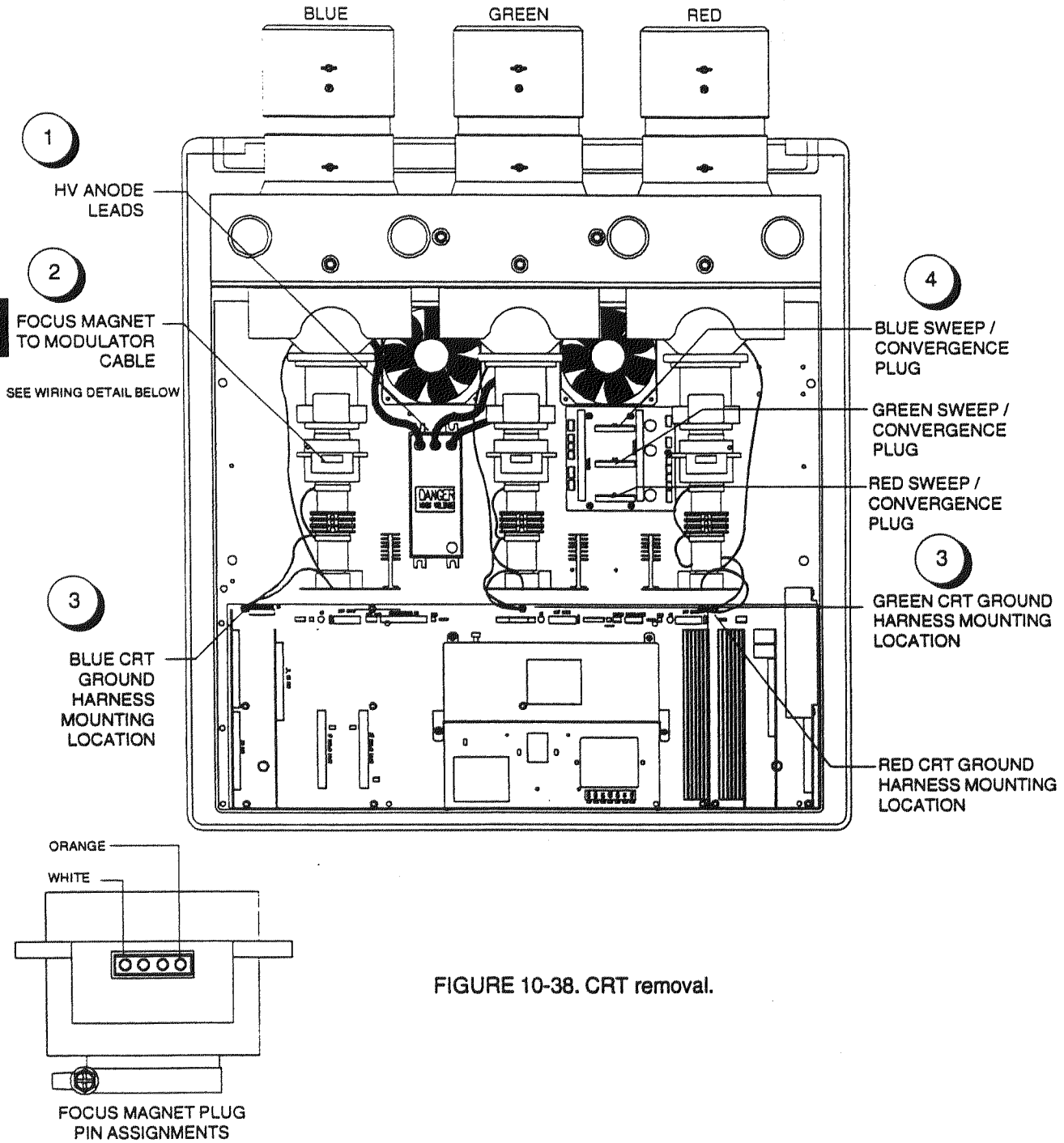


FIGURE 10-38. CRT removal.

10.7.1 . . . . 9" CRT Removal Procedure: (CONTINUED): Refer to Figure 10-39

- STEP 6. **LENS/CRT ASSEMBLY REMOVAL:** Remove the Lens/CRT mounting hardware of the CRT to be replaced.

- STEP 7. With the appropriate protective eye wear and gloves on, carefully slide the Lens/CRT assembly through the head and out of the chassis.

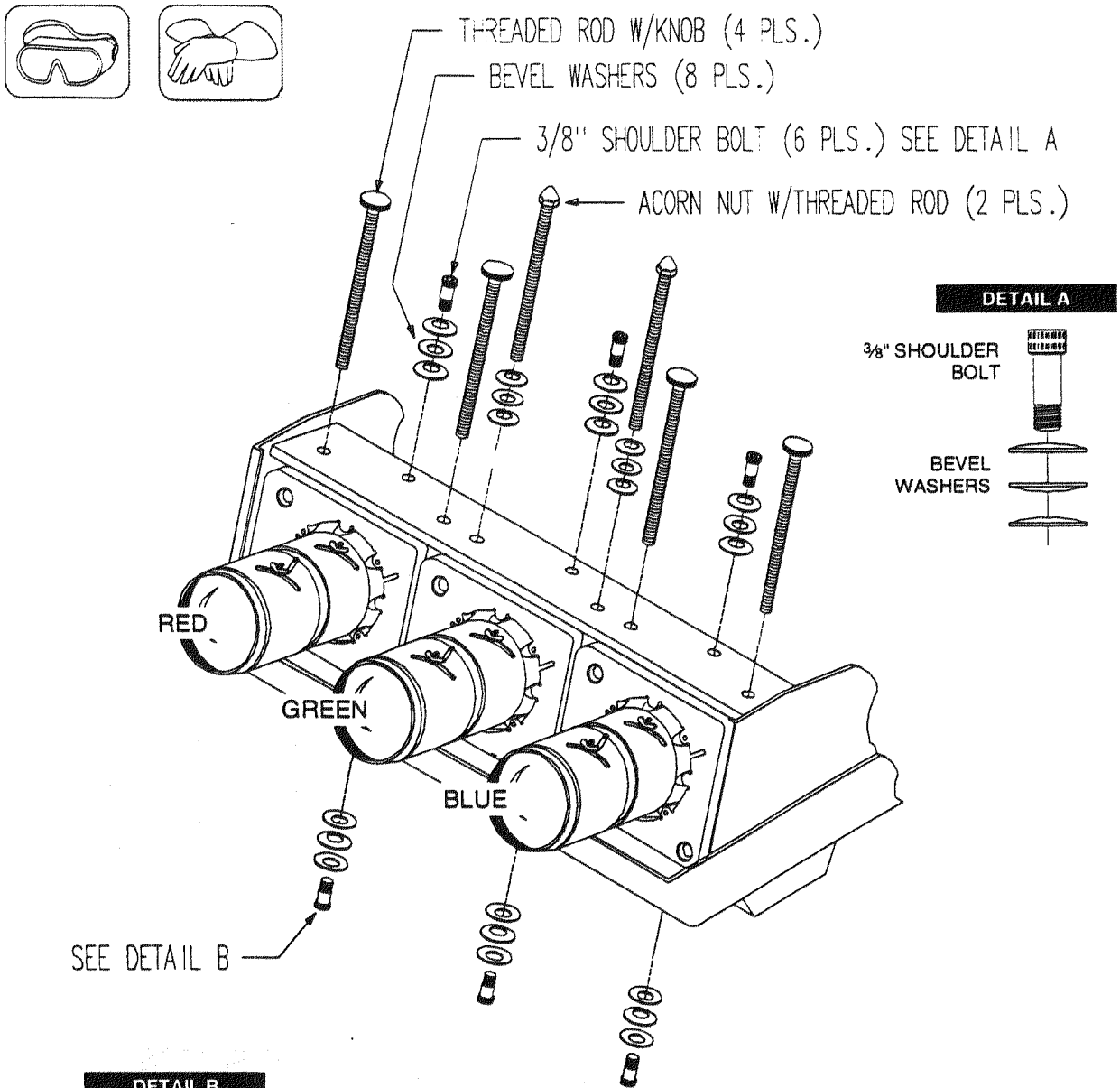


FIGURE 10-39. CRT mounting hardware.

10.7.1 . . . . 9" CRT Removal Procedure: (CONTINUED):

- STEP 8. **REMOVE LENS ASSEMBLY**: Using a 5/16" lens adjustment tool, remove the three (3) swivel screws, the three (3) bevel washer sets and the three (3) springs. NOTE: DO NOT TOUCH or attempt to clean the coated rear element of the lens. See Figure 10-40

- STEP 9. **REMOVE CRT NECK COMPONENTS**: Loosen the Yoke/Convergence assembly clamp, Focus magnet retainer ring and clamp and the Astigmator assembly clamp. Slide each component off the neck of the defective CRT. See Figure 10-40

The Yoke/Convergence coils have been nulled and are mated with epoxy, ENSURE that this assembly remains together as one piece.

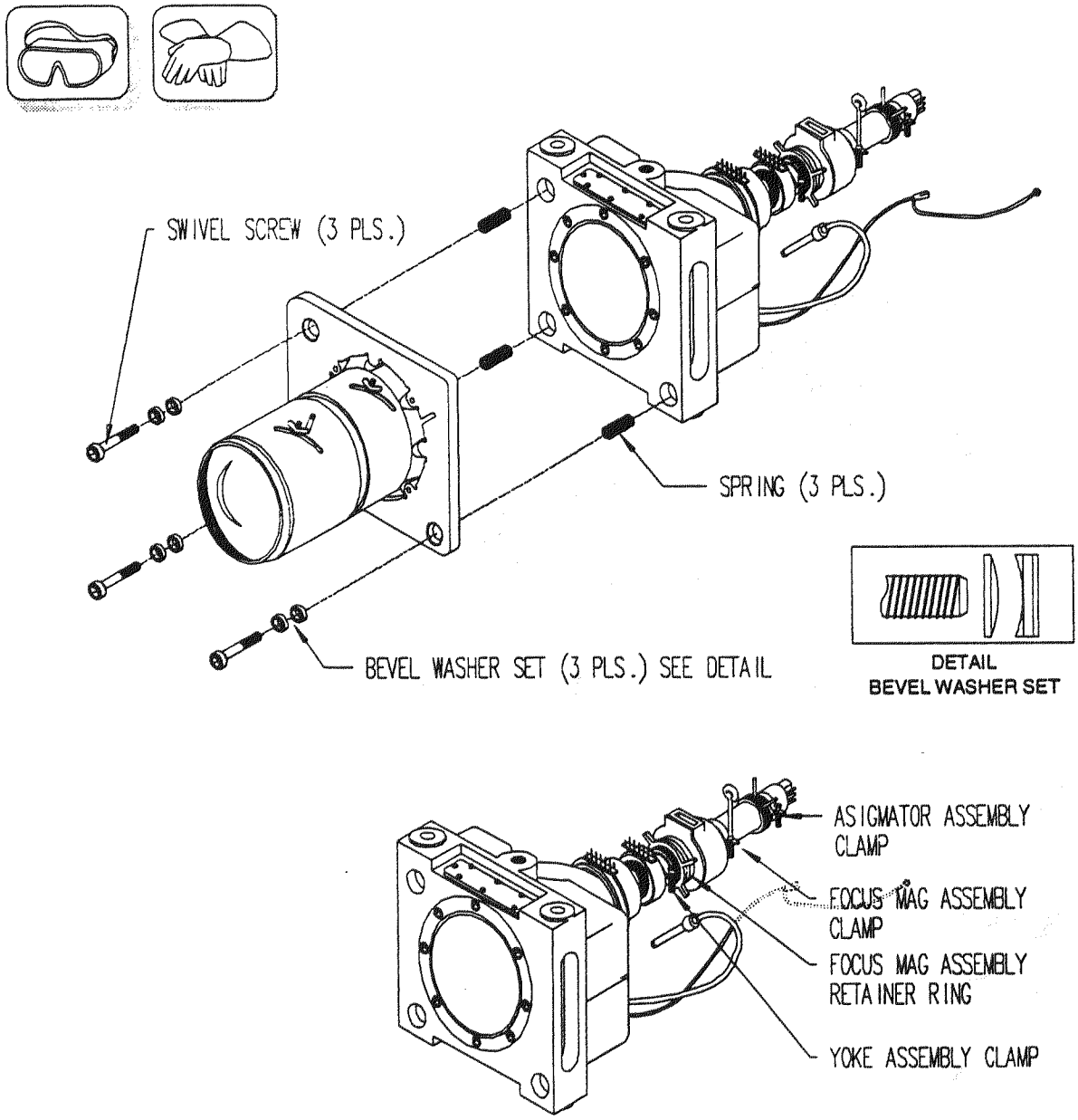


FIGURE 10-40. AMPRO 4300 CRT replacement procedure.

10.7.2 . . . . 9" CRT Replacement Procedure:

10.7.2.1 . . . . .Replacement Notes:

☐ Reverse the order of the removal procedure when installing the replacement CRT.

☐ Ensure the Yoke/Convergence assembly is pushed as far up onto the bell of the CRT as possible.

☐ Slide the Focus Magnet assembly up to Yoke assembly and tighten the retainer ring and clamp.

☐ Ensure all ground connections have been re-established.

• WARNING •

TO PREVENT X-RAY LEAKAGE, DEFLECTION YOKES MUST ALWAYS REMAIN FIRMLY AGAINST THE BELL OF THE CRT.

☐ **DO NOT** touch or try to clean the coated rear element of the lens assembly !

☐ **DO NOT** operate the system with the lens assembly(ies) removed !

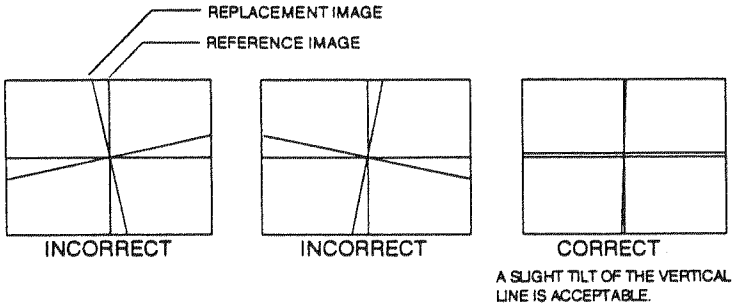
☐ Refer to Figure 10-39, detail A and B when installing the top/bottom 3⁄8" shoulder bolts and bevel washers, install bottom bolt/washers. Firmly tighten then back-off ¼ to ½ of a turn. Install top bolt/washers in the same manner allowing the CRT assembly to swing in and out smoothly.

☐ **RECHECK YOUR WORK !!!**

Once all connections have been re-established and verified, apply the appropriate A.C. power to the system and energize the system.

10.7.2.2 . . . . .Yoke Rotation Adjustment:

- STEP 1. Select external or internal 32kHz crosshair pattern.
- STEP 2. Ensure Registration is "off".....55 [CODE]
- STEP 3. Cutoff one of the CRTs not under test. Leaving the replacement CRT and a reference color "on".
- STEP 4. Loosen the Yoke clamp of the replacement CRT.
- STEP 5. "CAREFULLY " rotate the yoke assembly under adjustment until the center horizontal line is parallel to the center horizontal line of the reference color or adjust until the center horizontal line is level. Tighten Yoke clamp.



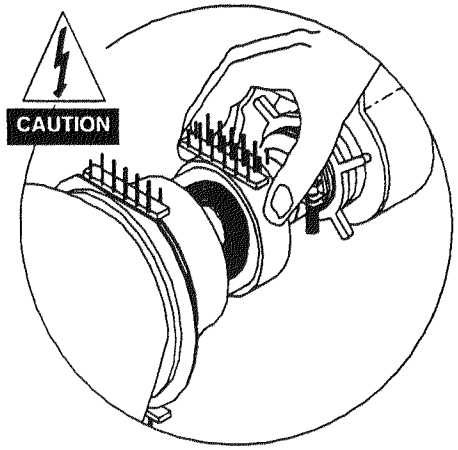


FIGURE 10-41. CRT replacement / yoke rotation.

10.7.2.3 . . . Focus Magnet Position and Lens Focus:

- STEP 1. Position Focus magnet under adjustment fully forward, straight up and down and tighten.
- STEP 2. Select internal 15kHz. crosshatch pattern.
- STEP 3. Using the remote control set the following controls for the color under adjustment;
  - ¤ Brightness [BRITE].....75%
  - ¤ Contrast [CONT].....65%
  - ¤ Static Focus 98 [CODE].....50%
- Dynamic Focus 99 [CODE]horizontal - [↔].....87% and vertical - [↕]..... 15%
- STEP 4. Ensure G2 cutoff is adjusted properly;
  - ¤ Select internal 62kHz crosshatch.
  - ¤ Cutoff CRT under test.
  - ¤ Set contrast and brightness to minimum.
  - ¤ Looking into the lens of the CRT under adjustment, adjust R2 on the CRT amplifier card so that the raster is just barely visible.
  - ¤ Restore CRT cutoff.
- STEP 5. Perform a preliminary lens focus and focal plane (*scheimpflug*) adjustment. Refer to Section 5 for detailed instructions
- STEP 6. **IF REQUIRED!** Typically the Focus Magnet assembly is position straight up and down, fully forward up against the Yoke/Convergence assembly. If necessary, perform the following procedure;
  - ¤ Loosen the focus magnet under adjustment.
  - ¤ Slide the focus magnet on the CRT until preliminary focus is achieved in the center of the projected image. Note, recheck lens focus.
  - ¤ Tighten the focus magnet clamp(s). **BE CAREFUL** not to rotate or slide the focus magnet.

10.7.2.4 . . . Astigmator/Beam Centering Prerequisites and Adjustments:

- STEP 1. Check and position the astigmator/beam centering assembly. The clamp used for securing the assembly should be in-line with the end of the G1 electrode located inside and at the rear of the CRT neck. See Figure 10-42.

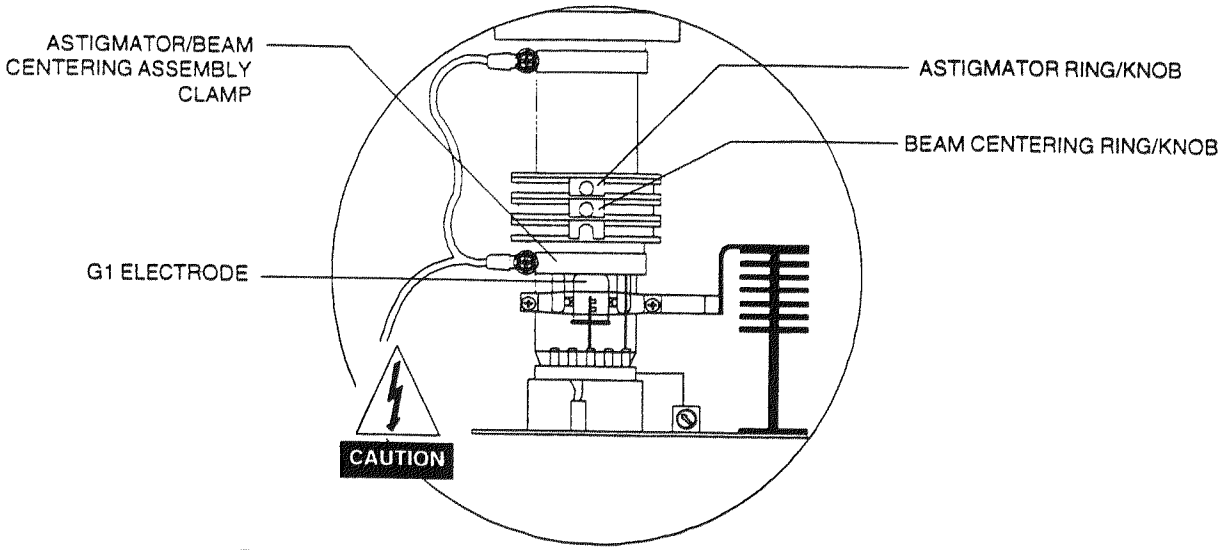


FIGURE 10-42. Asigmator/Beam centering assembly poistion

- STEP 2. Using the remote control, perform and set the following;
  - ¤ Select internal 15kHz crosshatch pattern
  - ¤ Set Brightness to.....80% and Contrast to.....95%
  - ¤ Static Focus (98 [CODE]) to.....50%
  - ¤ Sub-brightness (95 [CODE]) to.....50% and Sub-contrast to.....80%
- STEP 3. **BEAM CENTERING:** Decrease Static Focus (98 [CODE].....⇓) until a bright line is visible within the de-focused line.
  - ¤ Adjust the beam center ring, closest to the CRT amplifier (Figure 10-42), by rotating and turning the knob until the bright vertical and horizontal lines in the crosshatch pattern are centered within the de-focused crosshatch pattern or halo. See Figure 10-43.

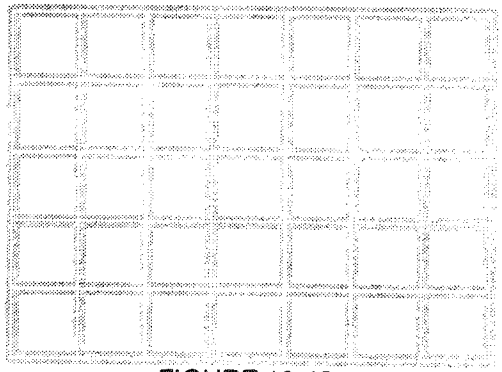


FIGURE 10-43.

Beam centering adjustement pattern.

10.7.2.4 . . . Astigmator/Beam Centering Prerequisites and Adjustments: (CONTINUED)

- STEP 4. Select internal 15kHz dot pattern.
- STEP 5. **ASTIGMATOR ADJUSTMENT**: Increase Static Focus (99 [CODE]..... ⇑) until the dots are uniformly de-focused.
  - ¤ Adjust the astigmator ring, (one closest to the lens end), by rotating and turning the knob for best roundness of the dots. See Figure 10-44
  - ¤ Repeat Steps 2 through 5 until optimum results are achieved.
- STEP 6. Re-focus the image.

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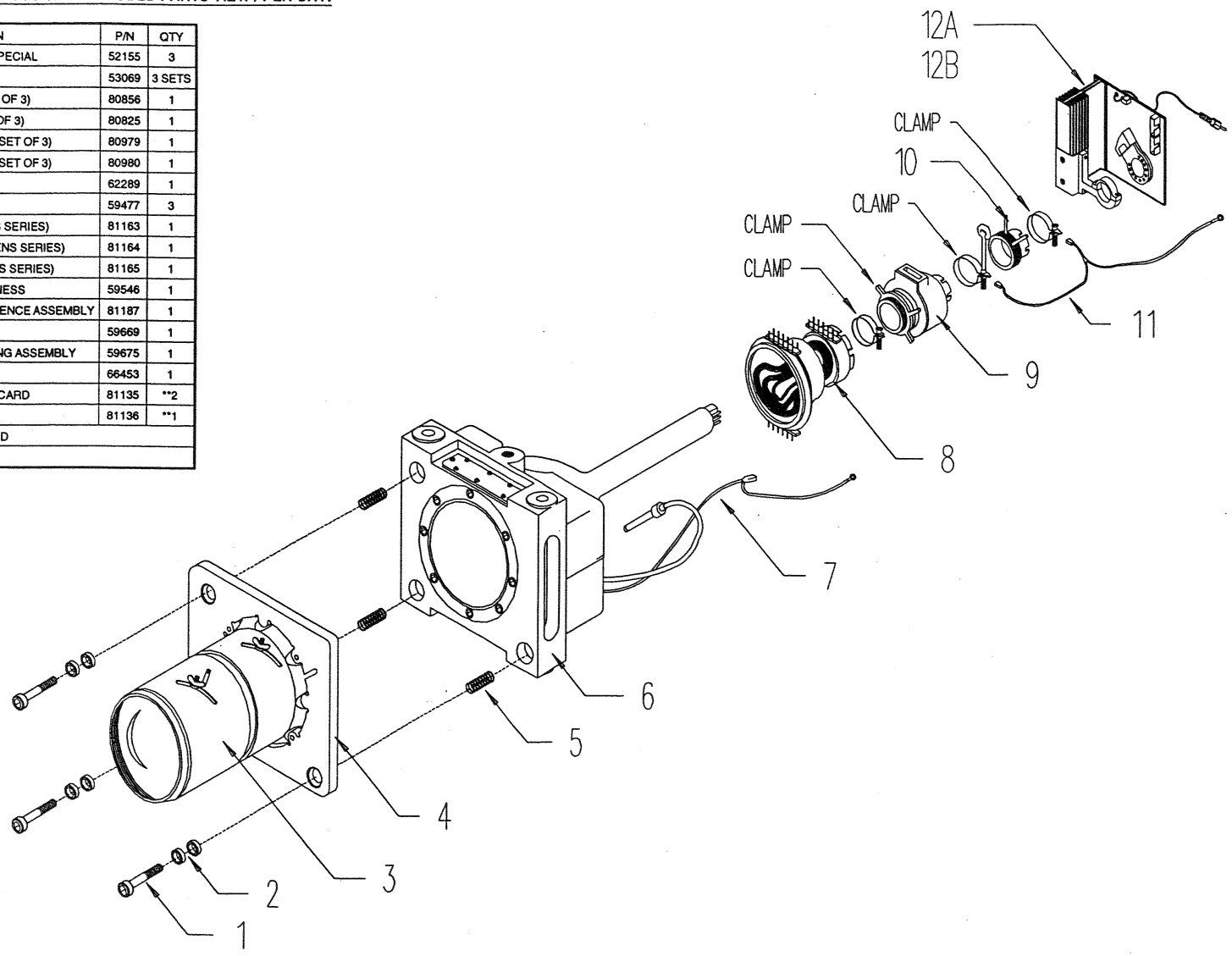
FIGURE 10-44. Asigmator adjustment pattern.

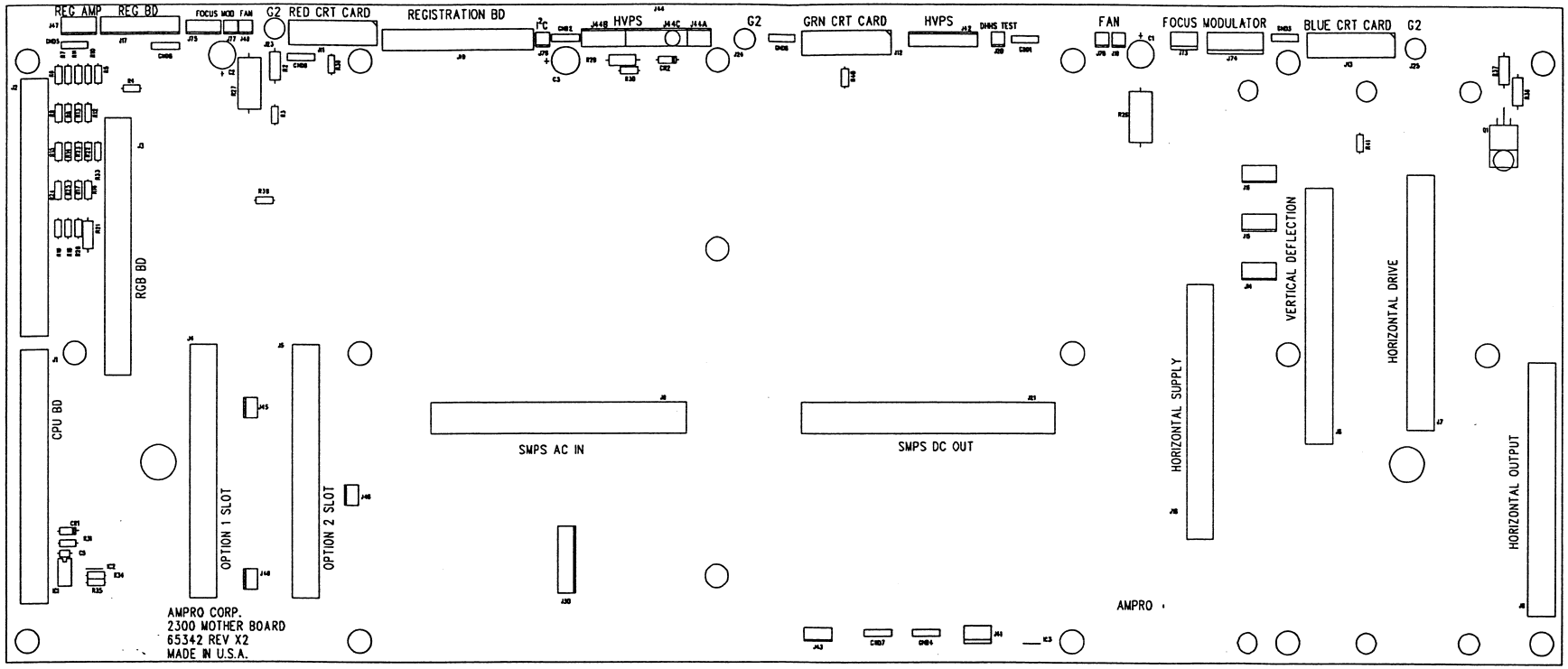
Once all aspects of the replacement CRT testing and adjustments have been satisfied, perform a complete mechanical and electronic setup for all sources and channels used. Refer to Sections 5 and 6 as required.

10.7.3 .....9" MAGNETIC FOCUS CRT EXPLODED PARTS VIEW / PER CRT:

ITEM	DESCRIPTION	P/N	QTY
1	SWIVEL SCREW 3/8-24 X 2.5 SPECIAL	52155	3
2	BEVEL WASHER SET (2/SET)	53069	3 SETS
*3	HD-10L LENS ASSEMBLY (SET OF 3)	80856	1
	HD-10 LENS ASSEMBLY (SET OF 3)	80825	1
	HD-10GT17 LENS ASSEMBLY (SET OF 3)	80979	1
	HD-10GT26 LENS ASSEMBLY (SET OF 3)	80980	1
4	LENS MOUNTING PLATE	62289	1
5	SPRING 3/4 X 3/8 X .093 X .156	59477	3
6	RED CRT/COUPLER (ALL LENS SERIES)	81163	1
	GREEN CRT/COUPLER (ALL LENS SERIES)	81164	1
	BLUE CRT/COUPLER (ALL LENS SERIES)	81165	1
7	CRT/COUPLER GROUND HARNESS	59546	1
8	DEFLECTION YOKE/CONVERGENCE ASSEMBLY	81187	1
9	FOCUS MAGNET ASSEMBLY	59669	1
10	ASTIGMATOR/BEAM CENTERING ASSEMBLY	59675	1
11	GROUND HARNESS	66453	1
12A	BLUE/GREEN CRT AMPLIFIER CARD	81135	**2
12B	RED CRT AMPLIFER CARD	81136	**1
*DEPENDS ON LENS OPTION INSTALLED			
**PER SYSTEM			



11.1 . . . . . AMPRO 3300 Mother Board (81169X3) / Component Layout / Parts List:

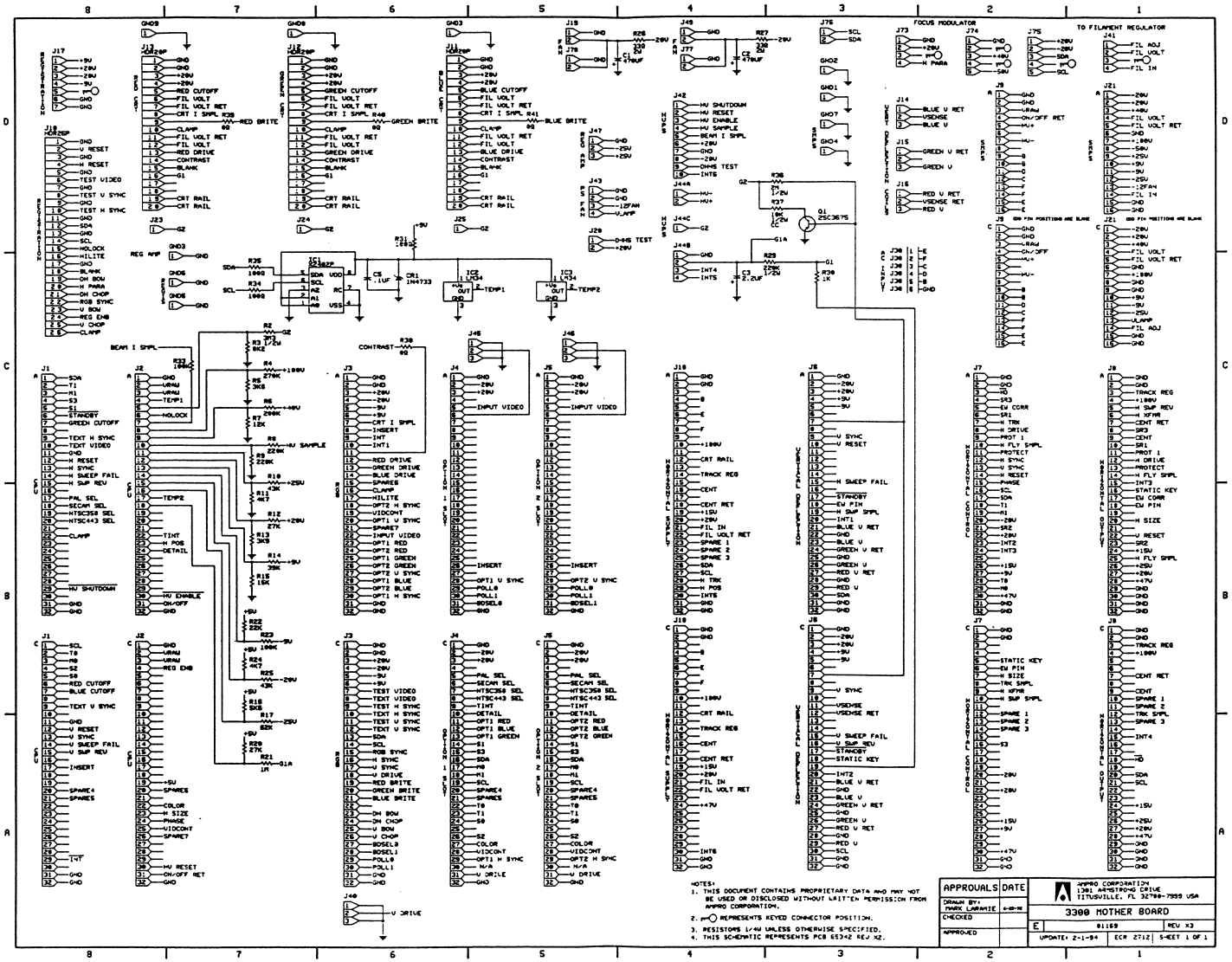


REF	DESCRIPTION	P/N
	MOTHER BOARD (81169X3)	
	PCB	
PCB	PRINTED CIRCUIT BOARD	65342A
	CAPACITORS	
C1	ELECT, 470µF, 35V	11025
C2	ELECT, 470µF, 35V	11025
C3	ELECT, 2.2µF, 350V	11071
C5	CERAMIC, .1µF, 12014	
	DIODES	
CR1	ZENER, 1N4733	32014
	ICs	
IC1	X2402P - CMOS 256X8 EEPROM W/I²C	34345
IC2	LM34C, ° F TEMP SENSOR	34456
IC3	LM34C, ° F TEMP SENSOR	34456
	CONNECTORS	
GND1	1 PIN, SPD, SML, MALE, PCB	51044
GND2	1PIN, SPD, SML, MALE, PCB	51044
GND3	1 PIN, SPD, SML, MALE, PCB	51044
GND4	1 PIN, SPD, SML, MALE, PCB	51044
GND5	1 PIN, SPD, SML, MALE, PCB	51044
GND6	1 PIN, SPD, SML, MALE, PCB	51044
GND7	1 PIN, SPD, SML, MALE, PCB	51044
GND8	1 PIN, SPD, SML, MALE, PCB	51044
GND9	1 PIN, SPD, SML, MALE, PCB	51044
J1	64 PIN DIN, FEMALE	51298
J2	64 PIN DIN, FEMALE	51298
J3	64 PIN DIN, FEMALE	51298
J4	64 PIN DIN, FEMALE	51298
J5	64 PIN DIN, FEMALE	51298
J6	64 PIN DIN, FEMALE	51298
J7	64 PIN DIN, FEMALE	51298
J8	64 PIN DIN, FEMALE	51298
J9	32 PIN DIN SOCKET	51390
J10	26 PIN, MALE W/O EJT RIB	51384
J11	20 PIN DBL ROW W/DETENTS	51613
J12	20 PIN DBL ROW W/DETENTS	51613
J13	20 PIN DBL ROW W/DETENTS	51613
J14	HDR, MTA156-3 POS.	51280
J15	HDR, MTA156-3 POS.	51280
J16	HDR, MTA156-3 POS.	51280
J17	HDR, MTA156 - 7 POS.	51134
J18	64 PIN DIN, FEMALE	51298
J19	HDR, MTA100 - 2 POS.	51169
J20	HDR, MTA100 - 2 POS.	51169
J21	32 PIN DIN, SOCKET	51390
J23	MOTHER BD G2 WIRE ASSY	66388
J24	MOTHER BD G2 WIRE ASSY	66388
J25	MOTHER BD G2 WIRE ASSY	66388
J30	HDR, MTA156 - 6 POS.	51133
J40	HDR, MTA100 - 3 POS.	51170
J41	HDR, MTA100 - 4 POS.	51171
J42	10 PIN MOLEX	51391
J43	HDR, MTA100 - 4 POS.	51171
J44A	HDR, 2 PIN W/LOCK	51397
J44B	156 MOLEX W/LOCK - 4 POS.	51351
J44C	CRT G2 WIRE ASSY.	66311
J45	HDR, MTA100 - 3 POS.	51170
J46	HDR, MTA100 - 3 POS.	51170
J47	HDR, MTA100 - 3 POS.	51170
J49	HDR, MTA100 - 2 POS.	51169
J73	HDR, MTA100 - 4 POS.	51171
J74	HDR, MTA156 - 5 POS.	51132
J75	HDR, MTA100 - 5 POS.	51172
J76	HDR, MTA100 - 2 POS.	51169
J77	HDR, MTA100 - 2 POS.	51169
J78	HDR, MTA100 - 2 POS.	51169
	TRANSISTORS	
Q1	TRANSISTOR, 2SC3675, NPN	33105
	RESISTORS Ω	
R2	3M3, 1/2W	22069
R3	8K2	21105
R4	270K	21129
R5	3K6	21120
R6	200K	21080
R7	12K	21068
R8	220K	21118
R9	220K	21118
R10	43K	21158
R11	4K7	21061
R12	27K	21072
R13	3K9	21121
R14	39K	21113
R15	15K	21107
R16	5K6	21063
R17	62K	21162
R20	27K	21072
R21	1M	21091
R22	22K	21070
R23	100K	21077
R24	4K7	21061
R25	43K	21158
R26	33,2W	23037
R27	33,2W	23037
R29	220K,1/2W	22059
R30	1K	21052
R31	100	21037
R33	100K	21077
R34	100	21037
R35	100	21037
R36	2M,1/2W	22085
R37	10K,1/2W,CC	22077
R38	0, "MOLDED JUMPER"	21168
R39	0, "MOLDED JUMPER"	21168
R40	0, "MOLDED JUMPER"	21168
R41	0, "MOLDED JUMPER"	21168

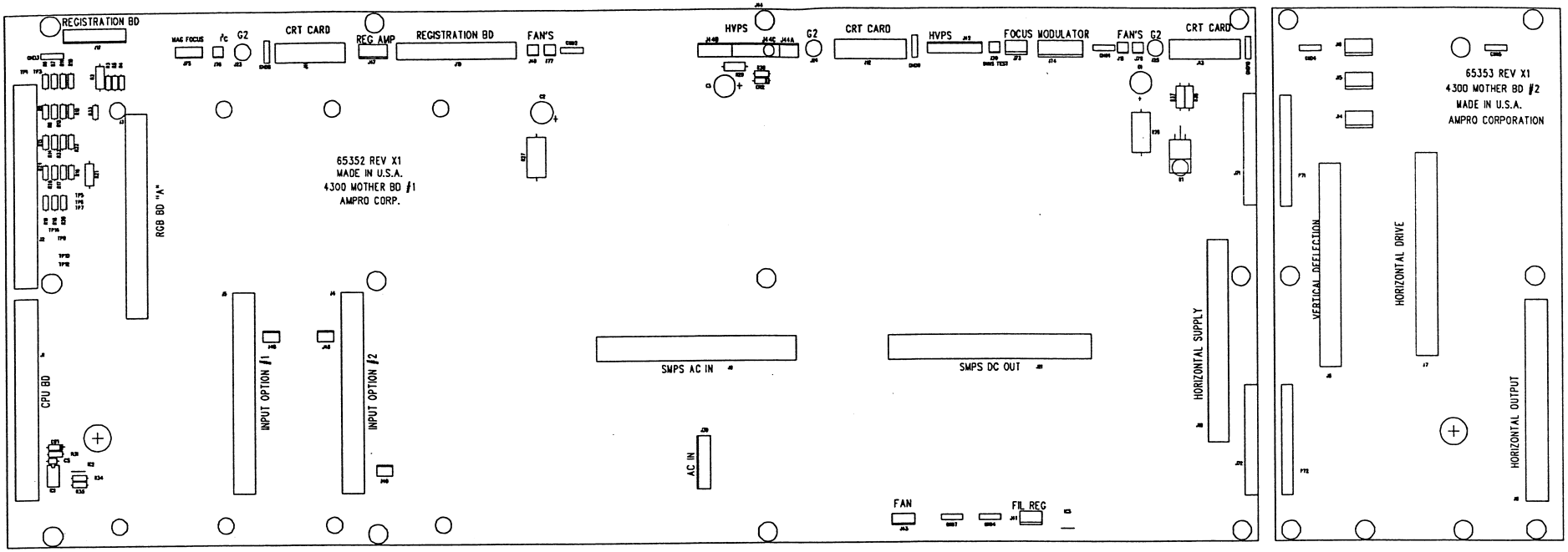
RESISTORS POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES SMD ¼ w

SMD/SMT denotes: Surface Mount Devices

11.1.1 . . . . AMPRO 3300 Mother Board (81169X3) Schematic: 1 of 1



11.2 . . . . . AMPRO 4300 Mother Board #1 (81079X7) and Mother Board #2 (81080X2) Component Layout / Parts List :

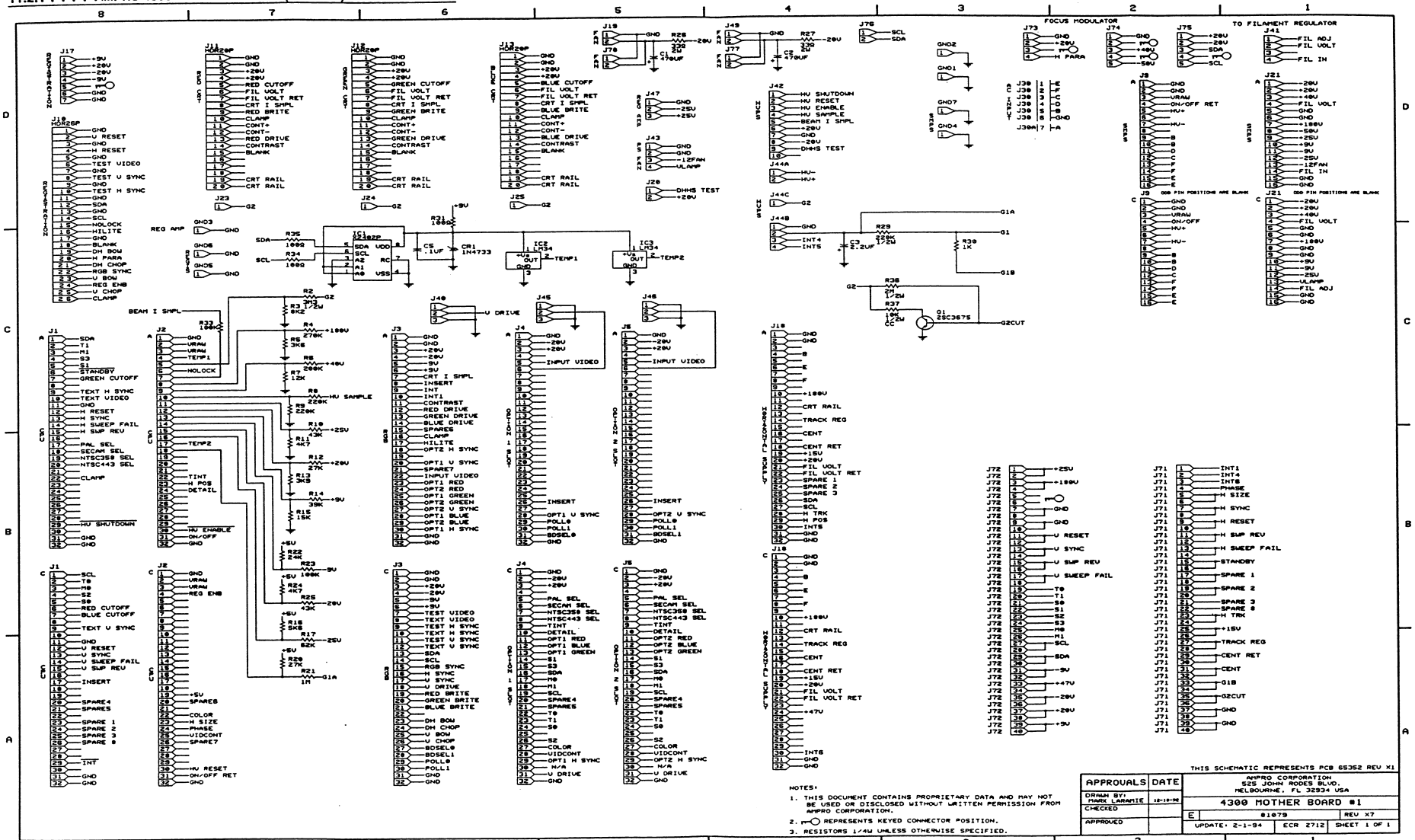


REF	DESCRIPTION	P/N
MOTHER BOARD #1 (81079X7)		
PCB		
PCB	PRINTED CIRCUIT BOARD	65352 (X7)
CAPACITORS		
C1	ELECT, 470µF, 35V	11025
C2	ELECT, 470µF, 35V	11025
C3	ELECT, 2.2µF, 350V	11071
C5	CERAMIC, .1µF	12014
DIODES		
CR1	ZENER, 1N4733	32014
CONNECTORS		
GND1	1 PIN, SPD, SML, MALE, PCB	51044
GND2	1 PIN, SPD, SML, MALE, PCB	51044
GND3	1 PIN, SPD, SML, MALE, PCB	51044
GND4	1 PIN, SPD, SML, MALE, PCB	51044
GND5	1 PIN, SPD, SML, MALE, PCB	51044
GND6	1 PIN, SPD, SML, MALE, PCB	51044
GND7	1 PIN SPD, SML, MALE, PCB	51044
GND8	1 PIN, SPD, SML, MALE, PCB	51044
GND9	1 PIN, SPD, SML, MALE, PCB	51044
GND10	1 PIN SPD, SML, MALE, PCB	51044
J1	64 PIN DIN, FEMALE	51298
J2	64 PIN DIN, FEMALE	51298
J3	64 PIN DIN, FEMALE	51298
J4	64 PIN DIN, FEMALE	51298
J5	64 PIN DIN, FEMALE	51298
J9	32 PIN DIN SOCKET	51390
J10	26 PIN, MALE W/EJT RIB	51056
J11	20 PIN DBL ROW W/DETENTS	51613
J12	20 PIN DBL ROW W/DETENTS	51613
J13	20 PIN DBL ROW W/DETENTS	51613
J17	HDR, MTA156 - 7 POS.	51134
J18	64 PIN DIN, FEMALE	51298
J19	HDR, MTA100 - 2 POS.	51169
J20	HDR, MTA100 - 2 POS.	51169
J21	32 PIN DIN, SOCKET	51390
J23	MOTHER BD G2 WIRE ASSY	66312
J24	MOTHER BD G2 WIRE ASSY	66312
J25	MOTHER BD G2 WIRE ASSY	66312
J30	HDR, MTA156 - 6 POS.	51133
J30A	6PIN HEADER	
J40	HDR, MTA100 - 3 POS.	51170
J41	HDR, MTA100 - 4 POS.	51171
J42	10 PIN MOLEX	51391
J43	HDR, MTA100 - 4 POS.	51171
J44A	HDR, 2 PIN W/LOCK	51397
J44B	156 MOLEX W/LOCK - 4 POS.	51351
J44C	CRT G2 WIRE ASSY.	66311
J45	HDR, MTA100 - 3 POS.	51170
J46	HDR, MTA100 - 3 POS.	51170
J47	HDR, MTA100 - 3 POS.	51170
J49	HDR, MTA100 - 2 POS.	51169
J71	40 PIN RGT ANGLE, MALE	51417
J72	40 PIN RGT ANGLE, MALE	51417
J73	HDR, MTA100 - 4 POS.	51171
J74	HDR, MTA156 - 5 POS.	51132
J75	HDR, MTA100 - 5 POS.	51172
J76	HDR, MTA100 - 2 POS.	51169
J77	HDR, MTA100 - 2 POS.	51169
J78	HDR, MTA100 - 2 POS.	51169
ICs		
IC1	X2402P - CMOS 256X8 EEPROM W/I²C	34345
IC2	LM34C, TEMP SENSOR	34456
IC3	LM34C, TEMP SENSOR	34456
TRANSISTORS		
Q1	2SC3675, NPN	33105
RESISTORS Ω		
R2	3M3,1/2W	22069
R3	8K2	21105
R4	270K	21129
R5	3K6	21120
R6	200K	21080
R7	12K	21068
R8	220K	21118
R9	220K	21118
R10	43K	21158
R11	4K7	21061
R12	27K	21072
R13	3K9	21121
R14	39K	21113
R15	15K	21107
R16	5K6	21063
R17	62K	21162
R20	27K	21072
R21	1M	21091
R22	22K	21070
R23	100K	21077
R24	4K7	21061
R25	43K	21158
R26	33,2W	23037
R27	33,2W	23037
R29	220K,1/2W	22059
R30	1K	21052
R31	100	21037
R33	100K	21077
R34	100	21037
R35	100	21037
R36	2M,1/2W	22085
R37	10K,1/2W,CC, 5%	22077
MOTHER BOARD #2 (81080X2)		
PCB		
PCB	PRINTED CIRCUIT BOARD	65353 (A)
CONNECTORS		
J6	64 PIN DIN, FEMALE	51298
J7	64 PIN DIN, FEMALE	51298
J8	64 PIN DIN, FEMALE	51298
J14	HDR, MTA156-3 POS.	51280
J15	HDR, MTA156-3 POS.	51280
J16	HDR, MTA156-3 POS.	51280
P71	40 PIN RGT ANGLE, FEMALE	51419
P72	40 PIN RGT ANGLE, FEMALE	51419

RESISTORS POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES SMD ¼ w

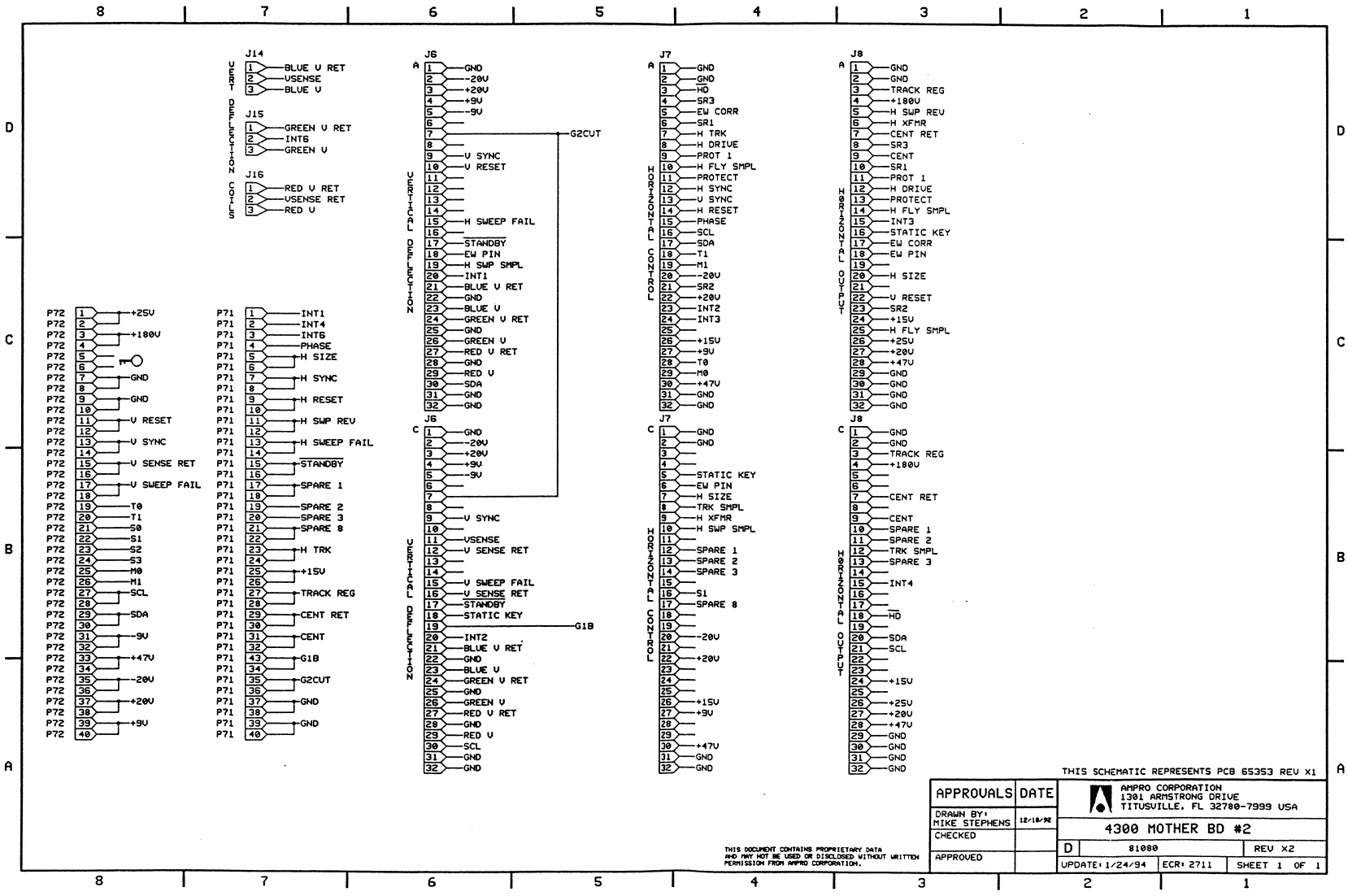
SMD/SMT denotes: Surface Mount Devices

11.2.1 . . . . AMPRO 4300 Mother Board # 1(81079X7) Schematic 1 of 1:



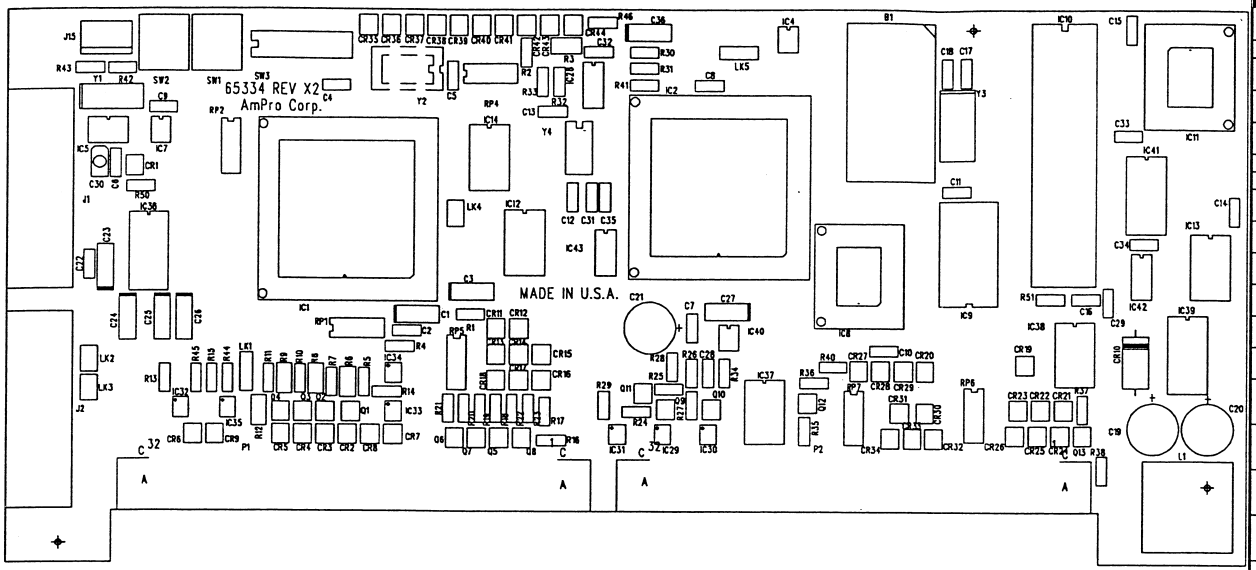
SMD/SMT denotes: Surface Mount Devices

11.2.2 . . . . AMPRO 4300 Mother Board #2 (81080X2) Schematic 1 of 1:



AMPRO 4300 Mother Board #1 (81080X2) Schematic 1 of 1

11.3 . . . . . CPU Module (3300 - 81154X / 4300 - 81153X) Component Layout / Parts List:



REF	DESCRIPTION	P/N
	PCB	
PCB	PRINTED CIRCUIT BOARD	65334(X2)
	BATTERY	
B1	3.6V VOLTS, LTC-7P, 750mAH	59403
	CAPACITORS	
C1	TANT, 10µF, 16V, SMD	15019
C2	100nF,CERAMIC, 50V SMD	12122
C3	TANT, 10µF, 16V SMD	15019
C4	100nF,CERAMIC, 50V SMD	12122
C5	100nF,CERAMIC, 50V SMD	12122
C6	100nF,CERAMIC, 50V SMD	12122
C7	100nF,CERAMIC, 50V SMD	12122
C8	100nF,CERAMIC, 50V SMD	12122
C9	100nF,CERAMIC, 50V SMD	12122
C10	100nF,CERAMIC, 50V SMD	12122
C11	100nF,CERAMIC, 50V SMD	12122
C12	100nF,CERAMIC, 50V SMD	12122
C13	100nF,CERAMIC 50V, SMD	12122
C14	100nF,CERAMIC, 50V SMD	12122
C15	100nF,CERAMIC, 50V SMD	12122

C16	100nF,CERAMIC, 50V SMD	12122
C17	18PF,CERAMIC, 200V, SMD	12121
C18	18PF,CERAMIC, 200V, SMD	12121
C19	ELECT, 220µF, 25V	11033
C20	ELECT, 100µF, 35V	11036
C21	ELECT, 100µF, 20V	15018
C22	100nF,CERAMIC, 50V SMD	12122
C23	TANT, 10µF, 16V, SMD	15019
C24	TANT, 10µF, 16V, SMD	15019
C25	TANT, 10µF, 16V, SMD	15019
C26	TANT, 10µF, 16V, SMD	15019
C27	TANT, 10µF, 16V, SMD	15019
C28	100nF,CERAMIC, 50V, SMD	12122
C29	100nF,CERAMIC, 50V, SMD	12122
C30	VARIABLE, 22pF, 100V	
C31	100nF,CERAMIC, 50V SMD	12122
C32	100nF,CERAMIC, 50V SMD	12122
C33	100nF,CERAMIC, 50V SMD	12122
C34	100nF,CERAMIC, 50V SMD	12122
C35	100nF,CERAMIC, 50V, SMD	12122
C36	TANT, 10µF, 16V, SMD	15019

	DIODES	
CR1	BAV99 DUAL SMT SOT-23	31074
CR2	BAV99 DUAL SMT SOT-23	31074
CR4	BAV99 DUAL SMT SOT-23	31074
CR3	BAV99 DUAL SMT SOT-23	31074
CR5	BAV99 DUAL SMT SOT-23	31074
CR6	BAV99 DUAL SMT SOT-23	31074
CR7	BAV99 DUAL SMT SOT-23	31074
CR8	BAV99 DUAL SMT SOT-23	31074
CR9	BAV99 DUAL SMT SOT-23	31074
CR10	1N5822, SCHOTTKY	31067
CR11	BAV99 DUAL SMT SOT-23	31074
CR12	BAV99 DUAL SMT SOT-23	31074
CR13	BAV99 DUAL SMT SOT-23	31074
CR14	BAV99 DUAL SMT SOT-23	31074
CR15	BAV99 DUAL SMT SOT-23	31074
CR16	BAV99 DUAL SMT SOT-23	31074
CR17	BAV99 DUAL SMT SOT-23	31074
CR18	BAV99 DUAL SMT SOT-23	31074
CR19	BAV99 DUAL SMT SOT-23	31074
CR20	BAV99 DUAL SMT SOT-23	31074

CR21	BAV99 DUAL SMT SOT-23	31074
CR22	BAV99 DUAL SMT SOT-23	31074
CR23	BAV99 DUAL SMT SOT-23	31074
CR24	BAV99 DUAL SMT SOT-23	31074
CR25	BAV99 DUAL SMT SOT-23	31074
CR26	BAV99 DUAL SMT SOT-23	31074
CR27	BAV99 DUAL SMT SOT-23	31074
CR28	BAV99 DUAL SMT SOT-23	31074
CR29	BAV99 DUAL SMT SOT-23	31074
CR30	BAV99 DUAL SMT SOT-23	31074
CR31	BAV99 DUAL SMT SOT-23	31074
CR32	BAV99 DUAL SMT SOT-23	31074
CR33	BAV99 DUAL SMT SOT-23	31074
CR34	BAV99 DUAL SMT SOT-23	31074
CR35	LED, SLM13VWS, SRF MNT	31075
CR36	LED, SLM13VWS, SRF MNT	31075
CR37	LED, SLM13VWS, SRF MNT	31075
CR38	LED, SLM13VWS, SRF MNT	31075
CR39	LED, SLM13VWS, SRF MNT	31075
CR40	LED, SLM13VWS, SRF MNT	31075
CR41	LED, SLM13VWS, SRF MNT	31075

CR42	LED, SLM13VWS, SRF MNT	31075
CR43	LED, SLM13VWS, SRF MNT	31075
CR44	LED, SLM13VWS, SRF MNT	31075
	ICs	
IC1	SAB80C537 - CMOS 8-BIT µROCESSOR, ROMLESS	34393
IC2	*NOT INSTALLED*	N/A
IC4	BQ2201SN,NONVOL RAM CONTRLR SMD	34400
IC5	PCF8583TD - CMOS CLOCK/CAL/RAM SMD	34399
IC7	24C02AT-SN - CMOS 256X8 EEPROM W/I²C SMD	34400
IC8	*NOT INSTALLED*	N/A
IC9	681000 - 32K X 8 STATIC RAM	34391
IC10	CRT9053 - VIDEO TERMINAL LOGIC CONTROLLER	34306
IC11	AT27C010-12JC - CMOS 256K x 1M EPROM, PLCC	34563
IC12	74HC273DW - H-CMS OCTL D FLP-FLP W/CLEAR	34385
IC13	74HC273DW - H-CMS OCTL D FLP-FLP W/CLEAR	34385
IC14	74HC273DW - H-CMS OCTL D FLP-FLP W/CLEAR	34385
IC28	LM319D, COMPRTR, DUAL, HIGH SPEED SMD	34397
IC29	TLP121 - OPTOISOLTR, PHOTO-XSISTOR OUT, MINI-FLT	34389
IC30	TLP121 - OPTOISOLTR, PHOTO-XSISTOR OUT, MINI-FLT	34389
IC31	TLP121 - OPTOISOLTR, PHOTO-XSISTOR OUT, MINI-FLT	34389
IC32	TLP121 - OPTOISOLTR, PHOTO-XSISTOR OUT, MINI-FLT	34389
IC33	TLP121 - OPTOISOLTR, PHOTO-XSISTOR OUT, MINI-FLT	34389
IC34	TLP121 - OPTOISOLTR, PHOTO-XSISTOR OUT, MINI-FLT	34389
IC35	TLP121 - OPTOISOLTR, PHOTO-XSISTOR OUT, MINI-FLT	34389
IC36	MAX238CWG - CMOS 5V RS-232 DRVR/RCVR SRF MNT	34387
IC37	TDA8444AT-OCTAL 6 BIT DAC W/I²C SMD	
IC38	PCD8584TD - I2C BUS CONTROLLER SMD	34398
IC39	LM2575M-5.0 5V SWITCHIN' REG. SMD SOL-24	34386
IC40	LM78L12ACM - 12 VOLT REGULATOR, S0-8 PACKAGE	34388
IC41	16K RAM, STATIC, SMD, CMOS	34564
IC42	74HC04M - SMD HEX INVERTER	34561
IC43	74HC14M - SMD HEX INV. W/SCHMITT TRIGGER	34562
	CONNECTORS	
J1	15 PIN SUBMINITURE 'D'	51388
J2	15 PIN SUBMINITURE 'D'	51388
J15	HD, MTA100 - 4POS	51171

P1	64 PIN A ⊕ C DIN MALE	51297
P2	64 PIN A ⊕ C DIN MALE	51297
	INDUCTORS	
L1	INDUCTOR, 330µH	42094
	SHORTING JUMPERS (LK)	
LK1	3 PIN HDR, .1 CTRS IN LINE	51333
LK2	2 PIN LINK, HEADER	51082
LK3	2 PIN LINK, HEADER	51082
LK4	2 PIN LINK, HEADER	51082
LK5	3 PIN HDR, .1 CTRS IN LINE	51333
	TRANSISTORS	
Q1	2N7002, MOSFET, N-CHAN, SOT-23	33117
Q2	2N7002, MOSFET, N-CHAN,	33117
Q3	2N7002, MOSFET, N-CHAN	33117
Q4	2N7002, MOSFET, N-CHAN	33117
Q5	2N7002, MOSFET, N-CHAN	33117
Q6	2N7002, MOSFET, N-CHAN	33117
Q7	2N7002, MOSFET, N-CHAN	33117
Q8	2N7002, MOSFET, N-CHAN	33117
Q9	2N7002, MOSFET, N-CHAN	33117
Q10	2N7002, MOSFET, N-CHAN	33117
Q11	2N7002, MOSFET, N-CHAN	33117
Q12	2N7002, MOSFET, N-CHAN	33117
Q13	2N7002, MOSFET, N-CHAN	33117
	RESISTORS Ω	
R1	10, SMD	26001
R2	390, SMD	26039
R3	10, SMD	26048
R4	470, SMD	26041
R5	47K, SMD	26089
R6	1K, SMD	26049
R7	47K, SMD	26089
R8	1K, SMD	26049
R9	1K, SMD	26049
R10	47K, SMD	26089
R11	47K, SMD	26089
R12	1K, SMD	26049
R13	470, SMD	26041
R14	470, SMD	26041
R15	470, SMD	26041
R16	1K, SMD	26049
R17	47K, SMD	26089
R18	47K, SMD	26089
R19	1K, SMD	26049
R20	47K, SMD	26089
R21	1K, SMD	26049
R22	1K, SMD	26049
R23	47K, SMD	26089
R24	390, SMD	26039
R25	47K, SMD	26089
R26	47K, SMD	26089
R27	390, SMD	26039
R28	47K, SMD	26089
R29	390, SMD	26039
R30	10K, SMD	26073
R31	10K, SMD	26073
R32	10K, SMD	26049
R33	10K, SMD	26063
R34	100, SMD	26025
R35	5K1, SMD	26066

RESISTORS POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES SMD ¼ w

SMD/SMT denotes: Surface Mount Devices

11.3 . . . . . CPU Module (3300 - 81154X / 4300 - 81153X) Parts List (continued):

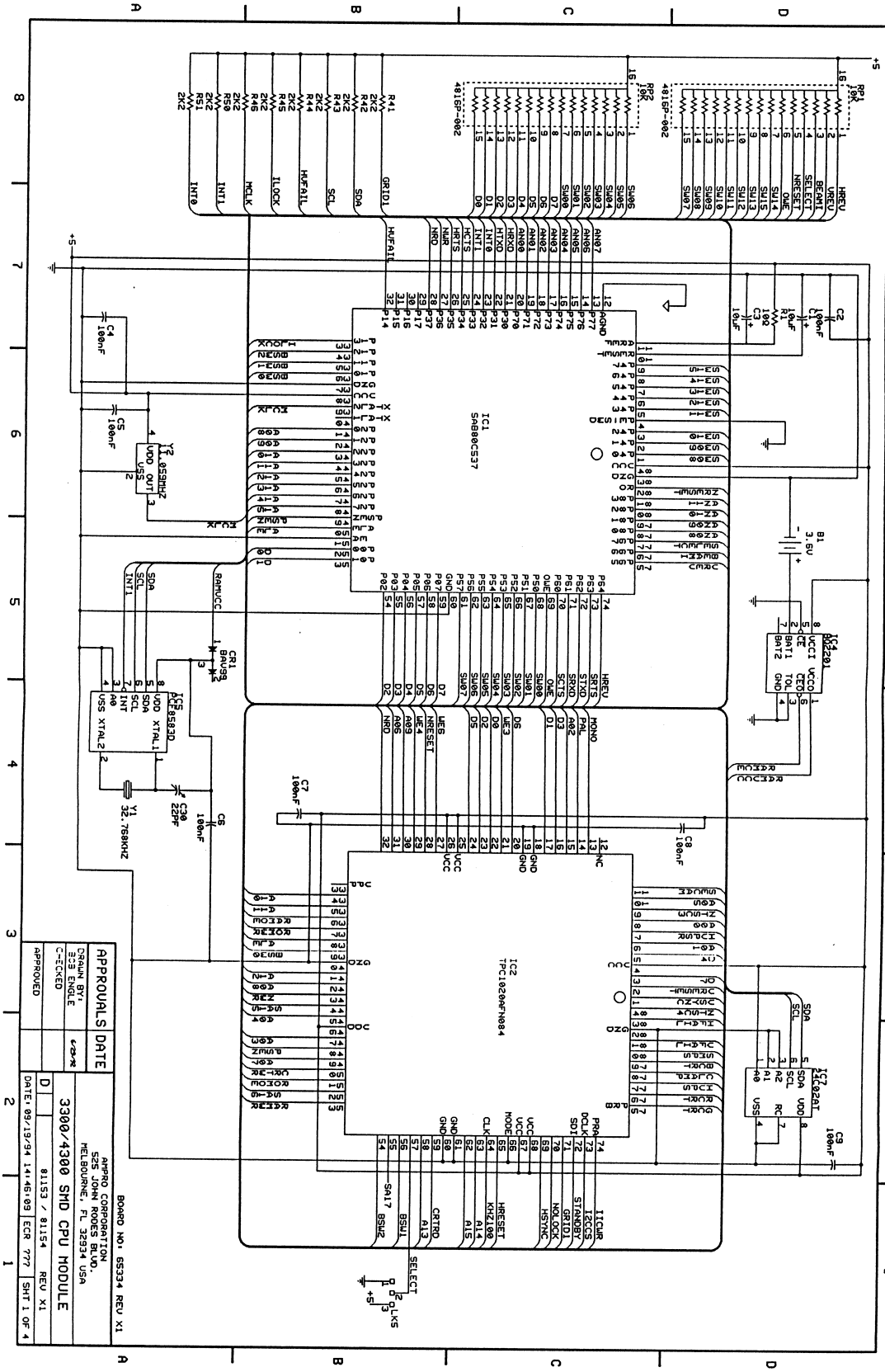
REF	DESCRIPTION	P/N
	RESISTORS Ω	
R36	5K1, SMD	26066
R37	47K, SMD	26089
R38	1K, SMD	26049
R40	100K, SMD	26063
R41	2K2, SMD	26057
R42	2K2, SMD	26057
R43	2K2, SMD	26057
R44	2K2, SMD	26057
R45	2K2, SMD	26057
R46	2K2, SMD	26057
R50	2K2, SMD	26057
R51	2K2, SMD	26057
	RESISTOR PACKS	
RP1	RESISTOR NETWORK, 10K	25047
RP2	RESISTOR NETWORK, 10K	25047
RP4	RESISTOR NETWORK, 560	25046
RP5	RESISTOR NETWORK, 470	25045
RP6	RESISTOR NETWORK, 470	25045
RP7	RESISTOR NETWORK, 470	25045
	SWITCHES	
SW1	HEXIDECIMAL, RIGHT ANGLE	56051
SW2	HEXIDECIMAL, RIGHT ANGLE	56051
SW3	DIP, 8 POLE, SINGLE THROW	56048
	CRYSTALS	
Y1	32.768KHz	43030
Y2	CMOS, 11.059MHZ	43032
Y3	17.1072 MHz	43031
Y4	ECS300-128 - DUAL OUT CMOS 12.8MHZ	43033
	MISC / UPDATES	

NOTES

RESISTORS POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES SMD ¼ w

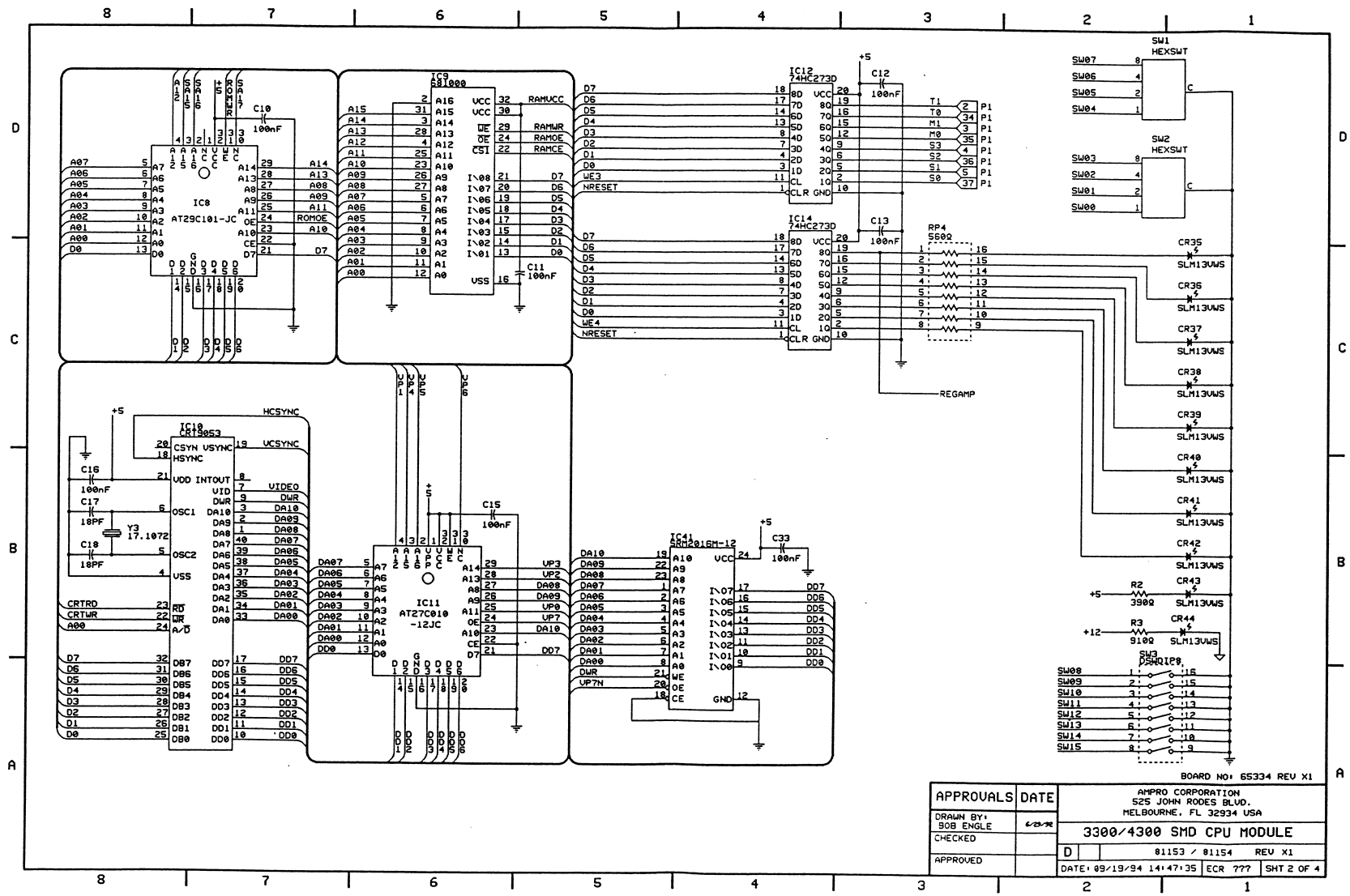
SMD/SMT denotes: Surface Mount Devices

11.3.1 . . . . CPU Module (3300 - 81154X/ 4300 - 81153X) Schematic 1 of 4:



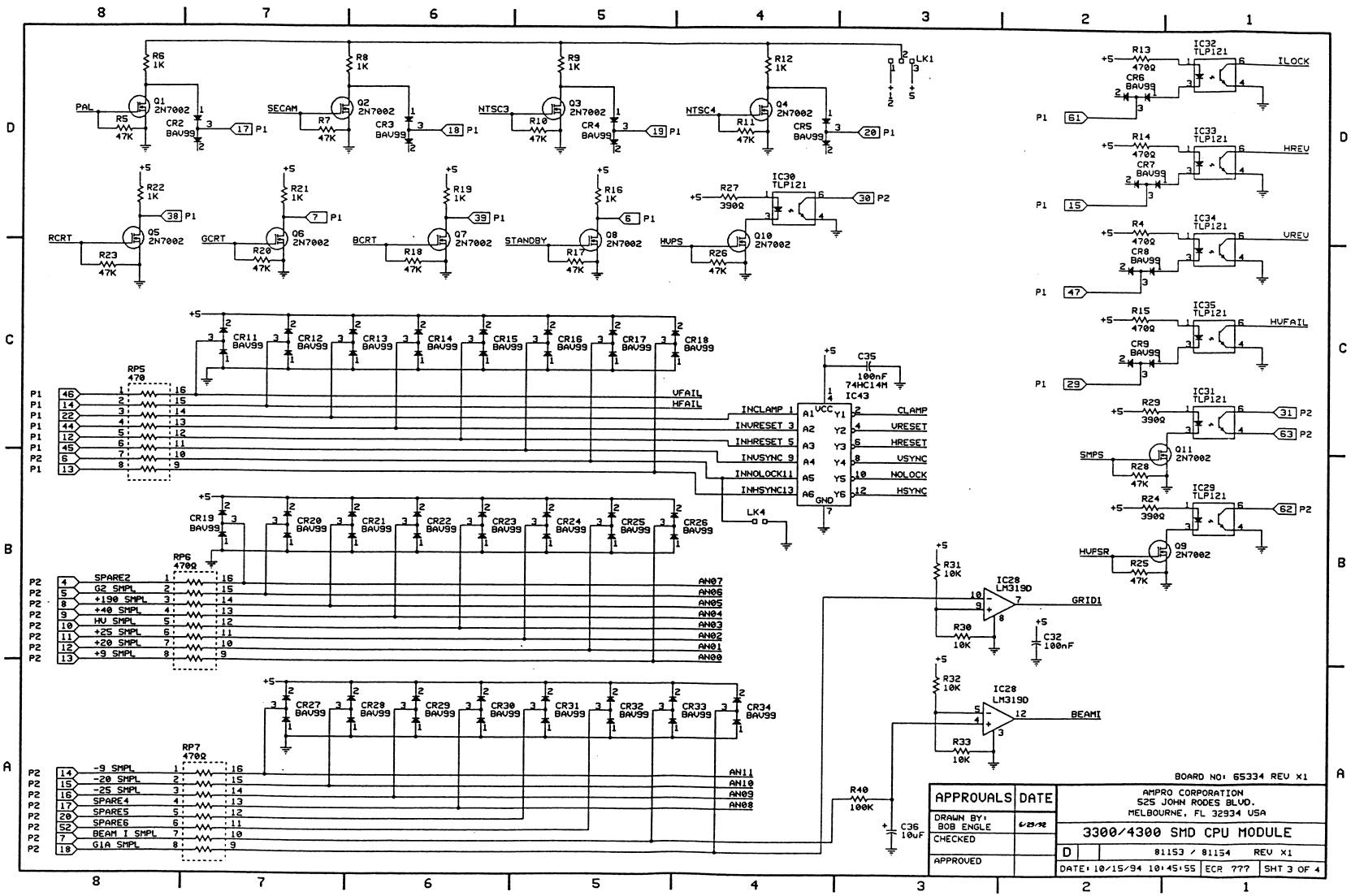
CPU Module (81153X / 81154X) Schematic 1 of 4

11.3.2 . . . . CPU Module (3300 - 81154X / 4300 - 81153X) Schematic 2 of 4:



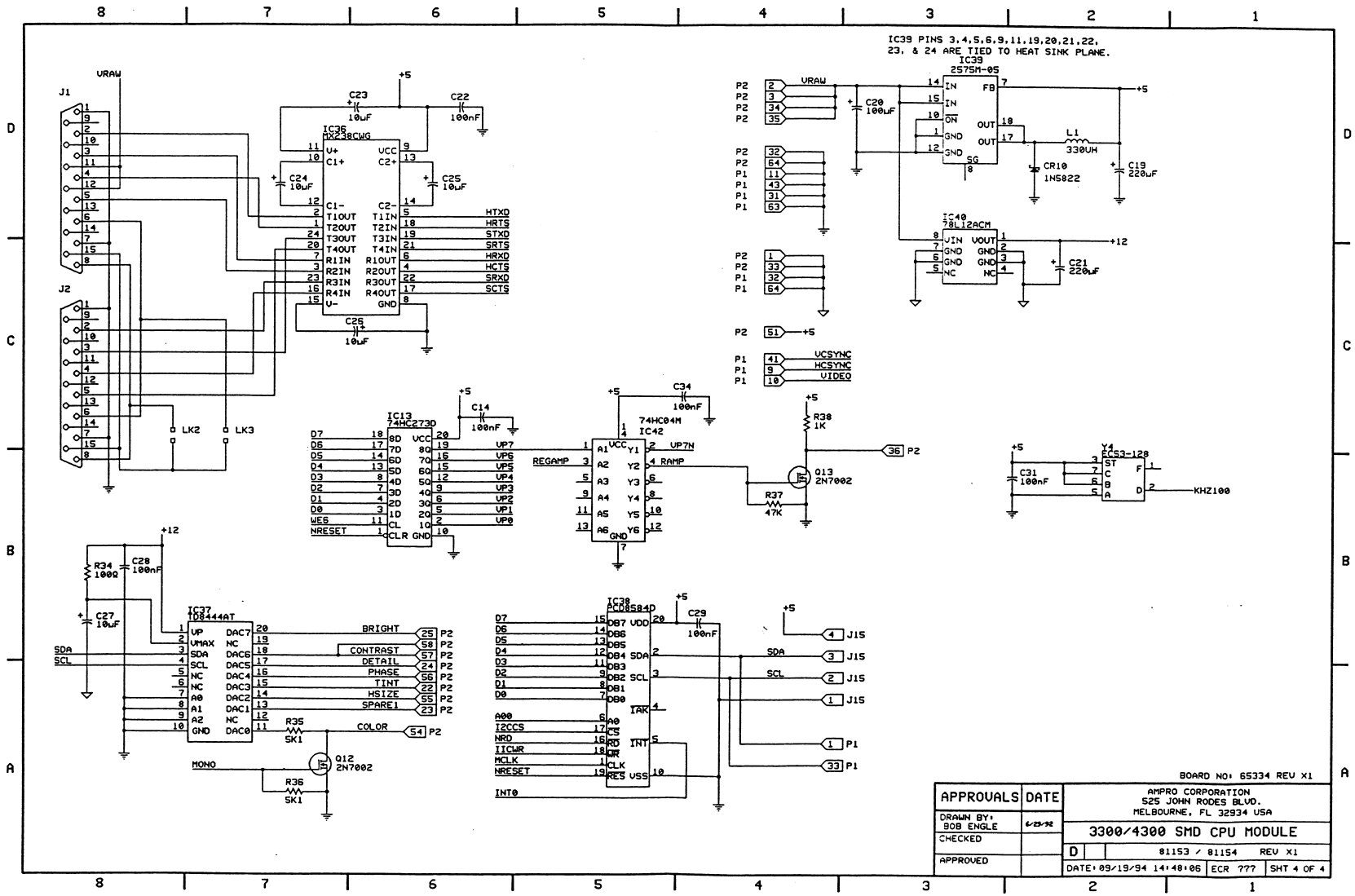
SMD/SMT denotes: Surface Mount Devices

11.3.3 . . . . CPU Module (3300 - 81154X / 4300 - 81153X) Schematic 3 of 4:



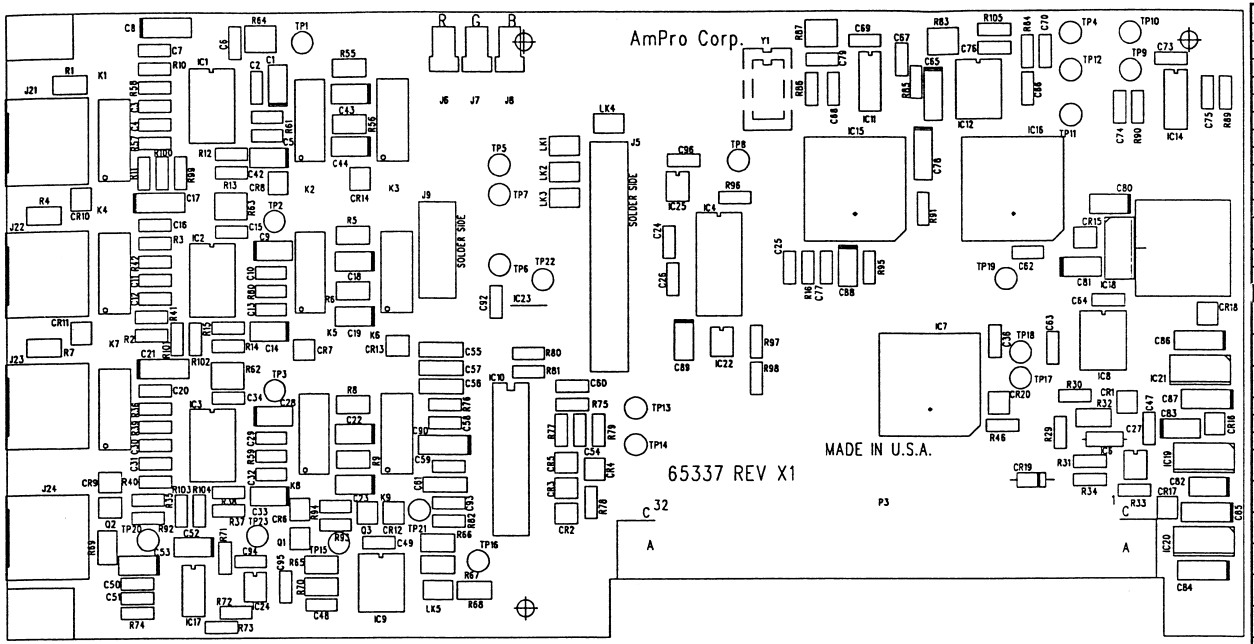
SMD/SMT denotes: Surface Mount Devices

11.3.4 . . . . CPU Module (3300 - 81154X / 4300 - 81153X) Schematic 4 of 4:



SMD/SMT denotes: Surface Mount Devices

11.4 . . . . . Analog RGB1 Module (81162X3) Component Layout / Parts List:



ANALOG RGB1 (81162X3)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65337(X1)
CAPACITORS		
C1	TANT, 1µF, 35V, SMD	15020
C2	.1µF, CERAMIC, 50V, SMD	12122
C3	.1µF, CERAMIC, 50V, SMD	12122
C4	.1µF, CERAMIC, 50V, SMD	12122
C5	.1µF, CERAMIC, 50V, SMD	12122
C6	.1µF, CERAMIC, 50V, SMD	12122
C7	.1µF, CERAMIC, 50V, SMD	12122
C8	TANT, 10µF, 16V, SMD	15019
C10	.1µF, CERAMIC, 50V, SMD	12122
C11	.1µF, CERAMIC, 50V, SMD	12122
C12	.1µF, CERAMIC, 50V, SMD	12122
C13	.1µF, CERAMIC, 50V, SMD	12122
C14	TANT, 1µF, 35V, SMD	15020
C15	.1µF, CERAMIC, 50V, SMD	12122
C16	.1µF, CERAMIC, 50V, SMD	12122
C17	TANT, 10µF, 16V, SMD	15019
C18	TANT, 1µF, 35V, SMD	15020
C19	TANT, 1µF, 35V, SMD	15020
C20	.1µF, CERAMIC, 50V, SMD	12122
C21	TANT, 10F, SRF MNT	15019
C22	TANT, 1µF, 35V, SMD	15020
C23	TANT, 1µF, 35V, SMD	15020
C24	.1µF, CERAMIC, 50V, SMD	12122
C25	.1µF, CERAMIC, 50V, SMD	12122
C26	.1µF, CERAMIC, 50V, SMD	12122
C27	CERAMIC, 10µF	11044
C28	.1µF, CERAMIC, 50V, SMD	15020
C29	.1µF, CERAMIC, 50V, SMD	12122
C30	.1µF, CERAMIC, 50V, SMD	12122
C31	.1µF, CERAMIC, 50V, SMD	12122
C32	.1µF, CERAMIC, 50V, SMD	12122
C33	TANT, 1µF, 35V, SMD	15020
C34	.1µF, CERAMIC, 50V, SMD	12122
C36	.1µF, CERAMIC, 50V, SMD	12122
C42	TANT, 1µF, 35V, SMD	15020
C43	TANT, 1µF, 35V, SMD	15020
C44	TANT, 1µF, 35V, SMD	15020
C47	.1µF, CERAMIC, 50V, SMD	12122
C48	.1µF, CERAMIC, 50V, SMD	12122
C49	.1µF, CERAMIC, 50V, SMD	12122
C50	.1µF, CERAMIC, 50V, SMD	12122
C51	.1µF, CERAMIC, 50V, SMD	12122
C52	TANT, 1µF, 35V, SMD	15020
C53	TANT, 1µF, 35V, SMD	15020
C54	3300pF, CERAMIC, 100V, SMD	12126
C55	.22µF, CERAMIC, 100V, SMD	12124
C56	.22µF, CERAMIC, 100V, SMD	12124
C57	.22µF, CERAMIC, 100V, SMD	12124
C58	.1µF, CERAMIC, 50V, SMD	12122
C59	.1µF, CERAMIC, 50V, SMD	12122
C60	.1µF, CERAMIC, 50V, SMD	12122
C61	.47µF, CERAMIC, 100V, SMD	12123
C62	.1µF, CERAMIC, 50V, SMD	12122
C63	.1µF, CERAMIC, 50V, SMD	12122
C64	.1µF, CERAMIC, 50V, SMD	12122
C65	TANT, 2.2µF, 50V, SMD	15021
C66	.01µF, CERAMIC, SMD	12125
C67	220pF, CERAMIC, 100V, SMD	12127
C68	220pF, CERAMIC, 100V, SMD	12127
C69	.1µF, CERAMIC, 50V, SMD	12122
C70	.1µF, CERAMIC, 50V, SMD	12122
C73	.1µF, CERAMIC, 50V, SMD	12122
C74	220pF, CERAMIC, 100V, SMD	12127
C75	220pF, CERAMIC, 100V, SMD	12127
C76	.1µF, CERAMIC, 50V, SMD	12122
C77	.1µF, CERAMIC, 50V, SMD	12122
C78	TANT, 10µF, 16V, SMD	15019
C79	.1µF, CERAMIC, 50V, SMD	12122
C80	TANT, 1µF, 35V, SMD	15020
C81	TANT, 1µF, 35V, SMD	15020
C82	TANT, 1µF, 35V, SMD	15020
C83	TANT, 1µF, 35V, SMD	15020
C84	TANT, 2.2µF, SMD	15021
C85	TANT, 2.2µF, SMD	15021
C86	TANT, 2.2µF, SMD	15021
C87	TANT, 2.2µF, SMD	15021
C88	TANT, 1µF, 35V, SMD	15020
C89	TANT, 1µF, 35V, SMD	15020
C90	TANT, 4.7µF, 20V, SMD	15025
C92	.1µF, CERAMIC, 50V, SMD	12122
C93	100pF, CERAMIC, 100V, SMD	12148
C94	.1µF, CERAMIC, 50V, SMD	12122
C95	.1µF, CERAMIC, 50V, SMD	12122
C96	.1µF, CERAMIC, 50V, SMD	12122
C97	100pF, CERAMIC, 300V, SMD	14014
DIODES		
CR2	BAV99 DUAL SMT SOT-23	31074
CR3	BAV99 DUAL SMT SOT-23	31074
CR4	BAV99 DUAL SMT SOT-23	31074
CR5	BAV99 DUAL SMT SOT-23	31074
CR6	BAV99 DUAL SMT SOT-23	31074
CR7	BAV99 DUAL SMT SOT-23	31074
CR8	BAV99 DUAL SMT SOT-23	31074
CR9	BAV99 DUAL SMT SOT-23	31074
CR10	BAV99 DUAL SMT SOT-23	31074
CR11	BAV99 DUAL SMT SOT-23	31074
CR12	BAV99 DUAL SMT SOT-23	31074
CR13	BAV99 DUAL SMT SOT-23	31074
CR14	BAV99 DUAL SMT SOT-23	31074
CR15	BAV99 DUAL SMT SOT-23	31074
CR16	BAV99 DUAL SMT SOT-23	31074
CR17	BAV99 DUAL SMT SOT-23	31074
CR18	BAV99 DUAL SMT SOT-23	31074
CR19	SA10, 10 VOLT SURGE ABSORBER	32035
CR20	BAV99 DUAL SMT SOT-23	31074
CR21	1N4148	31004
ICs		
IC1	MAX441CWP,HI-SPEED VID MUX	34413
IC2	MAX441CWP,HI-SPEED VID MUX	34413
IC3	MAX441CWP,HI-SPEED VID MUX	34413
IC4	MP7651AS, DAC,SMD	34411
IC6	MC33171D OP AMP SMD	34415
IC7	GAL20V8, TEST/TEXT MUX	37225
IC8	74HC4052DW - H-CMOS DUAL 4-CH ANA MUX/DEMUX	34405
IC9	74HC4052DW - H-CMOS DUAL 4-CH ANA MUX/DEMUX	34405
IC10	CXA1365S, SYNC DISCRIMINATOR	34376
IC11	74HC221AM, ONE-SHOT,DUAL, SMD	34409
IC12	MC14538BDW SMD DUAL MUTI VIB	34401
IC14	74HC221AM, ONE-SHOT, DUAL, SMD	34409
IC15	87C751,CMOS MPU WI2C,PLCC	34410
IC16	GAL20V8	37225
IC17	MAX454CSD, VIDEO MUX, SMD	34408
IC18	LM340T-5, REGULATOR, VOLTAGE, FIXED,+ 5V	34322
IC19	LM340T-12, REGULATOR, VOLTAGE, FIXED,+12V	34323
IC20	LM320T-12 - VOLTAGE REGULATOR,-12VDC	34325
IC21	LM320T-5 - VOLTAGE REGULATOR,-5VDC	34324
IC22	LM4041D,SMD,SOT23,ADJ SHUNT	34414
IC23	UA78L09L9, VOLTAGE REGULATOR, FIXED, +9V	34163
IC24	LM1881, SYNC STRIPPER	34253
IC25	MC33171D OP AMP SMD	34415
CONNECTORS		
J1	BNC, RED, RIGHT ANGLE	51079
J2	BNC, GREEN, RIGHT ANGLE	51079
J3	BNC, BLUE, RIGHT ANGLE	51079
J4	BNC, SYNC, RIGHT ANGLE	51079
J5	30 PIN, 2 x 15, RIGHT ANGLE	51488
J6	HDR, 2 PIN, RIGHT ANGLE	51169
J7	HDR, 2 PIN, RIGHT ANGLE	51169
J8	HDR, 2 PIN, RIGHT ANGLE	51169
J9	12 PIN, 2 x 6, STRIP	51574
P3	64 PIN A @ C DIN MALE	51297
RELAYS		
K1	SPST, REED, 12V, SMT	56066
K2	SPST, REED, 12V, SMT	56066
K3	SPST, REED, 12V, SMT	56066
K4	SPST, REED, 12V, SMT	56066
K5	SPST, REED, 12V, SMT	56066
K6	SPST, REED, 12V, SMT	56066
K7	SPST, REED, 12V, SMT	56066
K8	SPST, REED, 12V, SMT	56066
K9	SPST, REED, 12V, SMT	56066
SHORTING JUMPERS (LK)		
LK1	2 PIN LINK, HEADER	51082
LK2	2 PIN LINK, HEADER	51082
LK3	2 PIN LINK, HEADER	51082
LK4	2 PIN LINK, HEADER	51082
LK5	2 PIN LINK, HEADER	51082
TRANSISITORS		
Q1	2N7002, MOSFET, N-CHAN, SOT-23	33117
Q2	2N7002, MOSFET, N-CHAN, SOT-23	33117
Q3	2N7002, MOSFET, N-CHAN, SOT-23	33117
RESISTORS Ω		
R1	75,1/4W, SMD	27022
R2	470, SMD	26041
R3	10K, SMD	27073
R4	75,1/4W, SMD	27022
R5	75,1/4W, SMD	27022
R6	75,1/4W, SMD	27022
R7	75,1/4W, SMD	27022
R8	75,1/4W, SMD	27022
R9	75,1/4W, SMD	27022
R10	10K, SMD	26073
R11	470, SMD	26041
R12	270, SMD	26035
R13	270, SMD	26035
R14	270, SMD	26035
R15	270, SMD	26035
R16	22K, SMD	26081
R29	5K1, SMD	26066
R31	1K, SMD	26050
R32	220K, SMD	26105
R33	220K, SMD	26105
R34	75K, SMD	26094
R35	470, SMD	26041
R36	10K, SMD	27073
R37	270, SMD	26035
R38	270, SMD	26035
R39	10K, SMD	26073
R40	10K, SMD	26073
R41	10K, SMD	26073
R42	10K, SMD	26073
R46	4K7, SMD	26065
R55	75,1/4W, SMD	27022
R56	75,1/4W, SMD	27022
R57	10K, SMD	26073

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

SMD/SMT denotes: SURFACE MOUNT DEVICES

11.4 . . . . . Analog RGB1 Module (81162X3) Parts List /Notes: (continued)

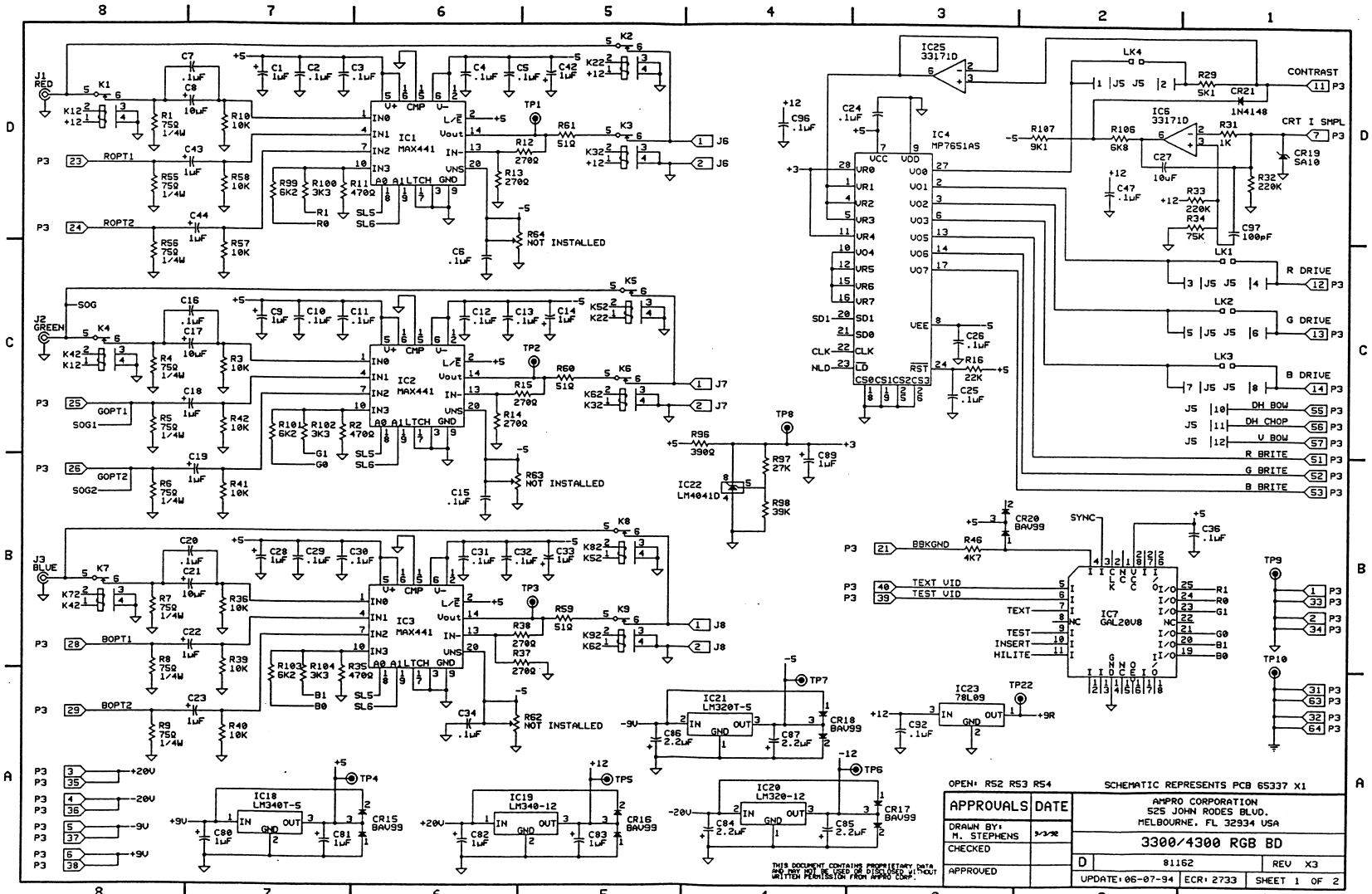
REF	DESCRIPTION	P/N
	RESISTORS Ω	
R58	10K, SMD	26073
R59	51, SMD	26018
R60	51, SMD	26018
R61	51, SMD	26018
R62	*NOT INSTALLED*	N/A
R63	*NOT INSTALLED*	N/A
R64	*NOT INSTALLED*	N/A
R65	75,1/4W, SMD	27022
R66	75,1/4W, SMD	27022
R67	75,1/4W, SMD	27022
R68	75,1/4W, SMD	27022
R69	75,1/4W, SMD	27022
R70	75,1/4W, SMD	27022
R71	200R, SMD	26032
R72	1K, SMD	26049
R73	1K, SMD	26049
R74	1K, SMD	26049
R75	27K, SMD	26083
R76	33K, SMD	26085
R77	3K9, SMD	26063
R78	3K9, SMD	26063
R79	3K9, SMD	26063
R80	47K, SMD	26089
R81	56K, SMD	26091
R82	270, SMD	26035
R83	POTENTIOMETER, 20K	24120
R84	30K, SMD	26084
R85	7K5, SMD	26070
R86	39K, SMD	26081
R87	POTENTIOMETER, 20K	24120
R89	2K, SMD	26056
R90	11K, SMD	26074
R91	4K7, SMD	26065
R92	22K, SMD	26081
R93	22K, SMD	26081
R94	22K, SMD	26081
R95	10, SMD	27001
R96	390, SMD	26039
R97	27K, SMD	26083
R98	39K, SMD	26087
R99	6K2, SMD	26068
R100	3K3, SMD	26061
R101	6K2, SMD	26068
R102	3K3, SMD	26061
R103	6K2, SMD	26068
R104	3K3, SMD	26061
R105	2K, SMD	26056
R106	6K8, SMD	26068
R107	9K1, SMD	20072
	TEST POINTS	
TP1 - TP23	TEST POINT, LOOP	51405
	CRYSTALS	
Y1	CMOS, 11.059MHz	43032
	MISC. / UPDATES	

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

SMD/SMT denotes: SURFACE MOUNT DEVICES

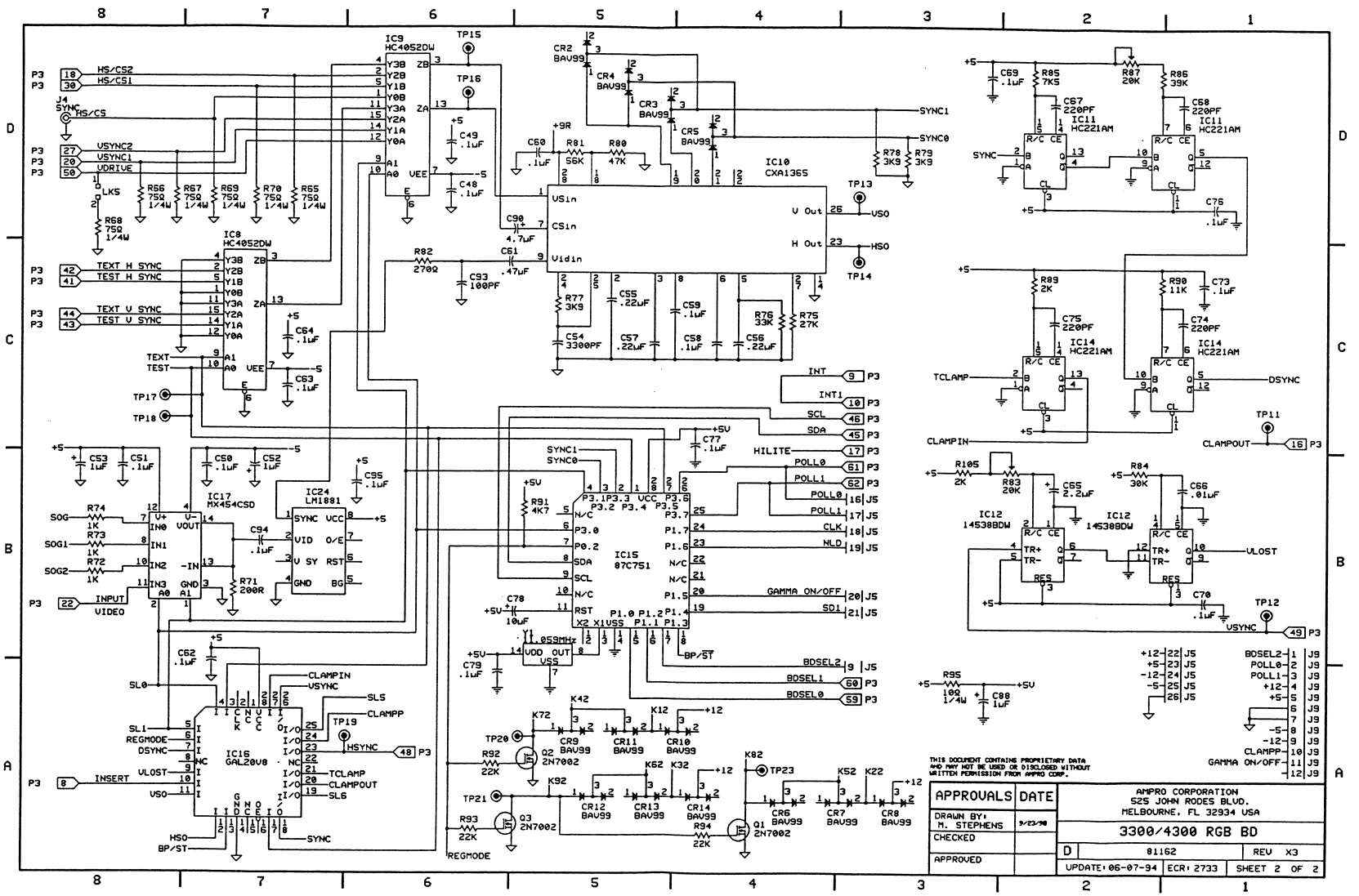
NOTES

11.4.1 . . . . Analog RGB1 Module (81162X3) Schematic 1 of 2:



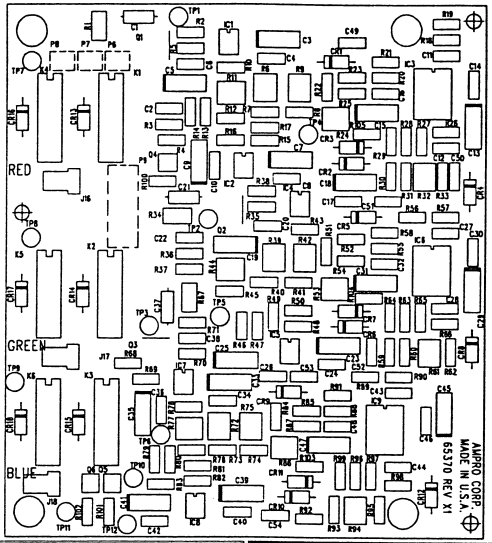
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.4.2 . . . . Analog RGB1 Module (81162X3) Schematic 2 of 2:



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.5 . . . . . Gamma Correction Board (81106X1) Component Layout / Parts List: (OPTIONAL)

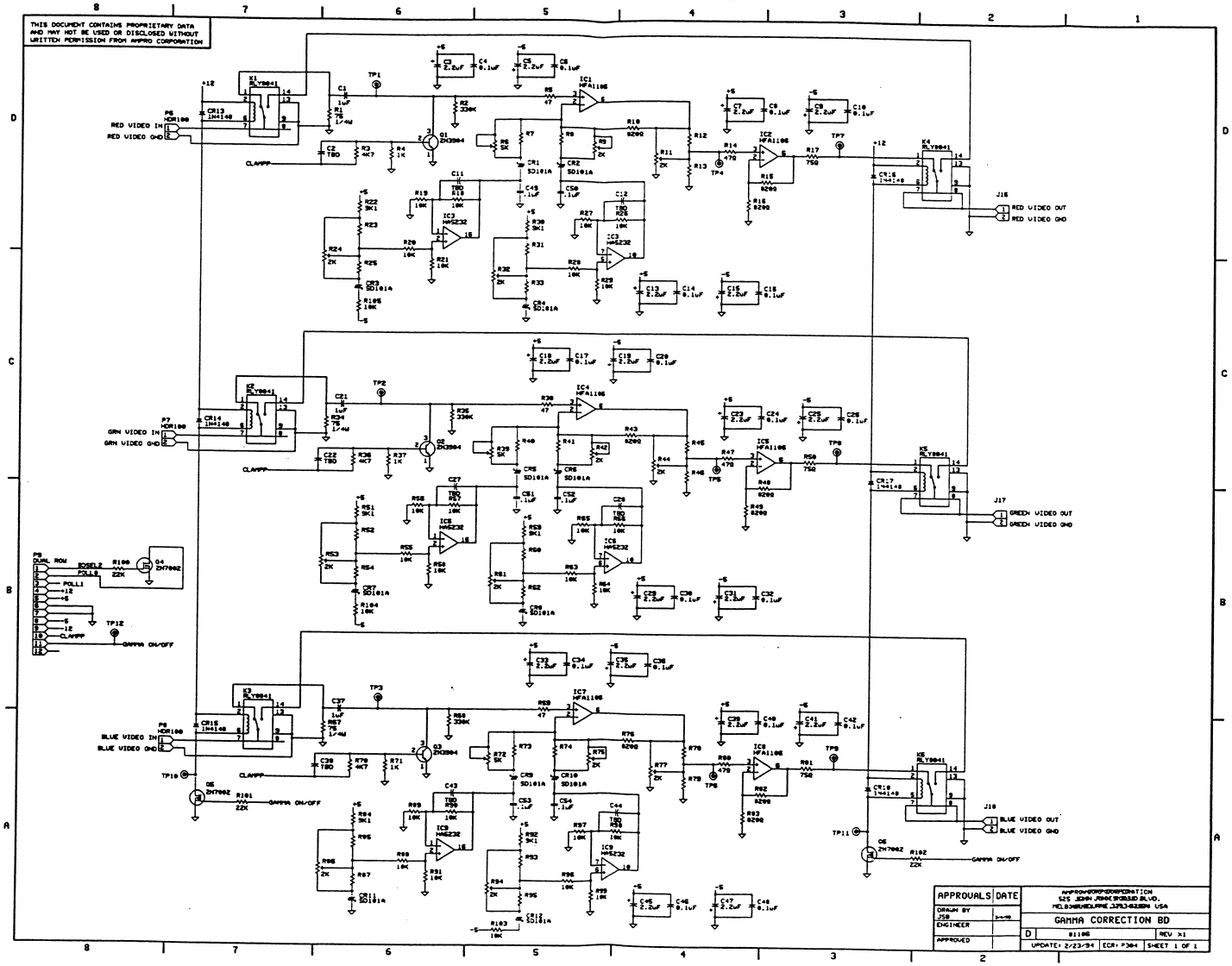


GAMMA CORRECTION (81106X1)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65370(X1)
CAPACITORS		
REF	DESCRIPTION	P/N
C1	1µF,CERAMIC, SMD	12097
C2	*SELECT @ TEST*	N/A
C3	TANT, 2.2µF, 50V, SMD	15021
C4	0.1µF,CERAMIC, 35V, SMD	12122
C5	TANT, 2.2µF, 50V, SMD	15021
C6	0.1µF,CERAMIC, 35V, SMD	12122
C7	TANT, 2.2µF, 50V, SMD	15021
C8	0.1µF,CERAMIC, 35V, SMD	12122
C9	TANT, 2.2µF, 50V, SMD	15021
C10	0.1µF,CERAMIC, 35V, SMD	12122
C11	*SELECT @ TEST*	N/A
C12	*SELECT @ TEST*	N/A
C13	TANT, 2.2µF, 50V, SMD	15021
C14	0.1µF,CERAMIC, 35V, SMD	12122
C15	TANT, 2.2µF, 50V, SMD	15021
C16	0.1µF,CERAMIC, 35V, SMD	12122
C17	0.1µF,CERAMIC, 35V, SMD	12122
C18	TANT, 2.2µF, 50V, SMD	15021
C19	TANT, 2.2µF, 50V, SMD	15021
C20	0.1µF,CERAMIC, 35V, SMD	12122
C21	1µF,CERAMIC, 35V, SMD	12097
C22	*SELECT @ TEST*	N/A
C23	TANT, 2.2µF, 50V, SMD	15021
C24	0.1µF,CERAMIC, 35V, SMD	12122
C25	TANT, 2.2µF, 50V, SMD	15021
C26	0.1µF,CERAMIC, 35V, SMD	12122
C27	*SELECT @ TEST*	N/A
C28	*SELECT @ TEST*	N/A
C29	TANT, 2.2µF, 50V, SMD	15021
C30	0.1µF,CERAMIC, 35V, SMD	12122
C31	TANT, 2.2µF, SMD	15021
C32	0.1µF,CERAMIC, 35V, SMD	12122
C33	TANT, 2.2µF, 50V, SMD	15021
C34	0.1µF,CERAMIC, 35V, SMD	12122
C35	TANT, 2.2µF, 50V, SMD	15021
C36	0.1µF,CERAMIC, 35V, SMD	12122
C37	1µF,CERAMIC, 35V, SMD	12097
C38	*SELECT @ TEST*	N/A
C39	TANT, 2.2µF, 50V, SMD	15021
C40	0.1µF,CERAMIC, 35V, SMD	12122
C41	TANT, 2.2µF, 50V, SMD	15021
C42	0.1µF,CERAMIC, 35V, SMD	12122
C43	*SELECT @ TEST*	N/A
C44	*SELECT @ TEST*	N/A
C45	TANT, 2.2µF, SMD	15021
C46	0.1uF,CERAMIC, 35V, SMD	12122
C47	TANT, 2.2uF, 50V, SMD	15021
C48	0.1uF,CERAMIC, 35V, SMD	12122
C49	CERAMIC, .1µF, 50V, SMD	12122
C50	CERAMIC, .1µF, 50V, SMD	12122
C51	CERAMIC, .1µF, 50V, SMD	12122
C52	CERAMIC, .1µF, 50V, SMD	12122
C53	CERAMIC, .1µF, 50V, SMD	12122
C54	CERAMIC, .1µF, 50V, SMD	12122
DIODES		
CR1	SD101A, SCHOTTKY	32029
CR2	SD101A, SCHOTTKY	32029
CR3	SD101A, SCHOTTKY	32029
CR4	SD101A, SCHOTTKY	32029
CR5	SD101A, SCHOTTKY	32029
CR6	SD101A, SCHOTTKY	32029
CR7	SD101A, SCHOTTKY	32029
CR8	SD101A, SCHOTTKY	32029
CR9	SD101A, SCHOTTKY	32029
CR10	SD101A, SCHOTTKY	32029
CR11	SD101A, SCHOTTKY	32029
CR12	SD101A, SCHOTTKY	32029
CR13	1N4148	31004
CR14	1N4148	31004
CR15	1N4148	31004
CR16	1N4148	31004
CR17	1N4148	31004
CR18	1N4148	31004
ICs		
IC1	HFA1106,CURRENT FEEDBACK AMP,8 PIN SOIC SMD	34542
IC2	HFA1106,CURRENT FEEDBACK AMP,8 PIN SOIC SMD	34542
IC3	HA5232,PRECISION DUAL OP AMP,16 PIN WIDE SOIC SMD	34541
IC4	HFA1106,CURRENT FEEDBACK AMP,8 PIN SOIC SMD	34542
IC5	HFA1106,CURRENT FEEDBACK AMP,8 PIN SOIC SMD	34542
IC6	HA5232,PRECISION DUAL OP AMP,16 PIN WIDE SOIC SMD	34541
IC7	HFA1106,CURRENT FEEDBACK AMP,8 PIN SOIC SMD	34542
IC8	HFA1106,CURRENT FEEDBACK AMP,8 PIN SOIC SMD	34542
IC9	HA5232,PRECISION DUAL OP AMP,16 PIN WIDE SOIC SMD	34541
CONNECTORS		
J16	2 PIN HEADER	51369
J17	2 PIN HEADER	51369
J18	2 PIN HEADER	52369
P6	2 PIN HEADER,HDR100	51571
P7	2 PIN HEADER,HDR100	51571
P8	2 PIN HEADER,HDR100	51571
P9	12 PIN HEADER,DUAL ROW	51572
RELAYS		
K1	DIP REED,DPST,8041-05-101	56076
K2	DIP REED,DPST,8041-05-101	56076
K3	DIP REED,DPST,8041-05-101	56076
K4	DIP REED,DPST,8041-05-101	56076
K5	DIP REED,DPST,8041-05-101	56076
K6	DIP REED,DPST,8041-05-101	56076
TRANSISTORS		
Q1	2N3904, SIGNAL, NPN	33006
Q2	2N3904, SIGNAL, NPN	33006
Q3	2N3904, SIGNAL, NPN	33006
Q4	2N7002, MOSFET, N-CHAN, SOT-23	33117
Q5	2N7002, MOSFET, N-CHAN, SOT-23	33117
Q6	2N7002, MOSFET, N-CHAN, SOT-23	33117
RESISTORS		
R1	75,1/4W, SMD	27022
R2	30K, SMD	26109
R3	4K7, SMD	26065
R4	1K, SMD	26065
R5	47, SMD	26049
R6	POTENTIOMETER, 5K	24119
R7	*SELECT @ TEST*	N/A
R8	*SELECT @ TEST*	N/A
R9	POTENTIOMETER, 2K	24128
R10	820, SMD	26047
R11	POTENTIOMETER, 2K	24128
R12	*SELECT @ TEST*	N/A
R13	*SELECT @ TEST*	N/A
R14	47, SMD	26017
R15	820, SMD	26047
R16	820, SMD	26047
R17	75, SMD	26022
R18	10K, SMD	26073
R19	10K, SMD	26073
R20	10K, SMD	26073
R21	10K, SMD	26073
R22	9K1, SMD	26072
R23	*SELECT @ TEST*	N/A
R24	POTENTIOMETER, 2K	26073
R25	*SELECT @ TEST*	N/A
R26	10K, SMD	26073
R27	10K, SMD	26073
R28	10K, SMD	26073
R29	10K, SMD	26073
R30	9K1, SMD	26072
R31	*SELECT @ TEST*	N/A
R32	POTENTIOMETER, 2K	24128
R33	*SELECT @ TEST*	N/A
R34	75,1/4W, SMD	27022
R35	330K, SMD	26109
R36	4K7, SMD	26065
R37	1K, SMD	26049
R38	47, SMD	26017
R39	POENTIOMETER, 5K	24119
R40	*SELECT @ TEST*	N/A
R41	*SELECT @ TEST*	N/A
R42	POTENTIOMETER, 2K	24128
R43	820, SMD	26047
R44	POTENTIOMETER, 2K	24128
R45	*SELECT @ TEST*	N/A
R46	*SELECT @ TEST*	N/A
R47	47, SMD	26017
R48	820, SMD	26047
R49	820, SMD	26047
R50	75, SMD	26022
R51	9K1, SMD	26072
R52	*SELECT @ TEST*	N/A
R53	POTENTIOMETER, 2K	24128
R54	*SELECT @ TEST*	N/A
R55	10K, SMD	26073
R56	10K, SMD	26073
R57	10K, SMD	26073
R58	10K, SMD	26073
R59	9K1, SMD	26072
R60	*SELECT @ TEST*	N/A
R61	POTENTIOMETER, 2K	24128
R62	*SELECT @ TEST*	N/A
R63	10K, SMD	26073
R64	10K, SMD	26073
R65	10K, SMD	26073
R66	10K, SMD	26073
R67	75,1/4W, SMD	27022
R68	330K, SMD	26019
R69	47, SMD	26017
R70	4K7, SMD	26065
R71	1K, SMD	26049
R72	POTENTIOMETER, 5K	24119
R73	*SELECT @ TEST*	N/A
R74	*SELECT @ TEST*	N/A
R75	POTENTIOMETER, 2K	24128
R76	820, SMD	26047
R77	POTENTIOMETER, 2K	24128
R78	*SELECT @ TEST*	N/A
R79	*SELECT @ TEST*	N/A
R80	47, SMD	26017
R81	75, SMD	26022
R82	820, SMD	26047
R83	820, SMD	26047
R84	9K1, SMD	26072
R85	*SELECT @ TEST*	N/A
R86	POTENTIOMETER, 2K	24128
R87	*SELECT @ TEST*	N/A
R88	10K, SMD	26073
R89	10K, SMD	26073
R90	10K, SMD	26073
R91	10K, SMD	26073
R92	9K1, SMD	26072
R93	*SELECT @ TEST*	N/A
R94	POTENTIOMETER, 2K	24128
R95	*SELECT @ TEST*	N/A
R96	10K, SMD	26073
R97	10K, SMD	26073
R98	10K, SMD	26073
R99	10K, SMD	26073
R100	22K, SMD	26081
R101	22K, SMD	26081
R102	22K, SMD	26081
R103	10K, SMD	26073
R104	10K, SMD	26073
R105	10K, SMD	26073
TEST POINTS		
TP1 - TP12	TEST POINT, LOOP	51405

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

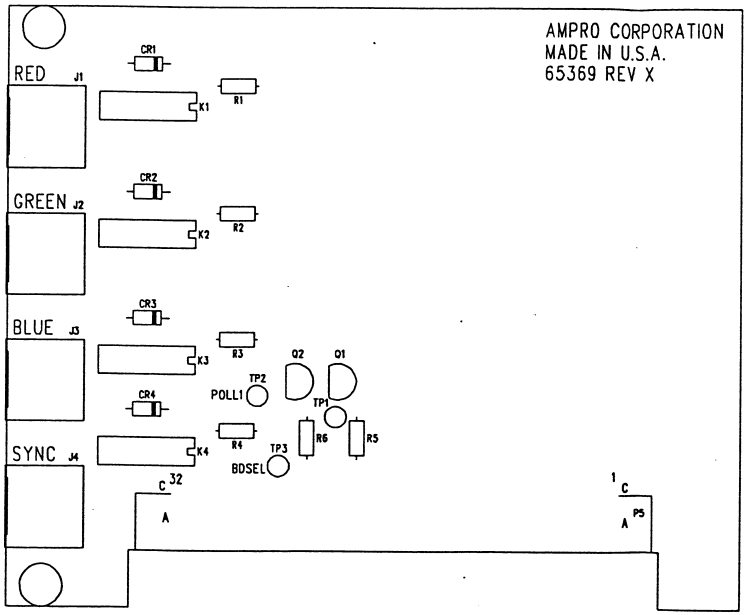
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.5.1 . . . . Gamma Correction (81106X1) Schematic 1 of 1:



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.6 . . . . . Analog RGB2 Module (81104X) Component Layout / Parts List: (OPTIONAL MODULE)

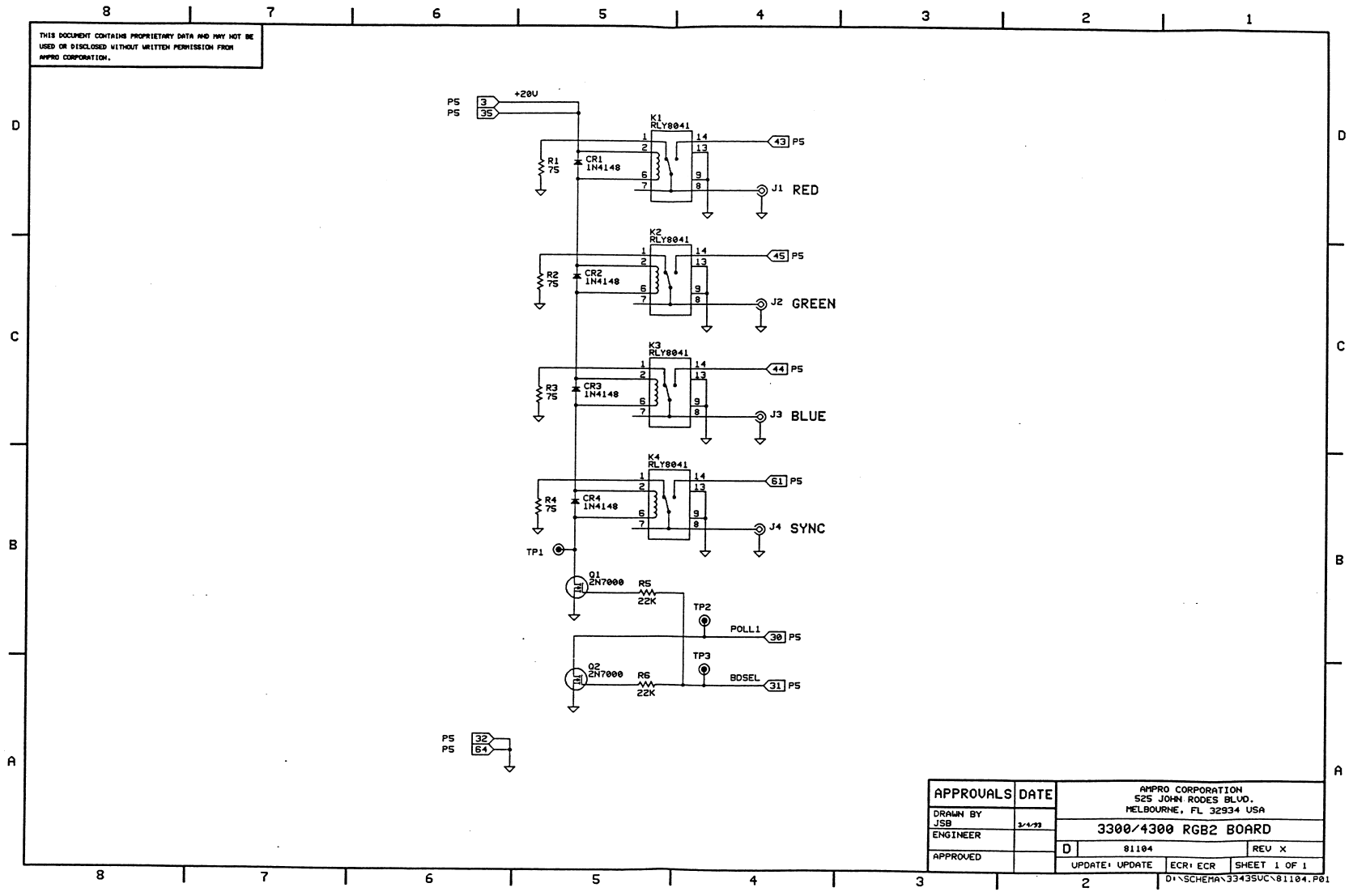


ANALOG RGB2 (81104X)		
REF	DECRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65369(X)
DIODES		
CR1	1N4148	31004
CR2	1N4148	31004
CR3	1N4148	31004
CR4	1N4148	31004
CONNECTORS		
J1	BNC, RT ANGLE, STUD FM	51079
J2	BNC, RT ANGLE, STUD FM	51079
J3	BNC, RT ANGLE, STUD FM	51079
J4	BNC, RT ANGLE, STUD FM	51079
P5	64 PIN DIN, MALE, RT ANGLE	51297
RELAYS		
K1	DIP REED, DPST, 8041-05-101	56076
K2	DIP REED, DPST, 8041-05-101	56076
K3	DIP REED, DPST, 8041-05-101	56076
K4	DIP REED, DPST, 8041-05-101	56076
Q1	2N7000 MOSFET	33096
Q2	2N7000 MOSFET	33096
RESISTORS		
R1	75	21035
R2	75	21035
R3	75	21035
R4	75	21035
R5	22K	21070
R6	22K	21070
TEST POINTS		
TP1	TEST POINT	51405
TP2	TEST POINT	51405
TP3	TEST POINT	51405

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

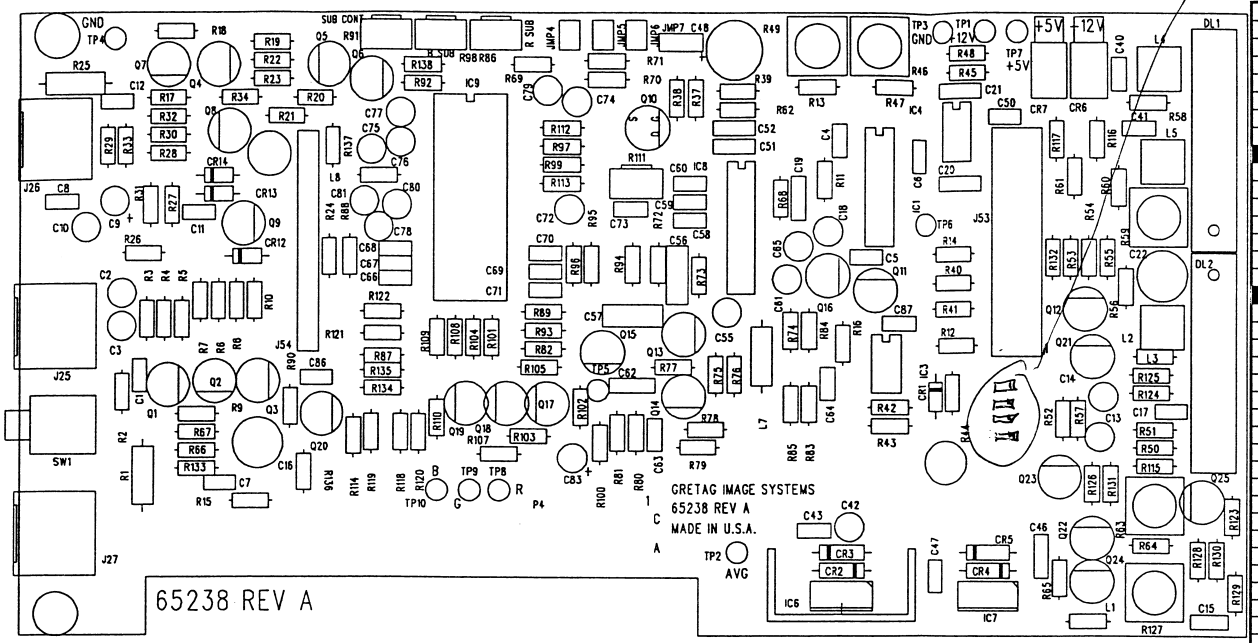
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.6.1 . . . . Analog RGB2 Module (81104X) Schematic 1 of 1: (OPTIONAL MODULE)



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.7 . . . . . Quad Video Decoder (81083X1) Component Layout / Parts List (OPTIONAL MODULE)



QUAD VIDEO DECODER (81104X1)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65238(A)
CAPACITORS		
C1	CERAMIC, .01µF, 50V	12051
C2	TANTALUM, 22µF, 16V	15006
C3	TANTALUM, 22µF, 16V	15006
C4	CERAMIC, 100PF, , 100V	12060
C5	CERAMIC, .1µF, , 50V	12071
C6	CERAMIC, .01µF, , 50V	12051
C8	CERAMIC, .01µF, , 50V	12051
C9	TANTALUM, 22µF, 16V	15006
C10	TANTALUM, 22µF, 16V	15006
C11	CERAMIC, .01µF, , 50V	12051
C12	CERAMIC, .01µF, , 50V	12051
C13	TANTALUM, 10µF, 35V	15011
C14	TANTALUM, 10µF, 35V	15011
C15	MICA, 22PF, 300V	14022
C16	TANTALUM, 100µF, 20V	15018
C17	.01µF, 50V	12051
C18	TANTALUM, 10µF, 35V	15011
C19	CERAMIC, .33µF, 50V	12080
C20	CERAMIC, .33µF, 50V	12080
C21	CERAMIC, .33µF, 50V	12080
C22	TANTALUM, 100µF, 20V	15018
C40	CERAMIC, .01µF, 50V	12051
C41	CERAMIC, .01µF, 50V	12051
C42	ELECT, 1µF, 50V	11001
C43	CERAMIC, .1µF, 50V	12071
C46	CERAMIC, .33µF, 50V	12080
C47	CERAMIC, .1µF, 50V	12071
C48	ELECT, 330µF, 10V	11076
C50	CERAMIC, .1µF, 50V	12071
C51	CERAMIC, .33µF, 50V	12080
C52	CERAMIC, .33µF, 50V	12080
C55	ELECT, 10µF, 35V	11008
C56	MICA, 220PF, 500V	14005
C57	MICA, 220PF, 500V	14005
C58	CERAMIC, 330PF, 200V	12082
C59	CERAMIC, 100PF, 100V	12060
C60	CERAMIC, 100PF, 100V	12060
C61	TANTALUM, 10µF, 35V	15011
C62	CERAMIC, .33µF, 50V	12080
C63	CERAMIC, .1µF, 50V	12071
C64	CERAMIC, .1µF, 50V	12071
C65	TANTALUM, 10µF, 35V	15011
C66	CERAMIC, .1µF, 50V	12071
C67	CERAMIC, .1µF, 50V	12071
C68	CERAMIC, .1µF, 50V	12071
C69	CERAMIC, .022µF, 100V	12090
C70	CERMIC, .022µF, 100V	12090
C71	CERAMIC, .1µF, 50V	12071
C72	TANTALUM, 1µF, 50V	15003
C73	CERAMIC, .1µF, 50V	12071
C74	ELECT, 22µF, 50V	11038
C75	TANTALUM, 10µF, 35V	15011
C76	TANTALUM, .33µF, 35V	15017
C77	TANTALUM, .33µF, 35V	15017
C78	TANTALUM, .47µF, 35V	15005
C79	TANTALUM, .33µF, 35V	15017
C80	TANTALUM, .47µF, 35V	15005
C81	TANTALUM, .47µF, 35V	15005
C83	TANTALUM, 10µF, 35V	15011
C86	CERAMIC, .01µF, 50V	12051
C87	CERAMIC, .1µF, 50V	12071
DIODES		
CR1	SD101A, SCHOTTKY	32029
CR2	1N4002 RECTIFIER 100V	31003
CR3	1N4002 RECTIFIER 100V	31003
CR4	1N4002 RECTIFIER 100V	31003
CR5	1N4002 RECTIFIER 100V	31003
CR6	LIGHT EMITTING DIODE, GRN	31013
CR7	LIGHT EMITTING DIODE, GRN	31013
CR12	1N4148	31004
CR13	1N4148	31004
CR14	1N4148	31004
CR15	1N4002 RECTIFIER 100V	31003
CR16	1N4002 RECTIFIER 100V	31003
DELAY LINES		
DL1	DL710	43005
DL2	DL345	43002
ICs		
IC1	CD4098, ONE-SHOT, RETRIG, DUAL, CMOS	34021
IC3	LF357B OPP AMP	34188
IC4	MC34001, OPP AMP	34172
IC6	LM7812T, REGULATOR, VOLTAGE, FIXED, +12V	34002
IC7	LM7805T, REGULATOR, VOLTAGE, FIXED, +5V	34088
IC8	TDA4565 COLOR TRANSIENT IMPROVEMENT	34227
IC9	TDA3505,CONTROL-CHROMA	34074
CONNECTORS		
J25	BNC, RIGHT ANGLE	51079
J26	4 PIN MINI DIN	51386
J27	BNC, RIGHT ANGLE	51079
J53	15 PIN SOCKET STRIP	51372
J54	15 PIN SOCKET STRIP	51372
JMP4	2 PIN LINK, HEADER	51082
JMP5	2 PIN LINK, HEADER	51082
JMP6	2 PIN LINK, HEADER	51082
JMP7	3 PIN LINK, HEADER	51333
P4	64 PIN A @ C DIN MALE	51279
INDUCTORS		
L1	68µH	42006
L2	VARIABLE, 11.8µH, TOKO	42056
L3	0 Ω "MOLDED JUMPER"	21168
L4	VARIABLE, 11.8µH, TOKO	42056
L5	VARIABLE, 11.8µH, TOKO	42056
L7	220µH	42046
L8	22µH	42057
TRANSISTORS		
Q1	2N3904, SIGNAL, NPN	33006
Q2	MPS3906, SIGNAL, PNP	33009
Q3	2N3904, SIGNAL, NPN	33006
Q4	2N3904, SIGNAL, NPN	33006
Q5	MPS3906, SIGNAL, PNP	33009
Q6	2N3904, SIGNAL, NPN	33006
Q7	2N3904, SIGNAL, NPN	33006
Q8	MPS3906, SIGNAL, PNP	33009
Q9	2N3904, SIGNAL, NPN	33006
Q10	JFET,2N5638,N-CHANNEL	33069
Q11	2N3904, SIGNAL, NPN	33006
Q12	2N3904, SIGNAL, NPN	33006
Q13	MPS3906, SIGNAL, PNP	33009
Q14	2N3904, SIGNAL, NPN	33006
Q15	2N3819 FET (SGD)	33068
Q16	MPS3906, SIGNAL, PNP	33009
Q17	2N3904, SIGNAL, NPN	33006
Q18	2N3904, SIGNAL, NPN	33006
Q19	2N3904, SIGNAL, NPN	33006
Q20	2N3904, SIGNAL, NPN	33006
Q21	2N3904, SIGNAL, NPN	33006
Q22	2N3904, SIGNAL, NPN	33006
Q23	2N3904, SIGNAL, NPN	33006
Q24	2N3904, SIGNAL, NPN	33006
Q25	2N3904, SIGNAL, NPN	33006
RESISTORS		
R1	120,1/2W	22052
R2	75	21035
R3	12K	21068
R4	220	21043
R5	18K	21116
R6	220	21043
R7	24K	21071
R8	1K6	21054
R9	1K5	21053
R10	470	21115
R11	68K	21122
R12	6K8	21064
R13	47K	21074
R14	3K3	21060
R15	16K	21069
R16	10M	21148
R17	12K	21068
R18	220	21043
R19	18K	21116
R20	220	21043
R21	24K	21071
R22	1K5	21053
R23	1K6	21054
R24	470	21115
R25	120,1/2W	22052
R26	12K	21068
R27	18K	21116
R28	24K	21071
R29	75	21035
R30	220	21043
R31	220	21043
R32	1K5	21053
R33	75	21035
R34	1K6	21054
R37	39	21123
R38	330K	21083
R39	100K	21077
R40	4K7	21061
R41	6K8	21064
R42	100	21037
R43	470	21115
R44	10M	21148
R45	160K	21157
R46	POTENTIOMETER, 20K	24057
R47	100K	21077
R48	47K	21074
R49	POTENTIOMETER, 100K	24078
R50	620	21106
R51	390	21047
R52	10K	21066
R53	1K	21052
R54	47	21030
R55	1K2	21114
R56	47	21030
R57	10K	21066
R58	390	21047
R59	POTENTIOMETER, 200	24096
R60	180	21041
R61	1K2	21114
R62	180	21041
R63	POTENTIOMETER, 1K	24049
R64	560	21049
R65	1K	21052
R66	1K3	21152
R67	4K7	21061
R68	1K2	21114
R69	15K	21107
R70	27K	21072
R71	9K1	21109
R72	100	21037
R73	100	21037
R74	10K	21066
R75	1K2	21114
R76	1K2	21114
R77	680	21050
R78	820	21051
R79	820	21051
R80	180K	21150
R81	100K	21077

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

SMD/SMT denotes: SURFACE MOUNT DEVICES

81083/81121 is part of Ordering P/N 69409

11.7 . . . . . Quad Video Decoder (81083X1) Parts List (CONTINUED)

REF	DESCRIPTION	P/N
	RESISTORS Ω	
R82	1K2	21114
R83	6K8	21064
R84	10K	21066
R85	2K2	21057
R86	POTENTIOMETER, 10K	24043
R87	3K9	21121
R88	220	21043
R89	100K	21077
R90	56K	21112
R91	POTENTIOMETER, 20K	24057
R92	1M5	21093
R93	22K	21070
R94	43K	21158
R95	240K	21081
R96	910K	21090
R97	1K	21052
R98	POTENTIOMETER, 10K	24043
R99	1K	21052
R100	10	21017
R101	1K	21052
R102	1K	21052
R103	100	21037
R104	1K	21052
R105	1K	21052
R107	100	21037
R108	1K	21052
R109	1K	21052
R110	100	21037
R111	POTENTIOMETER, 10K	24053
R112	100K	21077
R113	9K1	21109
R114	*NOT INSTALLED*	N/A
R115	2.2	21001
R116	1K1	21126
R117	390	21047
R118	330K	21083
R119	150K	21079
R120	0 Ω *MOLDED JUMPER*	21168
R121	12K	21068
R122	22K	21070
R123	18K	21116
R124	6K8	21064
R125	390	21047
R126	1K2	21114
R127	POTENTIOMETER, 5K	24046
R128	330	21046
R129	1K5	21053
R130	330	21046
R131	1K5	21053
R132	100	21037
R134	0 Ω *MOLDED JUMPER*	21168
R135	*NOT INSTALLED*	N/A
R136	*NOT INSTALLED*	N/A
R137	*NOT INSTALLED*	N/A
R138	0 Ω *MOLDED JUMPER*	21168
R139	2K2	20057
	SWITCHES	
SW1	SPDT, RIGHT ANGLE	56044

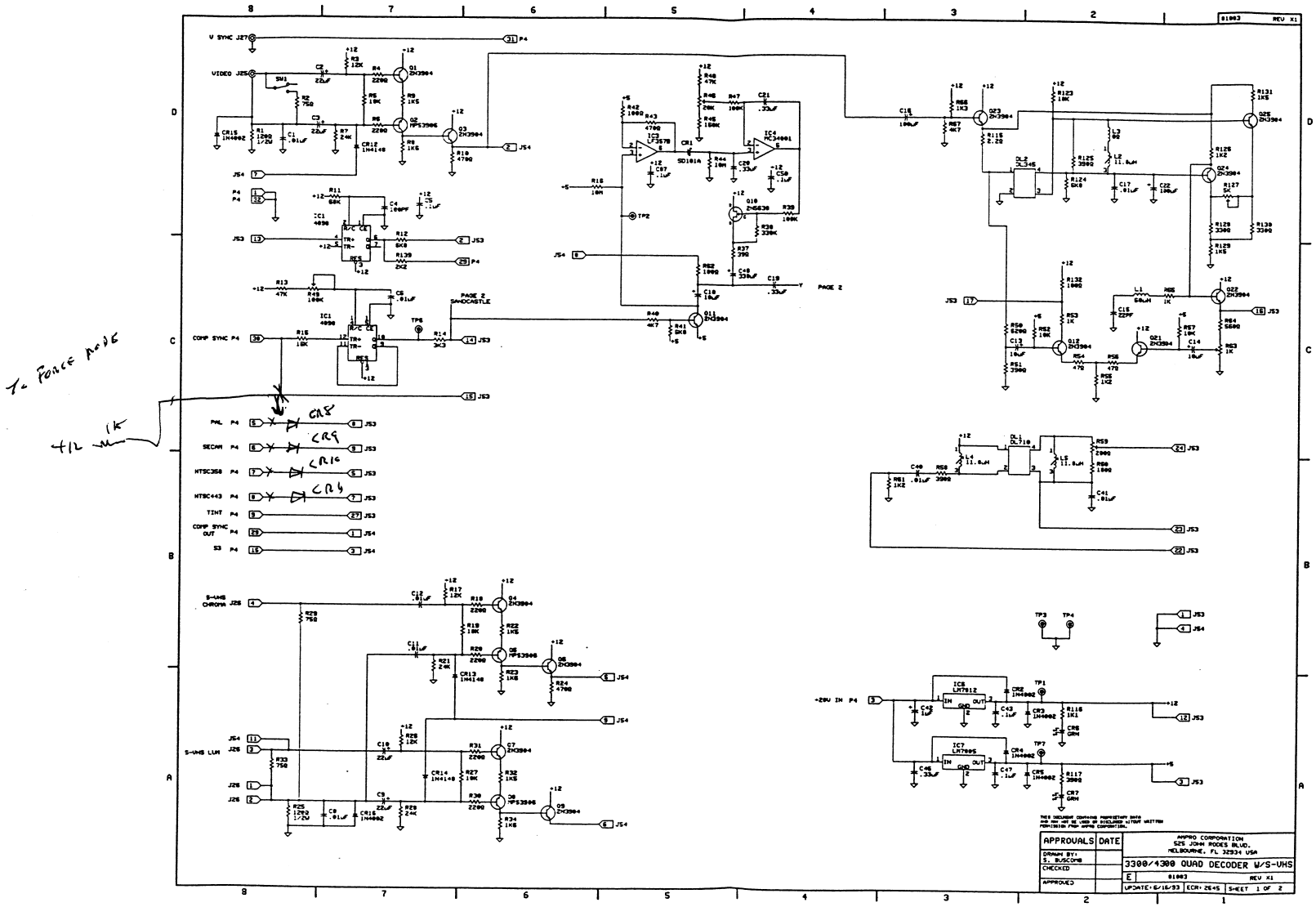
TEST POINTS		
TP1 - TP10	TEST POINT	51045
	MISC. / UPDATES	

NOTES

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

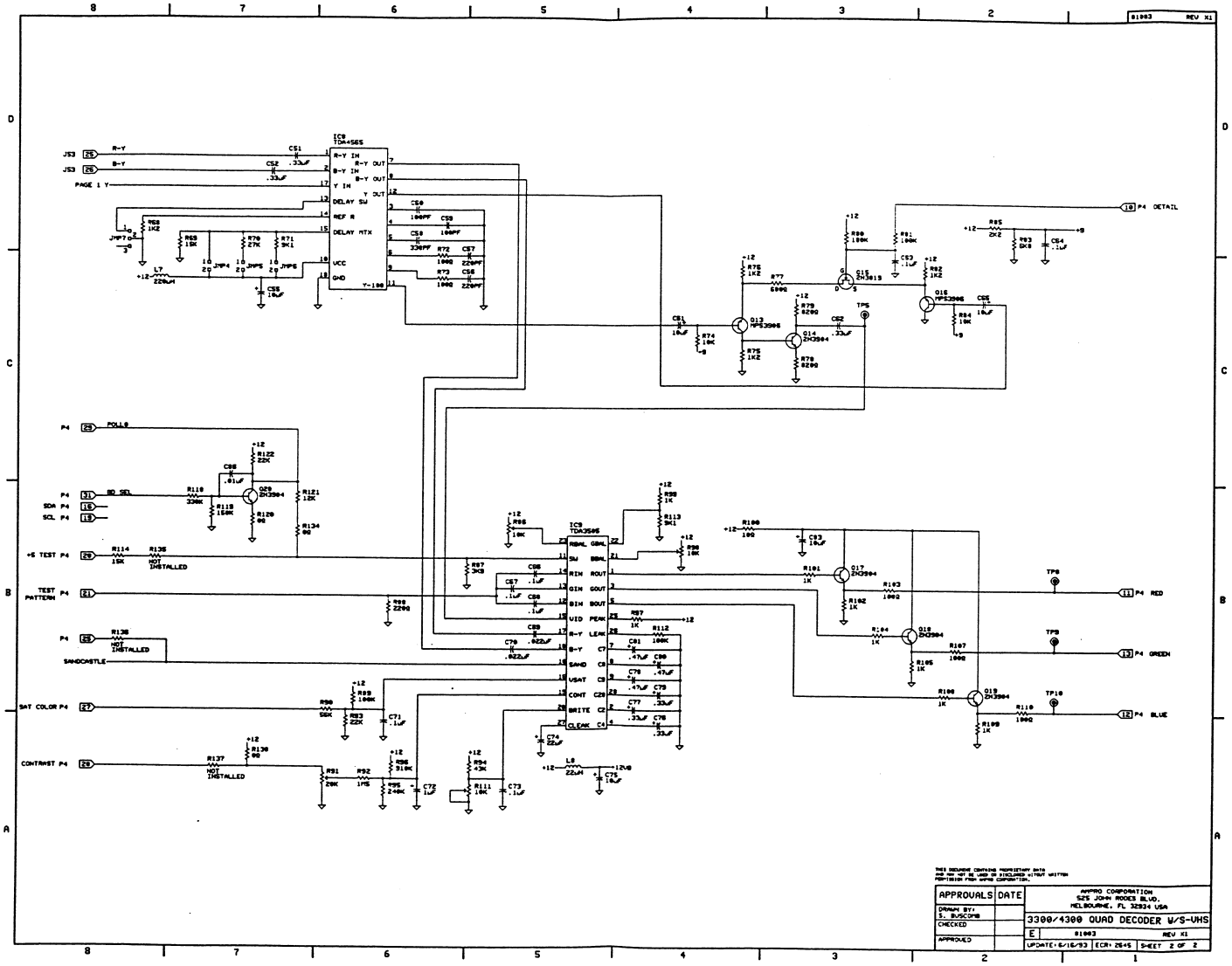
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.7.1 . . . . Quad Video Decoder (81083X1) Schematic 1 of 2:



SMD/SMT denotes: SURFACE MOUNT DEVICES

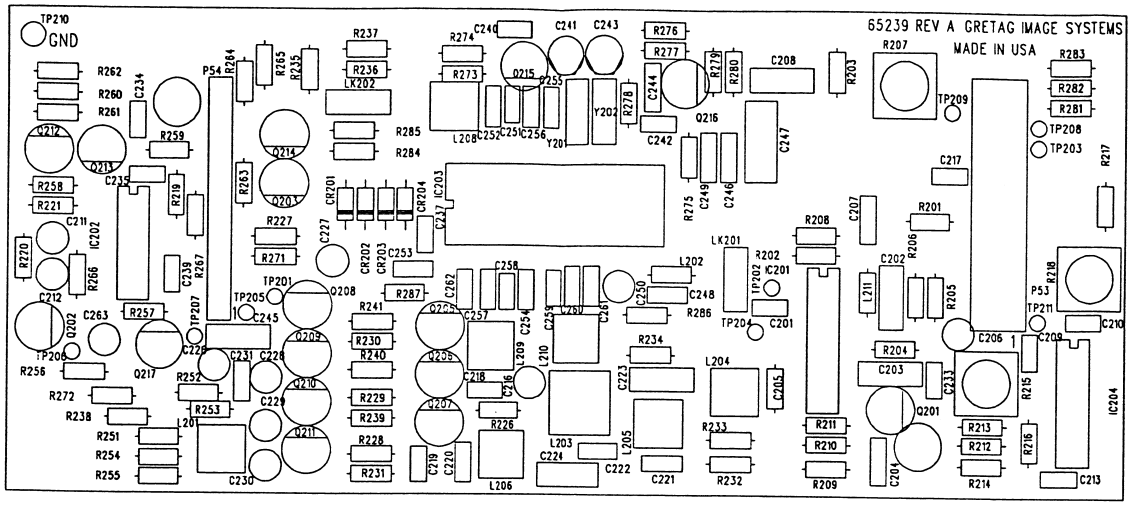
11.7.2 . . . . Quad Video Decoder (81083X1) Schematic 2 of 2:



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.8 . . . . . Video Select Board (81121A) Component Layout / Parts List

81121A is part of Assembly # 81083



65239 REV A

VIDEO SELECT BOARD (81121A)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65239(A)
CAPACITORS		
C201	CERAMIC, .022µF, , 100V	12090
C202	MYLAR, .0047µF, 100V	13001
C203	MYLAR, .0047µF, 100V	13001
C204	CERAMIC, .22µF, 100V	12094
C205	CERAMIC, .1µF, 50V	12071
C206	TANTALUM, 10µF, 35V	15011
C207	CERAMIC, .56µF, 100V	12084
C208	MYLAR, .0047µF, 100V	13001
C211	CERAMIC, 10µF, NPO, 50V	11044
C212	CERAMIC, 10µF, NPO, 50V	11044
C216	TANTALUM, 1µF, 50V	15003
C217	CERAMIC, .0022µF, 100V	12089
C218	CERAMIC, .0022µF, 100V	12089
C219	CERAMIC, .0022µF, 100V	12089
C220	MICA, 390pF, 50V	14010
C221	MICA, 120pF, 100V	14013
C222	MICA, 27pF, 300V	14032
C223	MICA, 220pF, 500V	14005
C224	MICA, 820pF, 300V	14024
C226	TANTALUM, 1µF, 50V	15003
C227	CERAMIC, 2.2µF, NPO, 50V	11085
C228	TANTALUM, 2.2µF, 50V	15001
C229	TANTALUM, 2.2µF, 50V	15001
C230	TANTALUM, 2.2µF, 50V	15001

C231	MICA, 120pF, 100V	14013
C233	CERAMIC, .01µF, 50V	12051
C235	CERAMIC, .1µF, 50V	12071
C237	CERAMIC, .1µF, 50V	12071
C240	CERAMIC, .1µF, 50V	12071
C241	10-12pF	12087
C242	CERAMIC, .1µF, 50V	12071
C243	5-30pF	12095
C244	CERAMIC, .47µF, 100V	12083
C245	MICA, 220pF, 500V	14005
C246	CERAMIC, .33µF, 50V	12080
C247	MYLAR, .047µF, 100V	13017
C248	MYLAR, .022µF, 100V	13002
C249	CERAMIC, .33µF, , 50V	12080
C250	TANTALUM, 10µF, 35V	15011
C251	CERAMIC, .001µF, 100V	12064
C252	MICA, 120pF, 100V	14013
C253	MICA, 180PF, 50V	14025
C254	MICA, 180PF, 50V	14025
C255	MYLAR, .022µF, 100V	13002
C256	MYLAR, .022µF, 100V	13002
C257	MICA, 68pF, 300V	14008
C258	CERAMIC, 22pF, 200V	12056
C259	CERAMIC, 22pF, 200V	12056
C260	MICA, 68pF, 300V	14008
C261	MICA, 120pF, 100V	14013
C262	MICA, 120pF, 100V	14013
C263	TANTALUM, 10µF, 35V	15011

DIODES		
CR201	1N4148	31004
CR202	1N4148	31004
CR203	1N4148	31004
CR204	1N4148	31004
CR205	1N4148	31004
CR206	1N4148	31004
CR207	1N4148	31004
CR208	1N4148	31004
ICs		
IC201	TDA2595 HORIZONTAL COMBINATION	34073
IC202	4066 - CMOS QUAD BILATERAL SWITCHES	34158
IC203	TDA4555, DECODER-MULTISTANDARD VIDEO	34095
INDUCTORS		
L201	VARIABLE, 18µH, TOKO	42082
L202	22µH	42057
L203	VARIABLE W/CENTER TAP, 68µH	42075
L204	VARIABLE W/CENTER TAP, 10.9µH	42077
L205	VARIABLE,12.5µH	42074
L206	VARIABLE, 3.8µH, TOKO	42055
L208	VARIABLE, 11.8µH, TOKO	42056
L209	VARIABLE, 11.8µH, TOKO	42056
L210	VARIABLE, 11.8µH, TOKO	42056
L211	22µH	42057

CONNECTORS		
P53	HDR, 15 PIN	51371
P54	HDR, 15 PIN	51371
TRANSISTORS		
Q201	2N3904, SIGNAL, NPN	33006
Q202	MPS3906, SIGNAL, PNP	33009
Q203	2N3904, SIGNAL, NPN	33006
Q205	2N3904, SIGNAL, NPN	33006
Q206	2N3904, SIGNAL, NPN	33006
Q207	2N3904, SIGNAL, NPN	33006
Q208	2N3904, SIGNAL, NPN	33006
Q209	2N3904, SIGNAL, NPN	33006
Q210	2N3904, SIGNAL, NPN	33006
Q211	2N3904, SIGNAL, NPN	33006
Q212	2N3904, SIGNAL, NPN	33006
Q213	MPS3906, SIGNAL, PNP	33009
Q214	2N3904, SIGNAL, NPN	33006
Q215	2N3904, SIGNAL, NPN	33006
Q216	2N3904, SIGNAL, NPN	33006
RESISTORS Ω		
R201	1K	21052
R202	82K	21104
R203	680	21050
R204	100K	21077
R205	120K	21078
R206	12K	21068
R207	POTENTIOMETER, 50K	24047
R208	4K7	21061
R210	220	21043

R212	4K7	21061
R219	470	21115
R220	4K7	21061
R221	7K5	21065
R226	100	21035
R227	2K2	21057
R228	15K	21107
R229	15K	21107
R230	15K	21107
R231	2K2	21057
R232	1K5	21053
R233	1K8	21055
R234	68	21034
R235	4K7	21061
R236	4K7	21061
R237	4K7	21061
R238	100	21035
R239	15K	21107
R240	15K	21107
R241	15K	21107
R251	560	21049
R252	3K3	21060
R253	18K	21116
R254	47K	21074
R255	22K	21070
R256	2K2	21057
R257	220K	21118
R258	62K	21162
R260	10K	21066

R261	2K	21056
R262	47K	21074
R263	33K	21073
R264	4K7	21061
R265	10K	21066
R266	10	21017
R267	10K	21066
R273	10K	21066
R274	10K	21066
R275	10K	21066
R276	10K	21066
R277	10K	21066
R278	1K	21052
R279	5K1	21062
R280	10K	21066
R281	6K8	21064
R282	3K3	21060
R283	18K	21116
R284	5K1	21062
R285	5K1	21062
R286	680	21050
R287	1K2	21114
R288	4K7	21061
TEST POINTS		
TP201 - TP210	TEST POINT	51072
CRYSTALS		
Y201	8.86MHZ	43006
Y202	7.2MHZ	43008

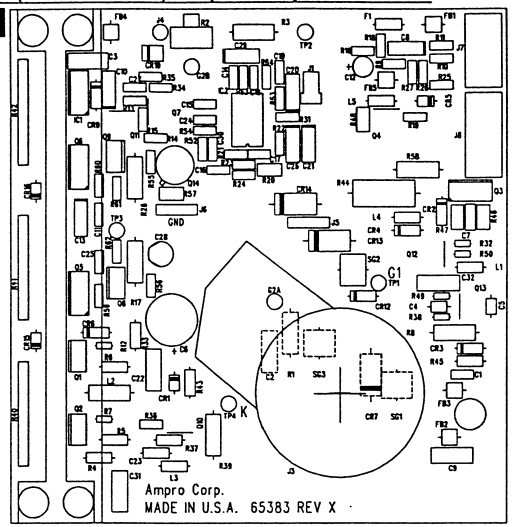
RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

SMD/SMT denotes: SURFACE MOUNT DEVICES

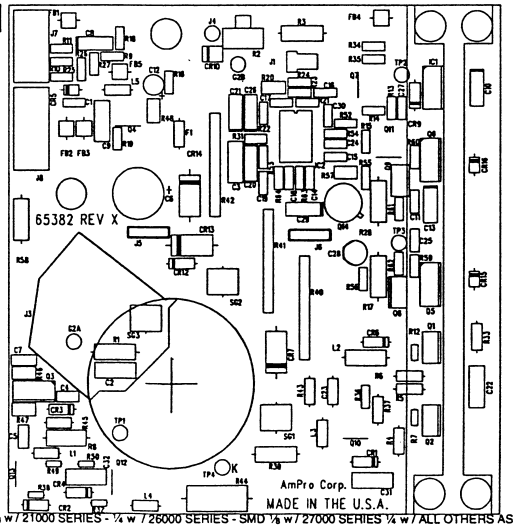
81083/81121 is part of Ordering P/N 69409

11.9 . . . . . CRT Amplifier Card (81135X3/81136X3) Component Layout / Parts List:

65383X (81135X3)



65382X (81136X3)

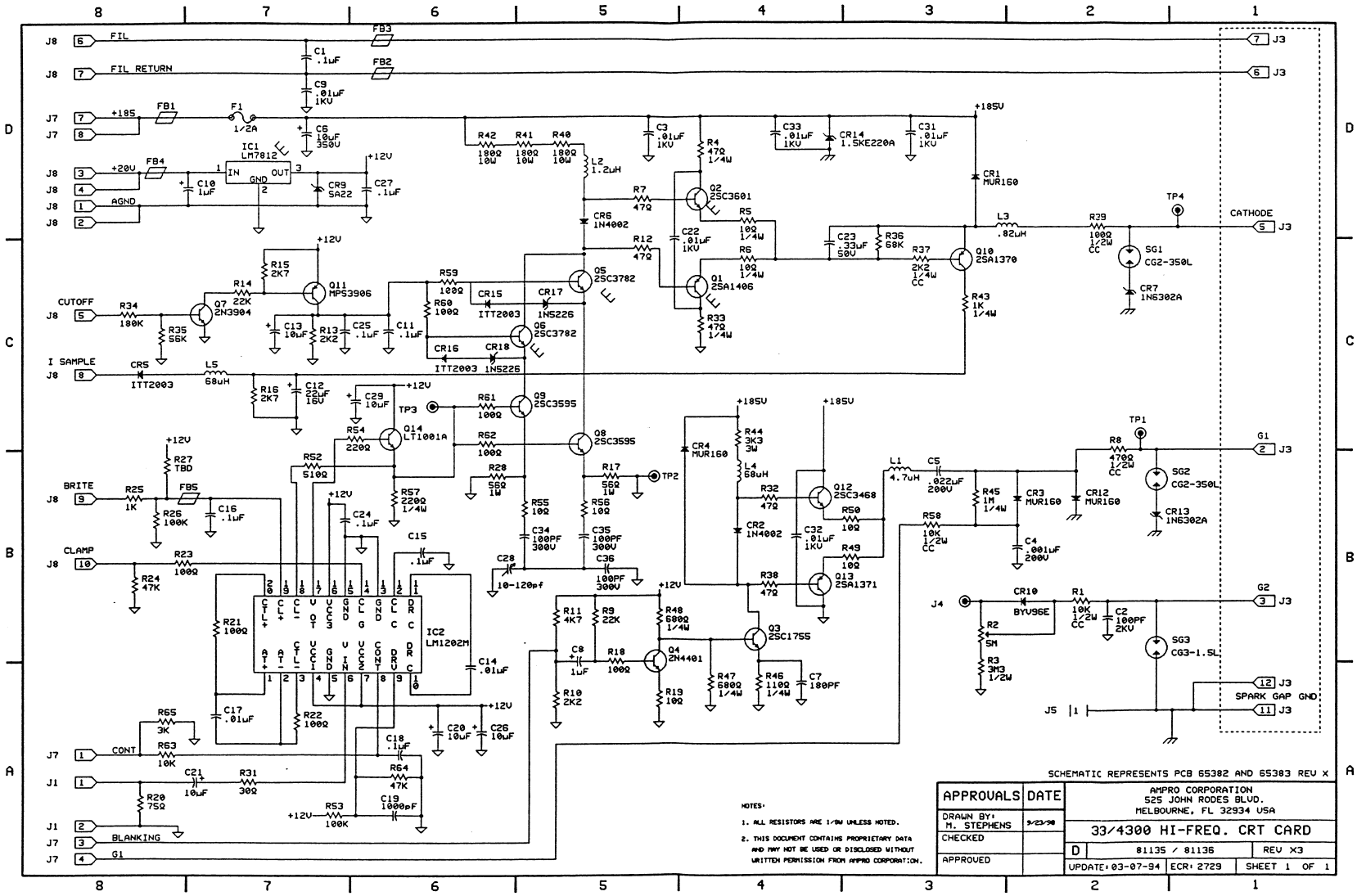


CRT AMPLIFIER CARD (81135X3/81136X3)		
REF	DESCRITPION	P/N
PCBs		
PCB	81135X3 PRINTED CKT BOARD	65383 (X)
PCB	81136X3 PRINTED CKT BOARD	65382 (X)
CAPACITORS		
C1	CERAMIC, .1µF, 50V, 12104	
C2	CERAMIC, 100pF, 2KV	12086
C3	CERAMIC, .01µF, 1KV	12015
C4	CERAMIC, .001µF, 200V	12105
C5	CERAMIC, .022µF, 200V	12106
C6	ELECT, 10µF	11059
C7	MICA, 180pF	14025
C8	TANT, 1µF, SMD	15020
C9	CERAMIC, .01µF, 1KV	12015
C10	TANT, 1F, SMD	15020
C11	CERAMIC, .1µF, 50V	12104
C12	TANTALUM, 22µF	15006
C13	TANT, 10µF, SMD	15019
C14	.01µF, CERAMIC, SMD	12125
C15	CERAMIC, .1µF, 50V	12104
C16	CERAMIC, .1µF, 50V	12104
C17	.01µF, CERAMIC, SMD	12125
C18	.1µF, CERAMIC, SMD	12122
C19	1000pF, CERAMIC, SMD	12143
C20	TANT, 10µF, SRF MNT	15019
C21	TANT, 10µF, SMD	15019
C22	CERAMIC, .01µF, 1KV	12015
C23	CERAMIC, .33µF, 50V	12113
C24	CERAMIC, .1µF, 50V	12104
C25	CERAMIC, .1µF, 50V	12104
C26	TANT, 10µF, SMD	15019
C27	CERAMIC, .1µF, 50V	12104
C28	10-120pF	12087
C29	TANT, 10µF, SMD	15019
C31	CERAMIC, .01µF, 1KV	12015
C32	CERAMIC, .01µF, 1KV	12015
C33	CERAMIC, .01µF, 1KV	12015
C34	CERAMIC, 100pF, 300V	14014
C35	CERAMIC, 100pF, 300V	14014
C36	CERAMIC, 100pF, 300V	14014
DIODES		
CR1	MUR160, 1A, 600V, DO41A	31090
CR2	1N4002 RECTIFIER 100V	31003
CR3	MUR160, 1A, 600V, DO41A	31090
CR4	MUR160, 1A, 600V, DO41A	31090
CR5	ITT2003, SIGNAL, SILICON	31017
CR6	1N4002 RECTIFIER 100V	31003
CR7	1N6302A, 180 VOLT SURGE ABSORBER	32041
CR9	SA22, 22 VOLT SURGE ABSORBER	32036
CR10	BYV96E	31042
CR12	MUR160, 1A, 600V, DO41A	31090
CR13	1N6302A, 180 VOLT SURGE ABSORBER	32041
CR14	ZENER, 1.5KE220A	32065
CR15	ITT2003, SIGNAL, SILICON	31017
CR16	ITT2003, SIGNAL, SILICON	31017
CR17	ZENER, 1N5226, 1/2W, 3.3V	32017
CR18	ZENER, 1N5226, 1/2W, 3.3V	32017
FUSE		
F1	FUSE, 1/2A	58030
FERITE BEADS		
FB1 - FB5	FERRITE BEAD	43201
ICs		
IC1	LM7812T, REGULATOR, VOLTAGE, FIXED, +12V	34002
IC2	LM1202M 230MHz VIDEO AMP SMD	34549
CONNECTORS		
J1	*NOT INSTALLED*	N/A
J3	CRT SOCKET	59331
J4	G2-WIRE ASSEMBLY	66389
J5	SPD, SML, MALE, PCB	51044
J6	SPD, SML, MALE, PCB	51044
J7	HDR, 8 PIN, SHROUDED	51396
J8	HDR, 10 PIN, DBL ROW W/DNT	51612
INDUCTORS		
L1	4.7uH	42087
L2	1.2H	42166
L3	0.82H	42171
L4	68uH	42006
L5	68uH	42006
TRANSISTORS		
Q1	2SA1406, VIDEO, PNP	33100
Q2	2SC3601, VIDEO, NPN	33174
Q3	2SC1755, NPN	33022
Q4	2N4401, VIDEO, NPN	33158
Q5	2SC3782, NPN	33088
Q6	2SC3782, NPN	33088
Q7	2N3904, SIGNAL, NPN	33006
Q8	2SC3595, VIDEO, NPN	33098
Q9	2SC3595, VIDEO, NPN	33098
Q10	2SA1370, VIDEO, PNP	33101
Q11	MPS3906, SIGNAL, PNP	33009
Q12	2SC3468, VIDEO, NPN	33157
Q13	2SA1371, VIDEO, PNP	33114
Q14	LT1001A, HI-FREQ VIDEO, NPN	33083
RESISTORS Ω		
R1	10K,1/2W,CC	22077
R2	POTENTIOMETER, 5M	24101
R3	3M3, 1/2W	22069
R4	47, 1/4W	21030
R5	10,1/4W	21017
R6	10, 1/4W	21017
R7	47	20017
R8	470, 1/2W, CC	22099
R9	22K	26081
R10	2K2	26057
R11	4K7	26065
R12	47	20017
R13	2K2	26057
R14	22K	26081
R15	2K7	26059
R16	2K7	26059
R17	56, 1W	23189
R18	100	26025
R19	10	26001
R20	*NOT INSTALLED*	N/A
R21	100	26025
R22	100	26025
R23	100	26025
R24	47K	26089
R25	1K	26049
R26	100K	26097
R27	*NOT INSTALLED*	N/A
R28	56, 1W	23189
R31	*NOT INSTALLED*	N/A
R32	47	20017
R33	47, 1/4W	21030
R34	180K	26103
R35	56K	26091
R36	68K	26093
R37	2K2, 1/4W, CC	21187
R38	47	20017
R39	100, 1/2W, CC	22076
R40	180, 10W	23137
R41	180, 10W	23137
R42	180, 10W	23137
R43	1K, 1/4W	21052
R44	3K3, 3W	23184
R45	1M, 1/4W	21091
R46	110,1/4W	27026
R47	680, 1/4W	27045
R48	680, 1/4W	27045
R49	10	20001
R50	10	20001
R52	510	26042
R53	100K	26097
R54	220	26033
R55	10	20001
R56	10	20001
R57	220, 1/4W	27033
R58	10K, 1/2W, CC	22077
R59	100	26025
R60	100	26025
R61	100	26025
R62	100	26025
R63	10K	26073
R64	47K	26089
R65	3K	20060
SPARK GAPS		
SG1	SURGE ARRESTER	32038
SG2	SURGE ARRESTER	32038
SG3	CG3-1.5L	32064
TEST POINTS		
TP1 - TP4	TEST POINT	51370

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

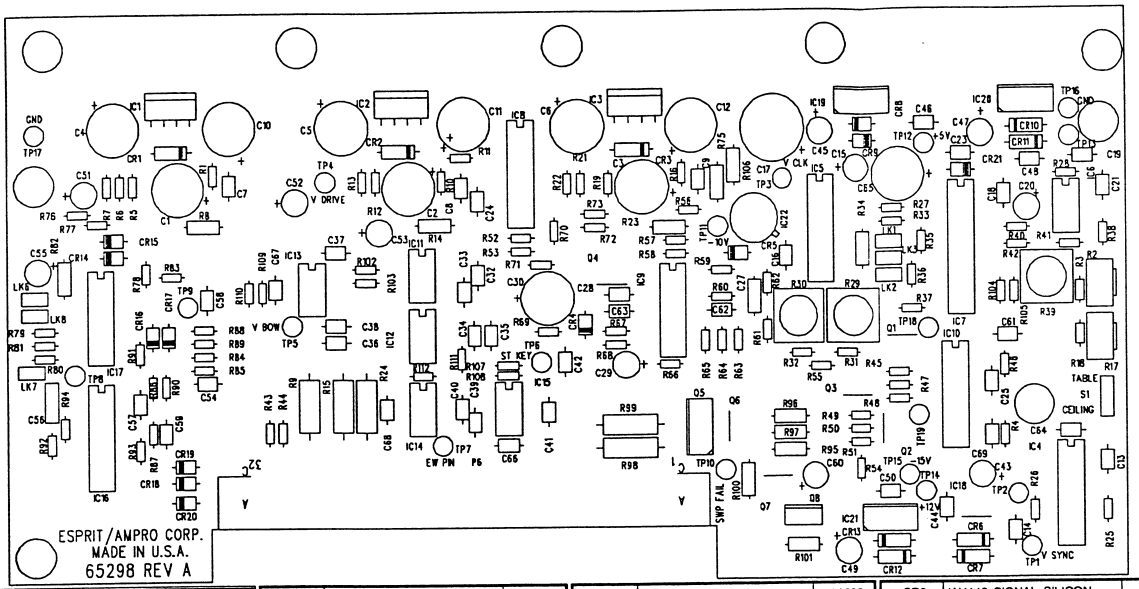
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.9.1 . . . . CRT Amplifier Card (81135X3/81136X3) Schematic 1 of 1:



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.10 . . . . Vertical Deflection Module (81131A) Component Layout / Parts List:



VERTICAL DEFLECTION (81131A)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65298 (A)
CAPACITORS		
C1	100µF, 35V	11036
C2	100µF, 35V	11036
C3	100µF, 35V	11036
C4	1000µF, 16V	11111
C5	1000µF, 16V	11111
C6	1000µF, 16V	11111
C7	.22µF, 50V	12094
C8	.22µF, 50V	12094
C9	.22µF, 50V	12094
C10	1000µF, 16V	11111
C11	1000µF, 16V	11111
C12	1000µF, 16V	11111
C13	.047µF, 35V	12117
C14	.1µF, 35V	12104
C15	TANTALUM, 1µF, 50V	15003
C16	2.2nF, 100V	12115
C17	4.7µF, 35V	11062
C18	1000pF	12111
C19	0.1µF, 50V	12104
C20	10µF, 35V	11008
C21	.047µF, 35V	12117
C23	.1µF, 50V	12104
C24	.1µF, 50V	12104
C25	.1µF, 50V	12104
C27	1µF, 50V	12097
C28	.047µF, 50V	12117
C29	TANTALUM, 1F, 50V	15003
C30	100F	11036
C32	.1µF, 50V	12104
C33	.1µF, 50V	12104
C34	.1µF, 50V	12104
C35	.1µF, 50V	12104
C36	.1µF, 50V	12104
C37	.1µF, 50V	12104
C38	.1µF, 50V	12104
C39	.1µF, 50V	12104
C40	.1µF, 50V	12104
C41	.1µF, 50V	12104
C42	.1µF, 50V	12104
C43	TANTALUM, 1µF, 50V	15003
C44	.1µF, 50V	12104
C45	TANTALUM, 1µF, 50V	15003
C46	.1µF, 50V	12104
C47	TANTALUM, 1µF, 50V	15003
C48	.1µF, 50V	12104
C49	TANTALUM, 2.2µF, 50V	15001
C50	.1µF, 50V	12104
C51	.47µF, 50V	11045
C52	.47µF, 50V	11045
C53	.47µF, 50V	11045
C54	.01µF, 50V	12109
C55	10µF, 35V	11008
C56	.47µF, 100V	12083
C57	.01µF, 50V	12109
C58	.01µF, 50V	12109
C59	.1µF, 50V	12104
C60	TANTALUM, 2.2µF, 50V	15001
C61	.1µF, 50V	12104
C62	.1µF, 50V	12104
C63	.1µF, 50V	12104
C64	.1µF, 50V	12104
C66	.1µF, 50V	12104
C67	.1µF, 50V	12104
C68	.1µF, 50V	12104
C69	.1µF, 50V	12104
C70	2200pF, 100V	12115
C71	2200pF, 100V	12115
C72	2200pF, 100V	12115
C73	TANTALUM, 10µF, 50V	15011
C74	.1µF, 50V	12104
C75	.0033µF, 50V	12100
DIODES		
CR1	1N4002 RECTIFIER 100V	31003
CR2	1N4002 RECTIFIER 100V	31003
CR3	1N4002 RECTIFIER 100V	31003
CR4	1N4148, SIGNAL, SILICON	31004
CR5	1N4148, SIGNAL, SILICON	31004
CR6	1N4002 RECTIFIER 100V	31003
CR7	1N4002 RECTIFIER 100V	31003
CR8	1N4148, SIGNAL, SILICON	31004
CR9	1N4148, SIGNAL, SILICON	31004
CR10	1N4002 RECTIFIER 100V	31003
CR11	1N4002 RECTIFIER 100V	31003
CR12	1N4002 RECTIFIER 100V	31003
CR13	1N4002 RECTIFIER 100V	31003
CR14	SD101A, SCHOTTKY	32029
CR15	SD101A, SCHOTTKY	32029
CR16	SD101A, SCHOTTKY	32029
CR17	SD101A, SCHOTTKY	32029
CR18	SD101A, SCHOTTKY	32029
CR19	SD101A, SCHOTTKY	32029
CR20	SD101A, SCHOTTKY	32029
CR21	SD101A, SCHOTTKY	32029
ICs		
IC1	TDA8172, VERTICAL DRIVER	34350
IC2	TDA8172, VERTICAL DRIVER	34350
IC3	TDA8172, VERTICAL DRIVER	34350
IC4	74HC221 - H-CMOS DUAL MONO MV	34335
IC5	CD4046, PLL, CMOS	34203
IC6	MC1455 - TIMER	34013
IC7	PAL, TTL/TEST 8 BIT COUNTER	37056
IC8	TDA8444N, OCTAL 6 BIT DAC W/I²C	34275
IC9	MC3403P,QUAD DIFF INPUT OP-AMP	34241
IC10	74HC221 - H-CMOS DUAL MONO MV	34335
IC11	AD633, GP ANALOG MULTIPLIER	34274
IC12	AD633, GP ANALOG MULTIPLIER	34274
IC13	AD633, GP ANALOG MULTIPLIER	34274
IC14	AD633, GP ANALOG MULTIPLIER	34274
IC15	AD633, GP ANALOG MULTIPLIER	34274
IC16	4538 - CMOS DUAL PRECISION MONOSTABLE MULTIVIBRATOR	34040
IC17	LM339 - LOW POWER QUAD VOLTAGE COMPARATOR	34044
IC18	LM78L12T,REGULATOR,VOLTAGE, FIXED,+12V	34080
IC19	LM7805C - VOLTAGE REGULATOR, +5VDC	34088
IC20	LM7815T, REGULATOR, +15V	34183
IC21	LM7915T, REGULATOR, VOLTAGE, FIXED, -15V	34187
IC22	LH0070-0H, 10V PRECISION REFERENCE	34014
CONNECTORS		
LK1	2 PIN LINK, HEADER	51082
LK2	2 PIN LINK, HEADER	51082
LK3	2 PIN LINK, HEADER	51082
LK6	2 PIN LINK, HEADER	51082
LK7	2 PIN LINK, HEADER	51082
LK8	2 PIN LINK, HEADER	51082
P6	64 PIN DIN, MALE, RT ANGLE	51297
TRANSISTORS		
Q1	2N3904, SIGNAL, NPN	33006
Q2	BC548B, SIGNAL, NPN	33042
Q3	MPS3906, SIGNAL, PNP	33009
Q4	N-CHANNEL J-FET, 2N3819	33068
Q6	2N7000, MOSFET, SIGNAL, N-CHAN	33096
Q7	2N7000, MOSFET, SIGNAL, N-CHAN	33096
Q8	MPSU60, SIGNAL, PNP	33103
RESISTORS Ω		
R1	10K	20073
R2	POTENTIOMETER, 1K	24091
R3	1K3	20052
R4	68K	20093
R5	240K	20106
R6	120K	20099
R7	4K7	20065
R8	22	21001
R9	2,1/2W	22051
R10	10K	20073
R11	1K8	20055
R12	82K	20095
R13	4K7	20065
R14	22	21001
R15	2,1/2W	22051
R16	10K	20073
R17	POTENTIOMETER, 1K	24091
R18	1K3	20052
R19	240K	20106
R21	120K	20099
R22	4K7	20065
R23	22	21001
R24	2,1/2W	22051
R25	68K	20093
R26	68K	20093
R27	30K	20084
R28	51K	20090
R29	POTENTIOMETER, 20K	24045
R30	POTENTIOMETER, 200K	24044
R31	5K1	20066
R32	47K	20089
R33	220K	20105
R35	2K2	20057
R37	2K2	20057
R38	33K	20085
R39	POTENTIOMETER, 10K	24043
R40	8K2	20071
R41	1K5	20053
R42	4K7	20065
R43	100	20025
R44	100	20025
R45	20K	20080
R46	4K3	20064
R47	3K3	20061
R48	3K3	20061
R49	10K	20073
R50	22K	20081
R51	10K	20073
R52	16K	20078
R53	6K8	20069
R54	10K	20073
R55	22K	20081
R56	20K	20080
R57	36K	20086
R58	200K	20104
R59	10K	20073
R60	4K7	20065
R61	330K	20109
R62	51K	20090
R63	47K	20089
R64	20K	20080
R65	10K	20073
R66	20K	20080
R67	100K	20097
R68	1K	20049
R69	22K	20081
R70	7K5	20070
R71	13K	20076
R72	7K5	20076
R73	13K	20076
R75	1K	21052
R76	470K	20113
R77	470K	20113
R78	470K	20113
R79	470K	20113
R80	470K	20113
R81	470K	20113
R82	100	21037
R83	4K7	20065

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

SMD/SMT denotes: SURFACE MOUNT DEVICES

11.10 . . . . Vertical Deflection Module (81131A) Parts List (continued) / Notes:

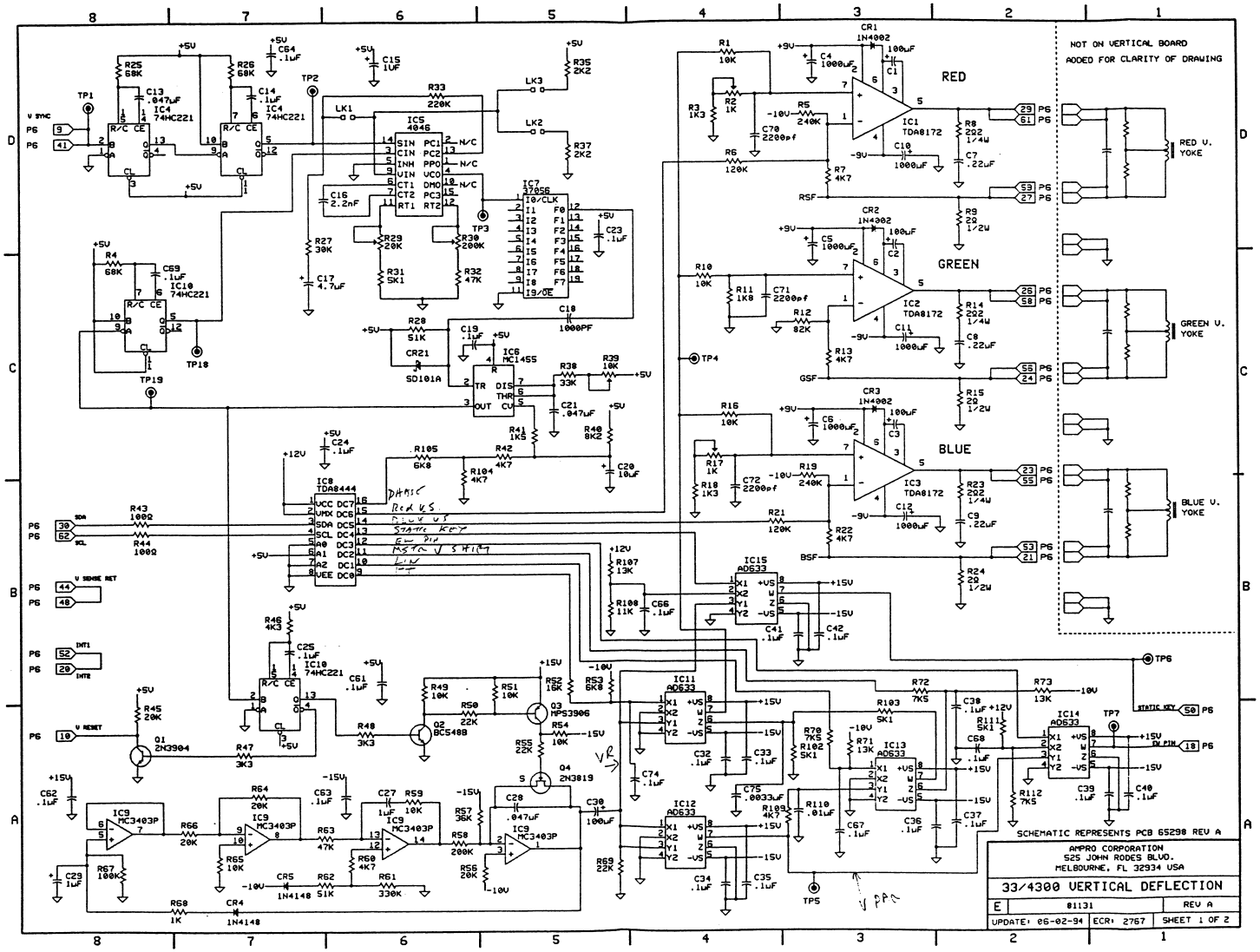
REF	DESCRIPTION	P/N
	TEST POINTS	
R84	13K	20076
R85	1K	20049
R86	1M	20121
R87	4K7	20065
R88	6K8	20069
R89	1K5	20053
R90	22K	20081
R91	22K	20081
R92	10K	20073
R93	68K	20093
R94	51K	20090
R95	100K	21077
R96	20K	21139
R97	4K7	21061
R98	0, "MOLDED JUMPER"	21168
R100	4K7	21061
R101	4K7	21061
R102	5K1	20066
R103	5K1	20066
R104	4K7	21061
R105	6K8	20069
R107	13K	20076
R108	11K	20074
R109	4K7	20065
R110	CAPACITOR, .01µF, 50V	12109
R111	5K1	20066
R112	7K5	20070
	TEST POINTS	
TP1-TP19	TEST POINT, LOOP	51405
	MISC. / UPDATES	

NOTES

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

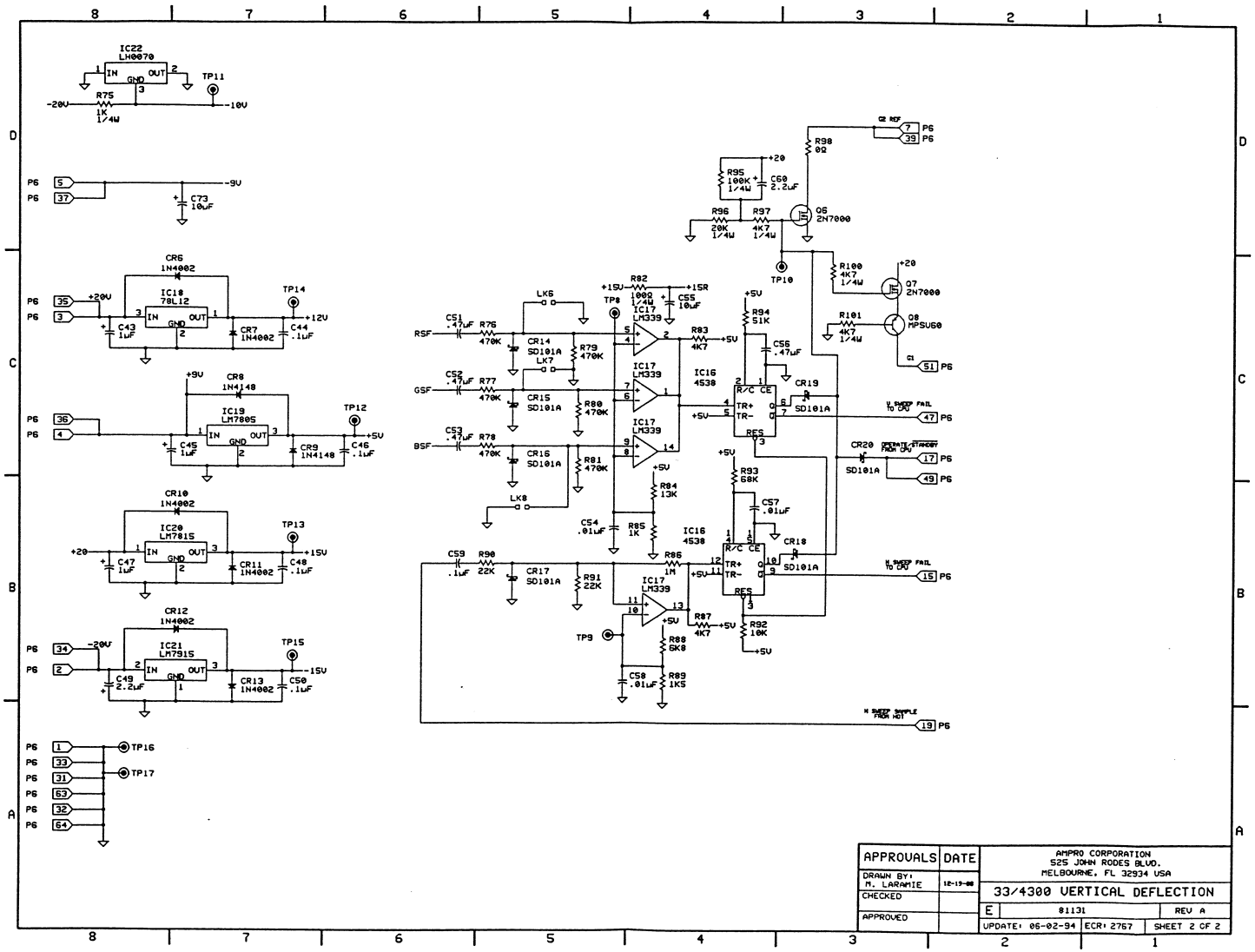
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.10.1 . . . Vertical Deflection Module (81131A) Schematic 1 of 2:



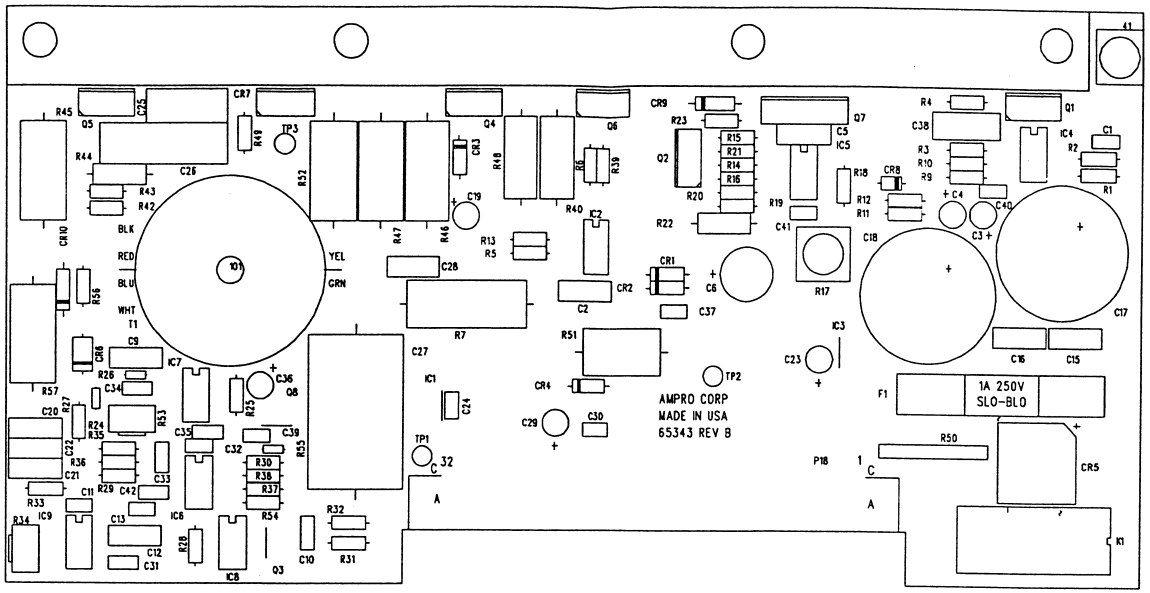
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.10.2 . . . Vertical Deflection Module (81131A) Schematic 2 of 2:



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.11 . . . . H.O.T. Power Module (81140B) Component Layout / Parts List:



H.O.T. POWER MODULE (81140B)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65343 (X)
CAPACITORS		
C1	CERAMIC, .1F, 50V	12104
C2	MICA, 1000pF, 100V	14023
C3	ELECT, 10µF, 35V	11008
C4	ELECT, 22µF, 16V	15006
C5	MICA, 470pF, 500V	14040
C6	ELECT, 1µF, 250V	11049
C9	MICA, 220pF, 50V	14005
C10	MYLAR, 150pF, 100V	14012
C11	CERAMIC, .1µF, 50V	12104
C12	MICA, 1000pF, 100V	14023
C13	CERAMIC, .1µF, 50V	12104
C15	MICA, 680pF, 500V	12119
C16	MICA, 680pF, 500V	12119
C17	ELECT, 220µF, 200V	11114
C18	ELECT, 220µF, 200V	11114
C19	ELECT, 10µF, 35V	11008
C20	CERAMIC, 47pF, 1KV	12023
C21	CERAMIC, 47pF, 1KV	12023
C22	CERAMIC, 47pF, 1KV	12023
C23	ELECT, 1µF, 50V	11001

C24	CERAMIC, .1µF, 50V	12104
C25	MICA, .1µF, 250V	13035
C26	MYLAR, .22µF, 400V	13006
C27	MYLAR, 4.7µF, 250V	13048
C28	CERAMIC, 680pF, 500V	12119
C29	ELECT, 10µF, 500V	11012
C30	CERAMIC, .1µF, 50V	12104
C31	CERAMIC, .1µF, 50V	12104
C32	CERAMIC, .1µF, 50V	12104
C33	CERAMIC, .01µF, 100V	12051
C34	CERAMIC, 47pF, 200V	12068
C35	CERAMIC, 2200pF, 100V	12089
C36	CERAMIC, 22µF, 20V	15022
C37	CERAMIC, .1µF, 50V	12104
C38	CERAMIC, .1µF, 250V	13035
C39	CERAMIC, 1000pF, 100V	12111
C40	CERAMIC, .1µF, 50V	12104
C41	CERAMIC, .1µF, 50V	12104
C42	CERAMIC, .01µF, 50V	12051
DIODES		
CR1	1N4002 RECTIFIER 100V	31003
CR2	1N4002 RECTIFIER 100V	31003
CR3	ZENER, 1W, 20V	36008
CR4	ZENER, 1N4756,47V,1W	32045
CR5	RECTIFIER, BRIDGE, KBPC604	31009

CR6	BUES1106 RECTIFIER	31036
CR7	MUR8100, 1000V, 8AMPS	31058
CR8	SD101A, SCHOTTKY	32029
CR9	MUR140, 1A,400V,DO41A	31088
CR10	MUR1100, 1000V, 1AMP	31098
FUSES		
F1	FUSE, 1A, SLO-BLO 3AG	58015
ICs		
IC1	LM78L12T,REGULATOR, VOLTAGE, FIXED, +12V	34080
IC2	MC33171P OP AMP	34229
IC3	LM78L15T, REGULATOR, VOLTAGE, FIXED, +15V	34184
IC4	MC33171P OP AMP	34229
IC5	MC33171P OP AMP	34229
IC6	ICL7621,OP-AMP, JFET, DUAL	34078
IC7	UC3844-CURRENT MODE PWM CONTROLLER 8-PIN DIP	34510
IC8	OPTOISOLATOR, 6N136, PHOTO-XSISTOR OUT	34511
IC9	ICM7555 - CMOS TIMER	34226
INDUCTORS		
L1	20µH, TOROIDIAL	42175
RELAYS		
K1	DPDT, 5A 250V	56075

CONNECTORS		
P18	64 PIN A @ C DIN MALE	51297
TRANSISTORS		
Q1	2SC1755, NPN	33022
Q2	2SC1755, NPN	33022
Q3	2N3904, SIGNAL, NPN	33006
Q4	2N12L MOSFET	33145
Q5	4N90 MOSFET	33094
Q6	TIP107, PNP	33049
Q7	MJH11021, PWR, PNP	33165
Q8	2N7000 MOSFET	33096
RESISTORS Ω		
R1	6K8	21064
R2	1K2	21114
R3	1K8	21055
R4	180	21041
R5	470	21115
R6	1K5	21053
R7	2,5W	23202
R9	220K	21118
R10	1K5	21053
R11	470	21115
R12	10	21017
R13	470	21115
R14	10K	21066

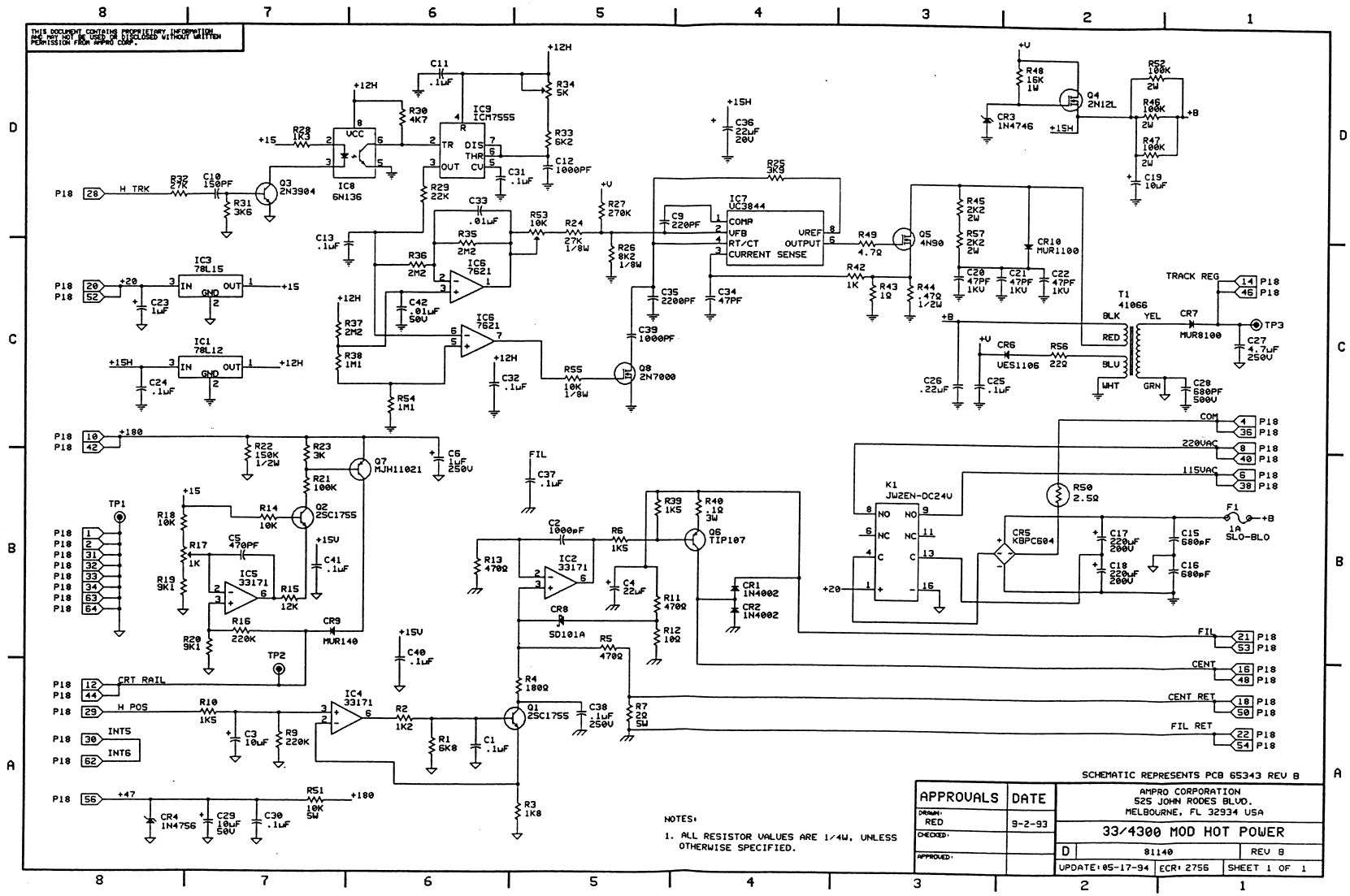
R15	12K	21068
R16	220K	21118
R17	1K	24049
R18	10K	21066
R19	9K1	21109
R20	9K1	21109
R21	100K	21077
R22	150K,1/2W	22026
R23	3K	21164
R24	27K,1/8W	20083
R25	3K9	21121
R26	8K2,1/8W	20071
R27	270K	21179
R28	1K3	21152
R29	22K	21070
R30	4K7	21061
R31	3K6	21120
R32	27K	21072
R33	6K2	21141
R34	POTENTIOMETER, 5K	24046
R35	2M2	21094
R36	2M2	21094
R37	2M2	21094
R38	1M1	21094
R39	1K5	21053

R40	,1,3W	23148
R42	1K	21052
R43	1	21003
R44	.47,1/2W	22073
R45	2K2,2W	23085
R46	100K,2W	21077
R47	100K,2W	21077
R48	16K,1W	23179
R49	4.7	21119
R50	2.5	23111
R51	10K,5W	23199
R52	100K,2W	21077
R53	POTENTIOMETER, 10K	24068
R54	1M1	21094
R55	10K,1/8W	20073
R56	22	21119
R57	2K2,2W	23085
TRANSFORMERS		
T1	TRANSFORMER, SPLIT PRIMARY	41066
TEST POINTS		
TP1 - TP3	TEST POINT, LOOP	51405

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

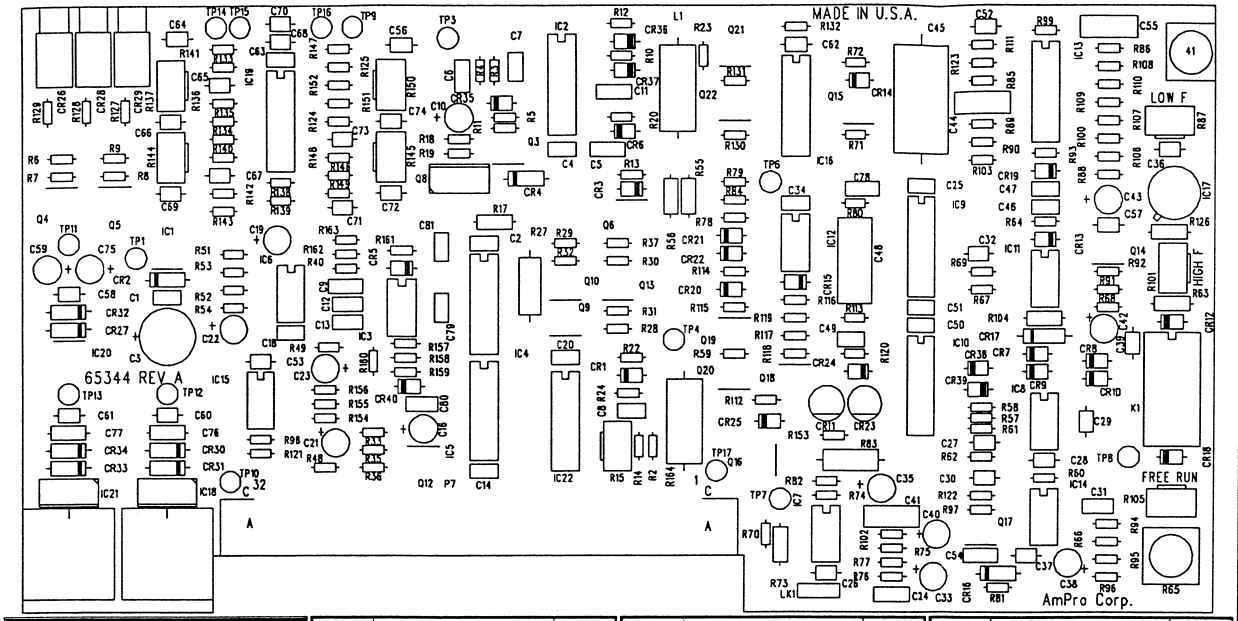
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.11.1 . . . H.O.T. Power Module (81140B) Schematic 1 of 1:



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.12 . . . . Horizontal Control Module (81139B) Component Layout / Parts List:



HORIZONTAL CONTROL (81139B)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65344(A)
CAPACITORS		
C1	CERAMIC, .1µF, 50V	12104
C2	CERAMIC, .1µF, 50V	12104
C3	ELECT, 100µF	11036
C4	CERAMIC, .1µF, 50V	12104
C5	MYLAR, 270pF	14011
C6	MYLAR, 47pF	12068
C7	*SELECT @ TEST*	N/A
C9	CERAMIC, 39pF	14016
C10	ELECT, 2.2µF	11071
C11	CERAMIC, 68pF	14008
C12	CERAMIC, 47pF	12068
C13	*SELECT @ TEST*	N/A
C14	CERAMIC, .1µF, 50V	12104
C18	CERAMIC, .1µF, 50V	12104
C19	ELECT, 10µF	11008
C21	ELECT, 1µF, 50V	11001
C22	ELECT, 1µF, 50V	11001
C23	ELECT, 1µF, 50V	11001
C24	MYLAR, .0047µF, 100V	13001
C25	CERAMIC, .1µF, 50V	12104
C26	CERAMIC, .1µF, 50V	12104
C27	CERAMIC, .01µF, 50V	12109
C28	CERAMIC, .1µF, 50V	12104
C29	CERAMIC, .1µF, 50V	12104
C30	CERAMIC, .022µF, 100V	12114
C31	MYLAR, 100PF, 100V	12060
C32	CERAMIC, .1uF, 50V	12104
C33	TANTALUM, 1uF, 50V	15003
C34	CERAMIC, .1F, 50V	12104
C35	TANTALUM, 22uF	15006
C36	CERAMIC, .01uF, 50V	12109
C37	CERAMIC, .1µF, 50V	12104
C38	ELECT, 10µF, 35V	11008
C39	CERAMIC, .1µF, 50V	12104
C40	ELECT, 1µF, 50V	11001
C41	MICA, 1000pF, 100V	14023
C42	ELECT, 1µF	11001
C43	ELECT, 2.2µF, 50V	11003
C44	MICA, 1000pF, 100V	14023
C45	MYLAR, 5µF	13053
C46	CERAMIC, .1µF, 50V	12104
C47	CERAMIC, .1µF, 50V	12104
C48	MICA, 2000pF, 500V	14007
C49	CERAMIC, .1µF, 50V	12104
C50	CERAMIC, .1µF, 50V	12104
C51	CERAMIC, .1µF, 50V	12104
C52	CERAMIC, .1µF, 50V	12104
C53	CERAMIC, .1µF, 50V	12104
C54	MICA, 100pF	14014
C55	MICA, 750pF	14039
C56	CERAMIC, .001µF, 100V	12111
C57	CERAMIC, .1µF, 50V	12104
C58	CERAMIC, .1µF, 50V	12104
C59	TANTALUM, 1µF, 50V	15003
C60	CERAMIC, .1µF, 50V	12104
C61	CERAMIC, .1µF, 50V	12104
C62	CERAMIC, .1µF, 50V	12104
C63	CERAMIC, .1µF, 50V	12104
C64	CERAMIC, .001µF, 100V	12111
C65	CERAMIC, .01µF, 50V	12109
C66	CERAMIC, .1µF, 50V	12104
C67	CERAMIC, .01µF, 50V	12109
C68	CERAMIC, .001µF, 100V	12111
C69	CERAMIC, .1µF, 50V	12104
C70	CERAMIC, .001µF, 100V	12111
C71	CERAMIC, .01µF, 50V	12109
C72	CERAMIC, .1µF, 50V	12104
C73	CERAMIC, .01µF, 50V	12109
C74	CERAMIC, .1µF, 50V	12104
C75	ELECT, 2.2µF, 50V	11003
C76	CERAMIC, .33µF, 100V	12113
C77	CERAMIC, .33µF, 100V	12113
C78	MICA, 100pF	14014
C79	CERAMIC, .1µF, 50V	12104
C80	*SELECT @ TEST*	N/A
C81	CERAMIC, .1µF, 50V	12104
DIODES		
CR2	1N4002 RECTIFIER 100V	31003
CR3	1N4148	31004
CR4	1N4002 RECTIFIER 100V	31003
CR5	RESISTOR, 56K	21066
CR6	1N4148	31004
CR7	1N4148	31004
CR8	DIODE, 1N4148	31004
CR9	DIODE, 1N4148	31004
CR10	1N4148	31004
CR11	LED, MV5053	31028
CR12	1N4148	31004
CR13	SD101A, SCHOTTKY	32029
CR14	SD101A, SCHOTTKY	32029
CR15	0 *MOLDED JUMPER*	21068
CR16	ZENER, 1N4733	32014
CR17	ZENER, 1N5939, 39V,1.5W	32018
CR18	SD101A, SCHOTTKY	32029
CR19	SD101A, SCHOTTKY	32029
CR20	1N4148	31004
CR21	SD101A, SCHOTTKY	32029
CR22	SD101A, SCHOTTKY	32029
CR23	LED, MV5053	31028
CR24	1N4148	31004
CR25	1N4148	31004
CR26	LED, 5300H5	31013
CR27	1N4002 RECTIFIER 100V	31003
CR28	LED, 5300H5	31013
CR29	LED, 5300H5	31013
CR30	1N4002 RECTIFIER 100V	31003
CR31	1N4002 RECTIFIER 100V	31003
CR32	1N4002 RECTIFIER 100V	31003
CR33	1N4002 RECTIFIER 100V	31003
CR34	1N4002 RECTIFIER 100V	31003
CR35	1N4148	31004
CR36	1N4148	31004
CR37	1N4148	31004
CR38	1N4148	31004
CR39	1N4148	31004
CR40	1N4148	31004
ICs		
IC1	LM78L12T, REGULATOR, VOLTAGE, FIXED, +12V	34080
IC2	4066 - CMOS QUAD BILATERAL SWITCHES	34158
IC3	MC33172, OP-AMP, JFET,DUAL	34230
IC4	4070 - CMOS QUAD EXCLUSIVE- OR GATE	34079
IC5	MC14011B - CMOS QUAD 2-INPUT NAND GATE	34090
IC6	TL082, OP-AMP, JFET, DUAL	34094
IC7	MC1391, PHASE LOCK LOOP	34017
IC8	TL082, OP-AMP, JFET, DUAL	34094
IC9	74LS74 - LS TTL DUAL D FLIP-FLOP	34117
IC10	74LS00 - LS TTL QUAD TWO INPUT NAND	34054
IC11	MC33172, OP-AMP, JFET,DUAL	34230
IC12	AD654, VOLTAGE TO FREQUENCY CONVERTER	34204
IC13	OP400, OUAD OP-AMP, LOW OFFSET, LOW POWER	34249
IC14	ICM7555 - CMOS TIMER	34226
IC15	X2402P - CMOS 256X8 EEPROM W/I²C	34345
IC16	74LS00 - LS TTL QUAD TWO INPUT NAND	34054
IC17	LH0070-0H, 10V PRECISION REFERENCE	34014
IC18	LM7805T, REGULATOR, VOLTAGE, FIXED, +5V	34088
IC19	LM339 - LOW POWER QUAD VOLTAGE COMPARATOR	34044
IC20	LM79L15T, REGULATOR, NEG VOLTAGE, FIXED, -15V	34185
IC21	LM7815T, REGULATOR, +15V	34183
RELAYS		
K1	DPDT, DIP,12V, 400MW	58015
CONNECTORS		
LK1	0Ω, *MOLDED JUMPER*	21168
P7	64 PIN A @ C DIN MALE	51297

TRANSISTORS		
Q3	MPS3906, SIGNAL, PNP	33009
Q5	MPS3906, SIGNAL, PNP	33009
Q6	MPSW56, SIGNAL, PNP	33167
Q7	MPSA42 NPN-HIGH VOLTAGE	33120
Q8	TIP47 NPN	33166
Q9	2N3904, SIGNAL, NPN	33006
Q10	MPS3906, SIGNAL, PNP	33009
Q13	MPS3906, SIGNAL, PNP	33009
Q14	2N3904, SIGNAL, NPN	33006
Q15	2N3904, SIGNAL, NPN	33006
Q16	2N3904, SIGNAL, NPN	33006
Q17	2N3904, SIGNAL, NPN	33006
Q18	MPS3906, SIGNAL, PNP	33009
Q19	MPSA14, DARLINGTON, NPN	33046
Q20	2N3904, SIGNAL, NPN	33006
Q21	2N7000 MOSFET	33096
Q22	2N7000 MOSFET	33096
RESISTORS Ω		
R3	6K8	20069
R4	680	20045
R5	220K	20105
R6	6K8	20069
R7	680	20045
R8	680	20045
R9	6K8	20069
R10	220K	20105
R11	220K	20105
R12	7K5	20070
R13	2K2	20057
R17	FUSE, 0.5A	58030
R18	10K	20073
R19	100	20066
R20	1M	20121
R22	100K	20073
R27	680, 1/2W	22037
R28	3K3	20061
R29	10K	20073
R30	1K8	20055
R31	13K	20076
R32	470	20041
R37	3K6	20082
R40	4K7	20065
R48	15K	20077
R49	220K	20105
R51	22K	20081
R52	10K	20073
R53	22K	20081
R54	100K	20097
R57	20K	20080
R58	2K2	20057
R59	2K2	20057
R60	4K7	20085
R61	2K	20058
R62	100K	20097
R63	91	21167
R64	3K3	20061
R65	POTENTIOMETER, 100K	24078
R66	1K5	20053
R67	8K2	20071

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

SMD/SMT denotes: SURFACE MOUNT DEVICES

11.12 . . . . Horizontal Control Module (81139B) Parts List (continued) / Notes:

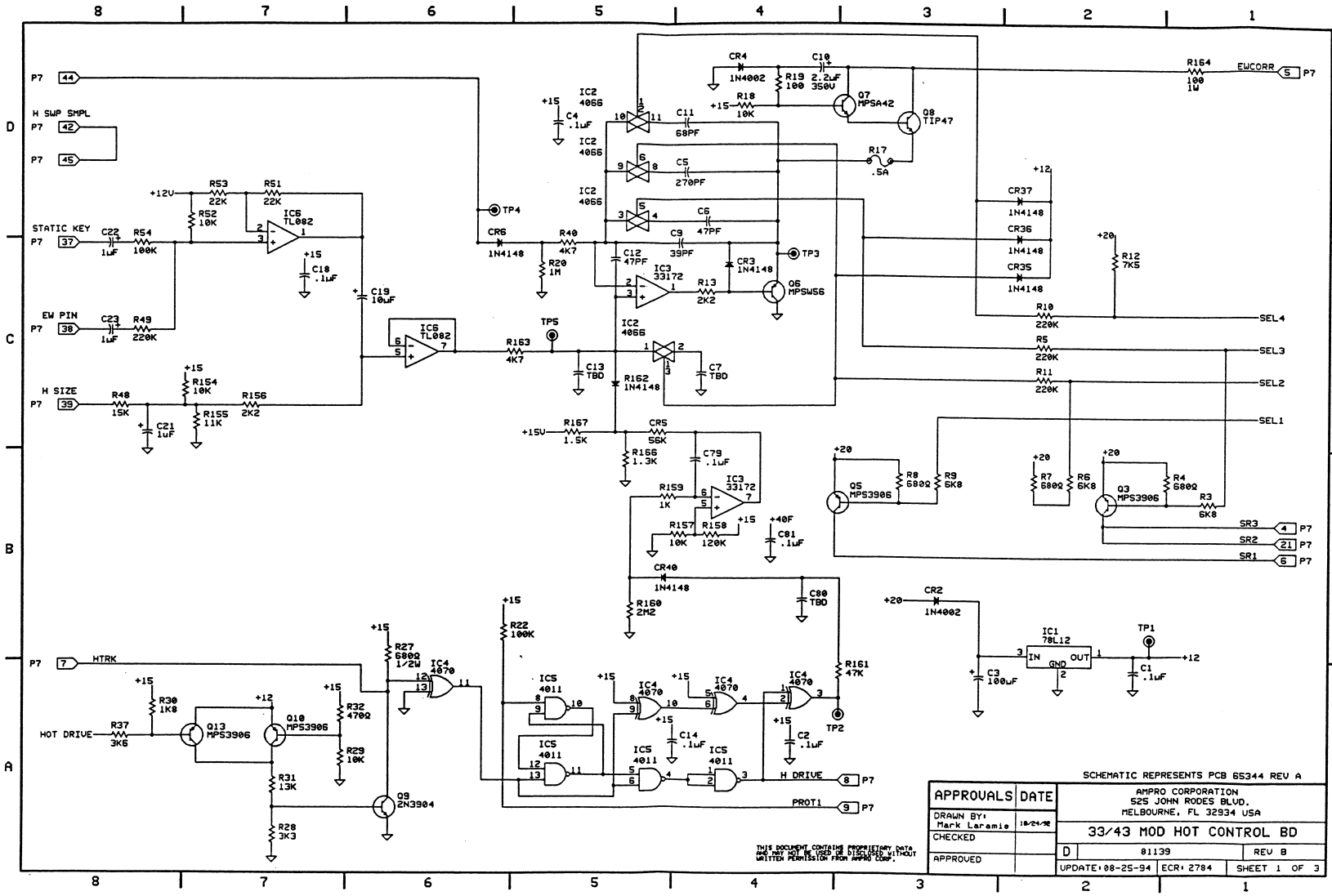
REF	DESCRIPTION	P/N
	RESISTORS Ω	
R68	10K	20073
R69	20K	20080
R70	3K3	20061
R71	1K	20049
R72	22K	20081
R73	470	21115
R74	1K6	20054
R75	75K	20094
R76	6K8	20069
R77	120K	20099
R78	510	20042
R79	2K2	20057
R80	1K	20049
R81	4K7	20065
R82	2K4	20058
R83	270, 1/2W	22030
R84	10	20031
R85	100K	20097
R86	10K	20073
R87	POTENTIOMETER, 50K	24065
R88	7K5	20070
R89	20K	20080
R90	47K	20089
R91	5K6	20067
R92	20K	20080
R93	20K	20080
R94	1K5	20053
R95	10K	20073
R96	4K7	20065
R97	4K7	20065
R98	100	20025
R99	470	20041
R100	47K	20089
R101	POTENTIOMETER, 5K	24058
R102	2K2	20057
R103	5K1	20066
R104	470	21115
R105	POTENTIOMETER, 20K	24035
R106	3K	20060
R107	2K7	20059
R108	10K	20073
R109	10K	20073
R110	10K	20073
R111	200K	20104
R112	3K9	20063
R113	510	20042
R114	510	20042
R115	22K	20081
R116	1K	20049
R117	1M	20121
R118	1K	20049
R119	180	20031
R120	2K2	20057
R121	100	20025
R122	4K7	20065
R123	100K	20097
R124	10K	20073
R125	1M	20121
R126	10	21017
R127	1K6	20054
R128	5K1	20066
R129	5K1	20066
R130	22K	20081
R131	22K	20081
R132	4K7	20065
R133	1M	20121
R134	1M	20121
R135	10K	20073
R136	10K	20073
R137	POTENTIOMETER, 20K	24057
R138	5K1	20066
R139	33K	20085
R140	10K	20073
R141	1M	20121
R142	1M	20121
R143	10K	20073
R144	POTENTIOMETER, 20K	24057
R145	POTENTIOMETER, 20K	24057
R146	470	20041
R147	1M	20121
R148	1M	20121
R149	10K	20073
R150	POTENTIOMETER, 20K	24057
R151	1M	20121
R152	10K	20073
R153	100	20025
R154	10K	20073
R155	11K	20074
R156	2K2	20057
R157	10K	20073
R158	120K	20099
R159	1K	20049
R160	2M2	21095
R161	47K	20089
R162	DIODE, 1N4148	31004
R163	4K7	20065
R164	100, 1W	23001
R166	1.3K	20052
R167	1.5K	20053
	TEST POINTS	
TP1 - TP5	TEST POINT	51405
TP6-TP17	TEST POINT	51370

Notes

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

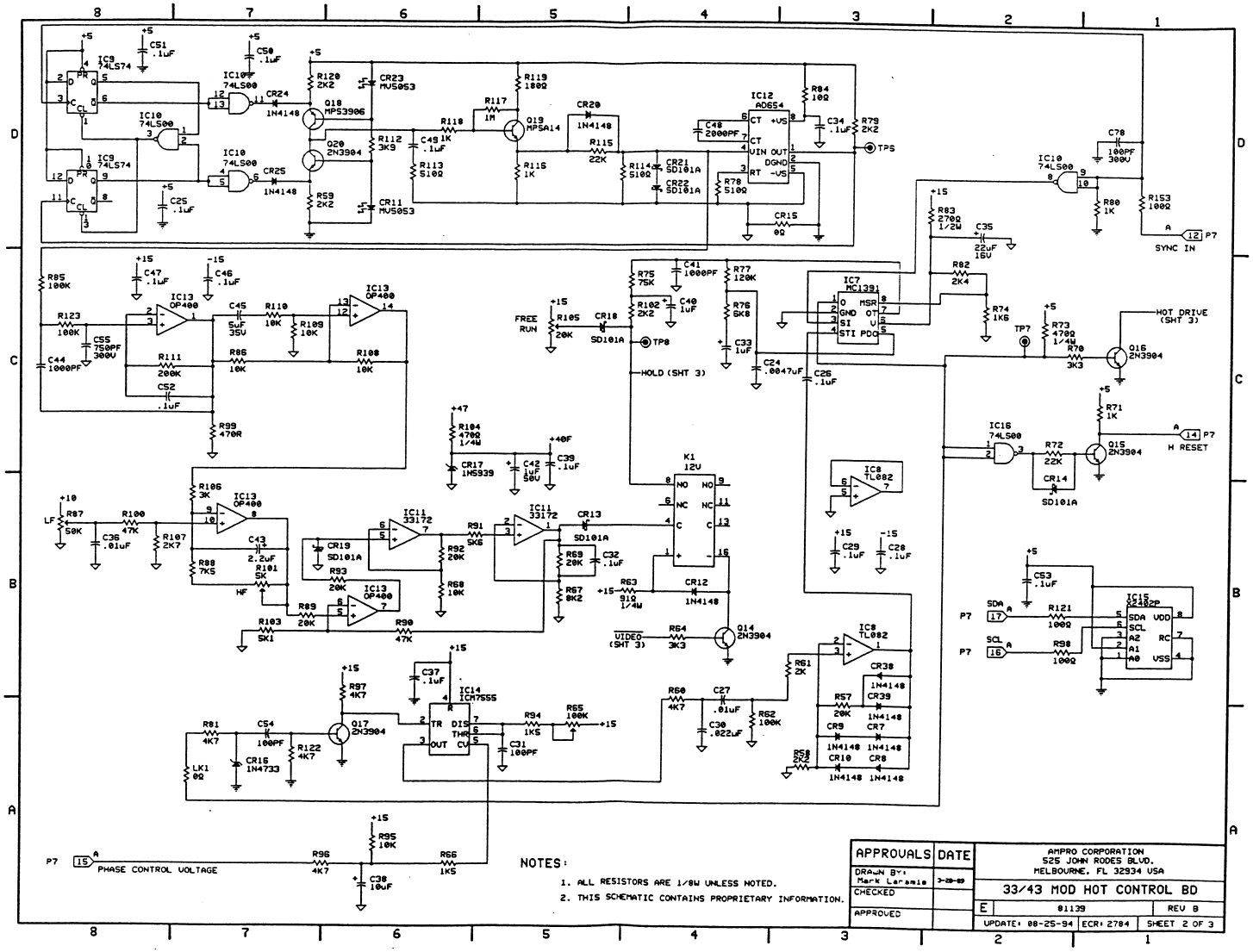
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.12.1 . . . Horizontal Control Module (81139B) Schematic 1 of 3:



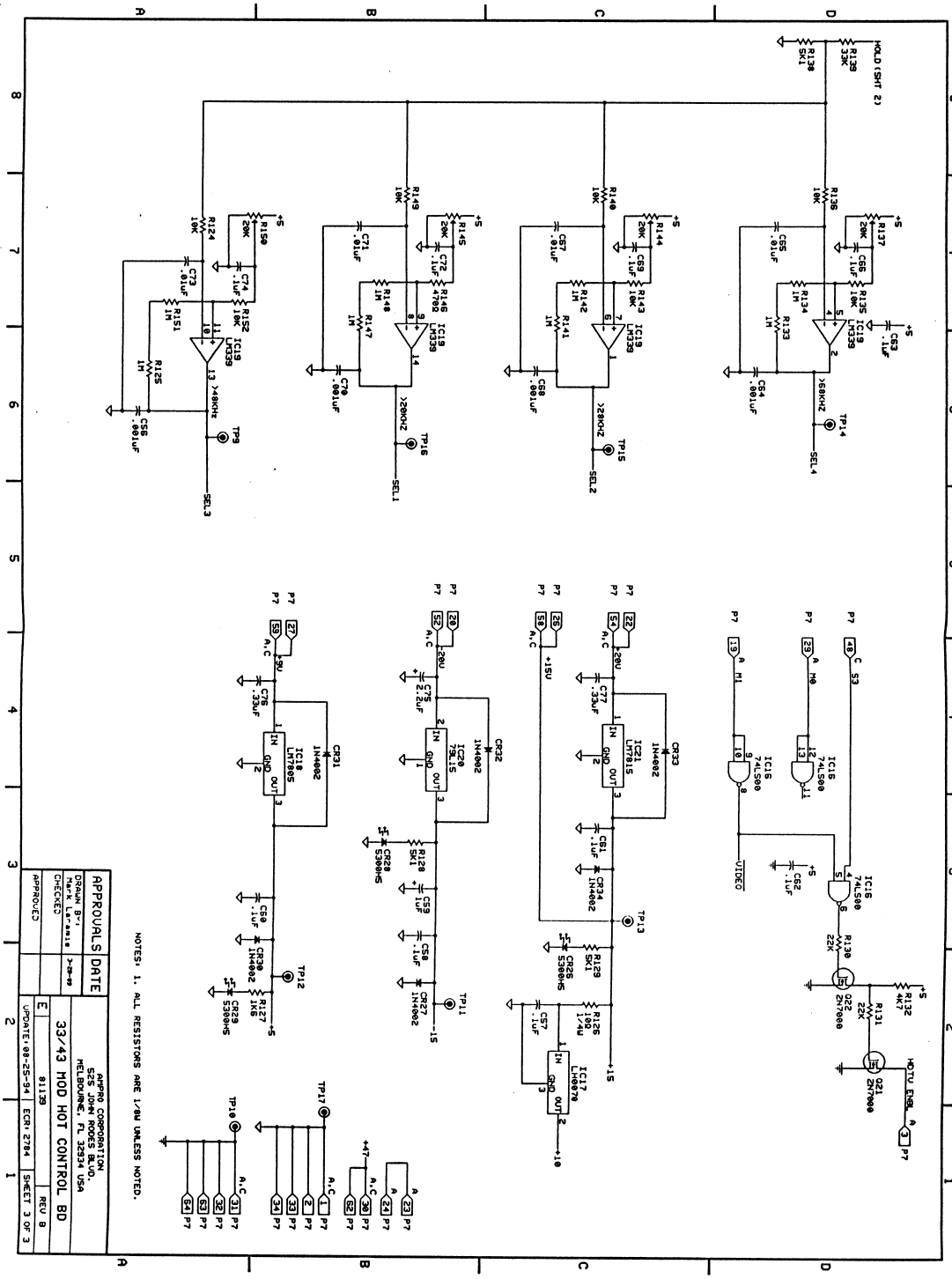
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.12.2 . . . Horizontal Control Module (81139B) Schematic 2 of 3:



SMD/SMT denotes: SURFACE MOUNT DEVICES

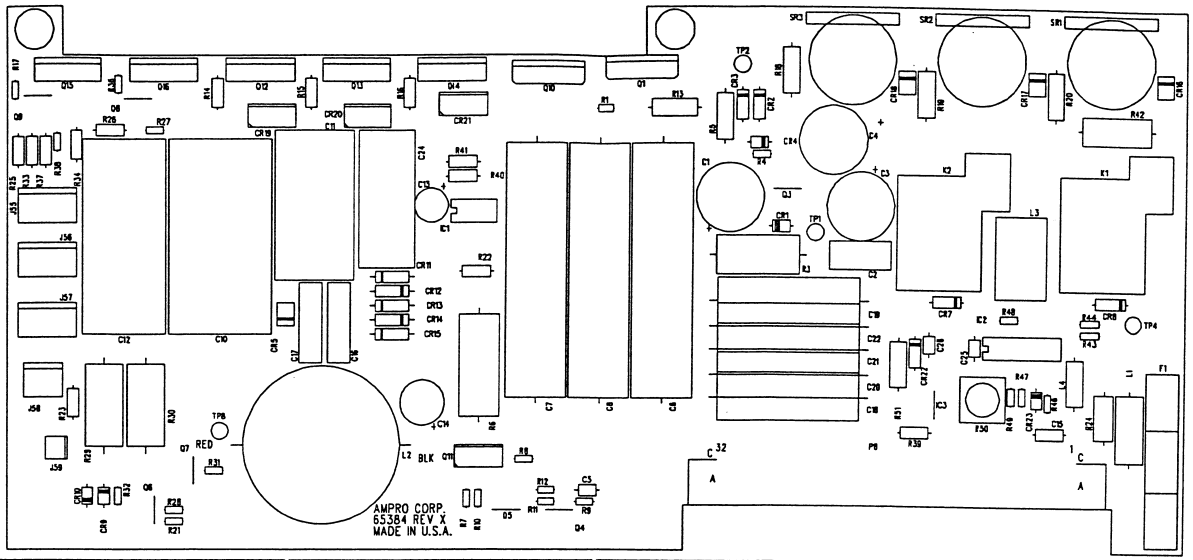
11.12.2 . . . Horizontal Control Module (81139B) Schematic 3 of 3:



Horizontal Control Module (81139B) Schematic 3 of 3

SMD/SMT denotes: SURFACE MOUNT DEVICES

11.13 . . . . H.O.T. Module (81137X4) Component Layout / Parts List:

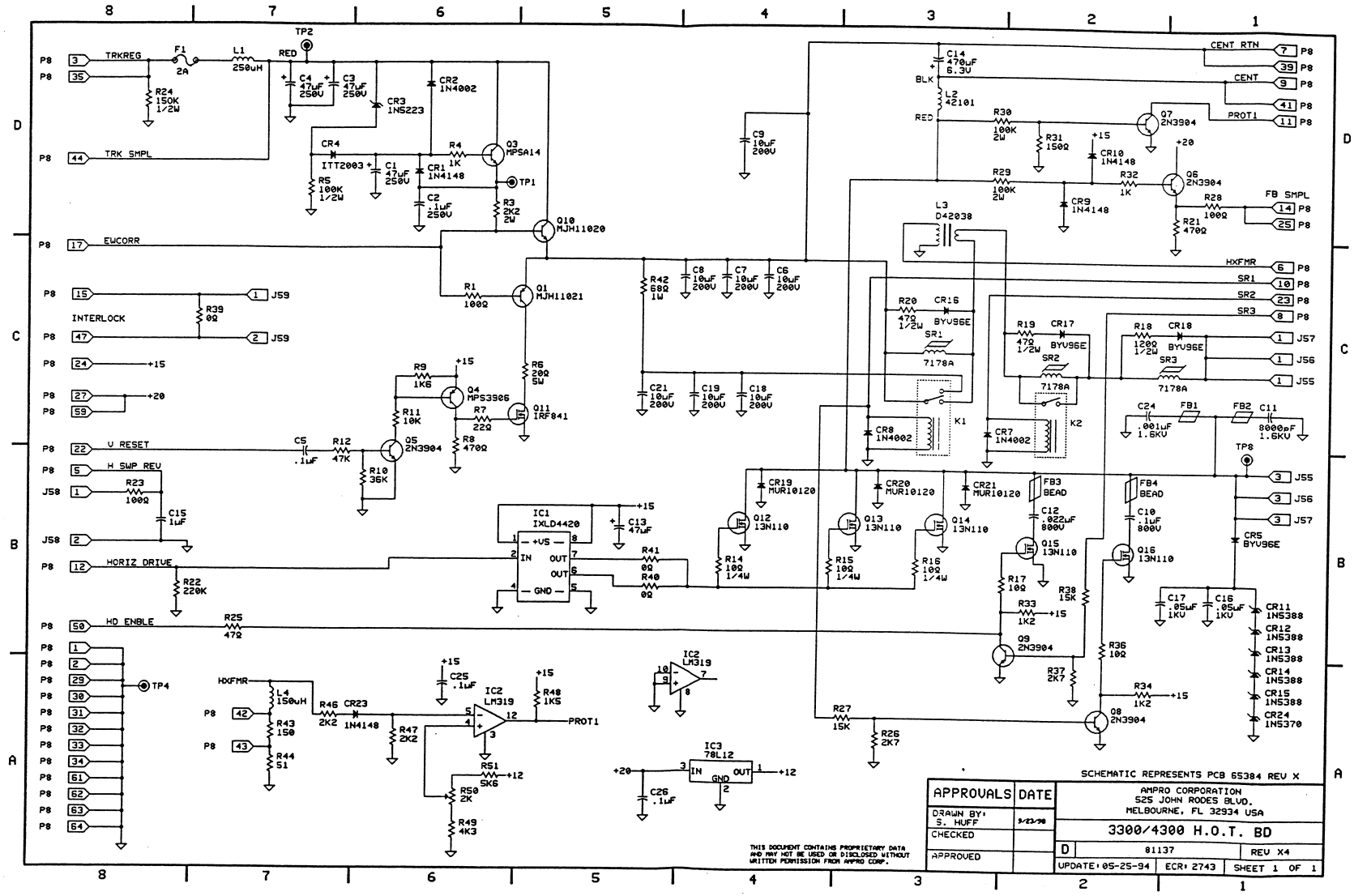


H.O.T. MODULE (81137X4)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65384(X)
CAPACITORS		
C1	ELECT, 47µF, 250V	11018
C2	MYLAR, .1µF, 250V	13035
C3	ELECT, 47µF, 250V	11018
C4	ELECT, 47µF, 250V	11018
C5	CERAMIC, .1µF, 50V	12104
C6	MYLAR, 10µF, 200V	13060
C7	MYLAR, 10µF, 200V	13060
C8	MYLAR, 10µF, 200V	13060
C9	MYLAR, 10µF, 200V	13060
C10	MYLAR, .1µF, 200V	13102
C11	MYLAR, 8000pF, 1.6KV	13043
C12	MYLAR, .022µF, 800V	13102
C13	TANTALUM, 47µF, 25V	15016
C14	ELECT, 470µF, 6.3V	11088
C15	CERAMIC, 1µF, 50V	12097
C16	CERAMIC, .05µF, 1KV	12098
C17	CERAMIC, .05µF, 1KV	12098
C18	MYLAR, 10µF, 200V	13094
C19	MYLAR, 10µF, 200V	13094
C21	MYLAR, 10µF, 200V	13094
C24	MYLAR, .001µF, 200V	13051
C25	CERAMIC, .1µF, 50V	12104
C26	CERAMIC, .1µF, 50V	12104
DIODES		
CR1	1N4148	31004
CR2	1N4002 RECTIFIER 100V	31003
CR3	1N5223,ZENER,1/2W,2.7V	32016
CR4	ITT2003, SIGNAL, SILICON	31017
CR5	BYV96E	31042
CR7	1N4002 RECTIFIER 100V	31003
CR8	1N4002 RECTIFIER 100V	31003
CR9	1N4148	31004
CR10	1N4148	31004
CR11	1N5388A, ZENER, 5W, 200V	32024
CR12	1N5388A, ZENER, 5W, 200V	32024
CR13	1N5388A, ZENER, 5W, 200V	32024
CR14	1N5388A, ZENER, 5W, 200V	32024
CR15	1N5388A, ZENER, 5W, 200V	32024
CR16	BYV96E	31042
CR17	BYV96E	31042
CR18	BYV96E	31042
CR19	MUR10120E, RECTIFIER	31064
CR20	MUR10120E, RECTIFIER	31064
CR21	MUR10120E, RECTIFIER	31064
CR23	1N4148	31004
CR24	ZENER, 5W, 56V	32015
FUSES		
F1	FUSE, 2A	58007
FERRITE BEADS		
FB1	FERRITE BEAD	43201
FB2	FERRITE BEAD	43201
FB3	FERRITE BEAD	43201
FB4	FERRITE BEAD	43201
ICs		
IC1	IXLD4420, MOSFET DRIVER	34331
IC2	LM319, COMPARITOR, DUAL, HIGH SPEED	34283
IC3	LM78L12T, REGULATOR, VOLTAGE, FIXED, +12V	34080
CONNECTORS		
J55	HDR, MTA156 - 3 PIN	51280
J56	HDR, MTA156 - 3 PIN	51280
J57	HDR, MTA156 - 3 PIN	51280
J58	HDR, MTA156 - 2 PIN	51279
J59	HDR, MTA156 - 2 PIN	51279
P8	64 PIN A ⊕ C DIN MALE	51297
RELAYS		
K1	SPST T90ND12	56046
K2	SPST T90ND12	56046
INDUCTORS		
L1	250µH	42029
L2	ISOLATOR INDUCTOR	42101
L3	COIL, CURRENT SENSE 200 TURN	42038
L4	150µH	42167
SR1	SATURABLE REACTOR	42172
SR2	SATURABLE REACTOR	42172
SR3	SATURABLE REACTOR	42172
TRANSISTORS		
Q1	MJH11021 PNP	33165
Q3	MPSA14, DARLINGTON, NPN	33046
Q4	MPS3906, SIGNAL, PNP	33009
Q5	2N3904, SIGNAL, NPN	33006
Q6	2N3904, SIGNAL, NPN	33006
Q7	2N3904, SIGNAL, NPN	33006
Q8	2N3904, SIGNAL, NPN	33006
Q9	2N3904, SIGNAL, NPN	33006
Q10	MJH11020 NPN	33164
Q11	IRF841 MOSFET	33065
Q12	MOSFET, 1XTH13N110, 1100V 13A	33159
Q13	MOSFET, 1XTH13N110, 1100V 13A	33159
Q14	MOSFET, 1XTH13N110, 1100V 13A	33159
Q15	MOSFET, 1XTH13N110, 1100V 13A	33159
Q16	MOSFET, 1XTH13N110, 1100V 13A	33159
RESISTORS Ω		
R1	100	20037
R3	2K2,2W	23085
R4	1K	20049
R5	100K,1/2W	22025
R6	20,5W	23120
R7	22	20009
R8	470	20041
R9	1K6	20054
R10	36K	20086
R11	10K	20073
R12	47K	20089
R14	10,1/4W	21017
R15	10,1/4W	21017
R16	10,1/4W	21017
R17	10	20001
R18	120,1/2W	22043
R19	47,1/2W	22043
R20	47,1/2W	22043
R21	470	20041
R22	220K	21118
R23	100	21037
R24	150K,1/2W	22026
R25	47	21030
R26	2K7	21059
R27	15K	20077
R28	100	20025
R29	100K,2W	23012
R30	100K,2W	23012
R31	150	20029
R32	1K	20049
R33	1K2	21114
R34		21114
R36	10	20001
R37	2K7	21059
R38	15K	20077
R39	0 "MOLDED JUMPER"	21168
R40	0 "MOLDED JUMPER"	21168
R41	0 "MOLDED JUMPER"	21168
R42	68,1W	23042
R43	150	20029
R44	51	20018
R46	2K2	20057
R47	2K2	20057
R48	1K5	20053
R49	4K3	20064
R50	POTENTIOMETER, 2K	24092
R51	5K6	20067
TEST POINTS		
TP1	TEST POINT, LOOP	51405
TP2	TEST POINT, LOOP	51405
TP4	TEST POINT, LOOP	51405
TP8	TEST POINT, LOOP	51405

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

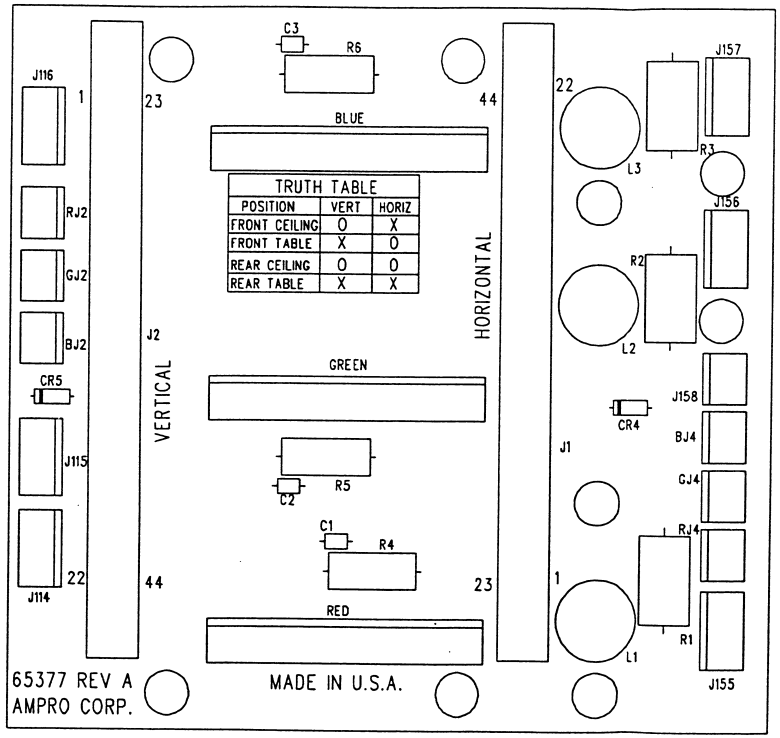
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.13.1 . . . H.O.T. Module (81137X4) Schematic 1 of 1:



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.14 . . . . Yoke Interface Board (81122X2) Component Layout / Parts List:

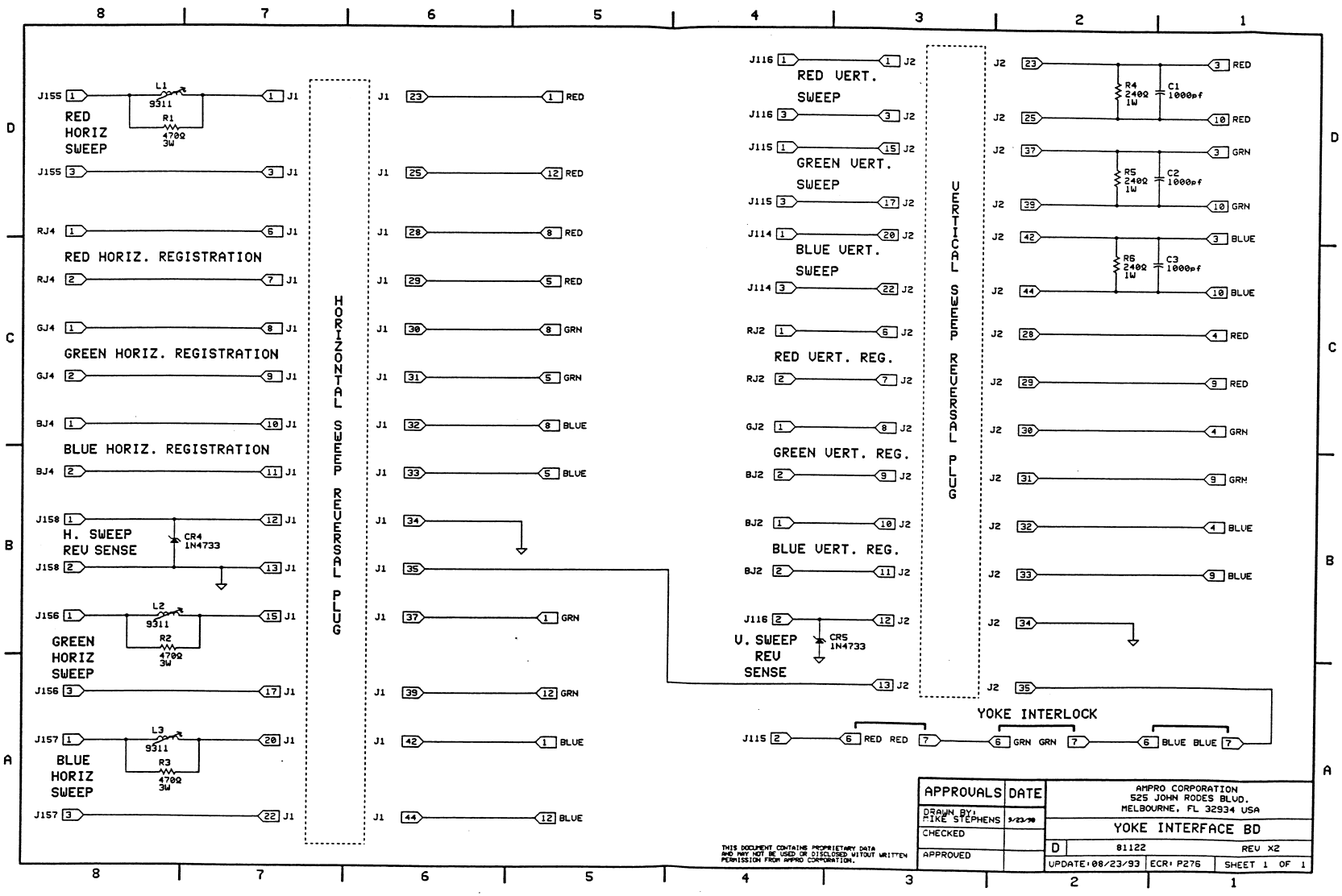


YOKE INTERFACE BOARD (81122X2)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65377 (A)
CAPACITORS		
C1	CERAMIC, 1000pF	12111
C2	CERAMIC, 1000pF	12111
C3	CERAMIC, 1000pF	12111
CONNECTORS		
BJ2	HDR, MTA156 - 2 POS.	51279
BJ4	HDR, MTA156 - 2 POS.	51279
BLUE	HDR, MOLEX 156 - 12 PIN	51350
GJ2	HDR, MTA156 - 2 POS.	51279
GJ4	HDR, MTA156 - 2 POS.	51279
GRN	HDR, MOLEX 156 - 12 PIN	51350
RED	HDR, MOLEX 156 - 12 PIN	51350
RJ2	HDR, MTA156 - 2 POS.	51279
RJ4	HDR, MTA156 - 2 POS.	51279
J1	44 PIN CARD EDGE .156 sp	51582
J2	44 PIN CARD EDGE .156 sp	51582
J114	HDR, MTA156 - 3 PIN	51280
J115	HDR, MTA156 - 3 PIN	51280
J116	HDR, MTA156 - 3 PIN	51280
J155	HDR, MTA156 - 3 PIN	51280
J156	HDR, MTA156 - 3 PIN	51280
J157	HDR, MTA156 - 3 PIN	51280
J158	HDR, MTA156 - 2 PIN	51279
DIODES		
CR4	ZENER, 1N4733	32014
CR5	ZENER, 1N4733	32014
INDUCTORS		
L1	WIDTH COIL PREM 9311	42168
L2	WIDTH COIL PREM 9311	42167
L3	WIDTH COIL PREM 9311	42167
RESISTORS		
R1	470,3W	23073
R2	470,3W	23073
R3	470,3W	23073
R4	240,1W, 5%	23142
R5	240,1W, 5%	23142
R6	240,1W, 5%	23142
MISC.		
CARD	SWEEP REVERSE CARDS (2 EA.)	65378

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

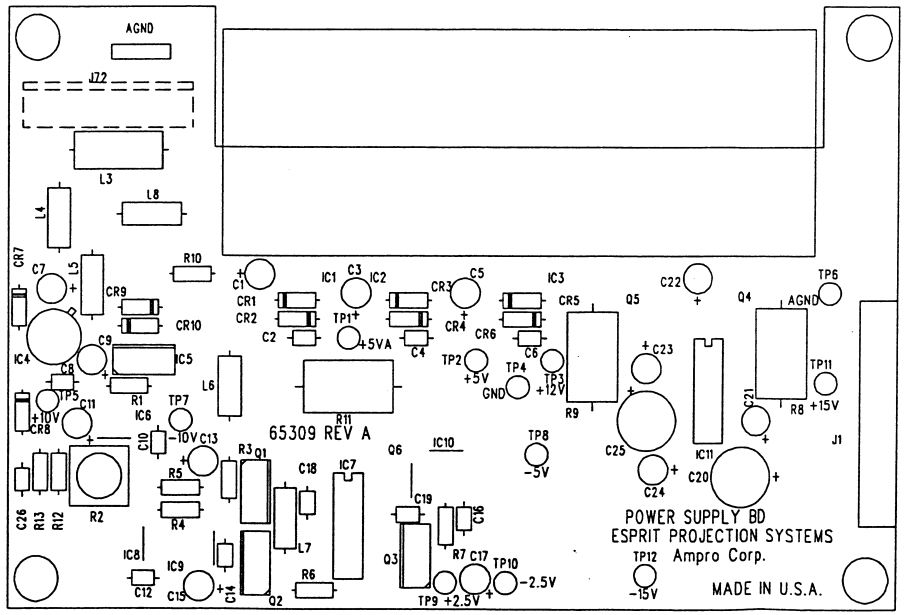
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.14.1 . . . Yoke Interface Board (81122X2 Schematic 1 of 1



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.15 . . . . Registration Power Supply[1] Board (80887A) Component Layout / Parts List:

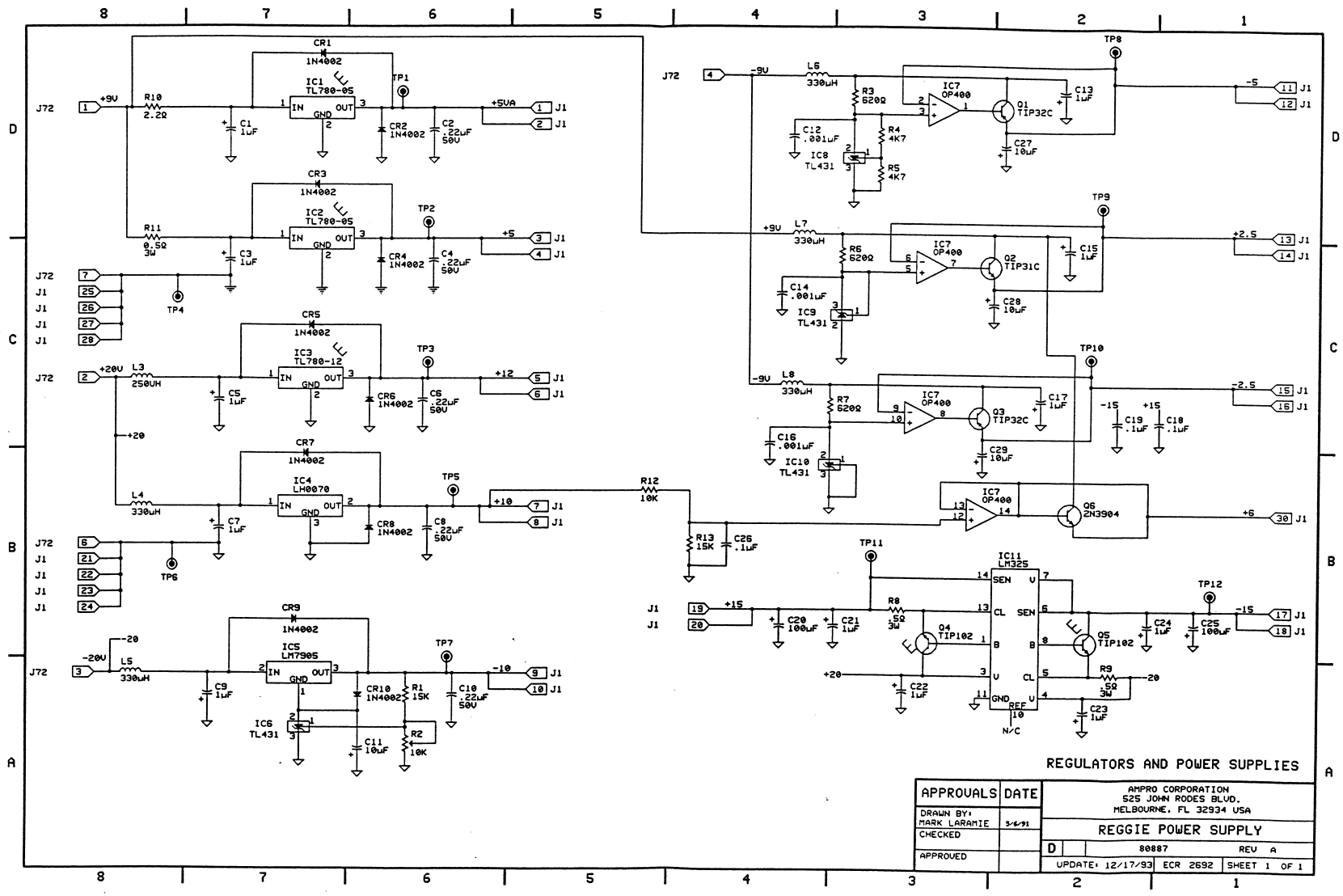


REGISTRATION POWER SUPPLY (80887A)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65309 (A)
CAPACITORS		
C1	TANTALUM, 1µF, 35V	15003
C2	CERAMIC, .22µF, 50V	12094
C3	TANTALUM, 1µF, 35V	15003
C4	CERAMIC, .22µF, 50V	12094
C5	TANTALUM, 1µF, 35V	15003
C6	CERAMIC, .22µF, 50V	12094
C7	TANTALUM, 1µF, 35V	15003
C8	CERAMIC, .22µF, 50V	12094
C9	TANTALUM, 1µF, 35V	15003
C10	CERAMIC, .22µF, 50V	12094
C11	TANTALUM, 10µF, 35V	11008
C12	CERAMIC, .001µF, , 100V	12064
C13	TANTALUM, 1µF, 35V	15003
C14	CERAMIC, .001µF, 100V	12064
C15	TANTALUM, 1µF, 35V	15003
C16	CERAMIC, .001µF, 100V	12064
C17	TANTALUM, 1µF, 35V	15003
C18	CERAMIC, .1µF, 50V	12104
C19	CERAMIC, .1µF, 50V	12104
C20	ELECT, 100µF, 35V	11036
C21	TANTALUM, 1µF, 35V	15003
C22	TANTALUM, 1µF, 35V	15003
C23	TANTALUM, 1µF, 35V	15003
C24	TANTALUM, 1µF, 35V	15003
C25	ELECT, 100µF, 35V	11036
C26	CERAMIC, .1µF, 50V	12104
C27	TANTALUM, 10µF, 35V	15011
C28	TANTALUM, 10µF, 35V	15011
C29	TANTALUM, 10µF, 35V	15011
DIODES		
CR1	1N4002 RECTIFIER 100V	31003
CR2	1N4002 RECTIFIER 100V	31003
CR3	1N4002 RECTIFIER 100V	31003
CR4	1N4002 RECTIFIER 100V	31003
CR5	1N4002 RECTIFIER 100V	31003
CR6	1N4002 RECTIFIER 100V	31003
CR7	1N4002 RECTIFIER 100V	31003
CR8	1N4002 RECTIFIER 100V	31003
CR9	1N4002 RECTIFIER 100V	31003
CR10	1N4002 RECTIFIER 100V	31003
ICs		
IC1	TL780-05C, PRECISION +5V REG	34269
IC2	TL780-05C, PRECISION +5V REG	34269
IC3	TL780-12C, +12V PRECISION REGULATOR	34276
IC4	LH0070-0H, 10V PRECISION REFERENCE	34014
IC5	LM7905C - VOLTAGE REGULATOR, -5VDC	34255
IC6	TL431, PROGRAMMABLE VOLTAGE REFERENCE	34277
IC7	OP400,QUAD OP-AMP,LOW OFFSET,LOW POWER	34249
IC8	TL431, PROGRAMMABLE VOLTAGE REFERENCE	34277
IC9	TL431, PROGRAMMABLE VOLTAGE REFERENCE	34277
IC10	TL431, PROGRAMMABLE VOLTAGE REFERENCE	34277
IC11	LM325AN - VOLTAGE REGULATOR	34063
CONNECTORS		
J1	30 PIN, 2x15, RT ANGLE	51442
J72	HD, MTA156 - 7 PIN	51134
INDUCTORS		
L3	250µH	42029
L4	330µH	42010
L5	330µH	42010
L6	330µH	42010
L7	330µH	42010
L8	330µH	42010
TRANSISTORS		
Q1	TIP32C, PNP	33079
Q2	TIP31C, NPN	33078
Q3	TIP32C, PNP	33079
Q4	TIP102, NPN	33048
Q5	TIP102, NPN	33048
Q6	2N3904, SIGNAL, NPN	33006
RESISTORS Ω		
R1	15K	21107
R2	POTENTIOMETER, 10K	24043
R3	620	21106
R4	4K7	21061
R5	4K7	21061
R6	620	21106
R7	620	21106
R8	0.5, 3W, 5%	23070
R9	0.5, 3W, 5%	23070
R10	2.2	21001
R11	0.5, 3W, 5%	23070
R12	10K	21066
R13	15K	21107
TEST POINTS		
TP1 - TP12	TEST POINT, LOOP	51405

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

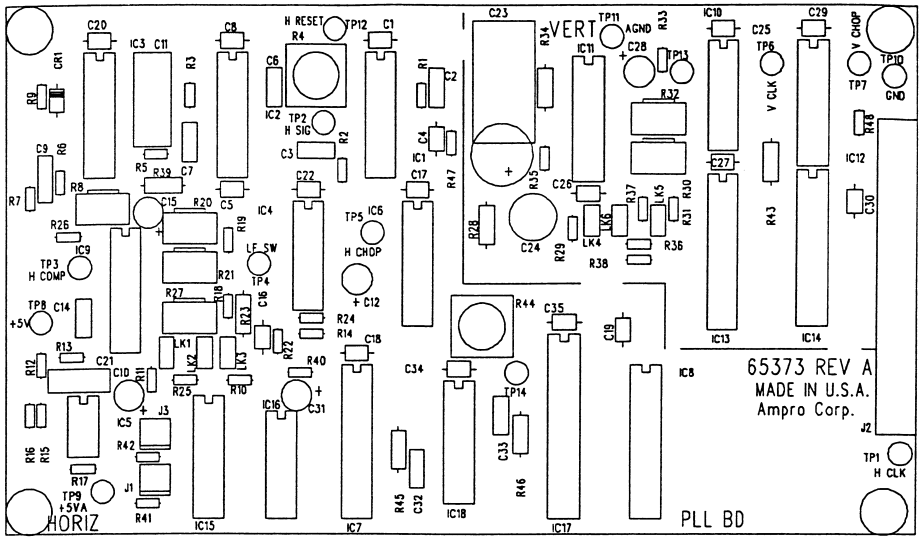
[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.15.1 . . . Registration Power Supply[1] Board (80887A) Schematic 1 of 1:



[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.16 . . . . Registration Horizontal & Vertical PLL[1] Board (81194X) Component Layout / Parts List:

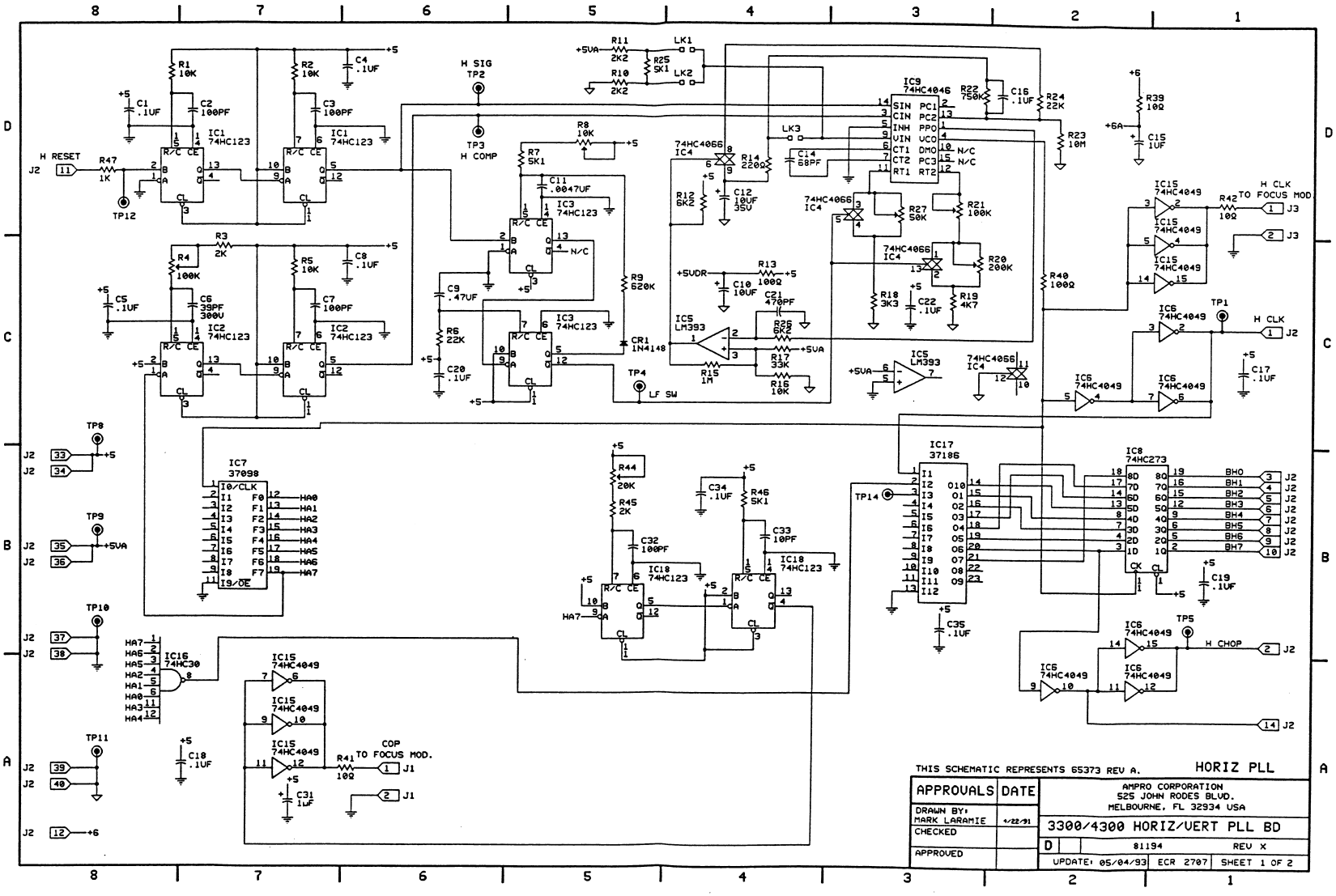


REGISTRATION H & V PLL (81194X)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65373 (A)
CAPACITORS		
C1	CERAMIC, .1µF, 50V	12104
C2	MYLAR, 100pF, 300V	14014
C3	MYLAR, 100pF, 300V	14014
C4	CERAMIC, .1µF, 50V	12104
C5	CERAMIC, .1µF, 50V	12104
C6	MYLAR, 39pF, 300V	14016
C7	MYLAR, 100pF, 300V	14014
C8	CERAMIC, .1µF, 50V	12104
C9	CERAMIC, .47µF, 100V	12083
C10	TANTALUM, 10µF, 35V	15011
C11	MICA, .0047µF, 500V	14001
C12	ELECT, 10µF	11008
C14	MYLAR, 68pF, 300V	14008
C15	TANTALUM, 1µF, 35V	15003
C16	CERAMIC, .1µF, 50V	12104
C17	CERAMIC, .1µF, 50V	12104
C18	CERAMIC, .1µF, 50V	12104
C19	CERAMIC, .1µF, 50V	12104
C20	CERAMIC, .1µF, 50V	12104
C21	MICA, 470pF, 50V	14040
C22	CERAMIC, .1µF, 50V	12104
C23	ELECT, 470µF, 16V	11107
C24	CERAMIC, 47µF, NPO	11112
C25	CERAMIC, .1µF, 50V	12104
C26	MICA, 6.8nF, 100V	14041
C27	CERAMIC, .1µF, 50V	12104
C28	TANTALUM, 1µF, 35V	15003
C29	CERAMIC, .1µF, 50V	12104
C30	CERAMIC, .1µF, 50V	12104
C31	TANTALUM, 1µF , 50V	15003
C32	MYLAR, 100pF, 300V	14014
C33	MYLAR, 10pF, 300V	14030
C34	CERAMIC, .1µF, 50V	12104
C35	CERAMIC, .1µF, 50V	12104
DIODES		
CR1	DIODE, 1N4148	31004
ICs		
IC1	74HC123 - H-CMOS DUAL RETRIG MONOSTABLE MULTIVIBRATOR	34195
IC2	74HC123 - H-CMOS DUAL RETRIG MONOSTABLE MULTIVIBRATOR	34195
IC3	74HC123 - H-CMOS DUAL RETRIG MONOSTABLE MULTIVIBRATOR	34195
IC4	74HC4066 - H-CMOS QUAD BILATERAL SWITCHES	34198
IC5	LM393N COMPARATOR-DUAL	34182
IC6	74HC4049B - H-CMOS HEX INVERTING BUFFER	34265
IC7	PAL, 1300/1500 TTL/TEST 8 BIT COUNTER	37098
IC8	74HC273 - H-CMOS OCTAL D FLIP-FLOP WITH CLEAR	34223
IC9	74HC4046,IC,PHASE LOCK LOOP,CMOS	34266
IC10	74HC14 - H-CMOS HEX INVERTER WITH SCHMITT TRIGGER	34368
IC11	74HC4046,IC,PHASE LOCK LOOP,CMOS	34266
IC12	74HC4049B - H-CMOS HEX INVERTING BUFFER	34265
IC13	PAL, 1300/1500 TTL/TEST 8 BIT COUNTER	37056
IC14	74HC273 - H-CMOS OCTAL D FLIP-FLOP WITH CLEAR	34223
IC15	74HC4049B - H-CMOS HEX INVERTING BUFFER	34265
IC16	74HC30 - H-CMOS 8 INPUT NAND GATE	34383
IC17	PEEL22CV10 - PROGRAMMABLE ARRAY LOGIC	37186
IC18	74HC123 - H-CMOS DUAL RETRIG MONOSTABLE MULTIVIBRATOR	34195
CONNECTORS		
J1	HDR, MTA100 - 2 POS.	51169
J2	40 PIN, RT ANGL, MALE	51417
J3	HDR, MTA100 - 2 POS.	51169
SHORTING JUMPERS		
LK1	2 PIN LINK, HEADER	51082
LK2	2 PIN LINK, HEADER	51082
LK3	2 PIN LINK, HEADER	51082
LK4	2 PIN LINK, HEADER	51082
LK5	2 PIN LINK, HEADER	51082
LK6	2 PIN LINK, HEADER	51082
RESISTORS		
R1	10K	20073
R2	10K	20073
R3	2K	20056
R5	10K	20073
R6	22K	20081
R7	5K1	20066
R8	POTENTIOMETER, 10K	24075
R9	620K	20116
R4	POTENTIOMETER, 100K	24078
R10	2K2	20057
R11	2K2	20057
R12	6K2	20068
R13	100	20025
R14	220	20033
R15	1M	20121
R16	10K	20073
R17	33K	20085
R18	3K3	20061
R19	4K7	20065
R20	POTENTIOMETER, 200K	24044
R21	POTENTIOMETER, 100K	24078
R22	750K	20118
R23	10M, 1/4W	21148
R24	22K	20081
R25	5K1	20066
R26	6K2	20068
R27	POTENTIOMETER, 50K	24047
R28	2.2M, 1/4W	21095
R29	150	20029
R30	POTENTIOMETER, 20K	24045
R31	22K	20081
R32	POTENTIOMETER, 200K	24044
R33	470K	20109
R34	10M, 1/4W	21148
R35	470	20041
R36	5K1	20066
R37	2K2	20057
R38	2K2	20057
R39	10	21017
R40	100	20025
R41	10	20001
R42	10	20001
R43	0 "MOLDED JUMPER"	21168
R44	POTENTIOMETER, 20K	24045
R45	2K	20056
R46	5K1	20066
R47	1K	20049
R48	1K	20049
TEST POINTS		
TP1 - TP14	TEST POINT	51405

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

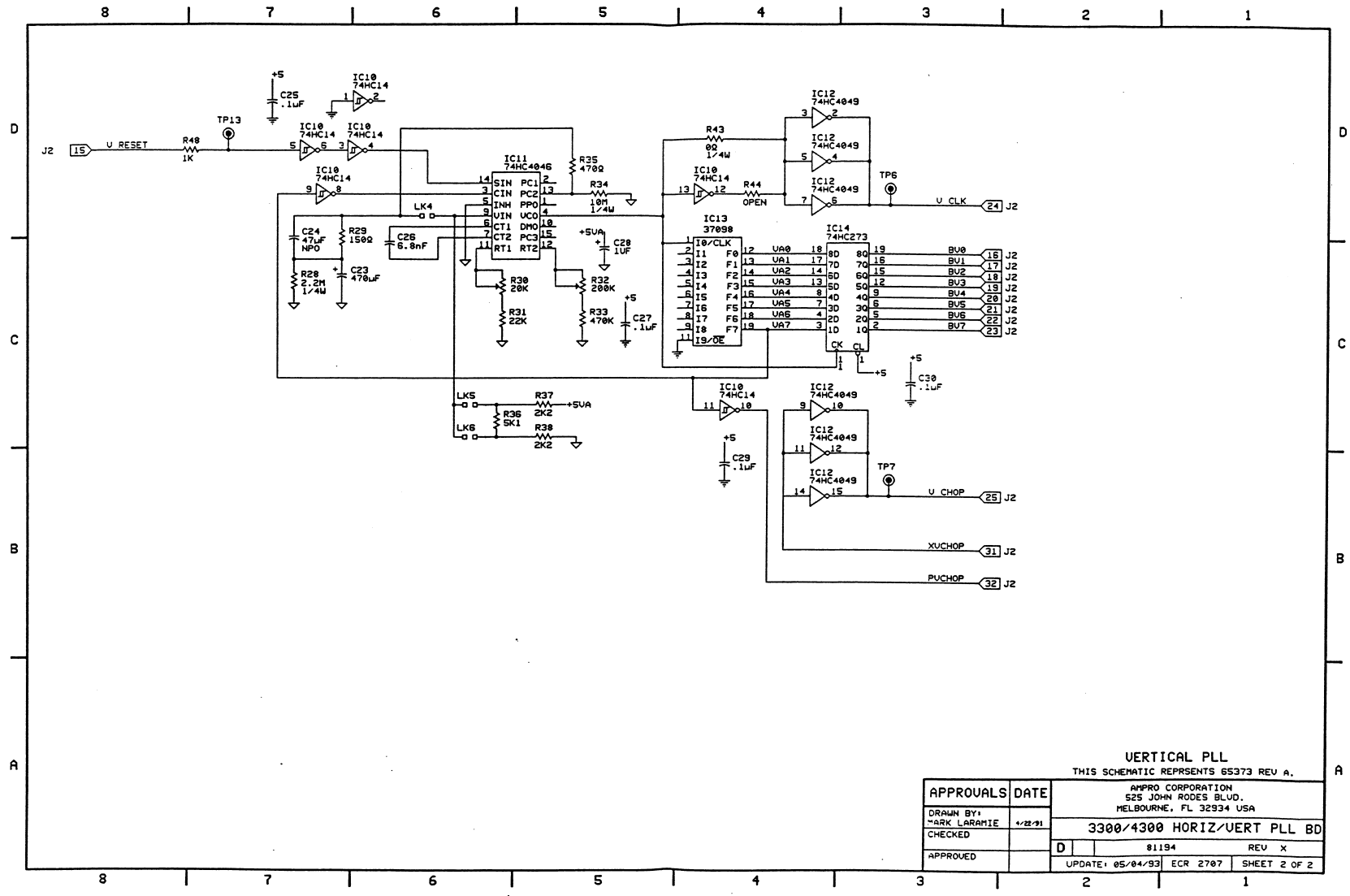
[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.16.1 . . . Registration Horizontal & Vertical PLL[1] Board (81194X) Schematic 1 of 2:



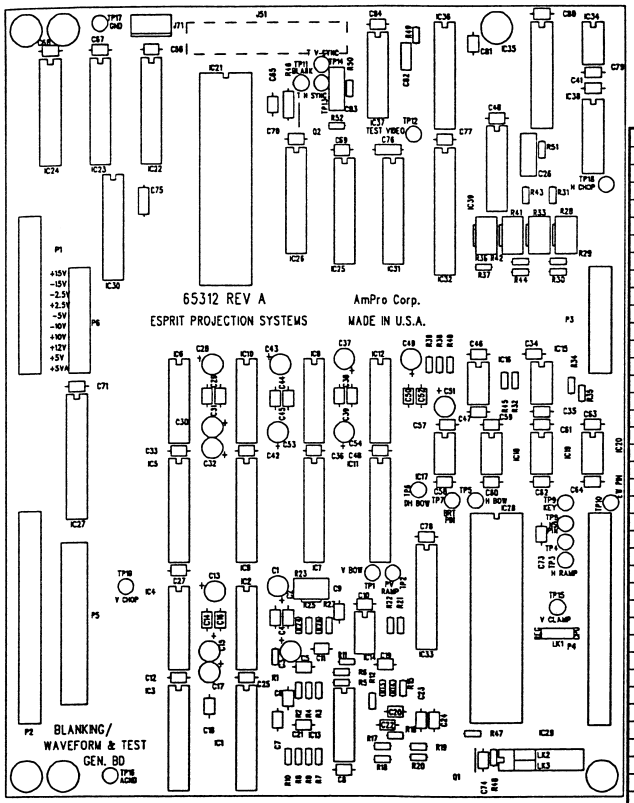
[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.16.2 . . . Registration Horizontal & Vertical PLL[1] Board (81194X) Schematic 2 of 2:



[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.17 . . . . Registration Waveform & Blanking Board[1] (81189A) Component Layout / Parts List:

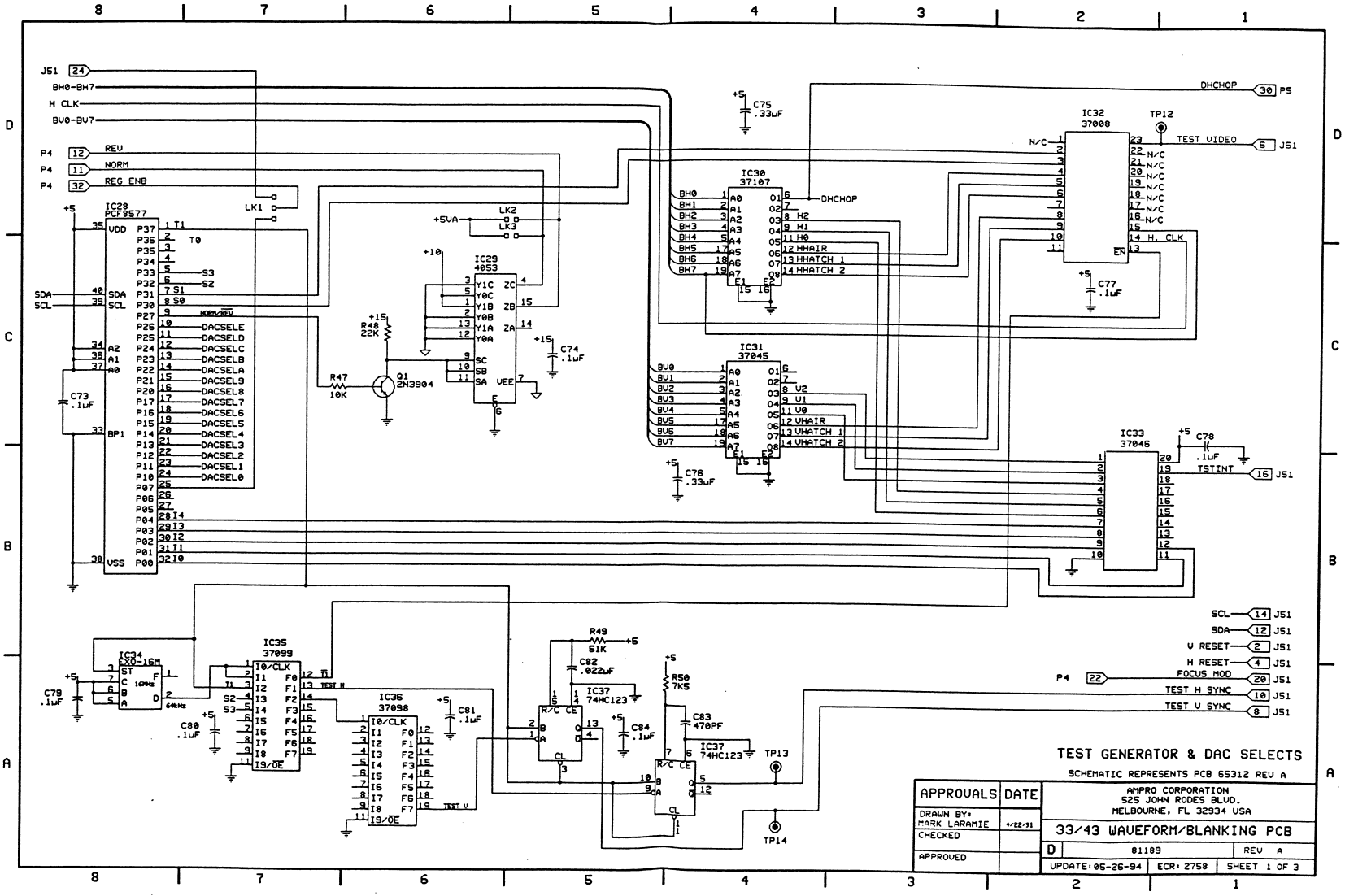


REGISTRATION WAVE/BLANK BD. (81189A)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65312 (A)
CAPACITORS		
C1	TANTALUM, 4.7µF, 50V	15012
C2	.1µF, 50V	12104
C3	TANTALUM, 4.7µF, 50V	15012
C4	.1µF, 50V	12104
C5	.01µF, 50V	12051
C6	.01µF, 50V	12051
C7	.01µF, 50V	12051
C8	.01µF , 50V	12051
C9	*SELECT @ TEST*	N/A
C10	.1µF, 50V	12104
C11	.1µF, 50V	12104
C12	.1µF, 50V	12104
C13	TANTALUM, 4.7µF, 50V	15012
C14	.1µF, 50V	12104
C15	TANTALUM, 4.7µF, 50V	15012
C16	.1µF, 50V	12104
C17	TANTALUM, 4.7µF, 50V	15012
C18	.1µF, 50V	12104
C19	.0068µF, 50V	12066
C20	.0068µF, 50V	12066
C21	.1µF, 50V	12104
C22	.1µF, 50V	12104
C23	.0068µF, 50V	12066
C24	.0068µF, 50V	12066
C25	.1µF, 50V	12104
C26	MICA, 220pF, 500V	14005
C27	.1µF, 50V	12104
C28	TANTALUM, 4.7µF, 50V	15012
C29	.1µF, 50V	12104
C30	TANTALUM, 4.7µF, 50V	15012
C31	1.µF, 50V	12104
C32	TANTALUM, 4.µF, 50V	15012
C33	.1µF, 50V	12104
C34	.1µF, 50V	12104
C35	.1µF, 50V	12104
C36	.1µF, 50V	12104
C37	TANTALUM, 4.7µF, 50V	15012
C38	.1µF, 50V	12104
C39	.1µF, 50V	12104
C40	.1µF, 50V	12104
C41	.1µF, 50V	12104
C42	.1µF, 50V	12104
C43	TANTALUM, 4.7µF, 50V	15012
C44	.1µF, 50V	12104
C45	.1µF, 50V	12104
C46	.1µF, 50V	12104
C47	.1µF, 50V	12104
C49	TANTALUM, 4.7µF, 50V	15012
C50	.1µF, 50V	12104
C53	TANTALUM, 4.7µF, 50V	15012
C54	TANTALUM, 4.7µF, 50V	15012
C57	.1µF, 50V	12104
C58	.1µF, 50V	12104
C59	.1µF, 50V	12104
C60	.1µF, 50V	12104
C61	.1µF, 50V	12104
C62	.1µF, 50V	12104
C63	.1µF, 50V	12104
C64	.1µF, 50V	12104
C65	.1µF, 50V	12104
C66	.1µF, 50V	12104
C67	.1µF, 50V	12104
C68	.1µF, 50V	12104
C69	.1µF, 50V	12104
C70	.1µF, 50V	12104
C71	.1µF, 50V	12104
C73	.1µF, 50V	12104
C74	.1µF, 50V	12104
C75	.33µF, 50V	12080
C76	.33µF, 50V	12080
C77	.1µF, 50V	12104
C78	.1µF, 50V	12104
C79	.1µF, 50V	12104
C80	.1µF, 50V	12104
C81	.1µF, 50V	12104
C82	.022µF,100V	13002
C83	470pF, 500V	14040
C84	.1µF, 50V	12104
C85	.1µF, 50V	12104
ICs		
IC1	82S135(34280), 256X8 PROM, HI-PRO.	37015
IC2	CA3338, VIDEO SPEED, 8BIT, D TO A CONV.	34270
IC3	37017, 82S135(34280), 256X8 PROM, HI-PRO.	37017
IC4	CA3338, VIDEO SPEED, 8BIT, D TO A CONV.	34270
IC5	37016, 82S135(34280), 256X8 PROM, HI-PRO.	37016
IC6	CA3338, VIDEO SPEED, 8BIT, D TO A CONV.	34270
IC7	37268, 82S135(34280), 256X8 PROM, HI-PRO.	37268
IC8	CA3338, VIDEO SPEED, 8BIT, D TO A CONV.	34270
IC9	37014, 82S135(34280), 256X8 PROM, HI-PRO.	37014
IC10	CA3338, VIDEO SPEED, 8BIT, D TO A CONV.	34270
IC13	OP400,OUAD OP-AMP,LOW OFFSET,LOW POWER	34249
IC14	OP249,OP-AMP,JFET,DUAL	34344
IC15	OP249,OP-AMP,JFET,DUAL	34344
IC16	OP249,OP-AMP,JFET,DUAL	34344
IC17	AD633, GP ANALOG MULTIPLIER	34274
IC18	AD633, GP ANALOG MULTIPLIER	34274
IC19	AD633, GP ANALOG MULTIPLIER	34274
IC20	AD633, GP ANALOG MULTIPLIER	34274
IC21	PCF8577 - 32 SEGMENT LCD DRIVER WITH I2C BUS	34285
IC22	74HC684 - CMOS OCTAL MAGNITUDE COMPARITOR	34286
IC23	74HC684 - CMOS OCTAL MAGNITUDE COMPARITOR	34286
IC24	74HC684 - CMOS OCTAL MAGNITUDE COMPARITOR	34286
IC25	74HC684 - CMOS OCTAL MAGNITUDE COMPARITOR	34286
IC26	74HC684 - CMOS OCTAL MAGNITUDE COMPARITOR	34286
IC27	20V8-CMOS-GAL-ELECTRICALLY ERASABLE	34371
IC28	PCF8577 - 32 SEGMENT LCD DRIVER WITH I2C BUS	34285
IC29	CD4053, MUX-DEMUX, 21, ANALOG, TRIPLE,CMOS	34041
IC30	63S281A, 256X8 PROM, HI-PRO.	34272
IC31	63S281A, 256X8 PROM, HI-PRO.	34272
IC32	PAL20RA10,ASYNCHRONOUS PLD	34268
IC33	PEEL153, PAL	34334
IC34	EXO-16M - DUAL OUTPUT CMOS CRYSTAL OSC, 16MHZ	43029
IC35	GAL16V8 - PROG. ARRAY LOGIC	37099
IC36	PAL, TTL/TEST 8 BIT COUNTER	37056
IC37	74HC123 - H-CMOS DUAL RETRIG MONOSTABLE MULTIVIBRATOR	34195
IC38	74HC74,FLIP-FLOP,D,DUAL,CMOS	34234
IC39	74HC221 H-CMOS DUAL MONOSTABLE MULTIVIBRATOR,	34291
CONNECTORS		
J51	26 PIN, RIBBON, MALE W/O EJECT	51384
J71	HDR, MTA100 - 4 POS.	51171
P1	30 PIN, 2 x 15, RT ANGL, FEMALE	51441
P2	40 PIN, RT ANGLE	51419
P3	20 PIN, RT ANGLE, FEMALE	51418
P4	40 PIN, RT ANGLE	51419
P5	30 PIN, 2 x 15, RT ANGL, FEMALE	51448
P6	20 PIN, 2 x10, FEMALE	51447
SHORTING JUMPERS (LK)		
LK1	3 PIN LINK, HEADER	51333
LK2	2 PIN LINK, HEADER	51082
LK3	2 PIN LINK, HEADER	51082
TRANSISTORS		
Q1	2N3904, SIGNAL, NPN	33006
Q2	2N7000, MOSFET, SIGNAL, N-CHAN	33096
RESISTORS Ω		
R1	16K	20078
R2	16K	20078
R3	2K2	20057
R4	15K	20077
R5	16K	20078
R6	16K	20078
R7	22K	20081
R8	18K	20079
R9	18K	20079
R10	12K	20075
R11	9K1	20072
R12	9K1	20072
R13	2K2	20057
R14	15K	20077
R15	9K1	20072
R16	9K1	20072
R17	12K	20075
R18	18K	20079
R19	12K	20075
R20	13K	20076
R21	10K	20073
R22	10K	20073
R23	POTENTIOMETER, 100K	24078
R24	910	20048
R25	9K1	20072
R26	9K1	20072
R27	10K	20073
R28	POTENTIOMETER, 100K	24078
R29	9K1	20072
R30	9K1	20072
R31	910	20048
R32	10K	20073
R33	POTENTIOMETER, 100K	24078
R34	10K	20073
R35	10K	20073
R36	POTENTIOMETER, 100K	24078
R37	9K1	20072
R38	9K1	20072
R39	910	20048
R40	10K	20073
R41	POTENTIOMETER, 100K	24078
R42	9K1	20072
R43	9K1	20048
R44	9K1	20072
R45	10K	20073
R46	0 *MOLDED JUMPER*	21168
R47	10K	20073
R48	22K	20081
R49	51K	20090
R50	7K5	20070
R51	39K	20087
R52	22K	20073
R53	1K	20049
R54	3K	20060
R55	4K7	20065
R56	10K	20073
TEST POINTS		
TP1 - TP19	TEST POINT	51405

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

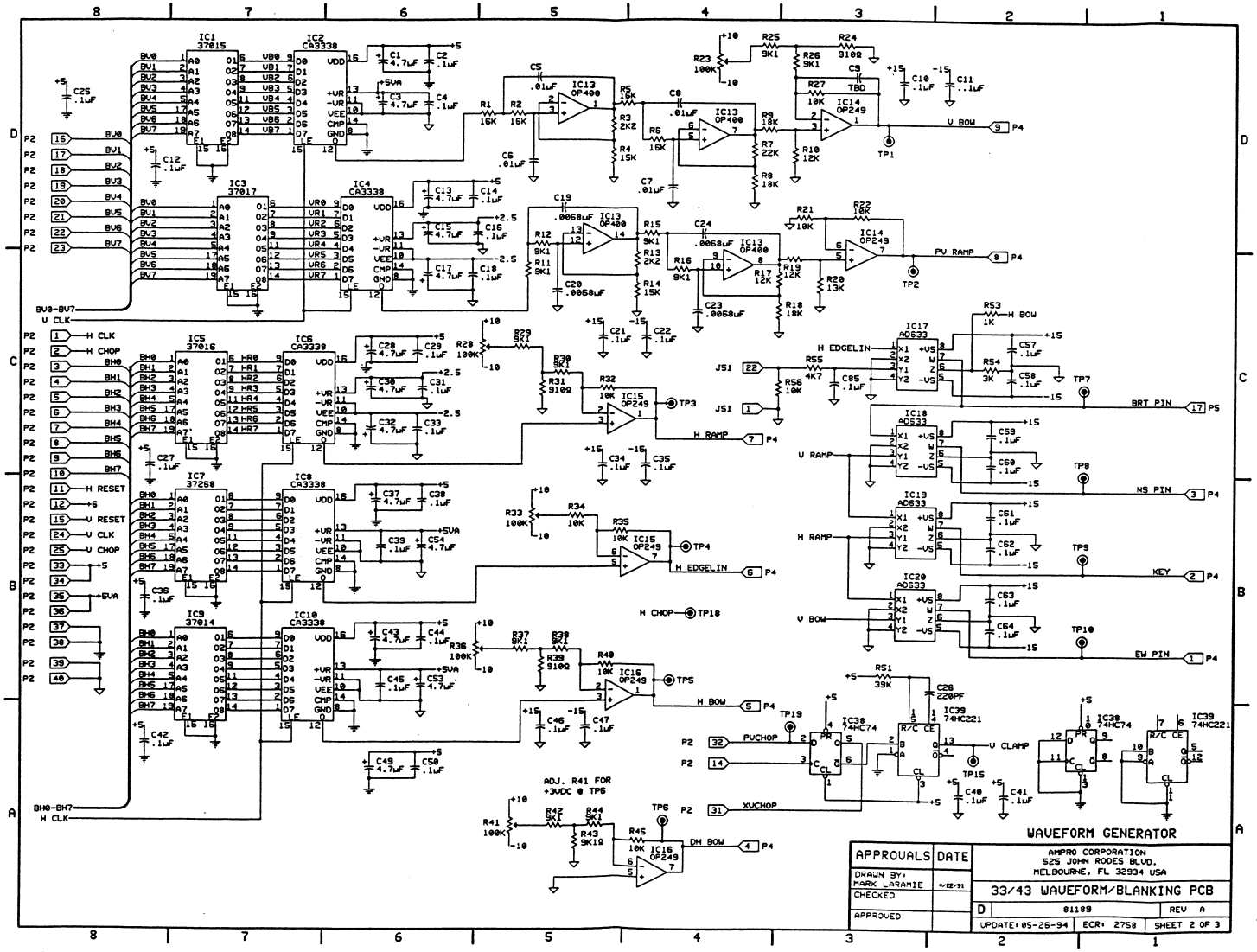
[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.17.1 . . . Registration Waveform & Blanking Board[1] (81189A) Schematic 1 of 3:



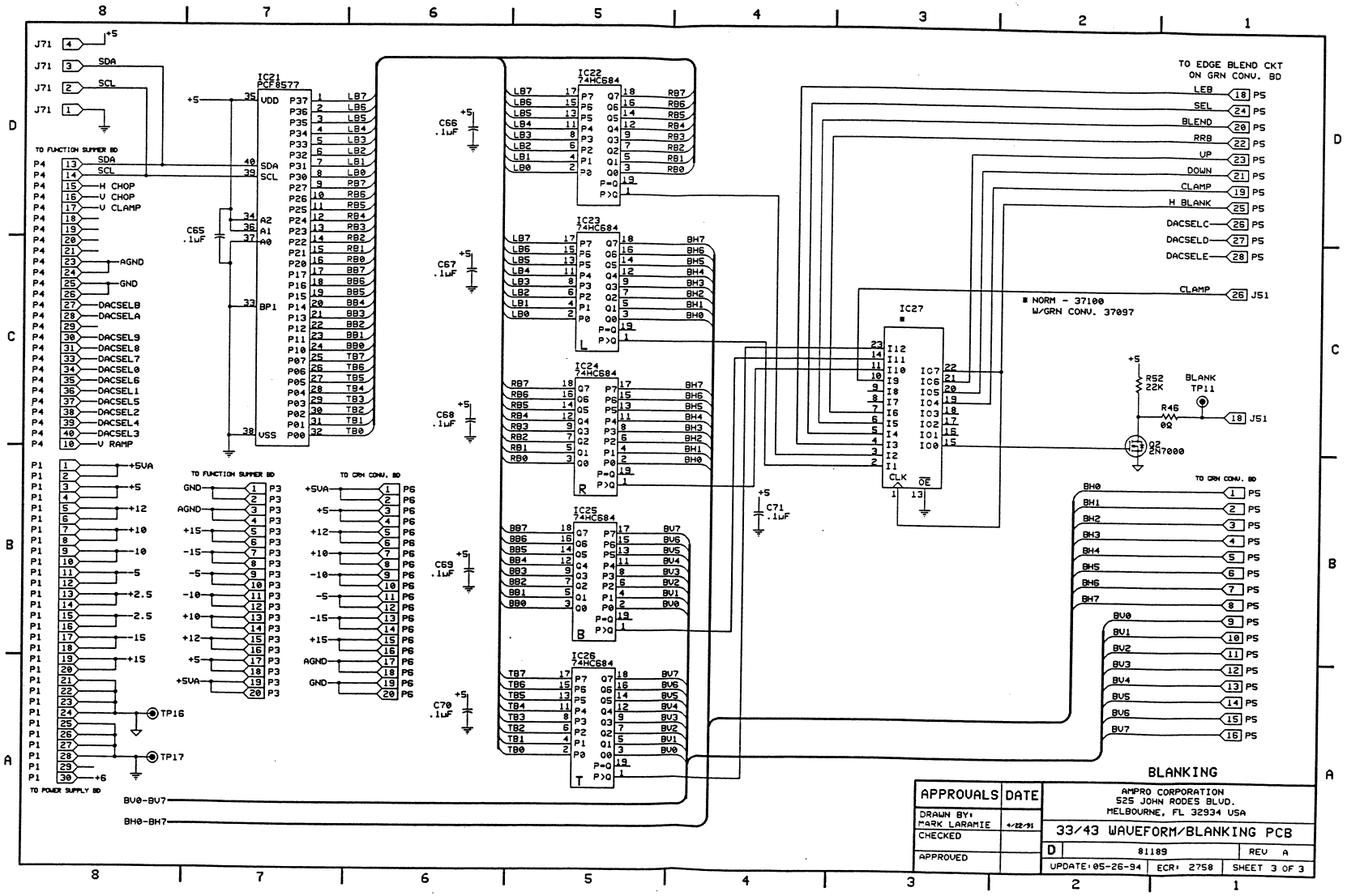
[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.17.2 . . . Registration Waveform & Blanking Board[1] (81189A) Schematic 2 of 3:



[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

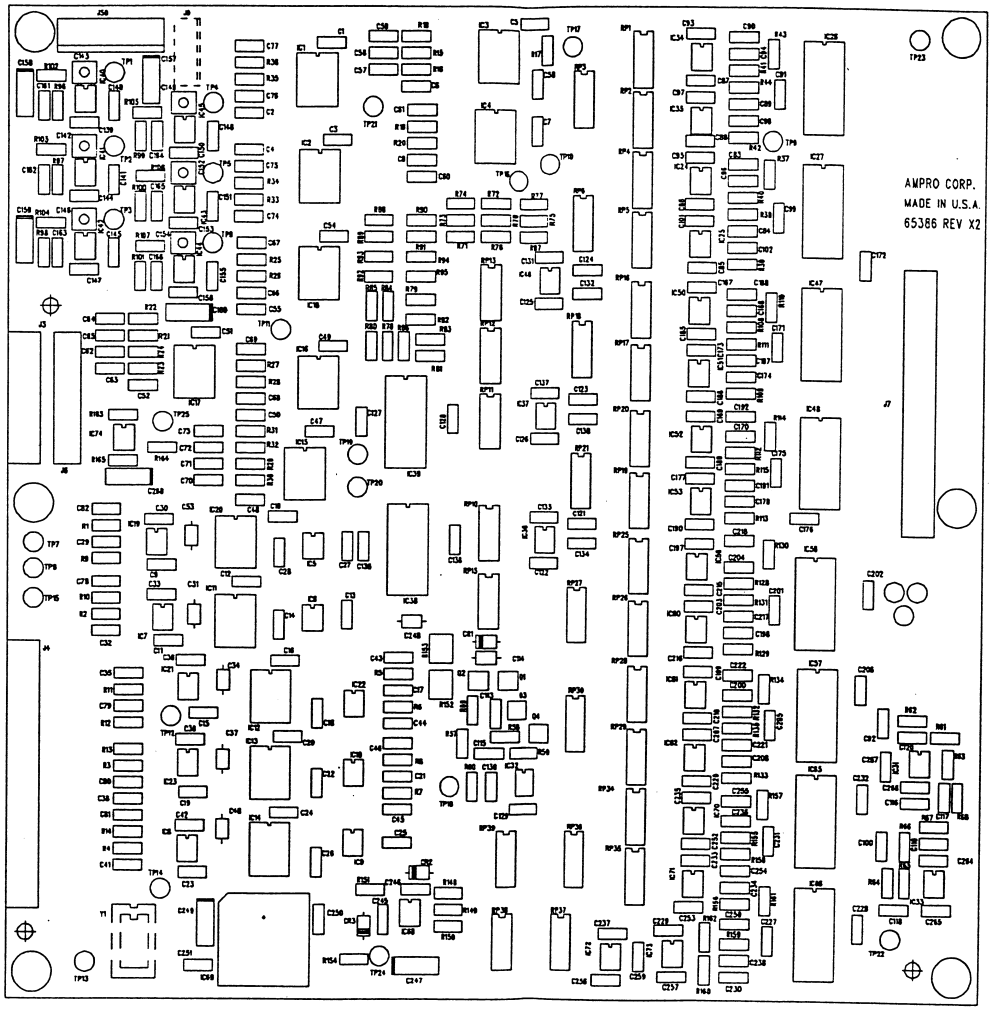
11.17.3 . . . Registration Waveform & Blanking Board[1] (81189A) Schematic 3 of 3:



[1]PART OF ASSEMBLY 81157

SMD/SMT denotes: SURFACE MOUNT DEVICES

11.18 .....Registration Function Summer Board[1] (81145A) Component Layout / Parts List:



RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.18 . . . . Registration Function Summer Board[1] (81145A) Component Layout / Parts List:

REGISTRATION FUNCTION SUMMER (81145A)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65386 (X2)
CAPACITORS		
C1 - 30	0.1µF, CERAMIC, 50V, SMD	12122
C31	CERAMIC, 1µF, 50V	12097
C32 / 33	0.1µF, CERAMIC, 50V, SMD	12122
C34	CERAMIC, 1µF, 50V	12097
C35 / 36	0.1µF, CERAMIC, 50V, SMD	12122
C37	CERAMIC, 1µF, 50V	12097
C38 / 39	0.1µF, CERAMIC, 50V, SMD	12122
C40	CERAMIC, 1µF, 50V	12097
C41 / 42	0.1µF, CERAMIC, 50V, SMD	12122
C43 - 46	180pF, CERAMIC, 50V, SMD	12154
C47 - 52	0.1µF, CERAMIC, 50V, SMD	12122
C53	CERAMIC, 1µF, 50V	12097
C54 / 55	0.1µF, CERAMIC, 50V, SMD	12122
C56 - 77	180pF, CERAMIC, 50V, SMD	12154
C79	120pF, CERAMIC, 50V, SMD	12156
C81	270pF, CERAMIC, 50V, SMD	12157
C83 - 89	5pF, CERAMIC, 50V, SMD	12147
C91 - 113	0.1µF, CERAMIC, 50V, SMD	12122
C114	CERAMIC, 1µF, 50V	12097
C115	0.1µF, CERAMIC, 50V, SMD	12122
C116 / 117	180pF, CERAMIC, 50V, SMD	12154
C118	68pF, CERAMIC, 50V, SMD	12155
C119	120pF, CERAMIC, 50V, SMA	12156
C120	120pF, CERAMIC, 50V, SMD	12156
C121 - 126	5pF, CERAMIC, 50V, SMD	12147
C127 - 138	0.1µF, CERAMIC, 50V, SMD	12122
C139 - 141	.1µF, CERAMIC, SMD	12104
C142 / 143	VARIABLE, CER, 2-10pF, 100V	12153
C144 / 145	.1µF, CERAMIC, 50V, SMD	12104
C146	VARIABLE, CER, 2-10pF, 100V	2153
C147 / 148	.1µF, CERAMIC, SMD	12104
C149	VARIABLE, CER, 2-10pF, 100V	12153
C150 / 151	.1µF, CERAMIC, SMD	12104
C152	VARIABLE, CER, 2-10pF, 100V	12153
C153	.1µF, CERAMIC, SMD	12104
C154	VARIABLE, CER, 2-10pF, 100V	12153
C155	.1µF, CERAMIC, SMD	12104
C156	.1µF, CERAMIC, SMD	12104
C157 - 160	TANT, 1µF, 35V, SMD	15020
C167 - 178	0.1µF, CERAMIC, 50V, SMD	12122
C185 - 192	5pF, CERAMIC, 50V, SMD	12147
C197 - 208	0.1µF, CERAMIC, 50V, SMD	12122
C215 - 222	5pF, CERAMIC, 50V, SMD	12147
C227 - 246	0.1µF, CERAMIC, 50V, SMD	12122
C247	TANT, 10µF, 35V, SMD	15011
C248	CERAMIC, 1µF, 50V	12097
C249	TANT, 10µF, 35V, SMD	15011
C250 / 251	0.1µF, CERAMIC, 50V, SMD	12122
C252 - 259	5pF, CERAMIC, 50V, SMD	12147
C264 - 267	0.1µF, CERAMIC, 50V, SMD	12122
C268	TANT, 1µF, 35V	15020
DIODES		
CR1	1N4148	31004
CR2/CR3	ITT2003, SIGNAL, SILICON	31017

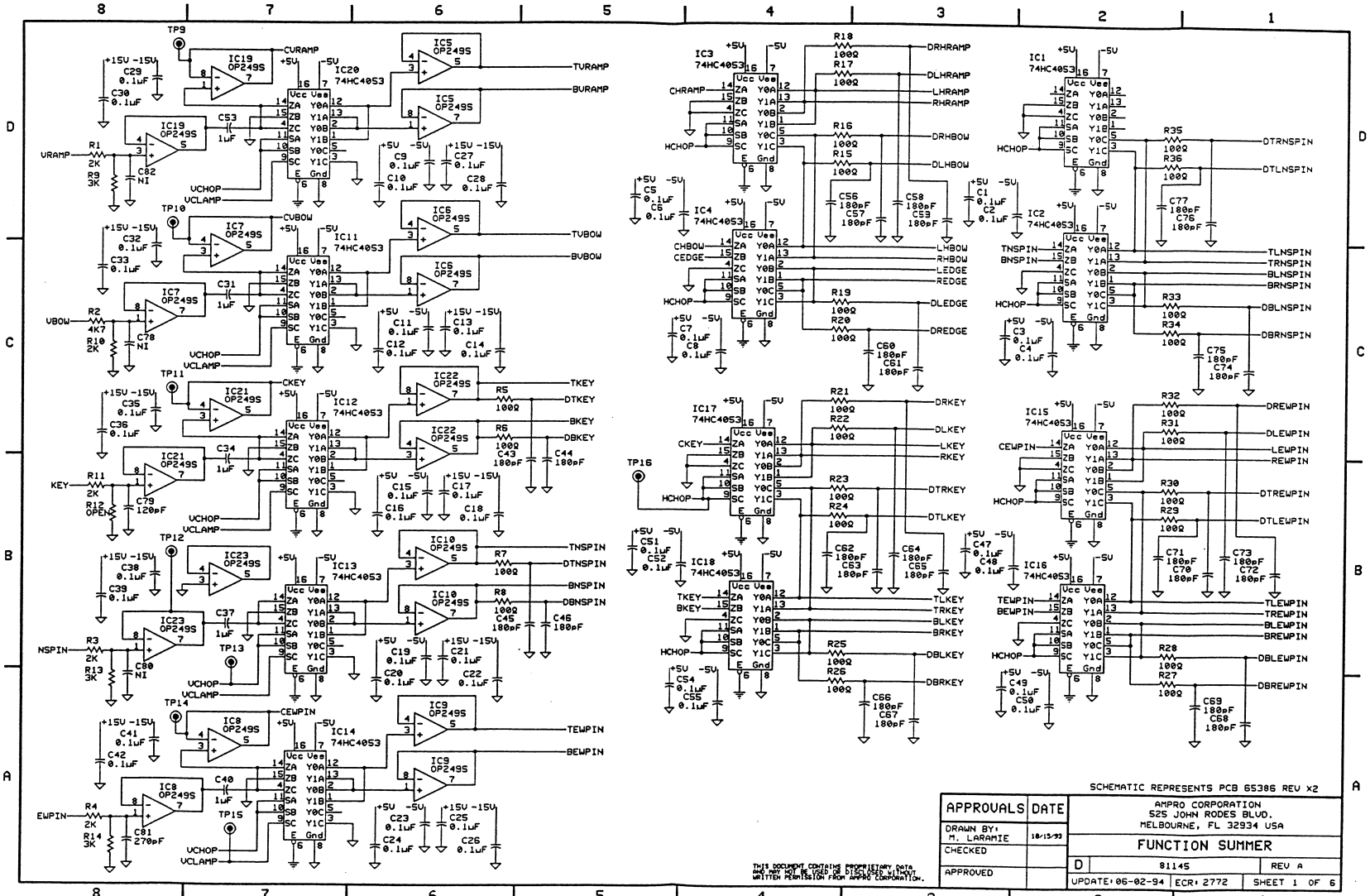
ICs		
IC1 - 4 , IC11 - 18 IC 20	74HC4053DW, H-CMOS TRIPLE 2-CHAN ANA MUX/DEMUX, 16P SOL	34544
IC5 - 10	OP249S, OP-AMP, JFET, DUAL	34545
IC19	OP249S, OP-AMP, JFET, DUAL	34545
IC21 - 25	OP249S, OP-AMP, JFET, DUAL	34545
IC26 / 27	MP7651AS, DAC, 28 PIN SOIC	34411
IC31 - 37	OP249S, OP-AMP, JFET, DUAL	34545
IC38 / 39	MP7651AS, DAC, 28 PIN SOIC	34411
IC40 - 45	AD744R, OP-AMP, BIFET, SMD	34551
IC46	OP249S, OP-AMP, JFET, DUAL	34545
IC47 / 48	MP7651AS, DAC, 28 PIN SOIC	34411
IC50 - 53	OP249S, OP-AMP, JFET, DUAL	34545
IC56 / 57	MP7651AS, DAC, 28 PIN SOIC	34411
IC59 - 62	OP249S, OP-AMP, JFET ,DUAL	34545
IC65 / 66	MP7651AS, DAC, 28 PIN SOIC	34411
IC68	OP249S, OP-AMP,J FET, DUAL	34545
IC69	87C751, CMOS W/I^2C, PLCC	34410
IC70 - 74	OP249S, OP-AMP, JFET, DUAL	34545
CONNECTORS		
J3	20 PIN, RT ANGLE, MALE	51416
J4	40 PIN, RT ANGLE, MALE	51417
J6	20 PIN, 2 x 20, FEMALE	51447
J7	40 PIN, 2 x 20, FEMALE	51449
J50	HDR, MTA100 - 8 POS.	51175
TRANSISTORS		
Q1 - Q4	2N7002, MOSFET, N-CHAN	33117
RESISTORS Ω		
R1	2K, SMD	26056
R2	4K7, SMD	26065
R3 / 4	2K, SMD	26056
R5 - 8	100, SMD	26025
R9	3K, SMD	26060
R10 / 11	2K, SMD	26056
R13 / 14	3K, SMD	26060
R15 - 36	100, SMD	26025
R37	1K5, SMD	26054
R38 / 39	7K5, SMD	26070
R40	4K7, SMD	26065
R41	1K5, SMD	26054
R42	7K5, SMD	26070
R43	4K7, SMD	26065
R44	7K5, SMD	26070
R57	4K7, SMD	26065
R58 / 59	10K, SMD	26073
R60	22K, SMD	26081
R61	4K7, SMD	26065
R62	2K, SMD	26056
R63	100, SMD	26025
R64	2K, SMD	26056
R66	2K, SMD	26056
R67	3K, SMD	26060
R68	100, SMD	26025
R69	47K, SMD	26065
R70 - R74	6K2, SMD	26089
R75	10K, SMD	26073
R76	6K2, SMD	26068
R77 / R78	10K, SMD	26073
R79	3K, SMD	26060
R80	6K2, SMD	26068
R81	3K, SMD	26060
R82 / R83	6K2, SMD	26068
R84	10K, SMD	26073
R85	3K, SMD	26060
R86 - R89	10K, SMD	26073
R90 / R91	68K, SMD	26093
R92 / R93	10K, SMD	26073
R94 /R95	68K, SMD	26093
R96 - 101	10K, SMD	20073
R102 - 107	100, SMD	26025
R108	6K2, SMD	26068
R109 / 110	12K, SMD	26075
R111/112	6K2, SMD	26068
R113/114	12K, SMD	26075
R115/128	6K2, SMD	26068
R129	3K3, SMD	26061
R130	6K2, SMD	26068
R131	3K3, SMD	26061
R132	6K2, SMD	26068
R133	3K3, SMD	26061
R134	6K2, SMD	26068
R135	3K3, SMD	26061
R148	10K, SMD	20073
R149/150	6K8, SMD	20069
R151	2K4, SMD	20058
R152/153	POTENTIOMETER, 20K	24120
R154	1K, SMD	21052
R155	6K2, SMD	26068
R156	7K5, SMD	26070
R157	6K2, SMD	26068
R158	7K5, SMD	26070
R159	6K2, SMD	26068
R160	7K5, SMD	26070
R161	6K2, SMD	26068
R162	7K5, SMD	26070
R163	390, SMD	26039
R164	27K, SMD	26083
R165	39K, SMD	26087
RESISTOR PACKS		
RP1 / 2	4K7, 16PIN, 8 RES, SMD	25054
RP3	18K, 16 PIN, 8 RES, SMD	25055
RP4 / 5	4K7, 16 PIN, 8 RES, SMD	25054
RP6	18K, 16 PIN, 8 RES, SMD	25055
RP10 / 11	4K7, 16 PIN, 8 RES, SMD	25054
RP12	18K, 16 PIN, 8 RES, SMD	25055
RP13	4K7, 16 PIN, 8 RES, SMD	25054
RP15	18K, 16 PIN, 8 RES, SMD	25055
RP16 / 17	4K7, 16 PIN, 8 RES, SMD	25054
RP18	18K, 16 PIN, 8 RES, SMD	25055
RP19 / 20	4K7, 16 PIN, 8 RES, SMD	25054
RP21	18K, 16 PIN, 8 RES, SMD	25055
RP25 / 26	4K7, 16 PIN, 8 RES, SMD	25054
RP27	18K, 16 PIN, 8 RES, SMD	25055
RP28 / 29	4K7, 16 PIN, 8 RES, SMD	25054
RP30	18K, 16 PIN, 8 RES, SMD	25055
RP34 / 35	4K7, 16 PIN, 8 RES, SMD	25054
RP36	18K, 16 PIN, 8 RES, SMD	25055
RP37 / 38	4K7, 16 PIN, 8 RES, SMD	25054
RP39	18K, 16 PIN, 8 RES, SMD	25055
TEST POINTS		
TP1 - 25	TEST POINT, LOOP	51405
CRYSTALS		
Y1	CMOS , 11.059MHz	43032

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

NOTES

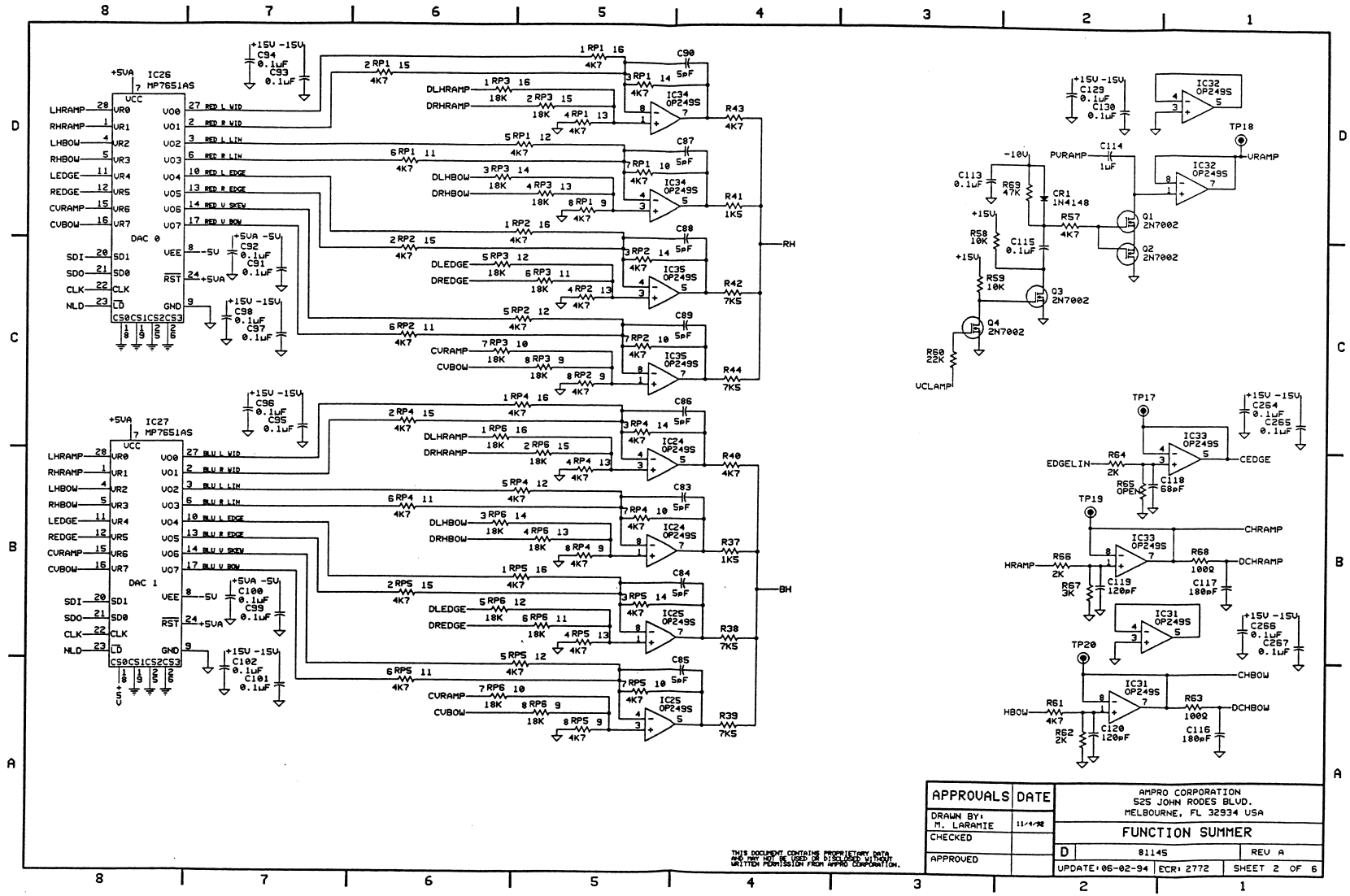
[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.18.1 . . . Registration Function Summer Board[1] (81145A) Schematic 1 of 6:



[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.18.2 . . . Registration Function Summer Board[1] (81145A) Schematic 2 of 6:



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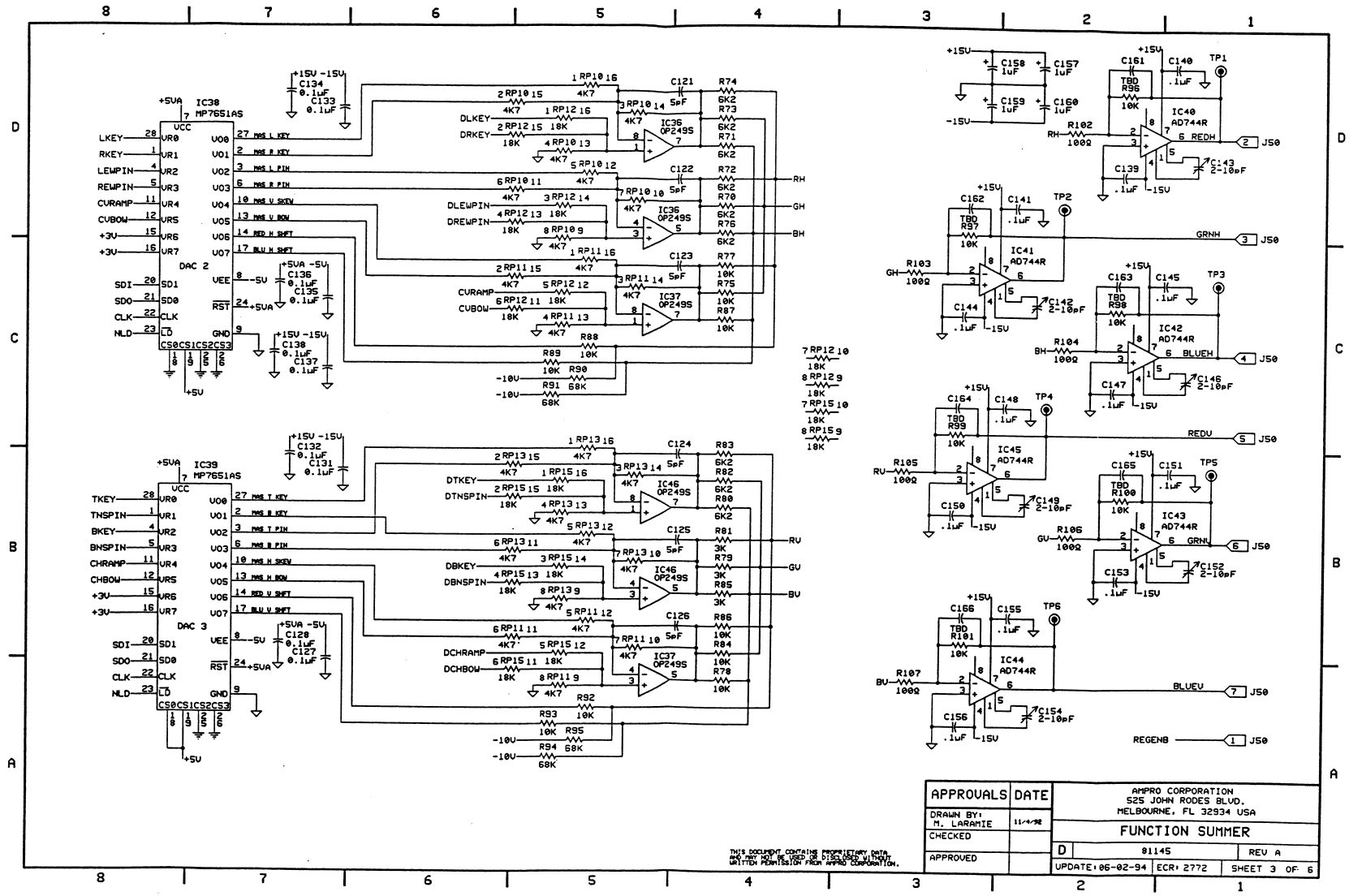
AMPRO CORPORATION
525 JOHN RODES BLVD.
MELBOURNE, FL 32934 USA

FUNCTION SUMMER

D	81145	REV A
UPDATE: 06-02-94	ECR: 2772	SHEET 2 OF 6

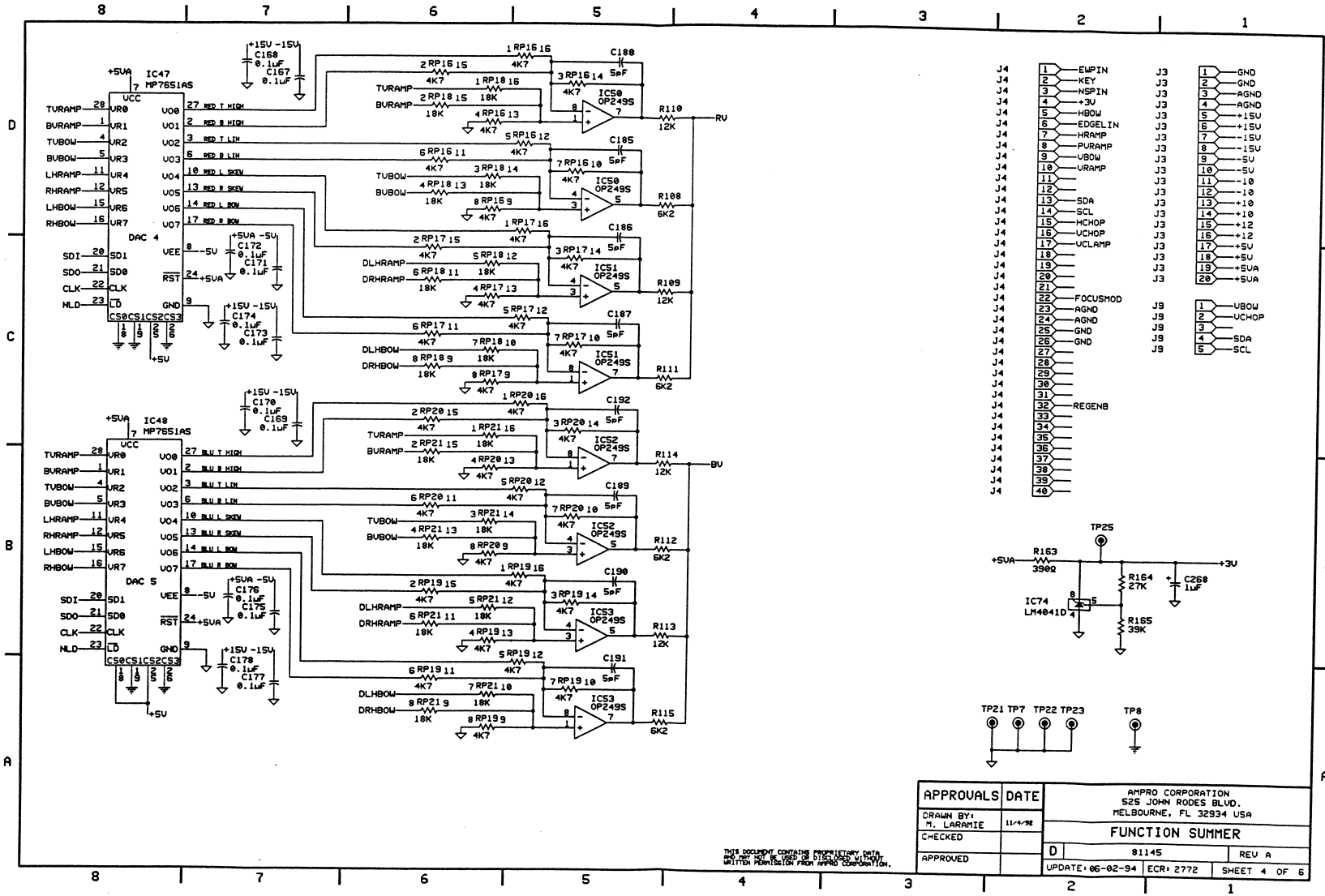
[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.18.3 . . . Registration Function Summer Board[1] (81145A) Schematic 3 of 6:



[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

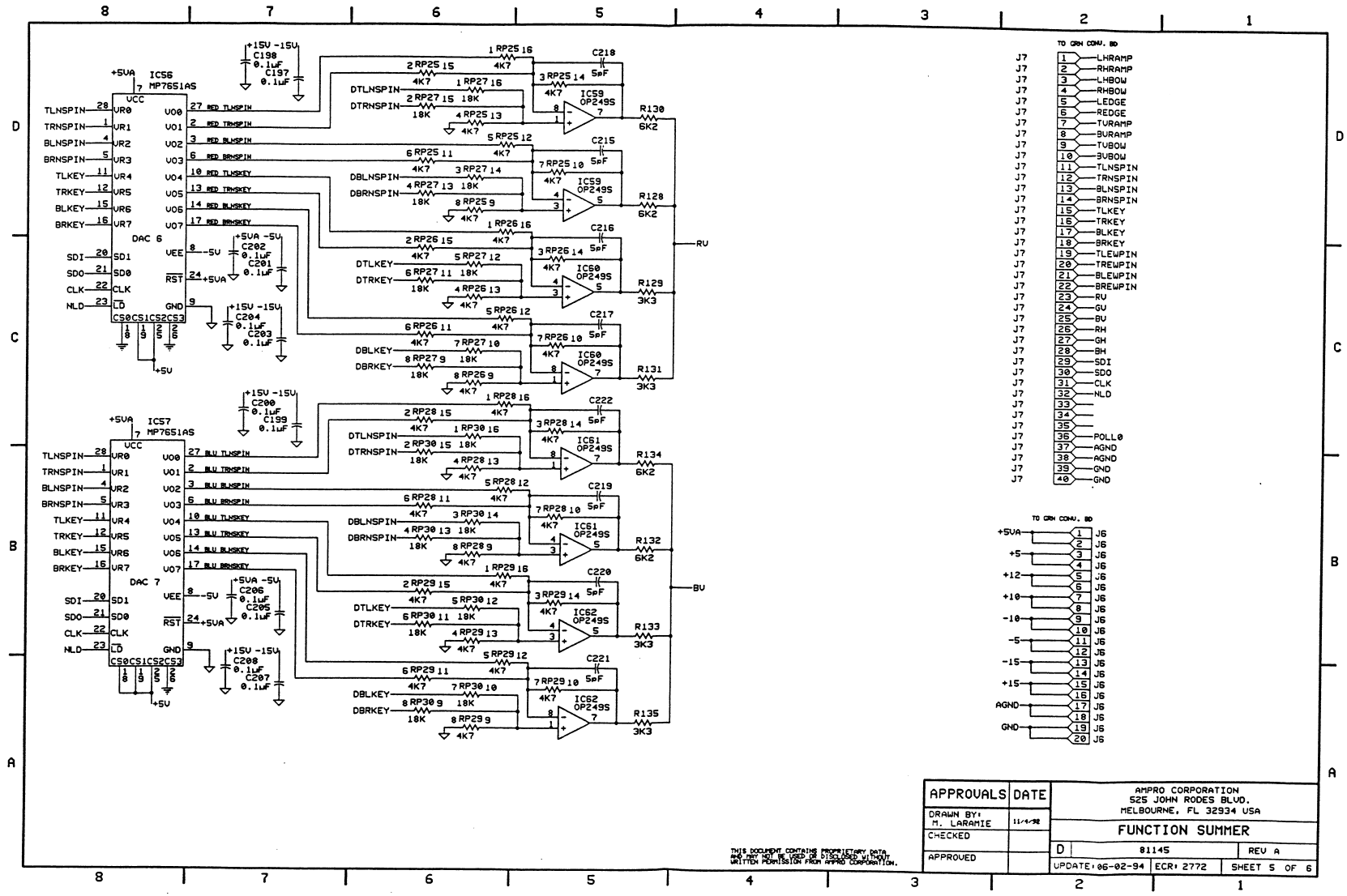
11.18.4 . . . Registration Function Summer Board[1] (81145A) Schematic 4 of 6:



[1]PART OF ASSEMBLY 81157

SMD/SMT denotes: SURFACE MOUNT DEVICES

11.18.5 . . . Registration Function Summer Board[1] (81145A) Schematic 5 of 6:



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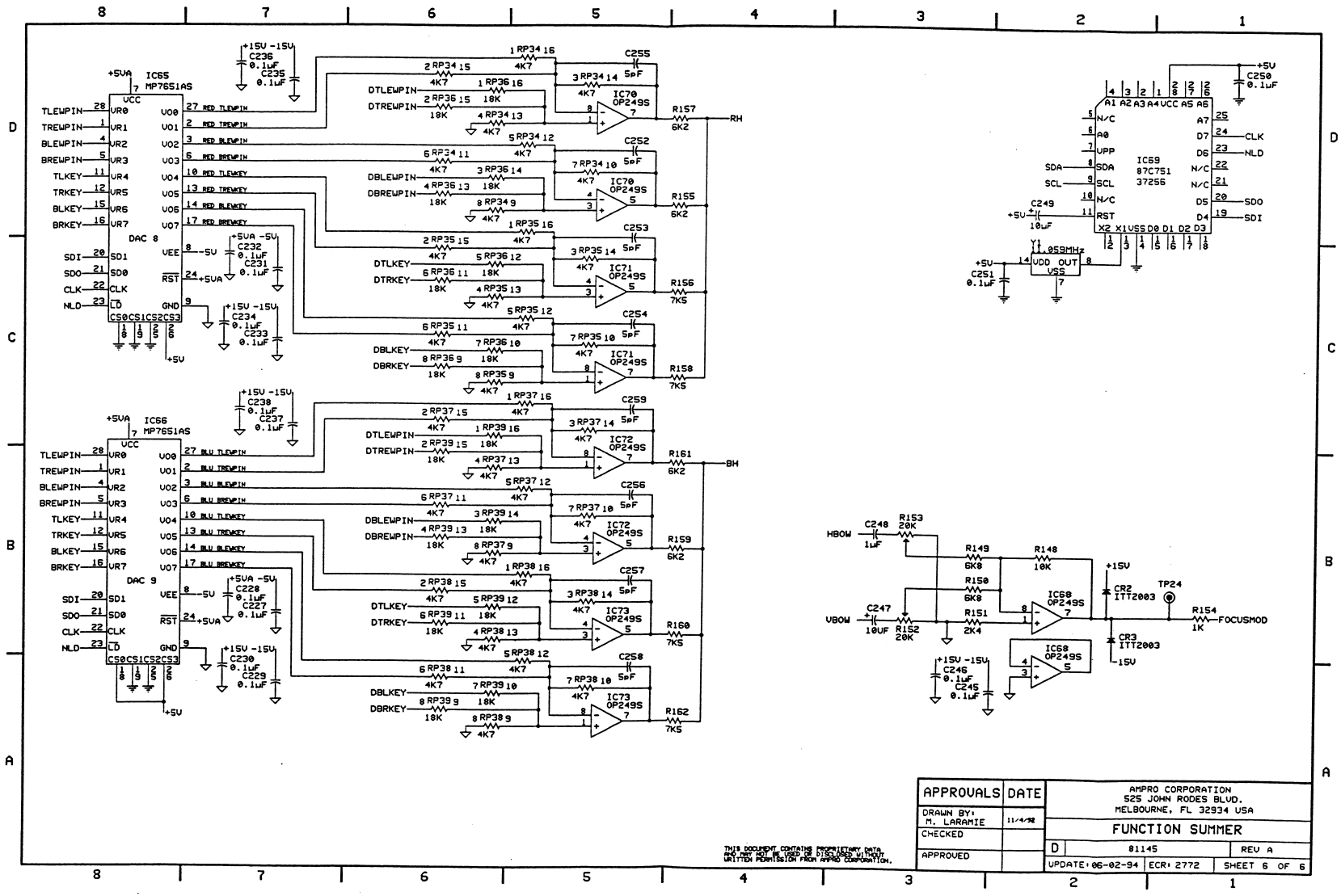
FUNCTION SUMMER

D	81145	REV A
UPDATE: 06-02-94	ECR: 2772	SHEET 5 OF 6

Registration Function Summer Board[1] (81145A) Schematic 5 of 6

[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.18.6 . . . Registration Function Summer Board[1] (81145A) Schematic 6 of 6:



APPROVALS	DATE
DRAWN BY: M. LARAMIE	11/4/93
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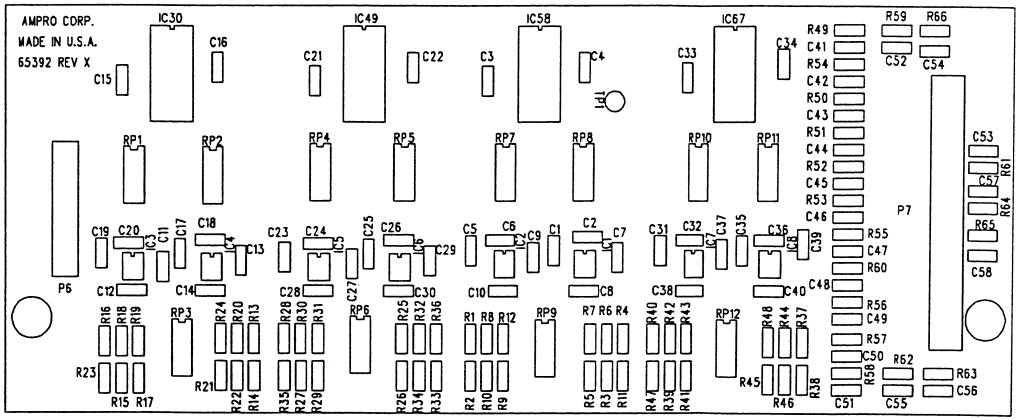
FUNCTION SUMMER

D	81145	REV A
UPDATE: 06-02-94	ECR: 2772	SHEET 6 OF 6

[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.19 . . . . Green Convergence Board[1] (81176X) Component Layout / Parts List:

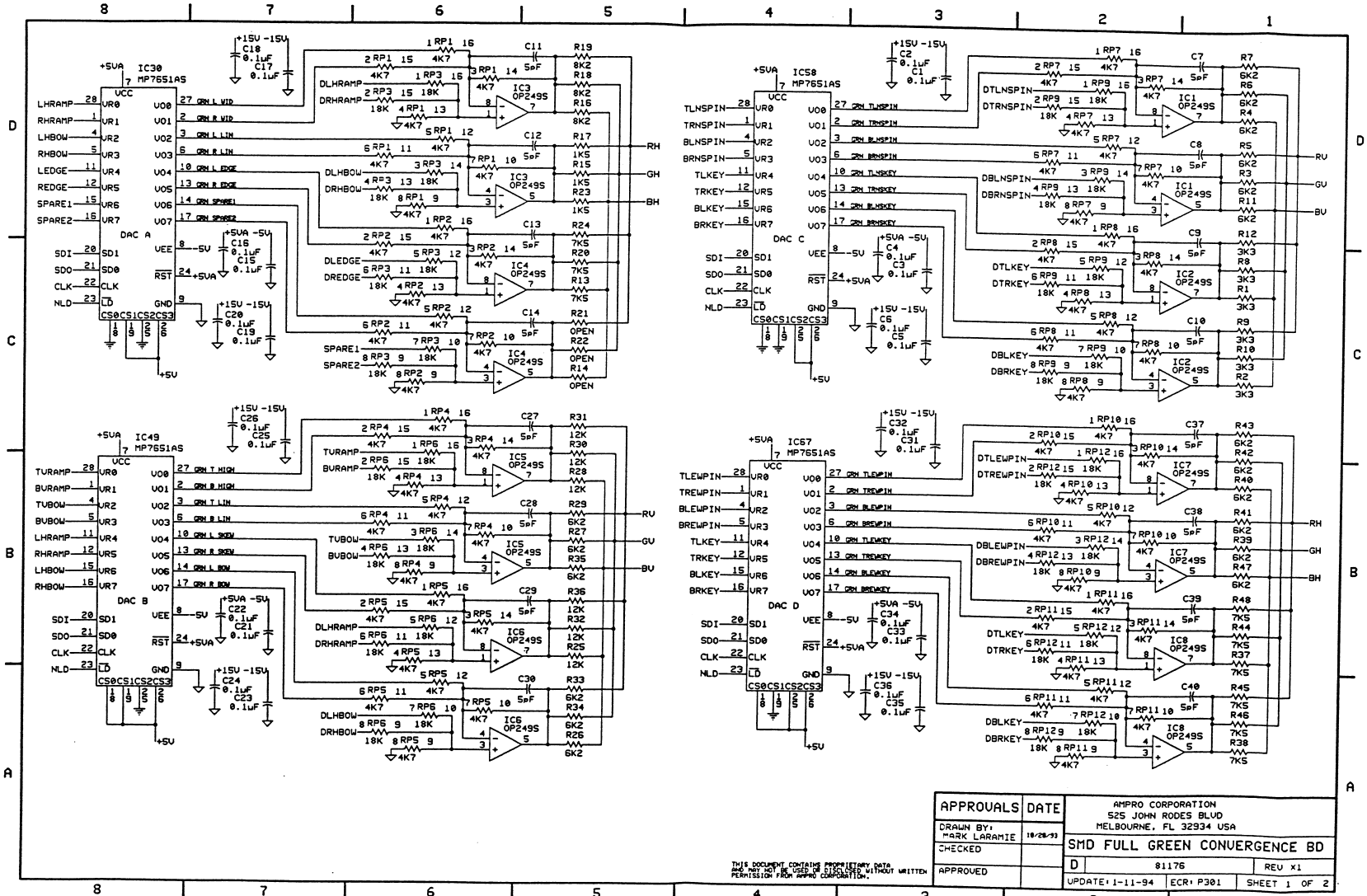


GREEN CONVERGENCE BOARD (81176X)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65392 (X)
PCB		
C1 - C6	0.1µF, CERAMIC, 50V, SMD	12122
C7 - C14	5pF, CERAMIC, 50V, SMD	12147
C15 - C26	0.1µF, CERAMIC, 50V, SMD	12122
C27 - C30	5pF, CERAMIC, 50V, SMD	12147
C31 - C36	0.1µF, CERAMIC, 50V, SMD	12122
C37 - C40	5pF, CERAMIC, 50V, SMD	12147
C41 - C58	180pF, CERAMIC, 50V, SMD	12154
ICs		
IC1 - IC8	OP249S, OP-AMP, JFET, DUAL	34545
IC30	MP7651AS, DAC, 28PIN SOIC	34411
IC49	MP7651AS, DAC, 28PIN SOIC	34411
IC58	MP7651AS, DAC, 28PIN SOIC	34411
IC67	MP7651AS, DAC, 28PIN SOIC	34411
CONNECTORS		
P6	HDR, 20 PIN	51444
P7	HDR, 40 PIN	51446
RESISTORS Ω		
R1 / R2	3K3, SMD	26061
R3 - R7	6K2, SMD	26068
R8 - R10	3K3, SMD	26061
R11	6K2, SMD	26068
R12	3K3, SMD	26061
R13	7K5, SMD	26070
R14	OPEN	N/A
R15	1K5, SMD	26054
R16	8K2, SMD	26071
R17	1K5, SMD	26054
R18 / R19	8K2, SMD	26071
R20	7K5, SMD	26070
R21 / R22	OPEN	N/A
R23	1K5, SMD	26054
R24	7K5, SMD	26070
R25	12K, SMD	26075
R26 / R27	6K2, SMD	26068
R28	12K, SMD	26075
R29	6K2, SMD	26068
R30 - R32	12K, SMD	26075
R33 - R35	6K2, SMD	26068
R36	12K, SMD	26075
R37 / R38	7K5, SMD	26070
R39 - R43	6K2, SMD	26068
R44 - R46	7K5, SMD	26070
R47	6K2, SMD	26068
R48	7K5, SMD	26070
R49 - R66	100, SMD	26025
RESISTOR PACKS Ω		
RP1 / 2	4K7, 16 PIN, 8 RES, SMD	25054
RP3	18K, 16 PIN, 8 RES, SMD	25055
RP4 / 5	4K7, 16 PIN, 8 RES, SMD	25054
RP6	18K, 16 PIN, 8 RES, SMD	25055
RP7 / 8	4K7, 16 PIN, 8 RES, SMD	25054
RP9	18K, 16 PIN, 8 RES, SMD	25055
RP10 / 11	4K7, 16 PIN, 8 RES, SMD	25054
RP12	18K, 16 PIN, 8 RES, SMD	25055
TEST POINTS		
TP1	TEST POINT	51405

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

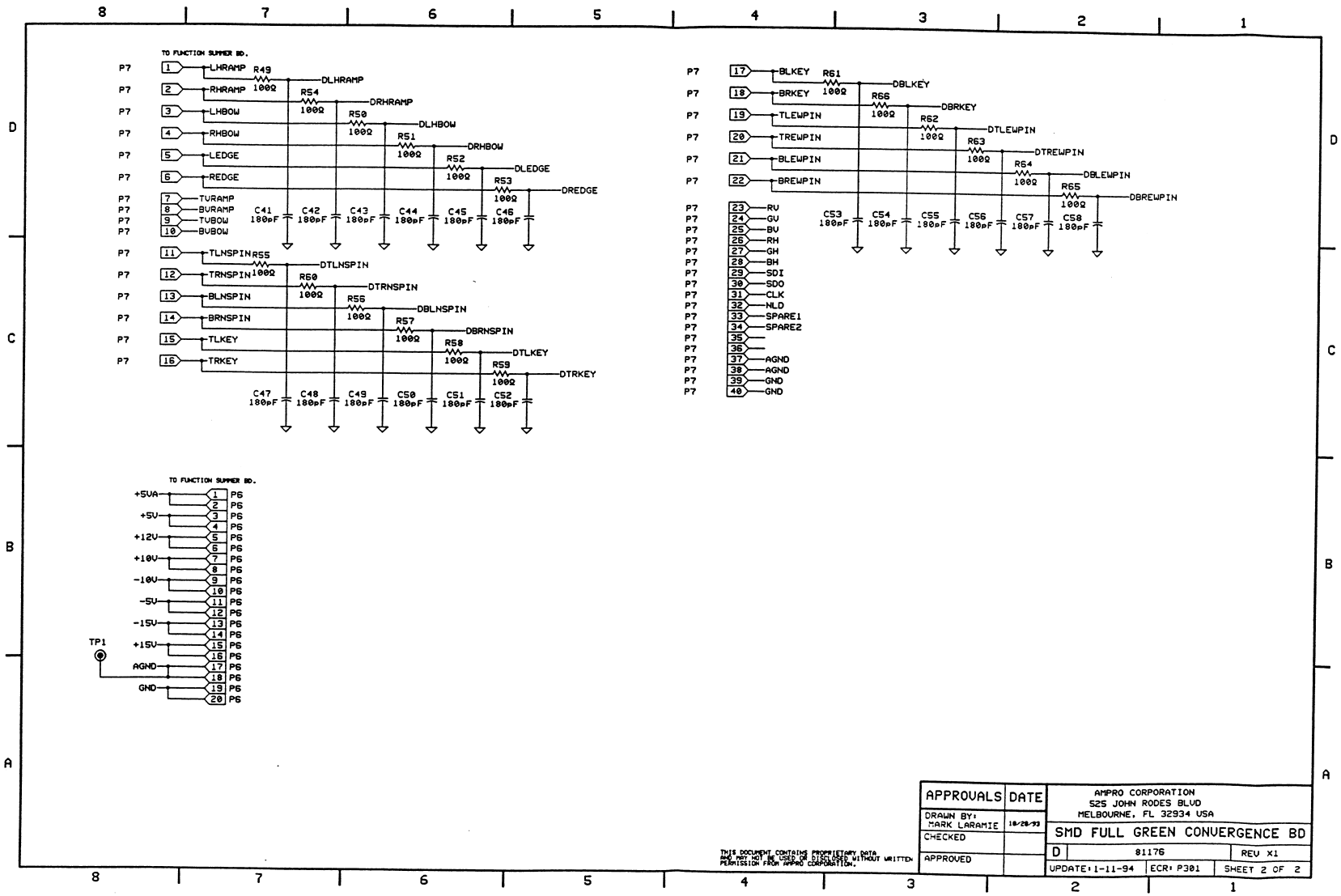
11.19.1 . . . Green Convergence Board[1] (81176X) Schematic 1 of 2:



[1]PART OF ASSEMBLY 81157

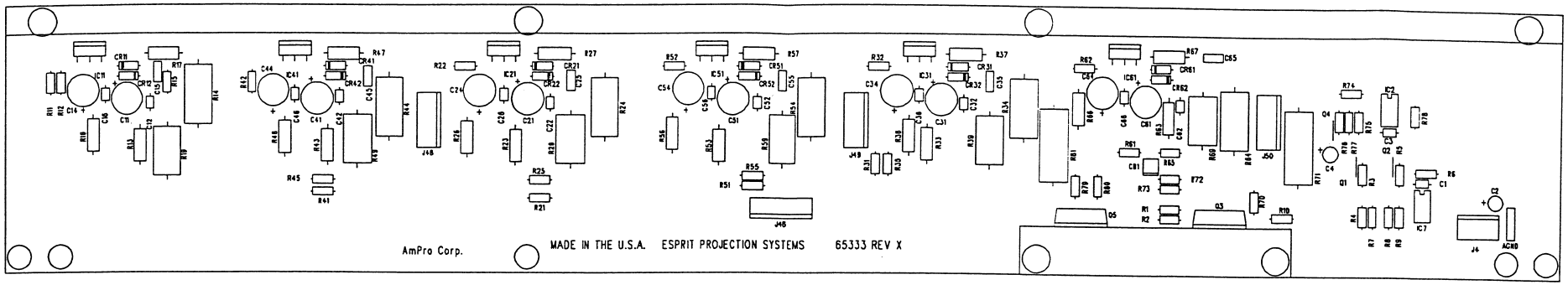
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.19.2 . . . Green Convergence Board[1] (81176X) Schematic 2 of 2:



[1]PART OF ASSEMBLY 81157
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.20 . . . . Registration Amplifier Board (3300 - 81224A / 4300 - 81010A) Component Layout / Parts List:



REGISTRATION AMPLIFIER BAORD (81010A)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65333 (X)
CAPACITORS		
C1	CERAMIC, .1µF, 50V	12104
C2	ELECT, 10µF	11008
C3	CERAMIC, .1µF, 50V	12104
C4	ELECT, 10µF, 35V	11008
C11	ELECT, 100µF, 35V	11036
C12	CERAMIC, .1µF, 50V	12104
C14	ELECT, 100µF, 35V	11036
C15	MYLAR, .022µF, 100V	13002
C16	CERAMIC, .1µF, 50V	12104
C21	ELECT, 100µF, 35V	11036
C22	CERAMIC, .1µF, 50V	12104
C24	ELECT, 100µF, 35V	11036
C25	MYLAR, .022µF, 100V	13002
C26	CERAMIC, .1µF, 50V	12104
C31	ELECT, 100µF, 35V	11036
C32	CERAMIC, .1µF, 50V	12104
C34	ELECT, 100µF, 35V	11036
C35	MYLAR, .022µF, 100V	13002
C36	CERAMIC, .1µF, 50V	12104
C41	ELECT, 100µF, 35V	11036
C42	CERAMIC, .1µF, 50V	12104

C44	ELECT, 100µF, 35V	11036
C45	MYLAR, .022µF, 100V	13002
C46	CERAMIC, .1µF, 50V	12104
C51	ELECT, 100µF, 35V	11036
C52	CERAMIC, .1µF, 50V	12104
C54	ELECT, 100µF, 35V	11036
C55	MYLAR, .022µF, 100V	13002
C56	CERAMIC, .1µF, 50V	12104
C61	ELECT, 100µF, 35V	11036
C62	CERAMIC, .1µF, 50V	12104
C64	ELECT, 100µF, 35V	11036
C65	MYLAR, .022µF, 100V	13002
C66	CERAMIC, .1µF, 50V	12104
CIRCUIT BRAKERS		
CB1	SPST, 190°F THERMOSTAT	58037
DIODES		
CR11	1N4002 RECTIFIER 100V	31003
CR12	1N4002 RECTIFIER 100V	31003
CR21	1N4002 RECTIFIER 100V	31003
CR22	1N4002 RECTIFIER 100V	31003
CR31	1N4002 RECTIFIER 100V	31003
CR32	1N4002 RECTIFIER 100V	31003
CR41	1N4002 RECTIFIER 100V	31003
CR42	1N4002 RECTIFIER 100V	31003
CR51	1N4002 RECTIFIER 100V	31003
CR52	1N4002 RECTIFIER 100V	31003

CR61	1N4002 RECTIFIER 100V	31003
CR62	1N4002 RECTIFIER 100V	31003
ICs		
IC2	MC33171P OP AMP	34229
IC7	MC33171P OP AMP	34229
IC11	LM675,POWER AUDIO OP-AMP, 14W	34199
IC21	LM675,POWER AUDIO OP-AMP, 14W	34199
IC31	LM675,POWER AUDIO OP-AMP, 14W	34199
IC41	LM675,POWER AUDIO OP-AMP, 14W	34199
IC51	LM675,POWER AUDIO OP-AMP, 14W	34199
IC61	LM675,POWER AUDIO OP-AMP, 14W	34199
CONNECTORS		
J4	HDR, MTA156 - 3 POS.	51280
J46	HDR, MTA100 - 8 POS.	51175
J48	HDR, MTA156 - 4 POS.	51131
J49	HDR, MTA156 - 4 POS.	51131
J50	HDR, MTA 156 - 4 POS.	51131
TRANSISTORS		
Q1	2N3904, SIGNAL, NPN	33006
Q2	2N3904, SIGNAL, NPN	33006
Q3	TIP147 PNP	33095

Q4	MPS3906, SIGNAL, PNP	33009
Q5	TIP142 NPN	33102
RESISTORS Ω		
R1	120K	21078
R2	39K	21113
R3	22K	21070
R4	390K	21084
R5	22K	21070
R6	22K	21070
R7	5K1	21062
R8	20K	21139
R9	5K1	21062
R10	3K3	21060
R11	2K2	21057
R12	1K1	21126
R13	0.47,1/2W	22073
R14	33,2W	23037
R15	2K2	21057
R16	0.47,1/2W	22073
R17	15,1/2W	22060
R19	5,3W	23052
R21	2K2	21057
R22	1K1	21126
R23	0.47,1/2W	22073
R24	33,2W	23037
R25	2K2	21057

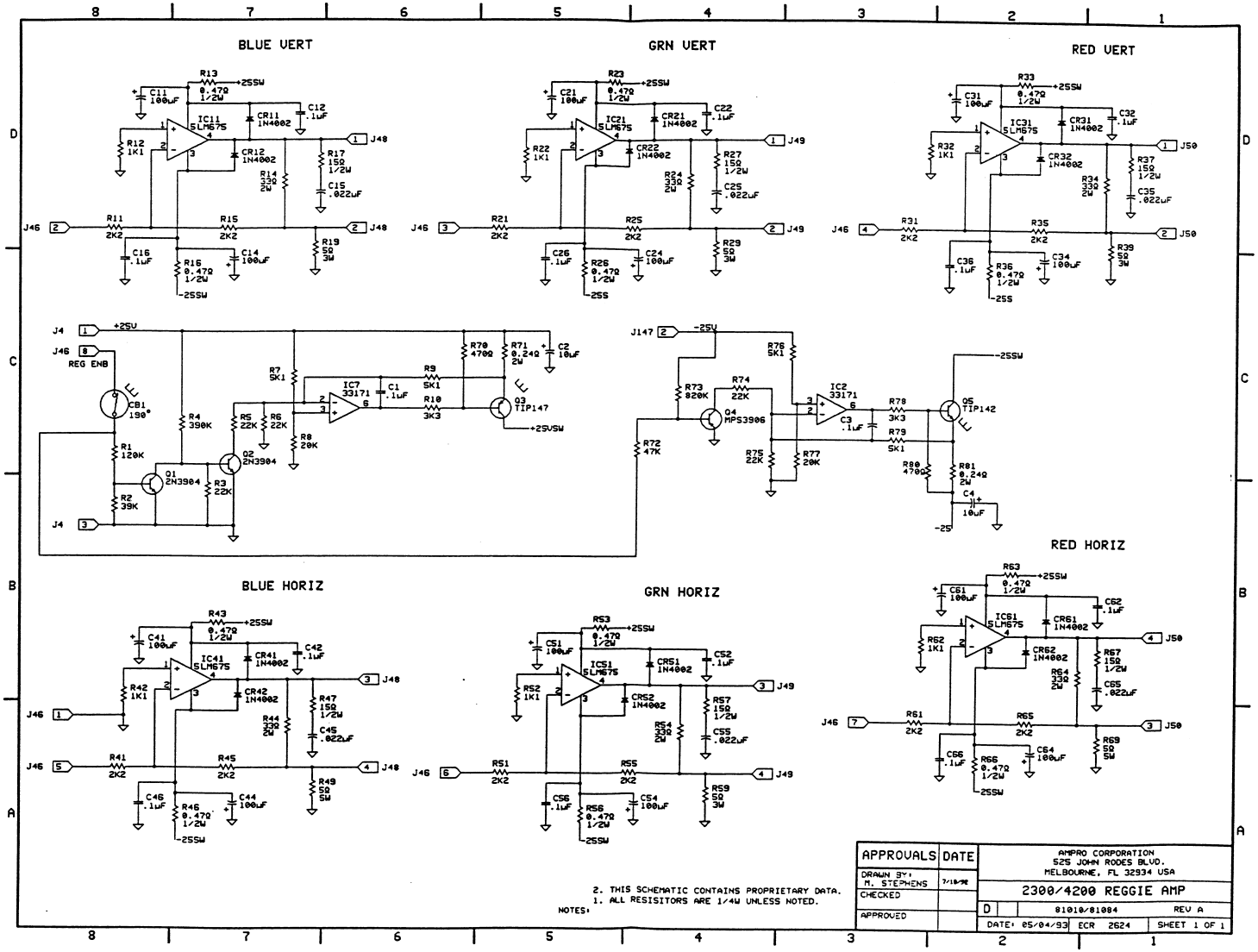
R26	0.47,1/2W	22073
R27	15,1/2W	22060
R29	5,3W	23052
R31	2K2	21057
R32	1K1	21126
R33	0.47,1/2W	22073
R34	33,2W	23037
R35	2K2	21057
R36	0.47,1/2W	22073
R37	15,1/2W	22060
R39	5,3W	23052
R41	2K2	21057
R42	1K1	21126
R43	0.47,1/2W	22073
R44	33,2W	23037
R45	2K2	21057
R46	0.47,1/2W	22073
R47	15,1/2W	22060
R49	5,5W	23149
R51	2K2	21057
R52	1K1	21126
R53	0.47,1/2W	22073
R54	33,2W	23037
R55	2K2	21057
R56	0.47,1/2W	22073
R57	15,1/2W	22060

R59	5,3W	23052
R61	2K2	21057
R62	1K1	21126
R63	0.47,1/2W	22073
R64	33,2W	23037
R65	2K2	21057
R66	0.47,1/2W	22073
R67	15,1/2W	22060
R69	5,5W	23149
R70	470	21115
R71	0.24,2W	23026
R72	47K	21074
R73	820K	21089
R74	22K	21070
R75	22K	21070
R76	5K1	21062
R77	20K	21139
R78	3K3	21060
R79	5K1	21062
R80	470	21115
R81	0.24,2W	23026

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

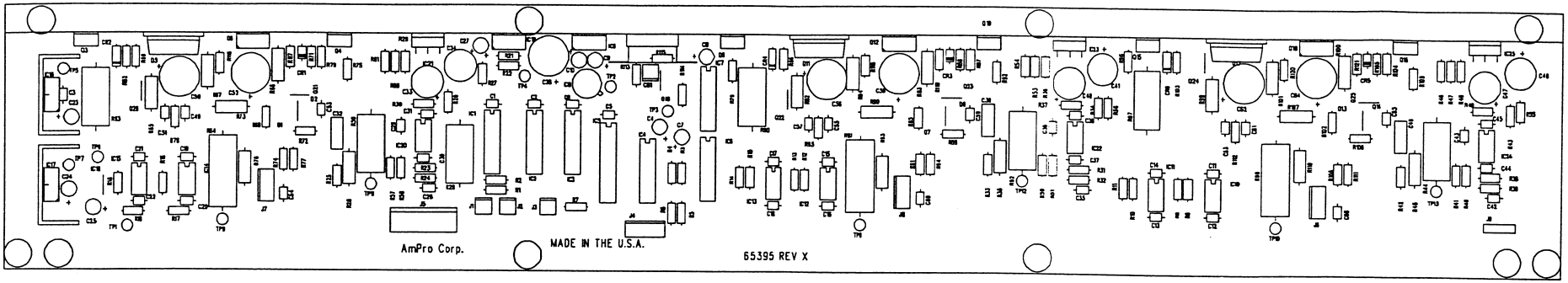
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.20.1 . . . Registration Amplifier Board (3300 - 81224A / 4300 - 81010A) Schematic 1 of 1:



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.21 . . . . Magnetic Focus Modulator Board (81170AX3) Component Layout::



SMD/SMT denotes: SURFACE MOUNT DEVICES

11.21.1 . . . Magnetic Focus Modulator Board (81170AX3) Parts List:

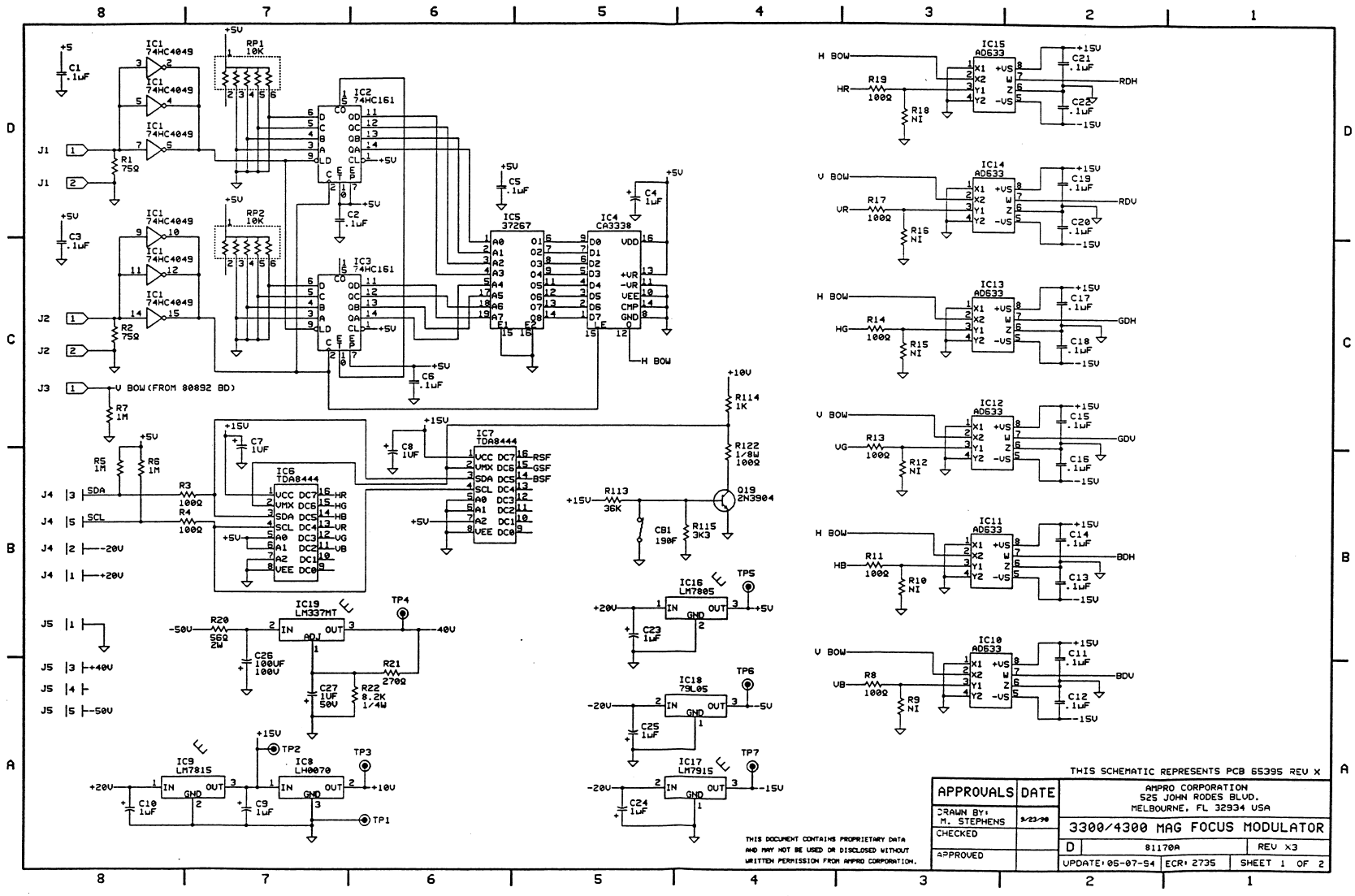
MAGNETIC FOCUS MODULATOR (81170AX3)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65395 (X)
CAPACITORS		
C1	CERAMIC, .1µF, 50V	12104
C2	CERAMIC, .1µF, 50V	12104
C3	CERAMIC, .1µF, 50V	12104
C4	TANTALUM, 1µF, 50V	15003
C5	CERAMIC, .1µF, 50V	12104
C6	CERAMIC, .1µF, 50V	12104
C7	ELECT, 1µF, 50V	11001
C8	ELECT, 1µF, 50V	11001
C9	ELECT, 1µF, 50V	11001
C10	ELECT, 1µF, 50V	11001
C11	CERAMIC, .1µF, 50V	12104
C12	CERAMIC, .1µF, 50V	12104
C13	CERAMIC, .1µF, 50V	12104
C14	CERAMIC, .1µF, 50V	12104
C15	CERAMIC, .1µF, 50V	12104
C16	CERAMIC, .1µF, 50V	12104
C17	CERAMIC, .1µF, 50V	12104
C18	CERAMIC, .1µF, 50V	12104
C19	CERAMIC, .1µF, 50V	12104
C20	CERAMIC, .1µF, 50V	12104
C21	CERAMIC, .1µF, 50V	12104
C22	CERAMIC, .1µF, 50V	12104
C23	ELECT, 1µF, 50V	11001
C24	ELECT, 1µF, 50V	11001
C25	ELECT, 1µF, 50V	11001
C26	ELECT, 100µF, 100V	11087
C27	ELECT, 1µF, 50V	11001
C28	CERAMIC, .1µF, 50V	12104
C29	CERAMIC, 1000pF, 50V	12152
C30	CERAMIC, .1µF, 50V	12104
C31	CERAMIC, .1µF, 50V	12104
C32	MYLAR, 0.22µF, 50V	13004
C33	ELECT, 100µF, 35V	11036
C34	ELECT, 100µF, 35V	11036
C35	CERAMIC, .1µF, 50V	12104
C36	CERAMIC, 1000pF, 50V	12152
C37	CERAMIC, .1µF, 50V	12104
C38	CERAMIC, .1µF, 50V	12104
C39	MYLAR, 0.22µF, 50V	13004
C40	ELECT, 100µF, 35V	11036
C41	ELECT, 100µF, 35V	11036
C42	CERAMIC, .1µF, 50V	12104
C43	CERAMIC, 1000pF, 50V	12152
C44	CERAMIC, .1µF, 50V	12104
C45	CERAMIC, .1µF, 50V	12104
C46	MYLAR, 0.22µF, 50V	13004
C47	ELECT, 100µF, 35V	11036
C48	ELECT, 100µF, 35V	11036
C49	CERAMIC, .1µF, 50V	12104
C50	ELECT, 100µF, 100V	11087
C51	CERAMIC, 0.01µF, 100V	13037
C52	ELECT, 100µF, 100V	11087
C53	CERAMIC, .1µF, 50V	12104
C54	CERAMIC, 1000pF, 100V	12111
C55	CERAMIC, .1µF, 50V	12104
C56	ELECT, 100µF, 100V	11087
C57	CERAMIC, 0.01µF, 100V	13037
C58	ELECT, 100µF, 100V	11087
C59	CERAMIC, .1µF, 50V	12104
C60	CERAMIC, 1000pF, 100V	12111
C61	CERAMIC, .1µF, 50V	12104
C62	ELECT, 100µF, 100V	11087
C63	CERAMIC, 0.01µF, 100V	13037
C64	ELECT, 100µF, 100V	11087
C65	CERAMIC, .1µF, 50V	12104
C66	CERAMIC, 1000pF, 100V	12111
CIRCUIT BREAKERS		
CB1	SWITCH, SPST	58037
DIODES		
CR1	1N4148	31004
CR2	ZENER, 1N5226, 1/2W, 3.3V	32017
CR3	1N4148	31004
CR4	ZENER, 1N5226, 1/2W, 3.3V	32017
CR5	1N4148	31004
CR6	ZENER, 1N5226, 1/2W, 3.3V	32017
ICs		
IC1	74HC4049B - H-CMOS HEX INVRTING BUFFER	34265
IC2	74HC161 - H-CMOS /16 SYNC COUNTER	34264
IC3	74HC161 - H-CMOS /16 SYNC COUNTER	34264
IC4	CA3338, VIDEO SPEED, 8BIT, D TO A CONV.	34270
IC5	37267, 82S135(34280), 256X8 PROM, HI-PRO.	37267
IC6	TDA8444N, OCTAL 6 BIT DAC W/I²C	34275
IC7	TDA8444N, OCTAL 6 BIT DAC W/I²C	34275
IC8	LH0070-0H, 10V PRECISION REFERENCE	34014
IC9	LM7815T,REGULATOR,+15V	34183
IC10	AD633, GP ANALOG MULTIPLIER	34274
IC11	AD633, GP ANALOG MULTIPLIER	34274
IC12	AD633, GP ANALOG MULTIPLIER	34274
IC13	AD633, GP ANALOG MULTIPLIER	34274
IC14	AD633, GP ANALOG MULTIPLIER	34274
IC15	AD633, GP ANALOG MULTIPLIER	34274
IC16	LM7805T, REGULATOR, VOLTAGE, FIXED, +5V	34088
IC17	LM7915T, -15V REGULATOR	34187
IC18	LM79L05T,REG,FIXED,-5V	34173
IC19	LM337MT - 3-TER ADJ. OUT NEG. REG LO I	34568
IC20	TL081,OP-AMP,JFET	34242
IC21	LM675,POWER AUDIO OP-AMP, 14W	34199
IC22	TL081,OP-AMP,JFET	34242
IC23	LM675,POWER AUDIO OP-AMP, 14W	34199
IC24	TL081,OP-AMP,JFET	34242
IC25	LM675,POWER AUDIO OP-AMP, 14W	34199
CONNECTORS		
J1	HDR, MTA100 - 2 POS.	51169
J2	HDR, MTA100 - 2 POS.	51169
J3	HDR, MTA100 - 2 POS.	51169
J4	HDR, MTA100 - 5 POS.	51172
J5	HDR, MTA156 - 5 POS.	51132
J6	HDR, MTA100 - 4 POS.	51171
J7	HDR, MTA100 - 4 POS.	51171
J8	HDR, MTA100 - 4 POS.	51171
TRANSISTORS		
Q1	2N5087, AMP, NPN	33170
Q2	2N5087, AMP, NPN	33170
Q3	2SA 1406, VIDEO, PNP	33100
Q4	2SC3600, VIDEO, NPN	33099
Q5	2SC3281, 200V, 15A, 150W	33173
Q6	MJE15029, PNP	33172
Q7	2N5087, AMP, NPN	33170
Q8	2N5087, AMP, NPN	33170
Q9	2SA 1406, VIDEO, PNP	33100
Q10	2SC3600, VIDEO, NPN	33099
Q11	2SC3281, 200V, 15A, 150W	33173
Q12	MJE15029, PNP	33172
Q13	2N5087, AMP, NPN	33170
Q14	2N5087, AMP, NPN	33170
Q15	2SA 1406, VIDEO, PNP	33100
Q16	2SC3600, VIDEO, NPN	33099
Q17	2SC3281, 200V, 15A, 150W	33173
Q18	MJE15029, PNP	33172
Q19	2N3904, SIGNAL, NPN	33006
Q20	2N3904, SIGNAL, NPN	33006
Q21	MPS3906, SIGNAL, PNP	33009
Q22	2N3904, SIGNAL, NPN	33006
Q23	MPS3906, SIGNAL, PNP	33009
Q24	2N3904, SIGNAL, NPN	33006
Q25	MPS3906, SIGNAL, PNP	33009
Q26	MPSW56 PNP AMPLIFIER	33167
Q27	MPSW56 PNP AMPLIFIER	33167
Q28	MPSW56 PNP AMPLIFIER	33167
RESISTORS Ω		
R1	75	21035
R2	75	21035
R3	100	21037
R4	100	21037
R5	1M	21091
R6	1M	21091
R7	1M	21091
R8	100	21037
R9	*NOT INSTALLED*	N/A
R10	*NOT INSTALLED*	N/A
R11	100	21037
R12	*NOT INSTALLED*	N/A
R13	100	21037
R14	100	21037
R15	*NOT INSTALLED*	N/A
R16	*NOT INSTALLED*	N/A
R17	100	21037
R18	*NOT INSTALLED*	N/A
R19	100	21037
R20	56, 2W	23126
R21	270	21045
R22	8.2K, 1/4W	21105
R23	10K	21066
R24	5K1	21062
R25	1	21177
R26	0 *MOLDED JUMPER*	21168
R27	0 *MOLDED JUMPER*	21168
R28	820,1/2W	22088
R29	7K5	21065
R30	33K	21107
R31	10K	21066
R32	5K1	21062
R33	1	21177
R34	0 *MOLDED JUMPER*	21168
R35	820,1/2W	22088
R36	7K5	21065
R37	33K	21107
R38	10K	21066
R39	5K1	21062
R40	12K	21068
R41	2K2	21057
R42	1	21177
R43	0	21168
R44	15,2W	23204
R45	820,1/2W	22088
R46	10K	21066
R47	10K	21066
R48	7K5	21065
R49	33K	21107
R50	2K2	21057
R51	12K	21068
R52	15,2W	23204
R53	10K	21066
R54	10K	21066
R55	0 *MOLDED JUMPER*	21168
R56	0 *MOLDED JUMPER*	21168
R57	2K2	21057
R58	12K	21068
R59	15,2W	23204
R60	10K	21066
R61	10K	21066
R62	130	21131
R63	3K3,2W	23138
R64	5,5W	23149
R65	68,1W	23197
R66	0.47,1/2W	22073
R67	0.2,1/2W	22142
R68	0, *MOLDED JUMPER*	21168
R69	4.7	21009
R70	10	21017
R71	4.7	21009
R72	680	21050
R73	330	21046
R74	220K	21118
R75	200	21042
R76	2K2,1/2W	22010
R77	1K	21126
R78	0 *MOLDED JUMPER*	21168
R79	130	21131
R80	3K3,2W	23138
R81	5,5W	23149
R82	68,1W	23197
R83	0.47,1/2W	22073
R84	0.2,1/2W	22142
R85	0 *MOLDED JUMPER*	21168
R86	4.7	21009
R87	10	21017
R88	4.7	21009
R89	680	21050
R90	330	21046
R91	220K	21118
R92	200	21042
R93	2K2,1/2W	22010
R94	1K	21126
R95	0 *MOLDED JUMPER*	21168
R96	130	21131
R97	3K3,2W	23138
R98	5,5W	23149
R99	68,1W	23197
R100	0.47,1/2W	22073
R101	0.2,1/2W	22142
R102	0 *MOLDED JUMPER*	21168
R103	4.7	21009
R104	10	21017
R105	4.7	21009
R106	680	21050
R107	330	21046
R108	220K	21118
R109	200	21042
R110	2K2,1/2W	22010
R111	1K	21126
R112	0 *MOLDED JUMPER*	21168
R113	36K	21140
R114	1K	21052
R115	3K3	21060
R116	100	21037
R117	100	21037
R118	100	21037
R119	100	21037
R120	100	21037
R121	100	21037
R122	100	20025
RP1	10K	25015
RP2	10K	25015
TEST POINTS		
TP1 - TP13	TEST POINT LOOP	51405

NOTES

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

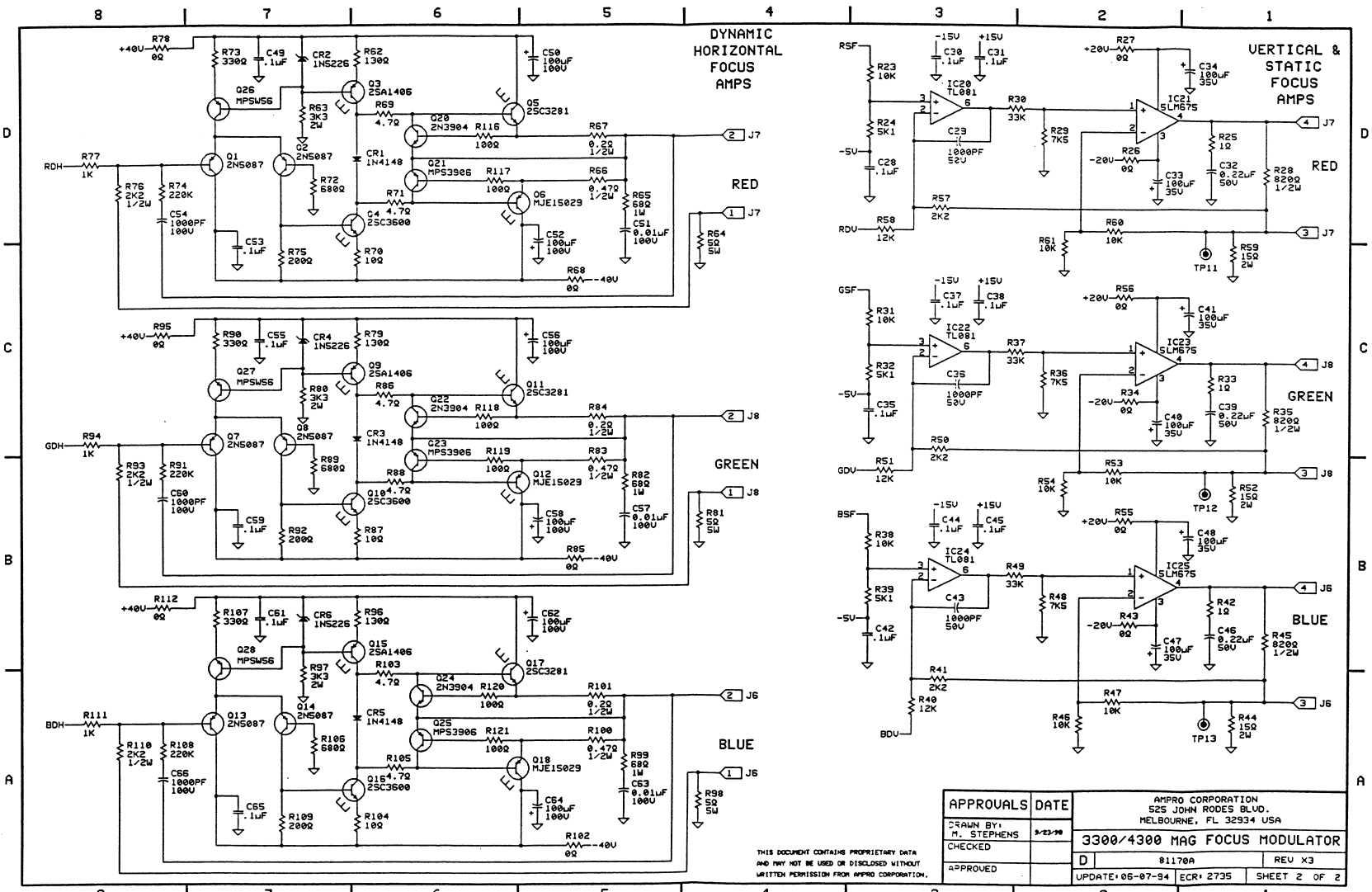
SMD/SMT denotes: SURFACE MOUNT DEVICES

11.21.2 . . . Magnetic Focus Modulator Board (81170AX3) Schematic 1 of 2:

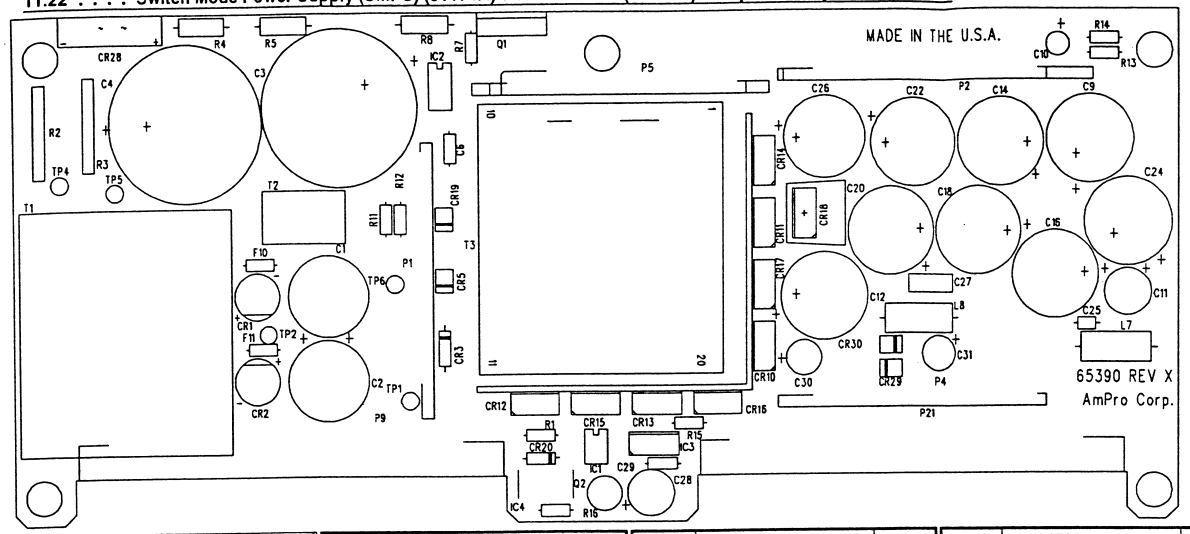


SMD/SMT denotes: SURFACE MOUNT DEVICES

11.21.3 . . . Magnetic Focus Modulator Board (81170AX3) Schematic 2 of 2:



11.22 . . . . Switch Mode Power Supply (SMPS) (81174A) & Fuse Board[1] (81175A) Component Layout / Parts List:



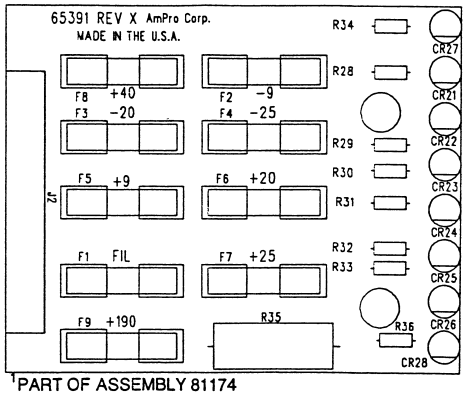
SMPS (81174A)		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65390 (X)
CAPACITORS		
C1	ELECT, 2200µF, 35V	11058
C2	ELECT, 1000µF, 35V	11057
C3	ELECT, 1800µF, 200V	11142
C4	ELECT, 1800µF, 200V	11142
C5	*NOT INSTALLED*	N/A
C6	CERAMIC, 1µF, 50V	12097
C7	CERAMIC, .1µF, 50V	12071
C8	MICA, 1000pF, 100V	13051
C9	ELECT, 500µF, 25V	11152
C10	ELECT, 10µF, 35V	11008
C11	ELECT, 470µF, 16V	11107
C12	ELECT, 500µF, 25V	11152
C13	CERAMIC, .01µF, 100V	12052
C14	ELECT, 600µF, 40V	11106
C15	CERMIC, .01µF, 100V	12052
C16	ELECT, 600µF, 40V	11106
C17	CERAMIC, .01µF, 100V	12052
C18	ELECT, 500µF, 25V	11152
C19	CERAMIC, .01µF, 100V	12052
C20	ELECT, 600µF, 40V	11106
C21	CERAMIC, .01µF, 100V	12052
C22	ELECT, 600µF, 40V	11106
C23	CERAMIC, .01µF, 100V	12052
C24	ELECT, 470µF, 50V	11139
C25	CERAMIC, .01µF, 100V	12052
C26	ELECT, 39µF, 250V	11140
C27	MICA, .01µF, 1KV	12015

C28	ELECT, 47µF, 35V	11035
C29	CERAMIC, 1µF, 50V	12097
C30	ELECT, 22µF, 100V	11141
C31	ELECT, 22µF, 100V	11141
C32	TANTALUM, 1µF	15003
DIODES		
CR1	1N4002 RECTIFIER 100V	31003
CR2	RECTIFIER, BRIDGE,W04M	31022
CR3	GE531 RECTIFIER	31005
CR6	MR918	31041
CR7	MR918	31041
CR8	MR918	31041
CR9	MR918	31041
CR10	MBR 1045, RECTIFIER,F AST	31048
CR11	MBR 1045, RECTIFIER ,FAST	31048
CR12	BY229-600, RECTIFIER, FAST, DOUBLE DIFFUSED	31018
CR13	BY229-600, RECTIFIER, FAST, DOUBLE DIFFUSED	31018
CR14	MBR 1045, RECTIFIER, FAST	31048
CR15	MBR 1045, RECTIFIER, FAST	31048
CR16	BY229-600, RECTIFIER, FAST, DOUBLE DIFFUSED	31018
CR17	BY229-600, RECTIFIER, FAST, DOUBLE DIFFUSED	31018
CR18	BY229-600, RECTIFIER,FAST, DOUBLE DIFFUSED	31018
CR19	BYV96E	31042
CR20	CAPACITOR, CERAMIC, .1F, 50V	12104
CR28	RECTIFIER, BRIDGE, KBU8G, 8A	31051
CR29	BYV96E	31042
CR30	BYV96E	31042

CR31	1N4002 RECTIFIER 100V	31003
FUSES		
F10	5A, FAST, 1/4w SIZE	58023
F11	5A, FAST, 1/4w SIZE	58023
FERRITE BEADS		
FB1	FERRITE BEAD	43201
FB2	FERRITE BEAD	43201
FB3	FERRITE BEAD	43201
FB4	FERRITE BEAD	43201
FB5	FERRITE BEAD	43201
ICs		
IC1	OPTOISOLATOR, 4N35, PHOTO-TRANSISTOR OUT	34009
IC2	IXLD4420, MOSFET DRIVER	
IC3	TL594CN, SMPS CONTROL CIRCUIT	34164
IC4	LM78L15T,REGULATOR,VOLTAGE, FIXED,+15V	34184
INDUCTORS		
L1	50µH, 9 AMP MAX	42083
L2	50µH, 9 AMP MAX	42083
L3	50µH, 9 AMP MAX	42083
L4	50µH, 9 AMP MAX	42083
L5	50µH, 9 AMP MAX	42083
L6	50µH, 9 AMP MAX	42083
L7	50µH, 9 AMP MAX	42173
L8	250µH, HI CURRENT	42029
CONNECTORS		
P21	32 PIN A ● C DIN MALE	51398
P9	32 PIN A ● C DIN MALE	51398
TRANSISTORS		
Q1	MOSFET, IXTH12N100, 1000V, 12 AMPS	33090

Q2	TRANSISTOR, 2N3904, SIGNAL, NPN	33006
RESISTORS Ω		
R1	1K2	21114
R2	2.5,THRM	23111
R3	2.5,THRM	23111
R4	150K,1/2W	22026
R5	150K,1/2W	22026
R7	10K	21066
R8	1	21050
R9	1K2, 8W, 5%	23123
R10	1K2, 8W, 5%	21123
R11	180	21041
R12	22	21119
R13	560	21049
R14	130	21131
R15	120,1/2W	21052
R16	220	21043
R17	43K	21158
R26	POTENTIOMETER, 100	24093
TRANSFORMERS		
T1	DST-6-16, 16V@1.25A, 8V@2.5A	41061
T2	COIL, CURRENT SENSE 200 TURN	42038
T3	SMPS TRANSFORMER	41060
TEST POINTS		
TP1 - TP5	TEST POINT	51370
TP8	TEST POINT	51072

FUSE BOARD (81175A[1]) [1]PART OF ASSEMBLY 81174		
REF	DESCRIPTION	P/N
PCB		
PCB	PRINTED CIRCUIT BOARD	65391 (X)
DIODES		
CR21	LIGHT EMITTING DIODE, GRN	31051
CR22	LIGHT EMITTING DIODE, GRN	31051
CR23	LIGHT EMITTING DIODE, GRN	31051
CR24	LIGHT EMITTING DIODE, GRN	31051
CR25	LIGHT EMITTING DIODE, GRN	31051
CR26	LIGHT EMITTING DIODE, GRN	31051
CR27	LIGHT EMITTING DIODE, GRN	31051
CR28	LIGHT EMITTING DIODE, GRN	31051
CONNECTORS		
J2	20 PIN, RT ANGL. PCB MNT	51345
RESISTORS Ω		
R28	1K	21052
R29	2K2	21057
R30	2K7	21059
R31	1K	21052
R32	2K2	21057
R33	2K7	21059
R34	4K7, 1/2W	22014
R35	10K, 5W	23199
R36	200	21042

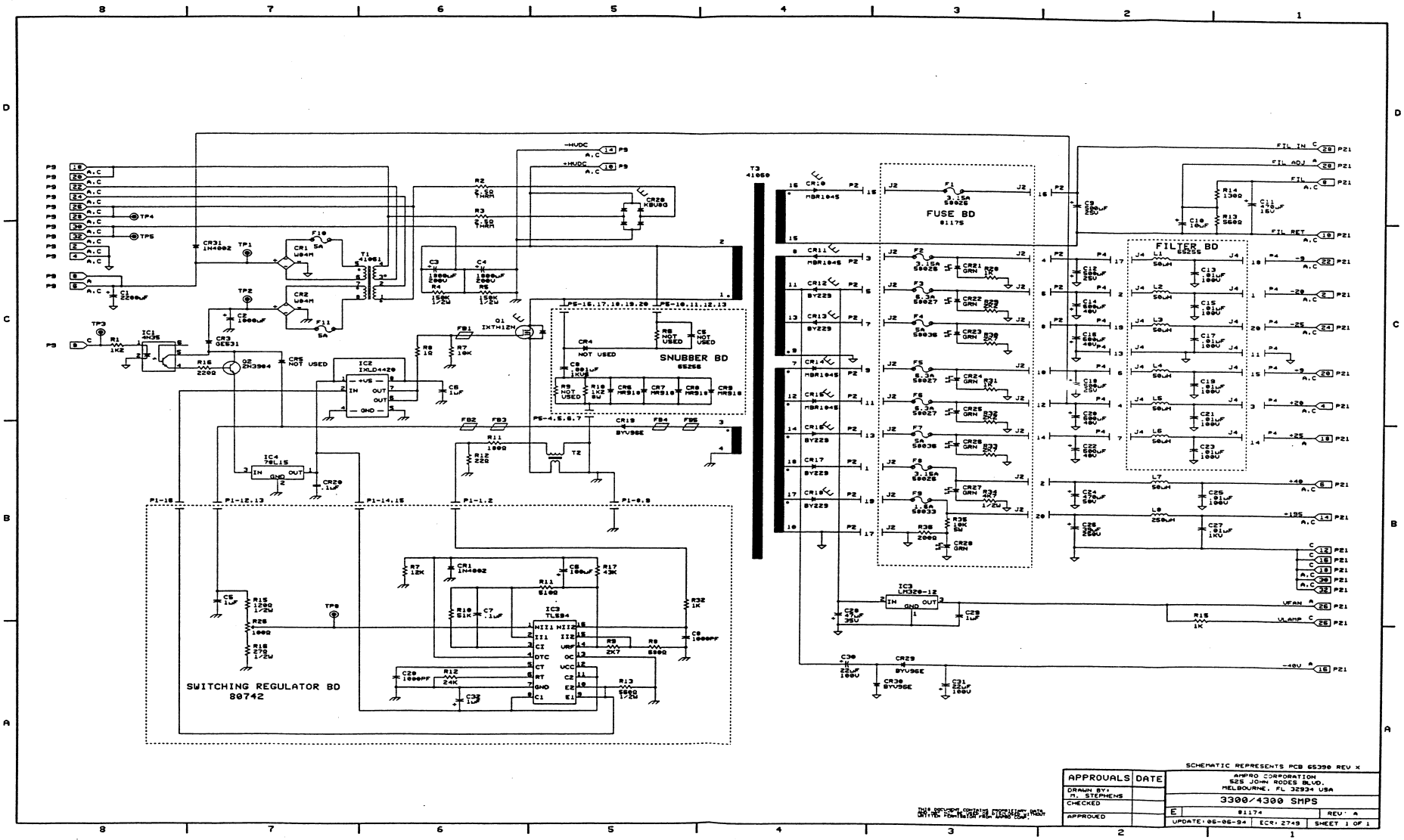


[1]PART OF ASSEMBLY 81174

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

SMD/SMT denotes: SURFACE MOUNT DEVICES

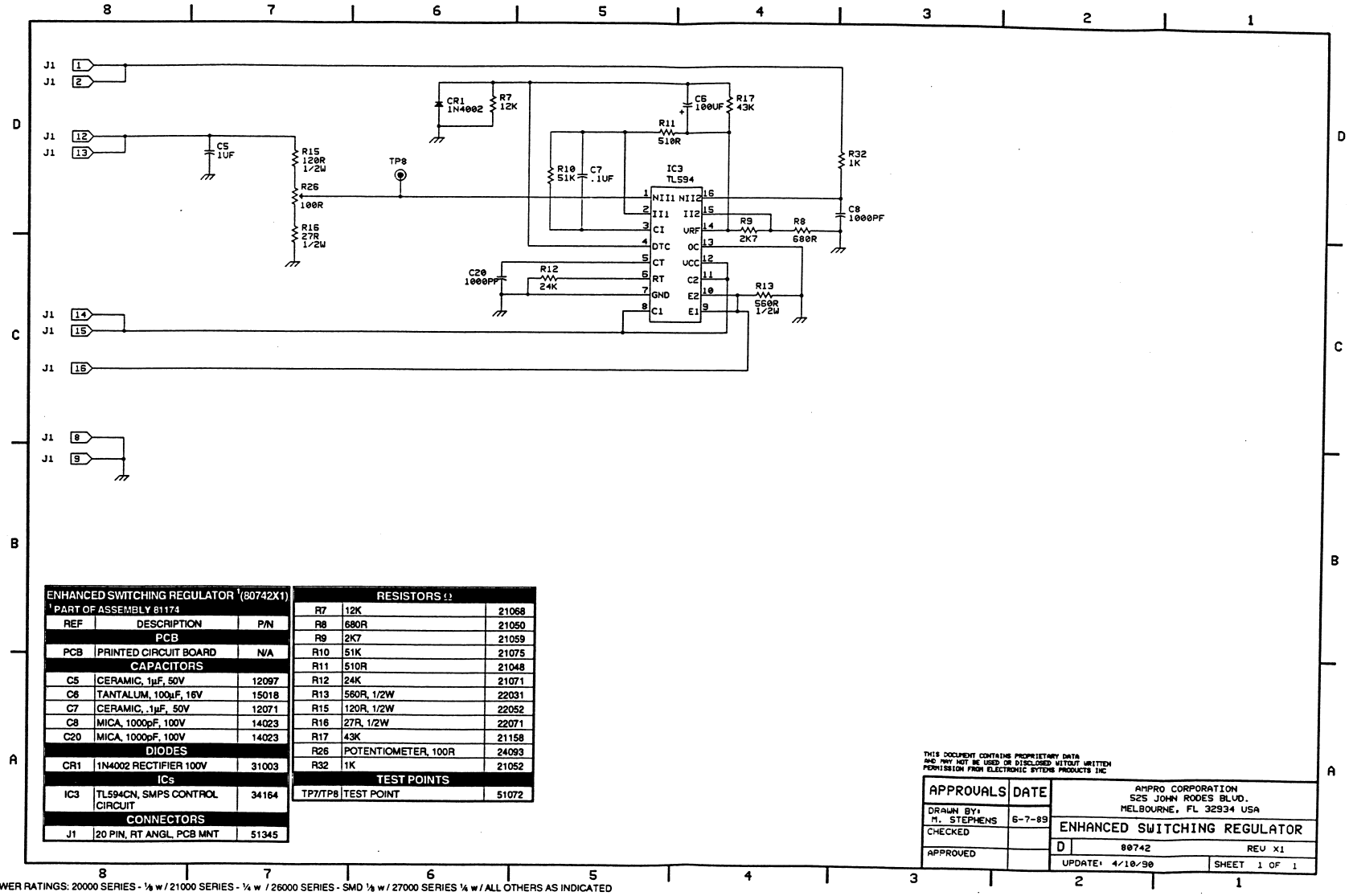
11.22.1 . . . Switch Mode Power Supply (SMPS) (81174A) & Fuse Board (81175A) Schematic 1 of 1



SMPS (81174A) & Fuse Board (81175A) Schematic 1 of 1

SMD/SMT denotes: SURFACE MOUNT DEVICES

11.23 . . . . Enhanced Switching Regulator (80742X1) Parts List / Schematic 1 of 1:



ENHANCED SWITCHING REGULATOR [1] (80742X1)		
[1] PART OF ASSEMBLY 81174		
REF	DESCRIPTION	P/N
	PCB	
PCB	PRINTED CIRCUIT BOARD	N/A
	CAPACITORS	
C5	CERAMIC, 1µF, 50V	12097
C6	TANTALUM, 100µF, 16V	15018
C7	CERAMIC, .1µF, 50V	12071
C8	MICA, 1000pF, 100V	14023
C20	MICA, 1000pF, 100V	14023
	DIODES	
CR1	1N4002 RECTIFIER 100V	31003
	ICs	
IC3	TL594CN, SMPS CONTROL CIRCUIT	34164
	CONNECTORS	
J1	20 PIN, RT ANGL, PCB MNT	51345

RESISTORS Ω		
R7	12K	21068
R8	680R	21050
R9	2K7	21059
R10	51K	21075
R11	510R	21048
R12	24K	21071
R13	560R, 1/2W	22031
R15	120R, 1/2W	22052
R16	27R, 1/2W	22071
R17	43K	21158
R26	POTENTIOMETER, 100R	24093
R32	1K	21052
	TEST POINTS	
TP7/TP8	TEST POINT	51072

RESISTOR POWER RATINGS: 20000 SERIES - ⅛ w / 21000 SERIES - ¼ w / 26000 SERIES - SMD ⅛ w / 27000 SERIES ¼ w / ALL OTHERS AS INDICATED

SMD/SMT denotes: SURFACE MOUNT DEVICES

APPLICATION BULLETIN #11

MODEL: AMPRO 2000/3300/4300 DISPLAY SYSTEMS	DATE: FEBRUARY 22, 1995
EFFECTIVE: 2000 - REVISION "Q" / 3300 - REVISION "D" / 4300 - REVISION "E"	
SUBJECT:. New Hard-Wired Remote Control (P/N 81271); This document will introduce you to the new AMPRO (RS-232) hard-wired remote control and highlight the significant functionality changes. It should be noted that some of the function keys have been rearranged, but their functionality remains the same. Please refer to Section 7 of the operation manual for detail information on the operation and functions of the new remote control.	

MODE SELECTION

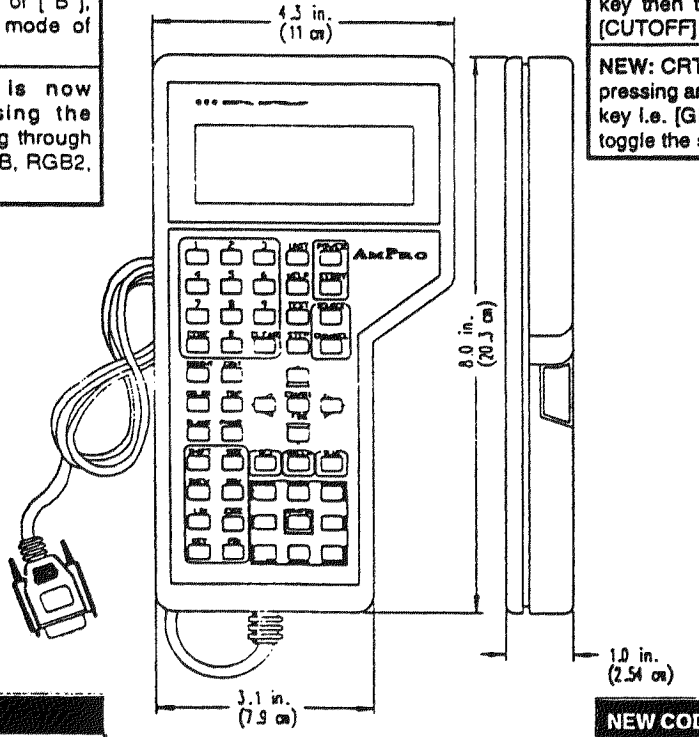
PREVIOUS: Mode selection was previously accomplished by pressing either the [RGB] , [A] or [B], depending on the desired mode of operation.

NEW: Mode selection is now accomplished by pressing the [SOURCE] key and stepping through the available inputs, i.e. RGB, RGB2, VIDEO1, etc.

CRT CUTOFF

PREVIOUS: CRT cutoff was performed by pressing the [CUTOFF] key then the desired color key, i.e., [CUTOFF] [GREEN].

NEW: CRT cutoff is accomplished by pressing and holding the desired color key i.e. [GREEN], for = 3 seconds to toggle the selected color "on" or "off".



COARSE/FINE

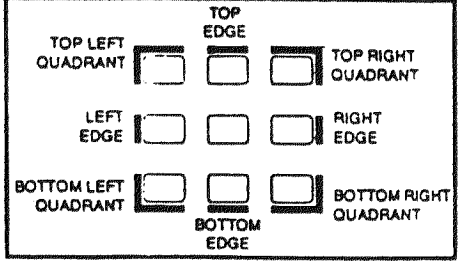
The coarse/fine function provides the ability to change the adjustment speed of the selected function.

PREVIOUS: Toggling between the coarse and fine adjustment was performed by toggling the [DYN] key.

NEW: Selection between the coarse or fine mode is now accomplished by pressing the dedicated [COARSE/FINE] key.

EDGES and QUADRANTS

Although the functionality of the area control keys has not changed, the illustration of these controls have. See example below.



NEW CODES

68 [CODE]: The detail key has been removed from the new remote control. To enable the detail function, you must first enter 68 then press the [CODE] key.

808 [CODE]: This code allows you to change the operating baud rate of the remote control eliminating the need to open the remote. Refer to Supplement 3 of the operation manual for additional information.

808 [KEY]: Enter 808, then press the [KEY] button to reset the remote control to the factory defaults.

AMPRO 3300 / 4300 System Commands	
DISPLAY / ENABLE / ADJUST	
45	DISABLE REGISTRATION KEYS
46	ENABLE REGISTRATION KEYS
47	ENABLE GUIDED REGISTRATION
48	CHANGE BLACK LEVEL CLAMP POINT (Toggle)
49	MONOCHROME MODE (Toggle)
50	ENABLE N-S CORNER PINCUSHION
55	REGISTRATION ON/OFF (Toggle)
IR REMOTE SETUP	
60	ENABLE MASTER HORIZ/VERT SIZE
61	ENABLE TOP BLANKING
62	ENABLE BOTTOM BLANKING
63	ENABLE LEFT BLANKING
64	ENABLE RIGHT BLANKING
65	RED CRT CUTOFF (Toggle)
66	GREEN CRT CUTOFF (Toggle)
67	BLUE CRT CUTOFF (Toggle)
68	ENABLE DETAIL FUNCTION
INSTALL	
70	INSTALL/REMOVE MODULE (Special Instructions)
RESET	
77	INITIALIZE INTERNAL TEST/HELP SCREENS
79	RESET INTERNAL TEST/HELP SCREENS
SPECIALS	
90	DISABLE HDTV MODE (HD Version Only)
91	ENABLE HDTV MODE (HD Version Only)
92	ENABLE INTENSITY MODULATION (Optional)
93	CLEAR INTENSITY MODULATION (Optional)
94	ENABLE SUB-CONTRAST ADJUST MODE
95	ENABLE SUB-BRIGHTNESS ADJUST MODE
96	SELECT COLOR TEMPERATURE
97	GAMMA CORRECTION ON/OFF (Optional)
98	ENABLE STATIC FOCUS
99	ENABLE DYNAMIC FOCUS
808	ACCESS REMOTE BAUD RATE SELECTION MENU
900	DISABLE QUIET MODE
901	ENABLE QUIET MODE
909	EXIT EXECUTIVE MODE OF OPERATION

AMPRO 3300 / 4300 System Commands	
INTERNAL TIMER REVISION E	
10	DISPLAY TIME OF DAY
11	SET TIME OF DAY
12	ENABLE TIMER OPERATION
13	DISABLE TIMER OPERATION
14	DISPLAY TIMER "ON" TIME
15	SET TIMER "ON" TIME
16	DISPLAY TIMER "OFF" TIME
17	SET TIMER "OFF" TIME
18	SET DAY
19	SELECT 5 OR 7 DAY OPERATION
CHANNEL	
20	CHANNEL WRITE PROTECT (Toggle)
21	ACTIVATE A.C.S.
22	COPY CHANNEL "TO"
23	COPY CHANNEL "FROM"
24	VALIDATE CHANNEL FREQUENCY
25	TEST CHANNEL VALIDATION
26	DISPLAY SYSTEM/CHANNEL STATUS PAGES
27	CHANNEL AUTO-SEARCH MODE (Toggle)
28	COPY CHANNEL "ALL"
29	CLEAR ACTIVE CHANNEL
DISPLAY / ENABLE / ADJUST	
30	DISPLAY DIAGNOSTICS
31	DISPLAY TOTAL OPERATING TIME
32	DISPLAY CRT TIME
33	DISPLAY ORIENTATION (Sweep Configuration)
34	DISPLAY BOARD STATUS (Input(s) Available)
35	DISPLAY ROM REVISION / SERIAL NUMBER
36	DISPLAY FREQUENCY COUNTER
37	ENABLE EXECUTIVE MODE
38	DISPLAY HIGH VOLTAGE RESET COUNT
39	DISPLAY INTERNAL TEMPERATURE(S)
40	ADJUST RED STATIC VERTICAL SHIFT (RVS)
41	ADJUST BLUE STATIC VERTICAL SHIFT(BVS)
42	ADJUST LCD BACK LIGHT
43	TEST REMOTE CONTROL
44	READ SWITCHES