DA3000
Video Distribution Amplifier

PESA Switching Systems
330A Wynn Drive
Huntsville, AL 35805

Document No. 81-9059-0305-0 Rev. G

Manual Updates:

1/31/95	Rev A: Manual released for initial printing.
11/15/95	Rev B: Incorporated ECO changes.
07/15/97	Rev C: Incorporated ECO changes.
02-28-01	Rev D: Not released - Agile conversion. GLT
02-28-01	Rev E: Synchronized revision level with Agile per ECO CE00126. GLT
03-01-01	Rev F: Deleted Printing Specification per ECO CE00113. GLT
03-15-01	Rev G: Deleted bills of material, drawings, and schematics per ECO CE00130. GLT

Service and Ordering Assistance

PESA Switching Systems, Inc.
330A Wynn Drive
Huntsville, AL 35805
Main Numbers:
Tel: (205) 726-9200
Fax: (205) 726-9271
Service Department Numbers:
Tel: (205) 726-9222
Fax: (205) 726-9268

Sales Office

National Sales Office
PESA Switching Systems, Inc.
35 Pinelawn Road, Suite 99E
Melville, NY 11747
Tel: (800) 328-1008
Fax: (516) 845-5023

PESA Switching Systems

NOTE

Please address all comments or suggestions concerning this or other PESA manuals to:

Publications Department
PESA Switching Systems, Inc.
330A Wynn Drive
Huntsville, Alabama 35805
(205) 726-9200 EXT. 145

PESA Switching Systems

ATTENTION

ATTENTION

ALL EQUIPMENT ITEMS MANUFACTURED BY OR SOLD BY PESA SWITCHING SYSTEMS, INC. SHOULD BE SERVICED BY QUALIFIED SERVICE PERSONNEL OR BY QUALIFIED SERVICE TECHNICANS ONLY.

PESA Switching Systems

This page inserted to facilitate duplex printing.

Table of Contents

DA3000 Video

Section 1. Introduction

1.1 Manual Overview 1.1
1.2 General Description 1.2
1.3 DA3000 Video Mainframe Specifications 1.3
1.4 VDA3001 Video Board Specifications 1.4
1.5 VDA3002 Video Board Specifications 1.5
1.6 SDVDA3001 Video Board Specifications 1.7

Figures

Figure 1-1 DA3000 Video Mainframe Front View 1.2
Figure 1-2 DA3000 Video Mainframe Rear View 1.2

Section 2. Installation

2.1 Introduction 2.1
2.2 Receipt Inspection 2.1
2.3 Unpacking 2.1
2.4 Location 2.2
2.5 Mounting 2.2
2.6 Cabling 2.3
2.7 Plug-In Video Card Installation 2.4
2.8 Video Power Supply Installation 2.5
2.9 Front Panel Installation 2.6
2.10 Rear Panel Connectors 2.7
Alarm Connector 2.7
DC Power Connector 2.8
Video Input and Output Connectors 2.8
2.11 DA3000 Video Mainframe System Connections 2.8
Connection Guide 2.8

Figures

Figure 2-1 Chassis Installation 2.2
Figure 2-2 Cables Attached to Supports 2.3
Figure 2-3 Video Board Installation 2.4
Figure 2-4 Isolation Diode Installation 2.5
Figure 2-5 Video Power Supply Installation 2.6
Figure 2-6 Front Panel Installation 2.7
Figure 2-7 DA3000 Video Rear Panel 2.7
Figure 2-8 Sample System Connections 2.9

Table of Contents

DA3000 Video

Section 3. Operation

3.1 Introduction 3.1
3.2 VDA3001 Video Board Operation 3.1
3.3 VDA3001 Video Board Adjustments 3.1
DC Offset (R3) 3.2
Common Mode Rejection Ratio (CMRR) (R10) 3.2
Gain (R17) 3.3
3.4 VDA3002 Video Board Operation 3.3
VDA3002 Video Board Power LED 3.3
VDA3002 Video Board Clamp Switch 3.4
Equalization Board HI-LO Switch 3.4
3.5 VDA3002 Video Board Adjustments 3.4
DC Offset (R2 and R72) 3.5
Common Mode Rejection (R28) 3.5
Gain (R21) 3.6
Equalization Board Adjustment 3.6
3.6 SDVDA3001 Digital Video Board Operation 3.8
Cable Detect LED (Green) 3.8
Equalization Alarm LED (Red) 3.8
3.7 SDVDA3001 Digital Video Board Adjustments 3.9
Cable Detect (R17) and Equalization Alarm (R19) 3.9

Section 4. Functional

4.1 Introduction 4.1
4.2 DA3000 Video Backplane 4.1
Input/Output 4.1
Power Distribution 4.1
4.3 VDA3001 Video Board 4.2
Power 4.2
Input 4.2
Output 4.3
4.4 VDA3002 Video Board 4.3
Power 4.3
Input 4.4
Clamp 4.4
Gain 4.5
Clamp Sync 4.5
Output 4.5
4.5 Video Equalization Board 4.5
First Stage 4.6
Second Stage 4.6

Table of Contents

DA3000 Video

Section 4. Functional Continued:

4.6 SDVDA3001 Video Board 4.6
Power 4.7
Input 4.7
Output 4.8
Alarm 4.8
4.7 PS45 Video Power Supply 4.8
Circuit Description 4.9

Section 5. Maintenance

5.1 Maintenance 5.1
5.2 Preventive Maintenance 5.1
5.3 Test Equipment 5.2
5.4 Corrective Maintenance 5.2
Factory Repair Service 5.2
Troubleshooting 5.3
Replacement Parts 5.3
5.5 Power Supply Fuse Replacement 5.3

Figures

Figure 5-1 Fuse Location on the PS45V Power Supply 5.4

Table of Contents

DA3000 Video

1.1 Manual Overview

This manual provides detailed instructions for installing and operating the PESA DA3000 Video Mainframe. This manual is divided into five sections as shown. Sections 3 and 4 contain in-depth operational and functional descriptions of the DA3000 Video Mainframe and the associated Video Distribution Boards.

Section 1, **INTRODUCTION**, summarizes the manual, describes the product, presents a list of terms, and provides the panel specifications.

Section 2, **INSTALLATION**, provides installation and setup instructions.

Section 3, **OPERATION**, describes system operation procedures.

Section 4, **FUNCTIONAL DESCRIPTIONS**, presents an in-depth description of each component.

Section 5, **MAINTENANCE**, explains procedures for maintenance.

1.2 General Description

The DA3000 Video Mainframe is the heart of PESA's new line of low cost video distribution amplifiers. Housed in a 2RU chassis with ten video card slots, video, equalized video, and serial digital video signals can be distributed by selecting the appropriate plug-in cards. Up to two power supply modules can be installed in the DA3000 Video Mainframe to allow single frame power redundancy.

Developed as a low cost modular frame, the DA3000 Video Mainframe is easily upgraded as requirements in the field change. All plug-in modules and power supplies are installed and removed from the front.

Currently there are three models of plug-in video distribution amplifier cards available; these are the VDA3001 Video Board, the VDA3002 Video Board, and the SDVDA3001 Video Board. The VDA3001 Video Board is a general purpose video distribution amplifier board, the VDA3002 Video Board is a equalizing video distribution amplifier board, and the SDVDA3001 is a serial digital distribution amplifier board. The VDA3001 is capable of accepting a 1V p-p video input or a 2V p-p subcarrier input. The VDA3002 is capable of equalizing up to 1000 feet of Belden 8281 coaxial cable when used for post-equalization and up to 650 feet of Belden 8281 coaxial cable when used for pre-equalization. The SDVDA3001 is capable of distributing a wide of range serial digital video signals.

Figure 1-1 DA3000 Video Mainframe Front View

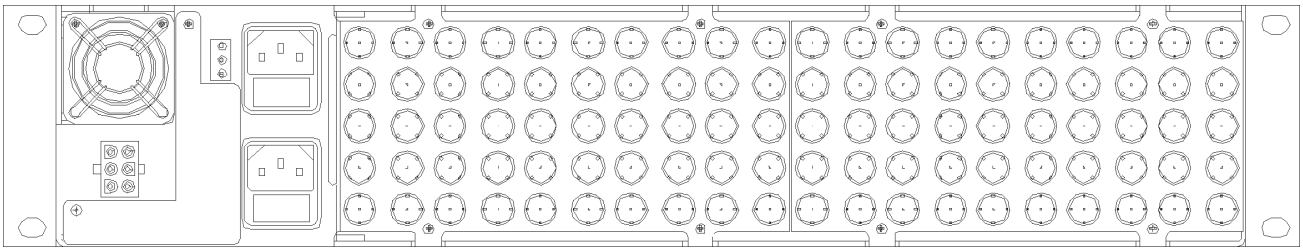

Figure 1-2 DA3000 Video Mainframe Rear View

1.3 DA3000 Video Mainframe Specifications

INPUT CHARACTERISTICS	
Input Type	Looping Inputs
Connector Type	BNC
OUTPUT CHARACTERISTICS	
Number	8 Per Channel
Connector Type	BNC
CARD SLOTS	
Number	10 Per Chassis
ENVIRONMENTAL - Operational	
Temperature	0℃ to 40℃
Humidity	10-90% Non-Condensing
POWER SUPPLIES	
Number	1 (Standard) 2 (Optional)
MECHANICAL	
Dimensions	2RU 19" W X 10" D 3.5" H (482.6mm X 254.1mm X 89mm)
POWER	
AC Voltages	100-130V, ±10%, 47-63Hz (US) 200-250V, ±10%, 47-63Hz (OUS)
Power	Apx. 45VA

1.4 VDA3001 Video Board Specifications

INPUT CHARACTERISTICS

Level	1V P-P Nominal
	2V P-P Max. (without obvious distortion)
Impedance	75 Ohm Bridging
Return Loss	>40dB to 5MHz
Coupling	AC/DC Selectable
Type	Differential
Common Mode Rejection	>70dB @ 60Hz
	>40dB to 5MHz
Common Mode Level	<6V P-P

OUTPUT CHARACTERISTICS

Level	1V P-P Nominal
	2V P-P Max (without obvious distortion)
Impedance	75 Ohms
Return Loss	>40dB to 5MHz
Coupling	Direct (DC) or DC Restored
DC on Outputs	<±20mV Max.
Number	Eight
Output Isolation	
Output to Output	>35dB to 5MHz
Module to Module	>70dB to 5MHz

GAIN CHARACTERISTICS

Gain	Unity
Gain Stability	<±0.1dB Max.
Gain Adjust Range	±3.0dB

LINEAR DISTORTION

Frequency Response	<±0.025dB to 10MHz
	<±0.5dB to 20MHz
	<-1.0dB to 30MHz
	<-3.0dB to 35MHz
Vertical Tilt	0.25%
Horizontal Tilt	0.25%

CHROMINANCE/LUMINANCE

Gain Inequality	<0.1%
Delay Inequality	<2 nsec

1.4 VDA3001 Video Board Specifications Continued:

NON-LINEAR DISTORTION
(All tests, 10-90%, 3.58MHz or 12.5-87.5%, 4.43MHz)

Differential Gain	0.1% @ 4.43MHz
Differential Phase	0.1° @ 4.43MHz

SIGNAL TO NOISE

Unweighted	-70dB to 20MHz

ENVIRONMENTAL - Operational

Temperature	0℃ to 40℃
Humidity	10-90% Non-Condensing

1.5 VDA3002 Video Board Specifications

INPUT CHARACTERISTICS

Level	1V P-P Nominal
	2V P-P Max. (without obvious distortion)
Impedance	Hi Z Bridging
Return Loss	>40dB to 5MHz
Coupling	AC/DC Selectable
Type	Differential
Common Mode Rejection	>70dB @ 60Hz
	>40dB to 5MHz
Common Mode Level	<6V P-P

OUTPUT CHARACTERISTICS

Level	1V P-P Nominal
	2V P-P Max. (without obvious distortion)
Impedance	75 Ohms
Return Loss	>40dB to 5MHz
Coupling	Direct (DC) or DC Restored (Clamp)
DC on Outputs	<±25mV Max. (Without Clamp)
	<±10mV Max. (With Clamp)
Number	Eight
Output Isolation	
Output to Output	>40dB to 10MHz
Module to Module	>70dB to 5MHz

GAIN CHARACTERISTICS

Gain	Unity
Gain Stability	<±0.1dB Max.
Gain Adjust Range	±3.0dB

1.5 VDA3002 Video Board Specifications Continued:

LINEAR DISTORTION

Frequency Response (With Equalization)	<±0.05dB to 5MHz <±0.1dB to 10MHz <-1.0dB to 30MHz <-3.0dB to 35MHz
Vertical Tilt	0.25%
Horizontal Tilt	0.25%

CHROMINANCE/LUMINANCE

Gain Inequality	<0.1%
Delay Inequality	<5 nsec

NON-LINEAR DISTORTION

(All tests, 10-90%, 3.85MHz or 12.5-87.5%, 4.43MHz)

Differential Gain	0.1% @ 4.43MHz
Differential Phase	0.1° @ 4.43MHz

SIGNAL TO NOISE

Unweighted	-70dB to 20MHz

EQUALIZATION (Optional Plug-On Module)

Range		0-1000 Feet Post-Equalization 0-650 Feet Pre-Equalization
Adjustment Type		Dual Range, Lo - Hi; continuously variable throughout each range.
	Post-Equalization	Lo Range = 0-500 Feet Hi Range = 500-1000 Feet
	Pre-Equalization Range	Lo Range = 0-500 Feet Hi Range = 500-650 Feet
Cable Type		Determined by Equalization Module used. Standard Module is for Belden 8281.

CLAMP

Clamp Speed	<10 Lines of video to correct maximum step of ±1.0V.

ENVIRONMENTAL - Operational

Temperature	0℃ to 40℃
Humidity	10-90% Non-Condensing

1.6 SDVDA3001 Video Board Specifications

INPUT CHARACTERISTICS

Standards	SMPTE 143Mb/s, NSTC 177Mb/s, PAL 270Mb/s, 525/625 Component 360Mb/s, 525/625 Component
Impedance	75 Ohm
Return Loss	>15dB to Clock Frequency
Signal Level	800mV ±10%
Common Mode Rejection	30V P-P, up to 60Hz
Equalization	Automatic

OUTPUT CHARACTERISTICS

Number of Outputs	8
Standards	SMPTE 143Mb/s, NSTC 177Mb/s, PAL 270Mb/s, 525/625 Component 360Mb/s, 525/625 Component
Impedance	75 Ohm
Return Loss	>15dB to Clock Frequency
Signal Level	800mV ±10%
DC Offset	0V ±0.5V
Rise and Fall Time	400-700pS (20 to 80% Amplitude)
Overshoot	<10% of Amplitude (all outputs terminated)

ENVIRONMENTAL - Operational

Temperature	0℃ to 40℃
Humidity	10-90% Non-Condensing


1
INTRODUCTION

2.1 Introduction

This section details DA3000 Video Mainframe installation procedures. The following topics are discussed:

- Receipt Inspection
- Unpacking
- Location
- Mounting
- Cabling
- Plug-In Video Card Installation
- Video Power Supply Installation
- Front Panel Installation
- Rear Panel Connectors
- DA3000 Video Mainframe System Connections

NOTICE

THE DA3000 VIDEO MAINFRAME VIDEO CARDS AND POWER SUPPLIES CONTAIN STATIC SENSITIVE DEVICES. CARE SHOULD BE USED WHEN IT IS NECESSARY TO HANDLE THESE CARDS. IT IS RECOMMENDED THAT A GROUND WRIST STRAP AND GROUNDING MAT BE USED BEFORE ATTEMPTING ANY EQUIPMENT INSTALLATIONS AND ADJUSTMENTS.

2.2 Receipt Inspection

The DA3000 Video Mainframe was tested and inspected prior to leaving the factory. Upon receipt, inspect the equipment for shipping damage. If any damage is found, contact the carrier immediately and save all packing material.

2.3 Unpacking

The DA3000 Video Mainframe is comprised of a frame, a backplane, up to two video power supplies, and up to ten video distribution boards. Prior to discarding packing material compare the parts received against the packing list. Carefully inspect the layers of packing material for any components which may have been overlooked during the initial unpacking.

2.4 Location

The DA3000 Video Mainframe may be located anywhere power is available. However, units should be mounted as close as possible to their associated equipment to minimize cable runs. Installation should be in an area where the ambient temperature does not exceed 40°C (104°F) inside the equipment rack.

2.5 Mounting

The DA3000 Video Mainframe is rack mounted in a standard 19” equipment rack. Sufficient space must be provided behind the rack to allow for the video and power cables. All mounting holes should be utilized and mounting hardware tightened securely. As with all equipment installed in a rack, the bottom screw on each side should be installed before proceeding with the remainder of the screws. Then all screws should be securely tightened. Support the DA3000 Video Mainframe's bottom while installing it in the rack. Figure 2-1 illustrates chassis installation in the equipment rack.

To install a DA3000 Video Mainframe in an equipment rack follow these steps:

1. Align the chassis with the slotted opening in the rack.
2. Install the bottom screws first.
3. Install the two top screws
4. Tighten all four screws securely.

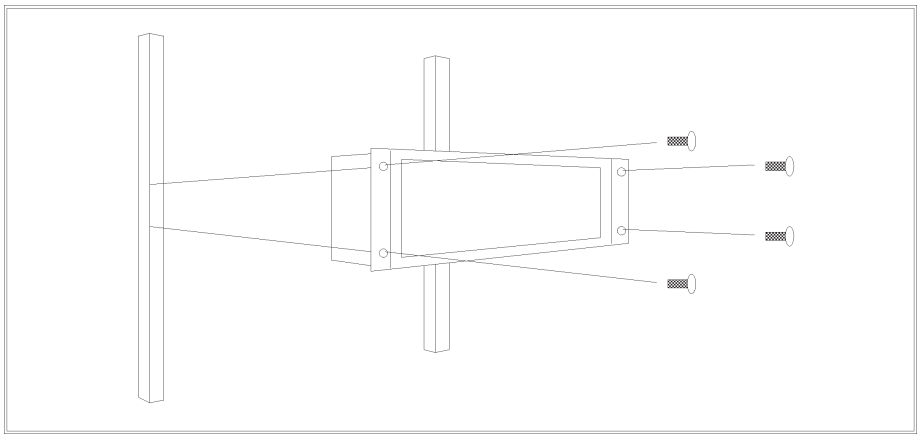

Figure 2-1 Chassis Installation

2.6 Cabling

Considerable weight will be added to the rear panel of the DA3000 Video Mainframe by the video cables and power cables. Therefore, all cables should be strained relieved and secured to racks or other supporting structures. Failure to provide adequate cable support can result in cables separating from connectors. If cable runs are to be stored under an elevated floor, they should be tied to the racks as a guide. If cables are run along the floor, do not allow them to lay in the work area behind the racks. Stepping or tripping on the cables may result in connections being pulled free or wire breakage inside the insulation. The DA3000 Video Mainframe should be installed in the equipment rack prior to attaching cables.

It is **strongly** recommended that you utilize Belden 8281 (or equal) 75 ohm cable for all video cabling. **NOTE: Do not use 50 ohm cable, as this will produce standing waves and oscillations.**

Use the following rules when cabling the DA3000 Video Mainframe:

1. Lay all cables in their intended positions, separating video from power cables wherever possible.

2. Provide proper support for each cable during the cabling process. The use of tie-wraps is recommended, as shown below in Figure 2-2.

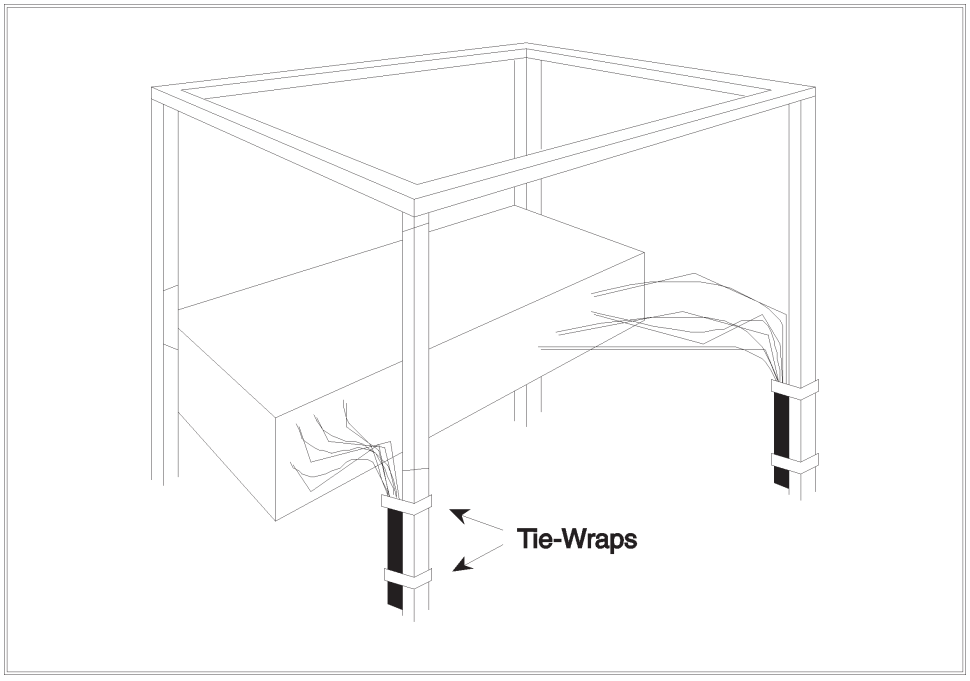

Figure 2-2 Cables Attached to Supports

2.7 Plug-In Video Card Installation

Currently there are three models of plug-in video distribution amplifier cards available; these are the VDA3001 Video Board, the VDA3002 Video Board, and the SDVDA3001 Video Board. The VDA3001 Video Board is a general purpose video distribution amplifier, the VDA3002 Video Board is a equalizing video distribution amplifier, and the SDVDA3001 Video Board is a serial digital video distribution amplifier. The VDA3001 is capable of accepting a 1V p-p video input or a 2V p-p subcarrier input. The VDA3002 is capable of equalizing up to 1000 feet of Belden 8281 coaxial cable when used for post-equalization and up to 650 feet of Belden 8281 coaxial cable when used for pre-equalization. The SDVDA3001 is capable of distributing a wide range of serial digital video signals.

To install a Video Board in the DA3000 Video Mainframe take the following steps while referring to Figure 2-3:

1. Align the Video Board with a set of circuit card guides in either the center or left-hand compartment of the frame.

2. Carefully push the Video Board into the frame until the circuit card connector makes initial contact with the backplane connector. At this point, firmly but carefully push the Video Board into the frame while making sure the connectors are properly aligned. Continue pushing the Video Board until it is in place and the connectors are firmly mated.

3. Repeat instructions 1-2 for each Video Board to be installed.

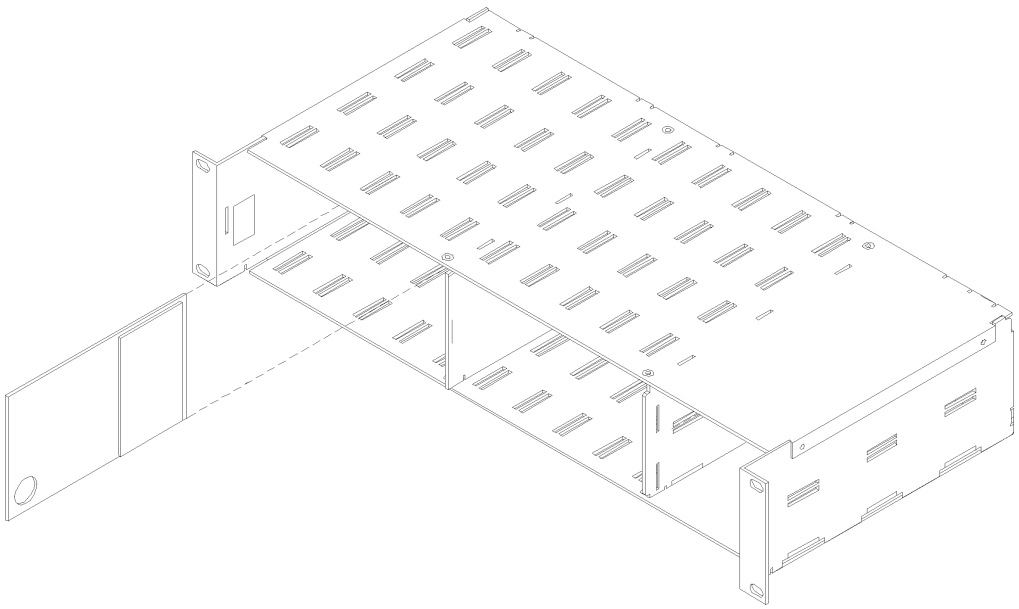

Figure 2-3 Video Board Installation

2.8 Video Power Supply Installation

Power is supplied to the DA3000 Video Mainframe through an internally mounted PS45 Video Power Supply. Power can also be supplied by an internally mounted secondary power supply or from an external power supply through the external power supply connector. External power supplies must be diode isolated from the internal power supplies. An 1N5821 or equivalent type diode may be used for this purpose. See Figure 2-4 for an illustration of the isolation diode installation. Each PS45 Video Power Supply provides ±9-16 volts unregulated DC.

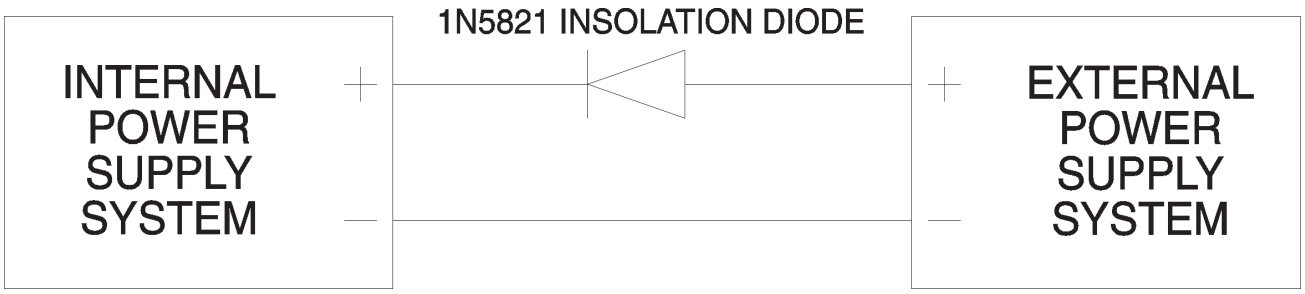

Figure 2-4 Isolation Diode Installation

In a redundant external power configuration, it should be noted that the DA3000 Video Mainframe does not differentiate between the supply intended as primary power and the supply intended as backup. Therefore, consideration should be given to avoid overloading the power supplies by having less than one supply per frame in multi-frame configurations.

To install a PS45 Power Supply in the DA3000 Video Mainframe take the following steps while referring to Figure 2-5:

1. Align the primary Video Power Supply with the upper set of circuit card guides in the right-hand side of the frame.

2. Carefully push the Video Power Supply into the frame until the power supply connector makes initial contact with backplane power connector. At this point, firmly but carefully continue pushing the PS45V Power Supply into the frame while making sure the connectors are properly aligned. Continue pushing the PS45V Power Supply until it is in place and the connectors are firmly mated.

3. If a redundant video power supply is to be installed, align it with the lower set of circuit card guides in the right-hand side of the frame and repeat step 2.

2.8 Video Power Supply Installation Continued:

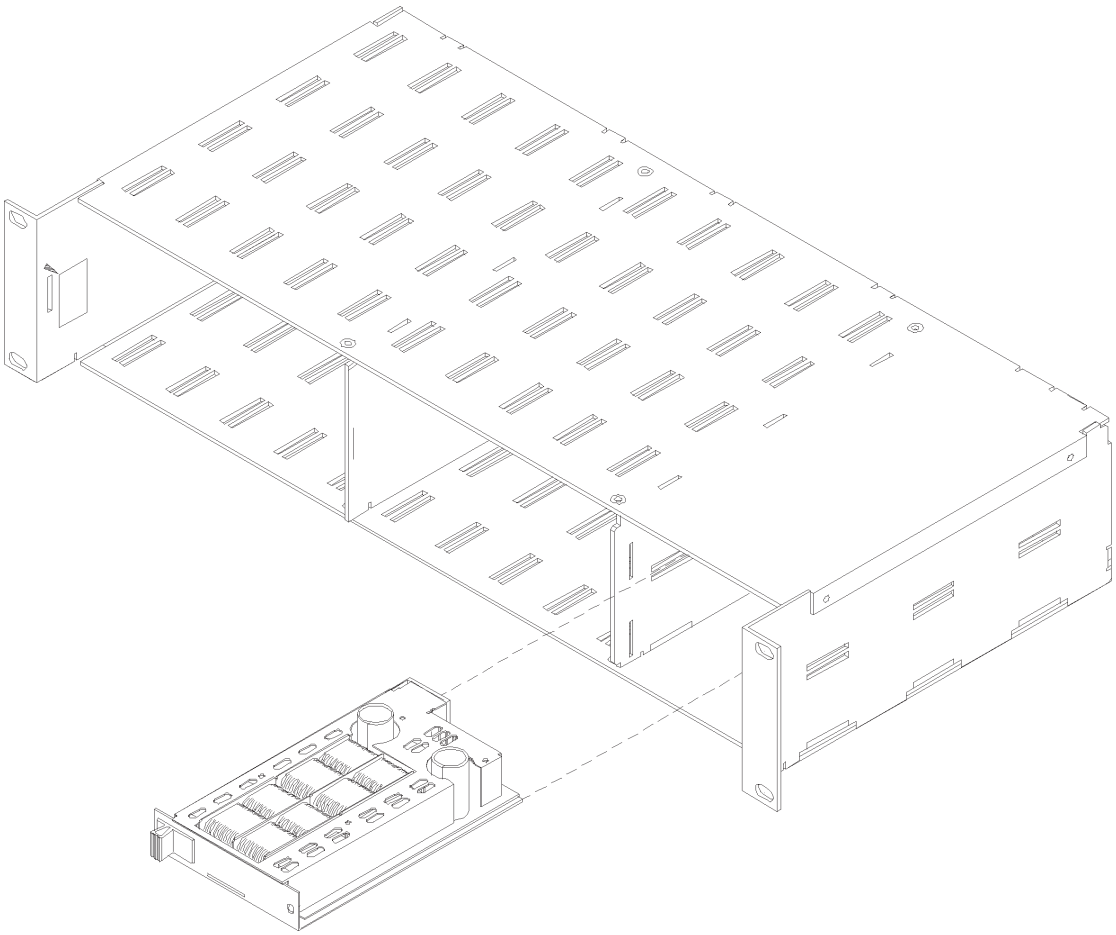

Figure 2-5 Video Power Supply Installation

2.9 Front Panel Installation

To install the access door (front panel) of the DA3000 Video Mainframe refer to Figure 2-6 and take the following steps:

1. Align the front panel to the front of the DA3000 Video Mainframe.

2. Now slide the front panel onto the mainframe assembly until the slide locks snap into place.

2.9 Front Panel Installation Continued:

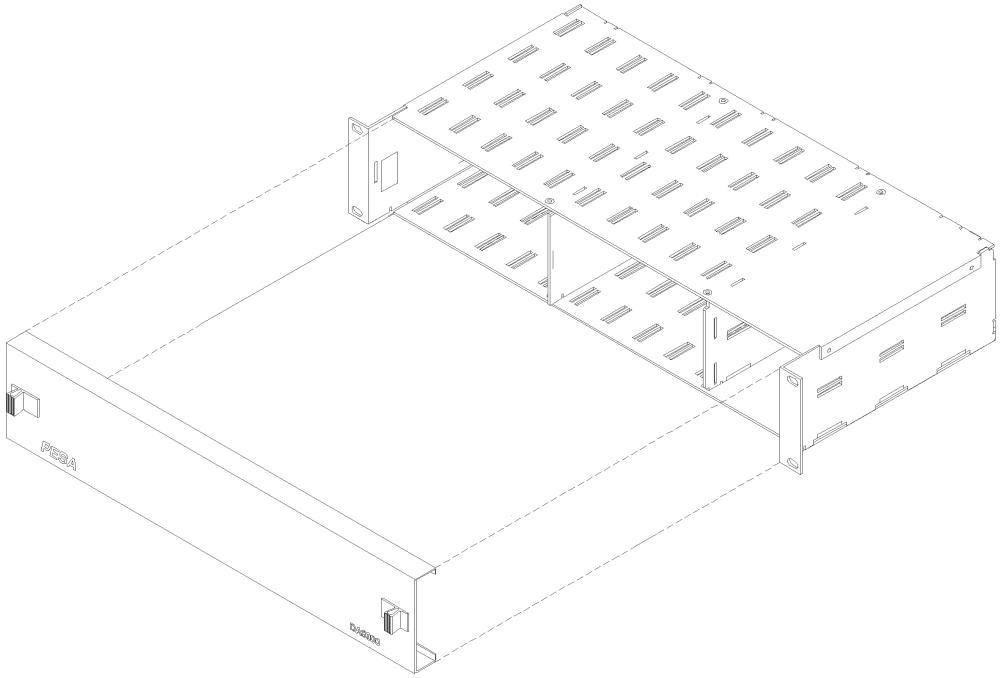

Figure 2-6 Front Panel Installation

2.10 Rear Panel Connectors

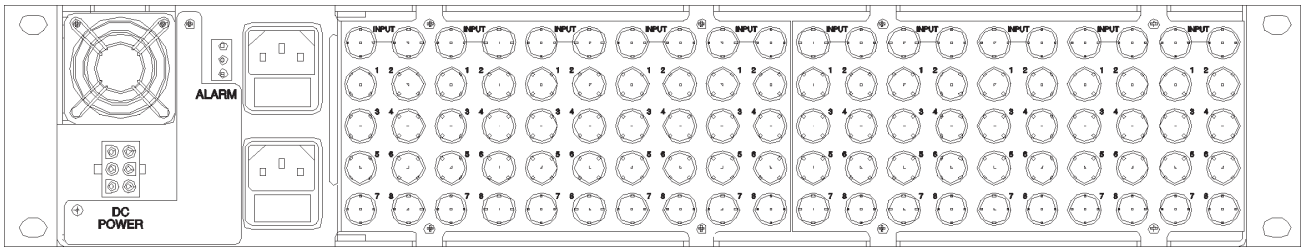

Figure 2-7 DA3000 Video Rear Panel

Alarm Connector

The alarm connector is disabled when PS45 Video Power Supplies are utilized to power the DA3000 Video Mainframe (standard configuration) except when SDVDA3001 Boards are installed. The fan circuit is also disabled. When PS70V Power Supplies are utilized to power the DA3000 Video Mainframe (optional configuration) the fan circuit is enabled and the alarm circuit, contained in PS70V Power Supply circuitry, acts as a switch to trigger an optional external alarm in the event of a failure in the power supply or of the external 110VAC (220VAC for the international version) source. The SDVDA3001 Board's alarm circuitry acts as a switch to trigger an optional external alarm in the event of an equalization loss. The alarm

2.10 Rear Panel Connectors Continued:

Alarm Connector Continued:

circuits supply a contact closure but do not provide an operational voltage for the external alarm. The alarm connector, located on the backplane, allows connection of the external alarm.

DC Power Connector

Power can be supplied to the DA3000 Video Mainframe through an externally mounted power supply or from internal power supplies. The DC Power Connector can be used as DC power input (external power supply) or as DC power output (internal power supplies) to allow the video mainframe to power additional equipment items.

Video Input and Output Connectors

There are ten video loop-through connectors located on the rear panel of the DA3000 Video Mainframe. There are also ten groups of video output connectors located on the rear panel. Each of these groups contain eight video output connectors.

2.11 DA3000 Video Mainframe System Connections

Once the DA3000 Video Mainframes are installed in the equipment racks, system connections can be made. Use the following guide and the sample system connections illustration, Figure 2-8, to insure that the DA3000 Video Mainframe system connections are hooked up correctly.

Connection Guide

1. Connect the video sources to the video inputs. The video inputs are loop through connectors and can be daisy chained as shown in Figure 2-8. The end of each video input daisy chain must be terminated with a 75 ohm termination.

2. Connect the video outputs to the video destinations.

3. Connect the primary power supply to the AC line.

4. If a redundant internal AC power supply is utilized, connect it to the AC line.

2.11 DA3000 Video Mainframe System Conn. Cont:

Connection Guide Continued:

5. If a backup power supply is to be included in the system configuration, connect it to the DC input/output connector and then connect it to the AC line.

The DA3000 Video Mainframe should now be powered up and ready for operation.

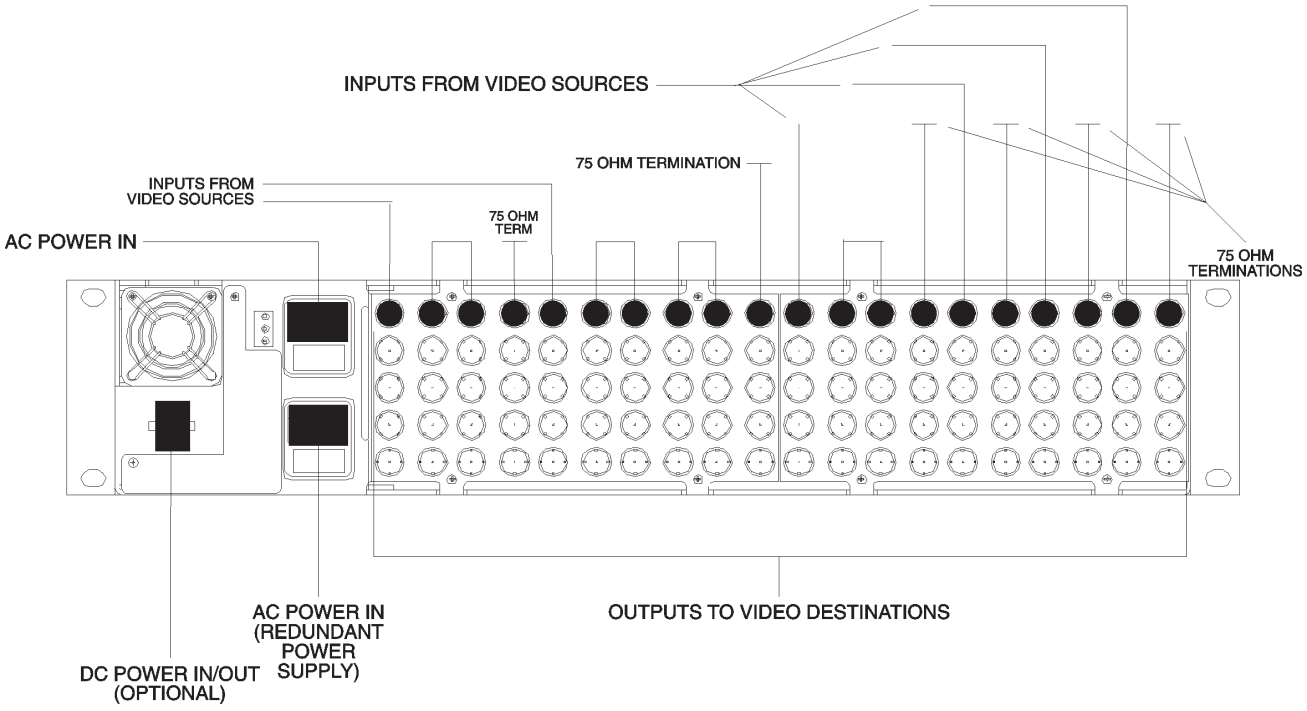

Figure 2-8 Sample System Connections

3.1 Introduction

The operation of the DA3000 Video Mainframe consists of applying power to the chassis and monitoring the associated video distribution amplifier cards and power supplies. This section describes the operation and adjustment of each type of video distribution amplifier card.

The three types of video distribution cards currently available are the VDA3001, the VDA3002, and the SDVDA3001 Video Distribution Amplifier Boards. The VDA3001 is a general purpose video distribution amplifier and the VDA3002 is an equalizing video distribution amplifier with back-porch clamping capability. The SDVDA3001 is a serial digital video distribution amplifier with automatic equalization.

3.2 VDA3001 Video Board Operation

The operation of the VDA3001 Video Distribution Board consists of plugging the board into the DA3000 Video Mainframe and powering the mainframe up. The VDA3001 Video Distribution Board does not have any user switches or indicators on it.

3.3 VDA3001 Video Board Adjustments

Though the VDA3001 Video Boards are tested and adjusted before shipment from the factory readjustment may be necessary when parts are replaced or equipment configuration changes. Refer to Component Assembly, VDA3001 Video Board, page 6.9 for VDA3001 adjustment locations. To properly test and adjust a VDA3001 Video Board the following test equipment or equivalent test equipment is needed:

Digital Multimeter
Audio Generator
Video Generator
Oscilloscope
75 Ohm Termination
Audio Distortion Analyzer
Video Network Analyzer

3.3 VDA3001 Video Board Adjustments Continued:

DC Offset (R3)

The DC Offset adjustment only affects the output of the VDA3001 when the VDA3001 input is AC coupled (R2 removed). The DC Offset is adjusted with no input signal applied to the VDA3001 Video Board. To adjust the DC Offset level take the following steps:

1. Connect the digital multimeter to one of the VDA3001 Board's outputs.

2. Set the multimeter to a low DC voltage range.

3. Adjust R3 until a 0V DC ±20mV DC reading is obtained.

4. Disconnect the digital multimeter from the VDA3001 Board's output.

Common Mode Rejection Ratio (CMRR) (R10)

The common mode rejection ratio adjustment provides a means to eliminate unwanted common mode noise and hum on the video distribution board's outputs. To adjust the CMRR take the following steps:

1. Short the center conductor of the video board's input to the sheild of its input.

2. Connect the audio generator to an oscilloscope.

2. Adjust the audio generator for a 2V p-p maximum signal at 60Hz on the oscilloscope.

3. Disconnect the audio generator from the oscilloscope.

4. Connect the high side of the audio generator's output to the short between the video board's signal input short. Connect the low side of audio generator's output to ground.

5. Connect the audio distortion analyzer to one of the video distribution board's outputs.

6. Adjust R10 for a null (lowest) reading on the distortion analyzer.

7. Disconnect all test equipment and remove the short.

3.3 VDA3001 Video Board Adjustments Continued:

Gain (R17)

The gain adjustment enables the customer to adjust the level of the output signal to match the level of the input signal (unity gain). To adjust the gain take the following steps:

1. Adjust the video generator for a 0.7V p-p output at 50KHz into a 75 ohm load.

2. Remove the 75 ohm load from video generator's output and connect the video generator to one of video distribution board's loop-thru input connectors. Connect the 75 ohm termination to the other loop-thru connector.

3. Connect the network analyzer to one of the video distribution board's outputs and terminate into 75 ohms.

4. Adjust R17 for a 0.7V p-p reading at 50KHz on the network analyzer.

5. Disconnect all test equipment.

3.4 VDA3002 Video Board Operation

The operation of the VDA3002 Video Distribution Board consists of plugging the board into the DA3000 Video Mainframe and powering the frame up. The operation VDA3002 also includes monitoring the power LED and setting clamp and equalization switches to the desired position.

The following paragraphs describe the function of VDA3002 Video Board's power LED and clamp switch. The function of the Equalization Board's HI-LO switch is also described.

VDA3002 Video Board Power LED

The function of the power LED is to provide an easily visible method of monitoring the health and operation of the VDA3002's voltage regulators. The power LED should be illuminated during normal operation. If power LED dims or extinguishes during operation check the operation of the DA3000 Mainframe's power supply system. If the mainframe power supply system is operating correctly and the other distribution boards in the mainframe are operating correctly check the output of the voltage regulators on the malfunctioning board.

3.3 VDA3001 Video Board Adjustments Continued:

VDA3002 Video Board Clamp Switch

The clamp switch allows the user to activate or deactivate the VDA3002 Video Board's back-porch clamp depending on user's preference.

Equalization Board HI-LO Switch

The HI-LO switch on the Equalization Board allows the user to set the cable length equalization range. The HI range is 500-650 feet when the Equalization Board is used for pre-equalization and 500-1000 feet when the Equalization Board is used for post-equalization. The LO range is 0-500 feet.

3.5 VDA3002 Video Board Adjustments

Though the VDA3002 Video Boards are tested and adjusted before shipment from the factory readjustment may be necessary when parts are replaced or equipment configuration changes. Refer to Component Assembly, VDA3002 Video Board, page 6.11 for VDA3002 adjustment locations.

NOTE: The equalization adjustments must be made by the customer for the desired cable lengths.

To properly test and adjust a VDA3002 Video Board the following test equipment or equivalent test equipment is needed:

Digital Multimeter
Audio Generator
Video Generator
Oscilloscope
75 Ohm Termination
Audio Distortion Analyzer
Video Network Analyzer
Sweeping Generator (with low frequency markers)
Waveform Monitor

3.5 VDA3002 Video Board Adjustments Continued:

DC Offset (R2 and R72)

The DC offset is adjusted with no input signal applied to the VDA3002 Video Board. Setting the VDA3002 DC offset consists of making two separate adjustments. To adjust the DC Offset levels take the following steps:

1. Connect the digital multimeter to the VDA3002 Board's TP2 and TP3 (GND).

2. Set the multimeter to a low DC voltage range and put jumper J1 in the AC coupled position.

3. Adjust R2 until a 0V DC ±5mV DC reading is obtained.

4. Disconnect the digital multimeter from the VDA3002 Board's TP2 and TP3 and connect it to one of the VDA3002 Board's outputs.

5. Adjust R72 until a 0V DC ±25mV DC reading is obtained with the clamp switch off.

6. Disconnect the digital multimeter from the VDA3002 Board's output.

Common Mode Rejection (R28)

The common mode rejection ratio adjustment provides a means to eliminate unwanted common mode noise and hum on the video distribution board's outputs. To adjust the CMRR take the following steps:

1. Short the center conductor of the video board's input to the sheild of its input.

2. Connect the audio generator to an oscilloscope.

2. Adjust the audio generator for a 2V p-p maximum signal at 60Hz on the oscilloscope.

3. Disconnect the audio generator from the oscilloscope.

4. Connect the high side of the audio generator's output to the shorted input connector. Connect the low side of audio generator's output to ground.

3.5 VDA3002 Video Board Adjustments Continued:

Common Mode Rejection (R28) Continued:

5. Connect the audio distortion analyzer to one of the video distribution board's outputs.

6. Adjust R28 for a null (lowest) reading on the distortion analyzer.

7. Disconnect all test equipment and remove the short.

Gain (R21)

The gain adjustment enables the customer to adjust the level of the output signal. To adjust the gain for unity, take the following steps:

1. Adjust the video generator for a 0.7V p-p output at 50KHz into a 75 ohm load.

2. Remove the 75 ohm load from video generator's output and connect the video generator to one of video distribution board's loop-thru input connectors. Connect the 75 ohm termination to the other loop-thru connector.

3. Connect the network analyzer to one of the video distribution board's outputs and terminate with 75 ohms.

4. Adjust R21 for a 0.7V p-p reading at 50KHz on the network analyzer.

5. Disconnect all test equipment.

Equalization Board Adjustment

The equalization board can be used for both input and output equalization. Both adjustment procedures are described in the following paragraphs.

NOTE: These adjustments must be aligned by the customer to fit cable configuration needs.

Input Equalization (R36)

To adjust a Video Equalization Board for input equalization (pre-equalization) take the following steps:

3.5 VDA3002 Video Board Adjustments Continued:

Equalization Board Adjustment Continued:

1. Make sure the Input Equalization Board's HI-LO Switch is set for the correct range.

2. Connect the waveform monitor (or calibrated oscilloscope) to one of the VDA3002 Board's outputs using the shortest cable possible. Terminate the output with 75 ohms.

3. Connect the desired input cable to one of the VDA3002 Board's loop-thru input connectors. Connect a 75 ohm termination to the other loop-thru input connector.

4. Adjust the sweep generator for a 20MHz sweep at 1V p-p amplitude and set the low frequency timing markers for 1MHz intervals at 1V p-p amplitude.

5. Connect the sweep generator to the far end of the input cable.

6. Adjust R36 on the Video Equalization Board for the best signal quality on the waveform monitor (or calibrated oscilloscope). The adjustment of R36 should be made for least amount of signal roll-off or an even amplitude throughout the sweep. Use the low frequency timing markers as an amplitude guide.

7. Disconnect the test equipment.

Output Equalization (R36)

To adjust a Video Equalization Board for output equalization (post-equalization) take the following steps:

1. Make sure the Input Equalization Board's HI-LO Switch is set for the correct range.

2. Connect the desired output cable to one of the VDA3002 Board's outputs. All of the VDA3002 Board's output cables must be approximately the same length when the Video Equalization Board is utilized for post-equalization or output equalization.

3. Connect the waveform monitor (or calibrated oscilloscope) to the far end of the desired output cable. Terminate the output cable with 75 ohms.

3.5 VDA3002 Video Board Adjustments Continued:

Equalization Board Adjustment Continued:

4. Adjust the sweep generator for a 20MHz sweep at 1V p-p amplitude and set the low frequency timing markers for 1MHz intervals at 1V p-p amplitude.

5. Connect the sweep generator to the VDA3002 Board's input using the shortest cable possible. Connect a 75 ohm termination to the other loop-thru input connector.

6. Adjust R36 on the Video Equalization Board for the best signal quality on the waveform monitor (or calibrated oscilloscope). The adjustment of R36 should be made for least amount of signal roll-off or an even amplitude throughout the sweep. Use the low frequency timing markers as an amplitude guide.

7. Disconnect the test equipment.

3.6 SDVDA3001 Digital Video Board Operation

The operation of the SDVDA3001 Digital Video Distribution Board consists of plugging the board into the DA3000 Video Mainframe. The operation VDA3002 also includes setting up the activation of the cable detect and equalization alarm LEDs. The operation of the SDVDA3001 Board also includes monitoring the LEDs once their activation alignment is completed. The following paragraphs describe the function of SDVDA3001 Digital Video Board's cable detect and equalization alarm LEDs.

Cable Detect LED (Green)

The function the cable detect LED is to provide a means of monitoring the health and stability of the SDVDA3001's input. The LED dims as the level of the input signal decreases.

Equalization Alarm LED (Red)

The function of equalization alarm LED is to warn the user that equalization requirements have changed. A customer provided external alarm may also be installed to audibly warn of equalization loss conditions.

3.7 SDVDA3001 Digital Video Board Adjustments

Though the SDVDA3001 Video Boards are tested and adjusted before shipment from the factory readjustment may be necessary when parts are replaced or equipment configuration changes. Refer to Component Assembly, SDVDA3001 Video Board, page 6.15 for SDVDA3001 adjustment locations.

NOTE: The following adjustments are designed to be set by customer.

Cable Detect (R17) and Equalization Alarm (R19)

The Cable Detect Adjustment is used by the customer to set the trip level of the Input Cable Detect LED (LED1). The Equalization Alarm Adjustment is used by the customer to set the trip level of Equalization Alarm LED (LED2) and if connected the external audible alarm. To set the Cable Detect Adjustment and the Equalization Alarm Adjustment take the following steps:

1. Connect the desired input cable to one of the SDVDA3002 Board's loop-thru input connectors. **Do not** connect a 75 ohm termination to the other loop-thru connector; as the SDVDA3002 Board terminates the cable.

2. Apply a 0.8V p-p digital video signal to the far end of the input cable.

3. Slowly adjust R17 until LED1 just illuminates then adjust R17 slightly more.

4. Slowly adjust R19 until LED2 just illuminates then adjust R19 until LED2 just extinguishes.

4.1 Introduction

This section contains the functional descriptions of DA3000 Video Mainframe's electronic circuits. Included in this section are the functional descriptions of the DA3000 Video Backplane, the associated Video Distribution Boards, the Video Equalization Board and the PS45 Power Supply. This manual section is divided into the following major topics:

- DA3000 Video Backplane
- VDA3001 Video Board
- VDA3002 Video Board
- Video Equalization Board
- SDVDA3001 Digital Video Board
- PS45 Video Power Supply

4.2 DA3000 Video Backplane

The DA3000 Video Backplane's electronic circuitry is divided into the input/output circuits and the power distribution circuits. The backplane's function is to provide the passive ins to the individual video distribution boards, passive outs from the video distribution boards, and to route power and ground to the individual video distribution boards. The input/output circuits are repeated ten times on the video backplane so only one set of input/output circuits are described.

Input/Output

The input signals are routed through the loop-thru BNC connectors to pins 1 and 17 of the 32-pin circuit card connector. The signal grounds are routed through the loop-thru BNC connectors to pins 2 and 18 of the 32-pin circuit card connectors. High frequency by-pass of the signal grounds is performed by 1.0uf capacitors. The output signals are tied from pins 3, 8, 14, 16, 19, 24, 30, and 32 of the 32-pin circuit card connector to the center pin of the output BNC connectors. The output grounds are tied from pins 4, 7, 13, 15, 20, 23, 29, and 31 of the 32-pin circuit card connector to the shield of the output BNC connectors.

Power Distribution

The power distribution circuits, located on the video backplane, route the power supply plus and minus voltages to the associated video distribution boards. Included are the routing of fan and alarm circuits.

4.3 VDA3001 Video Board

The VDA3001 is a general purpose two stage video distribution amplifier with a balanced input and eight 75 ohm outputs. The electronic circuitry of the VDA3001 Video Distribution Amplifier Board is divided into the power, input, and output circuits. These circuits are described in the following paragraphs.

Power

The power circuit consists of voltage regulators U4 (+5.6 volts) and U5 (-5.6 volts) and their associated components. Positive unregulated DC is feed into U4 through pins 6 and 22 of the 32-pin video connector (P1). The input current flow is reduced by R43 and filtered by C25. The output voltage level is controlled by U4 working inconjunction with D1. The positive output voltage level is filtered by C26 and other 0.1uf capacitors located throughout the VDA3001 Board's electronic circuits. Negative unregulated DC is feed into U5 through pins 11 and 27 of the 32-pin video connector (P1). The input current flow is reduced by R44 and filtered by C27. The output voltage level is controlled by U5 working inconjunction with D2. The negative output voltage level is filtered by C28 and other 0.1uf capacitors located throughout the VDA3001 Board's electronic circuits.

Input

The input circuit on the VDA3001 Video Distribution Board consists of U1 (operational amplifier) and U2 (operational amplifier) and their associated components. U1 and U2 work in conjunction to form a balanced input amplifier. The input signal is feed from pins 1 and 17 through R2 (DC coupling) or C1 and C2 (AC coupling) to U1, the input buffer. U1 provides a high input impedance. U2 along with precision resistors R11 to R14 and variable resistor R10 provide attenuation to unwanted common mode signals. The output of U2 is coupled through R15 to the VDA3001 Board's output circuits. Variable resistor R10 is used to tune the balanced input amplifier for the best common mode (hum) signal rejection. Variable resistor R3 is used to minimize the DC offset of the VDA3001 Board when the input is AC coupled.

4.3 VDA3001 Video Board Continued:

Output

The output circuit on the VDA3001 Video Distribution Board consists of U3 and Q1 through Q4 and their associated components. Pin 3 on U3 is coupled to the input stage through R15, R19, and variable resistor R17. R17 is utilized to adjust the gain of the amplifier, U3. Feedback of the output signal is tied to pin 2 of U3 through R25 and C16. The feedback network sets the gain of U3 and R17 sets the gain of the VDA3001 Video Distribution Board. Q1-Q4 and their associated components form a complimentary line driver. The output of the driver is feed to pins 3, 8, 14, 16, 19, 24, 30, and 32 of P1 through 75 ohm resistors. Refer to Figure 4-5.

4.4 VDA3002 Video Board

The VDA3002 Video Distribution Board is an equalizing video distribution amplifier with a built in back-porch clamp. The electronic circuitry of the VDA3002 Video Distribution Amplifier Board is divided into the power, input, clamp, gain, clamp sync, and output circuits. These circuits are described in the following paragraphs.

Power

The power circuits on the VDA3002 Video Distribution Board consists of U7 (power regulator), U8 (power regulator), Q1 (NPN transistor), Q8 (PNP transistor), and their associated components. Positive unregulated voltage is feed into U7 and Q1 through pins 6 and 22 of the 32-pin circuit card connector, P1. Q1 and D2, a 9.1V zener diode, filter the unregulated positive voltage to provide +9 volts to the VDA3002 Board's circuits. R45 limits the input current flow to C32 and U7. The positive voltage regulator, U7, working inconjunction with D3 produces a regulated output of +6.2V DC. Filtering of the positive regulated voltage is provided by C33, a 0.1uf capacitor, and other 0.1uf capacitors located throughout the VDA3002 Board's electronic circuits.

Negative unregulated voltage is feed into U8 and Q8 through pins 11 and 27 of the 32-pin circuit card connector, P1. Q8 and D4, a 9.1V zener diode, filter the unregulated negative voltage to provide -9 volts to the VDA3002 Board's circuits. R67 limits the input current flow to C41 and U8. The negative voltage regulator, U8, working in conjunction with D5 produces a regulated output of -6.2V DC. Filtering of the negative regulated voltage is provided by C42, a 0.1uf capacitor, and other 0.1uf capacitors located throughout the VDA3002 Board's electronic circuits.

4.4 VDA3002 Video Board Continued:

Power Continued:

The circuit of LED1 (a green light emitting diode), D6 (a 8.2V zener diode), and R70 provides a visible means of checking the health of the voltage regulator circuits. LED1 should be brightly illuminated when the voltage regulators are functioning properly. If the LED1 dims, check the output of the voltage regulators.

Input

The input circuit on the VDA3002 Video Distribution Board consists of U1 (operational amplifier) and U2 (operational amplifier) and their associated components. U1 and U2 work in conjunction to form a balanced input amplifier. The input signal is coupled from pins 1 and 17 through R4 (DC coupling) or C1, C2, and R4 (AC coupling) to U1, the input buffer. U1 provides a high input impedance. U2 along with precision resistors R11 thru R14 and variable resistor R28 provide attenuation to unwanted common mode signals. The output of U2 is coupled through R9 to the first stage of the Equalization Board. See Section 4.5 for a description of the Equalization Board's circuits. Variable resistor R28 is used to tune the balanced input amplifier for the best common mode (hum) signal rejection. Variable resistor R2 is used to minimize the DC offset of the balanced input amplifier circuit when in the AC coupled mode.

Clamp

The clamp circuit consists of U3, U4, and their associated components. When the clamp switch, SW1, is activated a sample of the VDA3002 Board's output is applied through SW1 to pin 5 of U3. A sync signal is applied to pin 8 of U3. The sync signal activates an internal logic switch inside U3 when the sync signal reaches the logic switch threshold level. When the logic switch is activated C15 is charged to the level of the back porch. U4 functions as clamp signal buffer and amplifier. The output of U4, the connection signal, is applied to pin 1 of U3. The output from the first stage of the Equalization Board is applied to pin 3 of U3. The output of the clamp circuit is then applied to the input of the second stage of the Equalization Board. If switch SW1 is not activated the video signal is passed through U3 without being clamped. The clamp must be off or disabled for non-composite video as there will not be a proper clamp pulse if there is no sync on the video.

4.4 VDA3002 Video Board Continued:

Gain

The gain circuit consists of U5 and its associated components. The output from the Output Equalization Board is applied to pin 3 of U5. R21 is utilized to adjust the gain of the VDA3002 Board. The output of U5 is coupled through R50 to the output circuit.

Clamp Sync

The clamp pulse circuit includes U9 and its associated components. A sample of the video output signal is applied through R75 and C35 to pin 2 of U5. Filtering of the video sample signal is provided by R-C filter C34 and R47 to reduce the chroma level. The output of U9 is applied to pin 8 of U3.

Output

The output circuit on the VDA3002 Video Distribution Board consists of U6 and Q4 through Q7 and their associated components. Pin 3 on U6 is coupled to the gain circuit through R25 and R50. A sample of the video output signal is applied to pin 2 of U6 through R54. The video output sample is conditioned by R52 and R53. The DC level on the video output sample is set by R71 and variable resistor R72. The adjustment of R72 also determines the DC offset level on the VDA3002 Board's video outputs. Q4-Q7 and their associated components form a complimentary line driver. The output of the line driver is feed to pins 3, 8, 14, 16, 19, 24, 30, and 32 of P1 through 75 ohm resistors.

4.5 Video Equalization Board

The Video Equalization Board is capable of equalizing up to 1000 feet of Belden 8281 (or equal) coaxial cable when used for post-equalization and up to 650 feet of Belden 8281 (or equal) coaxial cable when used for pre-equalization. The electronic circuitry of the Video Equalization Board is divided into the first stage and second stage circuits. These are circuits are described in the following paragraphs.

4.4 VDA3002 Video Board Continued:

First Stage

The first stage circuit includes a switch (SW1), resistors (R9 and R10), a capacitor (C11), and five resistor and capacitor networks wired in parallel. Switch SW1 enables the customer switch in 500 feet of equalization if required (HI position). When SW1 is in the off or 0 feet (LOW) position the video signal on pins 2 and 3 of P2 passes through R9 and SW1. The video signal then passes through pins 6 and 7 of P2 back to the VDA3002 Board. When SW1 is in the HI position the video signal on pins 2 and 3 of P2 pass through R10, C11, and the parallel resistor and capacitor networks. The parallel resistor and capacitor networks compensate for the longer cable length. The video signal then passes through pins 6 and 7 of P2 back to the VDA3002 Board.

Second Stage

The second stage circuit includes a variable resistor (R36), five resistor and capacitor networks wired in parallel, and their associated components. The variable resistor allows the customer to adjust the compensation factor of the equalization network dependent upon cable length. The video input signal is coupled to the second stage of the Equalization Board by pins 2 and 3 of P3. The video signal then passes through R35, C26, and the parallel resistor and capacitor networks. R35, C26, and parallel resistor and capacitor networks are wired in parallel with the center tap of the variable resistor, R36. This configuration allows R36 to be adjusted for the best overall compensation. Once the video signal passes through the compensation network it is coupled back to the VDA3002 Board by pins 6 and 7 of P3.

4.6 SDVDA3001 Video Board

The SDVDA3001 is a serial digital distribution amplifier board that is capable of distributing a wide range serial digital video signals. The electronic circuitry of the SDVDA3001 Serial Video Distribution Amplifier Board is divided into the power, input, output, and alarm circuits. These are circuits are described in the following paragraphs.

4.6 SDVDA3001 Video Board Continued:

Power

The SDVDA3001 power circuit, a flyback regulator, consists of U5, Q1, T1, and their associated components. Positive unregulated voltage is coupled to the SDVDA3001 power circuit through pins 6 and 22 of the circuit card connector, P1. Negative unregulated voltage is coupled to the board through pins 11 and 27 of P1. R39 and R40 limit the input current flow and function as fuses in the event of overload conditions. C16 and C17 provide initial input filtering. The choke filters, L2 and L4, prevent switching noise from getting back onto the input lines. C37 functions as an energy storage for input pulses to the flyback transformer, T1. C46 and C47 provide additional energy storage and filtering. R27 and C18 function as frequency compensation network for U5. U5 controls and regulates the output of the flyback power circuit. D2 and D3 function as clamp and protect the switcher circuit from overvoltage spikes. T1 transforms the switcher circuit output and D4 rectifies the switcher circuit output. C19 provides initial output filtering and power storage. R29, Q1, and precision resistor, R28 form an output divider feedback network and set the output voltage level of the flyback power circuit. Additionally, Q1 functions as a level shifting error amplifier providing additional output stability. L2 and C20 provide additional filtering of the flyback output voltage.

Input

The SDVDA3001 Board's input circuit is composed of U1 and its associated components. The serial digital input signal is connected to the input circuit by pins 1 and 17 of 32-pin circuit card connector. The input grounds are connected to pins 2 and 16 of 32-pin circuit card connector. The input signal is coupled through C1 and R43 to pin 8 (IN+) of U1. Precision resistor R1 functions as an input line terminating resistor. L1 cancels some of the effects of the stray capacitance on the input line. This improves input return loss. U1 provides automatic input cable equalization and converts the serial digital input from an unbalanced input to balanced outputs. The balanced outputs are coupled through precision resistors R41 and R42 to the output line drivers. The Signal Strength Indicator (SSI) output from pin 6 is applied to the alarm circuit.

4.6 SDVDA3001 Video Board Continued:

Output

The SDVDA3001 Board's output circuit is comprised of U2, U4, and their associated components. U2 and U4 function as serial digital lines drivers for eight output lines or four output lines each. The Data High and Data Low outputs (balanced outputs) from the input circuit are applied to pins 11 and 10 of U2 and U4 respectively. U2 and U4 convert the Data High and Data Low signals into serial digital outputs. The serial digital outputs are coupled to the output connections through capacitors and 68.1 ohm precision resistors.

Alarm

The alarm and indicator circuit is composed of U3, U6, LED1, LED2, and their associated components. The signal strength indicator (SSI) output from U1 is tied to pins 3 and 5 of U3 (dual operational amplifier) through R44 and R20 respectively. The SSI level varies from +4.4 volts to + 5 volts. A SSI level of +4.4 volts indicates a very short input cable and a SSI level of +5 volts indicates a very long input cable. When the SSI output level from U1 is low and R45 is properly adjusted LED1 should be brightly illuminated. As the SSI level approaches +5 volts LED1 should dim. Pin 7 of the second segment of U3 is coupled to LED2 (red light emitting diode) through D1. Output of LED2 is connected through R30 to pin 1 of U6. U6 functions as the external audible alarm driver and relay. When the SSI output level increases above a critical level, as determined by the adjustment of R19, the output level on pin 7 of U3 will increase to the level necessary to illuminate LED2 and trip the internal transistor in U6. If connected, the external alarm will then sound.

4.7 PS45 Video Power Supply

The PS45 Video Power Supply is an unregulated power source that supplies plus and minus DC voltages to DA3000 Video Distribution Amplifier Frame and associated circuit cards. Both the 115VAC (US) and 220VAC (OUS) models of the PS45 Video Power Supply are similar in design so only one model is discussed here.

4.7 PS45 Video Power Supply Continued:

Circuit Description

The AC line and AC neutral are connected to T1 and T2 (step down transformers) through input fuses. The signal ground is coupled to the chassis ground through C3. T1 and T2 decrease the AC line voltage and drive the full-wave rectifier composed of D1 through D4. The unregulated output of the full-wave rectifier is filtered by C1 and C2. R2 and R3 supply a minimum power supply load if the DA3000 Video Mainframe is empty. After the filters, series diodes are used (D5, D6, D8, and D9) to allow the power supply to be paralleled for redundancy. The series diodes insure that one power supply cannot load the output of another power supply placed in parallel in case of a shorted power supply diode or filtering capacitor. A sensing circuit comprised of R1, D7 (a zener diode), and CR1 (a green light emitting diode) senses the voltages across the filter capacitors and output resistors. The green LED (CR1), located on the power supply front panel, serves as rough indicator of the power supply output voltage levels; it dims as the positive and negative output voltage levels decrease. If the combined outputs decrease by approximately 25% from nominal, the green LED will be extinguished. The PS45 Video Power Supply is unregulated and will follow input line changes and output load variations.

5.1 Maintenance

The DA3000 Video Mainframe, the Video Distribution Boards, and the PS45V Power Supplies are designed and manufactured to give long, trouble free service with minimum maintenance requirements. If problems do occur, follow the troubleshooting procedure provided in this section. If additional technical assistance is required, refer to the General Assistance and Service information in the front of the manual.

5.2 Preventive Maintenance

Use the following guidelines for general preventive maintenance:

- Keep the inside of the frame clean, especially if your facility is subject to dust or dirt in the atmosphere. Use compressed air, an antistatic cloth, or a antistatic vacuum to clean the frame and internal components.

NOTICE

THIS EQUIPMENT CONTAINS STATIC SENSITIVE DEVICES. IT IS RECOMMENDED THAT A GROUNDED WRIST STRAP AND MAT BE USED WHILE MAKING REPAIRS OR ADJUSTMENTS.

- Observe proper procedures for preventing electrostatic discharge when cleaning the unit, and when inserting and removing cards. Ensure that all tools and personnel handling individual components are properly grounded.

- If a problem is suspected with an individual Video Distribution Board, first swap out the board and recheck the system for the problem.

5.3 Test Equipment

The test equipment recommended for servicing the DA3000 Video Mainframe, the Video Distribution Boards, and the PS45V Power Supplies is listed below. Equivalent test equipment may be used.

Digital Multimeter
Audio Generator
Video Generator
Oscilloscope
75 Ohm Load
75 Ohm Termination
Audio Distortion Analyzer
Video Network Analyzer

5.4 Corrective Maintenance

The following paragraphs provide information to assist the servicing technician in maintenance of the DA3000 Video Mainframe, the Video Distribution Boards, and the PS45V Power Supplies.

Factory Repair Service

If desired, equipment or boards may be returned to the factory (transportation prepaid) for repair. Refer to the General Assistance and Service information sheet in the front of this manual. Call the PESA Service Department for a RMA number before shipping an equipment item.

⇒ Pack the equipment securely and label with the correct address. Proper packaging saves money. Be sure to use antistatic packaging or wrap the board in aluminum foil. The small amount of extra care and time it takes to cushion a part or unit properly may prevent costly damage while in transit. Make certain that the address is both legible and complete. Failure to do so often results in delay or even loss.

5.4 Corrective Maintenance Continued:

Troubleshooting

The best troubleshooting tool is a familiarity with the equipment and a through understanding of its operation. Before troubleshooting the DA3000 Video Mainframe, the Video Distribution Boards, or the PS45V Power Supplies review sections 3 and 4 of this manual. Use the functional descriptions and adjustment procedures to quickly locate problems. If all of the video outputs from a DA3000 Video Mainframe are missing, check the PS45V Power Supply System and the power supply line fuses. See Section 5.5 for fuse replacement details. If some of the video outputs from a DA3000 Video Mainframe are missing, check the operation and adjustment of the individual Video Distribution Board whose outputs are missing.If the problem can be isolated on the board itself, and your facility is equipped for component level repair, proceed with repairs

NOTE

Do not attempt to repair equipment that is in warranty. If the equipment is in warranty follow the procedures found under Factory Repair Service.

Replacement Parts

Only parts of the highest quality have been used in the design and manufacture of the DA3000 Video Mainframe, the Video Distribution Boards, and the PS45V Power Supplies.If the inherent stability and reliability are to be maintained, replacement parts must be of the same quality. When replacing parts, avoid using excessive solder on the printed circuit board. Always make sure that the solder does not short two circuits together. Be sure the replacement part is identical to the original, and is placed in exactly the same position with same lead lengths.

5.5 Power Supply Fuse Replacement

Replacement of the two power supply fuses is accomplished by disconnecting power to the unit, removing the power supply and disassembling the fuse holder on the rear of the supply. The replacement value of the power supply fuses is 630mA (5x20mm) for a line voltage of 115VAC and 315 mA for a line voltage of 220VAC. Be sure to use the same voltage rating and type of fuses for replacements. See Figure 5-1.

5.5 Power Supply Fuse Replacement Continued:

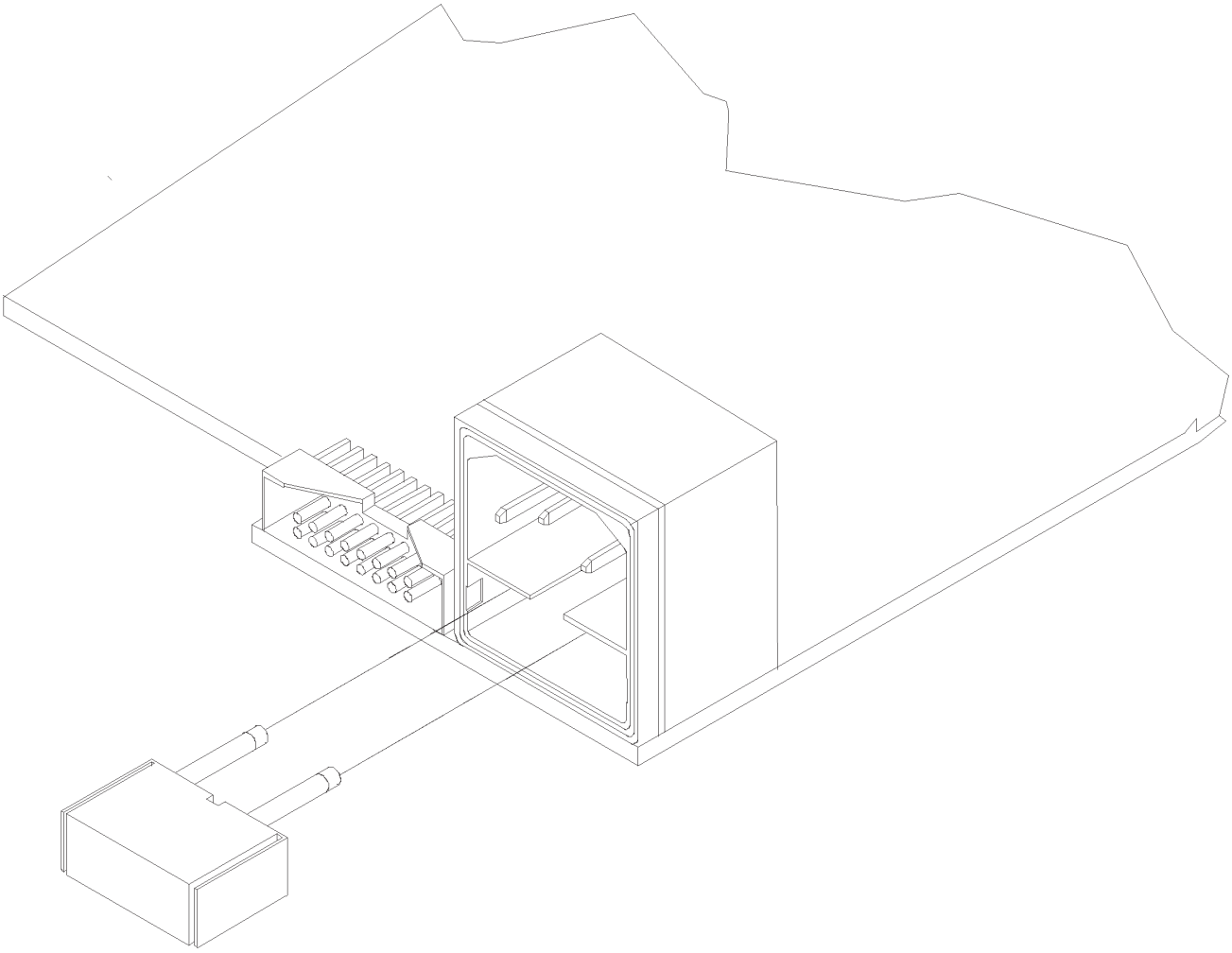

Figure 5-1 Fuse Location on the PS45V Power Supply

ADDENDUM

Introduction

The addendum incorporates the replacement of the DA3000 Video Frame's PS45V Power Supply with a PS70V Power Supply. This change was made necessary in order to ensure the proper operation of the VDA3005 Hi-Level Cards.

This addendum includes the following sections:

- Introduction
- General Description
- Functional Description
- Fuse Replacement

General Description

The PS70V Power Supply is an unregulated power source that supplies ± voltages to the DA3000 Frame.

Each power supply produced by PESA has an AC Select Switch that allows you to select the required voltage range. This switch is accessed by removing the plug-in supply. Insure that power is off before changing the switch setting. A separate jumper, located under the plastic safety cover surrounding the switch is used to add 15 volts to each switch setting. Using only the switch, nominal (± 10%) voltages available are 100, 120, 140, 200, 220, and 240. If the jumper is also moved, these voltages become 115, 135,155, 215, 235, and 255.

Access is provided to the jumper by removing the two screws that secure the cover. These screws also secure the PC board to the mounting tray. Be sure to replace both screws. Tighten securely but avoid cracking the plastic cover.

ADDENDUM

Functional Description

Input fuses provide overcurrent protection from internal faults and output overloads. If a fuse opens, correct the overcurrent condition then replace the fuse(s). Both sides of the line are fused.

The AC selector switch interconnects the transformer primaries in series and/or parallel combinations to provide the proper ratio for the input line voltage.

The secondaries drive full wave rectifiers with capacitor input filters providing positive and negative voltages with respect to ground.

After the filters, series diodes are used to allow supplies to be paralleled for redundancy. The diodes assure that one supply cannot load the output of the others in case of a shorted diode or capacitor.

A temperature sensing circuit controls the fan speed according to the air temperature and the temperature of the rectifier diodes. The fan usually runs at half speed at normal temperature (25°C).

A circuit senses the voltages across the filter capacitors. If the combined voltages decrease by approximately 25% from normal, the green LED is turned off. The red LED, located on the PC board, is then lit and the alarm closure activated at the same time. The green LED, located on the front panel, serves as a rough indicator of output voltage; it dims as the combined positive and negative voltages decrease.

These supplies are unregulated and follow input line changes and output load variations.

Fuse Replacement

Replacement of the two power supply fuses is accomplished by disconnecting power to the unit, removing the power supply and disassembling the fuse holder on the rear of the supply. The replacement value of the power supply fuses is 1.5 Amp (5x20mm) for a line voltage of 115VAC and 0.8 Amp for a line voltage of 220VAC. See Figure 2.

ADDENDUM

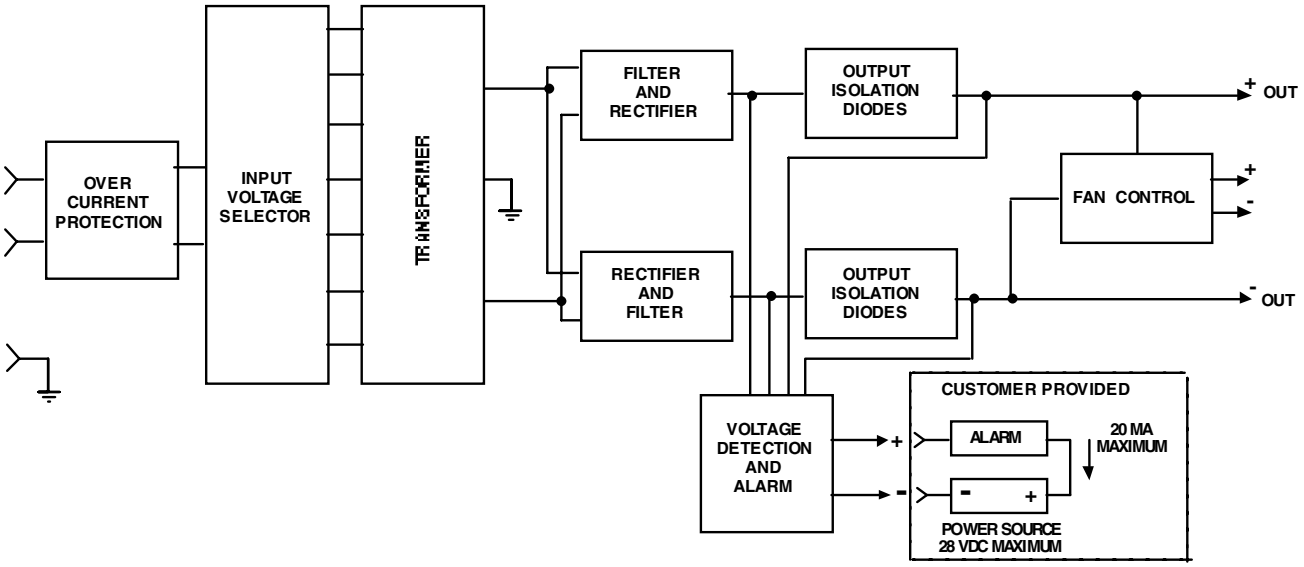

Figure 1 PS70V Functional Block Diagram

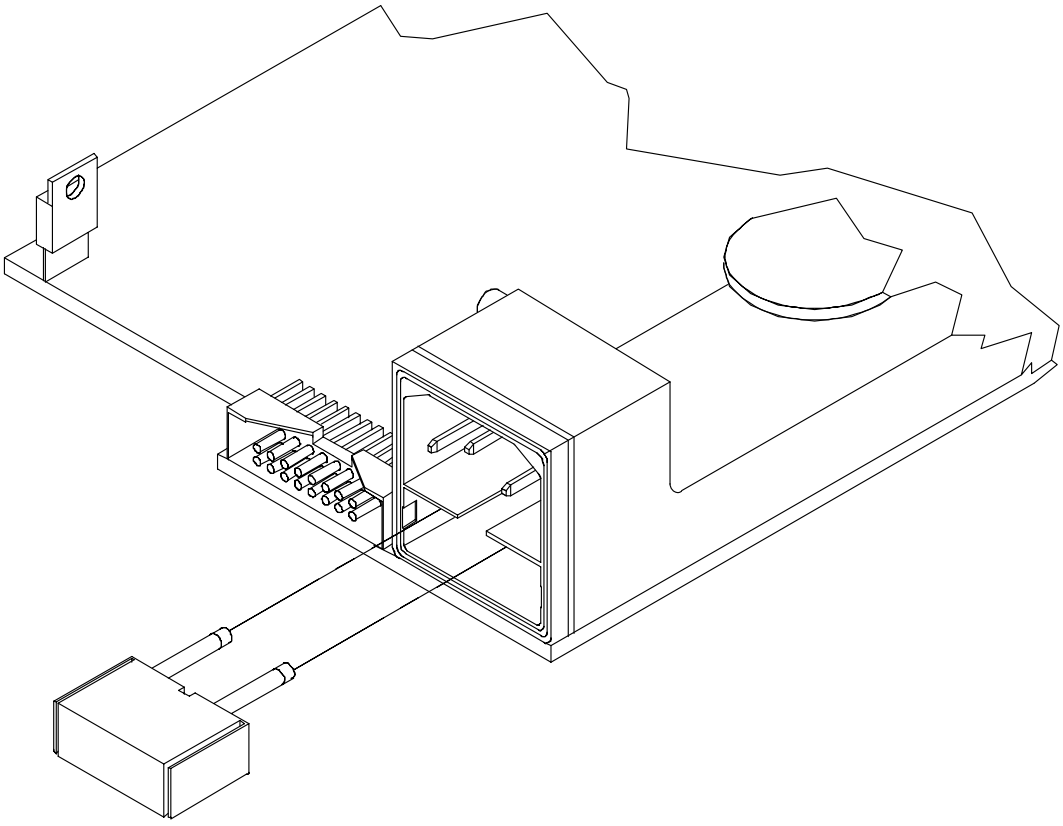

Figure 2 Fuse Location on the PS70V Power Supply

ADDENDUM

ADDENDUM

Introduction

The addendum is designed to serve as the preliminary technical data for the VDA3005 Hi-Level Board.

This addendum includes the following sections:

- Introduction
- General Description
- Specifications
- Functional Description

NOTE

Up to seven VDA3005 Hi-Level Boards can be installed in a VDA3000 Mainframe due to power supply and temperature loading. The VDA3005 Hi-Level Boards also require that a PS70V Power Supply be installed in the VDA3000 Mainframe rather than a PS45V Power Supply. Please refer to addendum number 81905903600 for additional information on the PS70V Power Supply.

General Description

The VDA3005 Hi-Level Board is a high performance, differential input, eight output, hi-level distribution amplifier compatible with PESA's VDA3000 Mainframe. Equalization is included on the VDA3005 Hi-Level Board for up to 200 feet of 75 ohm coax cable. Up to seven VDA3005 Boards can be housed in a single 2 RU rack mount enclosure with a single or redundant power supplies.

The VDA3005 Hi-Level Board is ideally suited for the distribution of hi-level digital TTL horizontal and vertical sync signals from graphic workstations or signals that have their baseline at +5V and pulse to ground. In addition, analog or digital data telemetry signals can be distributed to multiple destinations with complete transparency.

ADDENDUM

Specifications

INPUT CHARACTERISTICS

Level	±5.0V P (10V P-P) centered at 0V
Impedance	75 Ohm Looping
Return Loss	>45dB to 5MHz
	>35dB to 20MHz
Coupling	Direct (DC)
Type	Balanced (Differential)
Common Mode Rejection	>50dB

OUTPUT CHARACTERISTICS

Level	±5.0V P-P centered at 0V
Impedance	33 Ohms
Coupling	Direct (DC)
DC on Outputs	<±20mV Max
Isolation	>35dB to 5MHz
Number	Eight
Slew Rate	>1000V/µS
Equalization	0 to 200 Feet Belden 8281 or Equivalent to 15MHz

GAIN CHARACTERISTICS

Gain	±1.5dB

LINEAR DISTORTION CHARACTERISTICS

Frequency Response	±0.1dB to 5MHz
	±0.5dB, 5MHz to 15MHz
Vertical Tilt	0.2% (50Hz Square Wave)
Horizontal Tilt	0.2% (15750 Hz)

SIGNAL TO NOISE CHARACTERISTICS

Hum and Noise	73dB to 5MHz

ENVIRONMENTAL CHARACTERISTICS

Operational Temperature	0-40ºC
Operational Humidity	0-90% Non-Condensing
Storage Temperature	-25ºC to +100ºC

ADDENDUM

Functional Description

Power

The VDA3005 power circuit, a flyback regulator, consists of U4, Q5, T1, and their associated components. Positive unregulated voltage is coupled to the VDA3005 power circuit through pins 6 and 22 of the circuit card connector, P1. Negative unregulated voltage is coupled to the board through pins 11 and 27 of P1. R56 and R57 limit the input current flow and function as fuses in the event of overload conditions. C38, C39, L1, and L2 form an L-C input filter to stop switching noise from getting back onto the power lines. C41 functions as an energy storage for input pulses to the flyback transformer, T1. C40 and C46 provide additional. R58 and C43 function as frequency compensation network for U4. U4 controls and regulates the output of the flyback power circuit. D2 and D3 function as clamp and protect the switcher circuit from overvoltage spikes. T1 transforms the switcher circuit output and D1 and D4 rectify the switcher circuit output. C44 and C45 provide initial output filtering and power storage. R60, Q5, and precision resistor R59 form an output divider feedback network and set the output voltage level of the flyback power circuit. Additionally, Q5 functions as a level shifting error amplifier providing additional output stability. L3, L4, C31, and C32 provide additional filtering of the flyback output voltage. LED1 provides a visible means of checking the health of the power circuit.

Input

The input circuit on the VDA3005 Hi-Level Board consists of U1 (operational amplifier) and U2 (operational amplifier) and their associated components. U1 and U2 work inconjunction to form a balanced input amplifier. The input signal is fed from pins 1 and 17 through R2 (DC coupling) to U1, the input buffer. U1 provides a high input impedance. U2 along with precision resistors R11 thru R14 and variable resistor R10 provide attenuation to unwanted common mode signals. Variable resistor R10 is used to tune the balanced input amplifier for the best common mode (hum) signal rejection. The output of U2 is coupled through R15 to the VDA3005 Board's output circuits.

Equalization

The equalization circuit on the VDA3005 Hi-Level Board includes a variable resistor (R50), four resistors and four capacitors. The variable resistor allows the customer to adjust the compensation factor of the equalization circuit dependent upon output cable length.

ADDENDUM

Output

The output circuit on the VDA3005 Hi-Level Board consists of U3 and Q1 through Q4 and their associated components. Pin 3 on U3 is coupled to the input stage through R15, R19, and variable resistor R17. R17 is utilized to adjust the gain of the amplifier, U3. Feedback of the output signal is tied to pin 2 of U3 through R25 and C16. The feedback network sets the gain of U3 and R17 sets the gain of the VDA3005 Hi-Level Board. R48 and variable resistor R47 provide the means of adjusting the DC level on the VDA3005 Board's outputs for a minimum. Q1-Q4 and their associated components form a complimentary line driver. The output of the driver is feed to pins 3, 8, 14, 16, 19, 24, 30, and 32 of P1 through precision load resistors.

ADDENDUM

Introduction

The addendum is designed to serve as the preliminary technical data for the VDA3003 Ultra Wideband Video Distribution Board.

This addendum includes the following sections:

- Introduction
- General Description
- Specifications
- Functional Description

NOTE

Up to ten VDA3003 Ultra Wideband Boards can be installed in a VDA3000 Mainframe. The VDA3003 Ultra Wideband Boards require that a PS70V Power Supply be installed in the VDA3000 Mainframe rather than a PS45V Power Supply due to power supply and temperature loading . Please refer to addendum number 81905903600 for additional information on the PS70V Power Supply.

General Description

The VDA3003 is a high performance, differential input, eight outputs, ultra wide bandwidth, distribution amplifier compatible with PESA's DA3000 Video Mainframe. Up to ten VDA3003 boards can be housed in a single 2 RU rack mount enclosure with a single power supply or two power supplies for power redundancy. The VDA3003 includes up to 200 meters of cable equalization. The VDA3003 is ideally suited for distribution of hi-resolution graphic workstation signals.

ADDENDUM

Specifications

INPUT CHARACTERISTICS

Level	1V P-P Nominal
	2.4V P-P Max centered at 0V
Impedance	75 Ohm Internally Terminated
Return Loss	>45dB to 5MHz
	>25dB to 100MHz
	>20dB to 200MHz
Coupling	Direct (DC)
Type	Balanced (Differential)
Common Mode Rejection	>50dB to 60Hz

OUTPUT CHARACTERISTICS

Level	1V P-P Nominal
	2.4V P-P Max centered at 0V
Impedance	75 Ohms
Return Loss	>50dB to 5MHz
	>25dB to 100MHz
	>20dB to 200MHz
Coupling	Direct (DC)
DC on Outputs	<±20mV Max
Isolation	>50dB to 20MHz
Number	Eight
Slew Rate	>1900V/µS
Rise and Fall Time	3nS
Equalization	0 to 200 Meters Beldon 8281 or Equivalent to 200MHz

GAIN CHARACTERISTICS

Gain	±0.5dB

LINEAR DISTORTION CHARACTERISTICS

Frequency Response	±0.05dB to 10MHz
	±0.1dB, 10MHz to 100MHz
	+1.0dB/-3.0dB, 100MHz to 250MHz
Vertical Tilt	0.2% (50Hz Square Wave)
Horizontal Tilt	0.2%

NON-LINEAR DISTORTION CHARACTERISTICS

(All Tests, 10-90%, 3.58MHz or 12.5-87.5%, 4.43MHz)

Differential Gain	0.15% @ 4.43MHz

ADDENDUM

Differential Phase	0.15° @ 4.43MHz

SIGNAL TO NOISE CHARACTERISTICS

Hum and Noise	75dB to 5MHz
Harmonic Distortion	2nd Harmonic, -50dB to 20MHz
	3rd Harmonic, -55dB to 20MHz

ENVIRONMENTAL CHARACTERISTICS

Power Requirements	±8VDC
	120mA
Operational Temperature	0-40°C
Operational Humidity	0-90% Non-Condensing

Functional Description

Power

The power circuits on the VDA3003 Ultra Wideband Board consists of U9 (power regulator), U10 (power regulator), and their associated components. Positive unregulated voltage is feed into U9 through pins 6 and 22 of the 32-pin circuit card connector, J1. R71 limits the input current flow to C39 and U9. C39 and C40 stabilize the output of U9. C40 also improves the regulator's transient response. The positive voltage regulator, U9, working inconjunction with D1 produces a regulated output of +5.6VDC.

Negative unregulated voltage is feed into U10 through pins 11 and 27 of the 32-pin circuit card connector, J1. R72 limits the input current flow to C41 and U10. C41 and C42 stabilize the output of U10. C42 also improves the regulator's transient response. The negative voltage regulator, U10, working inconjunction with D3 produces a regulated output of -5.6VDC.

The circuit of LED1 (a green light emitting diode), D2 (a zener diode), and R73 provides a visible means of checking the health of the voltage regulator circuits. LED1 should be brightly illuminated when the voltage regulators are functioning properly. If LED1 dims, check the output of the voltage regulators.

Input

The input circuit on the VDA3003 Ultra Wideband Board consists of U1 (operational amplifier) and U2 (operational amplifier) and their associated components. U1 and U2 work inconjunction to form a balanced input

amplifier. The input signal is fed from pin 17 through R2 (DC coupling) to U1, the input buffer. U1 provides a high input impedance. U2 along with precision resistors R84, R6, R10, R12, and R26 and variable resistor R9 provide attenuation to unwanted common mode signals. Variable resistor R9 is used to balance the input amplifier for the best common mode (hum) signal rejection. The output of U2 is coupled through R14 to the VDA3003 Board's equalization circuits.

Equalization

The equalization circuits on the VDA3003 Ultra Wideband Board consists of U8, U5, and their associated components. U8, U5, and their associated components function as dual stage amplifier and a dual stage equalization circuit. U8, J3, and their associated components function as the first stage amplifier and equalization circuit. J3 allows 100 meters of equalization to switch either on or off dependent upon the length of the output cables. If the output cables are over 100 meters long, J3 should be on. If the output cables are less than 100 meters long, J3 should be off. U5, R80, and their associated components function as the second stage amplifier and equalization circuit. Variable resistor R80 allows adjustment of 0-100 meters of equalization. The first and second stages of the equalization circuit working together provide equalization for 0 to 200 meters of output cable.

Output

The output circuits on the VDA3003 Ultra Wideband Board consists of U6, U7, and their associated components. The output circuits are coupled to the equalization stages through R57 and variable resistor R28. R28 is utilized to adjust the signal level to the output line drivers (U6 and U7). U6 functions as the line driver for four outputs and U7 functions as the line driver for the other four outputs. Variable resistor R35 provides the means of adjusting the DC level on the U6 outputs for a minimum and variable resistor R62 provides the means of adjusting the DC level on the U7 outputs for a minimum. The output of the line drivers is feed to pins 3, 8, 14, 16, 19, 24, 30, and 32 of P1 through precision load resistors.

ADDENDUM

Introduction

The addendum is designed to serve as the preliminary technical data for the VDA3006 Hi-Level Board.

This addendum includes the following sections:

- Introduction
- General Description

NOTE

Up to seven VDA3006 Hi-Level Boards can be installed in a VDA3000 Mainframe due to power supply and temperature loading. The VDA3006 Hi-Level Boards also require that a PS70V Power Supply be installed in the VDA3000 Mainframe rather than a PS45V Power Supply. Please refer to addendum number 81-9059-0360-0 for additional information on the PS70V Power Supply.

General Description

The VDA3006 Hi-Level Board is a high performance, differential input, eight output, hi-level distribution amplifier compatible with PESA's VDA3000 Mainframe. Equalization is included on the VDA3006 Hi-Level Board for up to 200 feet of 75 ohm coax cable. Up to seven VDA3006 Boards can be housed in a single 2 RU rack mount enclosure with a single or redundant power supplies.

The VDA3006 Hi-Level Board is ideally suited for the distribution of hi-level digital TTL horizontal and vertical sync signals from graphic workstations or signals that have their baseline at +5V and pulse to ground. In addition, analog or digital data telemetry signals can be distributed to multiple destinations with complete transparency.

ADDENDUM

ADDENDUM

Introduction

CAUTION

PS130 POWER SUPPLIES CONTAIN ELECTRICAL SHOCK HAZARDS AND SHOULD ONLY BE SERVICED BY QUALIFIED SERVICE PERSONNEL WITH EXPERIENCE IN SERVICING OFF-LINE SWITCHING REGULATORS.

CAUTION

There are no user serviceable parts contained in the PS130 Power Supply. All service performed on the PS130 Power Supply should be accomplished by qualified service personnel. **The internal circuits of the PS130 Power Supply contain dangerous voltage and current levels. Prior to servicing any PS130 Power Supply make absolutely sure that the AC line input is disconnected.**

NOTE

The PS130 Power Supply replaces the power supply formerly used to power the PESA equipment item referenced in the technical manual to which this addendum is attached. This addendum takes precedence over any mention of the former power supply in the technical manual for any PESA equipment items where the PS130 Power Supply is utilized.

This addendum contains the power connection, front door removal and replacement, power supply removal and installation, and fuse replacement instructions for the PS130 Power Supply. The purpose of this addendum is to provide technical information to the customer concerning the operation and servicing of the PS130 Power Supply.

ADDENDUM

General

CAUTION

HIGH LEAKAGE CURRENT AT 230 VAC

The PS130 Power Supply leakage current exceeds 3.5mA when used at 230VAC because of leakage through emission filter capacitors.

The PS130 Video Power Supply is responsible for providing a regulated ±8.9VDC @ 5.5A to the switching frame. The PS130 Power Supply is designed to operate within output specifications with AC line voltages ranges from 105 - 240 VAC and with AC line frequencies of 50/60 Hz automatically. 3.15A 250VAC AC line fuses provide over-load protection.

The PS130 Audio Power Supply is responsible for providing a regulated ±24VDC @ 2.35A to the switching frame. The PS130 Power Supply is designed to operate within output specifications with AC line voltages ranges from 105 - 240 VAC and with AC line frequencies of 50/60 Hz automatically. 3.15A 250VAC AC line fuses provide over-load protection.

CAUTION

Disconnect AC Power Cord Before Removing Power Supply.

In the event of a PS130 Power Supply failure, PESA suggets returning the malfunctioning unit to the PESA Service Department for replacement. **PS130 Power Supplies contain lethal voltages when operating and should only be serviced by technicians qualified to service off-line switching regulators.** Please call the PESA Service Department for a RMA number before returning any units for replacement. The service department's phone number is listed on the Service and Ordering Assistance Page.

ADDENDUM

Power Connections

CAUTION

PS130 POWER SUPPLIES CONTAIN ELECTRICAL SHOCK HAZARDS AND SHOULD ONLY BE SERVICED BY QUALIFIED SERVICE PERSONNEL AND/OR QUALIFIED TECHNICIANS.

CAUTION

THIS POWER SUPPLY USES AN INDIVIDUAL AC POWER CORD. DISCONNECT CORD BEFORE REMOVING SUPPLY.

Power Connect

To power-up a PS130 Power Supply and its associated routing switcher frame take the following steps:

1. Insert the power supply into the frame following the instructions in the Power Removal Section of this addendum.

2. Connect the power supply to the AC line.

3. Repeat steps 1 and 2 for a secondary power supply if applicable.

4. If applicable, connect any DC power looped to and from other frames in the routing switcher system to the unit under test.

Power Disconnect

To power-down a PS130 Power Supply, disconnect the AC power cord from the power supply's AC line input connector. To power-down a PS130 Power Supply and its associated routing switcher frame take the following steps:

1. If applicable, disconnect any DC power looped to and from other frames in the routing switcher system from the unit under test.

2. Disconnect the AC line from the primary PS130 Power Supply.

3. If applicable, disconnect the AC line from the secondary PS130 Power Supply.

ADDENDUM

Front Door Removal and Replacement

Front Door Removal (Removable Front Doors Only)

To remove the PESA equipment item's front door (cover) take the following steps:

1. Grasp the both the left and right front cover slide locks and push or pull them towards the center of the equipment item's front.

2. Once both slide locks are slide toward the center of the equipment items front, carefully pull the front door off the equipment item.

Front Door Installation (Removable Front Doors Only)

To install the PESA equipment item's front door (cover) take the following steps:

1. Align the front door with the front of the PESA equipment item.

2. Once the front door is aligned with the front of the PESA equipment item, slide the front door onto the equipment item until the slide locks snap into the locking provided on the equipment item's chassis.

ADDENDUM

Power Supply Removal and Replacement

CAUTION

Two AC Power Cords may be connected to this unit.

Power Supply Removal

To remove the PESA equipment item's power supply or power supplies take the following steps:

1. **Disconnect the AC power cord connected to the power supply to be removed.**

2. Remove or open the equipment item's front door.

3. Grasp the power supply slide lock and pull it toward the center of the supply.

4. Once the slide lock is slid toward the center of the supply, carefully pull the power supply out of the equipment chassis.

5. Repeat step 1 and steps 3 and 4 to remove any additional power supplies from the equipment item.

Power Supply Installation

To install the PESA equipment item's power supply or power supplies take the following steps:

1. Align the primary power supply with the primary set of power supply circuit card guides in the equipment item's chassis.

2. Carefully push the power supply into the chassis until the power supply connector makes initial contact with the backplane power connector. At this point, firmly but carefully continue pushing the power supply into the equipment chassis while making sure the power connectors are properly aligned. You may have to slide the power supply latch toward the center of the supply in order for the latch to move past the frame's metal work. Continue pushing the power supply until the power supply slide lock clicks into the power supply slide lock hole provided in the equipment chassis and the power connectors are firmly mated.

3. If additional power supplies are to be installed in the equipment chassis, align them with a set of power supply circuit card guides in the equipment item and repeat step 2.

ADDENDUM

Fuse Replacement

CAUTION

DOUBLE-POLE/NEUTRAL FUSING

To replace the PS13O Power Supply line fuses take the following steps:

1. **Disconnect the AC power cord from the power supply being serviced.**

2. Remove or open the front door of the equipment item containing the PS130 Power Supply needing serviced.

3. Remove the power supply from the equipment item. Refer to the Power Supply Removal Section of this addendum for power supply removal instructions.

4. Carefully pull the AC line fuse holder open. The fuse holder is located adjacent to the PS130 Power Supply AC line input connector.

5. **Replace the fuses with fuses of equal current and voltage rating.**

6. Carefully slide the AC line fuse holder closed.

7. Install the power supply back into the equipment chassis. Refer to the Power Supply Installation Section of this addendum for complete power supply installation instructions.

5. Reconnect the associated AC power cord.