PESA Switching Systems

Cougar HD/SD™

Video Routing Switcher

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FCC Statement

TBD

Declaration of Conformity

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Chapter 1 – Introduction

General

This manual provides instructions for the installation, operation, and maintenance of the PESA Cougar HD/SD Video Routing Switcher.

Safety Warnings

Safety warnings, and other important information, are emphasized in three ways:

WARNING

Warning statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION

Caution statements identify conditions or practices that could result in damage to equipment.

NOTE

Notes add emphasis to information that is important for the correct installation, operation, or maintenance of the equipment.

Product Description

The Cougar HD/SD (High Definition/Serial Digital) provides a 32x32 digital video matrix in a 4 rack unit chassis. Modular card architecture can be expanded to full frame capacity. You can specify an active matrix that closely meets your immediate requirement and expand by installing plug-in cards in the field. If the initial HD signal requirement is small, but there is a strong probability of future expansion, the Cougar HD/SD is recommended. SD cards also can be installed in the frame, providing additional flexibility.

The Cougar HD/SD uses plug-in removable circuit cards for ease of component replacement and maintenance. Systems can be delivered in increments of four inputs and four outputs. The matrices can be serviced without turning off power to the frame. Front panel status indicators provide quick verification of critical voltage and circuit conditions on the HD/SD cards.

The Cougar HD/SD is suitable for field or studio use. It can be added as another level in a larger matrix or used in standalone applications. It comes equipped with a control port, two RS-232 ports, four RS-485 control ports, and external alarm connectors. It can be delivered with single or dual power supplies, and accepts an optional plug-in system controller board.

Specifications

General

Physical Characteristics

Height..... 5.25 in (133 mm) (4 Rack Units)
Width ..... 19.00 in (483 mm)
Depth..... 17.00 in (422 mm)
Weight..... 28.00 lb (12.7 kg)

Operational Environment

Temperature ..... 0-40°C
Humidity .....10-90% Non-Condensing

Power Requirements

Power Supply, PS155

Part Number 81-9065-2143-0
Input..... Auto-Ranging: 100 - 250 VAC, 50/60 Hz
Input Connector .....IEC 320 Receptacle
Output .....± 5 VDC at 150 W
Power Consumption.....215 VA

IEC 320 Line Cords

US
- Part Number..... 81-9028-0403-0
- Connectors..... IEC 320-C13 to NEMA 5-15P

UK
- Part Number..... 81-9028-TBD-0
- Connectors.....IEC 320-C13 to BS 1363A

Euro
- Part Number..... 81-9028-0411-0
- Connectors.....IEC 320-C13 to CEE 7/7 Schuko

Digital Video

Input Characteristics

Impedance ..... 75 O
Return Loss .....>15 dB, 5 MHz to 360 MHz
Equalization (Belden 8281)..... Automatic for 0-250 m to 270 Mbps,
Automatic for 0-200 m to 360 Mbps,
Connector Type .....Non-looping BNC (one per input)

Output Characteristics

Impedance ..... 75 O
Return Loss .....>15 dB, 5 MHz to 270 MHz
Signal Amplitude..... 800 mV ±10%, Terminated into 75 O
DC Offset .....±0.5 V, Terminated into 75 O
Rise/Fall Times..... 0.6 ns ±100 ps (20-80%) Terminated into 75 O
Timing Jitter .....<0.2 Unit Intervals p-p (SMPTE 259M)
Alignment Jitter .....<0.2 Unit Intervals p-p (SMPTE 259M)
Number ..... Single
Standard .....SMPTE 259M
Reclocking.....Auto Standard Selection at 143, 177, 270, and 360 Mbps
Connector Type ..... BNC

Digital Video, High Definition

Input Characteristics

Impedance ..... 75 O
Return Loss ..... >15 dB, 5 MHz to 1.5 GHz
Equalization..... Automatic up to 28 dB
Connector Type .....Internally Terminated BNC (one per input)

Output Characteristics

Impedance ..... 75 O
Return Loss ..... >15 dB, 5 MHz to 1.5 GHz
Signal Amplitude..... 800 mV ±10%
DC Offset ..... ±0.5 V
Rise/Fall Times.....<270 ps
Timing Jitter .....<1.0 Unit Intervals p-p (SMPTE 292M)
Alignment Jitter .....<0.2 Unit Intervals p-p (SMPTE 292M)
Number ..... Single
Reclocking..... Yes
Standard .....SMPTE 292M
Connector Type ..... BNC

Chapter 2 – Installation

Shipping Damage Inspection

Immediately upon receipt, all shipping containers should be inspected for damage caused in transit. If any damage is noted, save all packing material and contact both PESA and the carrier as soon as possible.

Unpacking

CAUTION

This equipment contains static sensitive devices. A grounded wrist strap and mat should be used when handling the internal circuit cards.

Carefully unpack the equipment and compare the parts received against the packing list and Table 1. If any parts appear to be missing, please contact PESA immediately.

Table 1. Equipment List

Part No. Description	Quantity Required
81-9065-2254-0 Cougar HD/SD Mainframe Includes the following: 1 each Backplane Assembly (81-9065-2256-0) 1 each Chassis Assembly (81-9065-2255-0) 2 each Power Filter PS155F (81-9065-2140-0)	1 each
81-9065-2143-0 PS155 Power Supply	Note 1 2 max per mainframe
81-9065-2259-0 Cougar HD/SD 32x32 Matrix Board	1 each
81-9065-2257-0 HD Input Circuit Card	Note 1 8 max per mainframe
81-9065-2283-0 SD Input Circuit Card	Note 1 8 max per mainframe
81-9065-2258-0 HD Output Circuit Card	Note 1 8 max per mainframe
81-9065-2284-0 SD Output Circuit Card	Note 1 8 max per mainframe
81-9028-0403-0 Line Cord, IEC 320, US	Note 1
81-9028-0411-0 Line Cord, IEC 320, Outside US	Note 1
81-9065-2260-0 HD/SD Matrix Board Extender	Note 1
81-9065-2261-0 HD/SD Input/Output Card Extender	Note 1
81-9065-2167-0 3500Plus System Controller	Note 1 1 max per mainframe
Note 1: This item is optional or may be ordered in varying quantities. Please consult your purchase order to verify that you have received the correct quantity.	

Installation Location

WARNING

For safety reasons, this equipment must be located near the socket-outlet or power strip so that the AC line cord plugs are easily accessible (EN60950:1992 §1.7.2).

This equipment is designed to be installed in a standard 19-inch equipment rack located in an environment conforming to the specifications shown in Chapter 1. Each unit should be located as close as possible to its associated equipment to minimize cable runs.

Consideration should be given to the connection of this equipment to the supply circuit and the effect that possible overloading could have on overcurrent protection circuits and supply wiring. Refer to the nameplate ratings when addressing this concern.

Installation in Equipment Rack

WARNING

This equipment should only be installed in a standard 19-inch equipment rack, and only in such a manner as to avoid any tipping hazard from uneven loading of the rack.

CAUTION

Fans located within this equipment provide forced air cooling. Care should be taken not to block airflow around these fans.

Sufficient space must be provided behind the equipment rack to allow for the control, signal, and power cables. All panel mounting holes should be utilized and mounting hardware tightened securely.

Install the equipment into the rack as follows:

1. Insert the panel assembly into the equipment rack and support the bottom of the panel assembly until all mounting screws have been installed and properly tightened.
2. Install the bottom two panel mounting screws.
3. Install the top two panel mounting screws.
4. Install any remaining panel mounting screws.
5. Tighten all of the panel mounting screws until they are secure.

Backplane Interface Connections

For personal safety, and to prevent damage to the equipment or cables, use the following guidelines when connecting cables to this equipment:

1. Install the equipment in the rack before connecting cables.
2. All cables should be carefully strain-relieved to prevent connector separation.

3. To the extent possible, separate control, signal, and power cables to minimize crosstalk and interference.
4. Secure cables to the rack with nylon cable ties. This will minimize the amount of force transmitted to the equipment and help route cables away from hazardous areas.
5. Route cables away from walk areas to avoid creating a safety hazard.

All interface connections are made at the rear of this equipment as shown in Figure 1. There are 32 input and 32 output video connectors to allow the connection of the digital video sources and destinations to this equipment. The digital video input connectors are internally terminated to 75 ohms.

NOTE

Any unused BNC signal connector must be terminated with a 75 Ohm terminator, part no. 81-9029-0668-4.

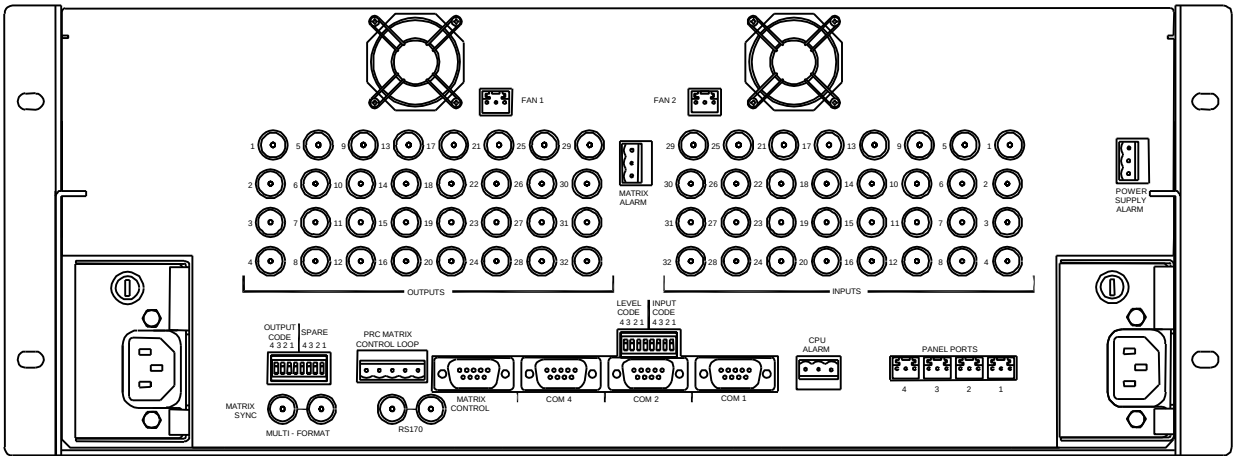


Figure 1. Interface Connections

Input Signal Connectors (INPUTS)

The BNC connectors labeled INPUTS provide the input signal interface. Use coaxial cable and a standard BNC connector to connect each source.

See “Input Looping Cables” on Page 15 for additional information when installing cables to a system utilizing this feature.

Output Signal Connectors (OUTPUTS)

The BNC connectors labeled OUTPUTS provide the output signal interface. Use coaxial cable and a standard BNC connector to connect each destination.

See “Output Looping Cables” on Page 15 for additional information when installing cables to a system utilizing this feature.

Matrix Sync Connectors (MATRIX SYNC)

These BNC coaxial connectors provide the interface for an optional house sync signal (NTSC, PAL, etc.) and are wired in parallel to allow equipment to be daisy-chained together. Either of them may be connected to house sync with coaxial cable and standard BNC connectors. The other connector may be used to loop the signal to another piece of equipment. Install 75 Ohm terminators (Part No. 81-9029-0668-4) on all unused BNC connectors.

Figure 2. MATRIX SYNC Connectors

For use with digital HD input and output signals, Multi-Format is compatible with the trilevel analog HD sync signal as detailed in standards document SMPTE 274M-1998, Section 14 Analog Sync (60/59.94/50 Hz). Multi-Format only connects to the 32x32 Matrix board; RS170 connects to both the internal system controller board and the 32x32 Matrix board.

Remote Control Panel Connectors (PANEL PORTS, 1-4)

These 3-contact connectors provide RS-485 serial communication interfaces using the PESA RCP Protocol (Document No. 81-9062-0300-0). See Figure 3 for an orientation view showing contact locations.

PANEL PORTS connect to the PESA Remote Control Panels with daisy-chained cables constructed with 3-contact connectors (Part No. 81-9029-0811-0 and Part No. 81-9029-0780-0) and shielded, twisted-pair cables (Part No. 81-9028-0043-2, Belden 8451, or equivalent) as shown in Figure 4. The connector body has an integral strain relief which requires the use of a nylon cable tie included with the connector. If this cable tie is not available, Part No. 81-9021-0028-8 may be used.

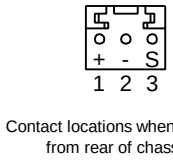


Figure 3. PANEL PORTS Connectors

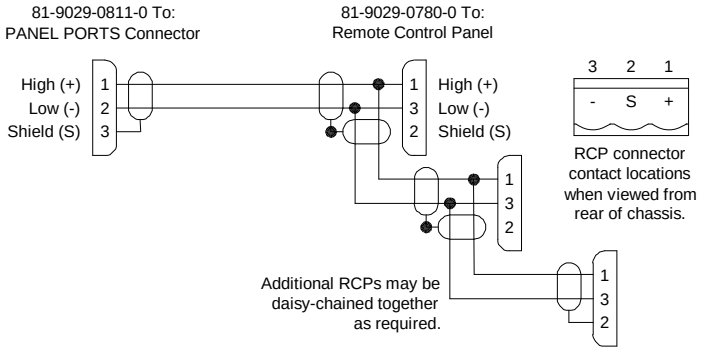
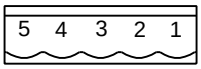


Figure 4. RS-485 Serial Cable

PRC System Expansion Connector (PRC MATRIX CONTROL LOOP)

This 5-contact connector is a loop-through connector used to provide an RS-422 serial communication interface using the PESA PRC Protocol (Document No. 81-9062-0316-0). See Figure 5 for an orientation view showing contact locations.

PRC MATRIX CONTROL LOOP may be connected to PESA PRC-type equipment with a cable assembly (Part No. 81-9028-0395-0) constructed as shown in Figure 6. If this cable must be constructed in the field, consult Drawing No. WI50-0250 for assembly details.



Contact locations when viewed
from rear of chassis.

Figure 5. PRC MATRIX CONTROL LOOP Connector

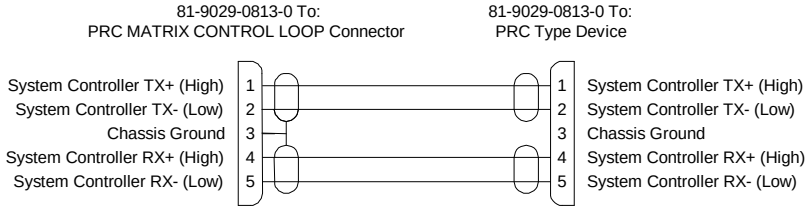


Figure 6. RS-422 PRC System Expansion Cable

RS-232 Connectors (COM 1, COM 2)

These DB9-Male connectors provide RS-232 serial communication interfaces. See Figure 7 for an orientation view showing contact locations.

- COM 1 is the primary RS-232 CPU link and may be connected to the PC running the control system software (e.g. Win3500, Win3500Plus, etc.) with a null modem cable (Part No. 81-9028-0393-0). If necessary, a cable up to 50 feet in length may be fabricated in the field as shown in Figure 8. If a 3500Plus system controller is installed, COM 1 may only be used with the P1E protocol, at either 9600 or 38400 baud. Consult the manual for your system controller to determine how to set the communication rate.

  COM 1 may also be connected to an external modem using an AT Serial Modem cable (Part No. 81-9028-0400-0). If necessary, a cable up to 50 feet in length may be fabricated in the field as shown in Figure 9 on page 10.

- COM 2 is a secondary RS-232 CPU link which may also be connected to a PC or external modem. COM 2 may be used with any of the protocols shown in Table 2. Consult the manual for your system controller to determine how to set the communication rate.

Table 2. PESA CPU Link Protocols

Protocol	Document No.
CPU Link Protocol No. 1 (P1)	81-9062-0407-0
CPU Link Protocol No. 1 Extensions (P1E)	81-9062-0408-0
Unsolicited Status Protocol (USP)	81-9062-0409-0
Truck Link Protocol (TRK)	81-9062-0410-0

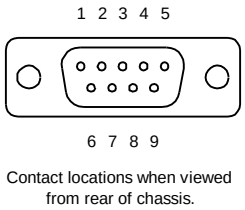


Figure 7. COM 1, COM 2 Connectors

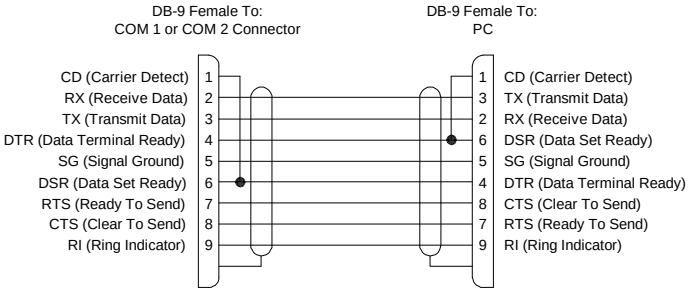


Figure 8. RS-232 CPU Link (Null Modem) Cable

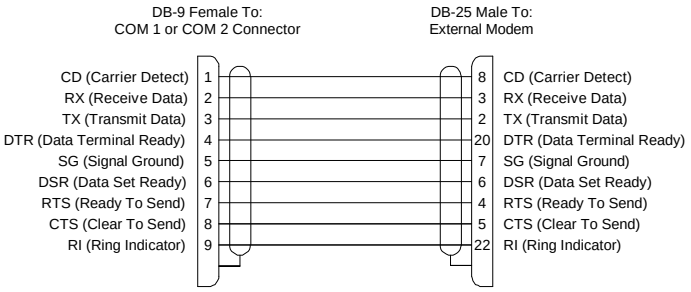


Figure 9. RS-232 CPU Link (AT Serial Modem) Cable

RS-422 Connectors (MATRIX CONTROL, COM 4)

These DB9-Male connectors provide RS-422 serial communication interfaces. See Figure 10 for an orientation view showing contact locations.

- MATRIX CONTROL is the communications interface to a PRC type routing switcher system and is connected to a routing switcher with an AT Serial Modem cable (Part No. 81-9028-0400-0). If necessary, a cable up to 4000 feet in length may be fabricated in the field as shown in Figure 11.
- COM 4 is an RS-422 CPU Link similar to the RS-232 CPU Link, except the cable may be up to 4000 feet in length and an RS-422 interface card must be installed in the expansion bus. COM 4 may be used with any of the protocols shown in Table 2 on page 10. Consult the manual for your system controller to determine how to set the communication rate. If necessary, a cable may be fabricated in the field as shown in Figure 12.

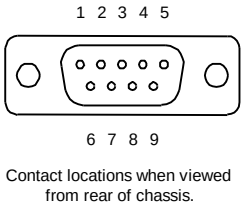


Figure 10. MATRIX CONTROL, COM 4 Connectors

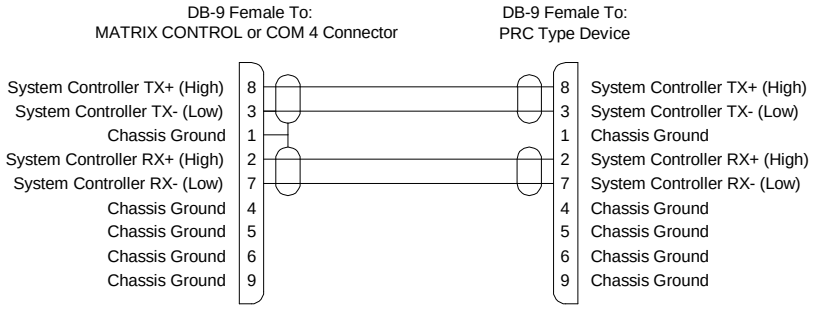


Figure 11. RS-422 Serial Cable

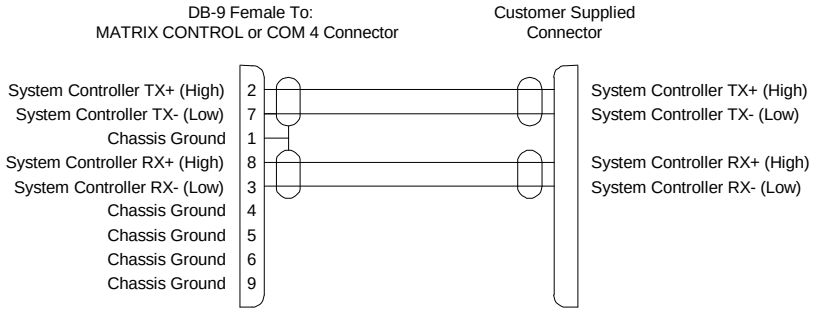


Figure 12. RS-422 CPU Link Cable

CPU Alarm Connector (CPU ALARM)

This 3-contact connector provides an optically isolated switch closure during an alarm condition. See Figure 13 for an orientation view showing contact locations.

CPU ALARM is connected to an external, customer supplied, monitoring circuit with a cable constructed with one 3-contact, screw-terminal connector (PESA Part No. 81-9029-0811-0) and a customer supplied cable, as shown in Figure 14. The connector body has an integral strain relief which requires the use of a nylon cable tie (PESA Part No. 81-9021-0028-8).

CAUTION

The alarm circuit connected to this connector must not exceed 12VDC or 10mA.

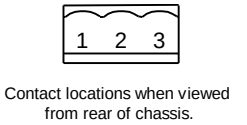


Figure 13. CPU ALARM Connector

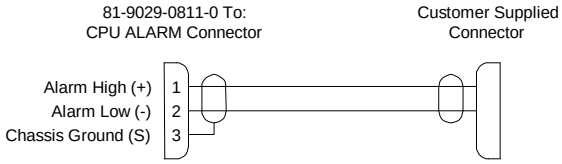


Figure 14. CPU ALARM Expansion Cable

Power Supply Alarm Connector (POWER SUPPLY ALARM)

This 3-contact connector provides an optically isolated switch closure during an alarm condition. See Figure 15 for an orientation view showing contact locations.

POWER SUPPLY ALARM is connected to an external, customer supplied, monitoring circuit with a cable constructed with one 3-contact, screw-terminal connector (PESA Part No. 81-9029-0811-0) and a customer supplied cable, as shown in Figure 16. The connector body has an integral strain relief which requires the use of a nylon cable tie (PESA Part No. 81-9021-0028-8).

CAUTION

The alarm circuit connected to this connector must not exceed 12VDC or 10mA.

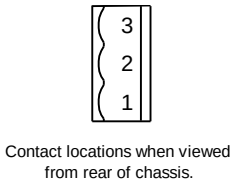


Figure 15. POWER SUPPLY ALARM Connector

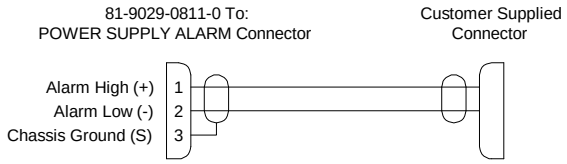


Figure 16. RS-422 Power Supply Alarm Expansion Cable

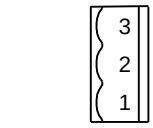
Matrix Alarm Connector (MATRIX ALARM)

This 3-contact connector provides an optically isolated switch closure during an alarm condition. See Figure 17 for an orientation view showing contact locations.

MATRIX ALARM is connected to an external, customer supplied, monitoring circuit with a cable constructed with one 3-contact, screw-terminal connector (PESA Part No. 81-9029-0811-0) and a customer supplied cable, as shown in Figure 18. The connector body has an integral strain relief which requires the use of a nylon cable tie (PESA Part No. 81-9021-0028-8).

CAUTION

The alarm circuit connected to this connector must not exceed 12VDC or 10mA.



Contact locations when viewed from rear of chassis.

Figure 17. MATRIX ALARM Connector

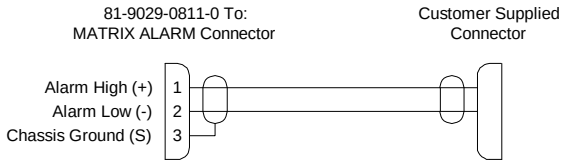


Figure 18. RS-422 Matrix Alarm Expansion Cable

Power Connections

WARNING

Always use a grounded AC receptacle to avoid a potentially lethal shock hazard in the event of an equipment power line fault.

NOTE

This equipment will not meet FCC EMI limits unless both AC line cords are plugged into properly grounded AC receptacles.

Connect the AC line cords (PESA Part No. 81-9028-0442-0) to the Backplane power connectors and then to an AC power source. This equipment is now powered-up and ready for the system controller software to be configured.

NOTE

This equipment contains two power supply assemblies connected in parallel. Only one power supply assembly is required to power this equipment. The second power supply assembly serves as a backup for the first. One power supply assembly may safely be removed while the other power supply assembly is connected to the power source.

Signal Connections

Input Looping Cables

A standard 4-foot cable assembly (Part No. 81-9028-0444-0) is used to connect the input board expansion connector on one routing switcher, to the input connector on the next routing switcher. These cables are used to expand the number of outputs available in a system. If this cable must be constructed in the field, please consult Drawing No. WI50-0269 for assembly details.

Output Looping Cables

A standard 8-foot cable assembly (Part No. 81-9055-0278-7) is used to connect the output board expansion connector on one routing switcher, to the output connector on the next routing switcher. These cables are used to expand the number of inputs available in a system. If this cable must be constructed in the field, please consult Drawing No. WI50-0150 for assembly details.

LED Locations and Switch Settings

Subassembly Installation

If specified when ordered, the switches on the subassemblies will already be properly configured.

32x32 Matrix Board LEDs

The 32x32 Matrix Board contains the following LEDs. See Figure 19 for the location of these LEDs.

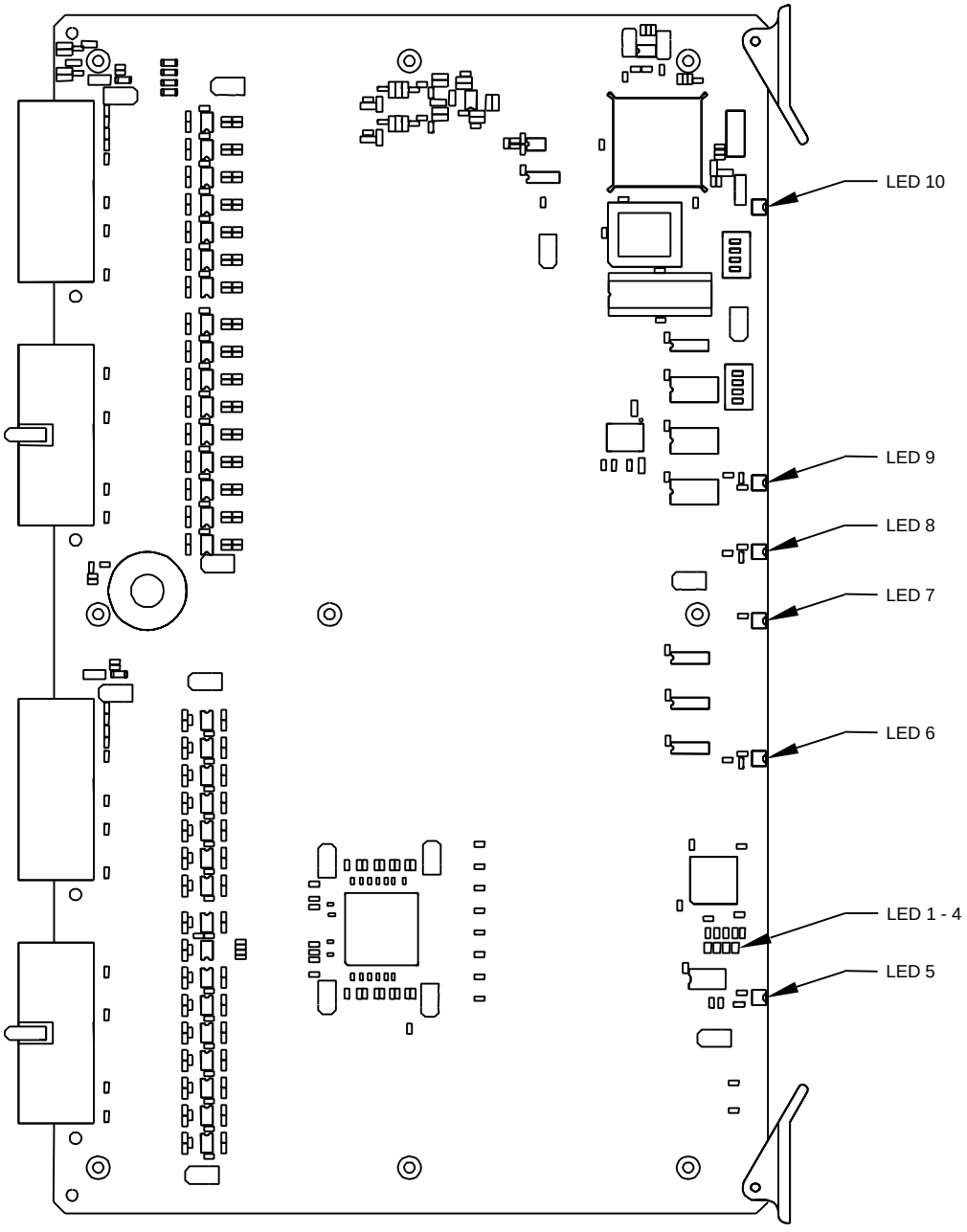


Figure 19. 32x32 Matrix Board LED Locations

32x32 Matrix Board Switches

NOTE

PESA software monitors a DIP switch setting and updates a setting without damage to the equipment. There is no need to cycle the power for a setting to take effect.

The 32x32 Matrix Board switches (S1 and S2) are four-position, slide-style, DIP switches. Each switch consists of four single pole, single throw (SPST) switches numbered 1 through 4. See Figure 20 for the location and orientation of these switches.

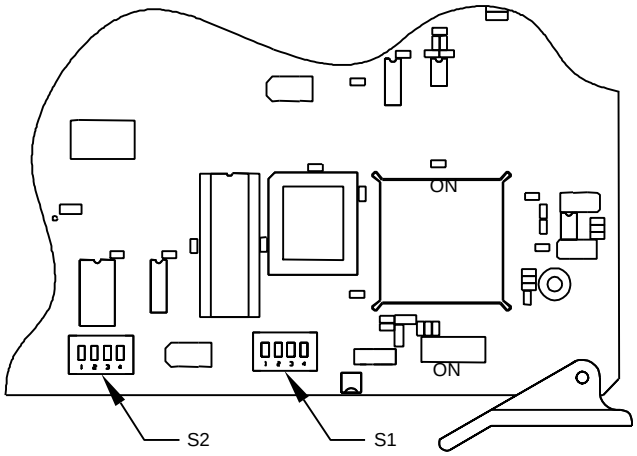


Figure 20. 32x32 Matrix Board DIP Switch S1 and S2 Locations

S1 – SPARE

S1 SPARE is reserved for future use. See Table 3 for switch settings.

Table 3. 32x32 Matrix Board Switch S1 Settings

32x32 Matrix Board Switch S1 Code Select	Switch S1-1	Switch S1-2	Switch S1-3	Switch S1-4
Reserved - Set switches to OFF	OFF	OFF	OFF	OFF

S2 – SYNC Line

S2 controls the selection of a sync line for synchronized switching. See Table 4 for switch settings.

Table 4. 32x32 Matrix Board Switch S2 Settings

32x32 Matrix Board Switch S2 Switch Line Select	Switch S2-1	Switch S2-2	Switch S2-3	Switch S2-4
Switch Line 10	ON	ON		
Switch Line 11	OFF	ON		
Switch Line 12	ON	OFF		
Switch Line 13	OFF	OFF		
Reserved - Set S2-3 to OFF			OFF	
Reserved - Set S2-4 to OFF				OFF

Backplane Board Switches

SPARE/OUTPUT CODE

SPARE/OUTPUT CODE is an eight-position, toggle-style, DIP switch. SPARE positions 1-4 are reserved for future use. OUTPUT CODE positions 1 through 4 control the selection of output offset codes. See Figure 21 for the orientation of this switch. See Table 5 for switch settings.

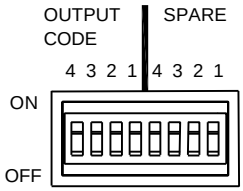


Figure 21. Spare/Output Code Switch Orientation

Table 5. Spare/Output Code Switch Settings

Backplane Board Spare/Output Code Switch Code Select	SPARE Positions				OUTPUT CODE Positions			
	4	3	2	1	4	3	2	1
Output Offset Codes 1-32					ON	ON	ON	ON
Output Offset Codes 33-64					ON	ON	ON	OFF
Output Offset Codes 65-96					ON	ON	OFF	ON
Output Offset Codes 97-128					ON	ON	OFF	OFF
Output Offset Codes 129-160					ON	OFF	ON	ON
Output Offset Codes 161-192					ON	OFF	ON	OFF
Output Offset Codes 193-224					ON	OFF	OFF	ON
Output Offset Codes 225-256					ON	OFF	OFF	OFF
Output Offset Codes 257-288					OFF	ON	ON	ON
Output Offset Codes 289-320					OFF	ON	ON	OFF
Output Offset Codes 321-352					OFF	ON	OFF	ON
Output Offset Codes 353-384					OFF	ON	OFF	OFF
Output Offset Codes 385-416					OFF	OFF	ON	ON
Output Offset Codes 417-448					OFF	OFF	ON	OFF
Output Offset Codes 449-480					OFF	OFF	OFF	ON
Output Offset Codes 481-512					OFF	OFF	OFF	OFF
Reserved - Set switches to OFF	OFF	OFF	OFF	OFF				

LEVEL CODE/INPUT CODE

LEVEL CODE/INPUT CODE is an eight-position, toggle-style, DIP switch which controls the selection of strobe assignments (LEVEL CODE) and input offset codes. See Figure 22 for the orientation of this switch. See Table 6 for switch settings.

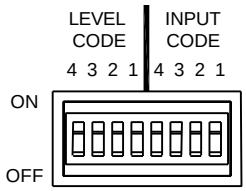


Figure 22. Level Code/Input Code Switch Orientation

Table 6. Level Code/Input Code Switch Settings

Backplane Board Level/Input Switch Code Select	LEVEL CODE Positions				INPUT CODE Positions			
	4	3	2	1	4	3	2	1
Input Offset Codes 1-32					ON	ON	ON	ON
Input Offset Codes 33-64					ON	ON	ON	OFF
Input Offset Codes 65-96					ON	ON	OFF	ON
Input Offset Codes 97-128					ON	ON	OFF	OFF
Input Offset Codes 129-160					ON	OFF	ON	ON
Input Offset Codes 161-192					ON	OFF	ON	OFF
Input Offset Codes 193-224					ON	OFF	OFF	ON
Input Offset Codes 225-256					ON	OFF	OFF	OFF
Input Offset Codes 257-288					OFF	ON	ON	ON
Input Offset Codes 289-320					OFF	ON	ON	OFF
Input Offset Codes 321-352					OFF	ON	OFF	ON
Input Offset Codes 353-384					OFF	ON	OFF	OFF
Input Offset Codes 385-416					OFF	OFF	ON	ON
Input Offset Codes 417-448					OFF	OFF	ON	OFF
Input Offset Codes 449-480					OFF	OFF	OFF	ON
Input Offset Codes 481-512					OFF	OFF	OFF	OFF
Reserved For Future Use	ON	ON	ON	ON				
Strobe 1	ON	ON	ON	OFF				
Strobe 2	ON	ON	OFF	ON				
Strobe 3	ON	ON	OFF	OFF				
Strobe 4	ON	OFF	ON	ON				
Strobe 5	ON	OFF	ON	OFF				
Strobe 6	ON	OFF	OFF	ON				
Strobe 7	ON	OFF	OFF	OFF				
Strobe 8	OFF	ON	ON	ON				
Strobe 9	OFF	ON	ON	OFF				
Strobe 10	OFF	ON	OFF	ON				
Strobe 11	OFF	ON	OFF	OFF				
Strobe 12	OFF	OFF	ON	ON				
Strobe 13	OFF	OFF	ON	OFF				
Strobe 14	OFF	OFF	OFF	ON				
Strobe 15	OFF	OFF	OFF	OFF				

Preparing for Subassembly Installation

If replacing certain subassemblies, the following instructions are to be performed. The 32x32 Matrix Board, Input and Output cards, and PS155 Power Supplies can only be accessed when the Front Cover and the Retainer Bar are removed.

Preparing for Installation

1. Remove the Front Cover (Figure 23) and Retainer Bar (Figure 24).
2. Replace the subassembly.
3. Install the Front Cover and Retainer Bar.

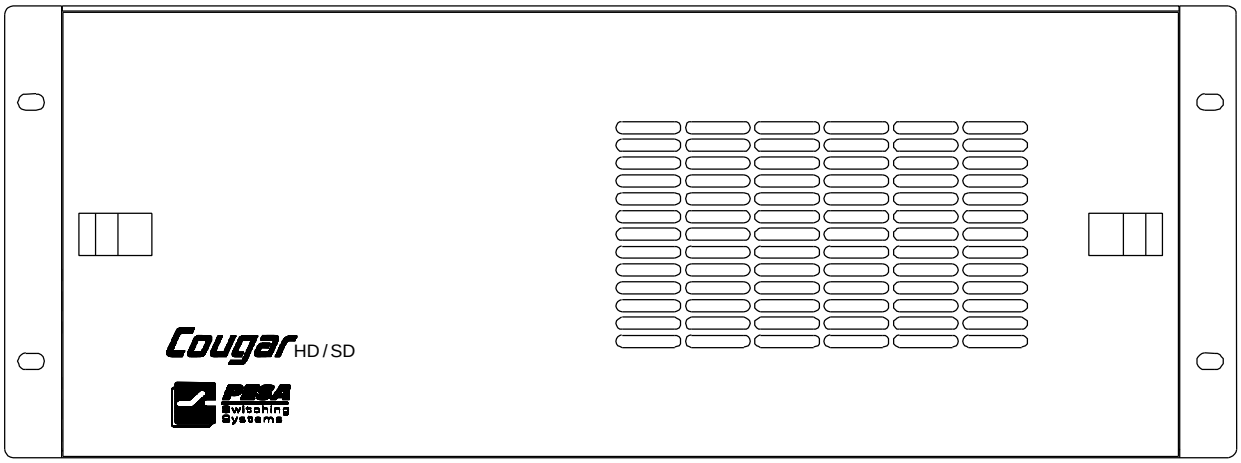


Figure 23. Cougar HD/SD Front View

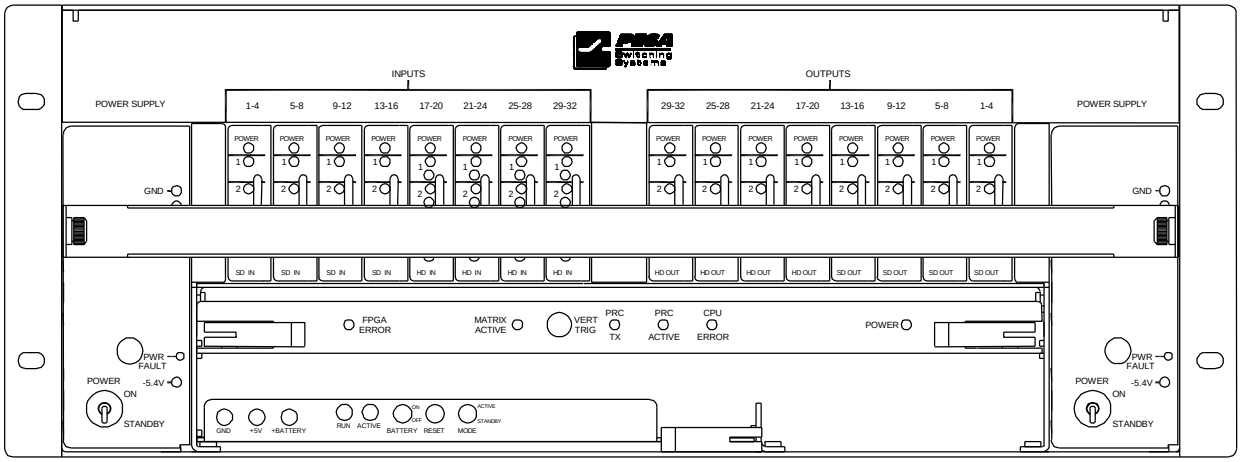


Figure 24. Cougar HD/SD Front View Without Cover

32x32 Matrix Board Installation

The 32x32 Matrix board is located as shown in Figure 24 and is installed as follows:

1. Align the shield plate of the 32x32 Matrix board with the card guides in the chassis.

2. Carefully insert the 32x32 Matrix board into the chassis until the connectors on the 32x32 Matrix board make contact with the backplane connectors. Inspect the mating connectors, if possible, to ensure proper alignment.
3. Firmly push the 32x32 Matrix board into the chassis until the connectors on the 32x32 Matrix board are fully mated with the backplane connectors.
4. Replace the Retainer Bar and Front Cover.

Input and Output Board Installation

The Input and Output boards are located as shown in Figure 25 and are installed as follows:

1. Align the printed circuit board of the input or output board with the card guides in the chassis.
2. Carefully insert the board into the chassis until the connectors on the board make contact with the backplane connectors. Inspect the mating connectors, if possible, to ensure proper alignment.
3. Firmly push the input or output board into the chassis until the connectors on the input or output board are fully mated with the backplane connectors.
4. Repeat the above steps for each additional input and output board, and replace the Retainer Bar and Front Cover.

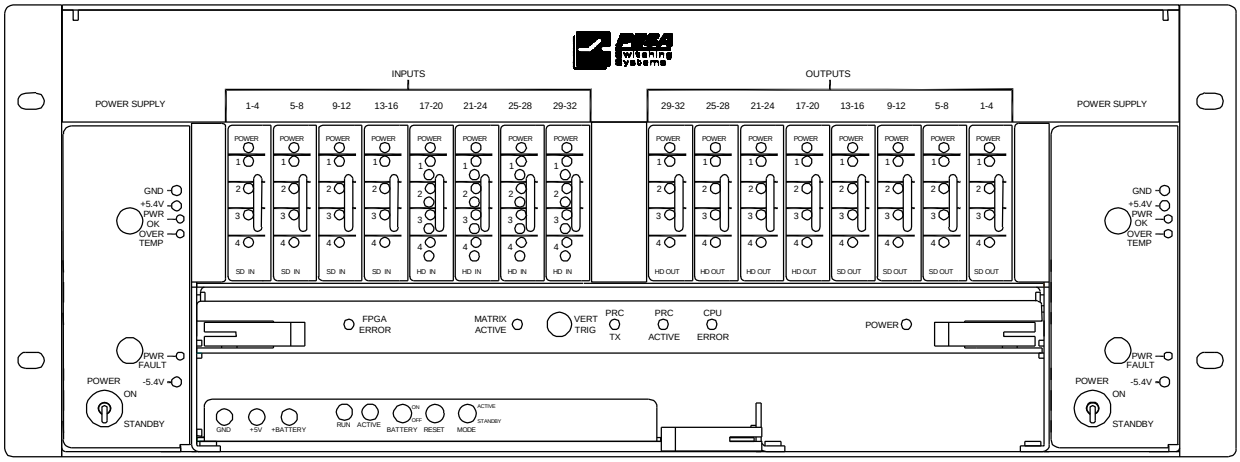


Figure 25. Front View (Front Cover and Retainer Bar Removed)

Power Connections

WARNING

Always use a grounded AC receptacle to avoid a potentially lethal shock hazard in the event of an equipment power line fault.

NOTE

This equipment will not meet FCC EMI limits unless both AC line cords are plugged into properly grounded AC receptacles.

PS155 Power Supply Installation

NOTE

This equipment can contain two power supply assemblies connected in parallel. Only one power supply assembly is required to power this equipment. The second power supply assembly serves as a backup for the first. One power supply assembly may safely be removed while the other power supply assembly is connected to the power source.

The Power Supplies are located as shown in Figure 25 and are installed as follows:

1. Align the Power Board Shield Plate of the Power Supply with the card guides in the chassis.
2. Carefully insert the Power Supply into the chassis until the connectors on the Power Supply make contact with the backplane connectors. Inspect the mating connectors, if possible, to ensure proper alignment.
3. Firmly push the Power Supply into the chassis until the connectors on the Power Supply are fully mated with the backplane connectors.
4. Repeat the above steps for the other Power Supply.

System Controller Installation

The System Controller is located as shown in Figure 25 and installed as follows:

1. Align the support plate of the System Controller with the card guides in the chassis.
2. Carefully insert the System Controller into the chassis until the connectors on the System Controller make contact with the backplane connectors. Inspect the mating connectors, if possible, to ensure proper alignment.
3. Firmly push the System Controller into the chassis until the connectors on the System Controller are fully mated with the backplane connectors.

Chapter 3 – Operation

General

There are no user adjustments on the 32x32 Matrix Board. If specified when ordered, the switches and jumpers on the subassemblies will already be properly configured. Otherwise, refer to LED Locations and Switch Settings on page 16.

The operation of the Cougar HD/SD Video Routing Switcher consists of periodically monitoring the LEDs of the 32x32 Matrix Board. The LEDs can only be seen when the front cover is removed. For LED locations, see Figure 25 on page 20.

NOTE

This equipment is operated by a system controller such as the PESA 3500 or 3500Plus System Controller. For detailed operational information, please refer to the system controller manual.

The following provides a brief operational description of the subassembly LEDs. For more details, refer to Troubleshooting on page 27.

32x32 Matrix Board

FPGA Error

FPGA Error is a red LED used to indicate a programming fault, or a reset occurred to the Field Programmable Gate Array.

Matrix Active

Matrix Active is a green LED that is ON to indicate an active crosspoint.

PRC TX

PRC TX is a green LED that blinks ON to indicate transmission of the data signal to the system controller.

PRC Active

PRC Active is a green LED that is ON when a transmission of the data signal from the system controller occurs.

CPU Error

CPU Error is a red LED that is ON to indicate a microprocessor problem on the 32x32 Matrix Board.

Power

Power is a green LED that is ON when the proper power supply voltage is being supplied to the 32x32 Matrix Board.

High Definition and Serial Digital Cards

Power Status

All HD and SD cards have green LEDs to indicate the presence of input power.

Input Signal Status

Each input has a yellow LED to indicate when a signal is present on that input.

Output Signal Status

Each output has a yellow LED to indicate when a valid signal is present on that output.

PS155 Power Supply

PWR OK and PWR FAULT

The power supply has a green LED to indicate the presence of output power (PWR OK LED). If the output voltage falls below the proper level, the PWR FAULT LED lights, and the PWR OK LED goes out. This condition occurs if a voltage signal decreases by 25 percent. An Opto-isolator circuit is used to provide the alarm closure.

Over Temperature

The power supply has a red LED to indicate an over temperature condition. J1 is a 3-pin, single-row connector used to shut off the power supply if this condition occurs, and a jumper has been placed on pins 1 and 2. An Opto-isolator circuit provides an alarm closure if the heat-sink temperature rises above 85 degrees C, and keeps the power supply shut off until it cools to at least 81 degrees C.

A jumper placed on J1 pins 2 and 3 will not shut off the power supply, but the red LED will light to indicate that an over temperature condition has occurred. The power supply is shipped with the jumper at J1 in positions 2 and 3.

Table 7. PS155 Power Supply Over Temperature Shutoff Enable/Disable (J1)

Over Temperature Shutoff	Jumper J1
Enable	1-2
Disable (Default)	2-3

Chapter 4 – Functional Description

The responsible for the distribution of power, control signals, house sync, alarm signals, and video signals throughout the routing switcher.

The is responsible for providing a passive interface between the Midplane boards and the System Controllers. The system control signals include communications port data, internal and external PRC communications port data, and control panel polling data.

Power Supply PS155

The Power Supply PS155 assemblies are responsible for providing a regulated +5VDC at 80A, and a regulated -5VDC at 240A, to the routing switcher's internal interfaces and circuit cards. The Power Supply assemblies are also responsible for providing the fan control voltages. Visual indicators (LED1 - LED3) provide a visual indication of the health of the Power Supplies. LED1 indicates the health of the output voltages. LED2 provides a visual indication of a Power Supply over temperature condition. LED3 provides a visual indication of a routing switcher fan failure.

32 X 32 Matrix board

The 32 X 32 matrix card is comprised of a microprocessor, input buffers, output buffers, and the 32 X 32 matrix.

Microprocessor

The microprocessor is responsible handling all communications to a system controller and updating the crosspoints. Crosspoint messages are received by the processor, decoded and validated for matrix under control. The processor then updates the crosspoint registers with current

Input Buffers

The input buffers provide isolation between the input boards and the matrix IC’s.

Output Buffers

The output buffers provides isolation between the matrix IC’s and the output boards.

32 X 32 Matrix IC’s

Two IC’s are used to make the full 32 X 32 matrix one located on the top of the board and one on the bottom.

Digital Input Buffer Board

Each board contains four input circuits. The input circuits are responsible for automatic input equalization and driving the signal inputs in to the 32 X 32 Digital Crosspoint board in the routing switcher. The input circuits are each comprised of a cable equalizer and a backplane driver The cable equalizer provides automatic input equalization for the digital video input signal to standard internal levels. The backplane driver is responsible for driving the digital video signal to the 32 X 32 Digital Crosspoint board.

Digital Output Board

Each board contains four output circuits. The output circuits are responsible for receiving digital video signals from the 32 X 32 matrix. The digital video signals are then reclocked to remove jitter that may be associated with long input cable. After the digital video signal is reclocked a matched impedance cable driver is used to output the digital video signal to coax. Each output has a LED that is on steady when a output digital video signal is present. Output boards come in both SD and HD versions.

Chapter 5 – Maintenance and Repair

Periodic Maintenance

The Cougar HD/SD Digital Video Routing Switcher is tested before shipment from the factory. If the equipment configuration changes or parts are replaced, adjustment is not necessary. The need for periodic maintenance is minimal.

CAUTION

This equipment contains static sensitive devices. A grounded wrist strap and mat should be used when handling the internal circuit cards.

NOTE

This equipment has been designed so maintenance operations can be performed while the equipment is operational (has power applied). Only the power supply assemblies and the AC line circuits contain potentially lethal shock hazards.

Troubleshooting

Subassembly LEDs

If this equipment fails to operate, check the appropriate LEDs on a subassembly for an indication of the operational status. Figure 25 on page 21 and Figure 19 on page 16 show the location of these LEDs. The LEDs can only be seen when the front cover is removed.

High Definition and Serial Digital Cards

Power Status

All HD and SD cards, and both power supplies, have green LEDs to indicate the presence of input power. If the LEDs are not ON:

- Check the power supply for correct operation and connection.
- Ensure that all interface connectors for the HD and SD cards are correctly mated.
- Contact Customer Service.

Input Card Signal Status

Each input card has four yellow LEDs that indicate when any signal is present on that input card. If the appropriate LEDs are not ON, contact Customer Service.

Output Card Signal Status

Each output card has four yellow LEDs that indicate when any valid signal is present on that output card. If the appropriate LEDs are not ON, contact Customer Service.

PS155 Power Supply Assembly

LED Designation	Color	Normal State	Troubleshooting Info
PWR OK PWR FAULT	GRN RED	ON OFF	Indicates that output voltages (±5.4V) are within design parameters. If PWR OK LED is OFF, and PWR FAULT LED is ON: 1. Check position of Power switch. 2. Ensure power supply is properly seated. 3. Check input power connection/fuse. 4. Replace the power supply. 5. Contact PESA Customer Service.
OVER TEMP	RED	OFF	Indicates that the power supply operating temperature is within design parameters. If LED is ON: 1. Check for blocked air flow: physical obstruction, air filter, etc. 2. Ensure ambient temperature is below 40 degrees C (105 degrees F). 3. Check input voltage level. 4. Replace the power supply. 5. Contact PESA Customer Service.

32x32 Matrix Board

LED Designation	Color	Normal State	Troubleshooting Info
POWER (LED 10)	GRN	ON	Indicates that input voltage to the PCB is within design parameters. If LED is OFF: 1. Remove and reinstall board to verify backplane connector is properly seated. 2. Check power supplies for proper operation. 3. Contact PESA Customer Service.
CPU ERROR (LED 9)	RED	OFF	Indicates that the microprocessor did not properly initialize. If LED is ON: 1. Contact PESA Customer Service.
PRC ACTIVE (LED 8)	GRN	ON	Indicates that there is communication activity on the PRC bus. This LED will be ON if the link is active.
PRC TX (LED 7)	GRN	ON	Indicates that the 32x32 Matrix Board is communicating over the PRC bus. This LED will be ON and blinking when activity occurs.
MATRIX ACTIVE (LED 6)	GRN	ON	Indicates that the module is in use. This LED will be ON if at least one crosspoint on the board is active.
FPGA ERROR (LED 5)	RED	OFF	Indicates that the Field Programmable Gate Array did not properly initialize. If LED is ON: 1. Contact PESA Customer Service.

System Controller Board

Please refer to the system controller manual for troubleshooting information.

PESA Customer Service

If the troubleshooting information above has not solved your problem, please contact the PESA Customer Service Department. Skilled technicians are available to assist you 24 hours per day, seven days per week.

Detailed contact information for the Customer Service Department is located inside the front cover of this document.

Repair

Before attempting to repair this equipment, please consult your warranty documents and/or the PESA Customer Service Department. Unauthorized repairs may void your warranty.

WARNING

PS155 Power Supply

An incorrectly repaired power supply could be a safety hazard. The power supply assembly in this equipment is not field/user serviceable. These offline switching power supplies contain internal voltages in excess of 300VDC and are not isolated from the AC power source. They should only be serviced by qualified service personnel using appropriate equipment. Because of this, it is strongly suggested that power supplies be returned to the PESA Customer Service Department for service.

CAUTION

Many of the PC boards in this equipment contain large numbers of SMT (Surface Mount Technology) components. Special tools are required to replace these components without causing damage to adjacent areas. It is strongly recommended that PESA Customer Service be consulted prior to attempting to repair any of the PC boards in this equipment.

Replacement Parts

Only parts of the highest quality have been used in the design and manufacture of this equipment. If the inherent stability and reliability are to be maintained, replacement parts must be of the same high quality. For this reason, we suggest that you consult our Customer Service Department before installing any parts not purchased from PESA.

Filter Cleaning

The front door of this equipment contains an air filter that should be cleaned periodically. Remove the air filter from the door and clean it with soapy water or low pressure air. After drying, reinstall the filter in the door.

Factory Service

Before returning any equipment to our factory for service or repair, please contact our Customer Service Department for an RMA number (Returned Material Authorization).

Detailed contact information for the Customer Service Department is located inside the front cover of this document.

PESA Documents

IL35-1130	Drawing Tree, Cougar HD/SD
WI50-0150	Cable, Coax, 75 Ohm, 8Ft, Video Looping, System Applications
WI50-0250	Wiring Diagram, Cougar Looping Control Cable
WI50-0269	Cable Assembly, Coax RG179, 4 Ft
81-9059-0507-0	Manual, Cougar HD/SD Video Routing Switcher
81-9062-0316-0	Specification, PESA Router Control Protocol (PRC)
81-9062-0407-0	Specification, CPU Link Protocol No. 1 (P1)
81-9062-0408-0	Specification, CPU Link Protocol No. 1 Extensions (P1E)
81-9062-0409-0	Specification, Unsolicited Status Protocol (USP)
81-9062-0410-0	Specification, Truck Link Protocol (TRK)
81-9062-0448-0	Specification, PESA Internet Remote Control Protocol (PIRC)

Glossary

Revised: 08 June 2001

NOTE

Entries in this glossary that relate to specific system controller features, are made with reference to the PESA 3500Plus (v3.1).

AES/EBU Audio

Informal name for a digital audio standard established jointly by the Audio Engineering Society and the European Broadcasting Union.

All Call

A diagnostic procedure that causes a single physical input to be switched to a range of physical outputs, for a specified component, with a single command.

Example: Assume the existence of component RED spanning physical inputs 1 through 6 and physical outputs 1 through 6. All call can be used to switch physical input 3 to physical outputs 2 through 6 with a single command.

See also: Diagonal.

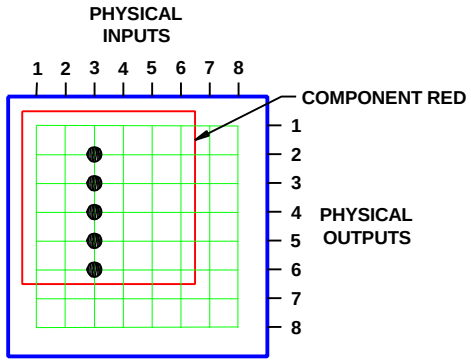


Figure 26. All Call

ANSI

American National Standards Institute.

Baud

The number of times a communication signal changes state (voltage, frequency, etc.) in one second.

Generally, only one bit of information is encoded in each change of state for signals operating below 300 baud. At these speeds, baud equals the number of bits transmitted per second.

At 300 baud and above, communications standards generally allow more than one bit to be encoded in each change of state. For example, modems operating at 1200 bits per second, and conforming to the Bell 212A standard, operate at 300 baud using a modulation technique called

phase modulation that transmits four bits per baud. At these speeds, data transmission rates are usually expressed in bits per second (b/s) rather than baud.

Baud was originally a unit of telegraph signaling speed, set at one Morse code dot per second. It was proposed at the International Telegraph Conference of 1927, and named after French Engineer J.M.E. Baudot (1845-1903).

Black Burst

A composite color video signal that has sync, color burst, and black video. It is used to synchronize other video sources to the same sync and color information.

See also: House Sync.

Block

A group of contiguous crosspoints in a routing switcher that form the smallest unit on which confidence is checked.

Because of the nature of the circuits involved, individual crosspoints cannot be checked to see if they are operating correctly. Instead, the control circuitry shared by groups of crosspoints is monitored. These groups of crosspoints, called blocks, vary in size according to product type. Block size for RM5 routing switchers is 8 inputs by 2 outputs and block size for PRC routing switchers is 8 inputs by 8 outputs. If any block gives a confidence error, all crosspoints in that block are assumed to be non-functional.

Block Checking

The continuous, sequential monitoring of confidence for each block in a routing switcher.

Block checking occurs automatically and continuously but can be disabled for troubleshooting purposes.

Blocked Destination

See: Source Block.

Blocked Source

See: Source Block.

Breakaway Switch

A switch where multiple sources are switched to a single destination on multiple levels.

Example: Assume the existence of sources VTR1 and VTR2, and destination MON1, defined on levels VIDEO and AUDIO. If VTR1 is switched to MON1 on the VIDEO level, and VTR2 is switched to MON1 on the AUDIO level, a breakaway switch has been taken.

Table 8. Breakaway Switch

Destination	Source	
	Level: VIDEO	Level: AUDIO
MON1	VTR1	VTR2

See also: Follow Switch.

Category

Entities assigned to keys on remote control panels, and used to select sources, destinations, and reentries.

Example: The categories VTR, 1, 2, and 3 can be used to select the source names VTR1, VTR2, and VTR3.

Category names:

1. Shall be created using only the following characters:
   - Upper case letters A through Z
   - Lower case letters a through z if enabled in the control system software
   - Numbers 0 through 9
   - The following special characters: space ( ), hyphen-minus (-), exclamation mark (!), ampersand (&), plus sign (+), equals sign (=), commercial at (@), and low line (_)
2. Shall contain a minimum of one, and a maximum of eight characters.
3. May begin with a space, end with a space, have embedded spaces, and consist of a single space. All spaces other than embedded spaces shall be entered by using the tilde (~) key instead of the space bar.
4. Shall be unique in the universe of category names.

Chop

To rapidly switch two different video signals into a monitor or other piece of test equipment. This is done to compare some signal characteristic, usually for quality control.

Chop Rate

The parameter used to control the switching rate when chopping two signals. The signal switching rate is determined as follows:

$$\frac{\text{Video Frame Rate (frames/s)}}{\text{Chop Rate}} = \text{Signal Switching Rate (switches/s)}$$

Figure 26. Chop Rate

For example, a chop rate of 1 used with NTSC signals (30 Frames/Second) will cause the signals to be switched 30 times per second. A chop rate of 60 used with the same signals will cause them to be switched every two seconds.

Component

The most basic signal element that can be switched by a single crosspoint. For example, in RGB video, “Red”, “Green”, and “Blue” are components; in stereo audio, “Left” and “Right” are components.

In Matrix Space, components of like type are usually grouped together into rectangular matrices of crosspoints having contiguous inputs and outputs. These matrices are also referred to as components and are grouped together into levels.

Figure 27 shows a 2x2 RGB video level (VID) consisting of three components (RED, GRN, and BLU).

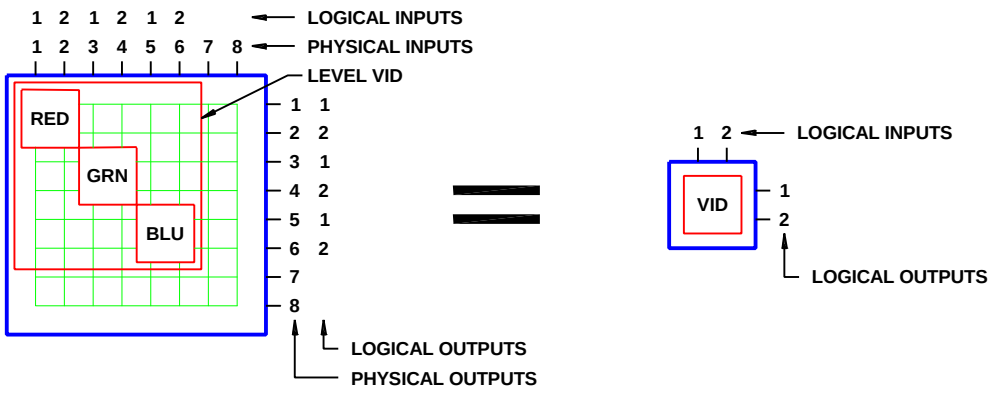


Figure 27. Component

As a general rule, users control the switching of levels, but component switching is handled automatically by the switching system. As shown in Figure 27, a user can specify a single logical switch, such as VID Input 1 to VID Output 2. This would result in the control system software taking three physical switches by activating crosspoints (1,2), (3,4), and (5,6).

Component names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Composite Video

A type of video signal that contains luminance, chrominance, blanking, and synchronizing information. NTSC, PAL, and SECAM are composite video signals, as opposed to RGB video which is not.

See also: Vertical Sync Signal.

Confidence

A property of a block that indicates whether or not the circuitry controlling the crosspoints in the block is functioning correctly.

When block checking determines that a block is not functioning correctly, the block is said to have a confidence error.

Confidence Error

See Confidence.

Configuration

A collection of system definitions that define the environment in which the system controller operates.

Each configuration is stored as a collection of files (.dbf or .txt) in a separate folder.

Configuration names may contain up to 32 alphanumeric characters.

Configuration Lock

A security measure enabled when a configuration is being uploaded or downloaded.

A configuration lock is used to ensure that only one user at a time may download a configuration to the controller.

Control Panel

See: Panel.

CPU Link

A bi-directional communication interface. A CPU link has two components: a serial port (either RS-232 or RS-422), and a protocol to govern how the port is used.

Crosspoint

The circuitry and components on a printed circuit board that constitute a single physical switch.

See also: Physical Switch.

Data Key

A user configurable control panel key, whose assigned function is used when the panel is in any mode except Salvo Select Mode.

Many control panels have user configurable keys. Each key can be assigned two functions, one as a data key and one as a salvo key. When the keys are pressed, the data key functions are used except when the panel is in salvo mode.

Data Key List

A named list of the functions assigned to each data key on a panel.

Multiple panels may share a data key list as long as they are the same type of panel. Different panel types may not use the same data key list.

Data key list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Default Destination

The destination for which status will be displayed when power is applied to a panel, or when a new configuration is downloaded to the controller.

Although not mandatory, it is recommended that a default destination be selected for each panel.

Destination

One or more logical outputs (limited to one per level), on one or more levels, that are switched together as a group.

Destination names may be created by using categories, and:

1. Shall be created using only the following characters:
    - Upper case letters A through Z
    - Lower case letters a through z if enabled in the control system software
    - Numbers 0 through 9
    - The following special characters: space ( ), hyphen-minus (-), exclamation mark (!), ampersand (&), plus sign (+), equals sign (=), commercial at (@), and low line (_)
2. Shall contain a minimum of one, and a maximum of eight characters.
3. Shall not begin or end with a space.

4. Shall be unique in the universe of destination and reentry names.

See also: Category.

Destination Block

See: Source Block.

Destination Group

See: Destination.

Destination Include List

A named list of the destinations a specific control panel is authorized to control.

A destination include list may be shared by multiple panels.

The default destination assigned to a panel may be controlled even if it is not on the destination include list.

Destination include list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Destination Number

A number assigned to each destination by the controller and used by CPU Protocol 1.

Destination numbers are also assigned to reentries.

Destination Status

See: Status.

Diagonal

A diagnostic procedure that causes a range of physical inputs to be switched to a range of physical outputs, in a diagonal pattern starting from a specified coordinate and continuing until the either the inputs or outputs are exhausted, for a specified component, with a single command.

Example: Assume the existence of component RED spanning physical inputs 1 through 6 and physical outputs 1 through 6 on a routing switcher. A diagonal with a starting input of 2 and a starting output of 1 would cause the following physical switches to be taken: (2,1), (3,2), (4,3), (5,4), and (6,5).

See also: All Call.

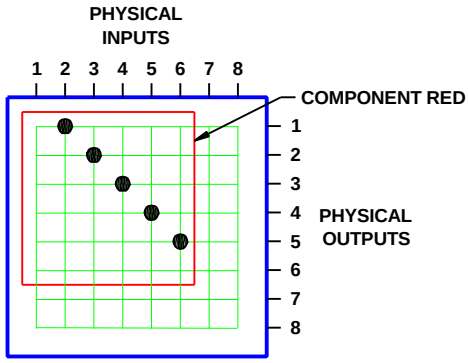


Figure 28. Diagonal

EIA

Electronic Industries Alliance.

Follow Switch

A switch where a single source is switched to a single destination on all levels. An abbreviated form of audio-follow-video switch.

Example: Assume the existence of source VTR1 and destination MON1 defined on levels VIDEO and AUDIO. If VTR1 is switched to MON1 on both the VIDEO level and AUDIO level, a follow switch has been taken.

This is the most common manner in which switches are taken on a routing switcher.

Table 9. Follow Switch

Destination	Source	
	Level: VIDEO	Level: AUDIO
MON1	VTR1	VTR1

See also: Breakaway Switch.

House Black

See: House Sync.

House Sync

A composite color video signal that has sync, color burst, and black video. It is used to synchronize video sources, and other equipment, to the same sync and color information.

Index

Obsolete. Prior to 3500Plus v3.0, indices were numbers used with categories to construct source, destination, and reentry names.

See also: Category.

Input Offset

In matrix space, the amount by which the origin of a component on strobe x, is offset from the origin of strobe x, measured along the input axis.

The coordinates of crosspoints in matrix space are determined by the strobe they reside on, and their input and output numbers. They are given in the form (input,output) on strobe x. The origin of a component (a matrix of crosspoints) is designated by the point that falls nearest the origin of its strobe (1,1). In Figure A below, the 3x4 component bounded by coordinates (3,2), (5,2), (5,5), and (3,5) has its origin at (3,2).

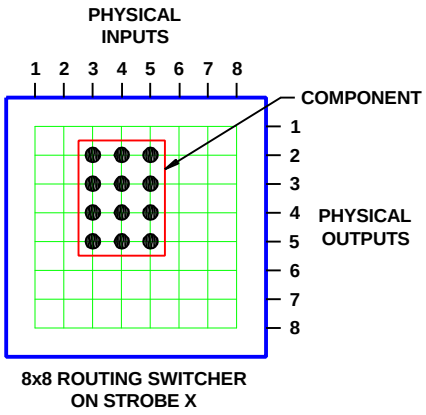


Figure 29. Input Offset, Single Routing Switcher

Input offset is the amount by which the origin of a component is offset from the origin of its strobe, measured along the input axis. A component whose origin coincides with that of its strobe (1,1) will have an input offset of 0. The component shown in Figure 29 has an input offset of 2.

When multiple routing switchers are assigned to the same strobe, the input and output connectors are renumbered to provide a unique coordinate for each crosspoint. Crosspoint coordinates are then determined in the same manner as above. The component shown in Figure 30 has its origin at (12,7) and an input offset of 11.

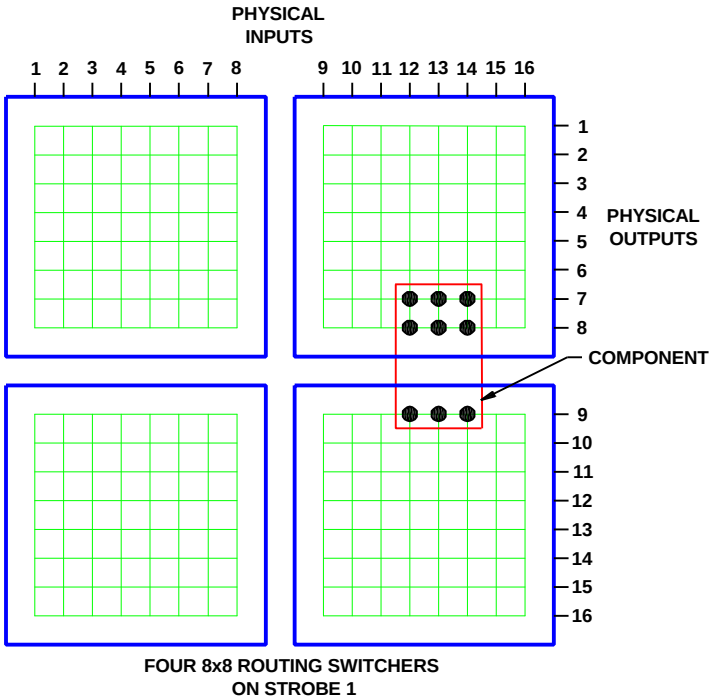


Figure 30. Input Offset, Multiple Routing Switchers

Level

A group of related components that are switched together.

A level is sometimes referred to as a level of control and is the basic granularity seen by a user. The components that comprise a level will always be switched together except when performing diagnostic operations.

Figure 31 shows a 2x2 RGB video level made up of three components, “RED”, “GRN”, and “BLU”, all of which are switched together at the same time.

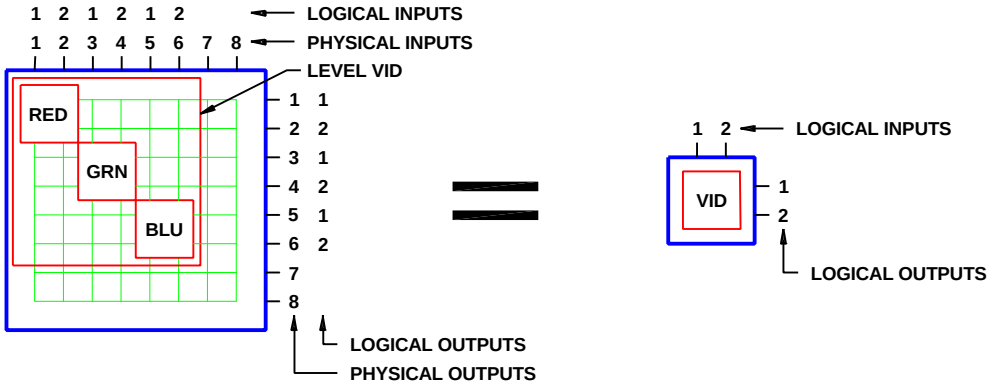


Figure 31. Level

As a general rule, users control the switching of levels, but component switching is handled automatically by the switching system. As shown in Figure 31, a user can specify a single logical switch, such as VID Input 1 to VID Output 2. This would result in the control system software taking three physical switches by activating crosspoints (1,2), (3,4), and (5,6).

Level names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Level Order

A property assigned to a level that controls the order of display when levels are displayed on a control panel, or addressed in CPU link protocols.

Levels of Control List

A named list of the levels a specific control panel is authorized to control.

Multiple panels may share a levels of control list.

Levels of control list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Local Modem

A modem connected to a PC running control system software such as Win3500Plus.

See also: Remote Modem.

Lock

A property placed on a destination that prevents all panels and ports from taking a switch on that destination, including the panel or port that locked it.

Locks may be cleared by any panel or port that has the same requester code and lock priority as the panel that locked the destination, that has a higher lock priority, or that has a lock priority of 0 (zero).

See also: Lock Priority, Protect.

Lock Priority

A property of panels and ports that allows them to be grouped with other panels or ports for the purpose of establishing lock and protect authority.

The lower the lock priority number, the higher the priority. Panel lock priorities not explicitly defined automatically default to “0” which gives absolute authority to clear any lock or protect on the system.

See also: Lock, Protect.

Logical Input

One or more physical inputs that are switched together as a group.

Logical inputs and outputs are switched level-by-level. Since each level may have more than one component, switching a single logical input or output may involve switching more than one physical input or output.

For example, a RGB input signal represents three physical inputs because it is connected to three input connectors on the routing switcher. However, since all three components (R, G, and B) are switched together as a level, it is a single logical input.

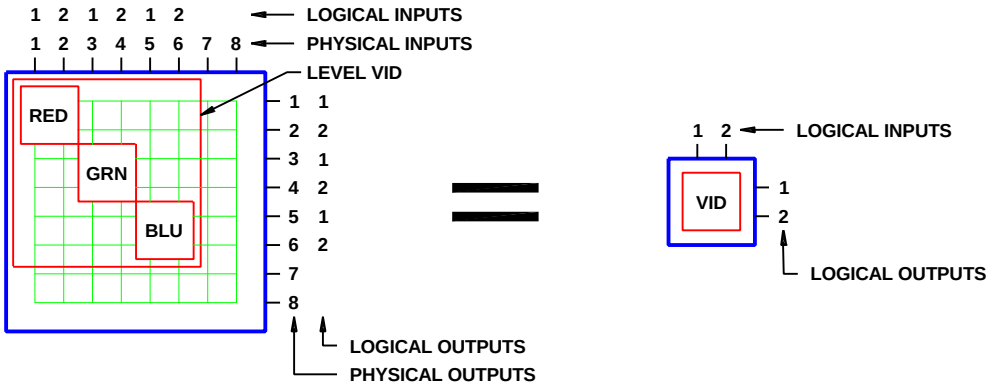


Figure 32. Logical Input

Logical inputs are numbered sequentially, level-by-level, beginning with 1. Input numbers are assigned in the same order as the physical inputs to the component(s) of the level. Since a routing switcher may be configured to have more than one level, it may have more than one logical input designated as number 1. However, within each level, every logical input will have a unique number. Logical outputs are numbered in the same manner. Logical input/output numbering is handled automatically by the control system software as components are configured.

See also: Physical Input.

Logical Output

See: Logical Input.

Logical Switch

The control system software command that switches a logical input to a logical output.

See also: Physical Switch.

Matrix Breakup

The division of a single physical matrix into one or more components.

Matrix breakup allows complex signal types to reside within a single physical matrix. For example, a video matrix is often broken into R, G, and B components.

Matrix breakup is a software function handled by the control system software.

Matrix Space

A three-dimensional mathematical model of the crosspoints in a switching system.

The coordinates of crosspoints in matrix space are given in the form (input,output) on strobe x.

When a switching system is physically made up of only one routing switcher, the crosspoint coordinates are the same as the input and output connector numbers, and the resulting matrix space has only two dimensions. For example, the coordinates of the crosspoint indicated in Figure 33 is (4,2) on strobe 1.

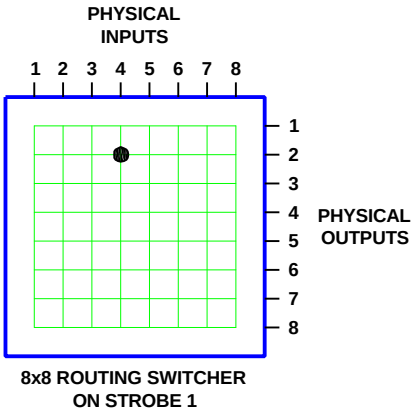


Figure 33. Matrix Space, One Routing Switcher on One Strobe

Two-dimensional matrix space can also be composed of the crosspoints located in multiple routing switchers. The input and output connectors on the additional routing switchers are renumbered as required to ensure that each crosspoint can be identified by a unique (input,output) coordinate. When switching systems are constructed in this manner, matrix space size is no longer constrained by routing switcher size. The switching system shown in Figure 34 consists of four 8x8 routing switchers assigned to the same strobe. The coordinates of the indicated crosspoint are (12,14) on strobe 1.

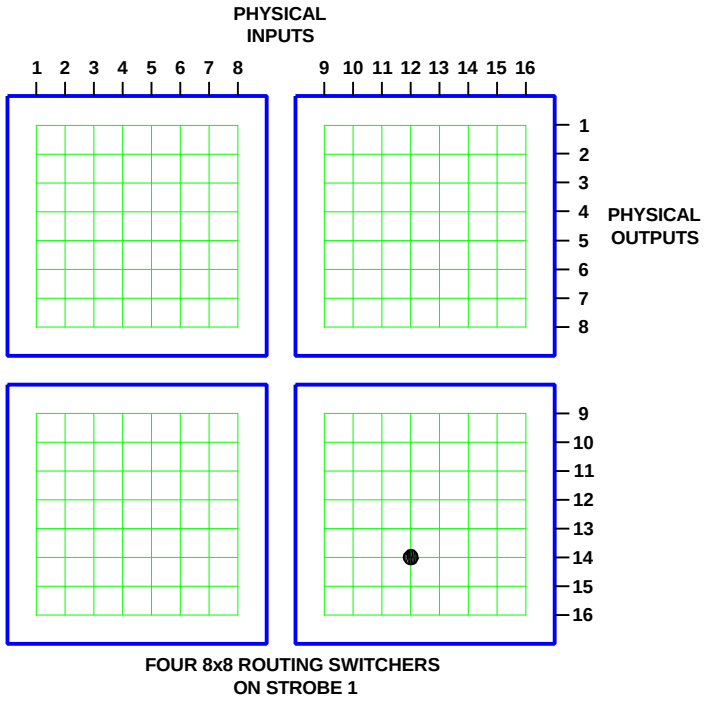


Figure 34. Matrix Space, Four Routing Switchers on One Strobe

Strobe numbers are used to introduce a third dimension into matrix space. Every routing switcher in a switching system is assigned to a strobe. In systems using more than one strobe (and, therefore having three-dimensional matrix space), crosspoint coordinates are given in the form (input,output) on strobe x. In Figure 35, the coordinates of the indicated crosspoint in the left routing switcher are (4,2) on strobe 1. The coordinates of the crosspoint on the right are (4,2) on strobe 2.

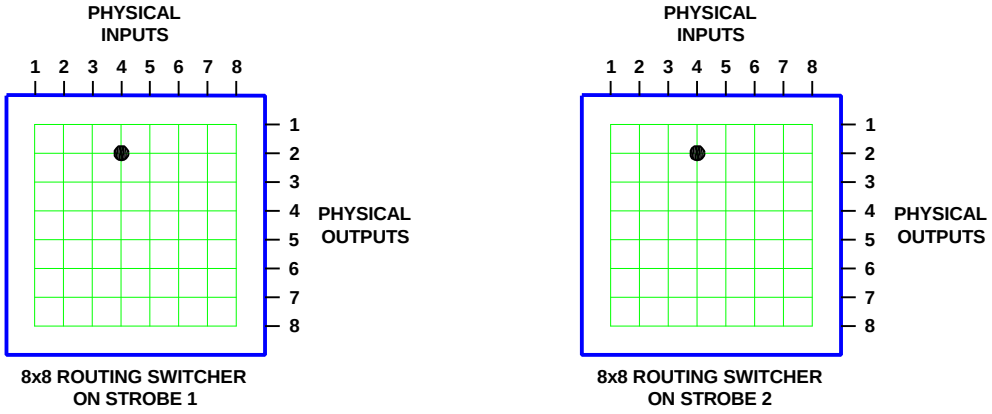


Figure 35. Matrix Space, Two Routing Switchers on Two Strobes

NTSC

National Television Standards Committee. The NTSC was responsible for setting television and video standards in the United States. The NTSC standard for television defines a composite video signal with a refresh rate of 60 half-frames (interlaced) per second. Each frame contains 525 lines and can contain 16 million different colors.

See also: PAL, SECAM.

Output Offset

In matrix space, the amount by which the origin of a component on strobe x, is offset from the origin of strobe x, measured along the output axis.

The coordinates of crosspoints in matrix space are determined by the strobe they reside on, and their input and output numbers. They are given in the form (input,output) on strobe x. The origin of a component (a matrix of crosspoints) is designated by the point that falls nearest the origin of its Strobe (1,1). In Figure 36 below, the 3x4 Component bounded by coordinates (3,2), (5,2), (5,5), and (3,5) has its origin at (3,2).

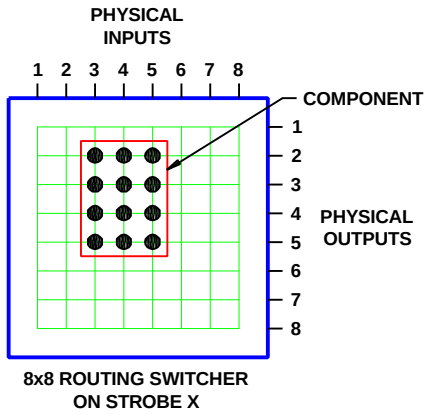


Figure 36. Output Offset, Single Routing Switcher

Output offset is the amount by which the origin of a component is offset from the origin of its strobe, measured along the output axis. A component whose origin coincides with that of its strobe (1,1) will have an output offset of 0. The component shown in Figure 36 has an output offset of 1.

When multiple routing switchers are assigned to the same strobe, the input and output connectors are renumbered to provide a unique coordinate for each crosspoint. Crosspoint coordinates are then determined in the same manner as above. The component shown in Figure 37 has its origin at (12,7) and an output offset of 6.

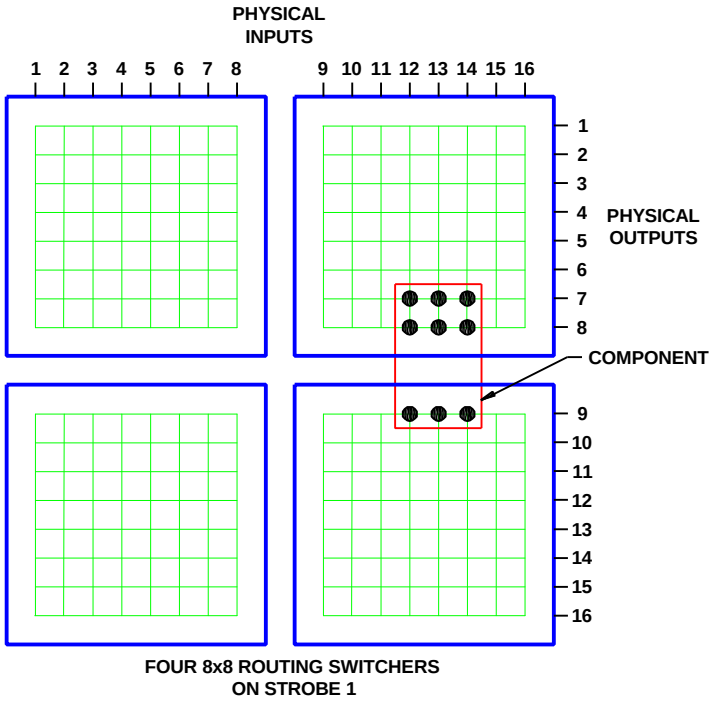


Figure 37. Output Offset, Multiple Routing Switchers

PAL

Phase Alternating Line, the dominant television standard in Europe. The United States uses a different standard, NTSC. Whereas NTSC delivers 525 lines of resolution at 60 half-frames per second, PAL delivers 625 lines at 50 half-frames per second.

See also: NTSC, SECAM.

Panel

A user interface, usually mounted in a standard 19” rack, containing alphanumeric displays, push buttons, LEDs, etc. Sometimes referred to as a control panel.

A panel is used to control a switching system by taking switches, obtaining status, etc.

Panel names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Panel Address

A unique identifier, set by DIP switch on every panel, that allows the system controller to differentiate between panels.

Panel Name

An optional identifier for a control panel.

Individual panels are identified by panel address. Because of this, a panel name is not required when configuring a panel.

Panel names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Password

Each User Account and Configuration may be protected with an eight-character, upper case, alphanumeric password.

PC

Personal computer. Typically used to run control system software such as Win3500Plus.

PESA control system software is designed to operate on any IBM® compatible personal computer (AT® or later) with a Microsoft Windows™ operating system (3.1, 95, 98, or NT).

Physical Input

The electrical signal coming from a device connected to an input connector on a routing switcher.

Physical inputs and outputs are the electrical signals passing through the input and output connectors of a routing switcher. Each connector represents one input or output.

For example, a RGB input signal would represent three physical inputs since it would be connected to three input connectors on the routing switcher.

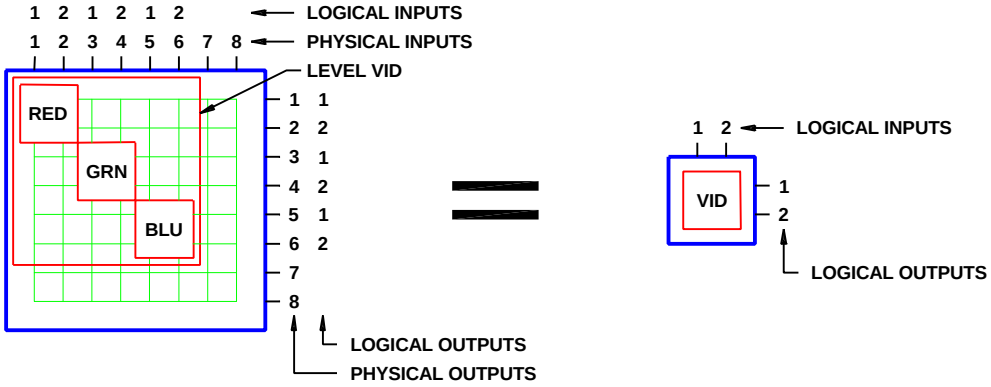


Figure 38. Physical Input

Physical inputs are numbered sequentially beginning with 1, and have the same number as the corresponding input connector on the routing switcher. This includes connectors that have been renumbered with input offset when multiple routing switchers have a common strobe. Physical outputs are numbered in the same manner.

See also: Logical Input.

Physical Switch

The hardware that switches a physical input to a physical output. Sometimes referred to as a crosspoint.

See also: Logical Switch, Crosspoint.

Physical Output

See: Physical Input.

Port

A serial communication bus interface connector on a system controller.

Port names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter. Port names are optional because a port is identified by its address.

PRC Device

A device designed to be compatible with the PESA Routing Control protocol (PRC).

Ocelot, Cougar, Jaguar, Tiger, and Cheetah routing switchers are PRC devices.

See also: RM5 Device.

Protect

A property placed on a destination that prevents all panels and ports from taking a switch on that destination, unless taken from a panel or port that has the same requester code as the panel or port that protected it.

Destination protection may be cleared by any panel or port that has the same requester code and lock priority as the panel or port that protected the destination, that has a higher lock priority, or that has a lock priority of 0 (zero).

See also: Lock, Lock Priority, Requester Code.

Protect Priority

See: Lock Priority.

Protocol

The format to be used when sending data between two devices.

Protocol names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Readback

Information received from a routing switcher reporting which physical input is currently switched to a specified physical output.

To ensure that the configuration in the controller, and the actual state of the physical switches in a routing switcher agree, the routing switcher can be made to read back the status of each physical output. Where the routing switcher reports a different physical input from that expected by the controller, a readback error is declared.

Readback Error

See Readback.

Reentry

An entity that exists as both a source and destination at the same time, whose function is to facilitate switching a single source to multiple destinations, with a single logical switch.

Reentries are virtual entities that exist in the control software only. Their creation and use does not require any physical modification to the switching system hardware.

Example: Assume the existence of source SRC1 and destinations DST1, DST2, and DST3. Reentry REENT1 is created and switched to the three destinations. With a single logical switch, SRC1 can now be switched to REENT1 and the signal will arrive at all three destinations at the same time.

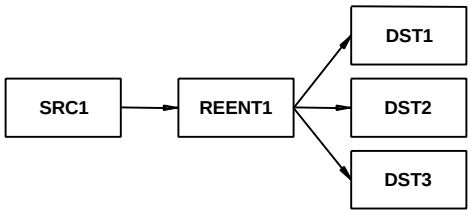


Figure 39. Reentry

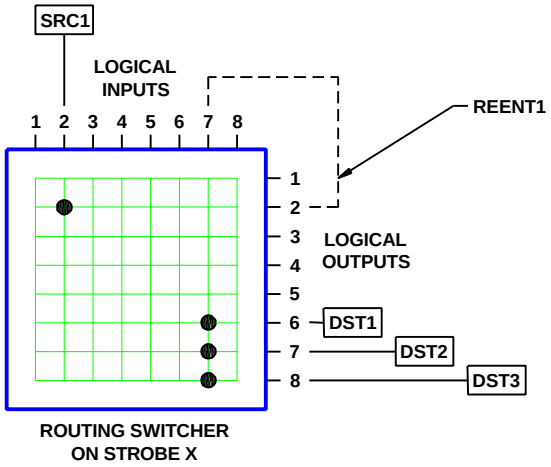


Figure 40. Reentry

A reentry is assigned both a source number and a destination number.

Reentry names may be created by using categories, and:

1. Shall be created using only the following characters:
   - Upper case letters A through Z
   - Lower case letters a through z if enabled in the control system software
   - Numbers 0 through 9
   - The following special characters: space ( ), hyphen-minus (-), exclamation mark (!), ampersand (&), plus sign (+), equals sign (=), commercial at (@), and low line (_)
2. Shall contain a minimum of one, and a maximum of eight characters.
3. Shall not begin or end with a space.
4. Shall be unique in the universe of source, destination, and reentry names.

See also: Category.

Remote Client

A user connected to a networked system controller such as the e-Route.

Remote Client Name

A string of up to sixteen characters consisting of letters, numbers, and some symbols. A Remote Client Name must begin with a letter, and may not contain any spaces.

Symbols Permitted: - _ @ ! & + =

Remote Client Parameters

Reserved for future use.

Remote Client Password

A string of up to eight characters consisting of letters, numbers, and some symbols. A Remote Client Password may begin with either a number or a letter, and may not contain any spaces.

Symbols Permitted: : ; < = > ? @

Remote Modem

An external modem connected to a system controller.

The remote modem must be an external type capable of being configured to automatically answer incoming calls. Because the system controller does not output any modem configuration information, the remote modem must be completely transparent to the controller. The only modems tested by PESA for use as remote modems are the Practical Peripherals PM288MT II and the U.S. Robotics Sportster 28.8 using the following initialization strings:

PM288MT II: AT S0=2 Q1 X4 &C1 &D0 &K3 &S1 &W0 &Y0

Sportster 28.8: AT &F1 S0=2 &H1 &R2 &I0 L2 Q1 &C1 &D0 Y0 &W0

For more information about these modems and their initialization strings, contact Practical Peripherals or U.S. Robotics. Before using any other type of remote modem, please consult with PESA Customer Service.

See also: Local Modem.

Requester Code

A property of panels and ports that allows them to be grouped with other panels or ports for the purpose of establishing lock and protect authority.

Panel requester codes not explicitly defined automatically default to the panel address.

See also Lock, Lock Priority, Protect.

RM5 Device

A device designed to be compatible with the System 5 (RM5) control protocol.

The RM4000, RM5000, and Lynx routing switcher families are RM5 devices.

See also: PRC Device.

Salvo

A group of predefined logical switches taken in the same vertical interval.

Example: Assume the existence of sources CART1 and CART2; and destinations MON1, VTR1, and VTR2, defined on levels AUD and VID.

By pressing a single control panel key, the user desires to take the following switches: audio and video from CART1 to MON1; audio from CART2 and video from CART1 to VTR1; and audio and video from CART2 to VTR2.

Table 10. Salvo

Salvo Entry	Destination	Source	
		Level: AUD	Level: VID
1	MON1	CART1	CART1
2	VTR1	CART2	CART1
3	VTR2	CART2	CART2

Salvo SAL1 is created and will consist of three salvo entries (one salvo entry per destination in the salvo). Each salvo entry is then configured to switch the selected sources on the appropriate levels. Once salvo SAL1 is assigned to a salvo key on the control panel, the user will be able to take all the specified switches with the press of a single key.

All switches in a salvo are taken within the same vertical interval.

Salvo names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Salvo Entry

One or more logical switches assigned to a specific destination that is part of a salvo.

Salvo entry names are the same as the destination they are associated with.

Salvo Include List

A named list of the salvos a specific control panel is authorized to control.

A salvo include list may be shared by multiple panels.

Salvo include list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Salvo Key

A user configurable control panel key, whose assigned function is used when the panel is in salvo select mode.

Many control panels have user configurable keys. Each key can be assigned two functions, one as a data key and one as a salvo key. When the keys are pressed, the data key functions are used except when the panel is in salvo mode.

When a panel is in salvo select mode, a salvo will be executed immediately when the salvo key is pressed.

Salvo Key List

A named list of the functions assigned to each salvo key on a panel.

Multiple panels may share a salvo key list as long as they are the same type of panel. Different panel types may not use the same salvo key list.

Salvo key list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

SECAM

Sequential Couleur Avec Memoire, the line sequential color system used in France, Russia, Eastern Europe, and some Middle Eastern countries. Like PAL, SECAM is based on a 50 Hz power system, displaying interlaced lines at 50 fields per second. The color information is

transmitted sequentially (R-Y followed by B-Y, etc.) for each line and conveyed by a frequency modulated sub carrier that avoids the distortion arising during NTSC transmission.

See also: NTSC, SECAM.

Serial Port

See: Port.

Shared Input

A logical input that is used by more than one source.

Note that shared outputs are not permitted.

See also: Source Block.

SMPTE

Society of Motion Picture and Television Engineers. A professional organization that recommends standards for the television and film industries.

Soft Destination Key

See: Soft Key.

Soft Key

A special type of data key whose assigned function may be changed locally by a panel user.

Control system software is used to designate a data key as either a soft source key or a soft destination key. The assignment of a specific source or destination to the soft key may then be made with either the control system software, or locally at the panel by using Store Mode.

Soft Source Key

See: Soft Key.

Source

One or more logical inputs (limited to one per level), on one or more levels, that are switched together as a group.

Destination names may be created by using categories, and:

1. Shall be created using only the following characters:
   - Upper case letters A through Z
   - Lower case letters a through z if enabled in the control system software
   - Numbers 0 through 9
   - The following special characters: space ( ), hyphen-minus (-), exclamation mark (!), ampersand (&), plus sign (+), equals sign (=), commercial at (@), and low line (_)
2. Shall contain a minimum of one, and a maximum of eight characters.
3. Shall not begin or end with a space.
4. Shall be unique in the universe of source and reentry names.

See also: Category.

Source Block

A means of ensuring that a particular source will not be switched to a specific.

When configuring a switching system, it may be desirable to use source blocking to restrict the switching of certain logical inputs. This may be done while configuring either sources or destinations.

Since a blocked source may contain a logical input that is shared (used by more than one source), care should be taken to ensure that all sources using the logical input are blocked from the destination to be protected.

Source Group

See: Source.

Source Include List

A named list of the sources a specific control panel is authorized to control.

A source include list may be shared by multiple panels.

Source include list names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

Source Number

A number assigned to each source by the controller and used by CPU Protocol 1.

Source numbers are also assigned to reentries.

Status

A list of all sources on all levels currently switched to a selected destination.

Sometimes also used to refer to the operational state of the control system (lock status, switch status, and panel status).

Status Level

The default level to be used when displaying the status of a destination receiving signals from multiple sources, on a panel in all levels mode (ALL LEVS).

One function of the LCD display on a panel is to show which source is currently switched to a selected destination. This is known as destination status. Although more than one source can be switched to a single destination (limited to one source per level), the status display can only show one source at a time. When the panel is in all levels mode (ALL LEVS), Status Level is used to designate a default level to be used when displaying status. Only the source on this default level will be displayed. On panels that do not have LCD displays, this is indicated by a continuous, bright, pushbutton light.

If one or more other sources are also switched to the destination (on other levels), an octothorp (the “#” symbol) will be appended to the source name. The other source names can be viewed by toggling each level key in turn to show, level-by-level, which source has been switched to the destination. On panels that do not have LCD displays, this is indicated by an alternating bright/dim push button light.

Status Method

One of two possible ways to display status when a panel is in all levels (ALL LEVS) mode and the destination is not defined on the Status Level.

When a panel is in all levels mode (ALL LEVS), the status shown will be the source on the Status Level assigned to that panel. If the destination is not defined on the Status Level, Status Method is used to control the resulting display:

If DEF (Default Method) is selected, NO XXXXX will be displayed where XXXXX is the Status Level assigned to the panel.

If GRP (Group Method) is selected, the controller will examine every level sequentially, starting with the level designated as Level Order 1. The source switched on the first level found where the destination is defined, will be displayed as the destination status.

Stop Bit

In asynchronous communication, a bit that indicates that a byte of data has just been transmitted.

Every byte of data is preceded by a start bit and followed by a stop bit.

Strobe

The third dimension of matrix space.

Every routing switcher in a switching system is assigned a strobe. This is usually accomplished by setting a DIP switch on the back of the routing switcher. Strobes do not have to be unique and, in larger systems, each strobe might be associated with several routing switchers.

In many switching systems, strobes are used to group levels of the same type together. For example, video may be on Strobe 1, audio on Strobe 2, etc.

Sync Reference

A vertical sync signal used to ensure that switching occurs in the vertical interval of a video signal.

Sync Reference names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

See also: Vertical Sync Signal.

System 5 Device

See: RM5 Device.

TIA

Telecommunications Industry Association.

Tieline

A special type of logical switch that allows a logical input on one level to be switched to a logical output on a different level.

Example 1 - Switch a signal from analog camera ANCAM into an analog-to-digital converter (A/D) and then into digital video tape recorder DIGVTR: (Figure 41) Connect a cable between the appropriate output connector of the analog routing switcher and the input of the A/D, and a cable between the output of the A/D and the appropriate input connector on the digital routing switcher. Configure levels ANAVID and DIGVID and tieline TLINE1 to connect them. Configure destination DIGVTR on level DIGVID. Configure source ANCAM on level ANAVID to use tieline TLINE1. ANCAM may now be switched to DIGVTR with a single logical switch even though they are on different levels.

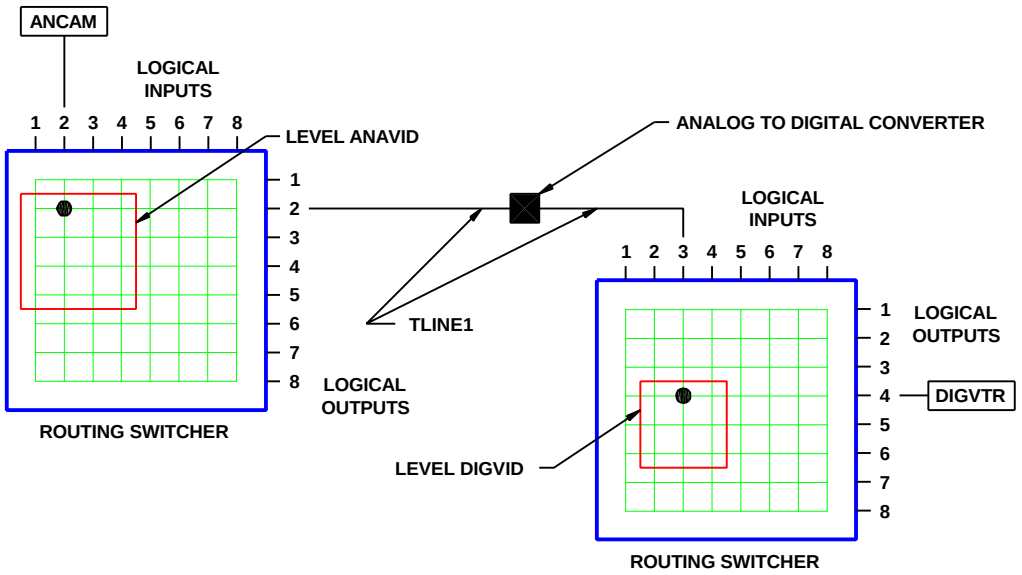


Figure 41. Tieline

Example 2 - Switch a signal from camera CAM1 (connected to a routing switcher in Room A) to video tape recorder VTR1 (connected to a routing switcher in Room B): (Figure 42) Connect a cable between the appropriate output connector of the routing switcher in Room A and the appropriate input connector on the routing switcher in Room B. Create levels VIDA and VIDB and configure a tieline connecting the output of VIDA to the input of VIDB. Define source CAM1 on level VIDA and destination VTR1 on level VIDB. CAM1 may now be switched to VTR1 with a single logical switch even though they (and their respective routing switchers) are located in two separate rooms.

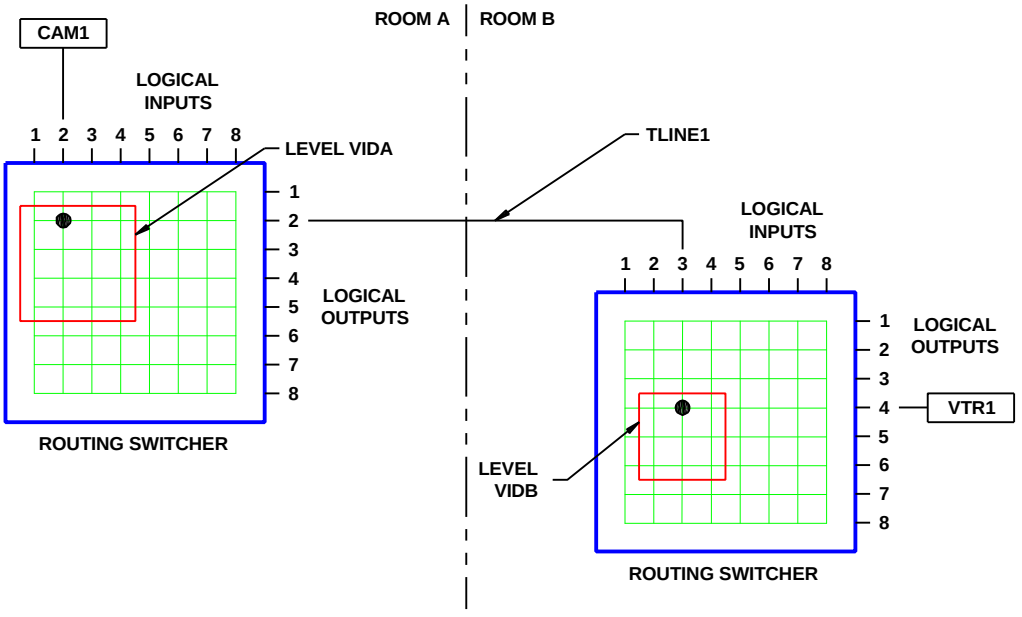


Figure 42. Tieline

Tieline names are one to eight characters in length and are constructed using uppercase letters, numbers, and spaces. The first character must be a letter.

User Account

A set of privileges and an optional user password saved as a user name.

User accounts provide a means of restricting access to certain system functions on a user-by-user basis.

User Name

A string of up to eight characters consisting of upper case letters, numbers, spaces, and some symbols:

Permitted: ! @ # $ % ^ & * _ + - = [ ] \ : " ; ' < > . ? /

Forbidden: { } | , ( )

User Password

A string of up to eight characters consisting of letters, numbers, and spaces. A User Password may begin with either a number or a letter. Leading spaces are discarded.

Vertical Interval

The portion of the video signal in which image information is absent to allow for the video device to prepare for the next frame of information.

Vertical Sync Signal

A short pulse generated at the beginning of each video timing frame that tells the video monitor when to start a new video timing field. For switching purposes, the vertical sync signal may be derived from house sync.

See also: Sync Reference.

Vertical Trigger

See: Vertical Sync Signal.

Video Timing Field

A package of information that contains information required to complete a full scan across a video monitor. There are two types of video fields denoted as odd and even.

Video Timing Frame

A package of information that contains all the information required to draw an image on a video device. Generally considered with respect to NTSC and PAL signals where the information is transmitted over a fixed time frame. A frame consists of two video timing fields denoted odd and even.

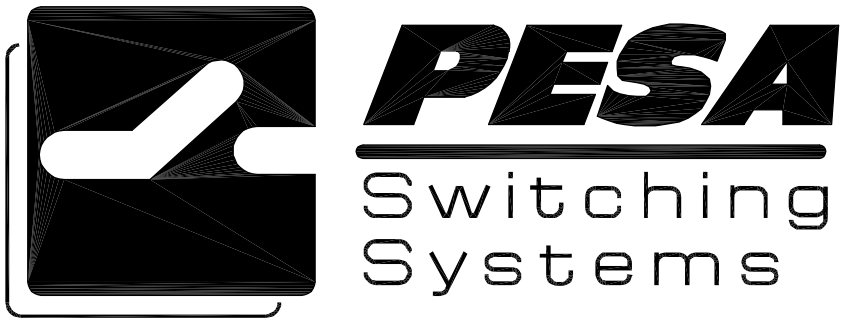
Working Directory

The location on the PC hard drive where control system software such as Win3500Plus is installed.

If the default settings of the Win3500Plus installation program were used, this will be c:\win3500p for 16-bit versions of the Microsoft Windows OS, and c:\program files\win3500p for 32-bit versions. Configurations may not be saved in the working directory or any subdirectory of the working directory.

Revision History

Rev.	Date	Description	By
A	07-06-01	Initial release.	D. Buie


PESA
Switching
Systems