PATHFINDER

MATRIX SWITCHER SERIES

INSTALLATION AND OPERATING GUIDE

(Covers all PFD-4X4 and PFD-4X2 models)

This guide is based on software rev. 1.04

244 Bergen Boulevard, West Paterson, NJ 07424 • Tel 973.785.4347 • Fax 973.785.3318 • Web www.fsrinc.com

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OPERATOR'S SAFETY SUMMARY

The general safety information in this summary is for operating personnel.

Do Not Remove Covers or Panels. There are no user-serviceable parts within the unit. Removal of the top cover will expose dangerous voltages. To avoid personal injury, do not remove the top cover. Do not operate the unit without the cover installed.
Power Source. This product is intended to operate from a power source that will not apply more than 230 volts rms between the supply conductors or between both supply conductor and ground. A protective ground connection by way of grounding conductor in the power cord is essential for safe operation.
Grounding the Product This product is grounded through the grounding conductor of the power cord. To avoid electrical shock, plug the power cord into a properly wired receptacle before connecting to the product input or output terminals. A protective-ground connection by way of the grounding conductor in the power cord is essential for safe operation.
Use the Proper Power Cord. Use only the power cord and connector specified for your product. Use only a power cord that is in good condition. Refer cord and connector changes to qualified service personnel.
Use the Proper Fuse To avoid fire hazard, use only the fuse having identical type, voltage rating, and current rating characteristics. Refer fuse replacement to qualified service personnel.
Do Not Operate in Explosive Atmospheres. To avoid explosion, do not operate this product in an explosive atmosphere.

Terms In This Manual

WARNING Highlights an operating procedure, practice, condition, statement, etc., which, if not strictly observed, could result in injury to or death of personnel. NOTE Highlights an essential operating procedure, condition or statement.

CAUTION The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature. accompanying the appliance.

AVERTISSEMENT!Le point d´exclamation dans un triangle equilatéral signale à alerter l´utilisateur qu´il y a des instructions d´operation et d´entretien tres importantes dans la litérature qui accompagne l´appareil.

VORSICHTein Ausrufungszeichen innerhalb eines gleichwinkeligen Dreiecks dient dazu,den Benutzer auf wichtige Bedienungs- und Wartungsanweisungen in der Dem Great beiliegenden Literatur aufmerksam zu machen.

WARNINGThe rear panel ON/OFF switch does not disconnect the unit from input AC power. To facilitate disconnection of AC power, the power cord must be connected to an accessible outlet near the unit. Building Branch Circuit Protection: For 115 V use 20 A, for 230 V use 8 A.

WARNINGWhen the COMPASS is used in the 230-volt mode, a UL listed line cord rated for 250 volts at 15 amps must be used and must conform to IEC-227 and IEC-245 standards. This cord will be fitted with a tandem prong-type plug.
Terms As Marked on Equipment

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INTRODUCTION

The PathFinder Matrix Switcher family is a ground-up development aimed at bringing new capabilities and a new level of performance to matrix switching.

In order for a display to accurately reproduce the original image, every component in the video system must have enough bandwidth to carry the signal and be as flat as possible in order to maintain the clarity and color fidelity. The PathFinders set a new standard in both areas.

Bandwidth and Frequency Response

At the heart of the PATHFINDER Series is a design that delivers high bandwidth and flat frequency response to insure that the original image is switched and distributed without being altered. Proper signal reproduction is much more than bandwidth. Frequency response plays a vital role in the clarity and accuracy of an image.

The units feature greater than 400 MHz (typical) of bandwidth to -3dB. Better, from 0 to 250 MHz the signal is +/-0.5 dB making the PathFinders the flattest matrix switchers on the market.

Stereo Audio Option

The stereo audio option provides balanced and unbalanced stereo audio switching with independent input trim control and output volume control.

Serial Input and Output

The Pathfinder command set is an easy to follow, easy to implement ASCII command set that gives control systems complete access to all functions. Each unit is equipped with an RS-232 serial port for remote communications systems. The units have an RS-232 input and output port to allow daisy chaining of additional serial controlled devices.

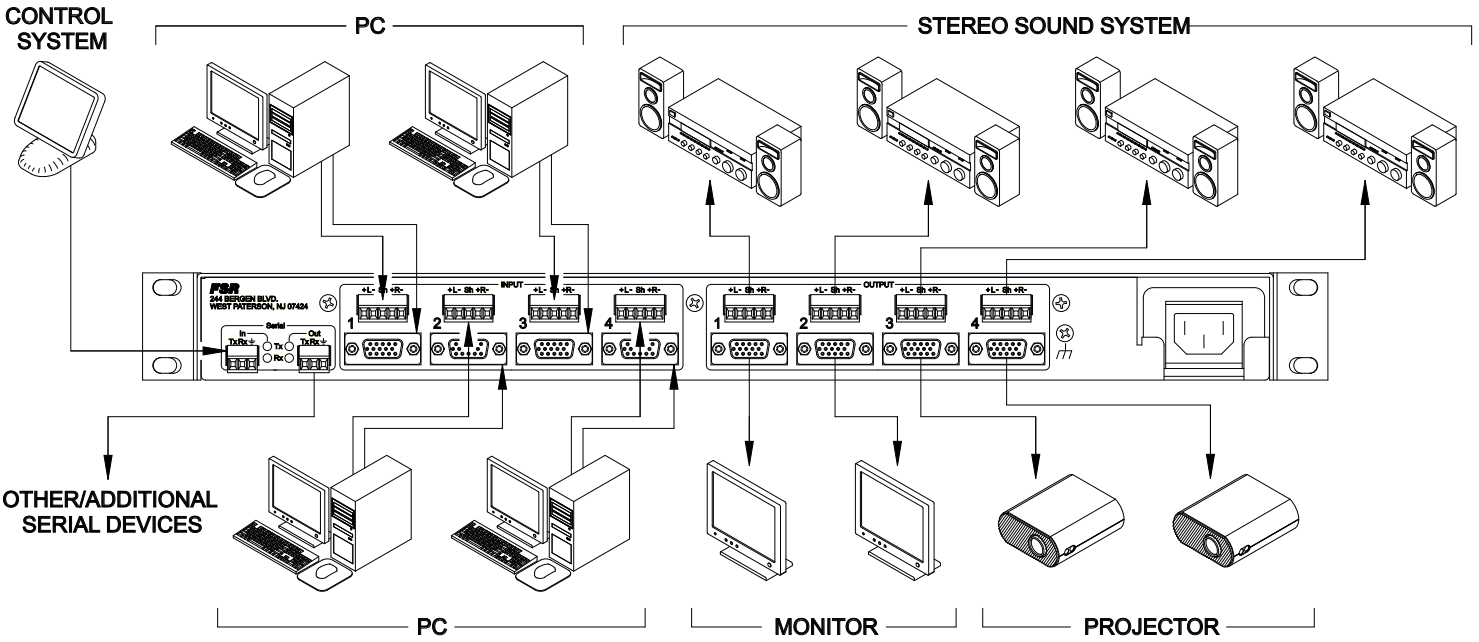
FEATURES

Very High Bandwidth
Easy Front Panel or RS-232 Operation and Setup
RS-232 Control
Integral Rack Ears
Audio Follow or breakaway modes (on Audio models)
Input Audio input trim and Audio Output Level Adjustments (on Audio models)
Sizes to Fit the Install

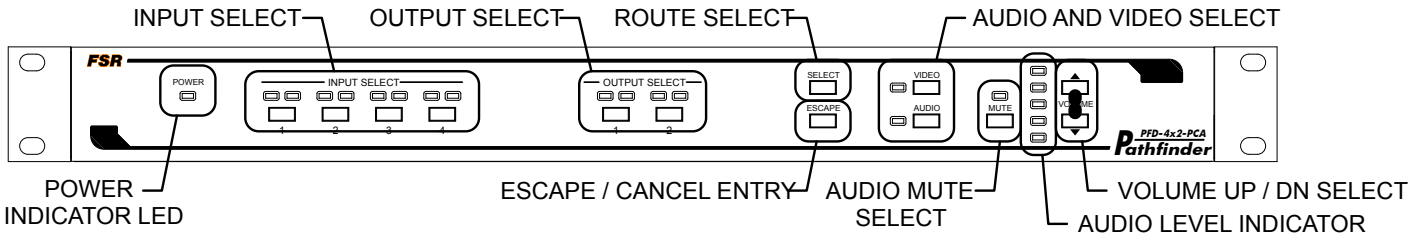
APPLICATIONS

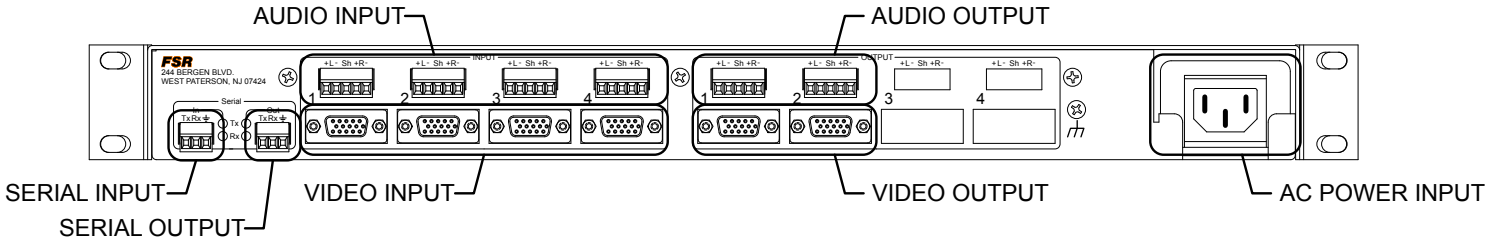
- Boardrooms
- Schools
- House of Worship
- Rental and Staging
- Convention Centers
- Divisible Ballrooms
- Security and Surveillance System Integration
- Monitoring Centers
- Courtrooms

TYPICAL APPLICATION (PFD-4X4 PCA shown)

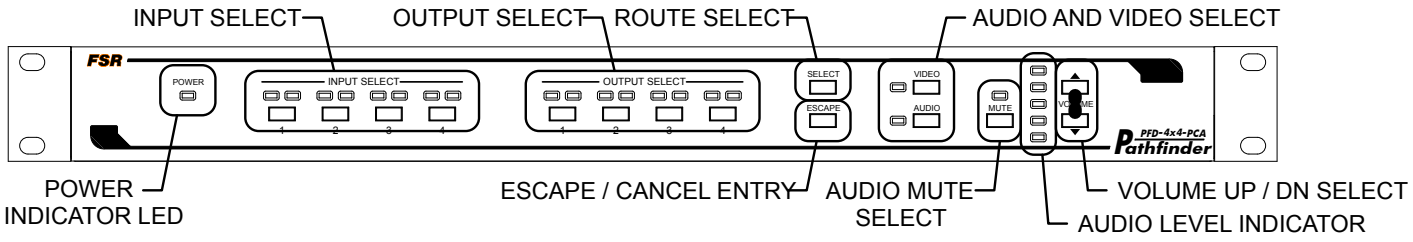


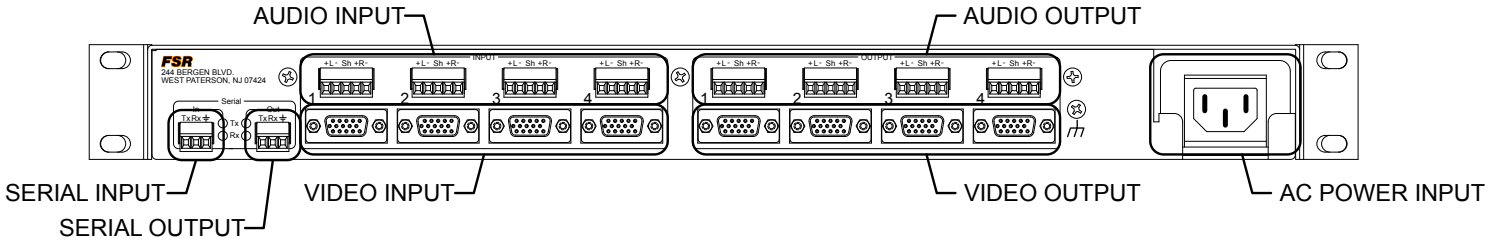
CONTROL AND CONNECTOR LOCATIONS





PFD-4x2-PCA SHOWN





PFD-4x4-PCA SHOWN

OPERATING GUIDELINES

This manual covers installation and operation the PFD-4X4 and PFD-4X2 family of matrix audio video switchers. Most of the operating principals are identical on all models. The unique characteristics such as connectors and pinouts are detailed on the application drawings.

PFD FRONT PANEL OPERATION

LED INDICATOR LAMP BEHAVIOR

The color and state of the indicator LED's provide the following status information.

● RED LED: indicates Video route or selection
● GREEN LED: indicates Audio route or selection
● GREEN LED FLASHES after an input push button is held down enabling audio input level adjustment

NOTE: Input and output status LED's will turn off after 30 seconds of front panel inactivity.

VIDEO / AUDIO SOURCE SELECTION AND OUTPUT ROUTING

Video and audio can be routed in either follow or breakaway mode. This will depend on the status of the VIDEO and AUDIO select pushbuttons. If both AUDIO and VIDEO select pushbuttons are selected, the audio source will follow the video source. The video or audio select pushbuttons, when selcted independently, allow for breakaway routing.

The video and audio sources are selected and stored by pressing one of the four INPUT SELECT buttons located on the left side of the front panel, selecting the desired OUTPUT SELECT button and pushing the SELECT button. The input and output LED's will turn off after the SELECT button is pressed.

The output pushbuttons can toggle the output selections on and off by repeated pushes. The video and/or audio LED's will be illuminated to indicate the current I/O selection when input or output buttons are pushed. The escape button, when pressed, will clear the current selection and revert to the previous route status. The last I/O route selected will always overwrite the previous I/O route.

Note that the audio or video sources on a particular input may be separately routed to different outputs. This is referred to as audio breakaway.

AUDIO INPUT TRIM ADJUSTMENTS

The audio trim may be adjusted for each of the 4 audio sources via the front panel. This is done by first pressing the ESCAPE button (if a previous operation was in progress) then pressing and holding the desired AUDIO INPUT button (the green audio input LED will flash) and then simultaneously pressing the volume up or down buttons to adjust the trim for the selected source. The green input select lamp will flash and the LED bar graph will remain lit for the duration of the adjustment. The audio trim may be ramped up or down by holding both the audio source button and the respective trim direction button and will traverse the –5 dB to +15 dB range in approximately 2-3 seconds. Or the user can adjust in discrete 1 dB increments by discrete volume up or down presses. When the audio input source button is released, the audio trim adjustment is terminated.

AUDIO OUTPUT LEVEL ADJUSTMENT

The current audio output level may viewed and adjusted via the VOLUME UP/DOWN and OUTPUT SELECT pushbuttons located on the right side of the front panel. The audio range may be adjusted in 1 dB increments from a floor of –45 dB to +5 dB by either pressing and holding the VOLUME UP/DOWN buttons or by discrete button presses. Each discrete press adjusts audio in 1dB steps. When continuously pressing a volume up or down button, the audio output level will be ramped in 1 dB increments, traversing the entire range from –45 to +5 dB in approximately 3 seconds. The five audio level indicator lamps are illuminated accordingly to reflect five ranges. Current audio output levels can be viewed by pressing the desired OUTPUT SELECT pushbutton.

AUDIO MUTE

When an output is selected, AUDIO MUTE may be toggled on and off by pressing the AUDIO MUTE push button to the immediate left of the audio output level lamps. The user may adjust the audio output level down while remaining in mute state. However, if the user presses the volume up button while muted then the audio will be unmuted and the audio output will be heard at the current level.

POWER INTERRUPT OR FAILURE EVENTS

The last saved route configuration, audio settings and mute states will remain in memory in the event of AC power failure or interruption. The unit will return to it's previous state when power is restored.

INSTALLATION

ENVIRONMENT

The Matrix rack unit should be mounted in a rack where an AC power outlet is nearby. It is a direct AC plug in unit via the supplied EIA power cord. The front and back of the unit should be positioned so that both the installer and operator can conveniently access the front and back for wiring and adjustments.

Check each the manufacturer's recommendations on cable requirements and termination. Use standard approved wiring practices.

The integrity of all audio and video sources should be pretested BEFORE they are connected to the Matrix rack. This holds true for the display devices as well. Simply direct connect the various sources and displays to pretest the cable runs and equipment. The tested equipment can then be connected to the Matrix rack unit. All terminations should have "ID" cable markers to aid in cabling and troubleshooting.

In installing the Matrix rack unit in a suitable manner, the following is required:

1. TMRA – The maximum recommended ambient temperature (TMRA) for the Matrix is 40°C.

2. Ambient Temperature Inside the Rack – The ambient temperature inside the rack should not exceed 55°C.

3. Air Flow – Installation of the Matrix inside the rack should not impede air flow.

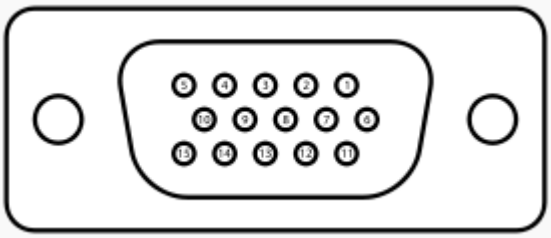
4. Mechanical Loading – Mounting of the Matrix inside the rack shall not result in a hazardous condition due to uneven loading.

5. Circuit Overloading – Refer to equipment nameplate ratings when addressing branch circuit and/or overcurrent protection requirements.

6. Reliable Earthing – Reliable earthing of the Matrix shall be maintained after rack mounting. Note – Earthing via the rack could be required if supply connection is not made directly to branch circuit (e.g. use of power strips).

VIDEO CONNECTOR AND PINOUT

The PFD-4x4 and 4X2 units provide standard HD-15 female connectors for video inputs and outputs. The all PFD units are capable of passing Composite, Component, or S-video via a HD-15 to 5 BNC breakout cable. This allows a variety of video I/O configurations by using the RGB signal lines as independent video channels. An example would be using the RED channel for composite video and the GREEN and BLUE channels for S-video signals.

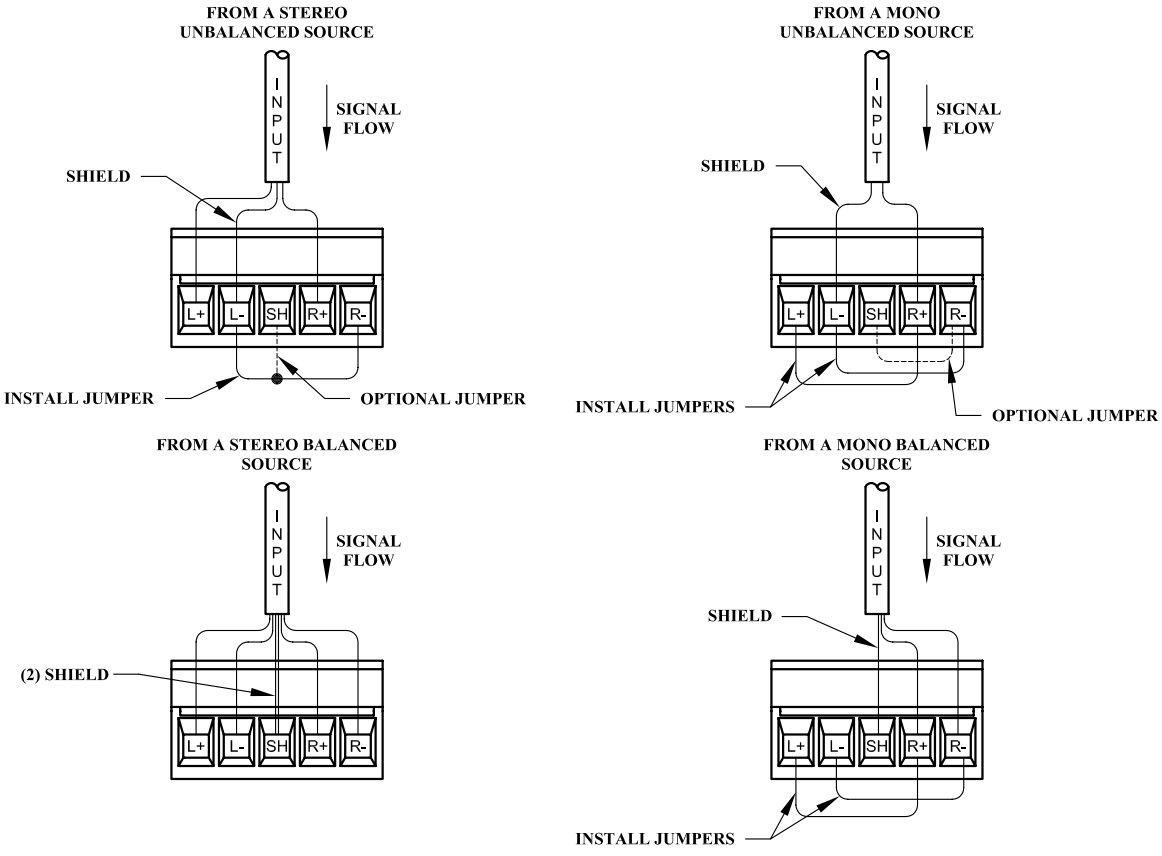


A female DE15 socket (video card side).

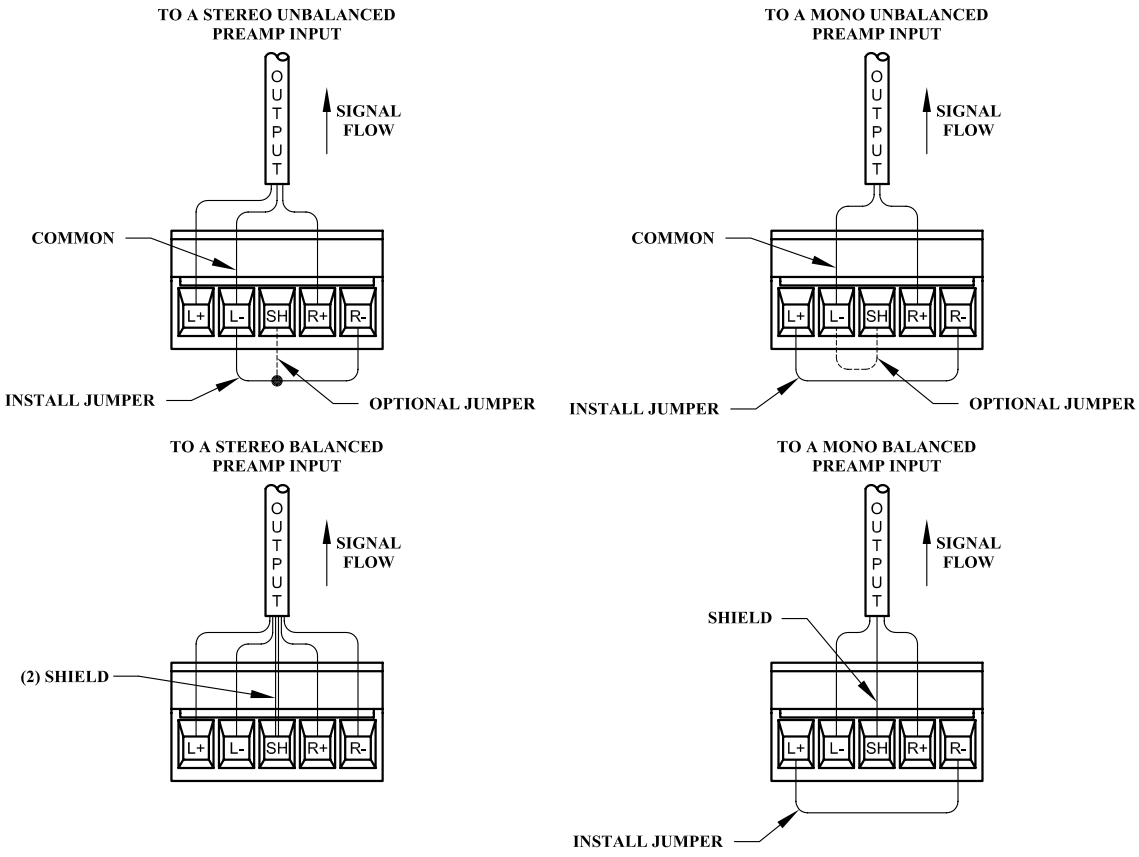
Pin 1	RED	Red video
Pin 2	GREEN	Green video
Pin 3	BLUE	Blue video
Pin 4	N/C	Not connected
Pin 5	GND	Ground (HSync)
Pin 6	RED_RTN	Red return
Pin 7	GREEN_RTN	Green return
Pin 8	BLUE_RTN	Blue return
Pin 9	+5 V	+5 V (DDC)
Pin 10	GND	Ground (VSync, DDC)
Pin 11	N/C	Not connected
Pin 12	SDA	I²C data
Pin 13	HSync	Horizontal sync
Pin 14	VSync	Vertical sync
Pin 15	SCL	I²C clock

WIRING DETAIL FOR PATHFINDER MODELS WITH AUDIO OPTION

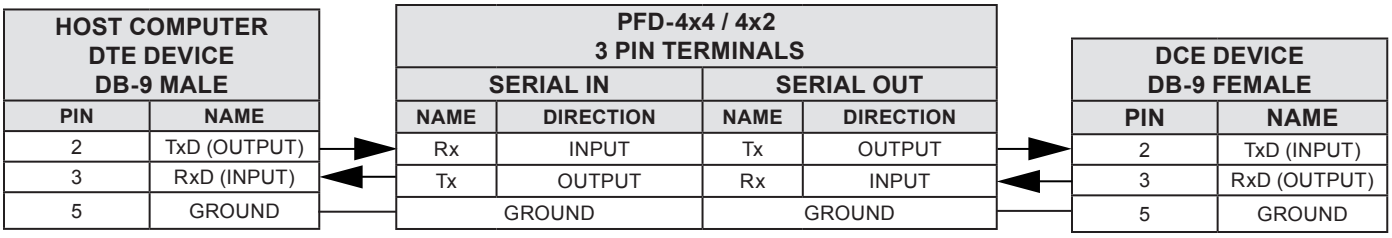
PATHFINDER AUDIO INPUT CONNECTOR WIRING



PATHFINDER AUDIO OUTPUT CONNECTOR WIRING



TYPICAL RS-232 WIRING

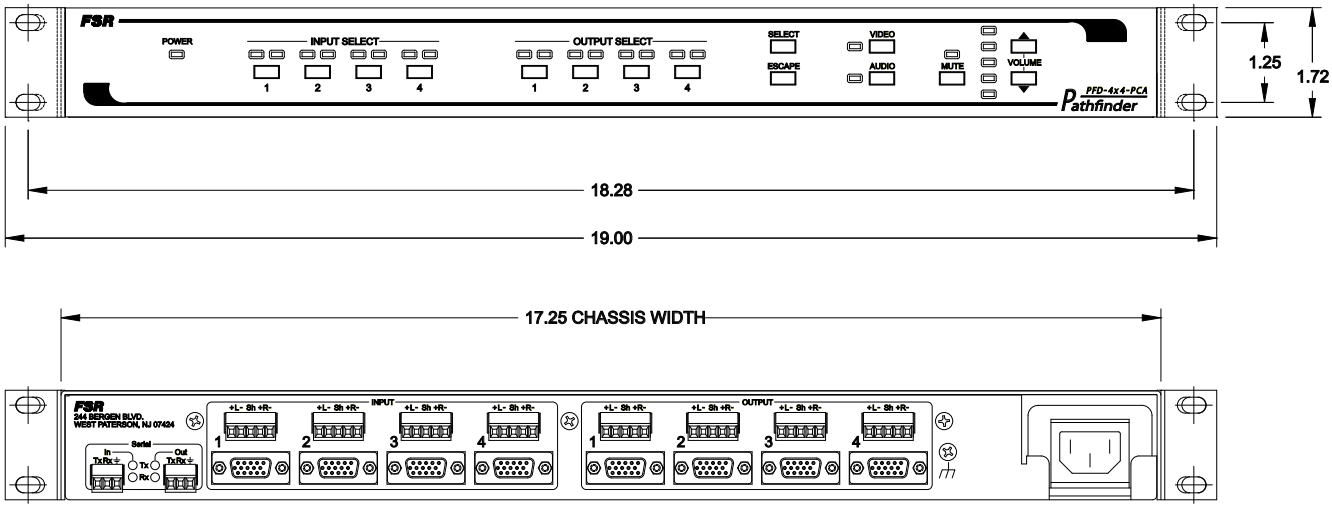


HOST COMPUTER DTE DEVICE DB-9 MALE	
PIN	NAME
2	TxD (OUTPUT)
3	RxD (INPUT)
5	GROUND

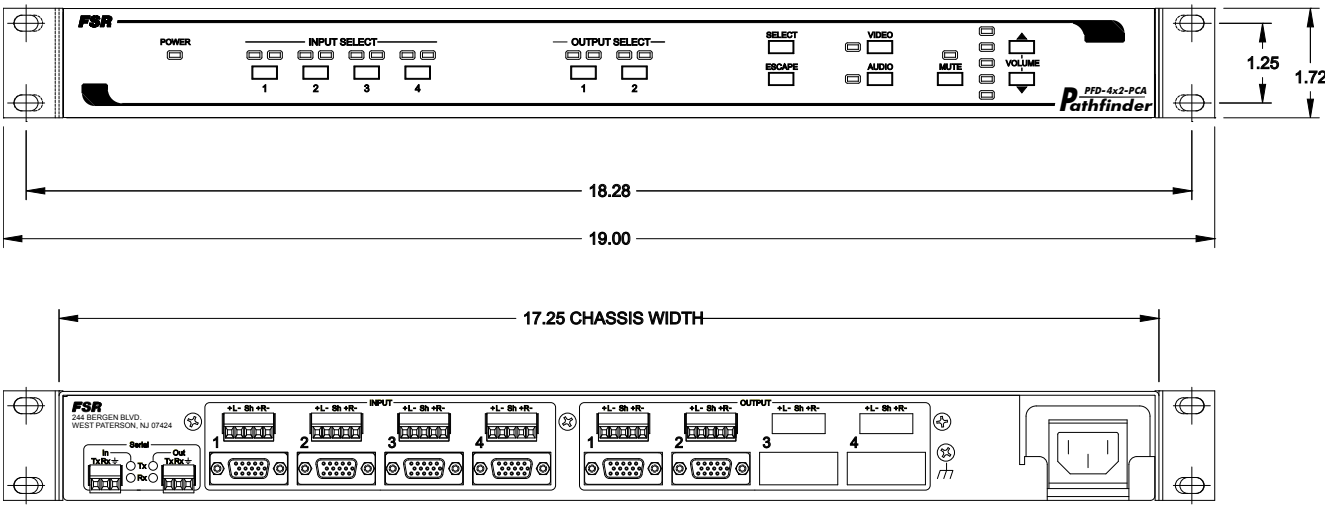
PFD-4x4 / 4x2 3 PIN TERMINALS			
SERIAL IN		SERIAL OUT	
NAME	DIRECTION	NAME	DIRECTION
Rx	INPUT	Tx	OUTPUT
Tx	OUTPUT	Rx	INPUT
GROUND		GROUND	

DCE DEVICE DB-9 FEMALE	
PIN	NAME
2	TxD (INPUT)
3	RxD (OUTPUT)
5	GROUND

FRONT AND REAR PANEL VIEWS



DEPTH INSIDE RACK IS APPROXIMATELY 10.50"



DEPTH INSIDE RACK IS APPROXIMATELY 10.50"

SPECIFICATIONS

VIDEO INPUT	
Input Impedance	75 ohms for R, G, and B inputs (pins 1, 2, and 3)
Nominal level	0.7V p-p
Maximum level	3V p-p with 0V offset
Input return loss	-48dB @ 5 MHz, -44dB @ 10 MHz
VIDEO OUTPUT	
Output Impedance	75 ohms for R, G, and B outputs (pins 1, 2, and 3)
Minimum bandwidth	-3dB @ 375 MHz 0.7V p-p
Typical Bandwidth	-3dB @ 410 MHz -.7V p-p
Flatness	+/-0.5dB 0-250 MHz
Output Offset Voltage	+/-10 mV max (with input floating)
Gain	Unity into 75 ohm load
Adjacent Channel crosstalk	-62dB @ 10 MHz, -47dB @ 100 MHz
Output return loss	-48dB @ 5 MHZ, -42dB @ 10 MHz
SYNC IN	
Frequency range	0-200 MHz
Input Impedance	576 ohms for H and V inputs (pins 13 and 14)
Polarity	positive or negative
Minimum level	2.2 Volts
Maximum level	6 Volts
SYNC OUT	
Delay	18 nS max
Rise/Fall time	2nS max
Output Impedance	75 ohms for H and V outputs (pins 13 and 14)
Polarity	Same as input (noninverting)
Level	4.5V min into Hi-Z, 2.2V min into 75 ohms
NOTE; RGB switching is performed during vertical blanking interval of the old source for the cleanest possible switch	
AUDIO INPUT	
Input trim range	+15 to -5dB in 1 dB steps
Max Input level	+7dBm
AUDIO OUTPUT	
Gain	6dB
Output level control range	+5 to -45dB in 1 dB steps plus mute
Mute Attenuation	>95dB @ 2 KHz
Max output level	+12dBm into 600 ohm balanced load
Adjacent Channel Crosstalk	< -90dB @ 2 KHz
Stereo separation	> 90dB @ 2 KHz
THD + Noise	< 0.1% @ 1 KHZ
Frequency Response	+/-0.25dB 20Hz-20KHz -3dB @ 160 KHz typical