



MatrixPRO™

16x Series
MatrixPRO™ – Wideband A/V Switcher



RECORD OF CHANGES

REV #	DATE	ECO #	DESCRIPTION	Approved By
A	8/16/04	1278	Release to Production	J. Wickenhiser

Operators 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 and Equipment Marking



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 équilatéral signale à alerter l'utilisateur qu'il y a des instructions d'opération et d'entretien très importantes dans la littérature qui accompagne l'appareil.

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



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CHAPTER ONE



Introduction

What you will find in this chapter...

- *About the MatrixPRO™*
- *Features*
- *Technical Description*

The logo for MatrixPRO™ features the brand name in a bold, sans-serif font. The word 'Matrix' is in a dark gray color, and 'PRO' is in a lighter gray color. A blue horizontal line is positioned below the text. The entire logo is set against a light gray rectangular background.

MatrixPRO™

1.0 INTRODUCTION

1.1 ABOUT THE MATRIXPRO™ 16X SERIES

The MatrixPRO™ High-Resolution Matrix Switcher is designed to route universal inputs such as composite video, s-video, component, and computer video sources (640x480 to 2048x1536). Audio routing is an option.

MatrixPRO™ is an ideal switcher to provide professional-quality video signal routing. The operator can save up to 16 "looks" from the front panel and 16 from the MP Control GUI. Typical applications include live staging events, corporate boardroom presentations, and educational and training events.

Attention to the Installation and Operation Sections of this manual is important to ensure trouble-free operation. Should you have any questions regarding the operation of this unit, please consult the factory.

1.2 FEATURES

- 375MHz (-3dB) @ 0dBm, minimum bandwidth, full loaded (One input driving all outputs)
- Mute on a per output basis
- Universal Inputs accept Composite, S-Video, Component Video, HDTV, RGBHV and stereo audio
- Stereo Audio Input and Output Signals Balanced or Unbalanced (optional)
- Volume Control on a per input basis
- Audio follow or breakaway
- Output audio gain and attenuation (-75dB to +20dB)
- IP (Ethernet) Control standard (Static IP Required)
- Front Panel Lockout Mode
- Memory Presets save individual I/O configurations for recall via the front panel or RS-232/485
- I/O Grouping allows specific outputs to be grouped together making installation and control easier.
- VREF (for Vertical Interval Switching) In with Loop Through or Channel 1 VSync or Extracted Composite VSync Input from Channel 1 Green

- Vertical Interval Switching capability provides glitch-free switches when used with synchronous video source. RGB delay used when video not synchronously locked
- MP Control Software GUI for setup and control via serial or Ethernet control
- Aux RS-485 connector for RS-485 pass through for daisy chaining multiple matrix switchers
- Optional MatrixPRO™ Remote Control Panel (MPRC) for remote operation via RS-485

1.3 TECHNICAL DESCRIPTION

MatrixPRO™ 16x is an RGBHV matrix switcher with 375MHz video bandwidth. It's available with 16 inputs and either 16 or 8 outputs. Output gain is unity into 75 ohm loads. All video signals are carried on BNC's for the highest signal quality. Audio routing card is available as an option.

A matrix switcher can route any input to any output or outputs. The matrix switcher has built in capabilities to group outputs and/or inputs with specific outputs.

The analog video section maintains flat response in the critical 0-10MHz band to prevent video smearing. The analog video section has excellent crosstalk immunity, good offset pass through, and output drive capabilities. The system can pass 2048x1536 signals with minimal degradation. The analog video section can pass RGB, RsGsBs, RGsB, component, composite, and S-video with significant input offset.

The horizontal and vertical sync sections reconstruct the sync signal to provide the most accurate output sync signals.

The audio section accepts and outputs both balanced and unbalanced audio signals on five contact Phoenix quick disconnect screw terminals. A 600 ohm resistor must be placed across the inputs if 600 ohm characteristic impedance is required.

The MatrixPRO™ 16x series can be controlled by the front panel, RS-232, RS-485, or Ethernet. The MP Control GUI allows control of the MatrixPRO™ router from a PC via serial and Ethernet interfaces. Barco Folsom also offers the compact 1RU MatrixPRO™ Remote Control Panel which provides 16 input and 16 output buttons for simple remote operation of the MatrixPRO™ router.

CHAPTER TWO

2

Installation

What you will find in this chapter...

- ❑ *Rear Panel Connectors*
- ❑ *Rack-Mount Installation*
- ❑ *Power Cord/Line Voltage Selection*
- ❑ *Video Input & Output Connections*

MatrixPRO™

2.0 INSTALLATION

2.1 REAR PANEL CONNECTORS

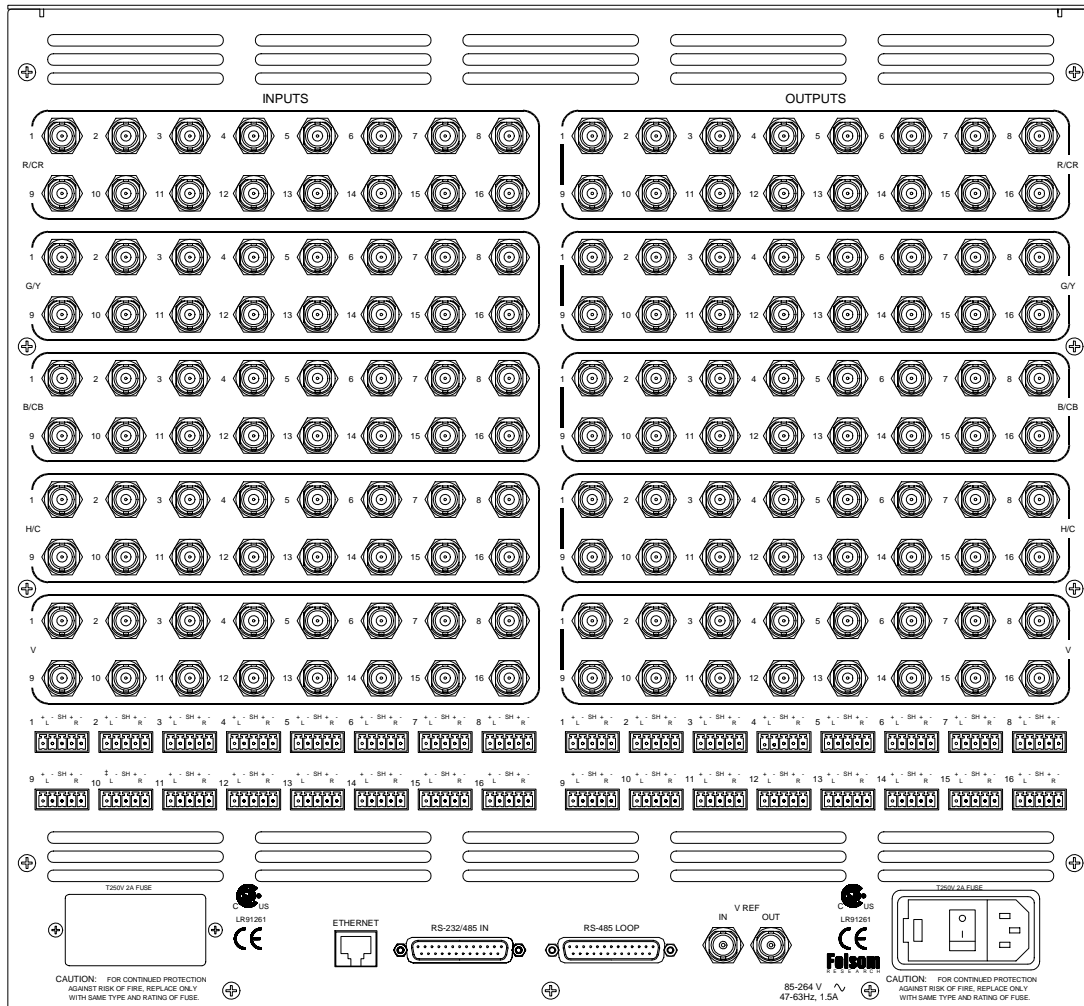


Figure 2-1: MatrixPRO™ 16x16A Rear Panel

- AC Power connector
- BNC Video Input and Output connectors
- DB-25 connector
- Loop through DB-25 connector
- Ethernet Connector
- Vertical Sync Reference input and output

2.2 RACK-MOUNT INSTALLATION

MatrixPRO™ 16x units are designed to be rack mounted. Due to the size of the MatrixPRO™ 16x, Barco Folsom suggests using optional rear rack mount extension

kit provided by Barco Folsom or L-brackets that would be supplied by the rack manufacturer.

When rack mounting the unit, remember that maximum ambient operating temperature for the unit is 40° C. Leave at least one inch of space front and rear to make sure that the airflow through the fan and vent holes is not restricted. When installing equipment into a rack, distribute the units evenly to prevent hazardous conditions that may be created by uneven weight distribution. Connect the unit only to a properly rated supply circuit. Reliable Grounding (Earthing) of Rack-Mounted Equipment should be maintained.

2.3 POWER CORD/LINE VOLTAGE SELECTION

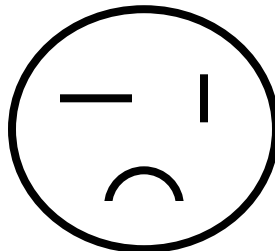
The MatrixPRO™ 16x Matrix Switcher performs line Voltage Selection automatically. No user controls are required for line voltage selection. The AC power cords must be accessible so that the cords can be removed during field servicing.

2.4 DUAL POWER SUPPLY VERSION

For dual power supply models, plug both power cord into the AC supply. Each power supply is independent and can be plugged into different sources. If desired, only one supply needs to be plugged in for proper operation.

WARNING

When the MatrixPRO™ 16x is used in the 230-volt mode, a UL listed line cord rated for 50 volts at 15 amps must be used. This cord will be fitted with a tandem prong-type plug.



Tandem Plug

AVERTISSEMENT

La choix de la ligne de voltage se réalise automatiquement par le MatrixPRO 16x Transformateur Graphique. On n'a pas besoin du controller usager pour la choix de la ligne de voltage.

WARNUNG

Das MatrixPRO 16x-Gerät mu beim Anschlu an 240V ~ mit einer vom VDE auf 250V/10A geprüften Netzleitung mit einem Schukostecker ausgestattet sein.



2.5 VIDEO INPUT CONNECTIONS

The video input section on the MatrixPRO™ rear panel provides 16 universal inputs. Each input can accept RGB, YUV, S-Video (Y/C), or composite (NTSC or PAL) video signals. The connections for each input channel are made via five BNC connectors. Connection points for each type of video signal are specified below.

Input Connections

Format – RGB (Typical Devices: Computers)		Format – YUV or Y Pr Pb (Betacam) (Typical Devices: DVD Player or Betacam Deck)	
Source to MatrixPRO		Source to MatrixPRO	
R	R/CR	Y	G/Y
G	G/Y	Pr	R/CR
B	B/CB	Pb	B/CB
H	H/C	or	
V	V	Y	G/Y
Format – S-Video (Y/C) (Typical Devices: S-Video VCR)		U	R/CR
		V	B/CB
Source to MatrixPRO		Format – NTSC/PAL (Typical Devices: Composite/PAL VCR)	
Y	G/Y	Source to MatrixPRO	
C	B/CB	Composite/PAL	G/Y

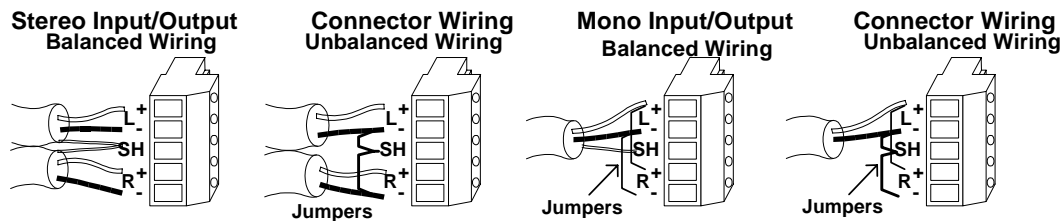
2.6 VIDEO OUTPUT CONNECTIONS

Sixteen or eight independently buffered outputs are provided. Outputs provide RGB video signals. Connect the outputs labeled R, G, and B on the rear panel of the MatrixPRO™ unit to the correspondingly labeled connectors on the output device.

Model	# of Inputs	# of Outputs	Audio	Dual Power Supply
MP-1616	16	16	No	No
MP-1608	16	8	No	No
MP-1616A	16	16	Yes	No
MP-1608A	16	8	Yes	No
MP-1616D	16	16	No	Yes
MP-1608D	16	8	No	Yes
MP-1616AD	16	16	Yes	Yes
MP-1608AD	16	8	Yes	Yes

2.7 AUDIO INPUT CONNECTIONS

The MatrixPRO™ 16x has 16 audio inputs that accept balanced and unbalanced signals. If a 600 ohm load impedance is desired a 600 ohm resistor must be connected across the input terminals. Connect each type of audio input source to MatrixPRO™ as indicated in the following diagram:



2.8 AUDIO OUTPUT CONNECTIONS

The MatrixPRO™ 16x has 16 outputs which drive unbalanced and balanced signals. Connect each type of audio output to the MatrixPRO™ as shown above.

CHAPTER THREE

3

Operation

What you will find in this chapter...

- ❑ *Power-up Initialization*
- ❑ *Console Installation*
- ❑ *Front Panel Operation*
- ❑ *GUI Configuration*
- ❑ *Optional MP Remote Control Panel*
- ❑ *MatrixPRO™ 16x Field Servicing*

MatrixPRO™

3.0 OPERATION

This portion of the manual provides instructions that indicate how to control all MatrixPRO™ functions. There are many means to control the unit available to the user. First, the front panel is available for status and control. Two keys and display on the MatrixPRO™ front panel are used for signal routing, to save and recall looks, mute audio sources, for volume control, and for other system configuration.

A second means of control is through the use of the MP Control software. The GUI can interface to the MatrixPRO™ through RS-232 or Ethernet.

Barco Folsom also makes a Remote Control Switch Panel for controlling the MatrixPRO™ remotely via RS-485. And finally the unit can be controlled remotely by various third-party controllers.

This section also describes field servicing the MatrixPRO™ 16x.

3.1 POWER-UP INITIALIZATION FOR MATRIXPRO

After plugging in the MatrixPRO™ to the wall socket (two are provided for dual power supply models), locate the Power Switch(s) on the back of the frame and turn the power ON. The LED's on the buttons will light, the display will show the Main Menu screen, and ***the last saved or recalled setup will be recalled.***

3.2 MATRIXPRO™16X FRONT PANEL OPERATION

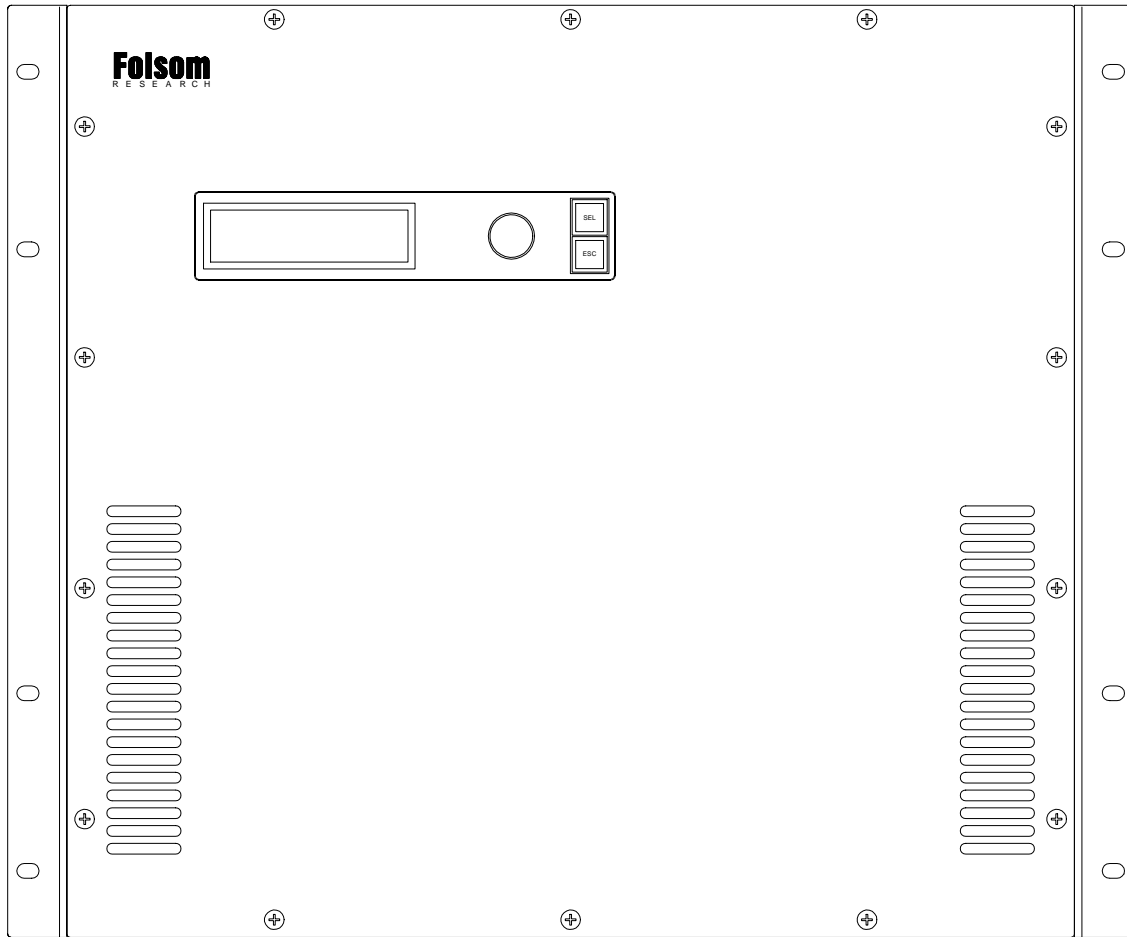


Figure 3-1 MatrixPRO 16x Front Panel

The front panel of the MatrixPRO™ 16x allows local control and monitoring of the matrix switcher. It displays power information for the dual power supply model. The front panel displays an emergency message if one of the dual power supplies fails or the AC power is removed from one of the supplies.

3.2.1 MENU STRUCTURE

The menu has 5 main menus (6 for dual power supply version) and each menu item will have a sub-menu.

3.2.1.1 MAIN MENU

MP 16x

A/V SEL	FILES
ROUTING	CONFIG
VOLUME	STATUS - dual PS version only

To enter into the Submenus, rotate the Selector Knob until the cursors are around the desired menu then press SEL. Once in the Submenu, move the cursor down or up to position the cursor next to the item to change. Press SEL to modify the selected item. Except in the routing menu, to back out of item without modifying it, press ESC, to enter the selection press SEL. In the routing menu, to have the modification take effect, press ESC again. This returns back to the Main Menu. In all other menus once the SEL button is pressed the modification takes effect. To return to the main menu, an ESC press is required.

For dual power supply versions, when an AC or DC fault occurs the front panel display indicates the type of fault and which supply has the fault. To access the menu rotate the Selector Knob or press one of the buttons. The message will appear again after 1 minute of inactivity.

3.2.1.2 A/V SEL

AUDIO/VIDEO MODE MENU

(AUDIO FOLLOW VIDEO)
VIDEO ONLY
AUDIO ONLY

This mode selects whether audio is routed with the video or video or audio is routed separately in the Routing menu. If audio is not installed in the system, video only is the only choice.

3.2.1.3 ROUTING

ROUTING MENU

**AUDIO FOLLOWS VIDEO
OUTPUT (1)
INPUT MUTE**

To select an output, rotate the dial press SEL. An input can then be routed by rotating the dial and pressing SEL. The routing won't take place until ESC is pressed. This way multiple routes can be set up and will take effect all at once.

3.2.1.4 VOLUME

VOLUME MENU

**AUDIO FOLLOWS VIDEO
INPUT (1)
VOLUME 0 DB**

An input must be routed to an output for the volume to be adjusted. The adjustments occur in real time.

3.2.1.5 FILES

FILES MENU

**SAVE CONFIG (1)
RECALL CONFIG 1**

Once a configuration, or "look", has been setup in the routing menu, it can be saved for later recall. Simply enter the files menu and with Save Config selected press SEL. Then rotate the dial to pick a file number and press SEL. This file number will now be available under Recall Config.

To recall a look rotate the dial so that Recall Config is selected and press SEL. Then rotate the dial until the desired saved file is reached and press SEL. Only file numbers that have looks saved to them will show up.

3.2.1.6 CONFIG

IP ADDRESS

**IP ADDRESS
RS-232/485
RS-485 NODE
FACTORY RESET**

The menus under these appear as below:

IP ADDRESS

150.158.008.223
^

The current IP address is shown and can be modified in this menu.

SERIAL MODE : RS-232

PRESS SEL FOR : RS-485

This mode toggles between the two different serial modes.

RS-485 NODE

NODE (1)

RS-485 is used with the MatrixPRO™ Remote Control Panel (MRPC). Nodes go from 1 to 32 with Node 1 being typical with no MRPC and node 17 being typical when MRPC is present. See MRPC user's manual for more details.

FACTORY RESET

ARE YOU SURE (NO)

This will bring the MatrixPRO™ back to factory default settings.

3.2.1.7 STATUS

Power Supply Status (dual power supply version only) - Monitors the AC and DC power status

PWR SUPPLY 1 AC: OK
PWR SUPPLY 1 DC: OK
PWR SUPPLY 2 AC: OK
PWR SUPPLY 2 DC: OK

3.3 MP CONTROL GUI OPERATION

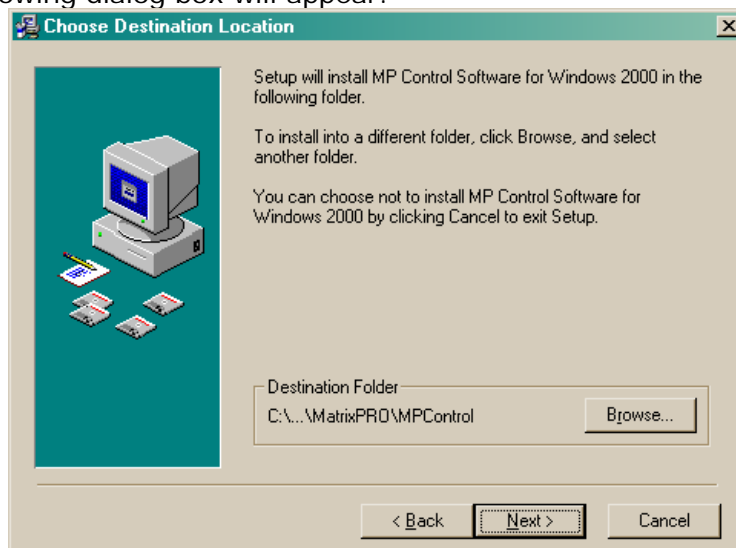
MP Control GUI is an interactive Graphical User Interface application designed to assist users with the operation of the MatrixPRO™.

3.3.1 MP CONTROL INSTALL INSTRUCTIONS

The MP Control software is available on the enclosed CD or may be downloaded from the Barco Folsom web-site or FTP server for the most updated version. The following step-by-step instructions will allow you to install Barco Folsom MP Control GUI to a Windows NT/2000/XP PC.

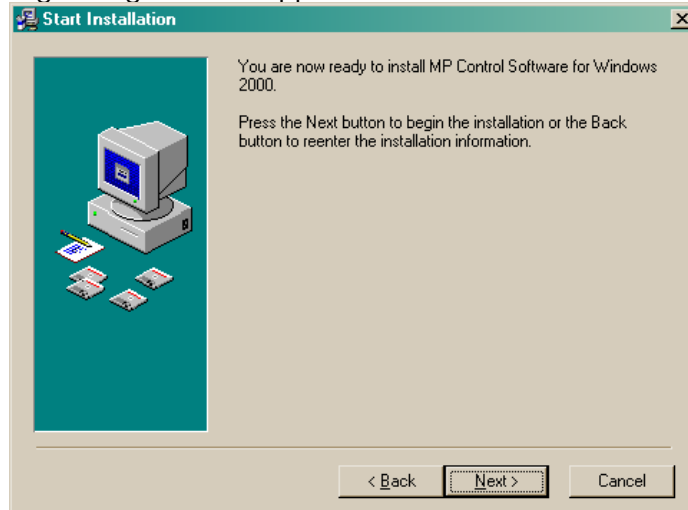
Follow the steps below and use the figures provided as a visual reference to the images being displayed during the installation process.

1. Double-click on the MPControlSetup.exe to begin the installation process. Click on the 'Next' button to continue the installation process.
2. The following dialog box will appear:



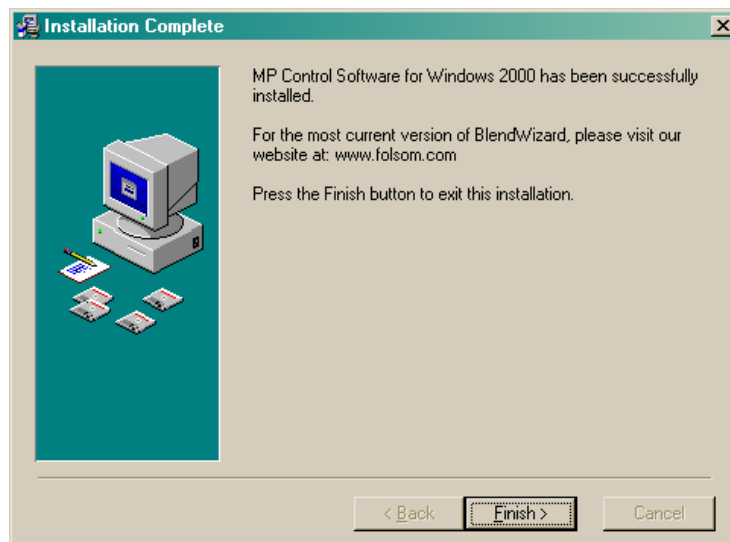
The default install directory is C:\Folsom Research\MatrixPRO\MPCControl. Click the 'Browse' button to select a different directory, if desired. Click the 'Next' button to continue.

3. The following dialog box will appear



The setup application is now ready to install the MP Control application. Click the 'Next' button to begin file transfer.

4. After successfully transferring the file to the directory specified, the following dialog box will appear:



Click the 'Finish' to exit the installation setup.

5. A shortcut to the MP Control application has been placed in the Windows desktop. The MP Control application can also be reached from the Start Menu (Start -> Programs-> Folsom Research -> MPCControl.)

3.3.2 EQUIPMENT SETUP

Connect the input and output sources on the MatrixPRO™. Connect the MatrixPRO™ remote port to an available serial (RS-232) port on the laptop/PC with the MP Control application installed. Turn on the MatrixPRO™ and wait for a complete system boot up. After the MatrixPRO™ has successfully booted up, run the MP Control application.



3.3.3 REMOTE ETHERNET SETUP

To control the MatrixPRO™ using a computer on the same LAN, pre-configure the MatrixPRO™ with a static IP address using RS-232 ipconfig command, program the MatrixPRO™ using the GUI over RS-232, or use the front panel. On the remote computer, launch the GUI. Press 'NO' when it asks if you would like to connect serially. Press the Setup tab. Enter the IP address of the MatrixPRO™ in the IP address box. Click the 'Ethernet' radio button under the 'RS-232'. The MatrixPRO™ now will be under the control of the GUI.

Note: Only one Ethernet socket is available so only one remote GUI can be accommodated at one time. However the MatrixPRO™ can still be controlled via RS-232, RS-485 or the Front Panel while being controlled over Ethernet. If the unit is controlled by other sources, Press 'Read from MatrixPRO' as necessary to find the current status of the MatrixPRO™. While operating the MatrixPRO™ with the GUI, it is recommended that the front panel lockout be activated on the GUI for correct operation.

CHAPTER FOUR

4

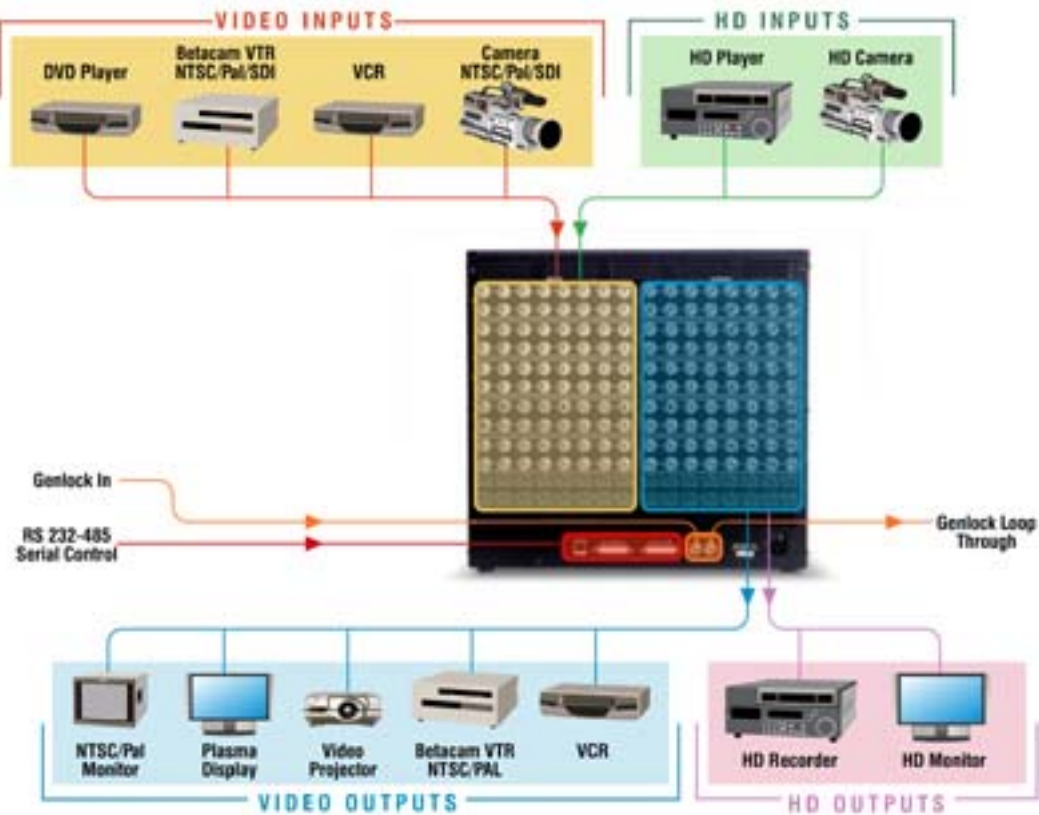
Connecting MatrixPro for Specific Applications

What you will find in this chapter...

- *Connectivity Diagrams*

MatrixPRO™

4.0 CONNECTIVITY DIAGRAM



Please note that the MatrixPRO™ does not convert any of the input formats, it only routes the video signals. Therefore, it is important to match the input formats to the output device.

Further Questions?

At Barco Folsom, we take pride in offering unique solutions to demanding technical problems. If you have questions, require further information or would like to discuss your application requirements in more detail, please call (916) 859-2500. Our Customer Support Engineers will be happy to supply you with the support you need.

CHAPTER FIVE

5

Software Upgrade Instructions

What you will find in this chapter...

- ❑ *Rear Panel Connectors*
- ❑ *Rack-Mount Installation*
- ❑ *Power Cord/Line Voltage Selection*
- ❑ *Video Input & Output Connections*



5.0 SOFTWARE UPGRADE INSTRUCTIONS

5.1 OVERVIEW

The MatrixPRO™ units built by Barco Folsom incorporate the system software in a Flash memory component. Flash memory allows easy upgrades without the need to send the unit back to the factory due to software changes.

The loader utility provides the capability to update the system Flash module with the latest revision of software. The upgrade utility can be run from a hard drive (recommended) or a floppy drive. Running the loader from a floppy drive is discouraged though due to the slow speeds associated with disk access.

5.2 HARDWARE REQUIREMENTS

- * IBM compatible computer with an available COM port
- * Serial cable conforming to EIA RS-232 specifications (i.e. Standard Modem cable) (The cable should have a DB-25 male connector on one end)

5.3 SOFTWARE REQUIREMENTS

- * Window 95/98/NT/2000/XP
- * Flash File Loader
- * MatrixPRO™ Software files

The Flash File Loader with the Software files can be downloaded from our FTP site as described below.

5.4 CONNECTING TO BARCO FOLSOM

Barco Folsom's FTP site address is: [ftp.folsom.com](ftp:folsom.com)

If you are using an FTP client, logon to our site using "anonymous" for the user name and your email address as the password (ex. johndoe@somecompany.com).

If you are using a web browser to access our FTP site, point the browser to:
<ftp://ftp.folsom.com>

5.5 DOWNLOADING NECESSARY FILES

MatrixPRO™ Software Files and Flash File Loader

Directory Location: [ftp.folsom.com](ftp:folsom.com) \ Products \ Video \ MatrixPRO™ \ MP16x

File to download: "MatrixPRO16x_Rev#####_###.exe"

5.6 INSTALLING THE MATRIXPRO SOFTWARE FILES AND FLASH FILE LOADER

Before installing the files, it is recommended that all running programs be properly shut down.

- 1) Click on the Start button and select Run.
- 2) Click on the Browse button and locate the "MatrixPRO16x_Rev#####_###.exe" file on your hard drive.
- 3) Double click on this file and then click OK to start the installation process.
- 4) Follow the on screen instructions to complete the install.

5.7 PREPARING TO UPGRADE THE MATRIXPRO™ 16X

- 1) Plug the DB-25 male connector into the port labeled "RS-232/485 IN" on the back of the MatrixPRO unit.
- 2) Make sure the other end of the cable is attached to the available COM port on the back of the computer performing the upgrade.
- 3) Turn the MatrixPRO ON or do a power cycle if it was previously powered on and wait for it to boot.

5.8 STARTING THE MATRIXPRO™ FLASH FILE LOADER UTILITY

After the files have been installed the MatrixPRO™ Flash File Loader can be selected to run.

- 1) Click on the Start button and select Programs.
- 2) Find the Folsom Research folder and select MatrixPRO™ Flash File Loader.

5.9 VERIFYING COMMUNICATIONS BETWEEN THE COMPUTER AND MATRIXPRO UNIT

- 1) In the loader program, click in the Black Terminal Window area.
- 2) If communications is established, pressing the ENTER key on the keyboard will result in the terminal window displaying various messages and finally with the system prompt "#" displayed. If nothing occurs when ENTER key is pressed, it is possible that serial port communication was not established. If this is true, click on the RS232 Config Menu and select the COM Port the unit is connected to. In the CONFIG SERIAL submenu and verify the following:

```
ECHO      = ON
BAUD RATE = 57.6K
DATA BIT  = 8
STOP BIT  = 1
PARITY    = NONE
HANDSHAKING = ON
```

If any of the communication parameters are changed within the loader, it is recommended that the MatrixPRO™ unit be powered cycled and the verification process started over.

5.10 UPLOADING FILES TO THE MATRIXPRO UNIT

- 1) Once communications have been established and verified, click on the "Open script file to read and upload" button.
- 2) Select "Complete Load.sld" and click OPEN.
- 3) After several minutes, the loader utility will display several messages. Press OK for each message that appears. After several minutes, the loader utility will inform the user that the process is complete.
- 4) Once this is done, you must power down the MatrixPRO™ unit and turn it back on for the software to take effect. You can also close the loader utility at this time.
- 5) Verify the new software is in the system by looking for the version numbers in the MP Commander GUI.
- 6) Once you have verified the version number, it is recommended that a factory reset be performed. This is done by going MP Commander GUI and clicking on the Factory Reset button

CHAPTER SIX

6

External Remote Control Protocol

What you will find in this chapter...

- *Default Serial Parameters*
- *Console Port (DB-25) Pin-out*
- *RS232 Format*
- *RS485 Format*
- *MatrixPRO™ Remote Commands*
- *MatrixPRO™ Remote Commands Description*

MatrixPRO™

6.0 SERIAL COMMAND SYNTAX SPECIFICATION

6.1 UPLOADING FILES TO THE MATRIXPRO™ UNIT

The following are the parameter settings for serial communication.

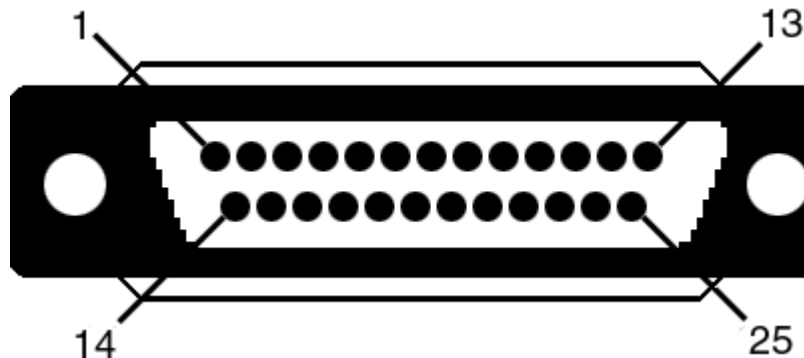
- ❑ Baud Rate is 57600 baud.
- ❑ Parity is NONE.
- ❑ Stop Bit is 1.
- ❑ Data Bit is 8.
- ❑ Echo is ON
- ❑ Flow Control is NONE

Note these are defaults and can be changed using serial commands listed on page 40.

6.2 RS-232/485 REMOTE CONTROL CONNECTIONS

The RS-232 or RS-485 serial port can be connected to a computer to support remote control of the MatrixPRO™ unit. The Electronics Industry Association (EIA) has produced standards for RS232 and RS485 for data communications. Below is the pinout for both RS232 & RS485 with DB25 connector.

Remote Port



DB25	RS232	RS485
1	Shield	Shield
2	TxD	T(-)
3	RxD	R(-)
4	RTS	N/A
5	CTS	N/A
6	DSR	N/A
7	Sig Gnd	Sig Gnd
8	DCD	N/A
10	N/A	N/A
12	N/A	N/A
14	N/A	T(+)
15	N/A	N/A
16	N/A	R(+)
19	N/A	N/A
20	DTR	N/A
21-25	N/A	N/A

6.3 RS-232 MODE

The MatrixPRO™ will respond with a '#' prompt when the command processor is ready for a command.

The command syntax is shown below
cmd arg1 arg2 ... argn<CR>

cmd	cmd is any valid Graphics Board command, typically 2 to 6 alphabetic (non numeric) characters.
arg	arg1, arg2, ... argn are required or optional parameters depending on the command used.
<CR>	carriage return (ASCII 13) terminates the command

A space (ASCII 32) must be inserted between the command and any arguments that follow. A space must also be inserted between all argument parameters except for the last argument in the chain.

All commands in RS232 mode **must** be terminated with a carriage return (ASCII 13). The carriage return will tell the command processor to begin execution of the command.

Query commands will return the following:

=result

#

The '=' indicates a result from a command is following. The 'result' will follow directly after the '='. The value of the result will vary depending on the query command used. A new line will be generated and the prompt will indicate the system is ready for a new command.

6.4 RS-485 MODE

To switch to RS-485 see page 22 in the front panel operation section. Single commands will be combined with a command delimiter start, device number, command separator and command delimiter end to form a command string as shown below:

Single Command Format:

cdsidcmd arg1 arg2 ..argncde

Multiple Command Format:

cdsidcmd arg1 arg2 ..argn,idcmd arg1 arg2 ..argn,...,idcmd arg1 arg2 ..argncde

cds	cds is the command delimiter start character '*' (ASCII 42).
id	id is the device number in the range of 1 to 32. This can be a single character for values less than 10, no preceding zero is required.
cmd	cmd is any valid Graphics Board command, typically 2 to 6 characters in length
arg	arg1,2,n is any required or optional parameters need for the command
,	separates multiple commands
cde	cde is the command delimiter end character '!' (ASCII 33).

Example:

**12XYZ A 9,9PDQY 1234, 31WX 200 98!*

The command string is started by the command delimiter start character '*'. The first command follows directly after the cds. The example shows that device 12 should process the XYZ command with A and 9 as parameters. A coma (ASCII 44) separates the commands. Device 9 will process the PDQY command with a parameter of 1234

and device 31 will process the WX command with parameters of 200 and 98. The cde '!' follows directly after the last command to end the command string.

Commands received in the command string will not be processed until the cde character '!' is received. This format allows commands to be stack to the same or multiple devices and executed when the cde '!' character is received by all units. Any incomplete or unknown commands will be ignored. The maximum number of commands that can be stacked per unit is 16. Each unit will only stack those commands assigned to it, even though all units receive the same command string.

During queue processing, no input buffer processing is performed. Characters sent through the serial port during queue processing are still stored in the input buffer. If hardware flow control is not observed, it is important to guarantee that the input buffer limit is not exceeded before completion of the last command string. Note: The command queue does not support backspace characters.

To minimize bus traffic the command words will be kept as short as possible. The units will not respond with prompts or any command error conditions. Echo will be disabled when RS-485 mode is selected.

6.5 MATRIXPRO™ REMOTE COMMANDS

HELP	Capabilities. Send list of commands available back in ASCII format
ALVL num lvl	Input Audio Level.
AVTYPE mode	AV Type. 0=A/V, 1=Audio, 2=Video
CLEAR	Clear all matrix video and audio routings.
CSUMSTAT	Display Main Code/RBF Checksum info
FDLY dly	Field delay for RGB sync. Delay (dly) in milliseconds
FPLOCK en	Locks/unlocks Front Panel control
GCLEAR grp	Clears grouping information
GADD grp out in	Add output, input to group
GDEL grp out in	Remove output, input from group
IPCONFIG I3 I2 I1 I0	IP address configuration I3.I2.I1.I0
LOADRMP	Places unit into loader mode for firmware upgrade
OMUTE out en	Enable/disable audio mute on output.
OSTAT [out]	Displays output status in ASCII.
PSTAT [num]	Displays preset status in ASCII.
PRST num	Saves current front panel configuration to a Preset location.
RPRST num	Recall preset from a Preset location.
RNOV	Recall Flash settings
RESETMP op	Reset the MatrixPRO™ and recall saved Flash values op [R F] Reset Factory Reset
RTEMP out in audio	Route inputs to outputs. If output is in group, group is routed too.
SBAUD	Sets Baud Rate. 0=19200, 1=28800, 2=38400, 3=57600.
SMODE mode [485id]	Serial Mode. 0=RS232, 1=RS485. [485id] opt if RS232
SWITCH mode	Switching Mode. mode = 0(RGB) 1(VSync) 2(Comp) 3(VREF In)
TAKE en	en = 1 simulates a TAKE button pushed on the front panel (i.e takes all prelim routes and makes it permanent). en = 0 simulates a CANCEL button pushed
UNOV	Save current settings to FLASH
VDLY dly	Vertical Interval delay. Delay for # of VSYNCS seen before raising /CE. Minimum is 1, max is 255

6.5.1 MATRIXPRO™ SERIAL COMMAND LIST/DESCRIPTION

Command:
HELP

Description: Displays the list of available command on a terminal emulator

Parameters: None

Example: HELP (Returns the command list.)

Command:
ALVL num lvl

Description: Updates input audio level

Parameters: **num** - Input number; [1 - 16]

lvl - Audio level; [0 - 252]

Query:

ALVL? num

Returns the selected input audio level in the format:

=lvl

Example: ALVL 1 252 (Set input 1 audio level to 252. All outputs connected to input 1 will have audio level of 252.)

Command:

AVTYPE mode

Description: Updates A/V mode for routing command.

Parameters: **mode** - A/V mode; 0=A/V, 1=Audio, 2=Video

Query:

AVTYPE?

Returns the current A/V mode in the format:
=mode

Example: AVTYPE 0 (Set A/V type to route both Audio and Video for the next route command sent)

Command:

CLEAR

Description: Clears all existing and pending video and audio routes.

Parameters: None

Example: CLEAR (Clears all existing and pending video and audio routes.)

Command:

CSUMSTAT

Description: Displays firmware checksums and other information.

Parameters: None

Example: CSUMSTAT (Displays firmware checksums and other information.)

Command:

FDLY dly

Description: Updates the field delay parameter for RGB Sync.

Parameters: **dly** - RGB delay (in milliseconds); [0-3000]

Query:

FDLY?

Returns the current field delay setting in the format:
=dly

Example: FDLY 100 (Set RGB sync field delay to be 100ms.)

Command:

FPLOCK en

Description: Lock / unlock the front panel from user input. Locking the front panel will result in the front panel not responding to user button presses.

Parameters: **en** - [0|1], Disable|Enable

Query:

FPLOCK?

Returns the current front panel lock status in the format:
=en

Example: FPLOCK 1 (Locks the front panel from the user.)

Command:

GCLEAR grp

Description: Clears the selected grouping information.

Parameters: **grp** - Group number to clear; [1-16]

Example: GCLEAR 1 (Clears the grouping information in group number 1.)

Command:

GADD grp out in

Description: Add output and/or input to the selected group index. Note: cannot add output to more than 1 group index.

Parameters: **grp** - Group number to add output/input; [1-16]

out - Output number to add; [1-16] / 101 if no output to add

in - Input number to add; [1-16] / 101 if no input to add

Example: GADD 1 4 2 (Add output 1 and input 2 to group 1.)

GADD 1 101 5 (Add input 5 to group 1)

Command:

GDEL grp out in

Description: Remove output and/or input from the selected group index.

Parameters: **grp** - Group number to remove output/input; [1-16]

out - Output number to remove; [1-16] / 101 if no output to remove

in - Input number to remove; [1-16] / 101 if no input to remove

Example: GDEL 1 4 2 (Remove output 1 and input 2 from group 1.)

GDEL 1 101 5 (Remove input 5 from group 1)

Command:

IPCONFIG I3 I2 I1 I0

Description: Sets the MatrixPRO™'s IP address

Parameters: **I3** - First set of IP numbers for Ipv4 (**I3.I2.I1.I0**); [0-255]

I2 - Second set of IP numbers for Ipv4 (**I3.I2.I1.I0**); [0-255]

I1 - Third set of IP numbers for Ipv4 (**I3.I2.I1.I0**); [0-255]

I0 - Fourth set of IP numbers for Ipv4 (**I3.I2.I1.I0**); [0-255]

Query:

IPCONFIG?

Returns the current IP address the MatrixPRO™ is set to in the format:
=I3.I2.I1.I0

Example: IPCONFIG 192 168 0 141 (Set MatrixPRO™ IP address to 192.168.0.141)

Command:

LOADRMP

Description: Places unit into loader mode. This mode is used to perform field upgrades

Parameters: None.

Example: LOADRMP (Puts unit into loader mode.)

Command:
OMUTE out mte

Description: Updates output mute status
Parameters: **out** - Output number; [1 - 16]
mte - Mute status; [0|1], Disable|Enable

Query:
OMUTE? out
Returns the selected output mute status in the format:
=mte

Example: OMUTE 2 1 (Mute output 2.)

Command:
OSTAT

Description: Displays output information (i.e. which input video/audio # routed, audio level, etc). This command is used in the MatrixPRO™ Remote Control Panel to return the result.

Parameters: **out** - Output number; [1 – 16]
(Note: this parameter is optional, if no parameter exist, all output information (i.e. 1-16) will be displayed.)

Example: OSTAT 1 (Displays output status for output 1.)
OSTAT (Displays output status for all outputs.)

Command:
PSTAT

Description: Displays preset information (i.e. preset valid, which input video/audio # routed, audio level, etc).

Parameters: **out** - Preset number; [1 – 16]
(Note: this parameter is optional, if no parameter exist, all preset information (i.e. 1-16) will be displayed.)

Example: PSTAT 1 (Displays preset status for preset 1.)
PSTAT (Displays preset status for all presets.)

Command:
PRST num

Description: Saves current front panel configuration/routing to a Preset location

Parameters: **out** - Preset number to save to; [1 – 16]
Example: PRST 1 (Saves configuration to preset location 1.)

Command:
RPRST num

Description: Recall an existing preset from a preset location and update current front panel configuration/routing. If no preset information has been saved to the preset location, no changes are made.

Parameters: **out** - Preset number to recall from; [1 – 16]
Example: RPRST 1 (Recalls configuration from preset location 1.)

Command:

RESETMP op

Description: Resets the system to factory defaults

Parameters: **op** - Reset operation; [R|F], Restart|Factory

Example: RESETMP F (Resets system to factory defaults and resets all user saved presets.)

Command:

RTEMP out in audio

Description: Routes input to output. If the output is in a group, all the outputs in the group will be routed to the input specified. If the output is in a I/O group but the input is not in the group, the command will be ignored.

Parameters: **out** - Output number; [1 - 8]

in - Video Input number to route video; [1-12] / 101 if no input to add / 0 unroutes input

audio - Audio Input number to route audio; [1-12] / 101 if no audio to add / 0 unroutes input

Query:

RTEMP? out

Returns the current video and audio inputs routed to the specified output in the format:

=in audio

Example: RTEMP 1 3 4 (Route to output 1, video input 3, audio input 4.)

RTEMP 4 101 5 (Route to output 4, audio input 5)

Command:

SBAUD mode

Description: Serial Baud Rate. Selects between 19.2, 28.8, 38.4, or 57.6K baud.

Parameters: **mode** - Mode; [0|1|2|3], 19200|28800|38400|57600

Query:

SBAUD?

Returns the current serial baud in the format.

=mode

Example: SMODE 0 (Sets Serial baud rate to 19200.)

Command:

SMODE mode [485id]

Description: Serial Mode. Selects between RS-232 or RS-485 serial modes. If select RS-485 mode, also need to specify RS-485 ID.

Parameters: **mode** - Mode; [0|1], RS-232|RS-485

485id - RS-485 ID for the MatrixPRO™. This field is ignored if switching to RS-232 mode

Query:

SMODE?

Returns the current serial mode in the format.

=mode 485id

Example: SMODE 0 (Sets Serial mode for RS-232.)
SMODE 1 10 (Sets Serial mode for RS-485 with ID 10)

Command:
SWITCH mode

Description: Video switching mode. Selects either RGB delay, Vertical Sync, Composite Sync, or V Ref Sync.

Parameters: **mode** - Mode; [0|1|2|3], RGB|Vsync|Comp|VREF

Query:

SWITCH?

Returns the current video switching mode in the format.

=mode

Example: SWITCH 0 (Sets video switching mode to RGB delay.)

Command:
TAKE en

Description: Route / Cancel all pending video/audio routes.

Parameters: en - Mode; [0|1], Route all pending|Cancel all pending. 0 is the equivalent of pressing the

CANCEL button on the front panel. 1 is the equivalent of pressing the TAKE button on the front panel.

Example: TAKE 1 (Routes all pending video/audio routes.)

Command:
UNOV

Description: Saves the system parameters to non-volatile RAM. The system parameters

stored are the current output/input routes, grouping information, IP setting and serial port configuration parameters. Upon power up, the system parameters stored in non-volatile RAM are used for system configuration.

Parameters: None

Example: UNOV (System parameters are saved to non-volatile RAM.)

Command:
VDLY dly

Description: Updates the vertical interval delay parameter for vertical interval switching.

Parameters: **dly** - The number of V Syncs before video is switching occurs; [1-255]

Query:

VDLY?

Returns the current vertical interval delay setting in the format:

=dly

Example: VDLY 10 (Set vertical interval delay to 10.)

CHAPTER SEVEN



Barco Folsom Information

What you will find in this chapter...

- *Warranty*
- *RMA Information*
- *Technical Support/General Contact Information*



7.0 BARCO FOLSOM WARRANTY

All video products are designed and tested to the highest quality standards and are backed by a full 3-year parts and labor warranty. Warranties are effective upon delivery date to customer and are non-transferable. Barco Folsom warranties are only valid to the original purchaser/owner. Warranty related repairs include parts and labor, but do not include faults resulting from user negligence, special modifications, lightning strikes, abuse (drop/crush), and/or other unusual damages.

The customer shall pay shipping charges when unit is returned for repair. Barco Folsom will cover shipping charges for return shipments to customers.

7.1 RETURN MATERIAL AUTHORIZATION (RMA)

In the unlikely event that a product is required to return for repair, please call 888-414-7226 and ask for a Sales Engineer to receive a Return Merchandise Authorization number (RMA).

RMA Conditions:

- a) Prior to returning any item, you must receive a Return Merchandise Authorization (RMA) number.
- b) All RMA numbers must appear on their return-shipping label.
- c) RMA numbers are valid for ten (10) days from issue date.
- d) All shipping and insurance charges on all RMA's must be prepaid by the customer

7.2 BARCO FOLSOM CONTACT INFORMATION

Sales Contact Information

Direct Sales Line: 916-859-2505
Toll Free Line: 888-414-7226
E-mail: sales@folsom.com

Technical Support Information

Tech Line: 888-414-7226 (Monday – Friday, 8 - 5 pm PST)
John Orr: 916-802-6867 (24hours/7days)
Chris Prosio: 916-719-6867 (24hours/7days)
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APPENDIX



What you will find in this chapter...

- *Technical Specifications*



8.0 MATRIXPRO™ 16X TECHNICAL SPECIFICATIONS

Video Routing

Gain.....Unity into 75 ohm load
Bandwidth375 MHz (-3dB) @ 0dBm, fully loaded
(One input driving all outputs)
0-25MHz +/- .1dB, 25-300MHz +2dB -.5dB @ 0dBm
Crosstalk..... -70dB @ 1 MHz, -55dB @ 10 MHz, -45dB @ 30
MHz, -35dB@ 100 MHz
Switching speed.....100 us to 4 seconds (Programmable)

Video Input

Number/signal type16 RGBHV, RGBS, RGsB, RsGsBs, analog
HDTV, component, composite, S-video
Connectors16 x 5 are female
Minimum/maximum levels.....Analog-0.5V to 1.85V p-p with no offset
Impedance..... 75 ohms
Return loss -30dB @ 5 MHz
Maximum DC offset (Vin=1Vpp)..... +1.8V, -.6V

Video Output

Number/signal type 16 or 8 RGBHV, RGBS, RGsB, RsGsBs,
analog HDTV, component, composite, S-video
Connectors..... 16 or 8 x 5 BNC female
Maximum level..... 2.85V p-p with limited BW, 0dBm for
375MHz BW
Impedance..... 75 ohms
Return loss..... -30dB @ 5 MHz
DC offset..... ±125mV maximum with input at 0V offset
Switching type..... RGB Delay up to 4 seconds

Sync

Input type..... RGBHV, RGBS, RGsB
Output type..... RGBHV, RGBS, RGsB
Input level0.5V to 5.0V p-p, 2.5V p-p normal
Output level (min).....2.0-V p-p into 75 ohm load, 4V p-p no load
Input impedance.....75 ohms
Output impedance..... 75 ohms
Polarity..... Positive or negative (follows input)

VREF Sync

Input type..... VSync
Output type..... VSync, Channel 1 VSync, Channel 1 Green
VSync (Extracted)
Input level0.5V to 5.0V p-p, 2.5V p-p normal
Output level (min).....2.0-V p-p into 75 ohm load, 4V p-p no load
Input impedance.....75 ohms
Output impedance..... 75 ohms
Polarity..... Positive or negative (follows input)

Audio Routing

Gain..... -76dB to +20dB
Frequency response 20 Hz to 20 kHz, @2V_{p-p} with 0.03% THD+N
Noise 0.03% @ 1 kHz at rated maximum
output drive
S/N >75dB, balanced, at 2V_{rms}
Crosstalk / Stereo Separation..... <-85dB @ 1 kHz, fully loaded

Audio Input

Number/signal type16 stereo, balanced/unbalanced
Connectors16 3.5 mm captive screw connectors, 5
pole
Impedance.....10 kohm balanced or unbalanced, DC
coupled
Maximum level.....6V_{rms} at 0.3% THD+N

Audio Output

Number/signal type16 or 8 stereo, balanced/unbalanced
Connectors16 or 8 3.5 mm captive screw connectors,
5 pole
Output gain adjustment.....-76dB to +20dB, adjustable per input by RS-
232/485 or front panel
Impedance.....50 ohms unbalanced, 100 ohms balanced
Gain error ±0.1dB channel to channel
Maximum level (Hi-Z) 2V_{rms} at 0.03% THD+N, 6V_{rms} at 0.3%
THD+N
Maximum level (Lo-Z) 1.7V_{rms} at 0.03% THD+N, 6.2V_{rms} at 0.3%
THD+N

Control/Remote

Serial control portRS-232/ RS-485, 25-pin female D connector
Baud rate and protocol9600, 8-bit, 1 stop bit, no parity
Ethernet control port 1 RJ-45 female and connector
Ethernet data rate..... 10/100Base-T, half/full duplex with
autodetect
Ethernet protocolARP, ICMP (ping), TCP/IP, Telnet, HTTP

POWER

Type.....100-240 VAC, 47-63 Hz, auto-configuring
Connector.....IEC connector with integrated fuse and switch
Power Dissipation.....150 watts

Enclosure

Dimension 16.25" H x 17.0" W x 13" D (9U high, full
rack width)
41.3 cm H x 43.2 cm W x 33.0 cm D
Weight.....50 lbs (23 kg)
Shipping weight.....55 lbs (25 kg)
Rack mountYes, with included parts
Enclosure typeMetal

ENVIRONMENTAL

Temperature.....0-40 degrees C
Humidity.....0-95%, non-condensing

AGENCY

FCC: Part 15, Subpart B - Class A, EN55022:1998 Class A and EN550024:1998.
CE: safety EN 60950:1992.