

MatrixPRO™

16x16 and 8x8 HD/SD-SDI Router



User's Guide

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- June 29, 2005



16x16 and 8x8 HD/SD-SDI Router • User's Guide

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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



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 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.

Change History

The table below lists the changes to the 16x16 and 8x8 HD/SD-SDI Router User's Guide.

Table 0-1. Change History

Rev	Date	ECO #	Description	Approved By
01	6/9/04		Initial Release	L. Gilstrom
05	3/28/05		Updates	P. Norton
A	6/29/05	1458	Release	J. Pacak

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Table of Contents

1. Introduction

The logo for MatrixPRO, featuring the word "MatrixPRO" in a bold, italicized, purple font with a blue underline. The "TM" trademark symbol is positioned to the upper right of the word.

In This Chapter

This chapter is designed to introduce you to the MatrixPRO™ 16x16 and 8x8 HD/SD-SDI Router User's Guide.

Areas to be covered are:

- [Chapter Structure](#)
- [How to Use This Guide](#)
- [Conventions](#)
- [About the MatrixPRO](#)
- [Features](#)
- [Technical Description](#)

1. Introduction

Chapter Structure

Chapter Structure

The following chapters provide instructions for all aspects of MatrixPRO 16x16 and 8x8 HD/SD-SDI Router operations:

- Chapter 1, "[Introduction](#)" provides a system overview, a list of features, and discusses easy ways to use this guide.
- Chapter 2, "[Hardware Installation](#)" provides comprehensive system installation instructions.
- Chapter 3, "[Operation](#)" provides basic system operating instructions.
- Chapter 4, "[GUI Installation and Operation](#)" describes the system's interactive Graphical User Interface application.
- Chapter 5, "[Application Specific Connections](#)" provides a sample diagram of system connectivity.
- Chapter 6, "[Upgrading Software](#)" outlines procedures for upgrading system software components.
- Appendix A, "[Specifications](#)" lists the MatrixPRO 16x16 and 8x8 HD/SD-SDI Router's specifications.
- Appendix B, "[Remote Control Protocol](#)" provides detailed information regarding external remote control protocol.
- Appendix C, "[Contact Information](#)" lists important Barco contact, RMA, warranty and technical support details.

How to Use This Guide

Following are important tips for streamlining your use of this User's Guide in its electronic "PDF" form.

Navigating

Use Acrobat Reader's "bookmarks" to navigate to the desired location. All chapter files have the same bookmark structure for instant navigation to any section. Please note:

- Extensive hyperlinks are provided within the chapters.
- Use Acrobat's "**Go to Previous View**" and "**Return to Next View**" buttons to trace your complete navigational path.
- Use the "**Previous Page**" and "**Next Page**" buttons to go to the previous or next page within a file.
- Use Acrobat's extensive search capabilities, such as the "**Find**" tool and "**Search Index**" tool to perform comprehensive searches as required.

Table of Contents and Index

Use the **Table of Contents** bookmarks to navigate a desired topic. Click any item to instantly jump to that section of the guide. You can also use the **Index** to jump to specific topics within a chapter. Each page number in the **Index** is a hyperlink.

Conventions

The following conventions are used throughout this guide:

- The symbol ■ denotes an operations procedure.
- The symbol ▲ denotes an example.
- Entries written in bold-face capital letters denote physical buttons or chassis connectors.
 - ▲ Press **SEL** to ...
- When two buttons together are required for an operation or function, the plus (+) sign is used between the buttons. This procedure requires that you hold down the first button, then press the second.
 - ▲ Press **SHIFT + 1/9** to ...

1. Introduction

About the MatrixPRO

About the MatrixPRO

The MatrixPRO 16x16 digital router is available in HD-SDI or SD-SDI versions:

- The HD-SDI router can route HD-SDI, adhering to SMPTE 292 or SD-SDI signals adhering to SMPTE 259.
- The SD-SDI router adheres only to SMPTE 259.

Both versions of the MatrixPRO 16x16 digital router provide 16 inputs and 16 outputs, and allow any input to be routed to any output (or group of outputs). The 8x router provides eight inputs and eight outputs.

MatrixPRO is an ideal switcher to provide professional-quality serial digital video signal routing. The operator can save up to eight "presets" from the front panel, and eight with the MatrixPRO Control GUI. Typical applications include live staging events, corporate boardroom presentations, and educational and training events. Remote control operation is available over RS-232, RS-485 and Ethernet.

To ensure trouble-free operation, please follow all procedures in the Installation and Operation sections of this manual. Refer to Chapter 2, "[Hardware Installation](#)" and Chapter 3, "[Operation](#)" for details.

Should you have any questions regarding the operation of this unit, please consult the factory. Refer to Appendix C, "[Contact Information](#)" section for information.

Features

The MatrixPRO 16x16 digital router includes the following features:

- HD-SDI architecture allows routing of digital serial video streams, adhering to SMPTE 292.
- SD-SDI architecture routes video adhering to SMPTE 259.
- Enable/disable reclockers are provided on the outputs.
- IP (Ethernet) control is standard, (a static IP address is required.)
- Front Panel Lockout Mode is provided.
- Memory Presets save individual I/O configurations for recall via the front panel or RS-232/485.
- I/O Grouping allows specific inputs and outputs to be grouped together making installation and control easier.
- The system's vertical interval switching capability provides glitch-free switches when used with synchronous video sources. The source for vertical switching will be channel 1 input.
- A MatrixPRO Control Software GUI is provided for setup and control via serial commands or Ethernet control.
- The optional MatrixPRO Remote Control Panel is available for remote operation via RS-485.

Technical Description

The MatrixPRO Serial Digital switcher is available in three versions.

- The 16x16 HD-SDI is a serial digital matrix switcher adhering to SMPTE 292M and SMPTE 259M with 16 inputs and 16 outputs.
- The 8x8 HD-SDI is a serial digital matrix switcher adhering to SMPTE 292M and SMPTE 259M with 8 inputs and 8 outputs.
- The 16x16 SD-SDI is a serial digital matrix switcher adhering to SMPTE 259M with 16 inputs and 16 outputs.

The output gain is unity into 75 ohm loads. All video signals are carried on BNCs for the highest signal quality.

A matrix switcher can route any input to any output (or multiple) outputs. The matrix switcher has built in capabilities to group outputs and route a single input to that group.

The router has the ability to switch inputs to outputs during the vertical interval. In practice, this feature will be used to switch synchronous sources. Channel 1 is the source for vertical interval switching. The feature can be enabled or disabled.

- If there is a signal present on channel 1, status will be reported as valid.
- If there is no signal present, status will be reported as invalid.

The reclocking circuits clean up marginal input signals. There are times when the signal quality is much worse than marginal, but still produces a usable picture. In this case, the reclocking circuits should be disabled because they will be ineffective at improving image quality.

The MatrixPRO 16x and 8x 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.

The MatrixPRO product line has been specifically designed to work as the front-end switchers for the Encore Presentation System. The Encore Controller communicates with MatrixPRO analog and digital routers over an EtherNet local area network. All Controller commands are processed and issued to the array of routers without the need to specifically program each switcher. Control of each router is essentially "transparent" to the user.

1. Introduction

Technical Description

2. Hardware Installation

The logo for MatrixPRO, featuring the word "MatrixPRO" in a bold, purple, sans-serif font with a trademark symbol (TM) to the right. A blue horizontal line is positioned below the text.

In This Chapter

This chapter provides detailed instructions for installing the MatrixPRO 16x16 and 8x8 HD/SD-SDI Router hardware.

The following topics are discussed:

- [Safety Precautions](#)
- [Unpacking and Inspection](#)
- [Site Preparation](#)
- [Rear Panel Connectors](#)
- [Rack-Mount Installation](#)
- [Power Cord/Line Voltage Selection](#)
- [Video Input/Output Connections](#)

2. Hardware Installation

Safety Precautions

Safety Precautions

For all MatrixPRO 16x16 and 8x8 HD/SD-SDI Router installation procedures, observe the following important safety and handling rules to avoid damage to yourself and the equipment:

- To protect users from electric shock, ensure that the power supplies for each unit connect to earth via the ground wire provided in the AC power Cord.
- The AC Socket-outlet should be installed near the equipment and be easily accessible.

Unpacking and Inspection

Before opening the boxes, inspect them for damage. If you find any damage, notify the shipping carrier immediately for all claims adjustments. As you open each box, compare its contents against the packing slips. If you find any shortages, contact your Barco sales representative.

Once you have removed all the components from their packaging and checked that all the listed components are present, visually inspect each unit to ensure there was no damage during shipping. If there is damage, notify the shipping carrier immediately for all claims adjustments.

Site Preparation

The environment in which you install your MatrixPRO 16x16 and 8x8 HD/SD-SDI Routers should be clean, properly lit, free from static, and have adequate power, ventilation, and space for all components.

Rear Panel Connectors

The figures below illustrate the MatrixPRO 16x16 and 8x8 rear panels:

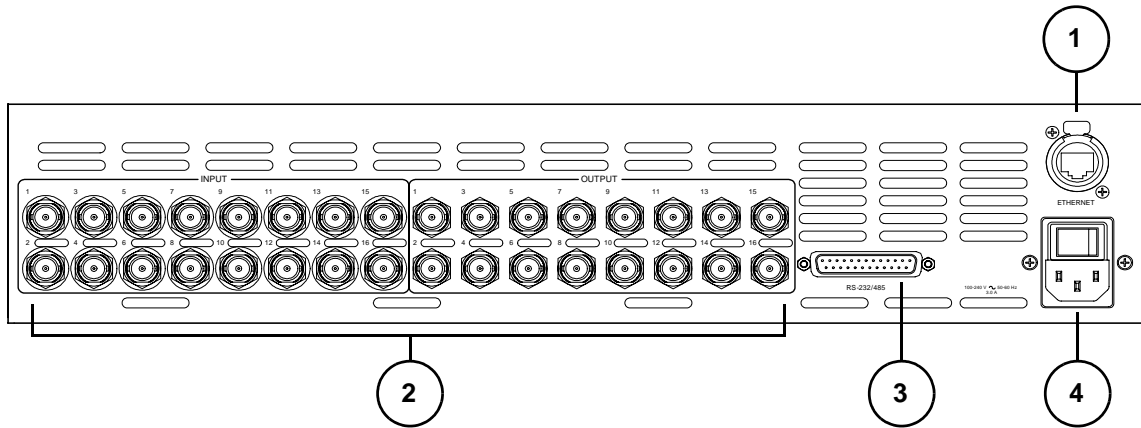


Figure 2-1. MatrixPRO 16x16 HD-SDI and SD-SDI Rear Panel

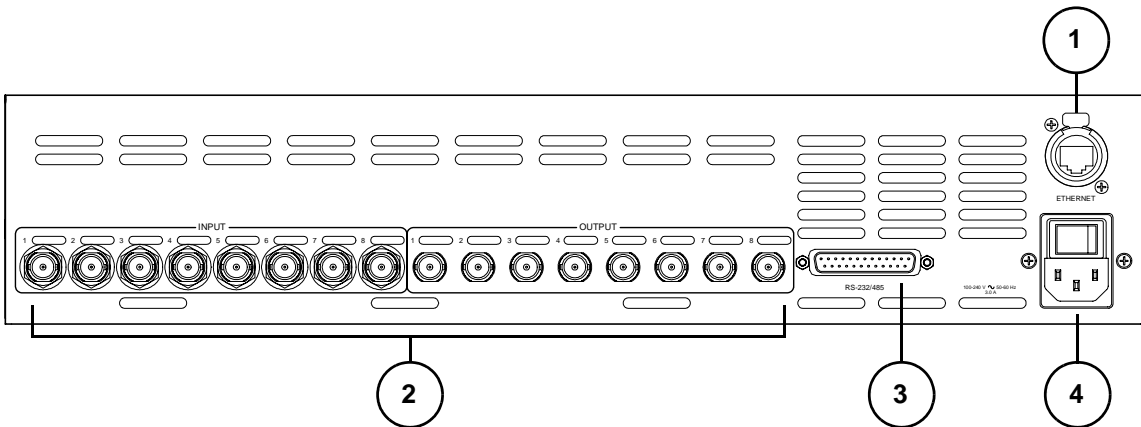


Figure 2-2. MatrixPRO 8x8 HD-SDI Rear Panel

1)	XLR Ethernet Connector	3)	DB-25 Serial Communications Connector
2)	BNC Video Input and Output Connectors	4)	AC Power Connector

2. Hardware Installation

Rack-Mount Installation

Rack-Mount Installation

MatrixPRO 16x and 8x Digital Router units are designed to be rack mounted.

Please note the following important points:

- When rack mounting the unit, remember that maximum ambient operating temperature for the unit is 40 degrees 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.

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.



Warning

When the MatrixPRO 16x16 HD/SDI SDI is used in the 230-volt mode, a UL listed line cord rated for 250 volts at 15 amps must be used. This cord will be fitted with a tandem prong-type plug.



Figure 2-3. Tandem Prong-type Plug

Avertissement

La choix de la ligne de voltage se réalise automatiquement par le MatrixPRO 16x16 HD/SDI SDI Transformateur Graphique. On n'a pas besoin du controller usager pour la choix de la ligne de voltage.

Warnung

Das MatrixPRO 16x16 HD/SDI SDI -Gerät mu beim Anschlu an 240V ~ mit einer vom VDE auf 250V/10A geprüften Netzleitung mit einem Schukostecker ausgestattet sein.

2. Hardware Installation

Video Input/Output Connections

Video Input/Output Connections

The figure below illustrates the input and output connectors on the 16x16 panel:

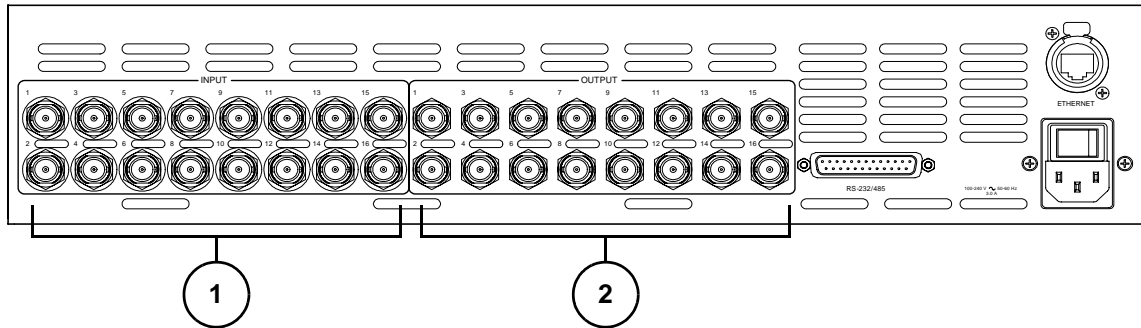


Figure 2-1. MatrixPRO 16x16 Input/Output Connectors

1) 16x Video Input Connectors	2) 16x Video Output Connectors
---	--

The figure below illustrates the input and output connectors on the 8x8 panel:

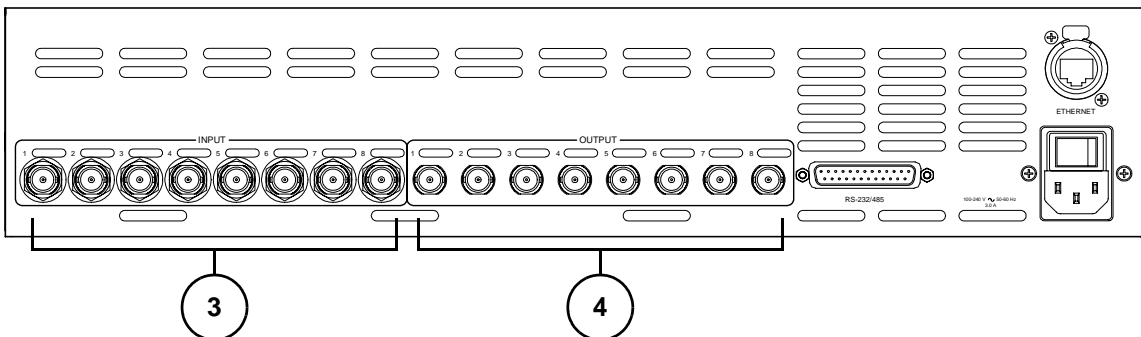


Figure 2-2. MatrixPRO 8x8 Input/Output Connectors

3) 8x Video Input Connectors	4) 8x Video Output Connectors
--	---

1) 16x Video Input Connectors

The video input section on the MatrixPRO rear panel provides 16 digital video inputs. Each HD-SDI input accepts serial digital video signals up to 1.485Gb/s. The SD-SDI version accepts serial digital video signals up to 540Mb/s. Connection points for each type of video signal are illustrated above.

2) 16x Video Output Connectors

Sixteen independently buffered outputs are provided.

3) 8x Video Input Connectors

Eight independently buffered inputs are provided.

4) 8x Video Output Connectors

Eight independently buffered outputs are provided.

3. Operation

*MatrixPRO*TM

In This Chapter

This chapter provides detailed operating instructions for the MatrixPRO 16x16 and 8x8 HD/SD-SDI Routers.

The following topics are discussed:

- [Control Overview](#)
- [MatrixPRO Power-Up Initialization](#)
- [MatrixPRO Front Panels](#)
- [Menu Structure](#)
- [Control of Digital Video Switching](#)
- [Establishing Groups of Inputs and Outputs](#)

3. Operation

Control Overview

Control Overview

This portion of the manual outlines 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 a display on the MatrixPRO front panel are used for navigating through the menu system. This enables you to configure the system, to save and recall presets, and to report system status. Channel routing is accomplished by a set of front panel switches.
- A second means of control is through the use of the MatrixPRO Control software. The GUI can interface to the MatrixPRO through RS-232 or Ethernet.
- Barco Folsom makes a Remote Control Switch Panel for controlling the MatrixPRO remotely.
- The unit can be controlled remotely by various third-party controllers.

MatrixPRO Power-Up Initialization

After plugging in the MatrixPRO to the wall socket, locate the power switch on the back of the chassis, and turn the power ON. The LEDs on the buttons will light, the display will show the **Main Menu** screen, and the last saved or recalled setup will be recalled.

MatrixPRO Front Panels

On the MatrixPRO 16x and 8x routers, the front panel allows local control and monitoring of the matrix switcher. The figures below illustrate the MatrixPRO 16x16 and 8x8 front panels:

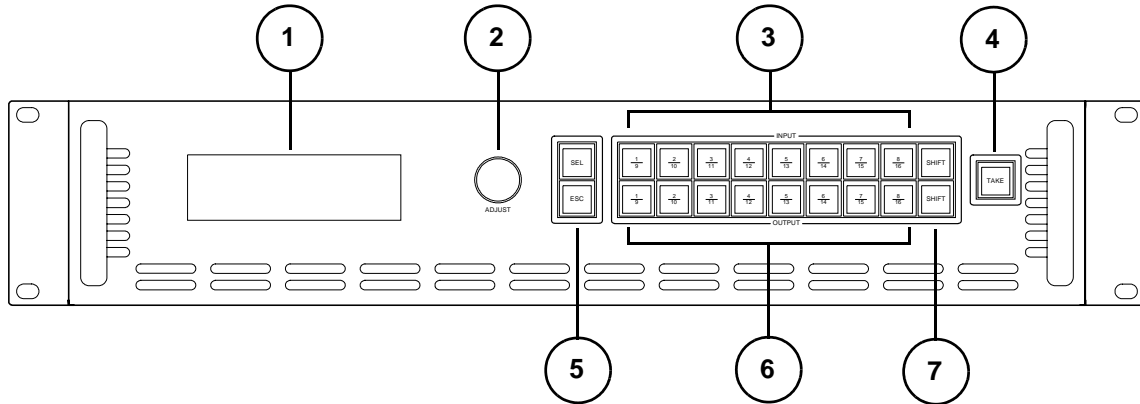


Figure 3-1. MatrixPRO 16x16 Front Panel

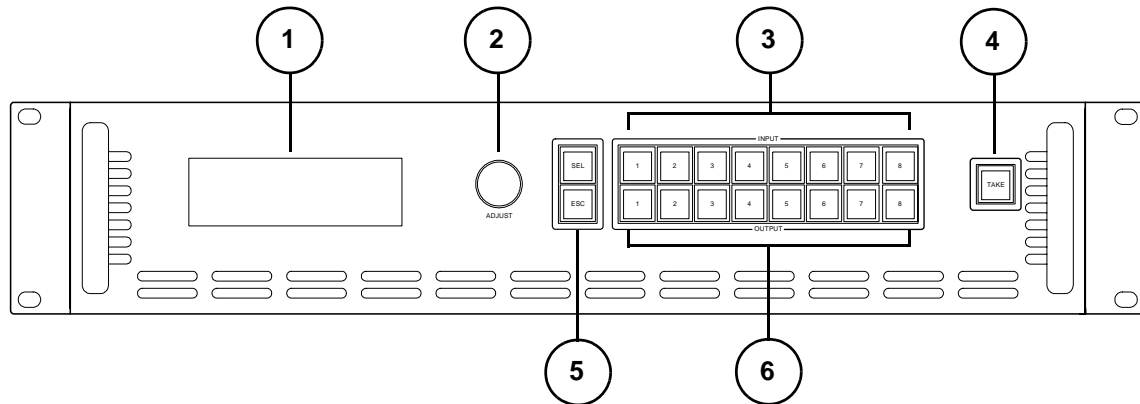


Figure 3-2. MatrixPRO 8x8 Front Panel

1) Menu Display	5) Menu Navigation Buttons
2) Menu Selector Knob	6) Output Crosspoint Selection Buttons
3) Input Crosspoint Selection Buttons	7) SHIFT Buttons (for MatrixPRO 16x16 only)
4) TAKE Button	

1) Menu Display

The Menu Display shows all MatrixPRO menus, using a four-line display. Brightness is adjustable.

2) Menu Selector Knob

Use the Selector Knob to scroll through system menus. The cursor (>) always indicates the current line.

3. Operation

MatrixPRO Front Panels

3) Input Crosspoint Selection Buttons

At the right-side of the front panel, the 8x and 16x routers each have a set of eight input selection switches on the top row. On the 16x only, unshifted input buttons access inputs 1-8; shifted buttons access inputs 9-16.

Routing operation resembles the industry standard procedure — select a destination (output), select a source (input) and press **TAKE**.

4) TAKE Button

Once input and output selections are made, press **TAKE** to complete a route.

5) Menu Navigation Buttons

Two buttons are provided for menu navigation. Within the menu structure:

- ~ Press **SEL** to enter a menu, change a parameter and accept a parameter.
- ~ Press **ESC** to exit a menu without making changes, and to navigate up the menu tree.

Refer to the "[Main Menu](#)" section for additional menu navigation instructions.

6) Output Crosspoint Selection Buttons

At the right-side of the front panel, The 8x and 16x routers each have a set of eight output selection switches on the bottom row. On the 16x only, unshifted output buttons access outputs 1-8; shifted buttons access outputs 9-16.

Routing operation resembles the industry standard procedure — select a destination (output), select a source (input) and press **TAKE**.

7) SHIFT Buttons

On the 16x router only, the two **SHIFT** keys allows access to inputs 9 through 16, and outputs 9 through 16. When the **SHIFT** key is pressed for the adjacent row, the button lights to indicate that inputs (or outputs) 9 through 16 can be accessed.

Please continue with the "[Menu Structure](#)" section, which describes all menu displays in the MatrixPRO Digital product line.

Menu Structure

This section illustrates and explains all the menus in the MatrixPRO's menu structure, in the order in which they appear. The following topics are discussed:

- [Menu Tree](#)
- [Main Menu](#)
- [Setup Menu](#)
- [Status Menu](#)
- [Reclocking Menu](#)
- [Vertical Interval Switching Menu](#)
- [Save Presets Menu](#)
- [Recall Presets Menu](#)

Note

The MatrixPRO menu display is four lines high, and the selector knob is used to scroll through the lines. In the following sections, *entire* menus will be shown for clarity, rather than four-line sections.

3. Operation

Menu Structure

Menu Tree

The figure below illustrates the MatrixPRO **Menu Tree**. Use this diagram for reference as you learn the menu structure.

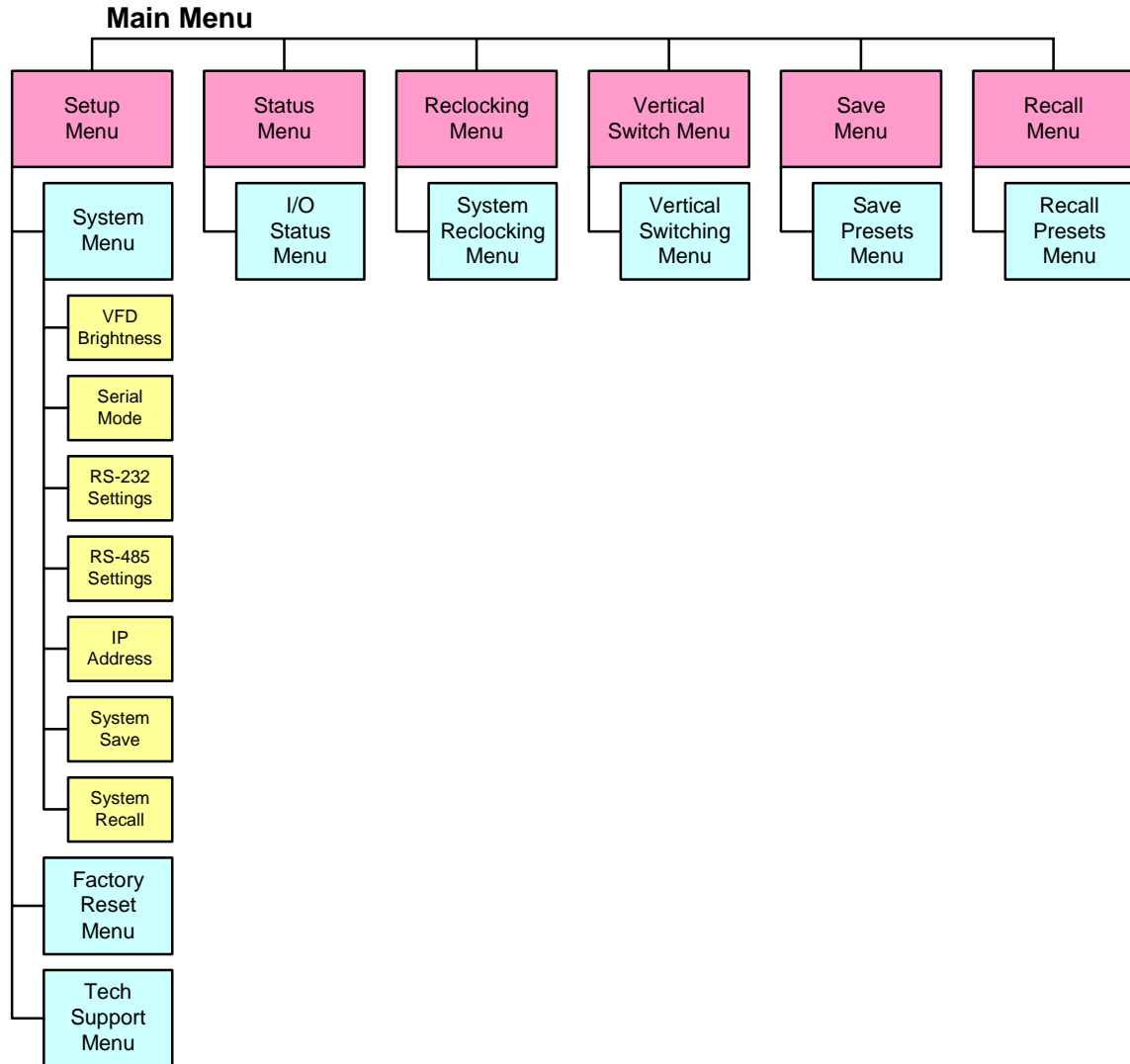


Figure 3-3. MatrixPRO Menu Tree

Main Menu

The figure below illustrates the **Main Menu**, which contains six items. Each of these items contains at least one sub-menu.

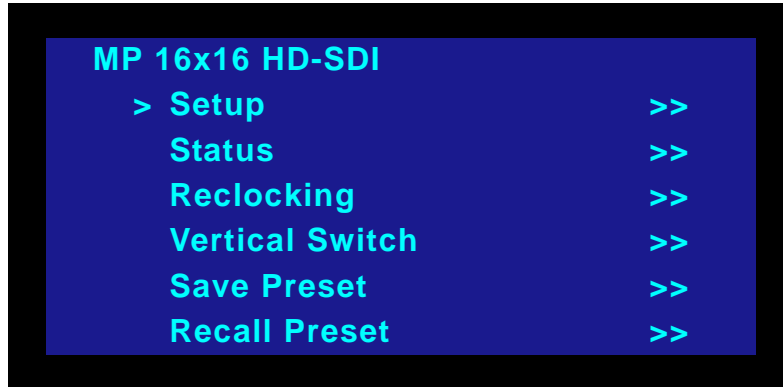


Figure 3-4. MatrixPRO Main Menu

Please note the following important rules regarding menu usage:

- To enter a sub-menu, rotate the selector knob until the navigation cursor (>) points to the desired menu item, then press the select key (**SEL**).
- If the double-cursor (>>) is showing, this indicates that a sub-menu is available. Press **SEL** to enter that menu.
- After entering the sub-menu, the cursor points to the first item in the sub-menu. Typically, the item contains two fields:
 - ~ The first field is the item description.
 - ~ The second field is the parameter associated with it.
- To change the parameter, press **SEL**. The cursor changes into the parameter-edit character (#). The selector knob can now be used to modify the parameter.
- When the desired parameter appears, press **SEL** to accept it. The edit cursor then changes back into the navigation cursor (>).
- While in the parameter-edit mode, the user can exit this mode without causing a change to the original parameter by pressing the escape key (**ESC**).
- Navigate up in the menu structure by pressing **ESC**.

Each menu is explained in detail below:

- [Setup Menu](#)
- [Status Menu](#)
- [Reclocking Menu](#)
- [Vertical Interval Switching Menu](#)
- [Save Presets Menu](#)
- [Recall Presets Menu](#)

3. Operation

Menu Structure

Setup Menu

From the **Main Menu**, select **Setup** to display the **Setup Menu**.

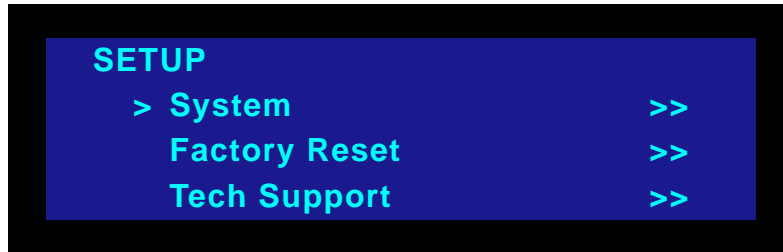


Figure 3-5. MatrixPRO Setup Menu

Each menu is explained in detail below:

- [System Menu](#)
- [Factory Reset Menu](#)
- [Tech Support Menu](#)

System Menu

From the **Setup Menu**, select **System** to display the **System Menu**



Figure 3-6. MatrixPRO System Menu

Each menu is explained in detail below:

- [VFD Brightness Menu](#)
- [Serial Mode Menu](#)
- [RS-232 Settings Menu](#)
- [RS-485 Settings Menu](#)
- [IP Address](#)
- [System Save](#)
- [System Recall](#)

VFD Brightness Menu

From the **System Menu**, select **VFD Brightness** to adjust the vacuum fluorescent display (VFD) brightness.

- To change brightness:
 1. Press **SEL**, then rotate the selector knob until the desired brightness is achieved.
 2. Press **SEL** to accept the new value, then **ESC** to return to menu navigation.

Serial Mode Menu

From the **System Menu**, select **Serial Mode** to display the **Serial Mode Menu**.

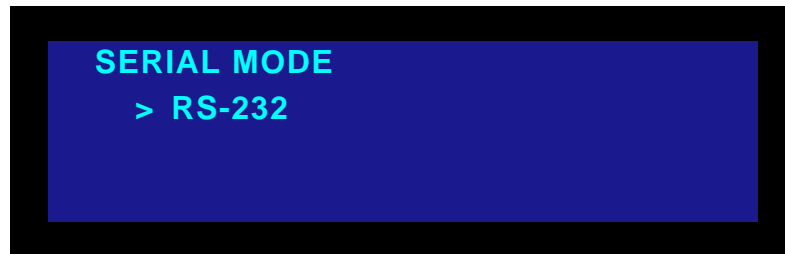


Figure 3-7. MatrixPRO Serial Mode Menu

This sub-menu enables you to determine the mode of serial communication. The choices are **RS-232** or **RS-485**. RS-232 signalling is used when there is a direct connection between a control function and the switcher. RS-485 signalling is used when there are many devices attached to a party-line communications ring. Each Node on the party-line is assigned a number for addressing purposes.

- To determine the mode of serial communication:
 1. Press **SEL** to enter the edit mode, indicated by the edit cursor (#).
 2. Rotate the selector knob to access the two modes.
 3. Press **SEL** to make the desired choice, then press **ESC** to exit.

RS-232 Settings Menu

From the **System Menu**, select **RS-232 Settings** to display the **RS-232 Settings Menu**.

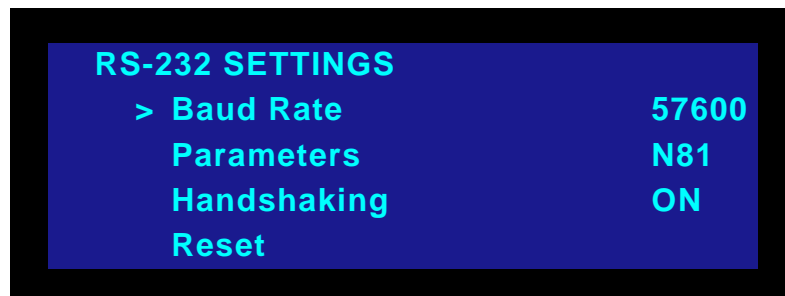


Figure 3-8. MatrixPRO RS-232 Settings Menu

This menu allows control of serial communications parameters for both RS-232 and RS-485. The parameters listed above show the default settings that result from a Factory Reset, or by issuing a **Reset** from this menu.

4. To “accept” the new IP address, press **ESC** at any time to exit the edit mode. The new IP address will take effect at this point.

System Save

From the **System Menu**, select **System Save** to save all settings except routing. When pressed, the menu briefly displays “**Saving.**”

System Recall

From the **System Menu**, select **System Recall** to recall all settings except routing. When pressed, the menu briefly displays “**Recall.**”

Factory Reset Menu

From the **Setup Menu**, select **Factory Reset** to display the **Factory Reset Menu**.

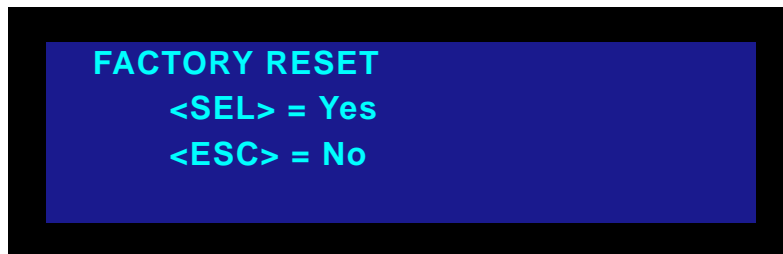


Figure 3-11. MatrixPRO Factory Reset Menu

The user must make a deliberate decision to perform a factory reset. When this function is performed, the following conditions will take effect:

- All output channels will be blanked.
- The serial communications protocol will be set to RS-232 and the parameters will be those default setting noted in the RS-232 sub-menu.
- The RS-485 node number will be set to **17**.
- All channels will have their reclocking circuits enabled.
- Vertical interval switching will be set to **Enabled**.
- The IP address will be reset to the default value of **192.168.000.242**.

3. Operation

Menu Structure

Tech Support Menu

From the **Setup Menu**, select **Tech Support** to display the **Tech Support Menu**.



Figure 3-12. MatrixPRO Tech Support Menu

The **Tech Support Menu** shows the installed version of software, as well as the phone number for factory support. During the week, technical help is available on the toll-free line from 8:00 AM to 6:00 PM, West Coast time.

Status Menu

From the **Main Menu**, select **Status** to display the **Input/Output Status Menu**, as illustrated below.

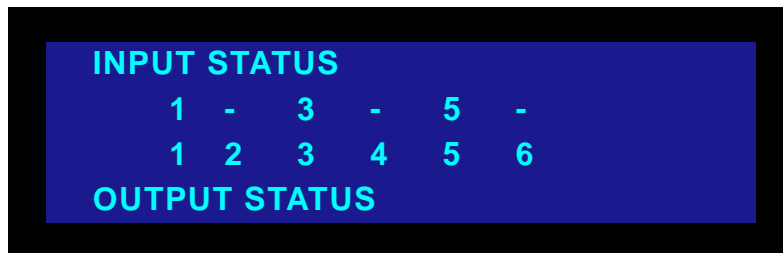


Figure 3-13. MatrixPRO Input/Output Status Menu (sample)

This menu shows the current assignments of inputs to outputs. The 16x router can route any input to any of 16 outputs. Please note:

- When this menu is entered, the lowest 6 of the 16 input/output assignments will be displayed.
- The selector knob is used to scroll through the input/output display. Turning the selector knob clockwise (CW) causes the display to drop the assignment for channel 1 and show the assignment for channel 7.
- This display will be updated whenever a new routing assignment is programmed by pressing the **Take** key.
- In the above sample display, numbers on the **upper line** represent input channel numbers assigned to a fixed output channel (as shown on the **lower line**).
- When an input is de-assigned from an output, that output will be "blanked," and the output will be at ground potential.
- When an output channel is "blanked" the dash character "-" will appear instead of an input channel number.

Reclocking Menu

From the **Main Menu**, select **Reclocking** to display the **Reclocking Control Menu**, as illustrated below.



Figure 3-14. MatrixPRO Reclocking Control Menu

The system's reclocking circuits clean up marginal input signals. There are times when the signal quality is much worse than marginal, but still produces a usable picture. In this case, the reclocking circuits should be disabled, because they will be ineffective at improving image quality.

- To enable or disable reclocking:
 1. Turn the selector knob CCW to point the navigation cursor to the next channel number, down in the list.
 2. Press **SEL** to allow editing of the Enabled or Disabled condition with the knob.
 3. Press **SEL** to exit the editing mode, and update the channel state.
 4. Press **ESC** to exit the edit mode with no change to the channel state.

All channels of reclocking are set to "enabled" during a factory reset.

3. Operation

Menu Structure

Vertical Interval Switching Menu

From the **Main Menu**, select **Vertical Switch** to display the **Vertical Interval Switching Menu**, as illustrated below.

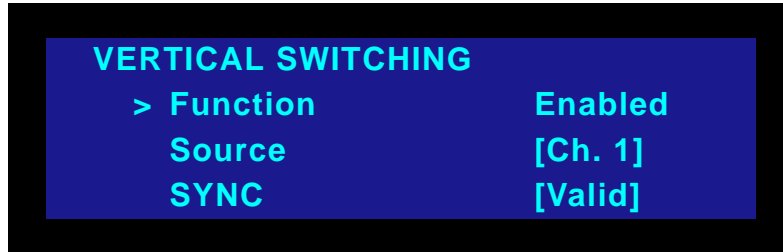


Figure 3-15. MatrixPRO Vertical Interval Switching Menu

The source for vertical SYNC is hard-set to the channel 1 input. The only function that the user can control is to enable or disable the vertical interval switching. This function can be enabled and disabled in the same manner as the reclocking function.

Status will report a unacceptable or absent input signal as "Invalid," and report an acceptable signal as "Valid." The status of input SYNC will always be reported whether or not the function is enabled.

Save Presets Menu

From the **Main Menu**, select **Save** to display the **Save Presets Menu**, as illustrated below.



Figure 3-16. MatrixPRO Save Presets Menu

There are eight machine configuration presets that can be saved.

- To save presets:
 1. Press **SEL** to enter the edit mode (#).
 2. Use the selector knob to scroll to the desired file number.
 3. Press **SEL** once more to save the entire machine state as of that moment.
 4. Press **ESC** to exit the edit routine.
 5. Press **ESC** key once more to return to the **Main Menu**.

Recall Presets Menu

From the **Main Menu**, select **Recall** to display the **Recall Presets Menu**, as illustrated below.



Figure 3-17. MatrixPRO Recall Presets Menu

There are eight video signal configuration presets that can be recalled.

- To recall presets:
 1. Press **SEL** to enter the edit mode (#).
 2. Use the selector knob to scroll to the desired file number.
 3. Press **SEL** once more to recall the entire machine state from the selected file.
 4. Press **ESC** to exit the edit routine.
 5. Press **ESC** key once more to return to the **Main Menu**.

3. Operation

Control of Digital Video Switching

Control of Digital Video Switching

- Use the following steps to perform a switch:
 1. Select an output channel (destination) from among the lower eight output buttons. On the 16x only, use the **SHIFT** button adjacent to the Output Row to access outputs 9-16 as required.

Note

If an input is already associated with that output, the input key will light. If there is no input channel associated with the selected output, all input keys will be dark.

2. To select a new input source, press the desired key. On the 16x only, use the **SHIFT** button adjacent to the Input Row to access inputs 9-16 as required. The newly selected input key will blink.
3. Press **Take**. The newly selected input key will light steadily.

Note

To cancel the route *before* pressing **Take**, press **ESC**. The previous input channel selection will remain in force.

4. To de-assign an input from an output, press the desired output key. This key will light, along with the currently assigned input channel.
5. Press and release the input key, which will begin to blink.
6. Press **Take**. The input channel key will go dark, indicating that the input has been de-assigned and that output channel has been "blanked."

Establishing Groups of Inputs and Outputs

The MatrixPRO routers can be set up to "lock-out" input sources that are incompatible with certain output display devices.

- ▲ **Example:** Input channels 1, 2 and 3 are SD-SDI sources and output channels 1, 2 and 3 are SD-SDI display devices. Input channels 4, 5 and 6 are HD-SDI sources and outputs 4, 5 and 6 are HD-SDI display devices.

Establishing groups like these prevents an input from Group 2 from being accidentally switched to a Group 1 output.

Note

Grouping inputs and outputs does not establish a route. The input source for a particular output still must be established using the Video Switching procedure. In addition, there can be only one input routed to any output or group of outputs.

There are two methods available for grouping inputs and outputs:

- The manual method, using the MatrixPRO front panel. Refer to the ["Manual Grouping"](#) section for instructions.
- The Graphical User Interface (GUI) method. In Chapter 4, refer to the ["Grouping Tab"](#) section for details.

Manual Grouping

- Use the following steps to create an input/output group manually:

- ▲ **Prerequisites:** Assume that input channel 1 is routed to output channel 1. No other inputs are assigned to any output.

1. To add output channel 2 to output channel 1 (thus establishing an output group), press and hold output channel 1 key, then press the output channel 2 key. Both output keys light.
2. To add output channel 3 to the output channel group, press and hold output channel 1 key and press the output channel 3 key. All three output keys light.
3. To add input channel 1 to the group, press and hold output channel 1 key and press the input channel 1 key. All three output keys and the new input key light.
4. To add input channel 2 to the group, press and hold output channel 1 key and press the input channel 2 key. All three output keys and the two new input keys light.
5. To add input channel 3 to the group, press and hold output channel 1 key and press the input channel 3 key. All three output keys and the three new input keys light.

When an input/output group has been established, it has the following characteristics:

- First, any single input in the group can be routed to the same three outputs.
- Second, when any key in the output group is pressed and held, all members of the input/output group will light up.
- Third, when that key is released, any input that is routed to the outputs will remain illuminated.

3. Operation

Establishing Groups of Inputs and Outputs

- Use the following steps to remove a member of an input/output group:
 1. Press and hold any output key other than the one to be removed, if that is the case.
 2. Press and release the key of the group member to be removed, either input or output. Now, when any output key is pressed and held all members of the group will light up except for the channel that has been removed.

Please note:

- If two or more input/output groups have been established, the members of each can be viewed by pressing and holding one of the group's output keys.
- After the key has been released, the current output group and its single input channel will remain lit.
- When an output key of the second group is pressed and held, its members will light while the keys of the first group will become dark.

4. GUI Installation and Operation

The logo for MatrixPRO, featuring the word "MatrixPRO" in a bold, purple, sans-serif font with a trademark symbol (TM) to the right. A blue horizontal line is positioned below the text.

In This Chapter

This chapter describes the installation and operation of the MatrixPRO interactive Control GUI. The following topics are discussed:

- [Control GUI Installation](#)
- [Equipment Setup](#)
- [Remote Ethernet Setup](#)
- [GUI Operation](#)

4. GUI Installation and Operation

Control GUI Installation

Control GUI Installation

The MatrixPRO Control GUI is an interactive Graphical User Interface application designed to assist users with MatrixPRO operation. There are two ways to obtain the software:

- The MatrixPRO Control software is available on the enclosed CD.
- The software may be downloaded from the Barco Folsom website or FTP server for the most up-to-date version. (<http://www.folsom.com>)

The following step-by-step instructions will allow you to install Barco Folsom MatrixPRO Control GUI in a Windows NT/2000/XP PC. Use the figures provided as a visual reference during the installation process.

■ Use the following steps to install the MatrixPRO control software:

1. Double-click on the **MPCControlSetup.exe** icon to display the **Welcome Dialog**.

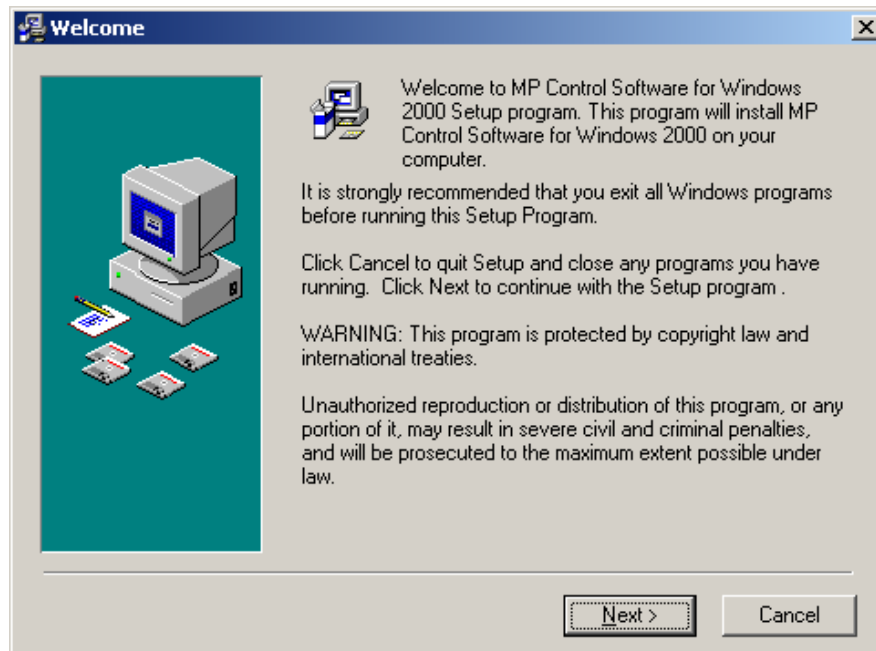


Figure 4-1. Welcome Dialog

2. Click **Next** to display the **Choose Destination Dialog**:

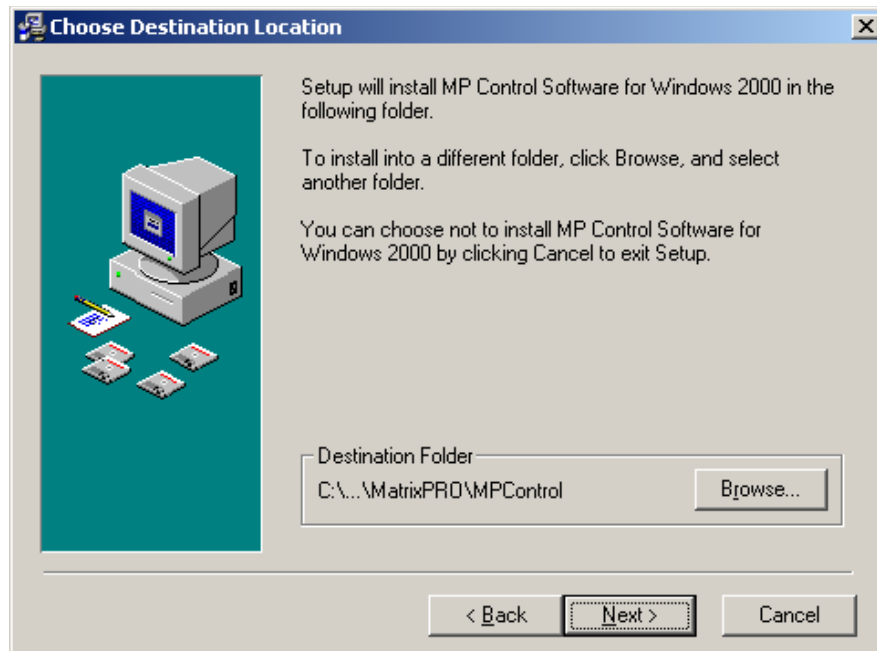


Figure 4-2. Choose Destination Dialog

The default install directory is **C:\Folsom Research\MatrixPRO\MPCControl**.

~ Click **Browse** to select a different directory, if desired.

3. Click **Next** to display the **Start Installation Dialog**.

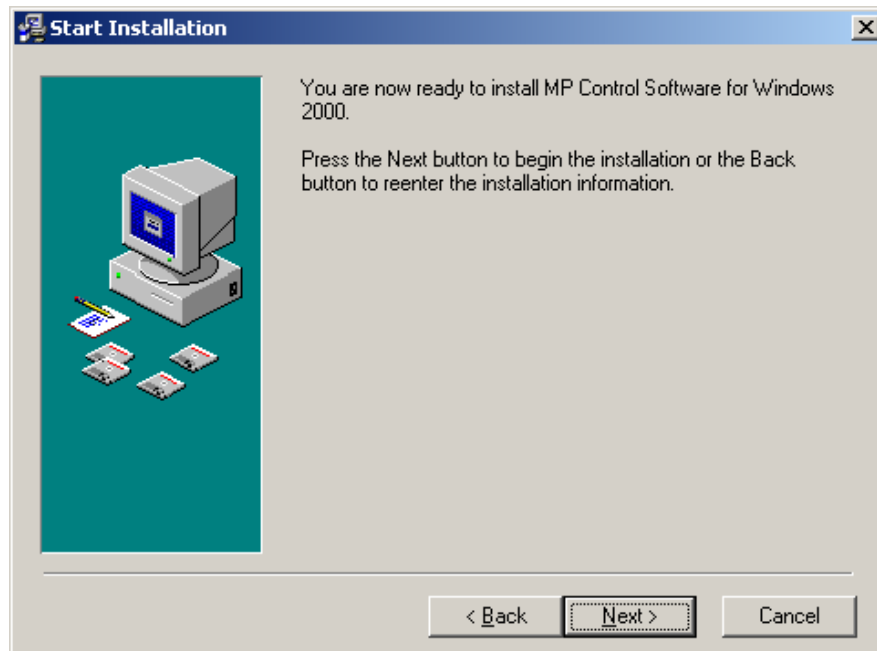


Figure 4-3. Start Installation Dialog

The setup application is now ready to install the MP Control application.

4. GUI Installation and Operation

Control GUI Installation

4. Click **Next** to begin file transfer.
5. After successfully transferring the file to the directory specified, the **Installation Complete Dialog** appears:

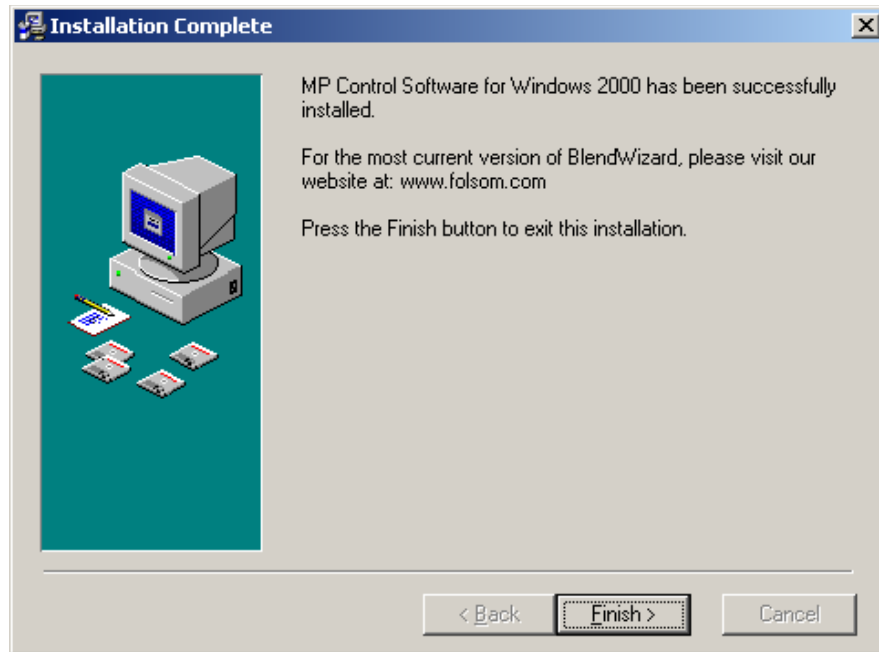


Figure 4-4. Installation Complete Dialog

6. Click **Finish** to exit the installation setup procedure.

Please note:

- A shortcut to the MatrixPRO Control application has been placed on the Windows desktop.
- The application can also be reached from the **Start Menu**:
Start > Programs > Folsom Research > MPCControl

Equipment Setup

- Use the following steps to set up equipment:
 1. Connect the input and output sources on the MatrixPRO.
 2. Connect the MatrixPRO remote port to an available serial (RS-232) port on the laptop/PC with the MatrixPRO Control application installed.
 3. Turn on the MatrixPRO and wait for a complete system boot up.
 4. After the MatrixPRO has successfully booted up, run the MatrixPRO Control application by clicking **Start > Programs > Folsom Research > MPControl**.

Remote Ethernet Setup

- Use the following steps to control the MatrixPRO using a computer on the same LAN:
 1. Pre-configure MatrixPRO with a static IP address using the RS-232 **ipconfig** command, program the MatrixPRO using the GUI over RS-232, or use the front panel menu system.
 2. On the remote computer, launch the GUI.
 3. Press **NO** when the dialog asks if you would like to connect serially.
 4. Click the **Setup Tab**.
 5. Enter the IP address of the MatrixPRO in the IP address box.
 6. Click the **Ethernet** radio button under the RS-232 heading. The MatrixPRO now will be under the control of the GUI.

Please note the following important points:

- Only one Ethernet socket is available — so only one remote GUI can be accommodated at one time. However, 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 **Update Status** as necessary to find the current status of the MatrixPRO.
- If an operation such as a route is not completed by using a **Take** command via the Front Panel or by serial command, the GUI can fall into an unknown state and operation may become unreliable.
- To prevent any mis-operation, it is recommended that the Front Panel Lockout be activated on the GUI.

4. GUI Installation and Operation

GUI Operation

GUI Operation

As with all Barco Folsom products, if the hardware is populated or functionality is enabled, the control "keys" will be labelled in black. If channels of hardware are not populated, the "key" labels will be grayed out.

▲ **Example:** In the case of a 8x8 router, input channels 9 through 16, and output channels 9 through 16 will be grayed-out.

The following topics are discussed in this section:

- [Video Switching Tab](#)
- [Preset Save And Recall](#)
- [Menu Bar](#)
- [Labeling Tab](#)
- [Grouping Tab](#)
- [Sequencing Tab](#)
- [Setup Tab](#)
- [The "About" Tab](#)

Video Switching Tab

- Use the following steps to utilize the **Video Switching Tab**:

1. Click on the **Video Switching Tab** on the GUI page. A sample tab is shown below.

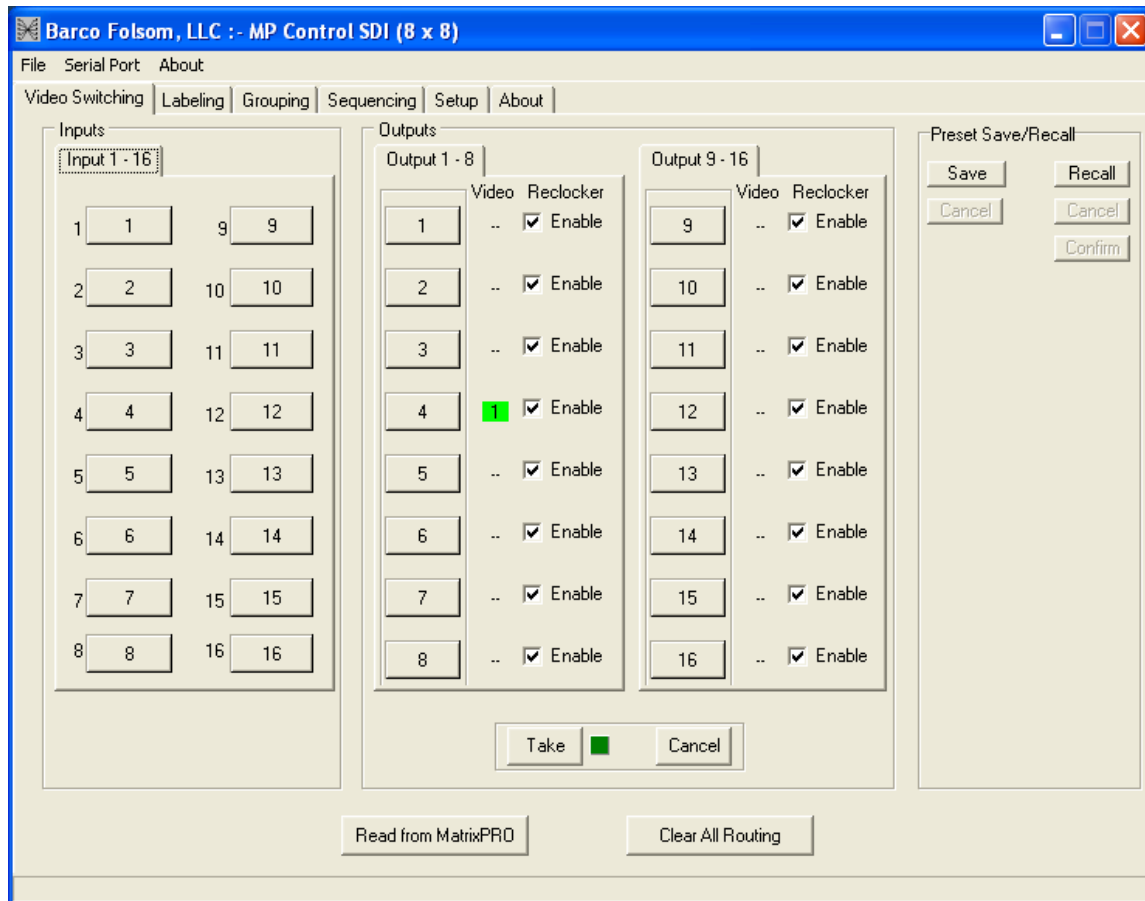


Figure 4-5. Video Switching Tab (sample)

2. Select input 1 by clicking once on it. The input "key" turns yellow. Click on the "key" a second time to de-select it.
3. Select an Output channel (e.g., Output 1). The Output "key" turns white indicating that a video route has been selected. To the right of the Output "key" in the Video column, a red box appears in which the Input channel assignment is listed. The red color indicates that a route is pending. Please note:
 - ~ On the front panel of the MatrixPRO, the Output channel will be steadily illuminated while the Input key will start blinking. This also is an indication that a route is pending.
4. Click the **Take** key on the GUI page. The red box in the Video column turns green indicating a completed route. The front panel Input key will be steadily illuminated. Please note:
 - ~ The **Video Switching** page mimics the MatrixPRO front panel — in that the user must click on a given input channel "key" in order to see the type

4. GUI Installation and Operation

GUI Operation

of the assigned output route, but the Input channel assigned to that particular Output channel can be read in the green box.

5. To cancel an Input/Output assignment, click the **Cancel** key.
6. A manual route may be performed on the front panel and then uploaded into the GUI by pressing the **Read From MatrixPRO** key. By clicking on the Input channel key, the Output channel key assigned to it will turn color.
7. To clear all routes if required, click **Clear All Routing**.

Preset Save And Recall

The complete MatrixPRO configuration can be saved as a "preset." Please note:

- There are 8 preset configurations available.
 - Presets can be simply one of many desired configurations that will be called up during a presentation.
 - Presets can also be set up as a sequence of configurations that can be stepped through using the automatic sequencing function. Refer to the "[Sequencing Tab](#)" section for details.
- Use the following steps to set up two sample presets:
1. Route input 1 to output 1, input 2 to output 2 (and so on) until all eight inputs are mapped to the eight outputs.
 2. Save this as preset 1.
 3. Route input 1 to output 2, input 2 to output 1 (and so on).
 4. Save this as preset 2.
 5. On the **Video Switching** tab, click the **Recall** button under the "Preset Save/ Recall" heading.
 6. Click on the 1 key. Notice that the input channel assignment boxes light up in red, indicating that a route is pending.
 7. Click the **Confirm** key. Notice that the input channel assignment boxes now turn green, indicating that the route has taken place.
 8. Click the **Recall** key and select Preset 2. Please note:
 - ~ The input channel assignment boxes light up in red, indicating that a route is pending.
 - ~ The input channel assignments are those of Preset 2, (input 1 to output 2, etc.).
 9. Click the **Confirm** key. Notice that the input channel assignment boxes now turn green, indicating that the route has taken place.

Menu Bar

At the top of the GUI page, there are three pull-down menus:

- The **File** pull-down offers one method of saving and loading configuration files.
- The **Serial Port** pull-down allows selection of the host computer COM port to use.
- The **About** menu shows configuration details, computer hardware requirements, device title, copyright statements and website information.

Labeling Tab

Click the **Labeling Tab** on the MatrixPRO Control application. A sample tab is shown below:

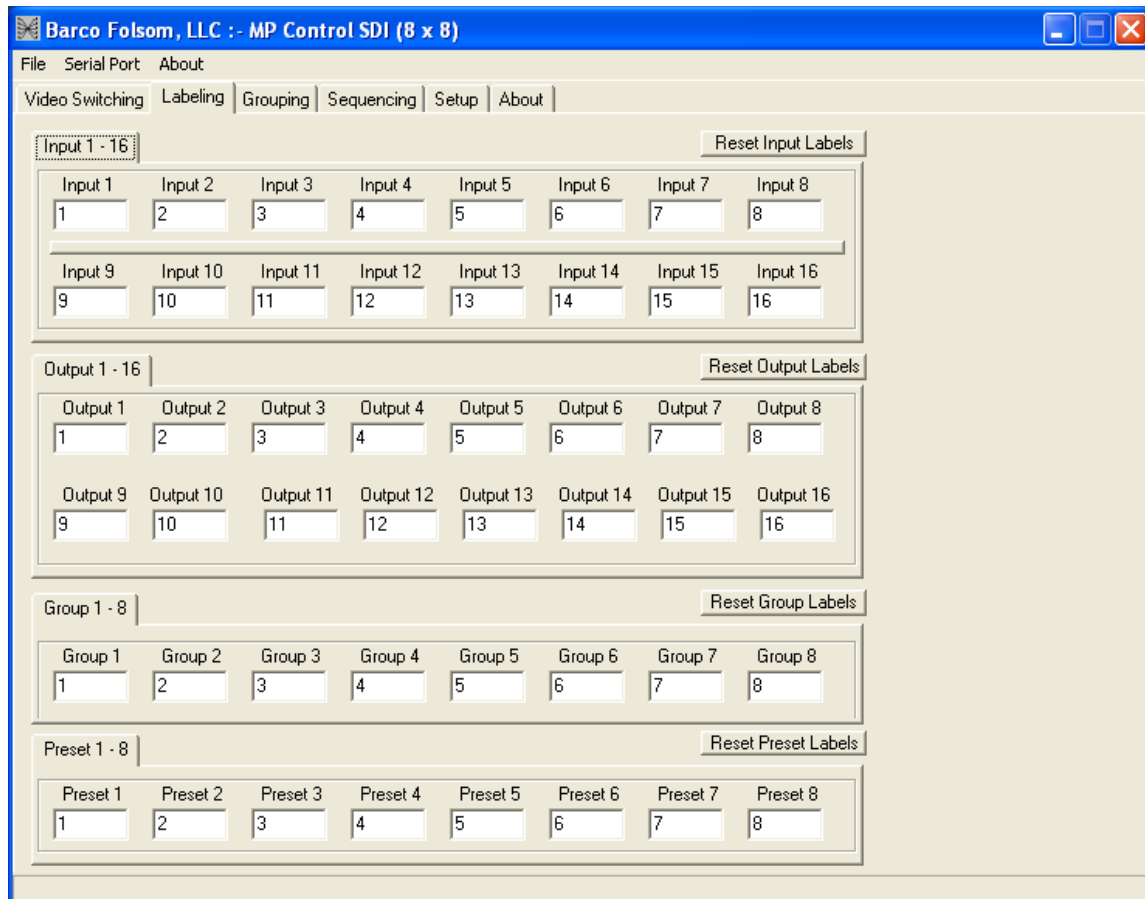


Figure 4-6. Labeling Tab (sample)

This tab allows the user to assign a name to any input and output channel. The names will appear throughout the GUI pages, as an aid to the user. There is a limit of 5 capitalized characters per label. These can be either letters or numbers, or a mixture of both.

4. GUI Installation and Operation

GUI Operation

Grouping Tab

Click the **Grouping Tab** on the MatrixPRO Control application. A sample tab is shown below:

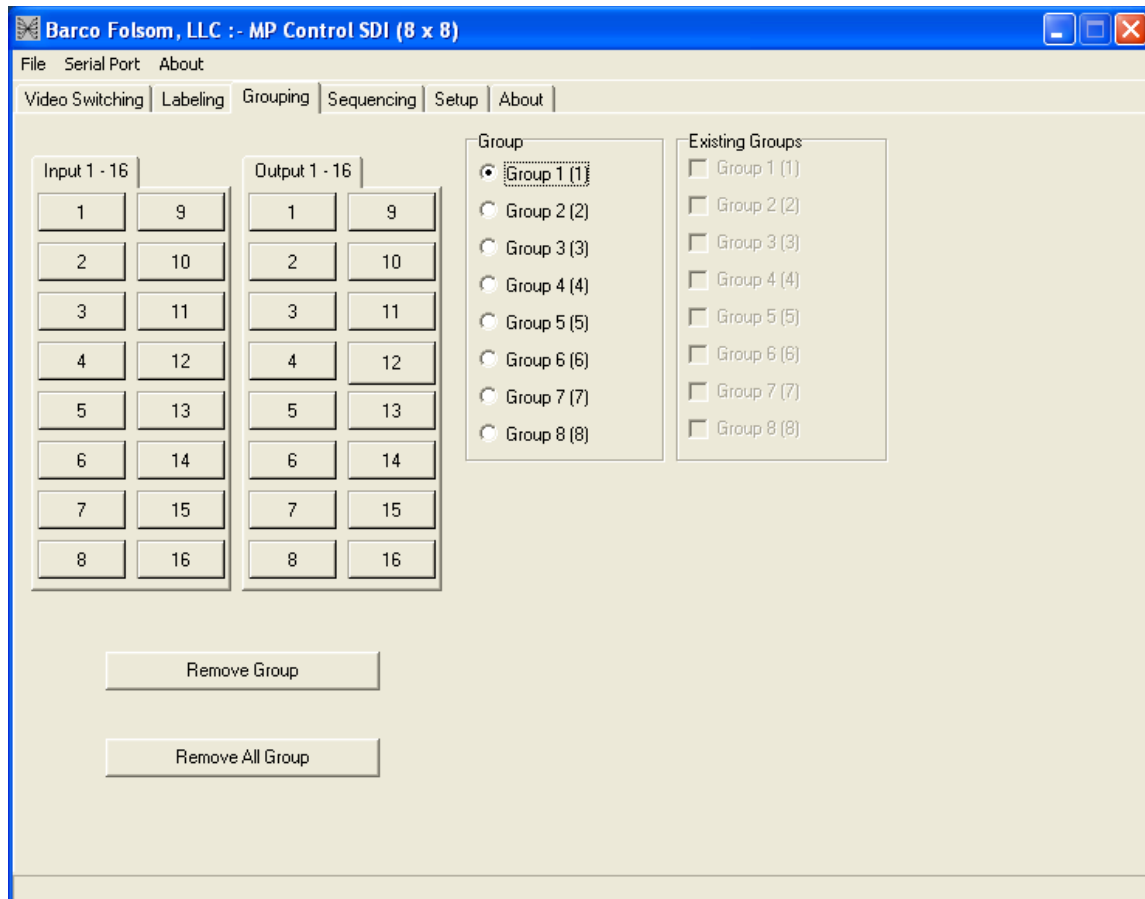


Figure 4-7. Grouping Tab (sample)

The MatrixPRO routers can be set up to "lock-out" input sources that are incompatible with certain output display devices.

- ▲ **Example:** Input channels 1, 2 and 3 are all SD-SDI sources, and output channels 1, 2 and 3 are SD-SDI display devices. Input channels 4, 5 and 6 are HD-SDI sources and output channels 4, 5 and 6 are HD-SDI devices.

Establishing groups like these prevents an input from Group 2 from being accidentally switched to a Group 1 output. The type of route and the input source must still be established using the **Video Switching** page.

- Use the following steps to establish a group:
 1. Define the Group Number by selecting a Group index from the Groups column.
 2. Select the output channels that will be associated with this Group (e.g., outputs 1, 2 and 3).
 3. Select the input channels that will be associated with this Group (e.g., inputs 1, 2 and 3). As these keys are clicked, they will turn yellow.

4. GUI Installation and Operation

4. Select the next Group number index in the Group column. The keys of the original Group 1 outputs will be grayed-out — indicating that they are no longer available to assign to another group.
5. Click on the Group 1 index number again. Notice that the keys of all members of that group will turn yellow.
6. To deassign members of a group, select the Group index for that group and click the **Remove Group** key.

The Front Panel buttons will show the members of a Group:

- Press and hold any one output key for a particular group.
- The the switch-caps of members of that group, both input and output, will light.
- When that key has been released, the output channels for that group will remain illuminated, while the current input source for that set of output channels will also remain illuminated.

4. GUI Installation and Operation

GUI Operation

Sequencing Tab

Click the **Sequencing Tab** on the MatrixPRO Control application. A sample tab is shown below:

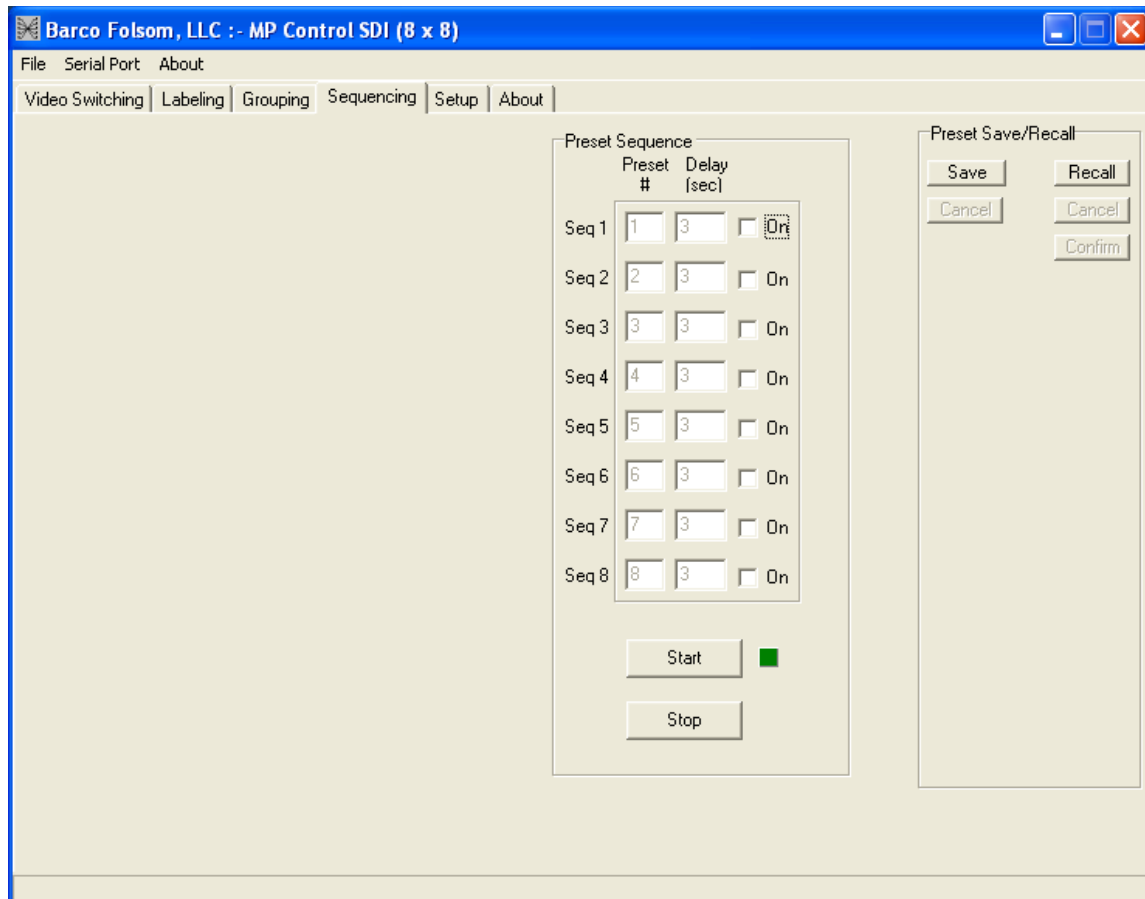


Figure 4-8. Sequencing Tab (sample)

The **Sequencing Tab** enables you to cycle through a sequence of presets. This functionality also allows for a variable "dwell time," in seconds, during which the currently selected preset is applied to the router. Dwell time ranges from 1 to 1000 seconds, and the default dwell time is 3 seconds. Please note:

- Up to 8 presets can be saved and recalled.
- If a preset has been saved, the Preset # column (next to the Sequence number column) will show a black numeral.
- If a preset has not been saved in the Preset # column, the numeral will be grayed-out.
- Clicking on the box in the "On" column places a check mark in that box and includes that preset in the sequence.
- The sequence can be started and stopped by clicking on the respective keys at the bottom of the page.

- Use the following steps to perform a sample sequence:
 1. Two presets were configured and loaded earlier in this tutorial. Refer to the ["Preset Save And Recall"](#) section for details.
 2. Be sure that the two "On" boxes for sequences 1 and 2 are checked.
 3. Set the delay for 3 seconds duration for each sequence.
 4. Click the **Start** key.
 5. Click the **Video Switching Tab** and watch the input assignments change every 3 seconds. Look at the front panel, and note that the input assignment for output channel 1 is showing the same activity.
 6. Click the **Sequence Tab** and stop the sequence.

4. GUI Installation and Operation

GUI Operation

Setup Tab

Click the **Setup Tab** on the MatrixPRO Control application. A sample tab is shown below:

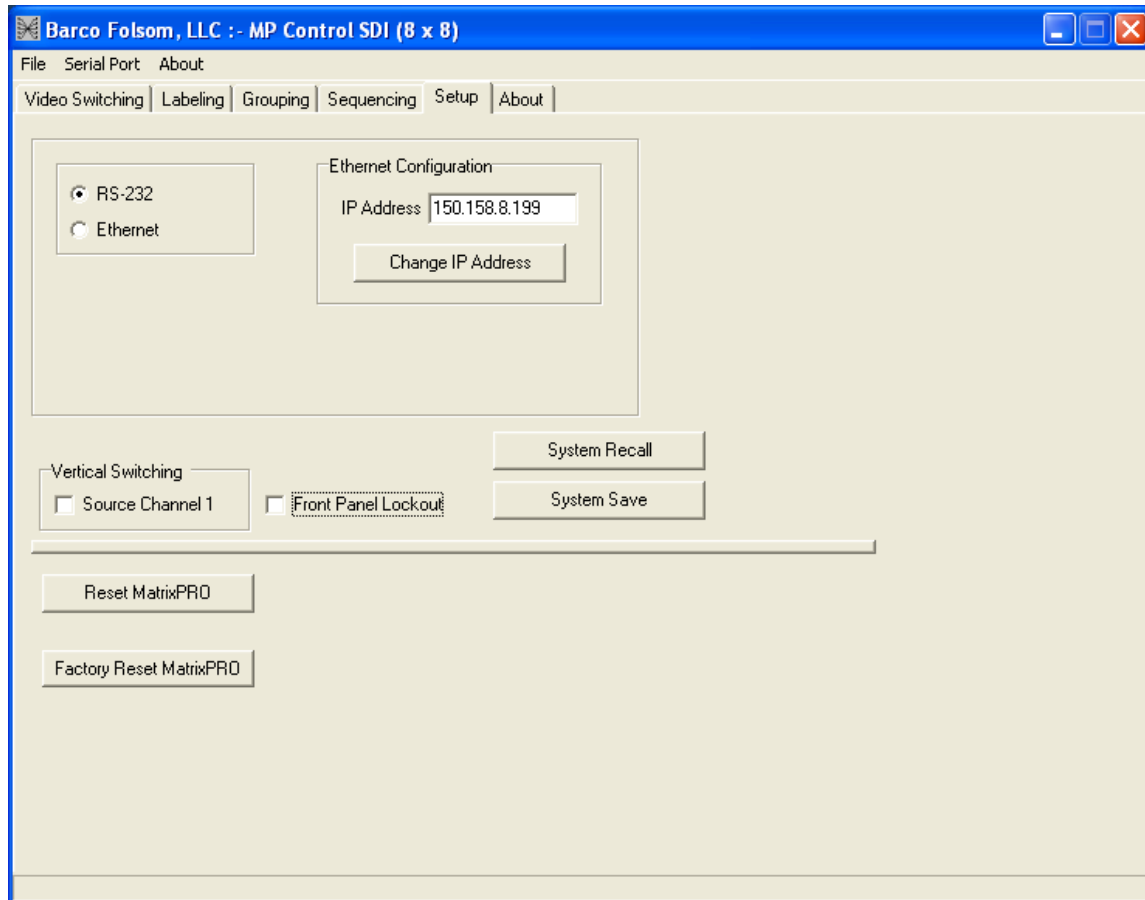


Figure 4-9. Setup Tab (sample)

The **Setup Tab** allows the user to select the method of MatrixPRO remote control, either RS-232 or EtherNet. Please note:

- The IP address must be manually set.
- MatrixPRO does not automatically search for and find a dynamic IP address.
- The default address is **192.168.000.242**.
- Clicking on the **Front Panel Lockout** check box disables the keyboard on the MatrixPRO front panel. A check-mark appears in this box when Front Panel Lockout is activated.
- Clicking the **Vertical Switching** check box causes the MatrixPRO to switch video inputs and outputs during the vertical interval of the input reference signal. The reference source is hard-set to Channel 1 input SYNC.

The "About" Tab

Click the **About Tab** on the MatrixPRO Control application. A sample tab is shown below:

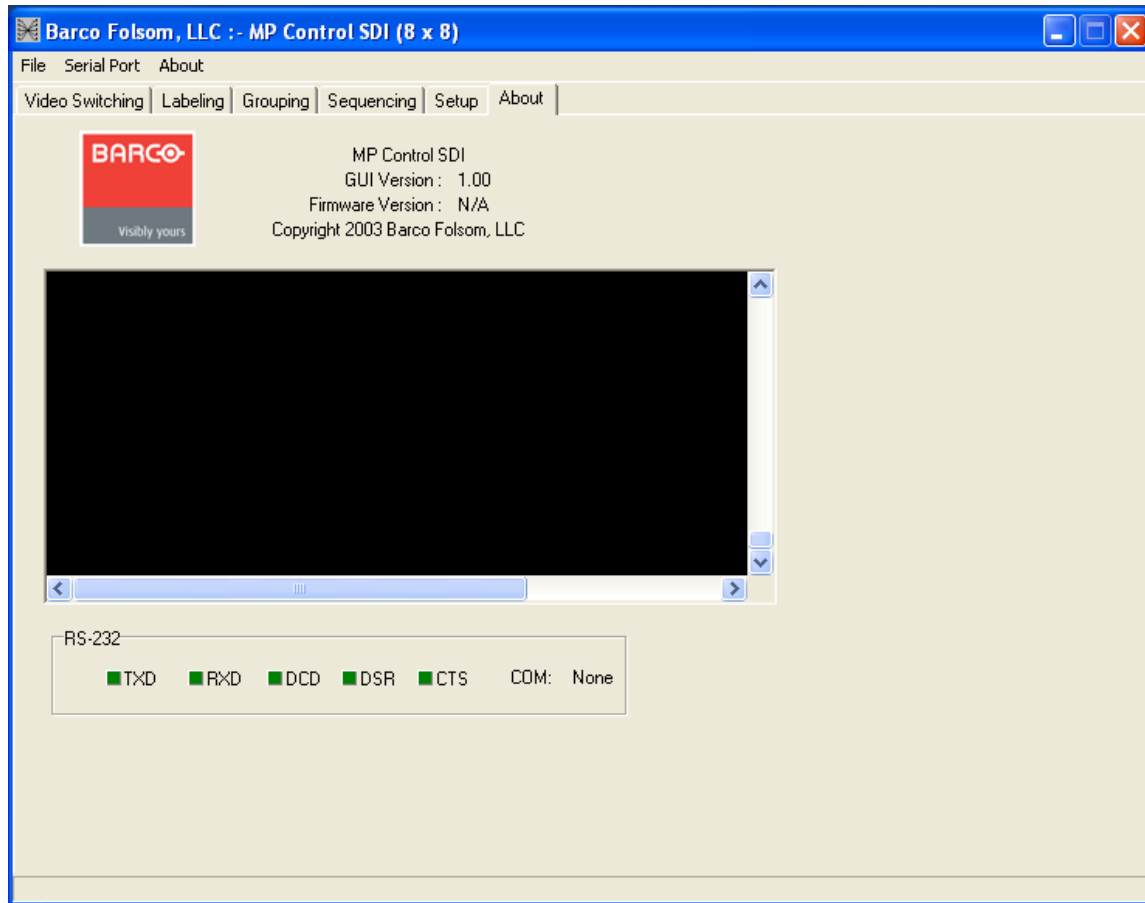


Figure 4-10. About Tab (sample)

This page shows the current GUI software revision as well as the firmware revision running on the MatrixPRO hardware. This page also contains the RS-232 dialog box.

Commands can be issued from this dialog box, and MatrixPRO will respond according to the serial command structure document. The user must position the mouse cursor inside the dialog box and make one click in order to issue commands to the MatrixPRO.

Serial activity indicators are located underneath the dialog box to aid in serial communication debugging.

4. GUI Installation and Operation

GUI Operation

5. Application Specific Connections

MatrixPRO™

In This Chapter

This chapter provides system connectivity information. The following topics are discussed:

- [Connectivity Diagram](#)

5. Application Specific Connections

Connectivity Diagram

Connectivity Diagram

The figure below provides a sample connectivity diagram:

MatrixPRO Digital Series Connectivity Diagram

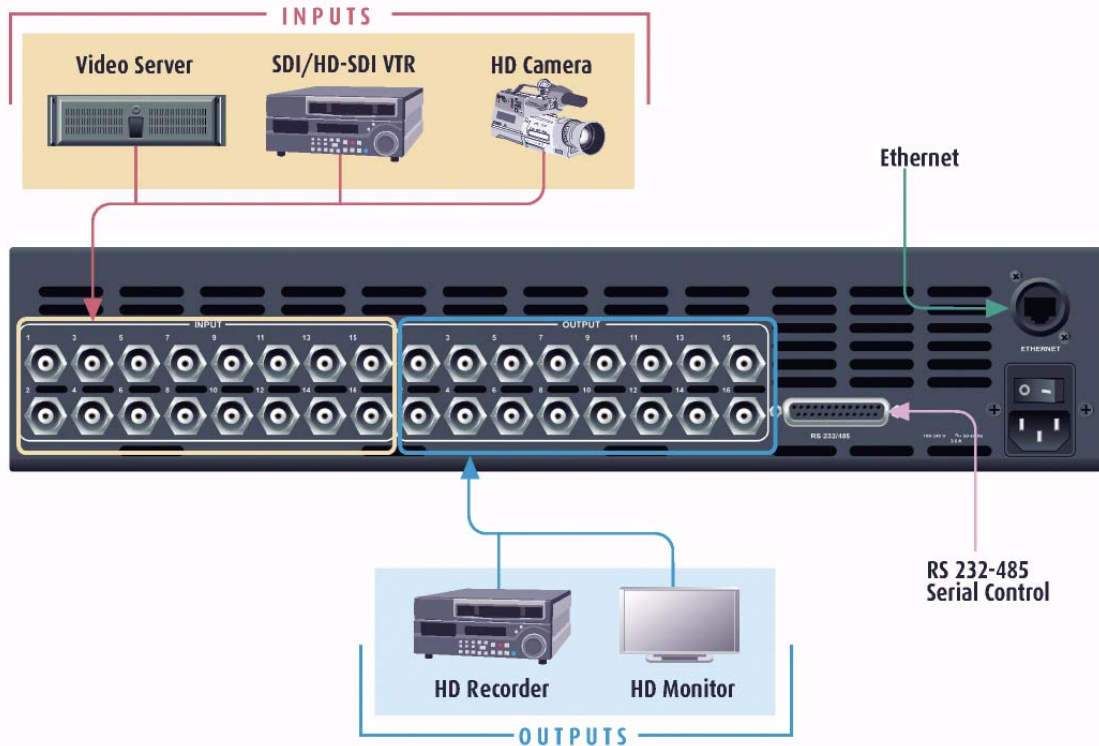


Figure 5-1. MatrixPRO Connectivity Diagram (sample)

Note that the MatrixPRO digital switcher product line does not scan convert any of the input formats — it only routes digital 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.

6. Upgrading Software

The logo for MatrixPRO, featuring the word "MatrixPRO" in a bold, purple, sans-serif font with a trademark symbol (TM) to the right. A horizontal blue line is positioned below the text.

In This Chapter

This chapter provides detailed instructions for upgrading system software components.

The following topics are discussed:

- [Overview](#)
- [Hardware Requirements](#)
- [Software Requirements](#)
- [Connecting to Barco Folsom](#)
- [Downloading Necessary Files](#)
- [Installing MatrixPRO Software Files and Flash File Loader](#)
- [Preparing to Upgrade the MatrixPRO](#)
- [Starting the MatrixPRO Flash File Loader Utility](#)
- [Uploading Files to MatrixPRO](#)

6. Upgrading Software

Overview

Overview

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

The “loader” utility enables you to update the system’s Flash module with the latest revision of software. The utility can be run from a computer with a hard drive (recommended) or a floppy drive. Running the loader from a floppy drive is discouraged due to the slow speeds associated with disk access.

Hardware Requirements

The following list outlines hardware requirements for upgrading software:

- IBM compatible computer with an available COM port
- Serial cable conforming to EIA RS-232 specifications (e.g., standard modem cable). The cable should have a DB-25 male connector on one end, and a DB-9 connector on the other end.

Note

This cable is available as an off-the-shelf, stocked item, Barco Folsom part number: **14-9760047-00**.

Software Requirements

The following list outlines software requirements for upgrading software:

- Windows® 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.

Connecting to Barco Folsom

- Barco Folsom's FTP site address is:
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 (e.g., **johndoe@somecompany.com**).
- If you are using a web browser to access our FTP site, point the browser to:
ftp://ftp.folsom.com
- If you are using a web browser to access our web site, point the browser to:
http://www.folsom.com

Downloading Necessary Files

MatrixPRO Software Files and Flash File Loader

Directory Location:

- ftp.folsom.com\Products\Video\MatrixPRO\MP16x/8x

File to download:

- MatrixPRO16x_Rev#####_###.exe

Installing MatrixPRO Software Files and Flash File Loader

- Use the following steps to install MatrixPRO software files and the Flash File loader:

Note

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 installation.

6. Upgrading Software

Preparing to Upgrade the MatrixPRO

Preparing to Upgrade the MatrixPRO

- Use the following steps to prepare to upgrade the MatrixPRO 16x and 8x:
 1. Plug the DB-25 male connector into the port labeled **RS-232/485** 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 if it was previously powered on, cycle the power and wait for it to boot.

Starting the MatrixPRO Flash File Loader Utility

- Use the following steps to start the Flash File utility:
 1. After the files have been installed, the MatrixPRO Flash File Loader can be selected to run.
 2. Click on the **Start** button and select **Programs**.
 3. Find the **Folsom Research** folder and select **MatrixPRO Flash File Loader**.
 4. To verify communications between the Computer and the MatrixPRO Unit, in the loader program, click in the **Black Terminal Window** area.
 5. If communications is established, pressing the **ENTER** key on the keyboard will result in the terminal window displaying various messages — and then displaying the system prompt "#."
 - ~ If nothing occurs when **ENTER** 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** to which the unit is connected.
 - ~ In the **CONFIG SERIAL** sub-menu, verify the following:
 - **ECHO = ON**
 - **BAUD RATE = 57.6K**
 - **DATA BIT = 8**
 - **STOP BIT = 1**
 - **PARITY = NONE**
 - **HANDSHAKING = ON**
 6. If any of the communication parameters are changed within the loader, cycle the power on the MatrixPRO unit and start the verification process again.

Uploading Files to MatrixPRO

- Use the following steps to upload files to the MatrixPRO system:
 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.
 4. After several minutes, the loader utility will inform the user that the process is complete. Once this is done, power down the MatrixPRO unit and turn it back on. This action enables the software to take effect.
 5. Close the loader utility.
 6. Verify that the new software is in the system, by looking for the version numbers in the MatrixPRO Command GUI.
 7. Once you have verified the version number, perform a factory reset by opening the MatrixPRO Command GUI and clicking on the **Factory Reset** button.

6. Upgrading Software

Uploading Files to MatrixPRO

A. Specifications

The logo for MatrixPRO, featuring the word "MatrixPRO" in a bold, purple, sans-serif font with a trademark symbol (TM) to the right. A blue horizontal line is positioned below the text.

In This Appendix

This appendix provides detailed technical specifications for the MatrixPRO 16x16 and 8x8 HD/SD-SDI Router.

The following topics are provided:

- [SDI Specifications](#)
- [HD/SDI Specifications](#)
- [Common Specifications](#)

A. Specifications

SDI Specifications

SDI Specifications

The table below lists MatrixPRO SDI specifications.

Table A-1. MatrixPRO SDI Specifications

Parameter	Detail	Specification
Video Input	Number/signal type	16 Unbalanced serial data
	Connectors	16 BNCs
	Signal Type	SMPTE 259M compliant
	Signal Speeds	143, 177, 270, 360 Mbps
	Impedance	75 ohms
	Return loss	-15dB @ 270 MHz
	Maximum Cable Length	350m at 270Mbps using Belden 1694A cable
Video Output	Number/signal type	16 Unbalanced serial data
	Connectors	16 BNCs
	Signal Type	SMPTE 259M compliant
	Impedance	75 ohms
	Return loss	-15dB @ 270 MHz
	Amplitude	800mV +/-10%
	Output Jitter with reclocker enabled (max)	0.2 U.I (Alignment), 1.0 U.I (Timing) per SMPTE specifications
	Switching type	Vertical interval per SMPTE specs - input channel 1 reference

HD/SDI Specifications

The table below lists MatrixPRO HD/SDI specifications.

Table A-2. MatrixPRO HD/SDI Specifications

Parameter	Detail	Specification
Video Input	Number/signal type	16 Unbalanced serial data
	Connectors	16 BNCs
	Signal Type	SMPTE 292M and SMPTE 259M compliant
	Signal Speeds	143, 177, 270, 360, 1483.5, 1485 Mbps
	Impedance	75 ohms
	Return loss	-15dB @ 1.485 GHz
	Maximum Cable Length	350m at 270 Mbps, 140m @ 1.485 Gbps using Belden 1694A cable
Video Output	Number/signal type	16 Unbalanced serial data
	Connectors	16 BNCs
	Signal Type	SMPTE 292M and SMPTE 259M compliant
	Impedance	75 ohms
	Return loss	-15dB @ 1.485 GHz
	Amplitude	800mV +/-10%
	Output Jitter with reclocker enabled (max)	0.2 U.I (Alignment), 1.0 U.I (Timing) per SMPTE specifications
	Switching type	Vertical interval per SMPTE specs - input channel 1 reference

A. Specifications

Common Specifications

Common Specifications

The table below lists common MatrixPRO specifications.

Table A-3. MatrixPRO Common Specifications

Parameter	Detail	Specification
VREF Sync	Input Source	Channel 1 Input
Control/Remote	Serial control port	RS-232 / RS-485, 25-pin female D connector
	Baud rate and protocol	57600, 8-bit, 1 stop bit, no parity, (selectable)
	Ethernet control port	1 RJ-45 female connector
	Ethernet data rate	10/100Base-T, half/full duplex with autodetect
	Ethernet protocol	ARP, ICMP (ping), TCP/IP, Telnet
Power	Type	100-240 VAC, 47-63 Hz, auto-configuring
	Connector	IEC connector with integrated fuse and switch
	Power Dissipation	35 watts
Enclosure	Dimensions	3.5" H x 17.0" W x 15" D
		8.9cm H x 43.2cm W x 38.1cm D
	Weight	17 lbs (7.6 kg)
	Shipping weight	22 lbs (10 kg)
	Rack mount	Yes, with included parts
	Enclosure type	Metal
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

B. Remote Control Protocol

The logo for MatrixPRO, featuring the word "MatrixPRO" in a bold, purple, sans-serif font with a trademark symbol (TM) to the right. A blue horizontal line is positioned below the text.

In This Appendix

This appendix provides information regarding external remote control protocol. The following topics are discussed:

- [Default Serial Parameters](#)
- [RS-232/485 Remote Control Connections](#)
- [RS-232 Mode](#)
- [RS-485 Mode](#)
- [MatrixPRO Remote Commands](#)

B. Remote Control Protocol

Default Serial Parameters

Default Serial Parameters

The following are the parameter settings for serial communication:

- **Baud Rate** = 57600 baud
- **Parity** = NONE
- **Stop Bit** = 1
- **Data Bit** = 8
- **Echo** = ON
- **Flow Control** = NONE

Note

These are defaults, which can be changed using serial commands. In Chapter 3, refer to the [“RS-232 Settings Menu”](#) section for instructions.

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 RS-232 and RS-485 that describe serial data communications.

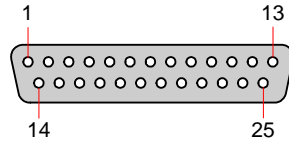


Figure B-1. Remote Port Connector, DB-25

Below is the pinout for both RS-232 and RS-485 with the DB-25 connector:

Table B-1. RS-232 and RS-485 Pinouts

DB25	RS-232	RS-485
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

B. Remote Control Protocol

RS-232 Mode

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>
```

Table B-2. RS-232 Command Syntax

Command	Description
cmd	cmd is any valid MatrixPRO command, typically 2 to 6 alphabetic (non numeric) characters
arg	argument1, argument2, ... argument"N" are required or optional parameters depending on the command used.
<cr>	carriage return (ASCII 13) terminates the command

Please note:

- 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 RS-232 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 that a result from a query 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.

RS-485 Mode

To switch to RS-485, refer to the “[RS-232 Settings Menu](#)” section in Chapter 3. 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
```

Table B-3. RS-485 Command Syntax

Command	Description
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 command delimiter start character. The example shows that device 12 should process the XYZ command with A and 9 as parameters. A comma (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 command end delimiter character “!” follows directly after the last command to end the command string.

Commands received in the command string will not be processed until the command end delimiter character “!” is received. This format allows commands to be stacked up for transmission to a single device 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 up 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

B. Remote Control Protocol

RS-485 Mode

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 should be kept as short as possible. The units will not respond with prompts or any command error conditions. Echo mode will be disabled when RS-485 mode is selected.

MatrixPRO Remote Commands

The table below lists MatrixPRO remote commands. Click the hyperlink for detailed descriptions and examples.

Table B-4. MatrixPRO Remote Commands

Command	Description
HELP	Capabilities. Send complete list of commands available in ASCII format
CLEAR	Clear all matrix video routings
CSUMSTAT	Display Main Code/RBF Checksum info
FPLOCK en	Locks/unlocks Front Panel control
GADD grp out in	Add an output or input to group
GCLEAR grp	Clears grouping information
GDEL grp out in	Remove output, input from group
IPCONFIG I3 I2 I1 I0	IP address configuration I3.I2.I1.I0
ISTAT num	Input video status
LOADRMP	Places unit into loader mode for firmware upgrade
OBLNK out blnk	Displays output channel status
OSTAT	Displays output status in ASCII
PRST num	Saves current front panel configuration to a Preset location
PSTAT	Displays preset status in ASCII
RCLKEN num en	Enables/Disables individual output reclockers
RESETMP op	Reset MatrixPRO, recall saved Flash values op [R F] Reset Factory Reset
RNOV	Recall Flash settings
RPRST num	Recall preset from a Preset location
RTEMP out in	Route inputs to outputs. If output is in group, group is routed too
SBAUD mode	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. 0 = (Vertical Interval Switching Off), 1 = On
TAKE en	en = 1 simulates a TAKE button pushed on the front panel (i.e takes all preliminary routes and makes them permanent). en = 0 simulates a CANCEL button pushed
UNOV	Save current settings to FLASH

B. Remote Control Protocol

MatrixPRO Remote Commands

MatrixPRO Serial Command List/Description

HELP

- **Description:** Displays a list of available commands on a terminal emulator such as ProComm or Hyperterminal.
- **Parameters:** None
- ▲ **Example:** HELP (Returns the command list.)

CLEAR

- **Description:** Clears all existing and pending video routes.
- **Parameters:** None
- ▲ **Example:** CLEAR (Clears all existing and pending video routes.)

CSUMSTAT

- **Description:** Displays firmware checksums and other information.
- **Parameters:** None
- ▲ **Example:** CSUMSTAT (Displays firmware checksums and other information.)

FPLOCK en

- **Description:** Lock / unlock the front panel from user input. Locking the front panel results 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.)

GADD grp out in

- **Description:** Add an output and/or input to the selected group index.

Note

The user cannot add output to more than one group index.

- **Parameters:**
 - grp** Group number to add output; [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
- ▲ **Examples:**
 - GADD 1 4 2 (Add output 4 and input 2 to group 1.)
 - GADD 1 101 5 (Add input 5 to group 1.)

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.)

GDEL grp out in

- **Description:** Remove output and/or input from the selected group index.
- **Parameters:**
 - grp** Group number to remove output; [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
- ▲ **Examples:**
 - GDEL 1 4 2 (Remove output 4 and input 2 from group 1.)
 - GDEL 1 101 5 (Remove input 5 from group 1.)

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)

ISTAT num

- **Description:** Gives status of input channel number's video status
- **Parameters:**
 - num** Input number; [1 - 16]
- Returns [1] for good video present
- Returns [0] for bad or absent video signal.
- ▲ **Example:** ISTAT 1 Queries status input one. Returns 1 for good video

B. Remote Control Protocol

MatrixPRO Remote Commands

LOADRMP

- **Description:** Places unit into loader mode. This mode is used to perform field upgrades
- **Parameters:** None.
 - ▲ **Example:** LOADRMP (Puts unit into loader mode.)

OBLNK out blnk

- **Description:** Updates output blanking status
- **Parameters:**
 - out** Output number; [1 - 16]
 - blnk** Blanking status; [0|1], Disable|Enable
- **Query:** OBLNK? out Returns the selected output blanking status in the format:
=blnk
 - ▲ **Example:** OBLNK 2 1 (Blank output 2.)

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 is specified, all output information (i.e., 1-16) will be displayed.

▲ Examples:

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

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.)

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.

▲ Examples:

PSTAT 1 (Displays preset status for preset 1.)

PSTAT (Displays preset status for all presets.)

RCLKEN num en

- **Description:** Enables and Disables Reclocker on Output Channel

- **Parameters:**

num Input number; [1 - 16]

en Enable -[1]; Disable - [0]

- **Query:** RCLKEN? num; Returns the selected output's Reclocker Status: =en

▲ Example: RCLKEN 10 1 (Enables output 10 Reclocker)

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.)

RNOV

- **Description:** Recalls the system parameters from non-volatile RAM. The system parameters that are recalled include the current input and output routes, grouping information, I.P. settings and serial port configuration parameters. Upon power-up, the system configures itself according to these parameters.

- **Parameters:** None

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.)

B. Remote Control Protocol

MatrixPRO Remote Commands

RTEMP out in

- **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 - 16]

in Video Input number to route video; [1-16] / 101 if no input to add / 0 unroutes input

- **Query:** RTEMP? out; Returns the current video inputs routed to the specified output in the format: =in

▲ **Examples:**

RTEMP 1 3 (Route to output 1, video input 3.)

RTEMP 4 101 (Route to output 4.)

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:** SBAUD 0 (Sets Serial baud rate to 19200.)

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

▲ **Examples:**

SMODE 0 (Sets Serial mode for RS-232.)

SMODE 1 10 (Sets Serial mode for RS-485 with ID 10)

SWITCH mode

- **Description:** Video switching mode. Enables vertical interval switching using the input on channel 1.

- **Parameters:**

mode Mode; [0|1], Off|On

- **Query:** SWITCH? Returns current video switching mode in the format: =mode

▲ **Example:** SWITCH 0 (Turns vertical interval switching off.)

TAKE en

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

- **Parameters:**

en Mode; [0|1], Cancel all pending|Route all pending.

Note

Issuing the parameter 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 (Activates all pending video routes.)

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 configures itself according the parameters stored in non-volatile RAM.

- **Parameters:** None

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

B. Remote Control Protocol

MatrixPRO Remote Commands

C. Contact Information

In This Appendix

The following topics are discussed in this Appendix:

- [Barco Folsom Warranty](#)
 - [Return Material Authorization \(RMA\)](#)
 - [Barco Events Contact Information](#)
-

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 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 will cover shipping charges for return shipments to customers.

Return Material Authorization (RMA)

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

- (888) 414-7226

RMA Conditions are listed below:

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

C. Contact Information

Barco Events Contact Information

Barco Events Contact Information

Barco Events USA/Barco Folsom, LLC

- 11101 Trade Center Drive
Rancho Cordova, California 95670
USA
- Phone: (916) 859-2500
- Fax: (916) 859-2515
- Websites:
 - ~ www.folsom.com
 - ~ www.events.barco.com

Sales Contact Information

- Direct: (916) 859-2505
- Toll Free: (888) 414-7226
- E-mail: folsomsales@barco.com

Barco N.V

- Noordlaan 5
8520 Kuurne
BELGIUM
- Phone: +32 56.36.82.11
- Fax: +32 56.35.16.51
- Website: www.events.barco.com

Technical Support Information

- Tech Line: (866) 374-7878 — 24 hours per day, 7 days per week
- E-mail: folsomsupport@barco.com

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