

User Guide

Signal Processors

MGP Pro Series

Multi-Graphic Processors



Extron® Electronics
INTERFACING, SWITCHING AND CONTROL

Safety Instructions

Safety Instructions • English

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Korean

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ATTENTION: Attention indicates a situation that may damage or destroy the product or associated equipment.

NOTE: A note draws attention to important information.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B51 ^W^C  
[01] R000400300004000080000600 [02] 35 [17] [03]  
Esc[X1 *X17*X20*X23*X21CE←
```

NOTE: For commands and examples of computer or device responses mentioned in this guide, the character “Ø” is used for the number zero and “O” is the capital letter “o.”

Computer responses and directory paths that do not have variables are written in the font shown here:

```
Reply from 208.132.180.48: bytes=32 times=2ms TTL=32  
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

```
ping xxx.xxx.xxx.xxx -t  
SOH R Data STX Command ETB ETX
```

Selectable items, such as menu names, menu options, buttons, tabs, and field names are written in the font shown here:

From the **File** menu, select **New**.

Click the **OK** button.

Specifications Availability

Product specifications are available on the Extron website, www.extron.com.

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Introduction

This section provides an overview of the MGP Pro Multi-Graphic Processors, including information about the following:

- [About this Guide](#)
- [About the MGP Pro Series Multi-Graphic Processors](#)
- [Features](#)
- [Application Diagram](#)

About this Guide

This guide discusses how to install, configure, and operate the Extron MGP Pro Series and the multi-graphic processors.

Throughout this guide, the terms “MGP,” “MGP Pro,” and “processor” are used interchangeably to refer to all models of the products.

About the MGP Pro Series Multi-Graphic Processors

The MGP Pro Series are multi-window, high resolution signal processors that can display signals from multiple video sources simultaneously on a single screen in picture-in-picture or picture-by-picture format. The MGPs combine high performance graphics scaling with customizable picture-in-picture functionality.

The MGP 464 Pro models can display up to four windows, while the MGP 462 Pro models can display one or two. The MGPs accept RGB, HDTV, component, S-video, and composite video signals on 4 fully-configurable inputs and 15 virtual inputs. They have 1 scaled output. The processors can switch among inputs, and provide a full range of picture controls for each window. Configurations can be saved as presets and recalled as needed.

The following models are available:

- **MGP 464 Pro and MGP 462 Pro** — Standard models with BNC input connectors that accept RGB, component video, S-video, and composite video
- **MGP 464 Pro DI and MGP 462 Pro DI** — An MGP 464 Pro or MGP 462 Pro with an HDMI input card installed, providing four HDMI input connectors.
- **MGP 464 Pro 3G-SDI and MGP 462 Pro 3G-SDI** — An MGP 464 Pro or MGP 462 Pro with two 3G/HD-SDI inputs and two HDMI inputs.

All HDMI inputs and outputs on these models support High-bandwidth Digital Content Protection (HDCP).

All models can be controlled remotely via the serial interfaces using the Extron Simple Instruction Set (SIS) commands or the Windows-based control software, or via an Ethernet LAN using the MGP Pro embedded web pages, SIS commands, or the control software.

Features

- **Inputs** — Four fully configurable video inputs on BNC connectors accept RGBHV (up to 1920x1200 and 2K), HDTV component video (up to 1080p @ 60 Hz), S-video, and composite video signals. In addition, the MGP 464 Pro and 462 Pro DI models have four HDMI inputs, and the MGP 464 Pro and 462 Pro 3G-SDI models have two 3G/HD-SDI and two HDMI inputs.
- **Virtual inputs** — 15 virtual inputs can be configured through software to accept standard definition component video, S-video, and composite video.
- **Output** — All MGP Pro models have one scaled output on the following:
 - A set of five BNC connectors for RGB (RGBHV, RGBS, RGsB) and HD component video
 - An HDMI connector for HDMI and DVI
- **HDCP compliance and visual confirmation** — A green screen is displayed when HDCP encrypted content is sent to a non-HDCP compliant display, providing immediate visual confirmation that protected content cannot be viewed on the display.
- **Key Minder** — Key Minder authenticates and maintains continuous HDCP encryption between input and output devices to ensure quick and reliable switching in professional AV environments while enabling simultaneous distribution of a single source signal to one or more displays.
- **Picture controls** — Picture controls allow you to adjust the size, position, brightness, contrast, color, tint, detail, and zoom for each window.
- **Window and input presets** — Window presets save sizing, positioning, and priority information. Input presets save input signal type information and picture control settings.
- **Window transition effects** — 6 types of window transition effects (22 different effects altogether) seamlessly mute and unmute (close and open) the windows.
- **Freeze control** — Freeze control freezes (locks) a window to the current image.
- **3:2 pulldown detection for NTSC video and 2:2 film detection for PAL** — These advanced film mode processing features help maximize image detail and sharpness for video sources that originated from film.

When film is converted to NTSC video, the film frame rate has to be matched to the video frame rate in a process called 3:2 pulldown. “Jaggies” and other image artifacts can result if conventional deinterlacing techniques are used on film-source video.

The MGP Pro advanced film mode processing recognizes signals that originated from film. The MGP Pro then applies video processing algorithms that optimize the conversion of video made in the 3:2 pulldown process. This results in richly detailed images with sharply defined lines.

A similar process, 2:2 film detection, is used for PAL film-source video.

- **Graphics still store** — Screen captures and uploaded bitmap (.bmp) graphics can be stored and used as background images. Images stored on the MGP Pro can be downloaded to a computer as .bmp files for archiving. Up to six full screen high resolution images can be stored in graphics still store memory.
- **Background image capture, save, and recall** — Background capture enables you to capture and save the image currently on the output screen. You can then recall the captured image and display it as a background later.
- **Live Background input** — An HDMI input is provided on all models as a means to display live, full-motion high-resolution computer or HDTV video from an HDMI or DVI source as a background. The Live Background input can be used for cascading two or three MGP Pro units to create large-scale displays with 6 to 12 windows.

- **Auto Image** — Auto Image automatically sizes, centers, and optimizes the image to the scaled output rate, filling the window.
- **EDID emulation** — The MGP provides selectable resolutions and refresh rates, enabling you to specify the rate of the incoming signal and ensure proper communication with the video source.
- **Remote operation** — The MGP Pro can be operated remotely via the serial interfaces using the Windows-based control software or SIS commands, or via the Ethernet interface using the embedded web pages, SIS commands, or the Windows-based control software.
- **Rack mounting** — The 2U high and full rack wide metal enclosure can be rack mounted using the included rack and through-desk mounting brackets.
- **Front panel security lockout (executive mode)** — Locks the front panel controls to prevent unauthorized use in non-secure environments or accidental changes to the unit settings.
- **RGB and video scaling** — All sources are scaled to a single output rate.
- **Window captioning** — Each picture-in-picture window can be labeled with a text label of up to 16 characters. The label can be positioned and sized as desired, and background, text, and border colors can be selected.
- **LockIt HDMI cable lacing brackets** — One bracket is provided for each HDMI input and output connector to secure the cables to the rear panel and prevent signal loss due to loose connections.
- **Test patterns** — A variety of internal test patterns, including crop pattern, crosshatch, colorbars, and three aspect ratio patterns, enable proper system setup.
- **Quad standard video decoding** — A digital four-line adaptive comb filter decodes NTSC 3.58, NTSC 4.43, PAL, and SECAM for integration into systems worldwide.

Application Diagram

The following application diagram shows an example of how devices may be connected to the MGP Pro series.

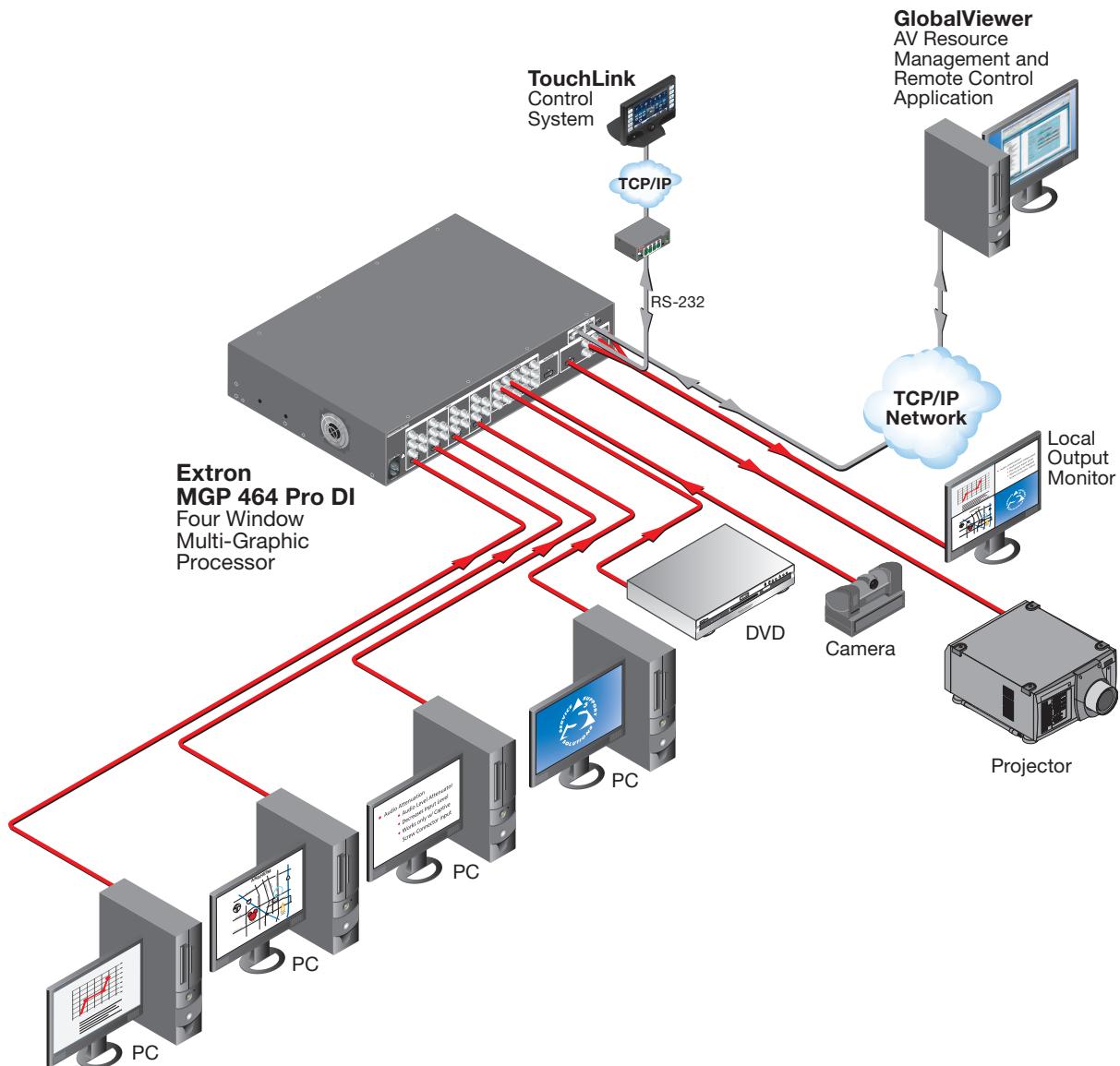


Figure 1. Connection Diagram for an MGP 464 Pro DI

Installation

This section describes the installation procedures for the MGP Pro Series Multi-Graphic Processor and the connectors on the rear panel. Topics include:

- [Installation Overview](#)
- [Rear Panel Features](#)
- [Installing or Replacing Button Labels](#)

Installation Overview

The MGP Processor can be connected to as many as 19 input devices simultaneously, and up to two output devices. Follow these steps to install the MGP Pro:

1. Install the four rubber feet on the bottom of the MGP Pro, or mount the unit using the supplied rack mounting brackets (see [Mounting the MGP Pro](#) on page 104).
2. Turn off power to the input and output devices and remove the power cords from them.
3. Connect the input sources to the BNC, HDMI, or 3G/HD-SDI input connectors (see [A BNC inputs 1 through 4](#) on page 7 or [B Virtual inputs \(inputs 5 through 19\)](#) on page 7).
4. For the MGP Pro DI models, connect up to four input sources to the HDMI and the BNC connectors as desired. For the MGP 462 Pro 3G-SDI, connect up to four input sources to the two 3G/HD-SDI connectors, the two HDMI connectors, and the four BNC connectors, in any desired combination. (Sources can be connected to HDMI, 3G/HD-SDI, and RGB connectors at the same time. The MGP processes the signal for which the input is configured.)
5. Attach an output device to the RGBHV/YUV BNC output connector set, the HDMI output connector, or both.
6. If the MGP Pro will be connected to a computer or to a host controller for remote operation, connect an RS-232 cable from the host to the Remote RS-232/422 connector on the rear panel (see [C RS-232/422 connector](#) on page 8) or to the front panel Config port (see [J Config port](#) under “Front Panel Features” on page 14).
7. If desired, connect an active LAN Ethernet cable to the RJ-45 port on the MGP Pro rear panel to establish a link to the network (see [D LAN connector](#) on page 8).
8. Plug the MGP Pro, input devices, and output devices into grounded AC sources, and power on all devices.

Rear Panel Features

Figure 2 shows the rear panel of the MGP 464 Pro DI and 462 Pro DI, which have four HDMI input connectors. Figure 3 shows the MGP 464 Pro and 462 Pro 3G-SDI rear panel, which has two 3G/HD-SDI and two HDMI input connectors. The standard MGP 464 Pro and 462 Pro models do not have HDMI or 3G/HD-SDI input connectors (although all models have HDMI output and Live Background connectors). In all other respects the rear panels are identical for all models.

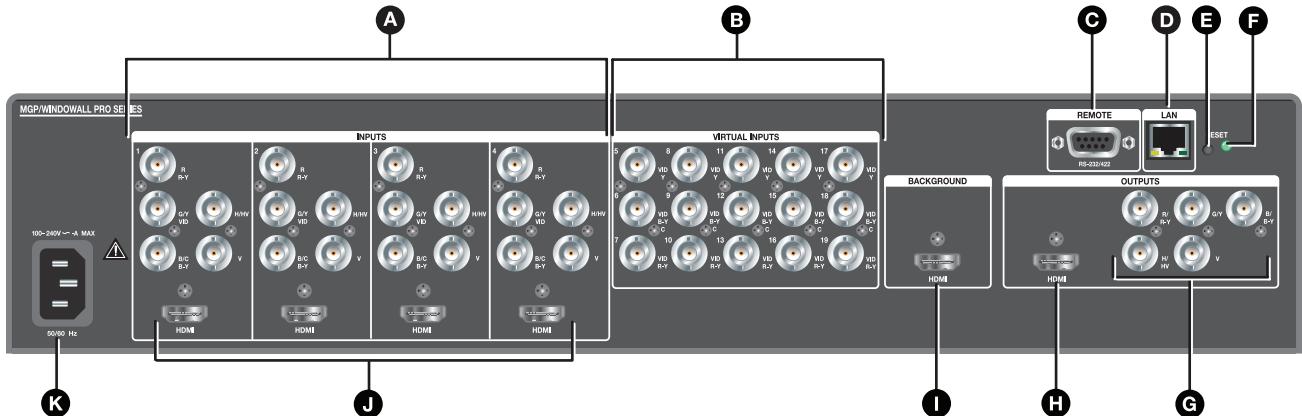


Figure 2. MGP 464 Pro DI and MGP 462 Pro DI Rear Panel

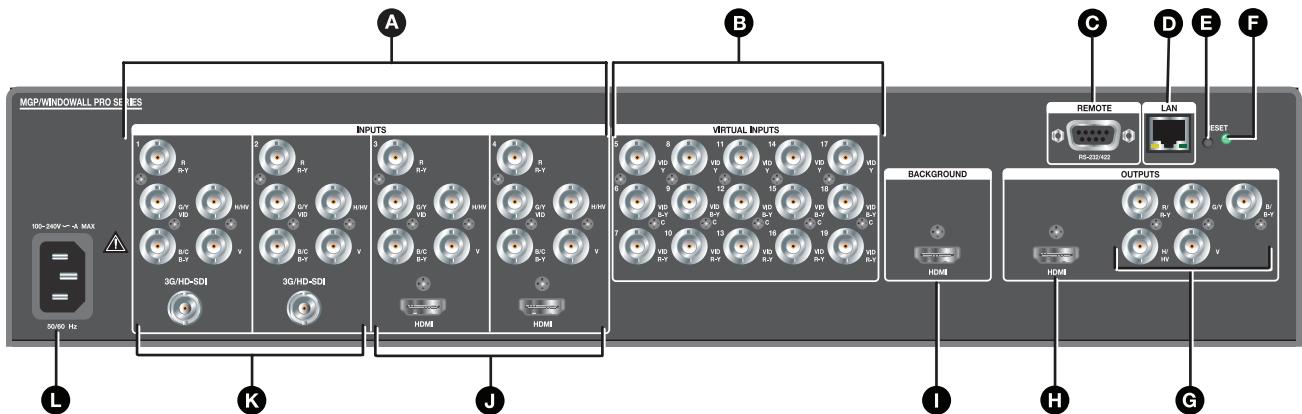


Figure 3. MGP 464 Pro 3G-SDI and MGP 462 Pro 3G-SDI Rear Panel

- A BNC inputs 1 through 4**
- B Virtual inputs (inputs 5 through 19)**
- C Remote RS-232/422 connector**
- D LAN connector**
- E Reset button**
- F Reset LED**
- G BNC output connectors**
- H HDMI output**
- I HDMI background input**
- J HDMI inputs**
- K 3G/HD-SDI inputs**
- L AC power connector**

A BNC inputs 1 through 4 — Plug RGB, high or standard definition component video, S-video, or composite video sources into these fully configurable BNC connectors, as shown in figure 4. Configure these connectors for the desired signal types via the front panel, the Windows-based control software, SIS commands, or the MGP web pages.

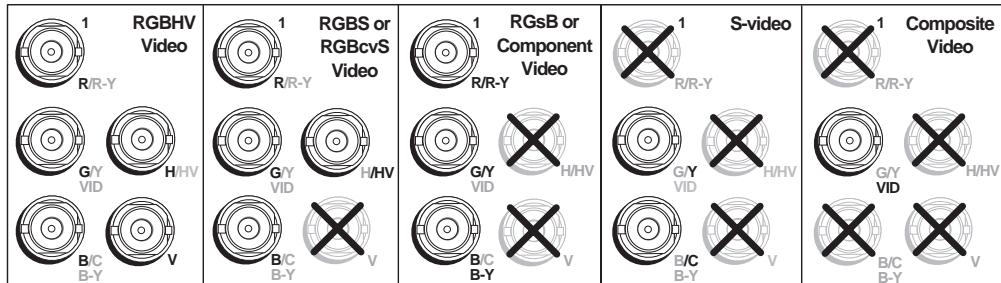
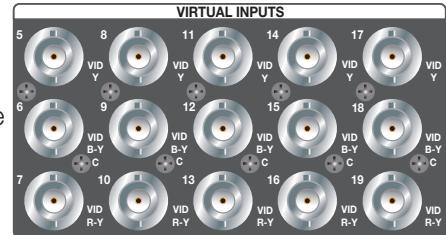


Figure 4. Connecting to RGB, HD Component Video, S-video, or Composite Video Inputs 1 through 4

B Virtual inputs (inputs 5 through 19) —

Connect standard definition component video, S-video, or composite video sources to these BNC connectors. The 15 BNC connectors for the virtual inputs are arranged in columns of three.

In each column, you can connect inputs as follows (see figure 5):



- Up to three composite video inputs (can be plugged into any connector or connectors in the column)
- One S-video input and, optionally, one composite video input

NOTE: The S-video must always be connected to the top two BNC connectors. The Y connector must be on top, the C connector in the middle. A composite video source can be connected to the bottom BNC connector.

- One interlaced component video source (must be connected to all three BNC connectors in the column).

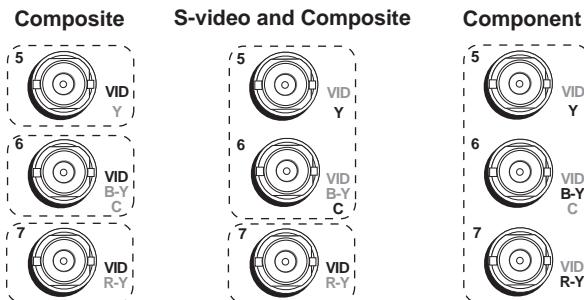


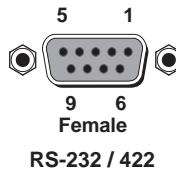
Figure 5. Virtual Input Connection Examples

You can configure these virtual inputs for the desired signal types using the MGP Series Control Program (see the control software help file) or SIS commands (see the **Remote Configuration and Control** section beginning on page 42). They cannot be configured via the front panel.

NOTE: When you configure a virtual input as S-video (using two input connectors) or component video (using three input connectors), pressing any one of its equivalent buttons selects the input. For example, if you plug an S-video source into input connectors 8 and 9, pressing either the 8 or the 9 input button selects that input.

- C Remote RS-232/422 connector** — Plug a computer or other RS-232 or RS-422 host device into this female 9-pin D connector. Wire the connector as shown in figure 6 (see the **Remote Configuration and Control** section beginning on page 42 for more information on controlling the MGP Pro remotely via RS-232 or RS-422).

NOTE: The MGP Pro also has an RS-232-only Config port on a 2.5 mm tip-ring-sleeve (TRS) connector on the front panel. For information on this port, see **J Config port** on page 14.



Pin	RS-232 Function	RS-422 Function
1	—	Not used
2	Tx	Transmit data
3	Rx	Receive data
4	—	Not used
5	Gnd	Signal ground
6	—	Not used
7	—	Not used
8	—	Tx+
9	—	Transmit data (+)

Figure 6. RS-232/422 Connector Pin Configuration

NOTE: The cables used to connect the RS-232/422 port to a computer or control system may need to be modified by removing pins or cutting wires. If unneeded pins are connected, the processor may cease functioning.

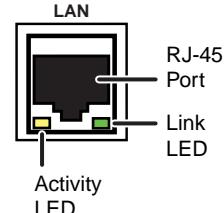
- D LAN connector** — Plug an RJ-45 network cable into this connector to connect the unit to a network (via a switch, hub, or router) or to a single computer.

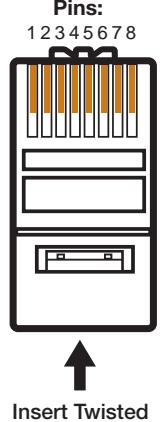
- **Activity LED** — This LED blinks to indicate network activity.
- **Link LED** — This LED lights to indicate a good network connection.

Use a straight-through cable to connect to a network, or a crossover cable to connect directly to a computer.

- For 10BaseT (10 Mbps) networks, use a CAT 3 or better cable.
- For 100BaseT (maximum 155 Mbps) networks, use a CAT 5 cable.

See **figure 7** on the next page for LAN port wiring information.





Pins:
1 2 3 4 5 6 7 8

Crossover Cable		
Pin	End 1 Wire Color	End 2 Wire Color
1	White-green	White-orange
2	Green	Orange
3	White-orange	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Orange	Green
7	White-brown	White-brown
8	Brown	Brown

Straight-through Cable		
Pin	End 1 Wire Color	End 2 Wire Color
1	White-orange	White-orange
2	Orange	Orange
3	White-green	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Green	Green
7	White-brown	White-brown
8	Brown	Brown

Insert Twisted
Pair Wires
**RJ-45
Connector**

T568A T568B

A cable that is wired as T568A at one end and T568B at the other (Tx and Rx pairs reversed) is a "crossover" cable.

T568B T568B

A cable that is wired the same at both ends is called a "straight-through" cable because no pin or pair assignments are swapped. Both ends of the cable can be T568B (as shown) or T568A (not shown).

Figure 7. Wiring the LAN Connector

If desired, configure the LAN port by using SIS commands (see the LAN port setup commands, beginning with the **Set IP address** command on page 75) or by using the Comm./IP Configuration menu on the front panel (see **Comm./IP Configuration Menu** on page 29). The LAN port default settings are:

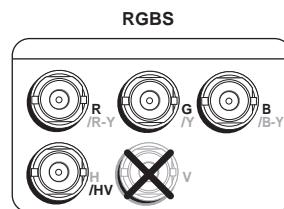
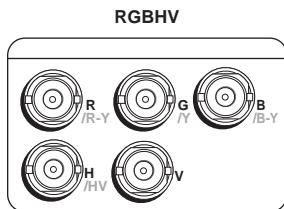
IP address: 192.168.254.254

Gateway IP address: 0.0.0.0

Subnet mask: 255.255.0.0

DHCP: off

- E** **Reset button** — Pressing this recessed button causes various IP functions and Ethernet connection settings to be reset to the factory defaults (see **Resetting** on page 40 for more information).
- F** **Reset LED** — This LED, located to the upper-right of the reset button, blinks a varying number of times to indicate which reset mode has been entered (see **Resetting** for details).
- G** **BNC output connectors** — Plug an output device into these five BNC connectors, as shown in figure 8.



RGSB

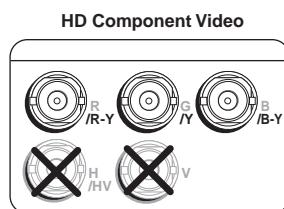
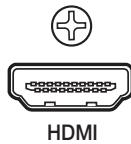


Figure 8. Connecting to BNC Output Connectors

H HDMI output — Plug an HDMI or DVI output device into this HDMI connector.

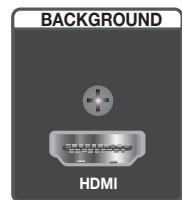


NOTES:

- When two output devices are attached to the BNC connectors **and** to the HDMI connector, both outputs display the same image.
- Connecting a DVI display to this HDMI connector requires an adapter cable.

LockIt brackets: LockIt cable lacing brackets, one for each HDMI input and the output connector, are provided with the MGP Pro. These brackets secure the HDMI cables to the rear panel connectors and reduce stress on the connectors, preventing signal loss due to loose cable connections. For information on attaching the LockIt brackets, see the *LockIt HDMI Lacing Bracket Installation Guide* card, available at www.extron.com.

I HDMI background input — Connect an HDMI or DVI input source to this HDMI connector in order to display the video source live as a background on your output screen. The four MGP Pro windows are displayed in front of this HDMI image. When an HDMI background is used, the MGP Pro output is locked to the input rate of the HDMI background. This input is not scaled.



NOTES:

- This input connector can be used only to receive the background image. To process HDMI input signals, use an MGP Pro DI or 3G-SDI model.
- Connecting a DVI source to this HDMI connector requires an adapter cable.

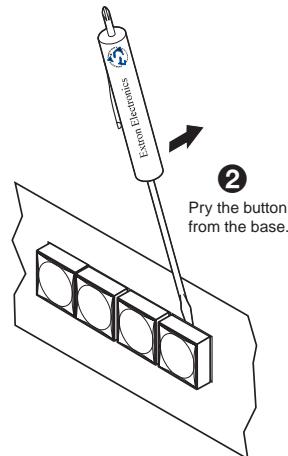
J HDMI inputs — Connect up to four (MGP Pro DI) or two (MGP Pro 3G-SDI) HDMI input sources to these HDMI input connectors, which can be used instead of the fully-configurable BNC input connectors (**A**). These inputs are available only on the MGP Pro DI and 3G-SDI models, which have the HDMI card installed.

K 3G/HD-SDI inputs (MGP Pro 3G-SDI models only) — Connect one or two SDI inputs to these SDI BNC input connectors. These connectors can be used instead of the fully-configurable BNC inputs.



NOTE: Standard definition (SD) SDI is not supported on these 3G/HD-SDI inputs.

L AC power connector — Connect the included power cord from this male IEC connector to a 100–250 VAC, 50-60 Hz power source.



Installing or Replacing Button Labels

The front panel button caps are pre-labeled for your convenience by default. However, you can replace them with button labels that you create, using the Button-Label Generator or other button label software. The button assembly consists of a clear lens cap, the button label, and a white diffuser (see the illustration at right and **figure 9** on the next page). Replace button labels as follows:

1. Make any desired button labels and cut them out.
2. Remove the button assembly by inserting a small, flat-bladed screwdriver between the button base and the diffuser to gently pry the button assembly off the button plunger, as shown in the illustration at right (**2**).

3. Locate the small corner notch on the lens cap, and slide the screwdriver between the lens cap and the diffuser (see figure 9, **③**).
4. Using a rotating motion of the screwdriver, carefully pry the two pieces apart (see figure 9, **④**).

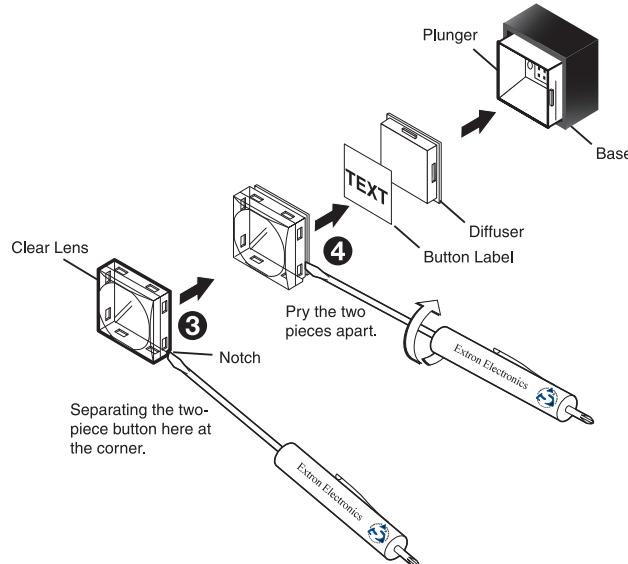


Figure 9. Replacing a Button Label

5. Lift out the transparent square label that you want to replace. You may need to use the small screwdriver to gently pry the label out.
6. Insert one of the new labels you created in step 1 into the clear button cap, align the white diffuser with the cap, and firmly snap it into place.
7. Gently, but firmly, press the reassembled button into place on the MGP Pro front panel.
8. Repeat steps 1 through 7 as needed to relabel other buttons.

Operation

This section describes the setup and operating procedures for the MGP Pro and includes the following sections:

- **Front Panel Features**
- **Power-up and Default Cycle**
- **Window Select Buttons**
- **Input Selection**
- **Menus, Configuration, and Adjustments**
- **Picture Controls**
- **Auto Memories**
- **Memory Presets**
- **Additional Functions**

You can set up and operate the MGP Pro using:

- The front panel controls
- A computer, a touch screen panel, or any other device that can send and receive serial communications through either serial port or the LAN port. Settings can be adjusted through the host computer using SIS commands or the Windows-based control software.
- A computer or other device using an Ethernet connection and IP protocol (Telnet or a web browser).

This section discusses the functions available through the front panel. For details on setup and control via RS-232 or RS-422, see the **Remote Configuration and Control** section beginning on page 42. For web page control, see the **HTML Configuration and Control** section beginning on page 84.

Front Panel Features

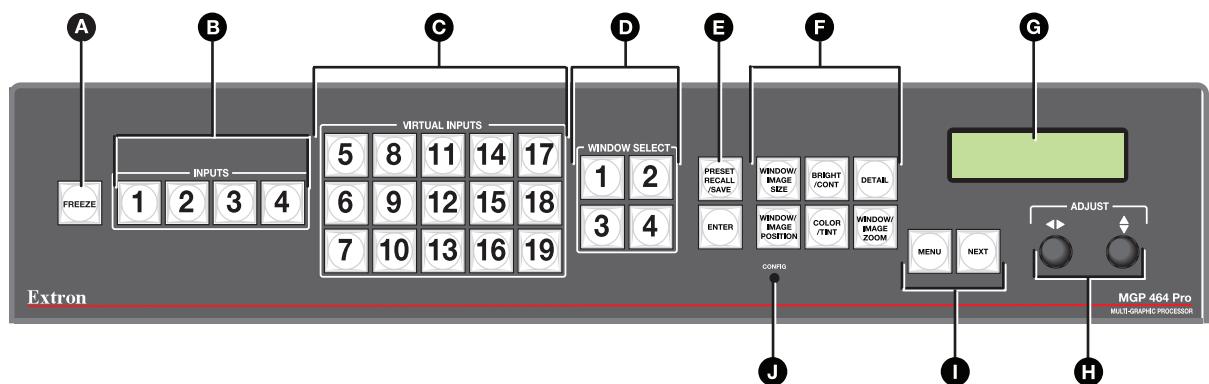


Figure 10. MGP 464 Pro Front Panel

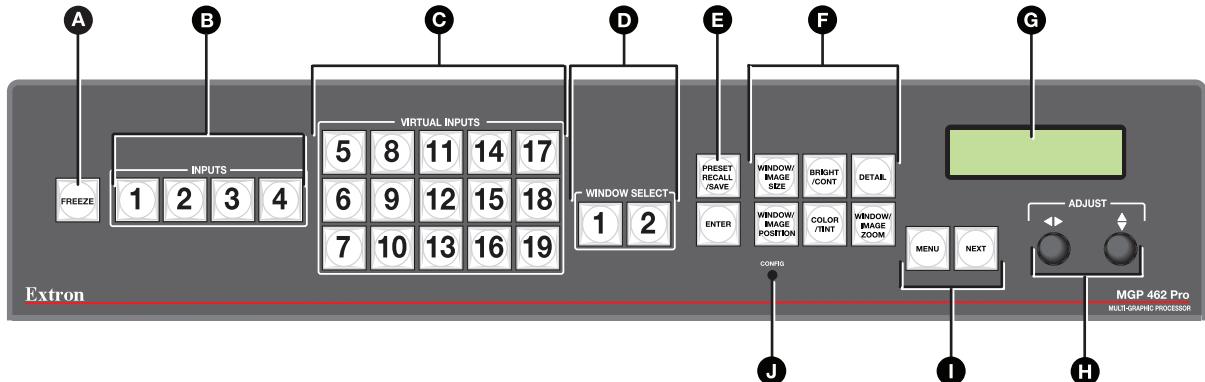


Figure 11. MGP 462 Pro Front Panel

- | | |
|--|--|
| A Freeze button
B Input selection buttons
C Virtual video input selection buttons
D Window Select buttons
E Window Preset buttons | F Picture control buttons
G LCD screen
H Adjust knobs
I Menu navigation buttons
J Config port |
|--|--|

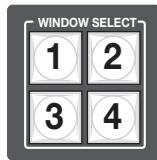
- A** **Freeze button** — Press this button to freeze the image in the currently selected window on the display. The image remains frozen until the Freeze button is pressed again, or a different input is selected.
- B** **Input selection buttons** — Press these buttons to select fully configurable inputs 1 through 4. On the DI models, these buttons can also select the four HDMI inputs, depending on the input configuration of the unit. On the MGP Pro 3G-SDI, input buttons 1 and 2 select the 3G/HD-SDI inputs and buttons 3 and 4 select the HDMI sources. When one of these buttons is pressed, its input signal switches to the window that is currently selected (**D**).
- When an input is selected, pressing its button again mutes the input. The input signal turns off and the window closes. The button flashes while the input remains muted. To unmute the input, press its button again. When an input is muted or unmuted, the window in which it was displayed opens or closes using the currently selected window transition effect. The Window Configuration menu lets you select a transition effect (for example, dissolve, curtain, or square wipe) with which the window will open or close (the default effect is **cut**) (see **Window Configuration Menu** on page 24).
- C** **Virtual video input selection buttons** — Press these buttons to select inputs 5 through 19. These inputs can be configured via remote control to accept standard definition component video, S-video, or composite video signals only. These inputs are referred to as “virtual” inputs because they can be configured as a variety of combinations of component, S-video, and composite video through SIS commands, the Windows-based control software, or the MGP Pro web pages. They cannot be configured via the front panel.

The virtual input buttons are arranged in five columns of three buttons each, reflecting the arrangement of the virtual input connectors on the rear panel.

Like the buttons for the four fully configurable inputs, the virtual input buttons light when pressed. Repeated pressing of a virtual input button toggles between muting and unmuting the input. When you press an input button connected to a component video source, all three buttons in its column light. If you press a button connected to an S-video source, the top two buttons in the column light. When a composite video source is selected, only one button lights.

NOTE: Only one input can be selected in each column.

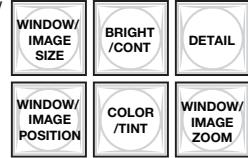
- D Window Select buttons** — Press these buttons to select, activate, or adjust one of the windows. While a window is selected, all picture controls are associated with it. The MGP 464 Pro models have four window selection buttons and the MGP 462 Pro models have two.



- E Window Preset button** — Press the Preset Recall/Save and Enter buttons to save or recall window presets (see [Window Presets](#) on page 36).



- F Picture control buttons** — Press these buttons to adjust window and image size, position, brightness, range of dark and light values (contrast), color, tint, detail, and zoom (magnify or reduce) (see [Picture Controls](#) on page 34).



- G LCD screen** — This screen displays messages, menu information, and your selections (see [Menus, Configuration, and Adjustments](#) on page 16.)



- H Adjust knobs** — Turn these horizontal and vertical Adjust knobs to adjust picture controls and to scroll through preset memory slots and submenu options (see [Menus, Configuration, and Adjustments](#)).



- I Menu navigation buttons** — Press Menu to access the MGP Pro menu system and step through the menus. From each menu, press Next to step through its submenus (see [Menus, Configuration, and Adjustments](#)).



- J Config port** — This configuration port on a 2.5 mm TRS connector is an alternative to the RS-232/422 port on the MGP Pro rear panel. However, unlike the rear panel port, it supports only RS-232 (see [C Remote RS-232/422 connector](#) on page 8 for a description of the rear panel serial port).



Both of the MGP Pro serial ports are used for system configuration and control. Commands are received through these ports from the computer, using SIS commands or the control software. Both serial ports can be active at the same time.

The protocol for this configuration port is 9600 baud, 8 data bits, 1 stop bit, no parity, and always RS-232.

An optional 9-pin D to 2.5 mm TRS configuration cable is available from Extron and can be used to connect your computer to this port. Figure 12 shows the configuration and pin assignments of this cable.

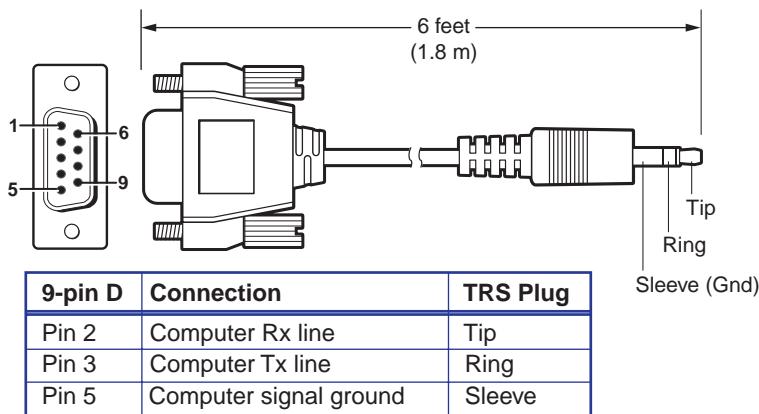


Figure 12. Optional 9-pin D to 2.5 mm TRS Cable for the Config Port

Power-up and Default Cycle

When you first plug the MGP Pro into a power source, the LCD screen displays an initial screen, which contains the product name, model, and firmware version. This is followed by the default cycle of screens showing the current input type for each window and the output resolution and refresh rate. These messages continue to cycle on the LCD screen when the menu system is not in use. The following flow diagram shows the order in which these screens appear.

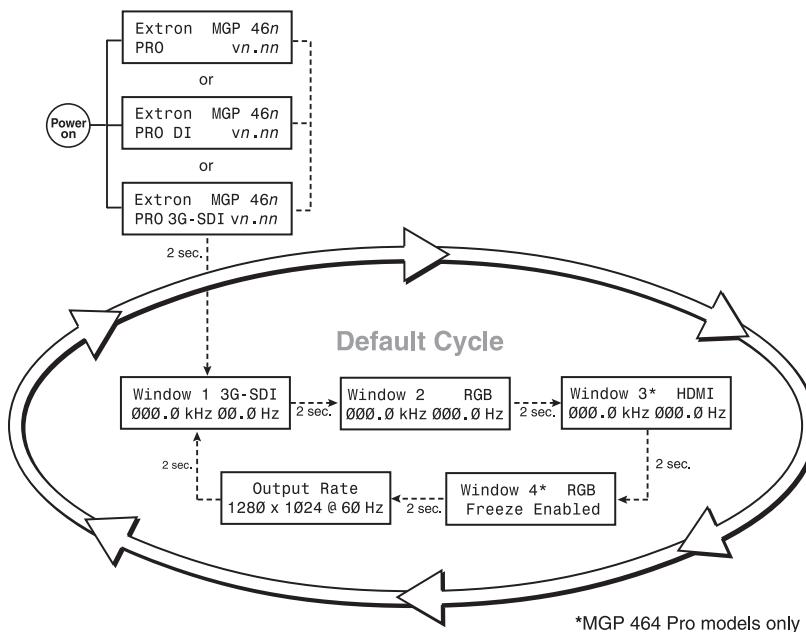


Figure 13. Default Cycle Example

NOTE: From any menu or submenu, the MGP Pro saves all adjustment settings and times out to the default screens after 20 seconds of inactivity.

Window Select Buttons

The MGP Pro front panel contains two (MGP 462 Pro) or four (MGP 464 Pro) Window Select buttons. Use these buttons in conjunction with the Input buttons to specify which window displays an input, or use them with the picture control buttons to specify which window or image will be adjusted.

When you select a picture control, the window whose button was previously selected is affected (see **Picture Controls** on page 34 for information on the available controls.)

To select a window, press its Window Select button, which lights. To deselect a window, press any other Window Select button.

Input Selection

The MGP Pro front panel contains a set of four input buttons that enable you to select RGB, HD component video, S-video, or composite video inputs for windows 1 through 4. On DI and 3G-SDI models, these buttons can select the HDMI or SDI input.

The front panel also contains 15 virtual input buttons that enable you to select only component video, S-video, or composite video inputs.

Selecting an Input

Before you can select an input, you must first select a window, as follows:

1. Press the Window Select button for the window in which you want the input to be displayed.
2. Press the button for the input you want to display.

For example: If you have a computer connected to input 1 and you want to display the computer output in window 4, press Window Select button 4, then press input button 1.

Muting an Input

To mute the currently selected input (turn off its signal and close the window on the display), press its Input button again. The button backlight blinks continuously, which indicates that the input is muted.

When an input is muted or unmuted, the currently selected transition effect (cut, wipe, or dissolve), if any, is used to close or open the window on the output display (see [Window Effect submenu](#) on page 25 for information on transition effects).

To unmute the input, press its button again. The button backlight stops flashing and returns to a steady light.

Menus, Configuration, and Adjustments

The MGP Pro menus enable you to configure the processor. The menu navigation buttons (Menu and Next) are located below and to the left of the LCD screen. Press these buttons to cycle through the available menu and submenu options.

Menu System Overview

The MGP Pro menu system consists of a main menu with nine options (menus). Each of these nine menus has a set of submenus, which enable you to make desired adjustments (see the Main Menu Flow diagram in [figure 14](#) on page 18).

Using the menus

Access the different levels of menus by pressing the **Menu** and **Next** buttons and turning the Adjust knobs as follows:

1. **Main menu access** — To access the main menu, press the Menu (left) button, located below and to the left of the LCD screen. The first main menu option (**Auto Image**) is displayed on the screen.
2. **Main menu options (menus)** — By repeatedly pressing the Menu button, you cycle through the main menu options. Press the Menu button repeatedly until the desired menu is displayed.

- 3. Submenu options** — When the Main menu item that you want to configure is displayed on the LCD screen, press the Next button (at the right of the Menu button) to cycle through the submenu options of the displayed menu.
- 4. Adjustments** — With a desired submenu option displayed, rotate the horizontal (◀▶) and vertical (▲▼) Adjust knobs clockwise or counterclockwise to display and select the parameters available for the option.
- 5. Implementation** — To save and implement the adjustments you have selected, do one of the following:
 - Press Next to display another submenu option to adjust.
 - Press Menu repeatedly until the Exit menu screen appears, then press Next.
 - Do nothing more, and wait until the LCD screen returns to the default cycle.

Your adjustments remain in effect until you change them or reset the unit to factory defaults (see **Resetting** on page 40).

NOTE: The menus time out and the default cycle displays after 20 seconds of inactivity. However, any selections you made with the Adjust knobs are saved and remain in effect.

Main menu flow

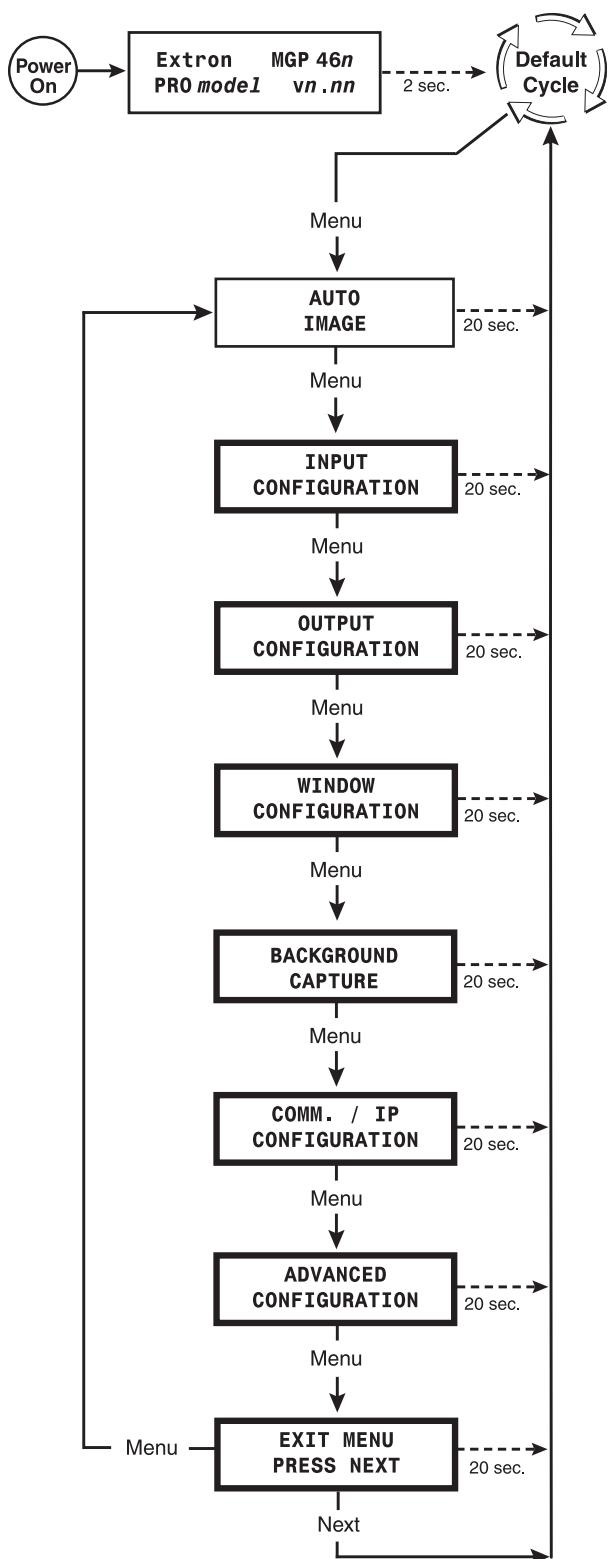


Figure 14. Main Menu Flow

Auto Image Menu

The Auto Image menu causes the MGP Pro to perform an automatic image adjustment in the selected window. Auto Image measures where the active area starts and stops, and adjusts input sampling accordingly, so that the image fills the window.

When an input is connected, the processor measures the sync frequencies of the incoming video source and sets the active image area, total image area, and sampling frequency according to a table stored on the MGP Pro. If an unknown input is connected to the MGP Pro, the processor measures and estimates the resolution of the incoming video. If the estimate proves inaccurate, the Auto Image function makes measurements to more accurately set up the input sampling.

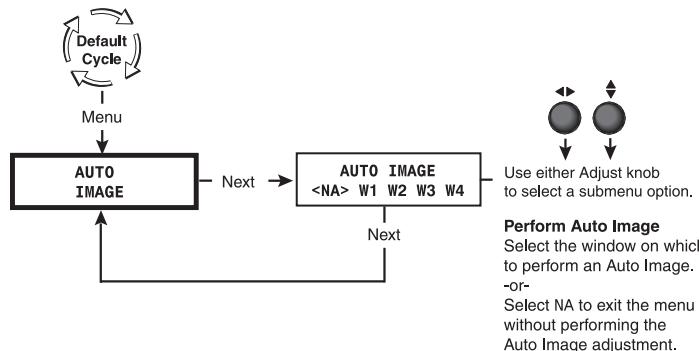


Figure 15. Auto Image Menu Flow

To perform an Auto Image adjustment:

1. Press the Menu button once to display the Auto Image menu.
2. Press the Next button once to display the available options.
3. Rotate the horizontal (\leftrightarrow) or vertical ($\uparrow\downarrow$) Adjust knob to select the window for which you want to perform Auto Image.
4. Press Next again to perform the Auto Image.
5. If desired, repeat steps **3** and **4** for any other windows for which you want to perform an automatic image adjustment.
6. When finished with Auto Image, do one of the following:
 - Select NA and press Next.
 - Press the Menu button.
 - Do nothing and wait for the menu to time out.

Input Configuration Menu

The Input Configuration menu allows you to select a video signal type for each of the four fully configurable inputs. All of these inputs can accept the following video signals: RGB, YUV-HD, YUVi, RGBcvS, S-video, composite video, HDMI (MGP Pro DI and 3G-SDI models only), and 3G/HD-SDI (MGP Pro 3G-SDI models only). RGB is the default. You can also select the horizontal and vertical start positions, pixel sampling phase for each window (except for YUVi, S-video, and composite video inputs), film mode, total pixels, active pixels, and active lines for each input. Rotate the horizontal Adjust (\blacktriangleleft) knob to cycle through and select one of the four inputs, and the vertical Adjust knob (\blacktriangleright) to adjust the setting.

NOTE: From any menu or submenu, the MGP Pro saves all adjustment settings and times out to the default screens after 20 seconds of inactivity.

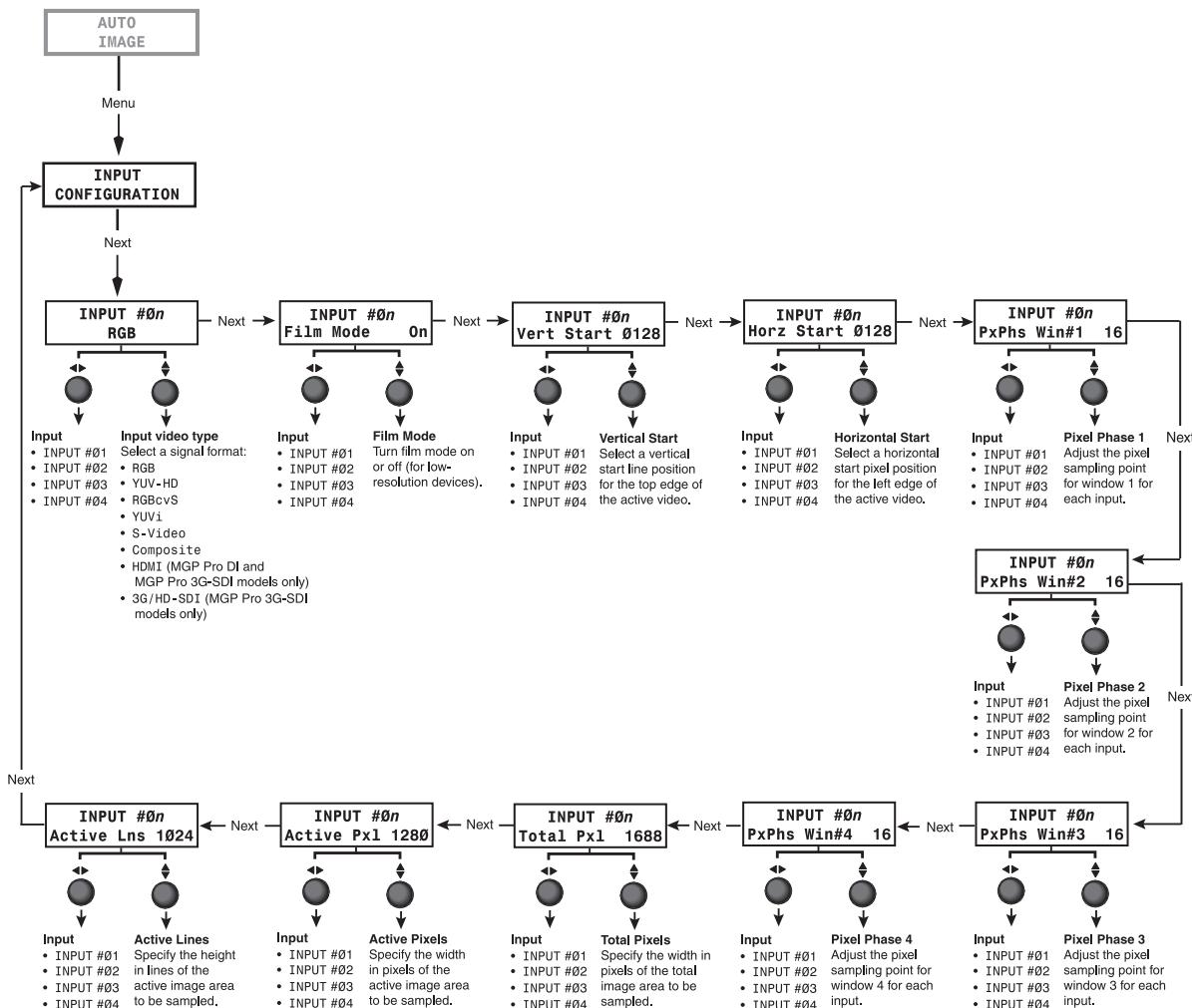


Figure 16. Input Configuration Menu Flow

NOTE: The 15 virtual inputs (numbered 5 through 19) cannot be configured from the front panel. You must use SIS commands or the Windows-based control software to configure them.

Input configuration submenu adjustments

The table below shows how to make the selections and adjustments that are accessed through the Input Configuration submenus.

Input Configuration Submenu	Horizontal Knob Adjustment	Vertical Knob Adjustment
Video type Accepted video signal types include: RGB S-video RGBcvS 3G/HD-SDI (MGP Pro 3G-SDI models only) YUV-HD Composite video YUVi HDMI (MGP Pro DI and MGP Pro 3G-SDI only)	Select input 1, 2, 3, or 4.	Select the desired video format for the displayed input. Default is RGB
Film mode For low resolution inputs. The video signal type for the input you are configuring must be set to YUVi, composite video, or S-video in order to place the input in film mode.	Select input 1, 2, 3, or 4. Shows the current film mode status for the displayed input: On , Off , or na (not applicable).	Select On or Off to turn 3:2 or 2:2 pulldown (film mode) on and off for the selected input.
Vertical start position The distance in pixels from the top edge of the total video input display area to the top edge of its active area.	Select input 1, 2, 3, or 4. Shows the current vertical start point for the displayed input.	Increase or decrease the distance in pixels from the top edge of the total video display area to the top edge of its active area. Default is 128 .
Horizontal start position The distance in pixels from the left edge of the total video input display area to the left edge of its active area.	Select input 1, 2, 3, or 4. Shows the current horizontal start point for the displayed input.	Increase or decrease the distance in pixels from the left edge of the total video display area to the left edge of its active area. Default is 128 .
Pixel phases 1 through 4 The point at which pixels are sampled for the selected window. (These values cannot be changed when the input is HDMI, YUVi, S-video, or composite video.)	Select input 1, 2, 3, or 4 for the selected window.	Increase or decrease the displayed value to move the pixel sampling point for the selected window to an optimal sampling point that ensures output clarity. The range of settings is Ø-31 . Default is 16 .
Total pixels The width in pixels of the total video display area. (The values cannot be changed for HDMI, YUVi, S-video, or composite video inputs.)	Select input 1, 2, 3, or 4.	Increase or decrease the width in pixels of the total video display area of the selected input. The default width is marked with an asterisk (*) on the LCD screen.
Active pixels The width in pixels of the active video area.	Select input 1, 2, 3, or 4.	Increase or decrease the width in pixels of the active video area of the selected input. The default width is marked with an asterisk (*) on the LCD screen.
Active lines The height in lines of the active video area.	Select input 1, 2, 3, or 4.	Increase or decrease the height in lines of the active video area of the selected input. The default width is marked with an asterisk (*) on the LCD screen.

Output Configuration Menu

The Output Configuration menu allows you to set output resolution, refresh rate, output signal type, and sync polarity. The following flow diagram shows the Output Configuration submenus and the adjustments that can be made from them.

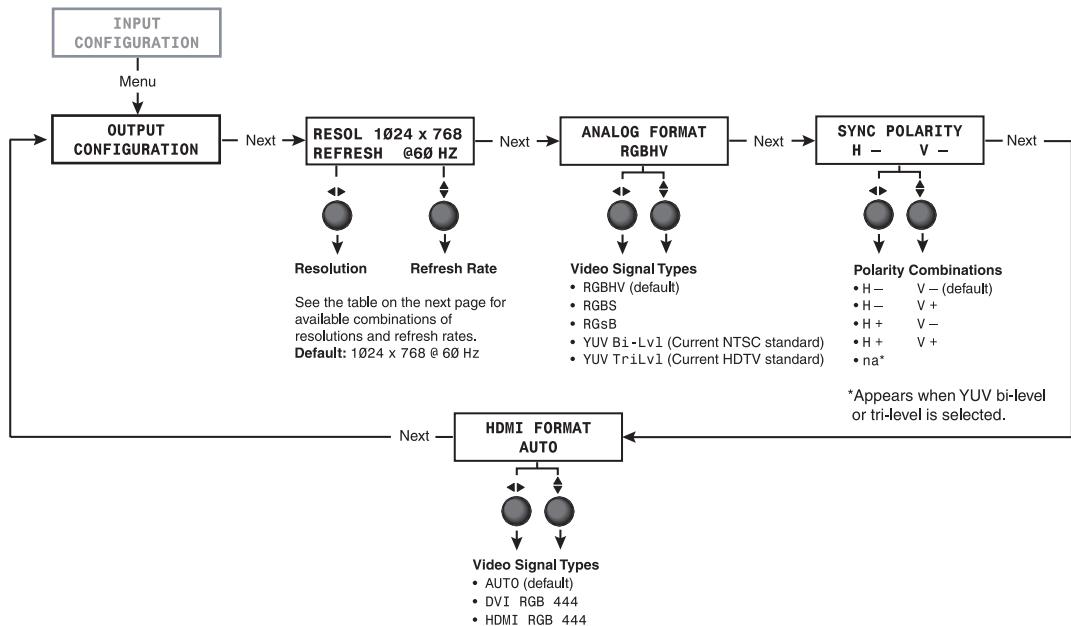


Figure 17. Output Configuration Menu Flow

Resolution and Refresh Rate submenu

While this submenu is displayed, rotate the horizontal Adjust (\blacktriangleleft) knob to select one of the available resolutions, or rotate the vertical Adjust (\blacktriangledown) knob to select one of the available refresh rates. The resolutions and refresh rates are listed in the **table** on the next page.

NOTE: The sync type and polarity options are available for the RGB output while the background timings are used. If available, the output of the MGP Pro is locked to the HDMI background rate until you select a different resolution or disconnect the HDMI background input.

By default, the resolution provided in the Extended Display Identification Data (EDID) is the last selected factory rate. To manually set the resolution information provided in the EDID data, see the **EDID Resolution and Refresh Rate commands** on page 51.

Resolution	Refresh Rates in Hz									
	50 Hz	60 Hz	72 Hz	96 Hz	100 Hz	120 Hz	24 Hz	59.94 Hz	29.97 Hz	30 Hz
640 x 480	X	X	X	X	X	X				
800 x 600	X	X	X	X	X	X				
852 x 480	X	X	X	X	X					
1024 x 768	X	X	X	X						
1024 x 852	X	X	X	X						
1024 x 1024	X	X	X							
1280 x 768	X	X	X	X						
1280 x 1024	X	X	X							
1360 x 765	X	X	X							
1365 x 768	X	X	X							
1366 x 768	X	X	X							
1365 x 1024	X	X								
1400 x 1050	X	X								
1600 x 1200	X	X								
480p		X						X		
576p	X				X					
720p	X	X						X		
1080i	X	X						X		
1080p	X	X					X	X	X	X
1280 x 800	X	X	X							
1360 x 768	X	X								
1440 x 900	X	X	X							
1680 x 1050		X								
Sharp 1080p ¹		X								
1920 x 1200	X	X								
1080p CVT		X								
2048 x 1080	X	X					X	X	X	X
LIVE BCKGD ² Rate	Resolution and clock of the incoming background input									

¹An HDTV 1080p rate specifically tailored to Sharp® Professional displays (such as the G655u).

²When LIVE BCKGD is selected as the output resolution/rate, the MGP Pro uses the incoming HDMI background input resolution and clock as the output rate.

Analog Format submenu

Rotate either the horizontal Adjust ($\blacktriangleleft\triangleright$) or the vertical Adjust ($\blacktriangleup\blacktriangledown$) knob to select the analog output signal type required by the display device. Available signal types are RGBHV, RGsB, RGBS, YUV bi-level and YUV tri-level. The default is RGBHV.

Sync Polarity submenu

The display device may require a particular combination of horizontal (H) and vertical (V) sync signal polarities. Rotate either the horizontal Adjust ($\blacktriangleleft\triangleright$) or the vertical Adjust ($\blacktriangleup\blacktriangledown$) knob to select the sync polarity. The options are H-V-, H+V-, H-V+, H+V+, or na (appears when YUV Bi-lvl or YUV TriLvl is selected). The default is H-V-.

HDMI Format submenu

Rotate either Adjust knob to select the digital format of the HDMI output. If you select AUTO, the MGP Pro detects the EDID from the connected display and determines if it supports the transmission of the ancillary data containing the information frame.

To manually specify whether the data is transmitted, select the DVI RGB 444 or HDMI RGB 444 option (RGB 444 is the DVI or HDMI colorspace).

Window Configuration Menu

The Window Configuration menu allows you to set window front/back priority, add colored borders to the windows, select which window transition effect to use when muting (closing) and unmuting (displaying) a window, and specify the duration of the selected effect.

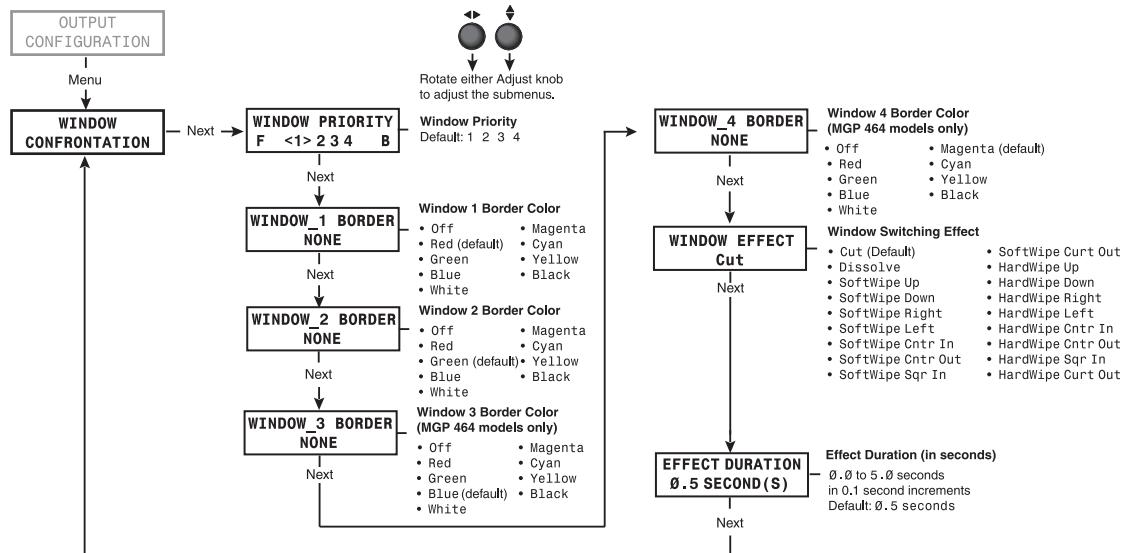


Figure 18. Window Configuration Menu Flow

Window Priority submenu

The Window Priority submenu allows you to set how the windows will overlap one another or “stack” on the display. For example, by default the window with priority 1 is displayed in front of all the other windows. If the top priority window is sized to fill the screen, the other windows are not visible.

By default, the Window Priority submenu displays the numbers of the windows in order, from left to right, with window 1 having first priority.

To change the priority of a window:

1. Press the Menu button repeatedly until WINDOW CONFIGURATION is displayed on the LCD screen.
2. Select a window by rotating the vertical Adjust (▲) knob to move the angle brackets on the LCD screen to the number of the window whose priority level you want to change.
3. Rotate the horizontal Adjust (◀▶) knob to move the bracketed window number to the desired priority position. For example, if you want window 2 to display in front of all the other windows (priority 1), move <2> all the way to the left, following the letter F on the LCD screen.
4. Repeat steps 1 and 2 as desired for each additional window whose priority you want to change.

Window Border submenus

Use these submenus (one for each window) to select colored borders for the windows. Turn either Adjust knob to display the available options: Red, Green, Blue, White, Magenta, Cyan, Yellow, and Black. You can also select Off, which specifies no border. The defaults are Red for window 1, Green for window 2, Blue for window 3, and Magenta for window 4.

Window Effect submenu

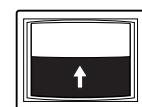
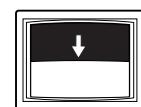
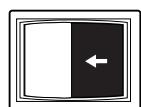
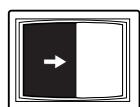
Use this submenu to select a transition effect for the MGP Pro to use when muting and unmuting windows. To select a transition effect:

1. Press the Menu button repeatedly until WINDOW CONFIGURATION is displayed on the LCD screen.
2. Press the Next button repeatedly until WINDOW EFFECT is displayed.
3. Rotate either the horizontal Adjust (◀▶) or the vertical Adjust knob (▲) to select a transition effect.

Available effects

- **Cut** — A cut instantly mutes or unmutes the window. The effect duration does not apply.
- **Dissolve** — A dissolve causes the window to fade in or out.
- **Standard wipe** — A standard wipe causes the new window to appear to unroll over the other one. The new window can roll from the top, bottom, left, or right.

A standard wipe can have a soft (fuzzy) or a hard (sharp) leading edge.



- **Center wipe** — A center wipe causes the new window to appear to unroll over the other one in one of two ways:

- In from the top and bottom edges to the center of the window
- Out from the center to the top and bottom edges of the window

A center wipe can have a soft (fuzzy) or a hard (sharp) leading edge.



- **Square wipe** — A square wipe causes the new window to appear to unroll over the other one in one of two ways:

- In from the top, bottom, right, and left edges to the center of the window
- Out from the center to the four edges of the window

This effect creates a square shaped transition.

A square wipe can have a soft (fuzzy) or a hard (sharp) leading edge.



- **Curtain wipe** — A curtain wipe causes the new window to appear to unroll over the other one in one of two ways:

- In from the left and right edges to the center of the window
- Out from the center to the right and left edges of the window

A curtain wipe can have a soft (fuzzy) or a hard (sharp) leading edge.



Effect Duration submenu

Use this submenu to set the amount of time the MGP Pro takes to complete a transition effect. Select from durations ranging from 0.0 to 5.0 seconds, in 0.1 second increments. (Duration is not available with the cut effect.)

To set an effect duration,

1. Press the Menu button repeatedly until the WINDOW CONFIGURATION menu is displayed.
2. Press the Next button until EFFECT DURATION is displayed.
3. Rotate either the horizontal (↔) or the vertical (↑) Adjust knob to select an effect duration.

Background Capture Menu

The Background Capture menu allows you to capture the image currently on the output screen and save it as a bitmap (.bmp) file with one of 16 designated image names. You can then recall the image and use it as a background.

Background Capture also can be done via the Windows-based control software (see the MGP Series Control Program help file).

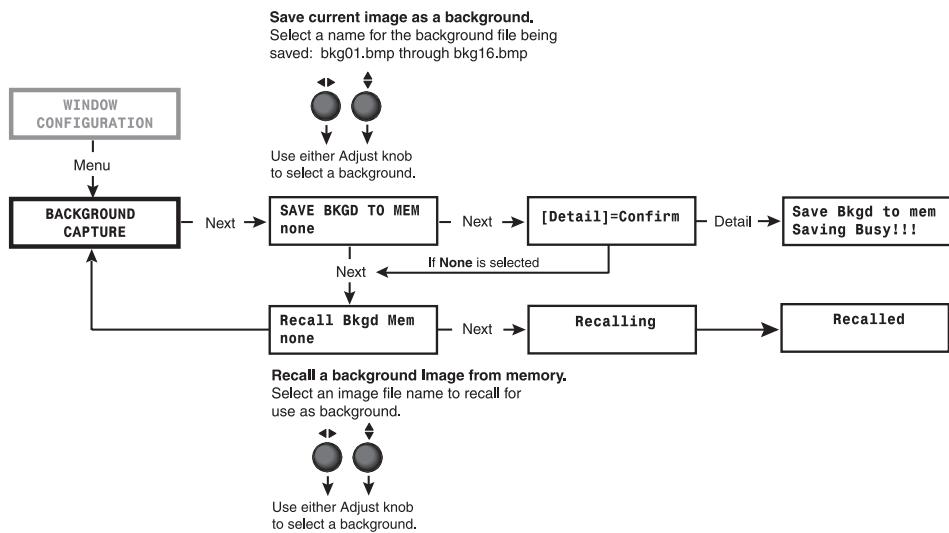


Figure 19. Background Capture Menu Flow

Memory space for background files

The MGP Pro has 16 MB of user storage space that can be used for saved backgrounds and uploaded user web pages. The number of images that you can save depends on the size (in kBytes) of the image bitmap file and the resolution. The following table shows examples of the number of images you can store based on resolution.

Resolution	640 x 480	800 x 600	1024 x 768	1280 x 1024	1400 x 1050	1600 x 1200	1080p
Image Size (kB)	900.00	1406.25	2304.00	3804.00	4306.64	5625.00	6075.00
Total Images	16	11	6	4	3	2	2

To calculate the size of a bitmap file for any image of any specified size, use this formula:

$$\text{file size} \text{ (in kilobytes)} = (\text{horizontal} \times \text{vertical} \times 3) + 54 \text{ (file header ID)}$$

Saving a background to memory

To save the current image to memory for use as a background,

1. Press Menu repeatedly until BACKGROUND CAPTURE is displayed.
2. Press Next to display SAVE BKGD TO MEM.

3. Rotate either Adjust knob to select a background file name (bkg01.bmp through bkg16.bmp) with which to save the image.

NOTE: You can save the background image only under one of the file names on this menu (you cannot create a different name for it). However, images loaded via the Windows-based control software (IP Link File Manager) or via the MGP Pro web pages can be given any desired file names (see the MGP Series Control Software help file or [Using the File Management Page](#) on page 93 for methods of saving files under new names).

If you do not want to save the image, select **None** on the LCD screen, then press Next. The RECALL BACKGROUND submenu screen is displayed.

4. Press the Next button to save the image as a bitmap (.bmp) file. The LCD screen displays [Detail] = Confirm.

NOTES:

- The unit supports 24-bit bitmap files only. Their file names must have no more than 16 characters, including the .bmp extension.
- The image that you save overwrites any existing image file with the same file name.

5. Press the Detail button (the top button located at the immediate left of the LCD screen).

The LCD screen displays **SAVE BKGR MEM Saving Busy!!!** The time the MGP Pro takes to save an image varies depending on the image file size. For example, a 1024x768 pixel image takes about 150 seconds to save. A very large image combined with a high output resolution could take as long as 5 minutes.

After 20 seconds, the MGP Pro displays the default cycle, but the Menu and Next buttons continue to blink until the image capture is complete.

NOTE: The unit continues to respond to commands while it is saving an image. However, the response time is longer. Attempting to save or recall another background image during this process is not recommended.

6. If you want to recall a background file for the output display, press Next within 20 seconds.

Recalling a background from memory

To recall an image from memory for use as a background,

1. Press Menu repeatedly until BACKGROUND CAPTURE is displayed.
2. Press Next repeatedly until RECALL BKGD MEM is displayed.
3. Rotate either Adjust knob to select one of background image files to recall for use as the output background.

To perform **no** action, press the Menu button.

4. Press the Next button to recall the image. The LCD screen displays **Recalling** while the image is being recalled, then **Recalled** after the recall is completed.

Comm./IP Configuration Menu

Use the Comm./IP Configuration menu to view and edit the serial communication port configuration and the MGP Pro IP addresses. The Comm./IP Configuration menu consists of two levels: view and edit.

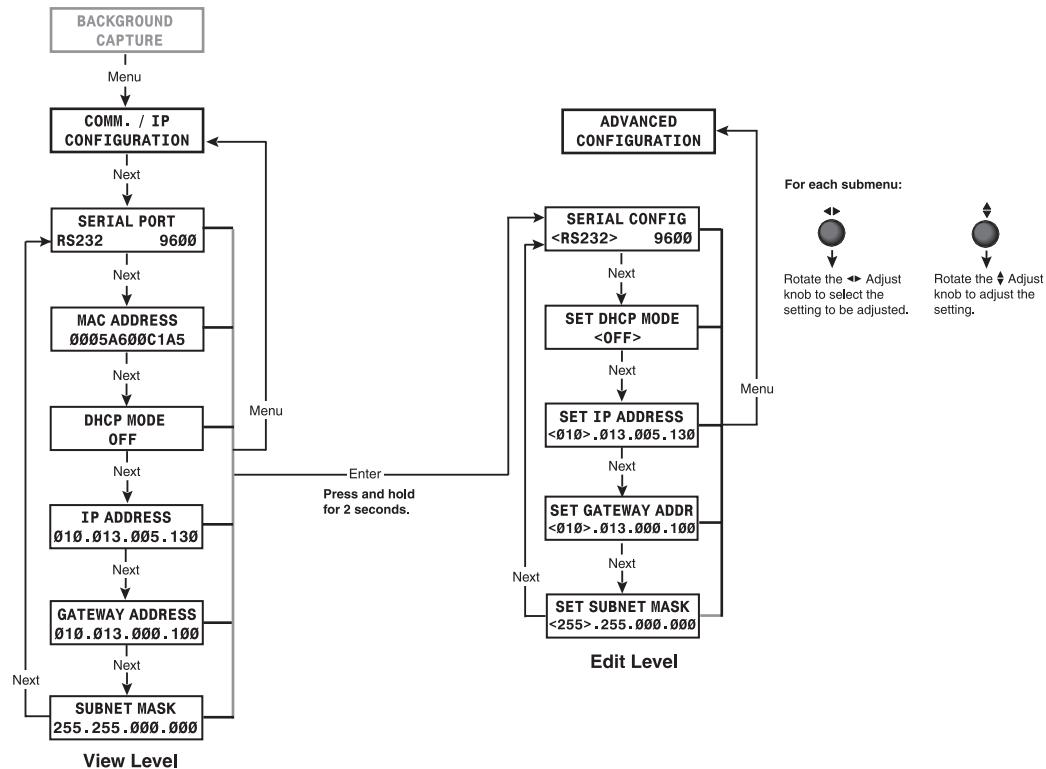


Figure 20. Communication/IP Configuration Menu Flow

Viewing serial port and IP settings

When you first reach the Comm./IP Configuration menu, the view level is displayed. At this level, all the screens that you cycle through by pressing Next show the current settings. The Adjust knobs are disabled and you cannot make changes from the screens.

To view the serial port and IP settings:

1. Press Menu repeatedly until COMM. / IP CONFIGURATION is displayed.
2. Press Next repeatedly to cycle through the screens displaying the current settings for the serial port, MAC address, DHCP mode, IP address, gateway address, and subnet mask.
3. Press Menu to return to the Comm./IP Configuration screen.

Making changes to the serial port and IP configuration

To make changes to the serial port configuration, IP address, DHCP mode, gateway address, and subnet mask, access the edit level screens as follows:

1. With any Comm./IP Configuration menu view-level screen displayed, press the Enter button and hold it until the Serial Config screen appears (approximately 2 seconds).
2. Press Next repeatedly to cycle through the edit level screens.
3. To enter or change information on each screen, rotate the horizontal Adjust knob (\leftrightarrow) to move the angle brackets to the desired setting. Rotate the vertical Adjust knob ($\uparrow\downarrow$) to adjust the setting.

- When finished editing the settings for the selected item, either press Next to display the editing screen for the next item, or press Menu to exit serial and IP edit mode and display the next menu (Advanced Configuration).

The following screens are provided for editing parameters:

- **Serial Config:** Configure the serial port by switching between RS-232 and RS-422, and selecting the baud rate.
 - **Set DHCP Mode:** Set DHCP to On or Off.

NOTE: DHCP must be off before you can edit the IP addresses.

- **Set IP Address:** Set the IP address.
 - **Set Gateway Addr:** Set the gateway address.
 - **Set Subnet Mask:** Set the subnet mask.

NOTE: The MAC address has no screen in this mode because it cannot be edited.

Advanced Configuration Menu

Use the Advanced Configuration menu to set the background color, turn blue mode on and off, and select test patterns. You can also view the internal temperature of the MGP Pro and reset the system to its factory default settings.

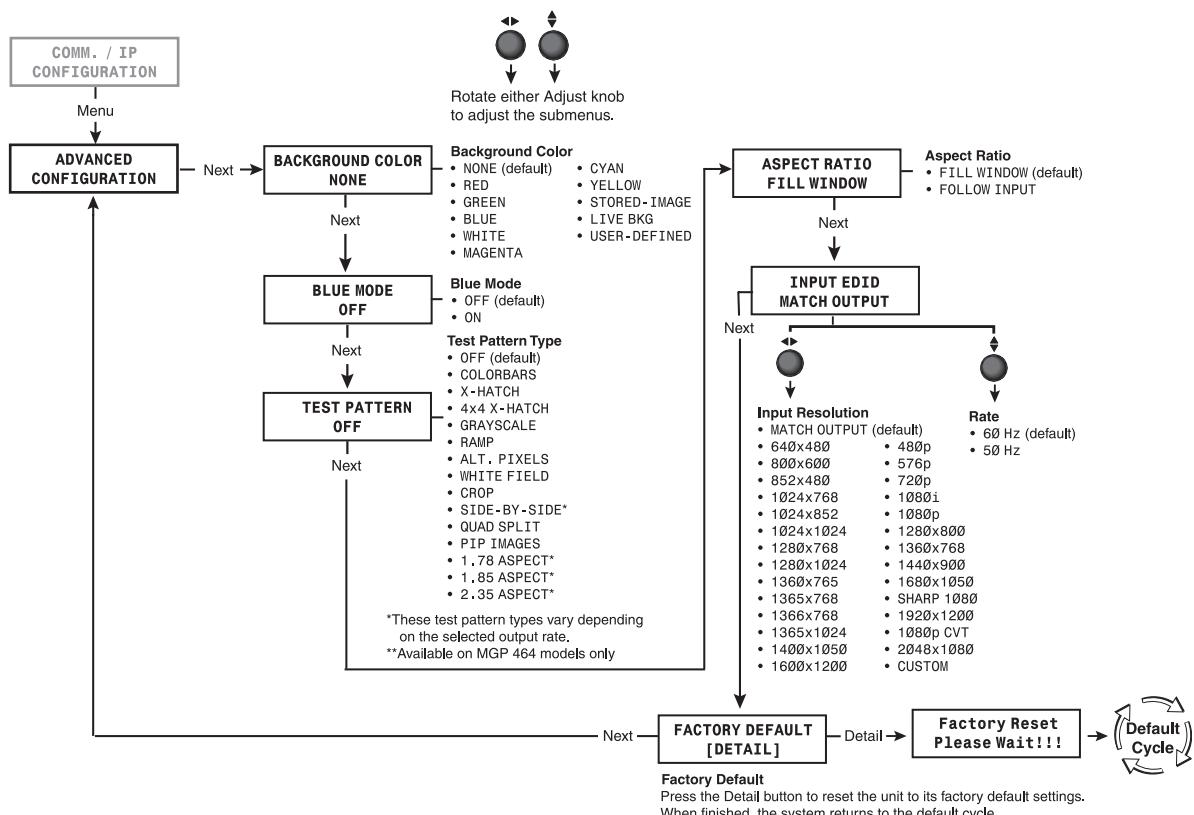


Figure 21. Advanced Configuration Menu Flow

Background Color submenu

Rotate either Adjust knob to select a background color for the output screen. Options are NONE, RED, GREEN, BLUE, WHITE, MAGENTA, CYAN, YELLOW, STORED - IMAGE, LIVE BKG, and USER DEFINED.

- NONE, the default setting, produces a black background.
- STORED - IMAGE is the saved background that was most recently recalled. Select this option if you want to return to the recalled background after having changed to a different background color.
- LIVE BKG displays the unscaled image from the live background input as the background on the screen. When this option is selected, the MGP Pro changes the output rate to match that of the live background source.

The output rate remains set to the live background rate until the rate is manually switched back to the factory default resolution. This provides clean transitions between the live background and stored images or background colors.

NOTE: The live background input does not support the 1080i resolution.

Blue Mode submenu

Blue mode causes only sync and blue video signals to be passed to the display. This can aid in the setup of the color and tint of video inputs on the MGP Pro. While the blue mode submenu is displayed, rotate either Adjust knob to turn blue mode on and off.

Test Pattern submenu

Several test patterns are available via this submenu to adjust the display device for color, convergence, focus, resolution, contrast, grayscale, and aspect ratio. Use either Adjust knob to select a test pattern. The available pattern selections are:

- OFF (default)
- COLORBARS (8 color bars)
- X-HATCH (16 x 12 crosshatch)
- 4x4 X-HATCH (4 x 4 crosshatch)
- GRayscale
- RAMP
- ALT. PIXELS (alternating pixels)
- WHITE FIELD
- CROP
- SIDE-BY-SIDE (4 x 3 or 16 x 9 side-by-side crop)
- QUAD SPLIT (4 x 4 quad split)
- PIP IMAGES (4 x 3 or 16 x 9 picture-in-picture images)
- 1.78 ASPECT (film aspect ratio 1.78)
- 1.85 ASPECT (film aspect ratio 1.85)
- 2.35 ASPECT (film aspect ratio 2.35)

See **figure 22** on the next page.

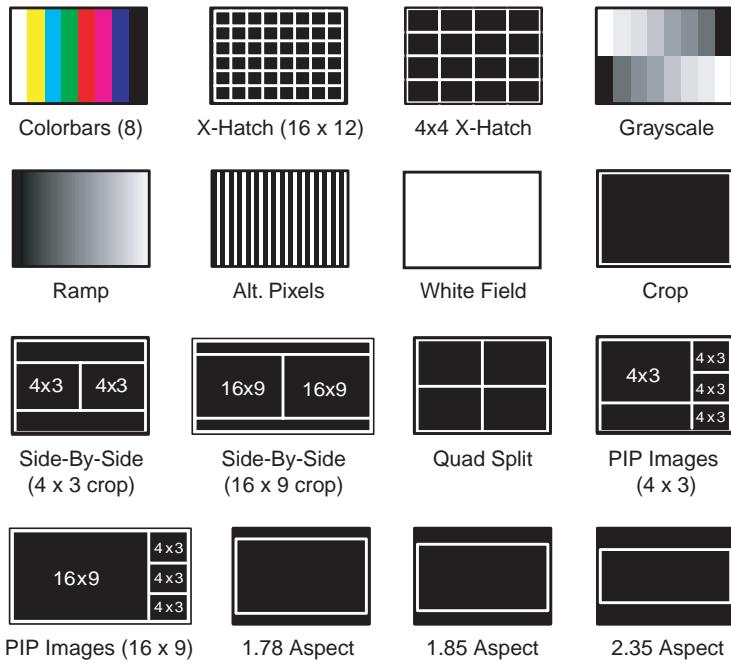


Figure 22. Test Patterns Available for the MGP Pro

NOTE: On the MGP 462 Pro models, all of the above test patterns are available except 4x4 Quad Split, 4x3 PIP Images, and 16x9 PIP Images.

Some of the test patterns available from the submenu vary depending on the selected output rate. For example, if a 4x3 output rate is selected, the 4x3 side-by-side crop and aspect ratio patterns appear. If a 16x9 output rate is selected, the 16x9 side-by-side crop and aspect ratio patterns appear.

Aspect Ratio submenu

Rotate either Adjust knob to select the aspect ratio of the image relative to the window in which it is displayed. The options are:

- **FILL WINDOW** — Each input signal fills the entire display raster (default).
- **FOLLOW INPUT** — Each input signal is displayed with its native aspect ratio.

Input EDID submenu

This submenu lets you define resolutions and refresh rates (EDID) for all the digital inputs and the live background input. The default is CUSTOM.

NOTE: The selected EDID is assigned to **all** the configurable inputs, including the live background.

The following EDID settings are available:

Resolution	50 Hz	60 Hz
Match Output	—	—
640 x 480	X	X
800 x 600	X	X
852 x 480	X	X
1024 x 768	X	X
1024 x 852	X	X
1024 x 1024	X	X
1280 x 768	X	X
1280 x 1024	X	X
1360 x 765	X	X
1365 x 768	X	X
1366 x 768	X	X
1365 x 1024	X	X
1400 x 1050	X	X
1600 x 1200	X	X
480p		X
576p	X	
720p	X	X
1080i	X	X
1080p	X	X
1280 x 800	X	X
1360 x 768	X	X
1440 x 900	X	X
1680 x 1050		X
*Sharp 1080p		X
1920 x 1200	X	X
1080p CVT		X
2048 x 1080	X	X
Custom	—	—

* An HDTV 1080p rate specifically tailored to Sharp® Professional displays (such as the G655u)

Internal Temperature screen

The Internal Temp submenu displays the current internal temperature of the unit. The MGP Pro displays the temperature in degrees Fahrenheit and Celsius. This is an information-only screen and no adjustments can be made on it.

Factory Default submenu

This submenu lets you reset the MGP Pro to the default settings with which it was delivered from the factory. Press the Detail button to initiate the reset.

Adding and Configuring Window Text

You can add a text box or label containing up to 16 characters to each window. You can also specify several parameters for the text label, including text size and color, label background color, label border color, and the position of the text box on the screen.

These window text specifications cannot be made from the front panel. You can create and configure the label using the Windows-based control software (see the software help file) or SIS commands via the serial or LAN ports (see the **Remote Configuration and Control** section beginning on page 42).

Picture Controls

The MGP Pro has six picture control buttons located on the front panel to the left of the Menu button. You can use these buttons to adjust size, position, brightness and contrast, color and tint, detail, and magnification (zoom).

NOTES:

- Picture controls are window-dependent. You set the values separately for each window.
- For Window/Image Size, Window/Image Position, and Window/Image Zoom, press the button repeatedly to switch between window settings and image settings.

Adjusting the Picture Controls

Make image adjustments to an input by using the picture control buttons on the front panel. When you select one of these buttons, the button for the most recently selected window lights, indicating that the window is being adjusted.

To adjust the picture controls:

1. Press the Window Select button to select the window you want to adjust.
2. Press the Input button for the input that you want to adjust, if it is not currently selected.
3. Press the button for the desired picture control: Window/Image Size (sizing), Bright/Cont (brightness and contrast), Detail (sharpness), Window/Image Position (moving and centering), Color/Tint (color quality), or Window/Image Zoom (magnification).
4. Rotate the horizontal Adjust (↔) or vertical Adjust (↕) knob to select a level from the available range.
5. Repeat steps 1 through 4 for each image adjustment to be made for the selected input/window.

NOTE: The LCD screen may display NA in place of a number if that adjustment does not apply to the input video format.

Picture Controls Summary

The following table explains the functions of the Picture Control buttons and how to make adjustments.

In this table, image number *nn* is the input number.

Button	Display	Function	Range	Adjust Knob
Window/ Image Size	WINDOW_ <i>n</i> SIZE: H= <i>nnnn</i> V= <i>nnnn</i>	Enlarge or shrink window <i>n</i> .	Min: 1/16 of the output rate Max: Output rate	For H (width): Horizontal \leftrightarrow Adjust knob For V (height): Vertical \downarrow Adjust knob
	(Press button twice.) IMAGE # <i>nn</i> SIZE: H= <i>nnnn</i> V= <i>nnnn</i>	Enlarge or shrink the image of input <i>nn</i> within the window.	Min: 1/16 of the output rate Max: 2 times the output rate	
Bright/ Cont	BRIT CONT <i>nnnn nnnn</i>	Brightness: Increase or decrease intensity of video light on screen. Contrast: Increase or decrease range of image light and dark values.	Brightness: 0000 - 0127 Default: 0064 Contrast: 0000 - 0127 Default: 0064	Bright: Horizontal \leftrightarrow Adjust knob Contrast: Vertical \downarrow Adjust knob
Detail	DETAIL <i>nnnn</i>	Adjust image sharpness.	0000 - 0127 Default: 0064	Either Adjust knob
Window/ Image Position	WINDOW_ <i>n</i> CNTR: H= \pm <i>nnnn</i> V= \pm <i>nnnn</i>	Position the upper-left corner of window <i>n</i> on the display in relation to the display center.	Default: 0000 \pm the output rate	For H: Horizontal \leftrightarrow Adjust knob For V: Vertical \downarrow Adjust knob
	(Press button twice.) IMAGE # <i>nn</i> START: H= \pm <i>nnnn</i> V= \pm <i>nnnn</i>	Position the upper-left corner of the image of input <i>nn</i> within the window in relation to the window center.	Default: 0000 \pm the output rate	
Color/ Tint	COLOR <i>nnnn</i> TINT <i>nnnn</i>	Color: Adjust color intensity. (At the lowest adjustment, all colors are shades of gray.) Tint: Change the appearance of colors.	Color: 0000 - 0127 Default: 0064 Tint: 0000 - 0127 Default: 0064	Color: Horizontal \leftrightarrow Adjust knob Tint: Vertical \downarrow Adjust knob
Window/ Image Zoom	WINDOW_ <i>n</i> ZOOM: H= <i>nnnn</i> V= <i>nnnn</i>	Increase or decrease the size of the selected window while keeping the aspect ratio constant.	Min: 1/16 of the output rate Max: Output rate	For H: Horizontal \leftrightarrow Adjust knob For V:
	(Press button twice.) IMAGE # <i>nn</i> ZOOM: H= <i>nnnn</i> V= <i>nnnn</i>	Increase or decrease the size of the image of input <i>nn</i> in the selected window while keeping the aspect ratio constant.	Min: 1/16 of the output rate Max: 2 times the output rate	Vertical \downarrow Adjust knob

Auto Memories

Whenever changes are made to the settings described in the previous pages, the MGP Pro automatically saves the changes in memory. These settings are saved based on the input frequency and are later recalled when the identical resolution is applied to the configured input. These memory locations are separate from the input presets.

The following settings are saved by the auto memory feature:

Pixel phase	Percentage of window filled*
Total pixels	Brightness
Active pixels	Contrast
Active lines	Color
Vertical start	Tint
Horizontal start	Detail

*Image size and position are saved as a percent of the window, so that the auto memory can be used for any size window.

Memory Presets

A preset is a set of window or input parameters that you create and save as a file in MGP Pro memory. You can recall a saved preset and implement its settings at any time. A preset enables you to save time by applying a group of settings to your MGP Pro at one time.

Window Presets

The MGP Pro allows up to 128 window presets that save information for all the windows. Use the Preset Save/Recall and Enter buttons on the front panel to save and recall presets. Window presets can also be saved, recalled, and named using the Windows-based control software (see the software help file) or by SIS commands via the serial interface or an Ethernet connection (see the **Remote Configuration and Control** section beginning on page 42).

The following settings can be saved in a window preset:

Window border color	Background setting
Window priority	Window size/position
Window mute status	Image size/position in the window
Label text color	Brightness
Label text size	Contrast
Label location	Color
Label border color	Tint
Label background color	Detail

NOTE: The label text itself cannot be saved, because it is always the name of the input.

Saving a window preset

To save a window preset using the front panel buttons:

1. Set the parameters listed above as desired for windows 1, 2, 3, and 4.
2. Press and hold the Preset Recall/Save button for at least 2 seconds. The LCD screen displays the following:

WINDOW PRESET
Save To #001

3. Rotate either Adjust knob to select one of the 128 available window preset locations in which to save the settings.
4. Press the Enter button to save the current window setting in the preset location that you selected. The LCD screen shows a message indicating that the preset is being saved to the selected memory location, followed by a message that the preset has been saved.

The following examples show a preset saved to memory location 1:

WINDOW PRESET
Saving To #001

WINDOW PRESET
#001 SAVED

If you want to exit this menu without saving any changes, repeatedly press the Preset Recall/Save button until the following message appears on the LCD screen, then press the Enter button to exit the Window Presets dialog.

WINDOW PRESET
[ENTER] TO EXIT

Recalling a window preset

To recall a window preset using the front panel buttons:

1. Press and release the Preset Recall/Save button. The following message appears on the LCD screen:

WINDOW PRESET
Recall #001 woINP

2. If you want to recall the preset **without** the input whose number was displayed when the preset was saved (Recall #xxx woINP), proceed to step 3.

If you want to recall the preset **with** the input (Recall #xxx wINP), press the Preset Recall/Save button again. The following message appears:

WINDOW PRESET
Recall #001 wINP

If you select this option, the inputs change to display the sources that were displayed at the time the preset was saved.

3. Use either Adjust knob to select a window preset number to recall. Press the Enter button to recall the preset you selected. The LCD screen shows a message indicating that the preset was recalled (in the example below, preset 1 was recalled).

WINDOW PRESET
#001 RECALLED

If you want to exit this menu without recalling a preset, repeatedly press the Preset Recall/Save button until you see the Window Preset [Enter] to Exit message. Press the Enter button to exit the Window Presets dialog.

Default presets

Figures 23 and 24 show the factory default preset window configurations for the four-window and two-window models. These presets can be used for any output rate. If you overwrite them, you can recover them by selecting Factory Defaults from the Advanced Configuration menu (see [Advanced Configuration Menu](#) on page 30).

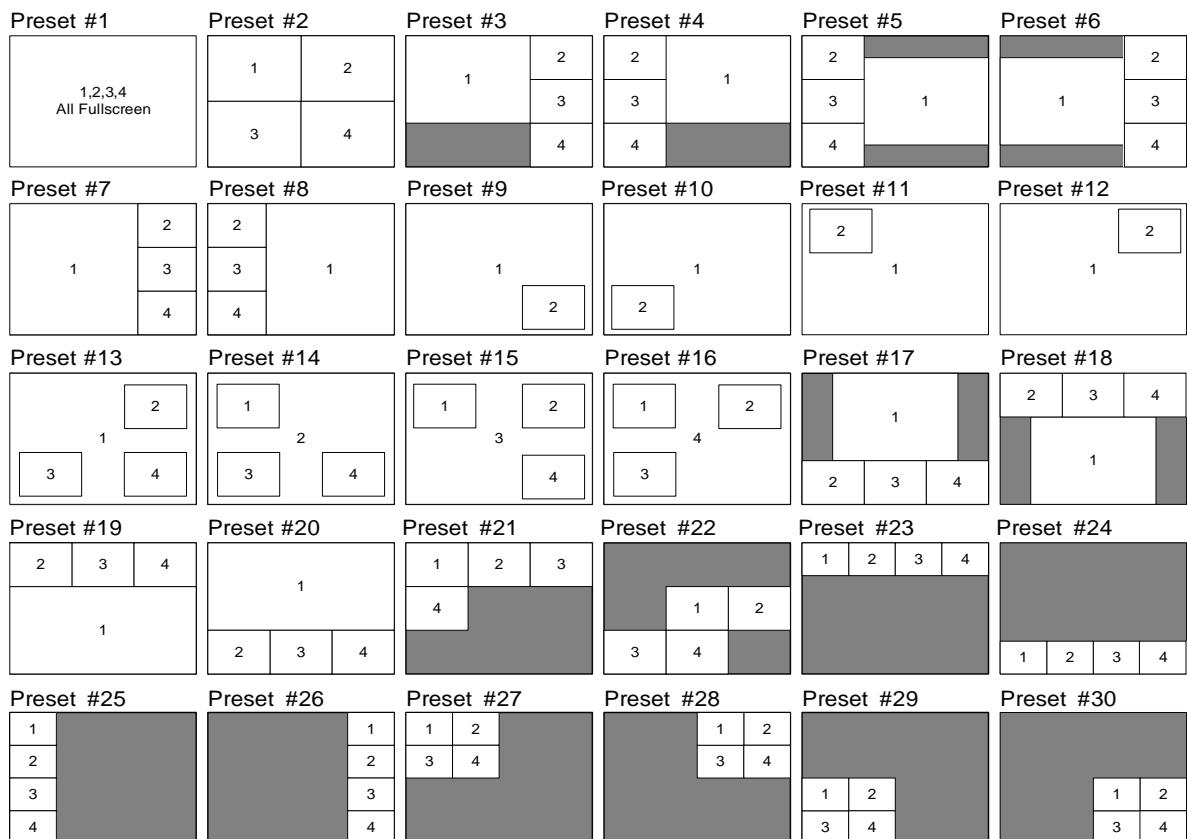


Figure 23. Factory Default Preset Configurations for MGP 464 Pro Models

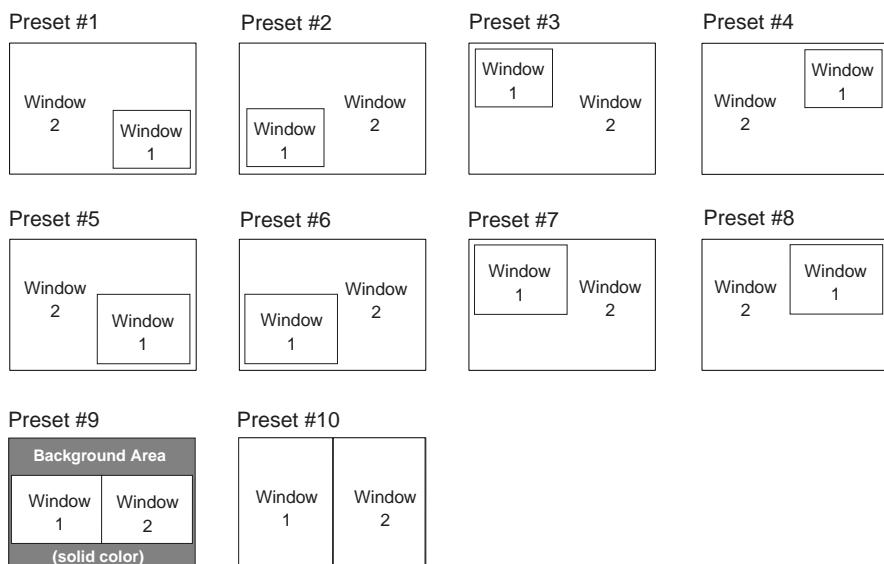


Figure 24. Factory Default Presets for MGP 462 Pro Models

Input Presets

The MGP Pro has 128 input preset slots, which can save signal type, input configuration settings, picture control settings, and window text for any of the inputs. These presets can be saved and recalled using the Windows-based control software (see the software help file) or by SIS commands (see the **Remote Configuration and Control** section beginning on page 42).

The following settings are contained in the input presets:

Input type	Horizontal start	Total pixels
Input name	Vertical start	Active pixels
Film mode On/Off	Pixel phase	Active lines
Brightness	Contrast	Color
Tint	Detail (sharpness)	Percentage of window filled*

*Image size and position are saved as a percent of the window, so that the input preset can be used for any size window.

NOTES:

- The 128 input presets are global, containing all of the settings for an input when the MGP Pro is used with a matrix switcher. This allows a matrix switcher with multiple types of video inputs to be connected to the MGP Pro to expand the number of input video sources.
- Each input should be switched into the MGP Pro, configured (window and image sizing, position, color, tint, brightness, contrast, and text label), then saved as a preset for recall by the control system when that input is sent from the switcher to any of the four MGP inputs.

Additional Functions

Freeze Mode

The front panel Freeze button is the first button on the left. Press this button to freeze the current image in the currently selected window. You can also freeze the windows using the control software or SIS commands via an RS-232 or RS-422 connection.

If you switch inputs while a window is frozen, the freeze mode is cancelled and the image from the new input appears in the window.

HDCP Authorization

The HDCP Authorized function allows the MGP Pro HDMI inputs to be able to report as an HDCP authorized sink or a non-HDCP authorized sink (display) device to a source device. This is especially useful for sources that encrypt their output even if the source material does not require HDCP encryption, which would then prevent content from being displayed on non-HDCP compliant displays.

For example, if you wanted to show a non-HDCP protected presentation from a PC using the HDMI output of the PC, there is a chance that the PC will encrypt the HDMI, because it can see that the MGP Pro HDMI input supports HDCP authorization. If you were going to send only the HDMI output of the MGP Pro to a display (sink) that supported HDCP, there would be no problem. However, if you wanted to use the MGP analog output to an analog sink, the green HDCP notification screen would be displayed, due to the source unnecessarily enabling encryption on its HDMI output.

By disabling HDCP authorization on one of the MGP Pro HDMI inputs, you ensure that the PC with non-HDCP protected content will determine that the signal path does not support HDCP, and therefore will not encrypt its output. With HDCP authorization disabled on the MGP input, you are able to view your non-HDCP protected content from the video output of the MGP Pro. With HDCP authorization enabled on an input, if HDCP protected content is selected on the source, the source either simply mutes its video output to black, or displays a warning message.

You can select HDCP authorization using SIS commands (see the [HDCP Input Authorization](#) commands on page 65) or via the MGP Series Control Program (see the control software help file).

Locking the Front Panel (Executive Mode)

To prevent access by unauthorized users or accidental changes to the MGP Pro settings, some of the front panel controls can be locked using executive mode. When you put the MGP Pro in executive mode via the front panel, the picture control buttons and the menu selection buttons are locked. All other functions (input and window selection, freezing, and preset saving and recalling) remain accessible. The rear panel RS-232/422, front panel Config, and the LAN ports also remain unlocked.

You can enable or disable executive mode when the system is in the default cycle. To turn executive mode on and off, press the Window/Image Size and the Window/Image Position buttons simultaneously, and hold them for at least 2 seconds. The default is Disabled.

You can also enable and disable executive mode by using the SIS commands or the Windows-based control software via the serial or LAN ports (see the [Remote Configuration and Control](#) section beginning on page 42 for more information).

NOTE: If you place the MGP Pro in executive mode by using SIS commands or the Windows-based control software, you have an additional type of executive mode available. In executive mode 2, all the front panel controls are locked. This mode is available only through SIS commands (see the [Remote Configuration and Control](#) section for information on SIS commands, or the control software help program).

Resetting

Resetting the unit causes various IP functions and Ethernet connection settings to revert to factory defaults. There are four reset modes (numbered 1, 3, 4, and 5 for the sake of comparison with Extron IP Link products) that are available by pressing the Reset button on the rear panel. The Reset button is recessed, so you must use a pointed stylus, ballpoint pen, or small screwdriver to press it (see the [Reset Modes Summary table](#) on the next page for an explanation of all the reset modes).

ATTENTION: Review the reset modes carefully. Using the wrong reset mode may result in unintended loss of flash memory programming, port reassignment, or processor reboot.

Reset Modes Summary			
Mode	Activation	Result	Purpose
1 Use Factory Firmware	Hold in the Reset button while applying power to the MGP Pro.	Restores the factory-installed firmware. It does not clear the current configuration.	Mode 1 can be used to remove a version of firmware if incompatibility issues arise.
3 Run or Stop Events	Hold in the Reset button until the Reset LED blinks once (after approximately 3 seconds). Then, within 1 second, press Reset momentarily (for less than 1 second).	Turns events on or off. The Reset LED blinks two times if events are starting or three times if events are stopping.	Mode 3 is useful for troubleshooting.
4 Reset All IP Settings	Hold in the Reset button until the Reset LED blinks twice (once after approximately 3 seconds and again after 6 seconds). Then, within 1 second, press Reset momentarily (for less than 1 second).	<ul style="list-style-type: none"> Enables ARP capability. Sets the IP address, subnet address, and gateway address to the factory defaults. Sets port mapping to the factory default. Turns DHCP off. Turn events off. <p>The Reset LED blinks four times in quick succession during the reset.</p>	Mode 4 enables you to set IP address information using ARP and the MAC address. It does not replace any user-installed firmware.
5 Reset to Factory Defaults	Hold in the Reset button until the Reset LED blinks three times (once after approximately 3 seconds, again after 6 seconds, and then again after 9 seconds). Then, within 1 second, press Reset momentarily (for less than 1 second).	Performs a complete reset to factory defaults (with the exception of the firmware), which includes: <ul style="list-style-type: none"> Everything mode 4 does Reset of most real time adjustments: <ul style="list-style-type: none"> Clears all ties, presets, and video settings. Resets all IP options. Removes or clears all MGP files. <p>The reset LED blinks four times in quick succession during the reset.</p>	Mode 5 is useful if you want to start over with the configuration.
NOTE: Mode 5 reset clears most adjustments. To save these settings, use the MGP Series Control Program and select Save/Restore Configuration from the File menu before you perform this reset (see the control program help file for more information).			

NOTES:

- The reset modes listed in the table above close all open IP and Telnet connections and all sockets.
- Each mode is a separate function, not a continuation from mode 1 to mode 5.
- Reset mode 2 is not available on the MGP products.
- For reset modes 3, 4, and 5, nothing happens if the momentary press does not occur within 1 second.

Remote Configuration and Control

This section describes the serial and Ethernet connections through which the Extron Simple Instruction Set commands can be issued to the MGP Pro. It also lists the commands that are available for controlling and configuring the MGP Processors. Topics include:

- [Control Connections](#)
- [SIS Control](#)
- [Windows-based Control Software](#)

The MGP Pro can be configured and controlled remotely via the following interfaces:

- RS-232 or RS-422 (Simple Instruction Set [SIS] commands or Windows-based control software)
- LAN (web pages, SIS commands, or Windows-based control software)

This section discusses the use of the SIS commands and how to access the Windows-based control software. For instructions on using the Windows-based control software, see the MGP Series Control Program help file.

Control Connections

The MGP Pro can support either RS-232 or RS-422 serial communication protocol and can operate at 9600, 19200, 38400, or 115200 baud rates.

Serial Ports

The MGP Pro has two ports for serial control, both of which enable use of SIS commands and the Windows-based control program. These serial ports can be connected to the serial port of a host device such as a computer running the Extron DataViewer utility, an RS-232 capable PDA, or a control system. This connection makes software control of the MGP Pro possible. The default protocol for these ports is:

Baud rate: 9600, **Data bits:** 8, **Stop bits:** 1, **Parity:** None, **Flow control:** None

For any communication program that you use, set up the connection using this protocol.

- **Rear panel RS-232/422 port:** The rear panel 9-pin D female connector labeled Remote RS232/422 can be connected to the serial port of a host device for RS-232 or RS-422 control of the MGP Pro (see [C Remote RS-232/422 connector](#) on page 8 for the pin assignments for this port).
- **Front panel RS-232 Port:** The front panel TRS connector labeled “Config” can be connected to a host device for RS-232 control only.

An optional 9-pin D to 2.5 mm cable can be ordered separately and used to connect the MGP Pro to the host serial port. For connection information for this cable, see [J Config port](#) on page 14.

Ethernet Port

The rear panel Ethernet connector on the MGP Pro can be connected to an Ethernet LAN or WAN. Communication between the MGP Pro and the controlling device can be via Extron DataViewer or Telnet (a TCP socket using port 23). The Telnet port can be changed, if necessary, via SIS (for information on connecting via Telnet, see [Connecting as a Telnet Client](#) on page 108).

The Ethernet connection makes SIS control of the MGP Pro possible using a computer connected to the same LAN or WAN. The SIS commands and behavior of the product are identical to the commands and behavior the product exhibits when you are communicating with it via a serial port.

Ethernet Cable

The Ethernet cable must be properly terminated for your application as either a straight-through cable or a crossover cable (for pin assignments for these cables, see [D LAN connector](#) on page 8).

Default IP Addresses

To access the MGP Pro via the Ethernet port, obtain the IP address of the unit (and the subnet mask and gateway address if needed) from your network administrator. If the IP address has been changed to an address comprised of words and characters, you can determine the actual numeric IP address using the ping (ICMP) utility (see [IP Address](#) on page 105 for more details). If the addresses have not been changed, the factory-specified defaults are:

- **IP address:** 192.168.254.254
- **Subnet mask:** 255.255.0.0
- **Gateway address:** 0.0.0.0

SIS Control

The MGP Pro accepts SIS (Simple Instruction Set) commands through the RS-232/422 port on the rear panel, the RS-232 front panel Config port, and the LAN port. SIS commands consist of one or more characters per command field. They do not require any special characters to begin or end the command character sequence. Each response to a command ends with a carriage return and a line feed (**↙**), which signals the end of the response character string. A string is one or more characters.

MGP Pro-initiated Messages

When a local event such as a front panel selection or adjustment takes place, the MGP Pro responds by sending a message to the host. No response is required from the host. Examples of MGP Pro-initiated messages are listed below (underlined).

- (c) Copyright 20nn, Extron Electronics, MGP model number PRO [model type], Vn.nn, 60-nnnn-nn
Www, DD Mmm YYYY HH:MM:SS

The MGP Pro sends the copyright message when it is first powered on. *Model number* is 462 or 464, and *model type*, if applicable, is DI or 3G-SDI. *Vn.n* is the firmware version number, and *60-nnnn-nn* is the unit part number.

The current date and time are displayed following the copyright message at power up if the connection is via the Internet. (*Www* are the first three letters of the day of the week, for example, *Mon* or *Fri*.)

- Reconfig
Reconfig
Reconfig
Reconfig

The MGP Pro sends a **Reconfig** message as each of the four windows is configured via the new connection.

- **Out n In nn** (where **Out n** is the window number, and **In nn** is the input number). The MGP Pro sends this response when an input is switched.

Error Responses

When the MGP Pro receives a valid SIS command, it executes the command and sends a response to the host device. If the processor is unable to execute the command because the command is invalid or contains invalid parameters, it returns an error response to the host. The error response codes are:

- E01 — Invalid input channel number (too large)
- E09 — Invalid function number (too large)
- E10 — Invalid command
- E11 — Invalid preset number
- E12 — Invalid output number (applies for addressing windows)
- E13 — Invalid value (out of range)
- E14 — Invalid for this configuration
- E17 — Invalid command for signal type
- E22 — Busy
- E24 — Privilege violation
- E26 — Maximum number of users connected has been exceeded
- E27 — Invalid event number
- E28 — Bad filename/File not found

Telnet and Web Communications

SIS commands can also be issued via an IP connection using either Telnet (port 23) or a web browser (port 80). The ASCII and URL commands listed in the tables in this section perform the same functions but are encoded differently to accommodate the requirements of each port (Telnet or browser).

The ASCII to hexadecimal (hex) character conversion table below is for use with the command and response table (see **Command and Response Table for MGP Pro SIS Commands**, beginning on page 51, and **Command and Response Table for IP SIS Commands**, beginning on page 67).

ASCII to Hex Conversion Table															
Space →	20	!	21	"	22	#	23	\$	24	%	25	&	26	'	27
(28)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57
X	58	Y	59	Z	5A	\	5B	\\	5C]	5D	^	5E	_	5F
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77
x	78	y	79	z	7A	{	7B		7C	}	7D	~	7E	DEL	7F

Figure 25. ASCII to Hexadecimal Character Conversion Table

The command and response tables list valid ASCII (for Telnet) command codes, the corresponding URL encoded (for web browsers) command codes, the responses of the processor to the host, and a description of the command function or results from executing the command.

Entering SIS Commands

- Upper- and lowercase letters may be used interchangeably in the command field unless otherwise specified.
- Commands may be sent back-to-back without spaces, for example, 2*2!2*0B.
- Numbers can be entered as 1 digit, or as 2 or 3 digits with leading zeros, for example, 8V = Ø8V = ØØ8V.
- There are a few differences in how to enter the commands depending on whether you are using Telnet or a web browser.
 - For control via a web browser, all non-alphanumeric characters must be represented as the hexadecimal equivalent, %xx, where xx represents the two-character hex byte. For example, a comma (,) would be represented as %2C.
 - When using these commands through a web browser, the URL reference is used to shorten the examples. “URL” refers to the full URL of the control interface and web page reference, including all path information, for example, <http://192.168.100.10/myform.htm>.
 - Some characters differ depending on what method you use to send the commands:

Telnet

Escape key (hex 1B)

Carriage return (hex ØD)

Web Browser

W [must not be encoded]

Pipe character (|) [must not be encoded]

NOTE: With Telnet you can use either the Escape **Esc** commands or the W commands, and the carriage return or the pipe character. With the web browser, you are required to use the W commands and the pipe character.

In either method, the data string (shown in braces as {data} in the command and response table) is directed to the specified port, and must be encoded if it is non-alphanumeric.

Symbol Definitions

↔	=	CR/LF Carriage return with line feed (hex ØD ØA)
↔	=	Carriage return (no line feed) (hex ØD)
For web browser commands, use the pipe character () instead of the soft return (↔).		
•	=	Space character
	=	Pipe (vertical bar) character
Esc	=	<Escape> key (hex 1B)
W	=	<Escape> key alternative
24, 27, 28	=	Superscript numbers correspond to error numbers, indicating the error message displayed if the command is entered incorrectly or with invalid parameters (see Error Responses on page 44).

MGP Pro commands

- X1** = Input number (1 - 20). 20 = live background (for HDCP status only)
- X2** = Window number
0 = All windows (available only for freeze and window mute)
1 = Window 1
2 = Window 2
3 = Window 3 (MGP 464 Pro models only)
4 = Window 4 (MGP 464 Pro models only)
- X3** = Input video format
1 = RGB
2 = YUV-HD
3 = RGBcvS
4 = YUVi
5 = S-video
6 = Composite video
7 = HDMI or 3G/HD-SDI
- X4** = On or off status
0 = off or disabled
1 = on or enabled
- X5** = Test pattern
0 = Off
1 = Colorbars
2 = X-Hatch (crosshatch 16 x 12)
3 = 4 x 4 X-Hatch
4 = Grayscale
5 = Ramp
6 = Alt. pixels (alternating pixels)
7 = White field
8 = Crop
9 = Side-By-Side (4 x 3 crop)
10 = Quad Split (4 x 4)
11 = PIP Images (4 x 3 or 16 x 9 PIP column)
12 = 1.78 Aspect (4 x 3 or 16 x 9 with 1.78 film aspect ratio)
13 = 1.85 Aspect (4 x 3 or 16 x 9 with 1.85 film aspect ratio)
14 = 2.35 Aspect (4 x 3 or 16 x 9 with 2.35 film aspect ratio)
- NOTE:** Patterns 10 and 11 are not available on the MGP 462 Pro models.
- X6** = Window text position
0 = None
1 = Bottom left
2 = Bottom center
3 = Bottom right
4 = Top left
5 = Top center
6 = Top right
- X7** = Window text, 16 characters maximum. The following characters can be used:
Symbols: / : - _ + " {space}
Numerals: 0 - 9
Letters: Lowercase a - z and uppercase A - Z
- X8** = Picture adjustment range (applies to color, tint, brightness, and contrast)
(0 - 127. Default = 64)
- X9** = Scaler resolution
0 = Match output rate ([input EDID command](#) only)
1 = 640 x 480
2 = 800 x 600
3 = 852 x 480
4 = 1024 x 768
5 = 1024 x 852
6 = 1024 x 1024
7 = 1280 x 768
8 = 1280 x 1024
9 = 1360 x 765
10 = 1365 x 768
11 = 1366 x 768
12 = 1365 x 1024
13 = 1400 x 1050
14 = 1600 x 1200
15 = 480p
16 = 576p
17 = 720p
18 = 1080i
19 = 1080p
20 = Live background input resolution ([output resolution command](#) only)
21 = 1280 x 800
22 = 1360 x 768
23 = 1440 x 900
24 = 1680 x 1050
25 = 1080p Sharp
26 = 1920 x 1200
27 = 1080p CVT
28 = 2048 x 1080
99 = Custom ([input EDID command](#) only)
- X10** = Detected input signal standard
0 = none
1 = NTSC
2 = PAL
4 = SECAM
- = Not applicable (occurs when input is set for RGB or YUV)
- X11** = Sharpness (detail) level (0 - 127)

X12 = Window transition effect type 1 = Cut 2 = Dissolve 3 = Soft wipe up 4 = Soft wipe down 5 = Soft wipe right 6 = Soft wipe left 7 = Soft wipe center in 8 = Soft wipe center out 9 = Soft wipe square in 10 = Soft wipe square out 11 = Soft wipe curtain in 12 = Soft wipe curtain out 13 = Hard wipe up 14 = Hard wipe down 15 = Hard wipe right 16 = Hard wipe left 17 = Hard wipe center in 18 = Hard wipe center out 19 = Hard wipe square in 20 = Hard wipe square out 21 = Hard wipe curtain in 22 = Hard wipe curtain out	X21 = Image or window position (Zero location is 2048, and limits are ± the output resolution.) <i>Example:</i> Front panel displays +50, but the response to the SIS command is 2098.
	X22 = Window size. The minimum size is 1/16 the size of the output active area. The maximum size is double the active output area.
	X23 = Image size. The minimum size is 1/16 the size of the input active area. The maximum size is double the active output area for 200% zoom.
	X24 = Window preset effect Ø = Cut 1 = Real time motion. If this is entered, recalling a window preset with the windows in new positions causes the windows to move to the new location and resize in a fluid motion.
	X25 = Red, green, or blue color value (Ø - 255)
	X26 = Window priority (1 - 4, where 1 is top priority and 4 is lowest priority)
	X27 = EDID table, 128 or 256 bytes (binary—machine readable only)
	X28 = EDID table, 128 or 256 bytes (hexadecimal—person-readable)
	X29 = HDCP status (valid only with HDMI inputs and outputs) Ø = No source or sink detected 1 = Source or sink with HDCP detected 2 = No source or sink with HDCP detected
	X30 = HDCP output setting Ø = Auto (default). Digital outputs are encrypted only when an encrypted input is connected. Switching is slower and problems with output sync may occur. 1 = On. Digital outputs are always encrypted, regardless of input selection. Switching is faster.
	X31 = HDMI output format Ø = Auto (based on sink EDID) 1 = DVI 444 RGB (0-255, no InfoFrames) 2 = HDMI 444 RGB (0-255, InfoFrames) Default is Ø.
	X32 = Virtual window number (Ø - 256)
	X33 = Virtual input number (Ø - 256)
	X34 = HDMI input HDCP authorization status Ø = HDCP encrypted data blocked 1 = HDCP encrypted data allowed Default is 1.
	X35 = Front panel lock (executive mode) status Ø = Unlocked 1 = Locked except for input selection buttons 2 = All controls locked

NOTE: All input EDID resolutions have available refresh rates of 50 Hz and 60 Hz only except:

- 576p has 50 Hz only.
- 480p, Sharp 1080p, and 1080p CVT have 60 Hz only.

X17 = Pixel phase (Ø - 31)
X18 = Advanced picture settings value (Range is the auto-sensed value ±512 lines or pixels.)
X19 = Window dissolve speed: 0 to 5 seconds in 0.1-second increments. <i>Example:</i> Ø1 = 0.1 second, 5Ø = 5.0 seconds)
X20 = Internal temperature in degrees Fahrenheit

NOTE: Front panel lockout does **not** include RS-232, RS-422, and Ethernet control.

X36	= Output polarity Ø = H-/V- (default) 1 = H-/V+ 2 = H+/V- 3 = H+/V+	X41	= Label text background color Ø = off (no background color) 1 = red 2 = green 3 = blue 4 = white 5 = magenta 6 = cyan 7 = yellow 8 = black 9 = translucent
X37	= Output sync format 1 = RGBHV 2 = RGBS 3 = RGsB 4 = YUV bi-level 5 = YUV tri-level	X42	= Window border color Ø = off (no border) 1 = red 2 = green 3 = blue 4 = white 5 = magenta 6 = cyan 7 = yellow 8 = black
X38	= Label text size 1 = small 2 = medium 3 = large	X43	= Screen background color Ø = off (no background color) 1 = red 2 = green 3 = blue 4 = white 5 = magenta 6 = cyan 7 = yellow 8 = background image 9 = live background input 1Ø = custom color
X39	= Label border color Ø = off (no border) 1 = red 2 = green 3 = blue 4 = white 5 = magenta 6 = cyan 7 = yellow 8 = black 9 = translucent	X44	= MGP Pro model name: MGP 462 Pro MGP 462 Pro DI MGP 462 Pro 3G-SDI MGP 464 Pro MGP 464 Pro DI MGP 464 Pro 3G-SDI
X40	= Label text color 1 = red 2 = green 3 = blue 4 = white 5 = magenta 6 = cyan 7 = yellow 8 = black		

IP-specific commands

X101 = Specific port number (01-99)

The port number is represented as two ASCII characters (2 bytes). For example, port 05 would be represented as 30 35 in hexadecimal.

01 = RS-232/422 port (rear panel)

02 = Config port (front panel)

X102 = Command data section

NOTE: For web encoding only: data is directed to the specified port and must be encoded if it is non-alphanumeric. Because data can include either command terminator, it must be encoded as follows when used within the data section:

- Space (hex 20) must be encoded as %2 (hex 25 32 30)
- Plus sign (Hex 2B) must be encoded as %2B (hex 25 32 42).

X103 = Greenwich Mean Time (GMT) offset value (-12:00–14:00) in hours and minutes (*hh:mm*)

X104 = Firmware version number (listed to two decimal places)

X105 = Unit name is a text string of up to 24 characters drawn from the alphabet (A-Z), digits (0-9), and the minus sign or hyphen (-). The first character must be an alpha character. The last character must not be a minus. No blank or space characters are permitted, and no distinction is made between upper- and lowercase.

X106 = Local date and time format

Set format (*MM/DD/YY-HH:MM:SS*), for example, 06/21/02-10:54:00

Read format (*Ddd, DD Mmm YYYY HH:MM:SS*).

Example: Fri, 26 Sep 2008 18:19:33

X107 = IP address (*nnn.nnn.nnn.nnn*). Leading zeros in each of the four fields are optional in setting values and are suppressed in returned values.

X108 = Mail domain name (for example, Extron.com)

X109 = Time in tens of milliseconds to wait for the first response character via the serial port.

Default = 10 (100 ms)

Maximum = 32767

X110 = Time in tens of milliseconds to wait between characters received via the serial port

Default = 20 (200 ms)

Maximum = 32767

X111 = Message length, delimiter value, or byte count (via the serial port)

#L = Length of message to be received

#D = Delimiter value

= byte count (1 through 32767. Default = 0)

X112 = Hardware (MAC) address (xx-xx-xx-xx-xx-xx)

X113 = Subnet mask (*nnn.nnn.nnn.nnn*). Leading zeros are optional in setting values in each of the four fields, and are suppressed in returned values.

X114 = Verbose response mode

0 = Clear/none (default for Telnet connections).

1 = Verbose mode is on (enabled) (default for RS-232 or RS-422 connections).

2 = Verbose mode is off, tagged responses are sent for queries (tagged responses are enabled).

3 = Verbose mode is on (enabled) and tagged responses are enabled and sent for queries

If tagged responses are enabled, all read or view commands return the constant string plus the data. For example:

Command: **[Esc] CN ↵**
Response: **Ipn • X105 ↵**

NOTE: In verbose response mode, the MGP responds with more information than it usually would. For example, the MGP can send out a notice of a change in some setting without receiving a query via your PC. That change could have been a result of an internal process (a script execution), a selection made using a touchpanel or keypad, a change made using GV or a web page, or input from a connected sensor or switch.

That is an example of a verbose (wordy) relationship between the MGP and a connected device. Verbose mode creates more network traffic than usual, which can slow down network performance.

	Verbose Responses	Tagged Responses
X114 Value	Receive unsolicited responses (messages) for all actions initiated via any source (touchpanel, port input, internal web page changes, or commands) instead of only for SIS commands	Receive tagged responses to read or view commands (Responses to SIS commands are always tagged. Turning tagged responses on adds tags to the responses to SIS read requests.)
0		
1	✓	
2		✓
3	✓	✓

See the **Set verbose mode command** (**[Esc] CV ↵**) on page 77 in the Command and Response Table for IP Commands for a brief explanation of what this communication mode is and what it does.

X115 = Priority status for the port receiving timeouts.

0 = Use Send data string command parameters

1 = Use Configure receive timeout command parameters. The response includes leading zeros. (Default = 0.)

X116 = Baud rate: 2400, 4800, 9600, 19200, 38400, or 115200

X117 = Parity (only the first letter is needed): 0[dd] E[ven] N[one] M[ark] S[pace]	X131 = Number of bytes to read
X118 = Data bits: 7 or 8	X132 = E-mail event number (1 - 64)
X119 = Stop bits: 1 or 2	X133 = E-mail recipient address
X120 = Port type Ø = RS-232 1 = RS-422	X134 = Name of e-mail file to be sent. First line of the file is the subject. The rest is the body of the e-mail.
X121 = Flow control H = hardware S = software N = none	X135 = Default name: a combination of the model-name and the last three character pairs of the unit MAC address (for example, MGP_Pro-464-ØØ-Ø2-3D)
X122 = Data pacing (0000 - 0001 ms between bytes) Default = Ø ms	X136 = Extended security (password) levels: 1 - 1Ø The response is 2 digits with a leading zero.
X123 = Password (12 characters = maximum length. No special characters are allowed.)	X137 = Connection security level Ø = anonymous 1 - 1Ø = extended security level 11 = user 12 = administrator
NOTE: A user password cannot be assigned if no administrator password exists. An E14 error code is returned. If the administrator password is cleared, the user password is also removed.	
X124 = Daylight saving time (used in much of the northern hemisphere [USA] and parts of Europe and Brazil) Ø = off or ignore 1 = on in USA 2 = on in Europe 3 = on in Brazil	X138 = (Ethernet only) Number of seconds (stated in tens of seconds) before timeout on IP connections (min. = 1 (10 seconds), max. = 65000 (650,000 seconds), and default = 30 (300 seconds). If no data is received during the timeout period, the Ethernet connection is closed. Each step is 10 seconds. When the unit is connected via RS-232 or RS-422, only the global timeout commands apply. Anything else returns an E13 error code. The response contains leading zeros.
X125 = Event number, range = Ø - 99	X139 = ASCII digits representing the numeric value of the data element read from the event buffer (leading zeros are suppressed)
X126 = Event buffer Ø = receive 1 = user 2 = NVRAM	X140 = Login without password is allowed. If enabled, the user does not enter a password. After the user clicks OK , the login level is set based on the X141 value. Ø = Disabled, 1 = Enabled
X127 = Event buffer offset (range = Ø to <i>MaxBufferSize</i>)	X141 = No-password login level 1 - 11 = Entry without password goes to the level specified if an administrator password exists. Ø = Entry without password is placed one level below the lowest password level (Ø-11).
X128 = Event data size b = bit B = byte (8 bits) S = short (16 bits) L = long (32 bits)	The response is returned as 2 digits with a leading zero if needed.
NOTE: This parameter is case sensitive.	
X129 = Event data to write	X142 = Number of seconds (in tens of seconds) before timeout on IP connections
X130 = Read password. RS-232 or RS-422 connection responds with the password. The IP connection responds with 4 asterisks (****) if a password exists, and with an empty space if none exists, instead of with an actual password.	X143 = Number that is inserted into the e-mail message if the .eml file has an embedded Esc ← command with no parameters. Use Ø as a placeholder if the optional X134 is used, but X143 is not needed.

Command and Response Table for MGP Pro SIS Commands

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description																																																																
Input Selection																																																																			
Select an input	<code>X1 * X2!</code>	<code>Out X2 • In X1 ↵</code>	Select input source <code>X1</code> for window <code>X2</code> .																																																																
View input	<code>X2!</code>	<code>X1 ↵</code>	View the input channel for the selected window. <code>X1</code> = 1 - 19. <code>X2</code> = Ø - 4. Ø = all windows.																																																																
Input Video Type																																																																			
Set video type	<code>X1 * X3 \</code>	<code>X1 Typ X3 ↵</code>	Set input <code>X1</code> to format <code>X3</code> . For <code>X3</code> : 1 = RGB 2 = YUV-HD 3 = RGBcvS 4 = YUVi 5 = S-video 6 = Composite video 7 = HDMI or 3G/HD-SDI.																																																																
View video type	<code>X1 \</code>	<code>X3 ↵</code>	View video signal type <code>X3</code> for input <code>X1</code> .																																																																
NOTE: It is recommended that virtual inputs be configured using the Windows-based control software (see the software help file for the procedures).																																																																			
EDID Resolution and Refresh Rate																																																																			
Set input EDID resolution and rate	<code>Esc A X9 * X16 EDID ↵</code>	<code>Edid A X9 * X16 ↵</code>	Set EDID resolution to scaler resolution <code>X9</code> and the refresh rate to <code>X16</code> .																																																																
NOTE: All input EDID resolutions have available refresh rates of 50 Hz and 60 Hz only except: <ul style="list-style-type: none"> • 576p has 50 Hz only. • 480p, Sharp 1080p, and 1080p CVT have 60 Hz only. 																																																																			
For X9: <table> <tbody> <tr><td>Ø</td><td>= Match output</td><td>14</td><td>= 1600x1200</td></tr> <tr><td>1</td><td>= 640x480</td><td>15</td><td>= 480p</td></tr> <tr><td>2</td><td>= 800x600</td><td>16</td><td>= 576p</td></tr> <tr><td>3</td><td>= 852x480</td><td>17</td><td>= 720p</td></tr> <tr><td>4</td><td>= 1024x768</td><td>18</td><td>= 1080i</td></tr> <tr><td>5</td><td>= 1024x852</td><td>19</td><td>= 1080p</td></tr> <tr><td>6</td><td>= 1024x1024</td><td>21</td><td>= 1280x800</td></tr> <tr><td>7</td><td>= 1280x768</td><td>22</td><td>= 1360x768</td></tr> <tr><td>8</td><td>= 1280x1024</td><td>23</td><td>= 1440x900</td></tr> <tr><td>9</td><td>= 1360x765</td><td>24</td><td>= 1680x1050</td></tr> <tr><td>10</td><td>= 1365x768</td><td>25</td><td>= 1080p Sharp</td></tr> <tr><td>11</td><td>= 1366x768</td><td>26</td><td>= 1920x1200</td></tr> <tr><td>12</td><td>= 1365x1024</td><td>27</td><td>= 1080p CVT</td></tr> <tr><td>13</td><td>= 1400x1050</td><td>28</td><td>= 2048x1080</td></tr> <tr><td>99</td><td>= Custom.</td><td></td><td></td></tr> </tbody> </table> For X16: <table> <tbody> <tr><td>1</td><td>= 50 Hz</td></tr> <tr><td>2</td><td>= 60 Hz.</td></tr> </tbody> </table>				Ø	= Match output	14	= 1600x1200	1	= 640x480	15	= 480p	2	= 800x600	16	= 576p	3	= 852x480	17	= 720p	4	= 1024x768	18	= 1080i	5	= 1024x852	19	= 1080p	6	= 1024x1024	21	= 1280x800	7	= 1280x768	22	= 1360x768	8	= 1280x1024	23	= 1440x900	9	= 1360x765	24	= 1680x1050	10	= 1365x768	25	= 1080p Sharp	11	= 1366x768	26	= 1920x1200	12	= 1365x1024	27	= 1080p CVT	13	= 1400x1050	28	= 2048x1080	99	= Custom.			1	= 50 Hz	2	= 60 Hz.
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<ul style="list-style-type: none"> • The default is to match the output resolution: <code>X9</code> = Ø, <code>X16</code> = Ø. • EDID resolutions are available only at 50 Hz and 60 Hz. If another rate is selected, the MGP Pro issues an E13 code. 																																																																			
View EDID resolution and rate	<code>Esc A EDID ↵</code>	<code>X9 * X16 ↵</code>	View current EDID resolution <code>X9</code> and rate <code>X16</code> .																																																																
Save EDID	<code>Esc S ØEDID ↵</code>	<code>Edid S Ø ↵</code>	Save the EDID from the connected output to Custom EDID location 99.																																																																

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Window Blanking (Muting)			
Mute window	[X2] * 1B	[X2] Blk1 ↵	Blank (mute) window [X2] using the currently selected transition effect. [X2] = Ø - 4. Ø = all windows.
Unmute window	[X2] * ØB	[X2] BlkØ ↵	Display (unmute) window [X2] using the currently selected transition effect.
View blanking status	[X2] B	[X4] ↵	View blanking status for window [X2]. For [X4]: Ø = unmuted, 1 = muted.
Window Priority			
Set priority	[X2] * [X2] * [X2] * [X2] ~	Pri [X2] [X2] [X2] [X2] ↵	Set the priority of the windows to the order entered.
View priority	~	[X2] [X2] [X2] [X2] ↵	Display the priorities of the windows.
Window Transition Effect			
Select effect	4 * [X12] #	Eff [X12] ↵	Select transition effect [X12] to be used when windows are muted or unmuted. For [X12]: 1 = Cut (default) 2 = Dissolve 3 = Soft wipe up 4 = Soft wipe down 5 = Soft wipe right 6 = Soft wipe left 7 = Soft wipe center in 8 = Soft wipe center out 9 = Soft wipe square in 10 = Soft wipe sq. out 11 = Soft wipe curtain in 12 = Soft wipe curtain out 13 = Hard wipe up 14 = Hard wipe down 15 = Hard wipe right 16 = Hard wipe left 17 = Hard wipe center in 18 = Hard wipe center out 19 = Hard wipe square in 20 = Hard wipe square out 21 = Hard wipe curtain in 22 = Hard wipe curtain out
View effect	4 #	[X12] ↵	View the currently selected window transition effect.
Window Effect Duration			
Select duration	5 * [X19] #	Dur [X19] ↵	Set the speed of the window effect to [X19]. [X19] = Ø - 5 seconds in 0.1-second increments
View duration	5 #	[X19] ↵	View the effect duration time.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Window Preset Effect			
NOTE: You can select additional window preset transition effects using the MGP Series Control Program (see the control software help file for more information).			
Select effect	19 * X24 #	Wpe X24 ↵	Select window preset transition effect X24 . For X24 : Ø = Cut 1 = Real time motion
View effect	19 #	X24 ↵	View the current preset transition effect.
Color			
Specific value	X2 * X8 C	X2 Col X8 ↵	Set color level for window X2 to X8 . X2 = Ø - 4. Ø = all windows. X8 = picture adjustment range: Ø - 127. Default = 64.
Increment color value	X2 + C	X2 Col X8 ↵	Select the next higher color level for window X2 .
Decrement color value	X2 - C	X2 Col X8 ↵	Select the next lower color level for window X2 .
View color level	X2 C	X8 ↵	View current color level setting for window X2 .
Tint			
Specific value	X2 * X8 T	X2 Tin X8 ↵	Set the tint level for window X2 to X8 .
Increment tint value	X2 + T	X2 Tin X8 ↵	Select next higher tint level.
Decrement tint value	X2 - T	X2 Tin X8 ↵	Select next lower tint level.
View tint level	X2 T	X8 ↵	View current tint level setting.
Contrast			
Specific value	X2 * X8 ^	X2 Con X8 ↵	Set the contrast level for window X2 to X8 .
Increment contrast value	X2 + ^	X2 Con X8 ↵	Select next higher contrast level.
Decrement contrast value	X2 - ^	X2 Con X8 ↵	Select next lower contrast level.
View contrast level	X2 ^	X8 ↵	View current contrast level setting for window X2 .
Brightness			
Specific value	X2 * X8 Y	X2 Brt X8 ↵	Set the brightness level for window X2 to X8 .
Increment brightness value	X2 + Y	X2 Brt X8 ↵	Select next higher brightness level.
Decrement brightness value	X2 - Y	X2 Brt X8 ↵	Select next lower brightness level.
View brightness level	X2 Y	X8 ↵	View current brightness level setting.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Detail Filter			
Set a specific value	$\text{x2} * \text{x11} \text{ D}$	$\text{x2} \text{ Det } \text{x11} \leftarrow$	Set the detail (sharpness) level for window x2 to x11 . $\text{x2} = \emptyset - 4$. \emptyset = all windows. $\text{x11} = \emptyset - 127$.
Increment detail level	$\text{x2} + \text{D}$	$\text{x2} \text{ Det } \text{x11} \leftarrow$	Select the next higher sharpness level.
Decrement detail level	$\text{x2} - \text{D}$	$\text{x2} \text{ Det } \text{x11} \leftarrow$	Select the next lower sharpness level.
View detail value	$\text{x2} \text{ D}$	$\text{x11} \leftarrow$	View the current sharpness level setting.
Horizontal Shift (Window)			
NOTE: For the shift values shown for the next two commands, the zero location is 2048 . When you enter a shift value via the front panel, the LCD screen shows only the amount of lines or pixels the window has shifted. The SIS response is offset by 2048. <i>Example: The LCD window displays +50, but the response to the SIS command is 2098.</i>			
Set a specific value	$1 * \text{x2} * \text{x21} \text{ H}$	$\text{x2} \text{ Whp } \text{x21} \leftarrow$	Set the horizontal centering of window x2 to x21 . For x21 : $\emptyset = 2048$. Limits are \pm the output resolution.
Increment horizontal image shift	$1 * \text{x2} + \text{H}$	$\text{x2} \text{ Whp } \text{x21} \leftarrow$	Shift window x2 right.
Decrement horizontal window shift	$1 * \text{x2} - \text{H}$	$\text{x2} \text{ Whp } \text{x21} \leftarrow$	Shift window x2 left.
View horizontal window shift amount	$1 * \text{x2} \text{ H}$	$\text{x21} \leftarrow$	View the amount of horizontal window shift.
Vertical Shift (Window)			
Set a specific value	$1 * \text{x2} * \text{x21} /$	$\text{x2} \text{ Wvp } \text{x21} \leftarrow$	Set the vertical centering of window x2 to x21 .
Increment vertical window shift	$1 * \text{x2} + /$	$\text{x2} \text{ Wvp } \text{x21} \leftarrow$	Shift window x2 up.
Decrement vertical window shift	$1 * \text{x2} - /$	$\text{x2} \text{ Wvp } \text{x21} \leftarrow$	Shift window x2 down.
View vertical window shift amount	$1 * \text{x2} /$	$\text{x21} \leftarrow$	View the amount of vertical shift.
Horizontal Shift (Image)			
Set a specific value	$2 * \text{x2} * \text{x21} \text{ H}$	$\text{x2} \text{ Ihp } \text{x21} \leftarrow$	Set the horizontal centering of the image in window x2 to x21 .
Increment horizontal image shift	$2 * \text{x2} + \text{H}$	$\text{x2} \text{ Ihp } \text{x21} \leftarrow$	Shift the image in window x2 right.
Decrement horizontal image shift	$2 * \text{x2} - \text{H}$	$\text{x2} \text{ Ihp } \text{x21} \leftarrow$	Shift the image in window x2 left.
View horizontal image shift amount	$2 * \text{x2} \text{ H}$	$\text{x21} \leftarrow$	View the current setting for horizontal centering of the image in window x2 .

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Vertical Shift (Image)			
Set a specific value	$2 * \boxed{x_2} * \boxed{x_{21}} /$	$\boxed{x_2} Ivp \boxed{x_{21}} \leftarrow$	Set the vertical centering of the image in window $\boxed{x_2}$ to $\boxed{x_{21}}$. $\boxed{x_2} = \emptyset - 4$. \emptyset = all windows. For $\boxed{x_{21}}$: $\emptyset = 2048$. Limits are \pm the output resolution.
Increment vertical image shift	$2 * \boxed{x_2} + /$	$\boxed{x_2} Ivp \boxed{x_{21}} \leftarrow$	Shift image in window $\boxed{x_2}$ up.
Decrement vertical image shift	$2 * \boxed{x_2} - /$	$\boxed{x_2} Ivp \boxed{x_{21}} \leftarrow$	Shift image in window $\boxed{x_2}$ down.
View vertical image shift amount	$2 * \boxed{x_2} /$	$\boxed{x_{21}} \leftarrow$	View the current setting for vertical centering of the image in window $\boxed{x_2}$.
Horizontal Size (Window)			
Set a specific value	$1 * \boxed{x_2} * \boxed{x_{22}} :$	$\boxed{x_2} Whs \boxed{x_{22}} \leftarrow$	Set the width of window $\boxed{x_2}$ to $\boxed{x_{22}}$. For $\boxed{x_{22}}$: Minimum = 1/16 the size of the active output area. Maximum = size of the active output area.
Increase horizontal size of window	$1 * \boxed{x_2} + :$	$\boxed{x_2} Whs \boxed{x_{22}} \leftarrow$	Widen the window.
Decrease horizontal size of window	$1 * \boxed{x_2} - :$	$\boxed{x_2} Whs \boxed{x_{22}} \leftarrow$	Narrow the window.
View horizontal size of window	$1 * \boxed{x_2} :$	$\boxed{x_{22}} \leftarrow$	View the width of the window.
Vertical Size (Window)			
Set a specific value	$1 * \boxed{x_2} * \boxed{x_{22}} ;$	$\boxed{x_2} Wvs \boxed{x_{22}} \leftarrow$	Set the height of window $\boxed{x_2}$ to $\boxed{x_{22}}$.
Increase vertical size of window	$1 * \boxed{x_2} + ;$	$\boxed{x_2} Wvs \boxed{x_{22}} \leftarrow$	Increase the height of the window.
Decrease vertical size of window	$1 * \boxed{x_2} - ;$	$\boxed{x_2} Wvs \boxed{x_{22}} \leftarrow$	Decrease the height of the window.
View vertical size of window	$1 * \boxed{x_2} ;$	$\boxed{x_{22}} \leftarrow$	View the height of the window.
Horizontal Size (Image)			
Set a specific value	$2 * \boxed{x_2} * \boxed{x_{23}} :$	$\boxed{x_2} Ihs \boxed{x_{23}} \leftarrow$	Set the width of the image in window $\boxed{x_2}$ to $\boxed{x_{23}}$. For $\boxed{x_{23}}$: Minimum = 1/16 the size of the active input area. Maximum = double the active output area for 200% zoom.
Increase horizontal size of image	$2 * \boxed{x_2} + :$	$\boxed{x_2} Ihs \boxed{x_{23}} \leftarrow$	Widen the image.
Decrease horizontal size of image	$2 * \boxed{x_2} - :$	$\boxed{x_2} Ihs \boxed{x_{23}} \leftarrow$	Narrow the image.
View horizontal size of image	$2 * \boxed{x_2} :$	$\boxed{x_{23}} \leftarrow$	View the width of the image.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Vertical Size (Image)			
Set a specific value	$2 * \boxed{X_2} * \boxed{X_{23}} ;$	$\boxed{X_2} I vs \boxed{X_{23}} \leftarrow$	Set the height of the image in window $\boxed{X_2}$ to $\boxed{X_{23}}$. $\boxed{X_2} = \emptyset - 4$. \emptyset = all windows. For $\boxed{X_{23}}$: Minimum = 1/16 the size of the active input area. Maximum = double the active output area for 200% zoom.
Increase vertical size of image	$2 * \boxed{X_2} + ;$	$\boxed{X_2} I vs \boxed{X_{23}} \leftarrow$	Increase the height of the image in window $\boxed{X_2}$.
Decrease vertical size of image	$2 * \boxed{X_2} - ;$	$\boxed{X_2} I vs \boxed{X_{23}} \leftarrow$	Decrease the height of the image in window $\boxed{X_2}$.
View vertical size of image	$2 * \boxed{X_2} ;$	$\boxed{X_{23}} \leftarrow$	View the height of the image in window $\boxed{X_2}$.
Picture Control Copy			
Copy picture controls	$2 \boxed{X_1} * \boxed{X_2} #$	$Pcc \boxed{X_1} \leftarrow$	Copy the picture controls for currently displayed input $\boxed{X_1}$ to window $\boxed{X_2}$. $\boxed{X_1} = 1 - 19$.
Window Size and Position			
Set window size and position	$\text{Esc } \boxed{X_2}, \boxed{X_{21}} * \boxed{X_{21}} * \boxed{X_{22}} * \boxed{X_{22}} X Y \leftarrow$ $Wxy \boxed{X_2}, \boxed{X_{21}} * \boxed{X_{21}} * \boxed{X_{22}} * \boxed{X_{22}} \leftarrow$		For window $\boxed{X_2}$, set the position (horizontal and vertical) to $\boxed{X_{21}}$ and the size (width and height) to $\boxed{X_{22}}$. For $\boxed{X_{21}}$: $\emptyset = 2048$. Limits are \pm the output resolution. For $\boxed{X_{22}}$: Minimum = 1/16 the size of the active output area. Maximum = size of the active output area.
View window size and position	$\text{Esc } \boxed{X_2} X Y \leftarrow$	$\boxed{X_2}, \boxed{X_{21}} * \boxed{X_{21}} * \boxed{X_{22}} * \boxed{X_{22}} \leftarrow$	View the position and size of window $\boxed{X_2}$.
Image Size and Position			
Set image size and position	$\text{Esc } \boxed{X_2}, \boxed{X_{21}} * \boxed{X_{21}} * \boxed{X_{23}} * \boxed{X_{23}} I Y \leftarrow$ $Ixy \boxed{X_2}, \boxed{X_{21}} * \boxed{X_{21}} * \boxed{X_{23}} * \boxed{X_{23}} \leftarrow$		For the image in window $\boxed{X_2}$, set the position (horizontal and vertical) to $\boxed{X_{21}}$ and the size (width and height) to $\boxed{X_{23}}$. $\boxed{X_2} = \emptyset - 4$. \emptyset = all windows. For $\boxed{X_{21}}$: $\emptyset = 2048$. Limits are \pm the output resolution. For $\boxed{X_{23}}$: Minimum = 1/16 the size of the active input area. Maximum = double the active output area for 200% zoom.
View image size and position	$\text{Esc } \boxed{X_2} I Y \leftarrow$	$\boxed{X_2}, \boxed{X_{21}} * \boxed{X_{21}} * \boxed{X_{23}} * \boxed{X_{23}} \leftarrow$	View the position and size of the image in window $\boxed{X_2}$.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Window Zoom			
Zoom in	1 * X2 + {	X2 Wzm ↵	Increase the size of window X2 while keeping its aspect ratio constant.
Zoom out	1 * X2 - {	X2 Wzm ↵	Decrease the size of window X2 while keeping its aspect ratio constant.
Image Zoom			
Zoom in	2 * X2 + {	X2 Izm ↵	Increase the size of the image in window X2 while keeping its aspect ratio constant.
Zoom out	2 * X2 - {	X2 Izm ↵	Decrease the size of the image in window X2 while keeping its aspect ratio constant.
Window Presets			
Recall window preset without input	1 * X14 .	Rpr 1 * X14 ↵	Recall window preset X14 without input settings. X14 = 1 - 128
Recall window preset with input.	2 * X14 .	Rpr 2 * X14 ↵	Recall window preset X14 with input settings.
Preset preview	Esc X14 * X2 XY ↵	Wxy X14 * X2 , X26 * X21 * X21 * X22 * X22 ↵	View the priority (X26), width and height (X22), and horizontal and vertical position (X21) of window X2 , saved in preset X14 . X26 = 1 - 4. 1 = top priority.
Save preset	2 * X14 ,	Spr2 * X14 ↵	Save the window positions to preset X14 .
View last recalled preset	1 .	X14 ↵	View last recalled window preset X14 .
Input Presets			
Recall input preset	3 * X2 * X15 .	Rpr 3 * X15 ↵	Recall input preset X15 to window X2 . X2 = Ø - 4. Ø = all windows. X15 = 1-128.
Save input preset	3 * X2 * X15	Spr 3 * X15 ↵	Save the input settings for window X2 to input preset X15 .
Input Naming			
Write input name	Esc X1 , X7 NI ↵	Nmi X1 , X7 ↵	Create a text label to display on the output, containing name X7 for input X1 . X1 = 1 - 19. X7 = up to 16 characters. For X7 , use: Symbols: / : - _ + " (space) Numerals: Ø - 9 Letters: Lowercase a - z and uppercase A - Z
Read input name	Esc X1 NI ↵	X7 ↵	View contents of the name label for input X1 .

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Window Preset Naming			
NOTE: Window preset names cannot be viewed on the LCD screen. They can be viewed via the MGP Series Control Program or SIS commands.			
Write preset name	[Esc] [X14] , [X7] NP ↵	Nmp [X14] , [X7] ↵	Give the window preset [X14] the name [X7]. [X14] = 1 - 128.
Read preset name	[Esc] [X14] NP ↵	[X7] ↵	View the name for window preset [X14].
Vertical Start			
Set a specific value	[X1] * [X13] (Vst [X1] * [X13] ↵	Set the vertical position of the first active pixel for input [X1] to [X13]. [X13] = Ø - 255. Default = 128.
Increment vertical start value	[X1] + (Vst [X1] * [X13] ↵	Increase vertical start location value for input [X1].
Decrement vertical start value	[X1] - (Vst [X1] * [X13] ↵	Decrease vertical start location value for input [X1].
View vertical start setting	[X1] ([X13] ↵	View the vertical start location of the first active pixel in the active window (displaying input [X1]).
Horizontal Start			
Set a specific value	[X1] * [X13])	Hst [X1] * [X13] ↵	Set the horizontal position of the first active pixel in the active window (input [X1]) to [X13]. [X1] = 1 - 19. [X13] = Ø - 255. Default = 128.
Increment horizontal start value	[X1] +)	Hst [X1] * [X13] ↵	Increase the horizontal start location value for input [X1].
Decrement horizontal start value	[X1] -)	Hst [X1] * [X13] ↵	Decrease the horizontal start location value for input [X1].
View horizontal start setting	[X1])	[X13] ↵	View the horizontal start location of the first active pixel in the active window (input [X1]).
Pixel Phase (available only for RGB and YUV-HD input signals)			
Set a specific value	[X2] * [X17] U	[X2] Phs [X1] * [X17] ↵	Set the pixel phase value for the input in window [X2] to [X17]. [X2] = Ø - 4. Ø = all windows. [X17] = Ø - 31.
Increment pixel phase value	[X2] + U	[X2] Phs [X1] * [X17] ↵	Select the next higher pixel phase value.
Decrement pixel phase value	[X2] - U	[X2] Phs [X1] * [X17] ↵	Select the next lower pixel phase value.
View pixel phase setting	[X2] U	[X17] ↵	View the current pixel phase setting for the input in window [X2].

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Total Pixels			
Set a specific value	11 * X1 * X18 #	Tpx X1 * X18 ↵	Set the total pixels value for input X1 to X18 . X18 = Auto-sensed value ± 512 lines or pixels.
Increment total pixels value	11 * X1 + #	Tpx X1 * X18 ↵	Select the next higher total pixels value for input X1 .
Decrement total pixels value	11 * X1 - #	Tpx X1 * X18 ↵	Select the next lower total pixels value for input X1 .
View total pixels setting	11 * X1 #	X18 ↵	View the current total pixels setting for input X1 .
Active Pixels			
Set a specific value	12 * X1 * X18 #	Apx X1 * X18 ↵	Set the active pixels value for input X1 to X18 .
Increment active pixels value	12 * X1 + #	Apx X1 * X18 ↵	Select the next higher active pixels value for input X1 .
Decrement active pixels value	12 * X1 - #	Apx X1 * X18 ↵	Select the next lower active pixels value for input X1 .
View active pixels setting	12 * X1 #	X18 ↵	View current active pixels value for input X1 .
Active Lines			
Set a specific value	13 * X1 * X18 #	A1n X1 * X18 ↵	Set the active lines value for the input X1 to X18 . X1 = 1 - 19. X18 = Auto-sensed value ± 512 lines or pixels.
Increment active lines value	13 * X1 + #	A1n X1 * X18 ↵	Select the next higher active lines value.
Decrement active lines value	13 * X1 - #	A1n X1 * X18 ↵	Select the next lower active lines value
View active lines setting	13 * X1 #	X18 ↵	View the current active lines setting for input X1 .

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Output Scaler Resolution and Rate			
Set output resolution and scan rate	<code>X9 * X16 =</code>	<code>Rte X9 * X16 ↵</code>	Select scaler output resolution <code>X9</code> and scan rate <code>X16</code> .
		For <code>X9</code> :	
		1 = 640x480	15 = 480p
		2 = 800x600	16 = 576p
		3 = 852x480	17 = 720p
		4 = 1024x768	18 = 1080i
		5 = 1024x852	19 = 1080p
		6 = 1024x1024	20 = Live background resolution
		7 = 1280x768	21 = 1280x800
		8 = 1280x1024	22 = 1360x768
		9 = 1360x765	23 = 1440x900
		10 = 1365x768	24 = 1680x1050
		11 = 1366x768	25 = 1080p Sharp
		12 = 1365x1024	26 = 1920x1200
		13 = 1400x1050	27 = 1080p CVT
		14 = 1600x1200	28 = 2048x1080.
		For <code>X16</code> :	
		1 = 50 Hz	
		2 = 60 Hz	
		3 = 72 Hz	
		4 = 96 Hz	
		5 = 100 Hz	
		6 = 120 Hz	
		7 = Live background input rate	
		8 = 24 Hz	
		9 = 59.94 Hz	
		10 = 29.97 Hz	
		11 = 30 Hz.	
View output rate settings	=	<code>X9 * X16 ↵</code>	View the current output resolution <code>X9</code> and refresh rate <code>X16</code> settings.
View output rate details	<code>Ø =</code>	<code>width * height * refresh rate ↵</code>	View the current output resolution and refresh rate in actual numbers.
NOTE: The View output rate details command can display the actual resolution of the output when the MGP Pro is configured to use the live background rate.			
Example:	<code>Ø =</code>	<code>1024*0768*060 ↵</code>	The output resolution is 1024x768. The rate is 60 Hz.
Freeze			
Enable freeze	<code>X2 * 1 F</code>	<code>X2 Frz 1 ↵</code>	Freeze the output video image in window <code>X2</code> . <code>X2</code> = Ø - 4. Ø = all windows.
Disable freeze	<code>X2 * Ø F</code>	<code>X2 Frz Ø ↵</code>	Unfreeze the output image
View freeze status	<code>X2 F</code>	<code>X4 ↵</code>	View freeze status <code>X4</code> . For <code>X4</code> : 1 = frozen. Ø = not frozen.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Test Pattern			
Set test pattern	[X5] J	Tst [X5] ↵	Select test pattern [X5]. For [X5]: Ø = Off (none) 1 = Colorbars 2 = X-Hatch (16 x 12) 3 = 4 x 4 X-Hatch 4 = Grayscale 5 = Ramp 6 = Alt. Pixels 7 = White Field 8 = Crop 9 = Side-By-Side (4 x 3 crop) 1Ø = Quad Split (4 x 4) 11 = PIP Images (4 x 3 or 6 x 9 PIP columns) 12 = 1.78 Aspect (4 x 3/16 x 9) 13 = 1.85 Aspect (4 x 3/16 x 9) 14 = 2.35 Aspect (4 x 3/16 x 9).
NOTE: Test patterns 10 and 11 are not available on the MGP 462 Pro models.			
View test pattern	J	[X5] ↵	View the currently selected test pattern.
Executive Mode			
NOTE: In all front panel lock modes, RS-232, RS-422, and Ethernet controls are not affected.			
Disable executive mode	Ø X	Exe Ø ↵	Unlock all front panel controls.
Enable executive mode	1 X	Exe 1 ↵	Lock front panel controls except for the input buttons.
Enable executive mode 2	2 X	Exe 2 ↵	Lock all front panel controls.
View executive mode status	X	[X35] ↵	View executive mode status [X35]. For [X35]: Ø = Unlocked. 1 = Locked except for input selection buttons. 2 = All controls are locked.
Special Functions			
Output polarity	1 * [X36] #	Pol [X36] ↵	Set output polarity to [X36]. For [X36]: Ø = H-/V- (default) 1 = H-/V+ 2 = H+/V- 3 = H+/V+.
<i>Example:</i>	1 * 2 #	Pol 2 ↵	Output sync polarity is H+/V-.
View output polarity	1 #	[X36] ↵	View the current output polarity setting [X36].

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Special Functions (continued)			
Set output sync format	2 * [x37] #	Syn [x37] ↵	Set the output sync format. For [x37] : 1 = RGBHV 2 = RGBS 3 = RGsB 4 = YUV bi-level 5 = YUV tri-level.
View output sync format	2 #	[x37] ↵	View current output sync format setting [x37] .
Set blue mode to On or Off	3 * [x4] #	Blu [x4] ↵	Turn blue mode on and off. Blue mode is useful when you are configuring display color settings. For [x4] : Ø = blue mode off. 1 = blue mode on.
View blue mode status	3 #	[x4] ↵	View the current blue mode status.
Set text position	6 * [x2] * [x6] #	[x2] T1c [x6] ↵	Change the location of the text label to [x6] in window [x2] . [x2] = Ø - 4. Ø = all windows. For [x6] : Ø = None 1 = Bottom left 2 = Bottom center 3 = Bottom right 4 = Top left 5 = Top center 6 = Top right.
View text position	6 * [x2] #	[x6] ↵	View the text label position ([x6]) in window [x2] .
Set text size	10 * [x38] #	Tsz [x38] ↵	Set the size of the label text. For [x38] : 1 = Small 2 = Medium 3 = Large.
View text size	10 #	[x38] ↵	View the current size ([x38]) of the label text.
Set text border color	14 * [x2] * [x39] #	[x2] Txb [x39] ↵	Change the color of the text label border in window [x2] . [x2] = Ø - 4. Ø = all windows. For [x39] : Ø = Off (no border) 1 = Red 2 = Green 3 = Blue 4 = White 5 = Magenta 6 = Cyan 7 = Yellow 8 = Black 9 = Translucent.
View text border color	14 * [x2] #	[x39] ↵	View the border color ([x39]) of the text label in window [x2] .

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Special Functions (continued)			
Set text color	16 * [X2] * [X40] #	[X2] Txc [X40] ↵	Set the color of the text in the label in window [X2] to [X40] . For [X40] : 1 = Red 2 = Green 3 = Blue 4 = White 5 = Magenta 6 = Cyan 7 = Yellow 8 = Black.
View text color	16 * [X2] #	[X40] ↵	View the current color of the text in window [X2] .
Set text background color	17 * [X2] * [X41] #	[X2] Tbc [X41] ↵	Set the background color of the text label in window [X2] to [X41] . For [X41] : Ø = Off (none) 1 = Red 2 = Green 3 = Blue 4 = White 5 = Magenta 6 = Cyan 7 = Yellow 8 = Black 9 = Translucent.
View text background color	17 * [X2] #	[X41] ↵	View the current color ([X41]) of the text label background in window [X2] .
Set window border color	9 * [X2] * [X42] #	[X2] Brd [X42] ↵	Set the color of the border around window [X2] to [X42] . [X2] = Ø through 4. Ø = all windows. For [X42] : Ø = Off (no border) 1 = Red 2 = Green 3 = Blue 4 = White 5 = Magenta 6 = Cyan 7 = Yellow 8 = Black.
View window border color	9 * [X2] #	[X42] ↵	View the current border color in window [X2] .

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Special Functions (continued)			
Set screen background color	8 * X43 #	Bkg X43 ↵	Set background color X43 for the output screen. For X43 : Ø = Off (default) 1 = Red 2 = Green 3 = Blue 4 = White 5 = Magenta 6 = Cyan 7 = Yellow 8 = Background image 9 = Live background input 1Ø = Custom color.
View background color	8 #	X43 ↵	View the current background color setting (X43).
Set a custom color	22 * X25 * X25 * X25 #	Ubk X25 * X25 * X25 ↵	Set custom color values (X25) for the screen background, setting red, green, and blue in that order. X25 = Ø - 255.
View custom color	22#	Ubk X25 * X25 * X25 ↵	View the red, green, and blue values of the custom screen background color.
Background Image			
Save image	Esc Ø , filename MF ↵	Ims filename ↵	Save the current output image to memory under the designated name.
NOTE: The filename must be no more than 16 characters, including the .bmp extension.			
Recall image	Esc Ø , filename RF ↵	Imr filename ↵	Recall the image with the specified file name and display it as a background.
Current image	Esc RF ↵	filename ↵	View the file name of the currently displayed background image.
Film Mode			
Enable film mode	18 * X1 * 1 #	X1 F1m 1 ↵	Enable film mode for input X1 . (Auto-sense 3:2 or 2:2 pull-down.) X1 = 1 - 19.
Disable film mode	18 * X1 * Ø #	X1 F1m Ø ↵	Disable film mode for input X1 . (Blocks the deinterlacer from using either pull-down method.)
View film mode status	18 * X1 #	X4 ↵	View the current film mode setting for input X1 . For X4 : Ø = film mode disabled 1 = Film mode enabled
Auto Image			
Run Auto image	55 * X2 #	Aut X2 ↵	Perform Auto Image on window X2 . X2 is: 1 - 4 for MGP 464 Pro models 1 or 2 for MGP 462 Pro models.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
HDCP/Signal Status			
NOTE: These commands are applied only to digital inputs.			
Query input	[Esc] I [X1] HDCP ←	[X29] ↵ With tagged response (verbose mode 2 or 3): Hdcp I [X1] * [X29] ↵	View HDCP status [X29] for input [X1] (HDMI inputs only). For [X29]: Ø = No source or sink detected. 1 = Source or sink with HDCP detected. 2 = No source or sink detected with HDCP.
Query all inputs	[Esc] I HDCP ←	[X29] [X29] ... [X29] ↵ With tagged response (verbose mode 2 or 3): Hdcp I Ø * [X29] ... [X29] ↵	View the HDCP status of all inputs. Inputs are displayed in numerical order with the live background input last.
Query output	[Esc] O [X1] HDCP ←	[X29] ↵ With tagged response (verbose mode 2 or 3): Hdcp O 1 * [X29] ↵	View HDCP status [X29] of the output.
HDMI Output Format			
Set format	[Esc] [X31] VTP0 ←	Vtpo [X31] ↵	Set the output color space and format to [X31]. For [X31]: Ø = Auto (based on sink EDID) 1 = DVI 444 RGB (Ø-255, no InfoFrames). 2 = HDMI 444 RGB (Ø-255, InfoFrames). Default is Ø.
View format setting	[Esc] VTP0 ←	[X31] ↵	View the current output colorspace for the HDMI output.
HDCP Input Authorization (HDMI inputs only)			
Set HDCP authorized device On	[Esc] E [X1] * 1 HDCP ←	Hdcp E [X1] * 1 ↵	Select HDCP authorization for input [X1].
Set HDCP authorized device Off	[Esc] E [X1] * Ø HDCP ←	Hdcp E [X1] * Ø ↵	Deselect HDCP authorization for input [X1].
View HDCP authorization status	[Esc] E [X1] HDCP ←	[X34] ↵ With tagged response (verbose mode 2 or 3): Hdcp E [X1] * [X34] ↵	View HDCP authorization status [X34] for input [X1]. For [X34]: Ø = HDCP encrypted data blocked. 1 = HDCP encrypted data allowed (default).

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
General Information			
General system information	[X2] * I	Chn [X1] • Typ [X3] • Std [X10] • Blk [X5] ↵	<p>View input number, video signal type, input signal standard, and blanking (muting) status in window [X2].</p> <p>[X1] = 1 - 19.</p> <p>[X3] = signal type. For [X3]:</p> <ul style="list-style-type: none"> 1 = RGB 2 = YUV-HD 3 = RGBcvS 4 = YUVi 5 = S-video 6 = Composite video 7 = HDMI or 3G/HD-SDI. <p>[X10] = signal standard. For [X10]:</p> <ul style="list-style-type: none"> Ø = None 1 = NTSC 2 = PAL 4 = SECAM - = Not applicable. <p>[X4] = muting status. For [X4]:</p> <ul style="list-style-type: none"> 1 = muted Ø = unmuted.

Command and Response Table for IP SIS Commands

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Bidirectional Serial Data Port				
Send data string	<code>[Esc] [X101] * [X109] * [X110] * [X111] RS ← [X02]</code> W [X109] %2A [X101] %2A [X110] %2A [X111] RS [X102] <i>{Response from command} ←</i>			
Example: <code>[Esc] Ø5 * 4 * 7 * 3L RS ← <data></code> W Ø5 %2A 4 %2A 7 %2A 3L RS <data> <i>{Response from command}</i>				
NOTES:				
<ul style="list-style-type: none"> • [X101] = Port number (Ø1 - 99) (always 2 digits, Ø1 = rear panel port, Ø2 = front panel port) • [X109] = Time in tens of milliseconds that the MGP Pro will wait until receipt of the first response character before terminating the command. Default = 1Ø = 10 ms. Max. = 32767. • [X110] = Time in tens of milliseconds that the MGP Pro will wait between characters being received via a serial port before terminating the current command or receive operation. Default = 2Ø = 20 ms. Max. = 32767. • [X111] = Message length #L or #D. The letter parameter is case sensitive (requires capital D or capital L). L = Length of the message to be received. D = Delimiter value. A delimiter of ASCII 0A = 10D. # = Byte count (for L) or a single ASCII character expressed in decimal form (for D). The byte count # can be Ø-32767. Default = Ø. The ASCII decimal # can be Ø-ØØ255. Default = the byte count. A 3-byte length = 3L. The response includes leading zeros. • [X102] = Command data section. For web encoding for [X102], be sure to convert non-alphanumeric characters to hex numbers (see the note on page 49). • The * [X109] * [X110] * [X111] sequence is optional. If [X109] and [X110] are not specified, the default values are used. 				
Configure serial port parameters ²⁴	<code>[Esc] [X101] * [X116] , [X117] , [X118] , [X119] CP ←</code> W [X101] %2A [X116] %2A [X117] %2A [X118] %2A [X119] CP Cpn [X101] • Ccp [X116] , [X117] , [X118] , [X119] CP ← For port [X101] , set baud rate [X116] , parity [X117] , data bits [X118] , and stop bits [X119] . [X116] = 2400, 4800, 9600, 19200, 38400, or 115200. [X117] = <u>odd</u> , <u>even</u> , <u>none</u> , <u>mark</u> , or <u>space</u> . (Only the first letter is required.) [X118] = 7 or 8. [X119] = 1 or 2.			
View serial port parameters	<code>[Esc] [X101] CP ←</code>	<code>W [X101] CP </code>	<code>[X116] , [X117] , [X118] , [X119] CP ←</code>	
Configure mode ²⁴	<code>[Esc] 1 * [X120] CY ←</code>	<code>W 1 %2A [X120] CY </code>	<code>Cpn1 • Cty [X120] ←</code>	Select serial mode [X120] for the rear panel RS-232/422 port. For [X120] Ø = RS-232 1 = RS-422.
NOTE: Only the rear panel RS-232/422 port can be configured.				
View serial mode	<code>[Esc] [X101] CY ←</code>	<code>W [X101] CY </code>	<code>[X120] ←</code>	View current port mode.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Bi-directional Serial Data Port (continued)				
Configure flow control ²⁴	[Esc] [X101] * [X121] , [X122] CF ←	W [X101] %02A [X121] %02C [X122] CF	Cpn [X101] • Cfl [X121] , [X122] ←	For port [X101], set flow control type [X121] with [X122] ms between bytes. For [X121]: H = Hardware. S = Software. N = None (default). [X122] = 0000 through 0001. Default = Ø ms.
View flow control	[Esc] [X101] CF ←	W [X101] CF	[X121] , [X122] ←	
Configure receive timeout ²⁴	[Esc] [X101] * [X109] * [X110] * [X115] * [X111] CE ←	W [X101] %2A [X109] %2A [X110] %2A [X115] %2A [X111] CE	Cpn [X101] • Cce [X109] , [X110] , [X115] , [X111] ←	For port [X101], set: <ul style="list-style-type: none">• The time that the MGP Pro will wait for a response before terminating the command• Message length• Priority status.
NOTES:				
<ul style="list-style-type: none"> • [X101] = Port number (Ø1-99). Ø1 = rear panel RS-232/422 port, Ø2 = front panel Config port. • [X109] = Time in tens of milliseconds that the MGP Pro will wait until receipt of the first response character before terminating the command. Default = 1Ø = 10 ms. Max. = 32767. • [X110] = Time in tens of milliseconds that the MGP Pro will wait between characters being received via a serial port before terminating the current command or receive operation. Default = 2Ø = 20 ms. Max. = 32767. • [X111] = Message length #L or #D. The letter parameter is case sensitive (requires capital D or capital L). L = Length of the message to be received. D = Delimiter value. A delimiter of ASCII 0A = 10D. # = Byte count (for L) or a single ASCII character expressed in decimal form (for D). The byte count # can be Ø - 32767. Default = Ø. The ASCII decimal # can be Ø - 00255. Default = the byte count. A 3-byte length = 3L. The response includes leading zeros. • [X115] = Priority status for port [X101] receiving timeouts. For [X115]: Ø = Use Send data string command parameters (default). 1 = Use Configure receive timeout command parameters. The response includes leading zeros. • The * [X109] * [X110] * [X111] sequence is optional. If [X109] and [X110] are not specified, the defaults are used. 				
View receive timeout	[Esc] [X101] CE ←	W [X101] CE	[X109] , [X110] , [X115] , [X111] ←	

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Ethernet Port				
Set current connection port timeout period	[Esc] Ø * [X138] TC ←	W Ø %2A [X138] TC	Pti Ø * [X138] ←	Set number of seconds (in tens of seconds) before timeout on the current IP connection only. [X138] = 1 - 32767. Default is 3Ø = 300 seconds = 5 minutes.
View current connection port timeout period	[Esc] ØTC ←	W ØTC	[X138] ←	
Set global IP port timeout period	[Esc] 1 * [X138] TC ←	W 1 %2A [X138] TC	Pti 1 * [X138] ←	Set number of seconds (in tens of seconds) before timeout on all IP connections made from this MGP Pro. [X138] = 1 - 32767. Default is 3Ø = 300 seconds = 5 minutes.
View global port timeout period	[Esc] 1TC ←	W 1TC	[X138] ←	
Firmware Version Requests				
NOTE: An asterisk (*) after the version number in these commands indicates which version is currently running. A caret (^) indicates bad checksum or invalid load. Question marks (? . ??) indicate that the firmware version is not loaded.				
Query firmware version	Q or 1Q	Q or 1Q	[X104] ← <i>With tagged response – verbose modes 2 and 3: VerØ1 * [X104] ←</i>	Show the MGP Pro firmware version number [X104] to two decimal places. Gives the number of the currently running version of the user-updatable firmware.
<i>Example:</i>	1Q	1Q	1.Ø1	
Query verbose version information	ØQ	ØQ	Responses from 2Q-3Q-4Q ← <i>With tagged response – verbose modes 2 and 3: VerØØ * {responses from 2Q-3Q-4Q} ←</i>	
<i>Example:</i>	ØQ	ØQ	1.ØØ-Ø.ØØ (1.48-MGP Pro Series -Wed, 16 Jan 2013 18:37:59 GMT) -2.Ø2*	Show bootstrap, factory-installed, and updated firmware versions (see Query commands 2Q, 3Q, and 4Q on the following lines).
Query bootstrap version	2Q	2Q	[X104] ← <i>With tagged response – verbose modes 2 and 3: VerØ2 * [X104] ←</i>	The bootstrap firmware is not user-replaceable, but you may need this information for troubleshooting.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Firmware Version Requests (continued)				
Query factory firmware version	3Q	3Q	X104 (plus <i>web ver. -desc -UL date/time</i>) ↵ With tagged response – verbose modes 2 and 3: Ver03 * X104 (plus <i>web ver. -desc -UL date/time</i>) ↵	Factory-installed firmware is not user-replaceable. This firmware was installed at the factory and is the version the processor reverts to after a mode 1 reset (see Resetting on page 40).
<i>Example:</i>	3Q	3Q	1.00 (1.07-MGP464 PRO -Wed, 16 Jan 2013 03:28:10 GMT)	In this example, the factory firmware version is 1.00, also known as the kernel version 1.07, for an MGP 464 Pro, dated 16 January, 2013.
Query updated firmware version	4Q	4Q	X104 (plus <i>web ver. -desc -UL date/time</i>) ↵ With tagged response – verbose modes 2 and 3: Ver04 * X104 (plus <i>web ver. -desc -UL date/time</i>) ↵	Use this command to find out which version of the firmware, if any, was uploaded into the unit after it left the factory. X104 = firmware version to two decimal places.
<i>Example:</i>	4Q	4Q	2.02 * (1.66– MGP464 Series –Mon, 14 Jan 2008 17:03:46 GMT	In this example, the factory firmware version is 2.02, also known as kernel version 1.66, for an MGP 464 Pro, dated 14 January, 2008, at 5:03 and 46 seconds pm, Greenwich mean time.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Information Requests				
Request unit part number	N	N	6Ø - 1258 - nn or 6Ø - 1259 - nn ↵ With tagged response – verbose modes 2 and 3: Pno 6Ø-1258-nn or Pno 6Ø-1259-nn ↵	Show unit part number. MGP 462 Pro is 60-1258-nn. MGP 464 Pro is 60-1259-nn. For nn: Ø1 = standard model Ø2 = DI model Ø3 = 3G-SDI model.
Request model name	1I	1I	Ø44 ↵ With tagged response – verbose modes 2 and 3: InfØ1 * Ø44	Show unit model name Ø44. Ø44 can be: MGP 462 Pro MGP 462 Pro DI MGP Pro 3G-SDI MGP 464 Pro MGP Pro DI MGP Pro 3G-SDI.
Request model description	2I	2I	Standard: Multi-Graphic Processor DI and 3G-HD/SDI: Multi-Graphic Processor w/ <HDMI or 3G-HD/SDI> option ↵ With tagged response – verbose modes 2 and 3: InfØ2 * Multi-Graphic Processor [w/ <HDMI or 3G-HD/SDI> option] ↵	Show type of unit.
Request system memory usage	3I	3I	n bytes used out of n kBytes ↵ With tagged response – verbose modes 2 and 3: InfØ3 * n bytes used out of n kBytes ↵	Show amount of memory used and total available memory for system operations.
Request user memory usage	4I	4I	n bytes used out of n kBytes ↵ With tagged response – verbose modes 2 and 3: InfØ4 * n bytes used out of n kBytes ↵	Show amount of user memory used and total available user memory.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Event Control				
Read event buffer memory ²⁷	<code>Esc [X125] , [X126] , [X127] , [X128] E ←</code> <code>W [X125] , [X126] , [X127] , [X128] E </code> <code>[X139] ←</code>			Read the contents of a specific section of a memory buffer for event number [X125]. [X125] = event number, 1 - 99. [X126] = event buffer. For [X126]: Ø = receive 1 = user 2 = NVRAM. [X127] = event buffer offset, Ø to <i>max. buffer size</i> . [X128] = Event data size. For [X128]: b = bit B = byte (8 bits) S = short (16 bits) L = long (32 bits). [X139] = data element value in ASCII from event buffer (leading zeros suppressed).
Write event to memory buffer ^{24, 27}	<code>Esc [X125] , [X126] , [X127] , [X129] , [X128] E ←</code> <code>W [X125] , [X126] , [X127] , [X129] , [X128] E </code> <code>Ewr [X125] , [X129] ←</code>			Write event [X125] to buffer [X126], offset by [X127]. Include data [X129], size [X128]. [X129] = event data to write.
Read string from event buffer memory ²⁷	<code>Esc [X125] , [X126] , [X127] , [X131] FE ←</code> <code>W [X125] , [X126] , [X127] , [X131] FE </code> <code>{string} ←</code>			Read string from event [X125], buffer [X126], offset by [X127], [X131] bytes. [X131] = number of bytes to read.
Write string to event buffer memory ^{24, 27}	<code>Esc [X129] , [X125] , [X126] , [X127] FE ←</code> <code>W [X129] , %2A [X125] , [X126] , [X127] FE </code> <code>Ewr [X125] , [X129] ←</code>			Write data string [X129] from event [X125], buffer [X127], offset by [X129].
Start events ^{24, 27}	<code>Esc 1AE ←</code>	<code>W 1AE </code>	<code>Ego ←</code>	Initiate all programmed events.
Stop events ^{24, 27}	<code>Esc ØAE ←</code>	<code>W ØAE </code>	<code>Est ←</code>	Stop all programmed events.
Read number of events running	<code>Esc AE ←</code>	<code>W AE </code>	<code>Enm nn ←</code> With tagged response – verbose modes 2 and 3: <code>Enm nnnnn</code>	<i>nn</i> = 2-digit number. <i>nnnnn</i> = 5-digit number.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
E-mail Commands				
Configure e-mail events ²⁴	[X132], [X133], [X134] CR ←		W [X132], [X133], [X134] CR Ipr [X132], [X133], [X134] ←	When event [X132] occurs, end e-mail notification [X134] to recipient address [X133]. [X132] = e-mail event number (1 - 64). [X133] = e-mail recipient address. [X134] = name of e-mail notification file to be sent (first file line is the subject and the rest is the e-mail body).
Example:	[Esc] 5, jdoe@extron.com, 7.eml CR ←		W5 %2C jdoe %40 extron %2E xom %2C 7 %2E eml CR lpr5, jdoe@extron.com, 7.eml ←	For e-mail event 5, send file 7.eml to jdoe@extron.com.
View e-mail events	[X132] CR ←	W [X132] CR	[X133] , [X134] ←	
Send e-mail (file named in mail box)	[Esc] [X132] SM ←	W [X132] SM	Eml [X132] ←	
Send e-mail (using a different file)	[Esc] [X132] , [X143] , [X134] SM ←	W [X132] %2C [X143] %2C [X134] SM ←	Eml [X132] ←	[X143] = number inserted into the e-mail message if the .eml file has an embedded [Esc] ← command.
Web Browser Specific Commands				
Read response from last URL command	[Esc] UB ←	W UB	{Response from command} ←	View the response to the last command that was entered.
IP Setup Commands				
Set unit name ²⁴	[Esc] [X105] CN ←	W [X105] CN	Ipn • [X105] ←	Change the processor name to [X105], a name of your choosing. For [X105]: The name can consist of up to 24 alphanumeric characters and the minus sign or hyphen (-). The first character must be a letter, the last character cannot be a minus sign. Case does not matter.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
IP Setup Commands (continued)				
Set unit name to factory default ²⁴	[Esc] • CN ↵	W %20 CN	Ipn • X135 ↵	X135 is the name the processor was shipped with: MGP46n-xx-xx-xx, a combination of the model and the last three pairs of the hex numbers in the unit MAC address.
Example:	[Esc] • CN ↵	W %20 CN	MGP462PRO-3G-SDI-09-44-92	The factory name of this unit indicates that it is an MGP 462 Pro, SDI configuration, and the last 6 digits of its MAC address are 09-44-92.
Read unit name	[Esc] CN ↵	W CN	X105 ↵	View current unit name X105 .
Set time and date ²⁴	[Esc] X106 CT ↵	W X106 CT	Ipt • X106 ↵	X106 is the local date and time format. The set format is <i>MM/DD/YY-HH:MM:SS</i> . (The hours, minutes, and seconds can also be separated by periods.) Examples: <i>11/13/06-10:54:00</i> or <i>11/13/06-10.54.00</i>
Read time/date	[Esc] CT ↵	W CT	X106 ↵	The read format is: <i>Www</i> [day of the week], <i>DD Mmm YYYY HH:MM:SS</i> . Example: Tue, 18 Nov 2006 18:19:33.
Set GMT offset ²⁴	[Esc] X103 CZ ↵	W X103 CZ	Ipz X103 ↵	Set Greenwich Mean Time (GMT) offset value X103 for the processor location. GMT offset (-12.00 to +14.00) represents the time difference in hours and minutes ($\pm hh:mm$ relative to Greenwich, England). The plus sign and leading zero are optional. X103 is in the format <i>hh:mm</i> . Example: <i>5:30</i> or <i>5.30</i> = +05:30.
Read GMT offset	[Esc] CZ ↵	W CZ	X103 ↵	View the current GMT offset.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
IP Setup Commands (continued)				
Set daylight saving time ²⁴	[Esc] X124 CX ←	W X124 CX	Ipx X124 ←	<p>Set daylight saving time [X124] on your MGP Pro. Daylight saving time (DST) is a 1-hour offset that is observed in the USA and parts of Europe and Brazil. For [X124]:</p> <ul style="list-style-type: none"> Ø = Off or ignore 1 = On in USA 2 = On in Europe 3 = On in Brazil. <p>Example: California uses GMT -8:00 from the second Sunday in March to the first Sunday in November, and -7:00 GMT from November to March. DST should be turned off in Hawaii, American Samoa, Guam, Puerto Rico, the U.S. Virgin Islands, the eastern time zone portion of Indiana, and Arizona (excluding the Navajo Nation).</p>
Read daylight saving time	[Esc] CX ←	W CX	X124 ←	View the daylight saving time setting for your MGP Pro.
Set DHCP on ²⁴	[Esc] 1DH ←	W 1DH	Idh1 ←	Turn on Dynamic Host Configuration Protocol (DHCP) to enable automatic assigning of IP addresses.
Set DHCP off ²⁴	[Esc] ØDH ←	W ØDH	IdhØ ←	
View DHCP mode	[Esc] DH ←	W DH	Idh X4 ←	View DHCP status [X4]: Ø = off, 1 = on.
Set IP address ²⁴	[Esc] X107 CI ←	W X107 CI	Ipi • X107 ←	Set IP address [X107] for your unit in the format <i>nnn.nnn.nnn.nnn</i> . Leading zeros in each of the four fields are optional.
Read IP address ²⁴	[Esc] CI ←	W CI	X107 ←	View IP address [X107] of your unit. Leading zeros in each of the four fields are suppressed in returned values.
Read hardware address (MAC)	[Esc] CH ←	W CH	X112 ←	View hardware media access control (MAC) address [X112] of your unit in the format <i>XX-XX-XX-XX-XX-XX</i> .
Set subnet mask ²⁴	[Esc] X113 CS ←	W X113 CS	Ips • X113 ←	Set unit subnet mask [X113] (<i>nnn.nnn.nnn.nnn</i>) The syntax is the same as for IP addresses. Leading zeros are optional in setting values.
Read subnet mask	[Esc] CS ←	W CS	X113 ←	View the unit subnet mask. Leading zeros are suppressed.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
IP Setup Commands (continued)				
Set gateway address ²⁴	[Esc] X107 CG ←	W X107 CG	Ipg • X107 ←	Set IP address X107 (nnn.nnn.nnn.nnn) for your gateway. Leading zeros are optional.
Read gateway address	[Esc] CG ←	W CG	X107 ←	View the gateway IP address for your unit.
Set administrator password	[Esc] X123 CA ←	W X123 CA	Ipa • X130 ←	<p>Set administrator access password X123.</p> <p>X123 = 4 to 12 alphanumeric characters. The password is case sensitive. Special characters (spaces or symbols) are not allowed.</p> <p>X130 = displayed password. With an RS-232 or RS-422 connection, the password is displayed.</p> <p>With an IP connection, masked characters (four asterisks) are displayed (****).</p>
Clear administrator password ²⁴	[Esc] • CA ←	W %20 CA	Ipa • ←	Remove all passwords (administrator and user).
NOTE: A user password cannot be assigned if an administrator password does not exist. Entering a password when the MGP Pro has not been configured displays an E14 error response from the processor. If the administrator password is cleared (removed), the user password is removed also.				
View administrator password	[Esc] CA ←	W CA	X130 ←	View password X130, shown with leading zeros.
Set user password ^{14 24}	[Esc] X123 CU ←	W X123 CU	Ipu • X130 ←	Set user password X123 (4-12 alphanumeric characters). The password is case sensitive. Special characters (spaces or symbols) are not allowed.
NOTE: A user password cannot be assigned if an administrator password does not exist.				
Clear user password ²⁴	[Esc] • CU ←	W %20 CU	Ipu • ←	Clear the user password only.
View user password	[Esc] CU ←	W CU	X130 ←	View password X130, shown with leading zeros.
Query session security level	[Esc] CK ←	W CK	<p>X137 ←</p> <p>With tagged response – verbose modes 2 and 3:</p> <p>Pvl X137 ←</p>	<p>View security level X137 of the current connection. For X137:</p> <p>Ø = Anonymous</p> <p>1 - 1Ø = Extended security level</p> <p>11 = User</p> <p>12 = Administrator.</p>

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description																		
IP Setup Commands (continued)																						
Set verbose mode ²⁴	[Esc] X114 CV ←	W X114 CV	X114 ←	<p>Enable or disable verbose mode type X114. For X114:</p> <ul style="list-style-type: none"> Ø = verbose mode and tagged responses disabled (default for Telnet connections) 1 = verbose mode enabled (default for RS-232 or RS-422 connections). 2 = tagged responses for queries enabled 3 = verbose mode and tagged responses for queries enabled. 																		
NOTE: This command controls both verbose responses or messages and tagged (labeled) responses.																						
Verbose mode is a communication mode in which the device responds with more information than it usually would. For example, the MGP can send out a notice of a change in volume, input, or some other setting without receiving a query via your PC. That change could have been a result of an internal process (a scheduled script execution), a selection made using a keypad, or a change made using the embedded web pages. This is an example of a verbose (wordy) relationship between the MGP and a connected device.				<table border="1"> <thead> <tr> <th></th> <th>Verbose Responses</th> <th>Tagged Responses</th> </tr> </thead> <tbody> <tr> <td>X114 Value</td> <td>Receive unsolicited messages for all actions (Initiated via any source (touchpanel, port input, internal web page changes, or commands) instead of only for SIS commands)</td> <td>Receive tagged responses to read/view requests (Responses to SIS commands are always tagged. Turning tagged responses on adds tags to the responses to SIS read requests.)</td> </tr> <tr> <td>Ø</td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>✓</td> <td></td> </tr> <tr> <td></td> <td></td> <td>✓</td> </tr> <tr> <td>3</td> <td>✓</td> <td>✓</td> </tr> </tbody> </table>		Verbose Responses	Tagged Responses	X114 Value	Receive unsolicited messages for all actions (Initiated via any source (touchpanel, port input, internal web page changes, or commands) instead of only for SIS commands)	Receive tagged responses to read/view requests (Responses to SIS commands are always tagged. Turning tagged responses on adds tags to the responses to SIS read requests.)	Ø			1	✓				✓	3	✓	✓
	Verbose Responses	Tagged Responses																				
X114 Value	Receive unsolicited messages for all actions (Initiated via any source (touchpanel, port input, internal web page changes, or commands) instead of only for SIS commands)	Receive tagged responses to read/view requests (Responses to SIS commands are always tagged. Turning tagged responses on adds tags to the responses to SIS read requests.)																				
Ø																						
1	✓																					
		✓																				
3	✓	✓																				
Verbose mode creates more network traffic than usual, which can slow down network performance. Verbose mode is usually enabled for troubleshooting and disabled for daily use.																						
<ul style="list-style-type: none"> With verbose mode off, you receive no notification of those changes or events. With verbose mode on, you receive status messages. These are not replies to a command that you send, but they are unsolicited messages that are generated by the equipment. 																						
By default, when the MGP is connected via Ethernet, verbose mode is disabled in order to reduce the amount of communication traffic on the network.																						
If you want to use the verbose mode (other than mode Ø) with an MGP, you must set this mode to On each time you reconnect to the MGP.																						
Read verbose mode	[Esc] CV ←	W CV	X114 ←																			
Remap Port Designations																						
Set Telnet port map ²⁴	[Esc] {port#} MT ←	W {port#} MT	Pmt {port#} ←	Set Telnet to the standard port number (23).																		
NOTES:																						
<ul style="list-style-type: none"> Duplicate port number assignments are not permitted (for example, the Telnet and web mapping cannot be the same). An E13 error code (invalid parameter) results. Remapping of the port number to other than defaults 80 or 23 or disabling it by resetting it to Ø can be done only to ports numbered 1024 or higher. 																						
Reset Telnet port map ²⁴	[Esc] 23MT ←	W 23MT	Pmt 00023 ←																			
Disable Telnet port map ²⁴	[Esc] ØMT ←	W ØMT	Pmt 00000 ←																			
Read Telnet port map (HTTP)	[Esc] MT ←	W MT	{port#} ←																			

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Remap Port Designations (continued)				
Set web port map ²⁴	[Esc] {port#} MH ←	W {port#} MH	Pmh {port#} ↵	
Reset web port map ²⁴	[Esc] 80MH ←	W 80MH	Pmh 00080 ↵	Set the web port to the standard port number (80).
Disable web port map ²⁴	[Esc] ØMH ←	W ØMH	Pmh 00000 ↵	
Read web port map ²⁴	[Esc] MH ←	W MH	{port#} ↵	
Set Direct Access port map ²⁴	[Esc] {port#} MD ←	W {port#} MD	Pmd {port#} ↵	
Reset Direct Access port map ²⁴	[Esc] 2001MD ←	W 2001MD	Pmd 02001 ↵	
Disable Direct Access port map ²⁴	[Esc] ØMD ←	W ØMD	Pmd 00000 ↵	
Read Direct Access port map ²⁴	[Esc] MD ←	W MD	{port#} ↵	
Listing Connections				
List connections	[Esc] CC ←	W CC	{Number of connections} ↵	
File Commands				
List files from current directory	[Esc] DF ←	W DF	(See below.)	Retrieve a list of files stored in the MGP Pro
List files from current directory and below	[Esc] LF ←	W LF	(See below.)	Each line of the response lists a different file name and its corresponding file size. The last line of the response indicates how much available file space remains.
<p>Unit web responses (HTML sample code):</p> <pre>var file = new array (); file [1] = 'filename1, date1, filesize1'; file [2] = 'filename2, date2, filesize2'; file [3] = 'filename3, date3, filesize3'; ... file [n] = 'filename n, date n, filesize n'; file [n+1] = 'filename n+1, date n+1, filesize n+1';</pre> <p>Unit Telnet responses:</p> <pre>filename x+1 • date/time • length ↵ filename x+1 • date/time • length ↵ filename x+1 • date/time • length ↵ filename x+1 • date/time • length ↵ ... space_remaining • bytes left ↵ ↵</pre>				
Stream Files via Port 80				
Load file to user flash memory	Use POST on port 80 followed by the delimited data to be written to the flash file memory.			
Retrieve file from user flash memory	Send a page GET on port 80 followed by: WSF Responds with raw unprocessed data in the file.			
Example	<code>http://192.168.254.254/mypage.html?cmd=WSF </code>			

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Stream Files via Telnet, RS-232, or RS-422				
Load file to user flash memory	[Esc] +UF filesize , filename ←	{Raw unprocessed data in file up to <i>filesize</i> }		
Retrieve file from user flash memory	[Esc] filename SF ←	W filename SF	Up1 ← Responds with 4 bytes of file size + raw unprocessed data in file.	
Mail Server Setup Commands				
Set mail server address and unit domain name ²⁴	[Esc] [X107] , [X108] , [X123] CM ←			
		W [X107] %2C X10* %2C [X123] CM ←	Ipm [X107] , [X108] , [X123] ←	[X107] = IP address, format <i>nnn.nnn.nnn.nnn</i> . [X108] = mail domain name (for example, <i>extron.com</i>). [X123] = password.
Read mail server address and unit domain name ²⁴	[Esc] CM ←	W CM 	[X107] , [X108] , [X123] ←	
Directory Commands				
Change/create directory	[Esc] {path} / {directory} / CJ ←	W {path} %2F {directory} %2F CJ 	Dir • {path} / {directory} / ←	
NOTE: A directory does not exist until a file has been copied into the path.				
Move back to root directory	[Esc] / CJ ←	W %2F CJ 	Dir • / ←	
Move up one directory	[Esc] . . CJ ←	W %2E %2E CJ 	Dir • {path} / {directory} / ←	
View current directory	[Esc] CJ ←	W CJ 	{path} / {directory} / ←	
Reset (Zap) / Erase Commands				
Erase user-supplied web page or file ^{24,28}	[Esc] {filename} EF ←	W {filename} EF 	Del • {filename} ←	
Erase current directory and its files ^{24,28}	[Esc] / EF ←	W %2F EF 	Dd1 ←	
Erase current directory and subdirectories ^{24,28}	[Esc] / / EF ←	W %2F %2F EF 	Dd1 ←	
Erase flash memory	[Esc] ZFFF ←	W ZFFF 	Zpf ←	

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Reset (Zap) / Erase Commands (continued)				
Reset all device settings to factory default ²⁴	[Esc] ZXXX ↵	W ZXXX	Zpx ↵	IP-related settings and flash memory are not reset.
Absolute system reset ²⁴	[Esc] ZQQQ ↵	W ZQQQ	Zpq ↵	Reset all settings and memories, including all adjustments, the IP address, and the subnet mask, to the factory default values. The IP address is reset to 192.168.254.254, and the subnet mask is set to 255.255.0.0 (identical to reset mode 5).
Absolute reset retaining IP ²⁴	[Esc] ZY ↵	W ZY	Zpy ↵	Same as Absolute system reset ([Esc] ZQQQ) except that IP settings, including IP address, subnet mask, gateway address, unit name, DHCP setting, and port mapping (Telnet/web/Direct Access) are excluded in order to preserve communication with the device (recommended after a firmware update).

Windows-based Control Software

The MGP Series Control Program provides a convenient way to configure the inputs, output windows, and images in each window. It also lets you save and recall input and window presets, and perform nearly all the other functions that can be accomplished via the front panel controls, the SIS commands, or the embedded web pages.

The software provides the following controls to configure your MGP Pro:

- **Input configuration** — Specify a name, video signal type, size in pixels of the active video area, horizontal and vertical starting points of the total video display area, and the pixel sampling points (pixel phase) of each of the 19 inputs for each window.
- **Output configuration** — Set output resolution, refresh rate, sync polarity, and signal type (RGBHV, RGBS, RGsB, or YUV tri-level and bi-level), select a test pattern, and enable or disable blue mode in order to set video color and tint levels.
- **Picture controls** — Position and size the windows and the images within the windows, zoom in or out on the images and windows, and make fine adjustments to contrast, brightness, color, tint, and sharpness.
- **Presets** — Create, save, and recall window and input presets.
- **Window configuration** — Set window priority, border color, text label colors, size, and location plus transition effects for each window of the display.
- **Background capture** — Capture the entire display on the output screen and save it as a bitmap, to be recalled and used as a window background when needed.

Downloading the MGP Series Control Program from the Website

The MGP Series Control Program is available on the Extron website at www.extron.com. From this site, you can also download updates to the MGP software as they become available. To access the software on the web:

1. Open the Extron web page and select the **Download** tab.
2. On the Download screen, click the **Software** button (shown at right).
The Download Center — Software screen appears, containing a list of control software products.
3. In one of the linked alphabets at the top and bottom of the screen, click **M**.
4. On the M software products page, scroll to locate the MGP Series, and click the **Download** link at the far right (see figure 26, ①).



MGP Series Control Software for the MGP 452xi and MGP 464 series. Release Notes	79-518-01	2.3	Jul. 10, 2013	18.5 MB	Download
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Figure 26. MGP Series Link on the Extron Website

5. On the next screen, fill in the required information.

6. Click the **Download MGPSeriesSetupVnxn.exe** button. Depending on your browser and Windows version, one of the following appears:
 - A File Download - Security Warning window opens. On this window, click **Run**. When a second File Download - Security Warning window opens, click **Run** on it to start the firmware installation wizard.
 - A button containing the name of the firmware file appears at the bottom of the browser screen. Click this button to display an Open File - Security Warning window. Click **Run** on this window to start the software installation wizard.
 - A confirmation window appears at the bottom of the browser screen. Click **Run** on this prompt to start the installation wizard.

NOTE: If you want to save the installation file to your computer hard drive to run later, click **Save**. On the Save As window that opens, save the setup file to the desired location. When you are ready to install the software, double-click on the **MGPSeriesSetupnxn.exe** icon, click **Run** on the download screen that opens, and restart this procedure at step 7.

7. Follow the instructions on the InstallShield Wizard screens to complete the software program installation. By default the installation creates a folder called "MGP464" in the following location on the computer:

c:\Program Files (x86)\Extron\MGP464 [for Windows 7 and later]

c:\Program Files\Extron\MGP464 [for Windows XP and earlier] **or**

If there is not already an Extron folder in your program files folder, the installation program creates it as well.

Starting the Control Program

The MGP Series software help file provides information on settings and on how to use the control program itself.

1. To run the MGP Series Control Program, do either of the following:

- Double-click on the MGP464.exe file, located on your computer at c:\Program Files or [Program Files(x86)]\Extron\MGP464.
- Access the program from the **Start** menu on your computer as follows:
 - a. Click **Start** on your computer screen.
 - b. Select **All Programs** from the **Start** menu.
 - c. From the All Programs menu, select **Extron Electronics**.
 - d. From the Extron Electronics menu, select **MGP 464**.
 - e. Select **MGP464 Control Pgm**.

The Communication Type Selection window appears ([figure 27](#) on the next page).

2. On the Communication Type Selection window, select the tab for the communication method you want to use between your computer and the MGP Pro.

NOTE: Most items in the MGP Pro Series control program can also be configured via the front panel, or via the MGP Pro web pages. (Virtual inputs 5 through 19 cannot be configured from the front panel.) For details on features and settings, see [Front Panel Features](#) on page 12 to configure via the front panel.

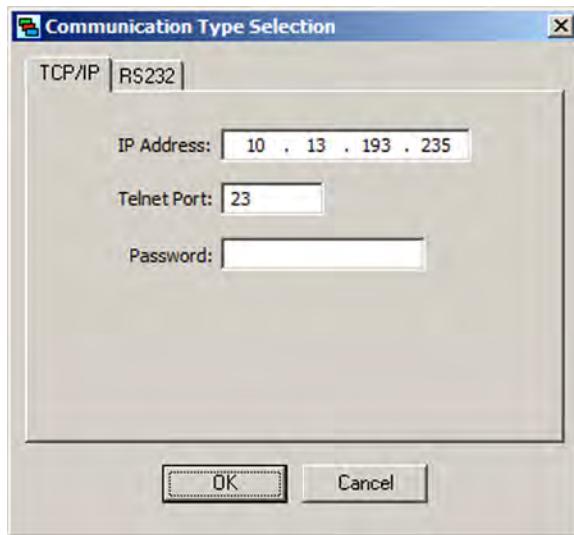


Figure 27. Comm Port Selection Window with TCP/IP and RS232 Tabs

- Select the **TCP / IP** tab if you are using the LAN port. If you will be uploading firmware, you should use this connection.
 - Select the **RS232** tab if you are using a serial ports. (The front panel port supports only RS-232. The rear panel 9-pin serial port supports RS-232 and RS-422.)
3. On the selected tab, enter the information for your communication type and click **OK**.
- **TCP / IP:** Enter your MGP Pro IP address, Telnet port (the default is 23), and a password if required.
 - **RS232:** Select your computer communication port from the **Port** menu, and the baud rate from the **Speed (baud)** menu. All other parameters are preset.

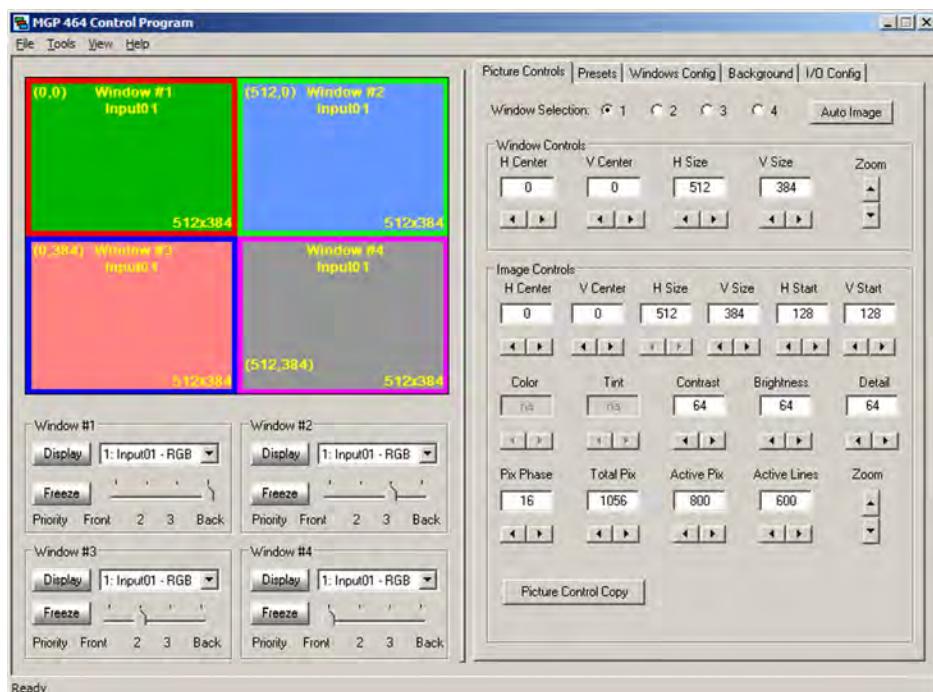


Figure 28. MGP Series Control Program Main Window (MGP 464 Pro)

4. For information on configuring the MGP Pro using the software, see the help file. To access the help file, select **Contents** from the **Help** pull-down menu or press the <F1> key.

HTML Configuration and Control

This section provides procedures for accessing and using the MGP Pro embedded web pages. Topics include:

- [Accessing the Web Pages](#)
- [Viewing System Status](#)
- [Using the Configuration Pages](#)
- [Using the File Management Page](#)
- [Using the Background Page](#)

The MGP Pro series can be controlled and configured using HTML web pages that are accessed over a network or from a local PC connected to the MGP Pro LAN port. The MGP Pro has factory-installed HTML web pages that allow you to view and adjust IP settings, upload firmware and other files to the MGP Pro, and select a background image for the display. Access these HTML pages using a web browser such as Microsoft® Internet Explorer®.

NOTES:

- Administrators have access to all of the web pages and are able to make changes to settings. Users can access the pages on the **System Status** and **Background** tabs only.
- The screen examples in this section all show MGP 462 Pro web pages. The MGP 464 Pro web pages are identical in content and appearance except for the product names and number of windows discussed.

Accessing the Web Pages

To access the MGP Pro HTML web pages:

1. Start the web browser program.
2. Enter the MGP Pro IP address in the browser **Address** field.

NOTE: If your local system administrators have not changed the address, use the factory-specified default, 192.168.254.254, for this field.

3. If you want the browser to display a page other than the default (such as a custom page that you have uploaded to the MGP), enter a slash (/) and the name of the file to open.

NOTES:

- The browser **Address** field should display the address in the following format:
nnn.nnn.nnn.nnn/optional_file_name.html
- The following characters are invalid in file names:
{space} ~ @ = ` [] { } < > ' " ; : | \ and ?.

4. Press the <Enter> key. If the MGP Pro HTML pages are not password protected, the browser displays a start page as described in step 5.

If the MGP Pro HTML pages are password protected, the browser displays the Internet Explorer Connect To dialog box (below left) or the Authentication Required dialog box (below right) (Google® Chrome® or Mozilla® Firefox®.).



Figure 29. Example of a Connect To Dialog Box

- a. Enter the administrator or user password in the **Password** field.

NOTE: A User Name entry is not required.

- b. Internet Explorer only: if desired, select the **Remember my password** check box to have the system input your password the next time you enter the IP address.
- c. Click **OK**.
5. If you entered the filename for a custom HTML page in step 4, the browser displays that page. If not, the browser displays the System Status page, which is the MGP Pro default start page. You can select the tabs at the top of this screen to display additional screens that enable you to configure the MGP Pro.

Viewing System Status

The System Status web page, accessed by clicking the **Status** tab, provides information on the current settings of your MGP Pro. Changes must be made via the Configuration web pages, the MGP Series Control Program, SIS commands, or the MGP Pro front panel. Personnel who have user access can view this page but cannot access the Configuration pages. They see only the **Status** and **Background** tabs. Figure 30 shows a typical MGP Pro System Status web page.

The screenshot shows the 'System Status' page of the Extron MGP Pro web interface. At the top, there's a navigation bar with tabs for Status, Configuration, File Management, and Background. The Status tab is active. On the right, there are links for 800.633.9876, Admin, Log Off, and Contact Us. The main content area is titled 'System Status' and contains three sections: 'System Description', 'IP Settings', and 'Serial Port Settings'.
System Description:
Model: MGP 462 Pro 3G-SDI
Description: Multi-Graphic Processor w/ SDI-HDMI option
Part Number: 60-1258-03
Firmware Version: 1.00
Date: 7/01/2003
Temperature: 082.40 F / 28.00 C
Time: 09:04 AM
of Connections: 002
IP Settings:
Unit Name: MGP462xi-3G-SDI-09-44-92
DHCP: Off
IP Address: 10.13.193.235
Gateway IP Address: 10.13.0.100
Subnet Mask: 255.255.0.0
MAC Address: 00-05-A6-09-44-92
Serial Port Settings:
Port: 1 Port: 2
Port Type: RS-232 Port Type: RS-232
Baud Rate: 9600 Baud Rate: 9600
Data Bits: 8 Data Bits: 8
Parity: None Parity: None
Stop Bits: 1 Stop Bits: 1
Flow Control: None Flow Control: None

Figure 30. System Status Page

Using the Configuration Pages

There are three Configuration pages, which only administrators can access. When you click the **Configuration** tab, these pages are listed on the sidebar menu at the left of the screen. The following sections describe the changes you can make from these pages.

System Settings Page

On the System Settings page (figure 31), you can set IP parameters for the MGP Pro.

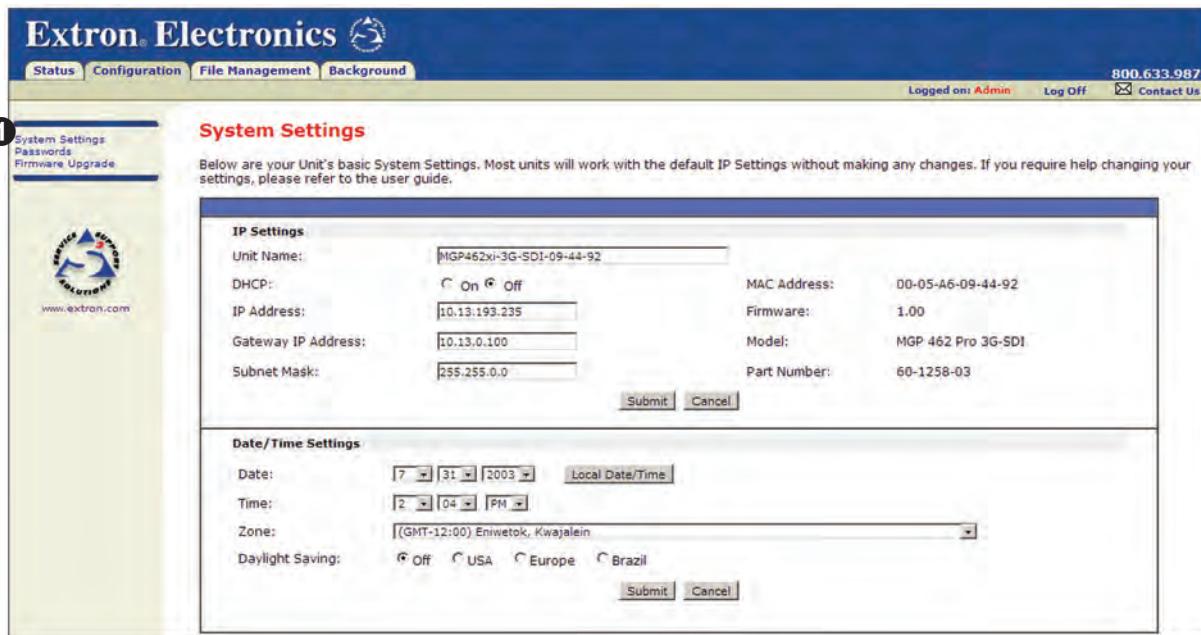


Figure 31. System Settings Page

To change your system settings:

1. On the **Configuration** tab, select **System Settings** from the sidebar menu at the left edge of the screen.
2. Select or enter the new information in the desired fields.
3. When you have made all the desired inputs, click the **Submit** button at the bottom of the section.

IP Settings fields

The IP Settings fields provide a location for viewing and editing settings unique to the Ethernet interface. After editing any of the settings on this page, click the **Submit** button at the bottom of the IP Settings section.

Unit Name field

The **Unit Name** field contains the name of the MGP Pro. The name assigned at the factory consists of the model name, followed by the last three character pairs of the **MAC address**. You can change this name field to any valid name, up to 24 alphanumeric characters.

NOTE: The following characters are invalid in the name:

+ ~ , @ = ` [] { } < > ' " ; : | \ and ?.

DHCP radio buttons

The **DHCP On** radio button directs the MGP Pro to ignore any entered IP addresses and to obtain its IP address from a Dynamic Host Configuration Protocol (DHCP) server (if the network is DHCP capable).

The **DHCP Off** radio button turns DHCP off. Contact the local system administrator for the setting of this control.

IP Address field

The **IP Address** field contains the IP address of the connected MGP Pro. This value is encoded in the MGP Pro flash memory.

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric subfields separated by dots (periods). Each field can be numbered from **000** through **255**. Leading zeros, up to 3 digits total per field, are optional. Values of **256** and above are invalid.

The factory-installed default address is **192.168.254.254**, but if this conflicts with other equipment at your installation, you can change the IP address to any valid value.

NOTE: IP address changes can cause conflicts with other equipment. Only local system administrators should change IP addresses.

Gateway IP Address field

The **Gateway IP Address** field identifies the address of the gateway to the mail server to be used if the MGP Pro and the mail server are not on the same subnet.

The gateway IP address has the same validity rules as the system IP address.

Subnet Mask field

The **Subnet Mask** field is used to determine whether the MGP Pro is on the same subnet as the mail server when you are subnetting. For more information, see [Subnetting, a Primer](#) on page 110.

MAC Address field

The Media Access Control (MAC) Address consists of six hexadecimal character pairs and is used to identify the processor hardware. This address is hard-coded in the unit and cannot be changed.

Date/Time settings fields

The Date/Time Settings section provides a location for viewing and setting the time functions.



Figure 32. Date/Time Settings Section

To change the date and time settings:

1. Click the drop box for the desired variable. The adjustable variables are month, day, year, hours, minutes, am or pm, and (time) zone. A drop-down scroll box appears (the **Month** drop box is selected in figure 32).
2. Click and drag the slider or click the **Scroll Up** button or **Scroll Down** button until the desired variable is visible.
3. Click on the desired variable.

NOTES: If setting the time, set the local time. The **Zone** variable allows you to then enter the offset from Greenwich Mean Time (GMT).

The **Zone** field identifies the standard time zone that has been selected and displays the amount of time, in hours and minutes, that the local time varies from the GMT international time reference.

4. Repeat steps 1 through 3 for other variables that need to be changed.
5. Select the appropriate **Daylight Saving** radio button. To turn off daylight saving time, select **Off**.

NOTE: When daylight saving time is enabled, the MGP Pro updates its internal clock between Standard Time and Daylight Saving Time in the spring and fall on the date that the time change occurs in the United States of America and parts of Europe and Brazil. When daylight saving time is turned off, the processor does not adjust its time reference.

6. Click the **Submit** button at the bottom of the Date/Time Settings section to implement your selections.

Passwords Page

The Passwords page lets you assign an administrator or user password to control access to the MGP Pro web pages. To access this page, click the **Configuration** tab, then the **Passwords** link on the left sidebar menu (see figure 33, ①).

NOTE:

- An administrator password must be in place before a user password can be assigned.
- Passwords must contain 4 to 12 alphanumeric characters. Symbols and spaces are not allowed, and the passwords are case sensitive.

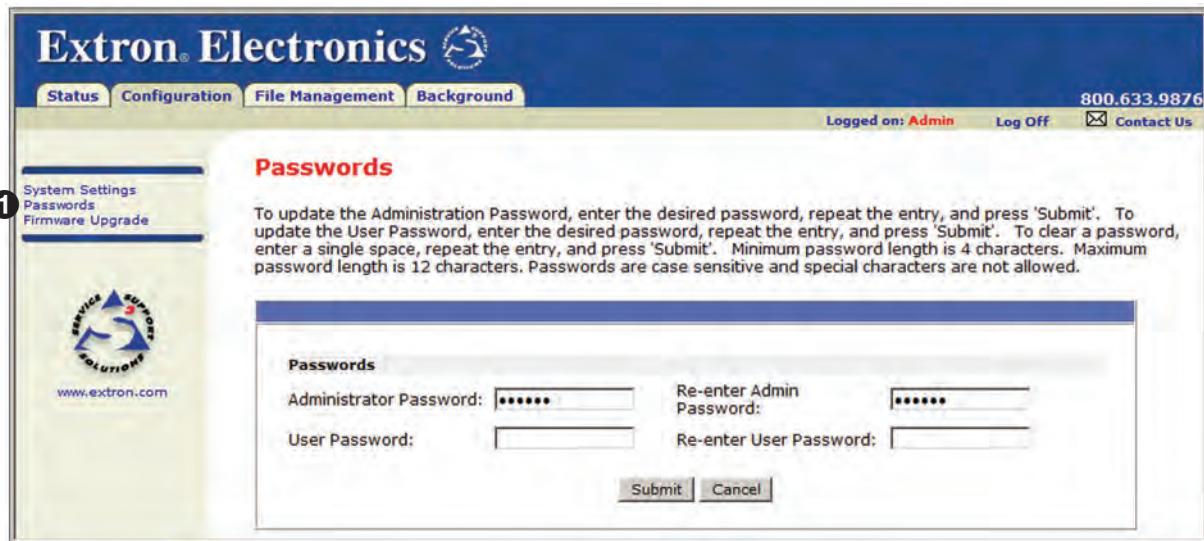


Figure 33. Passwords Page

Assigning a password

To assign passwords:

1. Enter the new administrator password in the **Administrator Password** field.
2. In the **Re-enter Admin Password** field, enter the same password again to confirm it.
3. If you want to assign a user password, enter it in the **User Password** field.

NOTE: You cannot assign a user password unless an administrator password has been assigned.

4. Reenter the same user password in the **Re-enter the User Password** field.
5. Click the **Submit** button to set the passwords.

Clearing a password

To remove an assigned password:

1. In the **Administrator Password** or **User Password** field, enter a single space.
2. Enter a single space in the **Re-enter Admin Password** or the **Re-enter User Password** field.
3. Click the **Submit** button.

Firmware Upgrade Page

The Firmware Upgrade page enables you to install a new version of firmware to your MGP Pro. (The same firmware is used for both the MGP 464 Pro and the MGP 462 Pro.) You can download the latest firmware version from the Extron website to your computer (see [Updating the Firmware](#) beginning on page 111 for more details on firmware updating).

To access the Firmware Upgrade page, click the **Configuration** tab, then the **Firmware Upgrade** link on the left sidebar menu (see figure 34, ①).



Figure 34. Firmware Upgrade Page

Determining the current firmware version

There are three methods you can use to find out what firmware version is currently installed on your MGP Pro:

- **Using the LCD screen:** Watch the LCD window as you connect the MGP Pro to a power source. The first information displayed on the screen is the firmware version (along with the product name).
- **Using the System Status web page:** Select the **Status** tab on the MGP Pro web page to display the System Status page. The firmware version is displayed in the System Description section.
- **Using the MGP Series Control Program:** Select **About MGP Pro** from the **Help** menu.

Uploading the firmware to the MGP Pro

To update the firmware on the MGP using the web pages:

1. Download and install the latest MGP Pro firmware version on your computer (see [Downloading the Firmware](#) on page 114 for the procedure).
2. On the MGP Pro **Configuration** tab, select **Firmware Upgrade** from the sidebar menu to display the Firmware Upgrade page.
3. Click **Browse** to open the Choose File to Upload (or Choose File) window (see [figure 35](#) on the next page) and locate the firmware file on your computer or server. The file extension must be **.S19**.

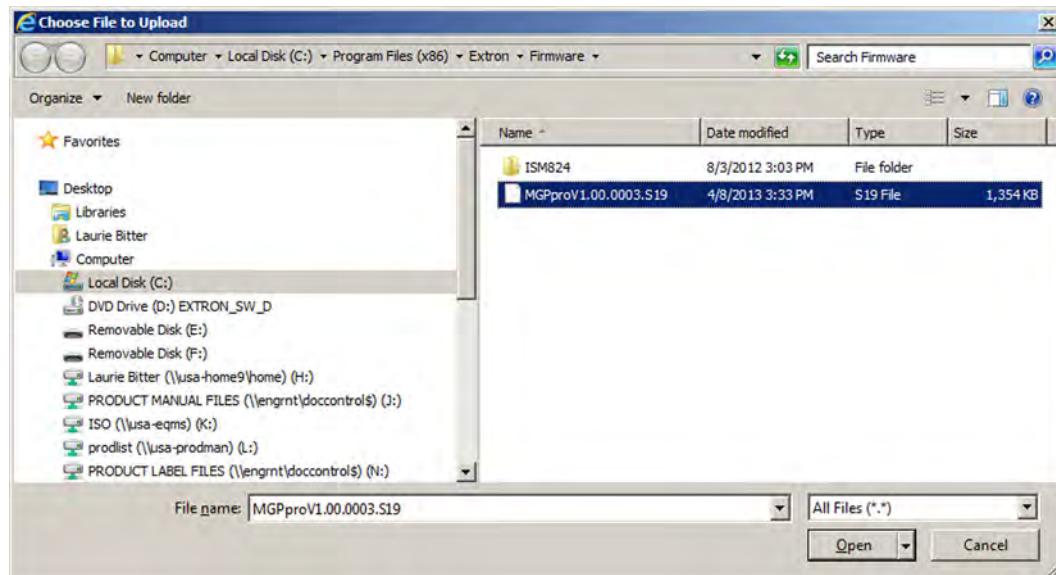


Figure 35. Choose File to Upload Window

ATTENTION: Valid firmware files must have the file extension .S19. A file with any other extension is not a firmware upgrade for this device and could cause the device to stop functioning.

4. Open the firmware file. Its name appears below the Current Firmware Version on the Firmware Upgrade page.
5. Click the **Upload** button on the Firmware Upgrade page to start the firmware update process. While the firmware is being uploaded, the **Upload** button changes to **Uploading...** and the LCD window on the MGP Pro displays first **Firmware Upload Please Wait!!!**, then **Firmware Reboot Please Wait!!!**

NOTE: While the firmware is uploading and rebooting, do not press any front panel buttons or make any selections on the web pages.

When the uploading process is complete, the **Uploading...** button on the screen changes back to **Upload**.

Using the File Management Page

The File Management page lets you upload files to the MGP Pro from your computer or network, and delete files from the unit. You can also upload personalized web pages via this page. To access the File Management page, select the **File Management** tab on the MGP Pro web page. You can use this function to load background images from your computer or the internet to display on the output screen. All background image files must be 24-bit bitmaps. The image files must be loaded to a folder named "nortxe-graphics."

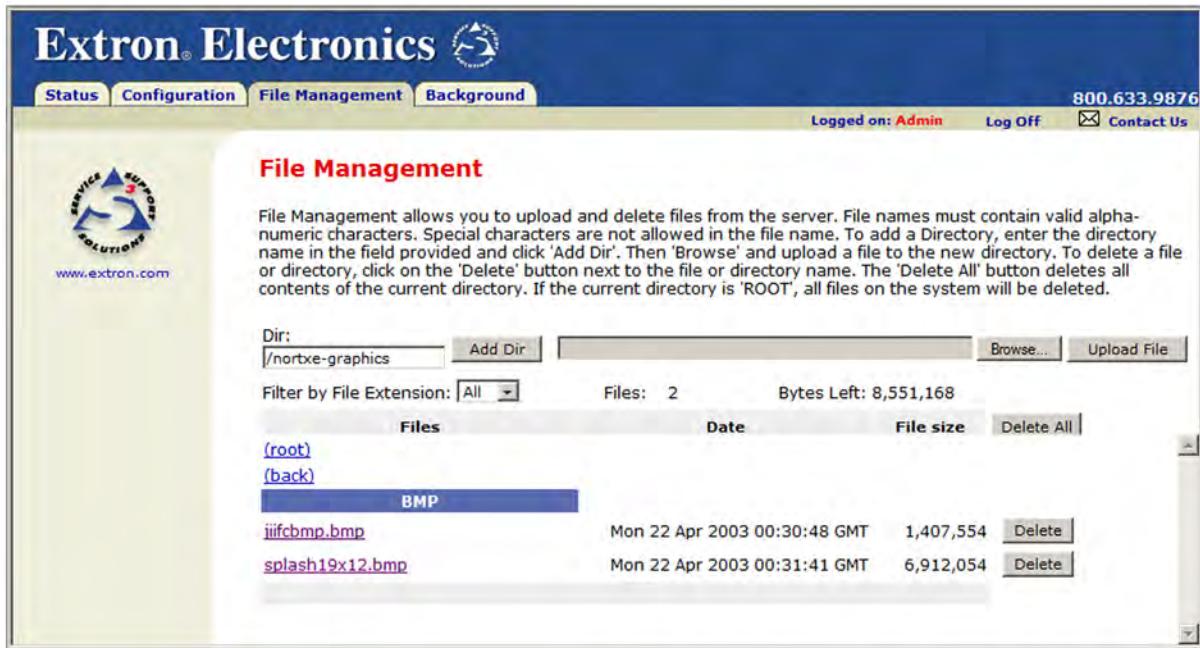


Figure 36. File Management Page

Uploading Files

Names of files to be uploaded to the MGP Pro must contain only valid alphanumeric characters and underscores. No spaces or special characters (symbols) are allowed. To upload files from the server,

1. Click the **Browse** button to the right of the file name field.
2. Browse to locate the file that you want to upload, and open it. The file name and directory path are displayed in the file name field on the File Management page.
3. Click the **Upload File** button. The selected file name appears in the Files column on the File Management page. Files are listed separately under headings of their extensions.

Adding a Directory

To add a directory or folder to the MGP Pro file system,

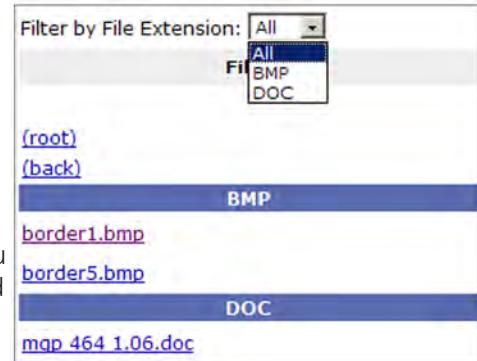
1. Enter the directory name in the **Dir:** field, following the slash (/).
2. Click the **Add Dir** button.
3. With the directory name displayed, perform the Uploading files procedure described in the previous section to add a file to the directory. The directory name appears at the top of the Files column, preceded by a slash.

To add more files to the directory, click the directory name to open it, then use the Uploading files procedure above. To exit the directory, click (**root**) or (**back**).

Other File Management Activities

You can also perform the following tasks on the File Management page:

- **Open a file:** Click on the name of the file in the Files column. Depending on your internet browser, you may need to subsequently click an icon that appears at the bottom of the screen.
- **Delete a file:** Click the **Delete** button at the right end of the line that contains the file you want to remove.
- **Delete all files:** Click the **Delete All** button.
- **Display files by file extension:** The **Filter by File Extension** menu (shown at right) lists the extensions of the files that have been uploaded to the MGP Pro. From this menu you can choose to display only files with a selected extension. Select **All** to show all files.



Using the Background Page

The Image Settings screen on the Background page lets you select a background for the output display. You can choose a background color, or you can upload bitmap images to the MGP Pro and select one as the display background. You can also specify the image from a HDMI input to display live as the background on the screen.

A screenshot of the 'Image Settings' screen on the Extron Electronics website. The top navigation bar includes 'Status', 'Configuration', 'File Management', 'Background', '800.633.9876', 'Logged on: Admin', 'Log Off', and 'Contact Us'. On the left, there is a logo for 'Extron Electronics' and the URL 'www.extron.com'. The main content area is titled 'Image Settings' and contains instructions: 'To select a background image click on a thumbnail below to preview the image and click 'Take' to select the image for Output. Click 'Add' to upload a new background image (.bmp only) to the system. Click 'Delete' to remove an image from the system.' Below this, there are two panels: 'Image Index' on the left with 'Add', 'Delete', and 'Take' buttons, and a preview window on the right showing a blue water splash image. A 'Background Color' dropdown menu is set to 'White'. The preview window displays the message 'Current Image : none' and 'Selected Image : splash19x12.bmp / 6,912,054 bytes'.

Figure 37. Image Settings Screen

Selecting a Background Color

To change the background color on the output display, select a color from the **Background Color** pull-down menu. The default selection, **Off**, results in a black background.

Displaying a Background Image

An image can be displayed as a background behind the windows on the output screen. This can be done by connecting an HDMI source and selecting it or by uploading a bitmap image to the MGP Pro and selecting it by using the **Add** and **Take** buttons.

Using an HDMI input

To use the unscaled image from a HDMI source as a live background on the output screen,

1. Connect an HDMI source to the HDMI Background connector on the rear panel.
2. From the **Background Color** menu, select **DVI Background Input**.

Using a bitmap image

You can upload a bitmap image, including one that was saved via background capture, from your computer to the MGP Pro and select an uploaded image as the background for the output screen.

NOTE: The MGP Pro supports only 24-bit bitmap files as backgrounds. The background file names must have a **.bmp extension**. The MGP Pro has 16 MB of memory to store captured or loaded images (see [Background Capture Menu](#) on page 27 to calculate the size of an image).

Uploading an image

To upload a bitmap image to the MGP Pro:

1. In the Image Index panel, click **Add**. The **Add Image** field is displayed.

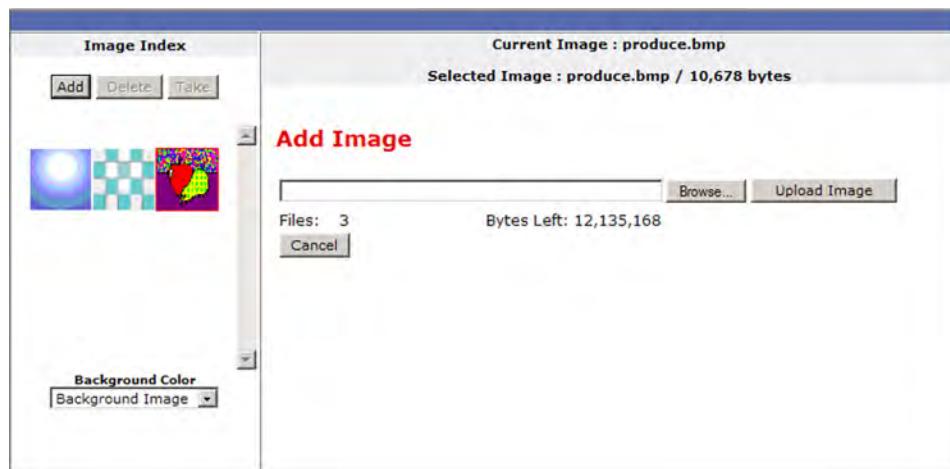


Figure 38. Add Image Field on the Image Settings Screen

2. Click **Browse** to open the Choose File to Upload (or Choose File) window, and locate the image (.bmp) file that you want to upload.
3. Open the image file in the Choose File to Upload window. Its name and the path to it are displayed in the **Add Image** field on the Image Settings screen.
4. Click **Upload Image**. This button changes to **Uploading...** while the file is loading.
5. When the uploading is complete, a thumbnail image of the uploaded file is displayed in the Image Index panel.

Selecting a background image

To select an uploaded image to be displayed as the background on the output screen:

- 1.** In the Image Index panel, click the thumbnail of the image you want to display. A larger version of the selected image appears to the right.
- 2.** Click **Take** to select that image for the output background.

Special Applications

This section describes some special types of applications that represent unique conditions. For the MGP Pro to operate properly in these situations, it is important that it be configured correctly. On the following pages, two application examples are described, along with their requirements for the MGP 462 Pro or MGP 464 Pro. Topics include:

- **Application 1: Connecting the MGP Pro to a Matrix Switcher**
- **Application 2: Connecting Multiple MGP Pros in Succession (Daisy-chaining)**

Application 1: Connecting the MGP Pro to a Matrix Switcher

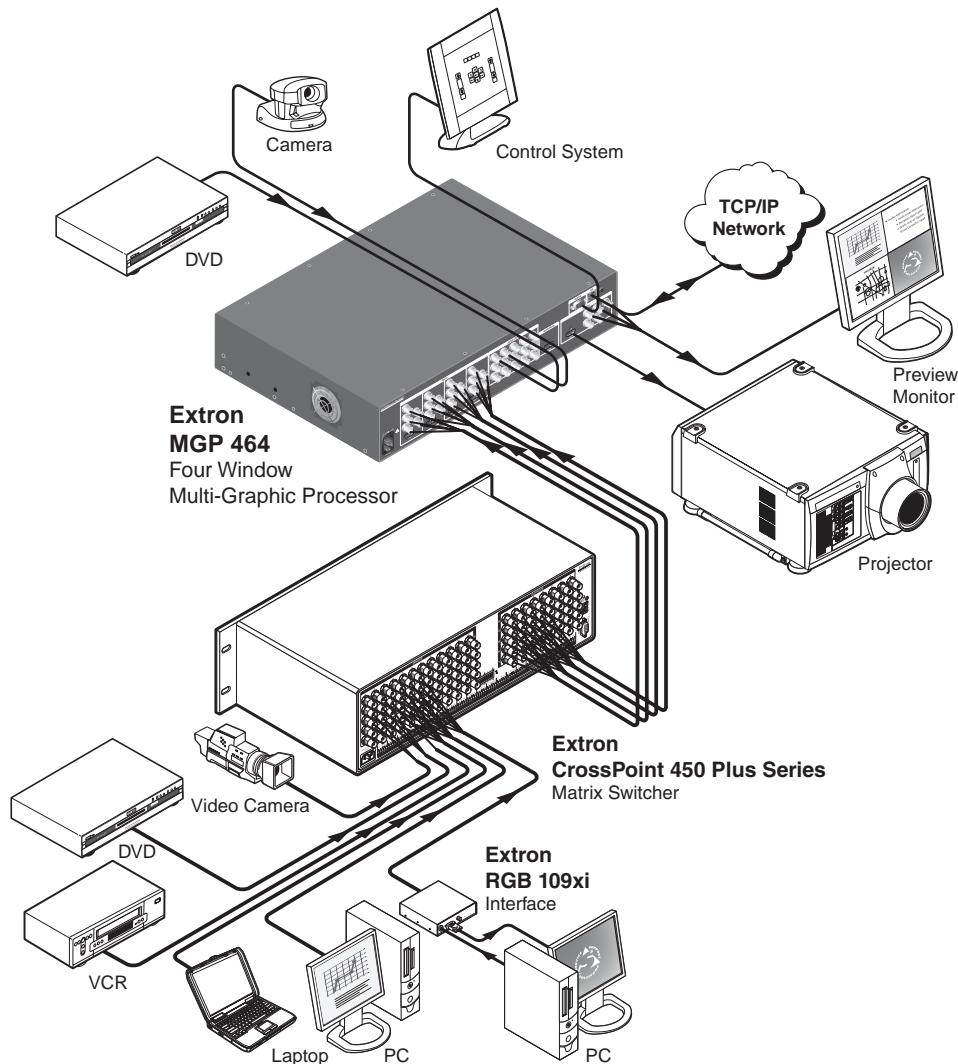


Figure 39. Application Diagram for a MGP 464 Pro Connected to a Matrix Switcher

When the MGP Pro is attached to a matrix switcher, such as the CrossPoint Ultra shown in **figure 39** on the previous page, inputs 1 through 4 come to the MGP Pro through the switcher, which supports RGB, component video, S-video, and composite video signal types. This application can be used with either an MGP 462 Pro or an MGP 464 Pro.

NOTE: If you are using a MGP 462 Pro with this application, only inputs 1 and 2 are connected from the switcher.

In this type of configuration:

- Window 1 on the MGP Pro displays input 1, window 2 displays input 2, and so forth.
- Input switches are made at the matrix switcher instead of at the MGP Pro.
- Input presets are recalled on the MGP Pro to correctly set up the input coming from the switcher. This setup can include the input name, the video signal type, picture controls, and advanced input configuration functions such as setting the active lines and pixels, total lines and pixels, and pixel phase.

You can perform the required MGP Pro setup operations using either of the following:

- SIS commands (see the **Remote Configuration and Control** section, beginning on page 42).
- The Windows-based control software (see the software help file).

Setting Up the MGP Pro to Work with a Matrix Switcher

To set up the MGP Pro to work with a matrix switcher:

1. Install and connect the MGP Pro as described in **Installation Overview** on page 5, with the exception of step 3. **In place of step 3 on page 5**, do the following:

Connect the four (or two) fully-configurable inputs of the MGP Pro to four (or two) of the matrix switcher outputs (see figure 40).

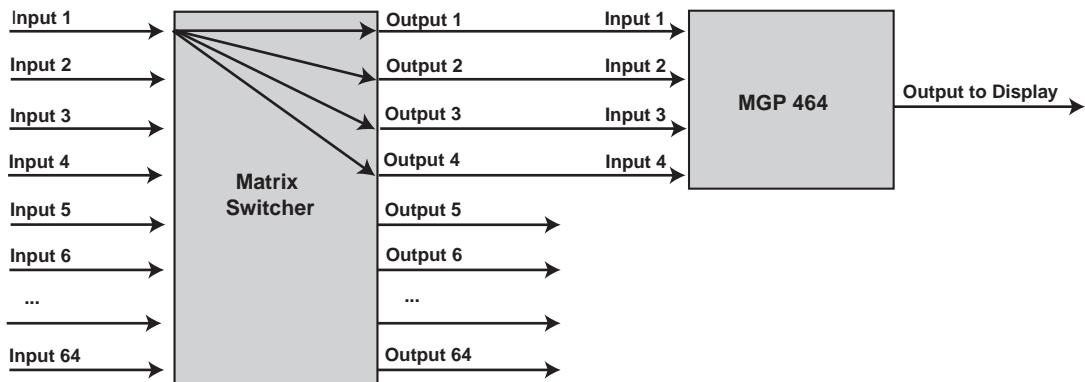


Figure 40. Connecting the Matrix Switcher to an MGP Pro

2. Size the windows on the MGP Pro to full screen. You can do this quickly by selecting window preset 1, 31, 61, 91, or 121.
3. On the matrix switcher, tie input 1 to the two or four switcher outputs that are connected to the MGP Pro (see your matrix switcher user guide for the tie procedure).

4. Select window 1 on the MGP Pro and configure the input as follows:
 - a. Set the following input sampling parameters as desired: signal type, horizontal and vertical start, total pixels, active pixels, and active lines.
 - b. Set the following picture controls as desired: image size, image position, color, tint, brightness, and contrast.
 - c. Set the pixel phase for window 1, then mute the window to display the next window behind it. **For analog inputs only**, repeat this step for windows 2, 3, and 4.
 - d. Save the adjusted settings as Input Preset 1.
5. Save the settings entered in step 4 again as Input Preset 2, 3, and so on, for each input on the matrix switcher that will be displayed on the output screen via the processor.

NOTE: Each input preset must be saved with the same number as the matrix switcher input.

6. Synchronize the MGP Pro to the matrix switcher as follows:
 - a. Open the MGP Series Control Program.
 - b. From the **Tools** menu, select **Sync MGP Pro Device to Matrix Switcher....** The Sync MGP Pro to Matrix Switcher window opens.
 - c. In the **IP Address** field, enter the matrix switcher IP address.
 - d. Click **Connect To Matrix** button. The matrix size of the switcher is displayed to the right of the button, and its input-output ties are shown in the Matrix Status section.
 - e. From the drop-down menu in the MGP **Input #1** field, select the number of the matrix switcher output to which you connected the MGP Pro input 1 in step 1.
 - f. Repeat step e for MGP Pro inputs 2 through 4, making sure to select the number of the matrix switcher output connector to which you attached the MGP Pro input.
 - g. Click **Take** to tie the MGP Pro inputs to the selected switcher outputs.
 - h. Click **Close** to close the Sync MGP Pro to Matrix Switcher window.

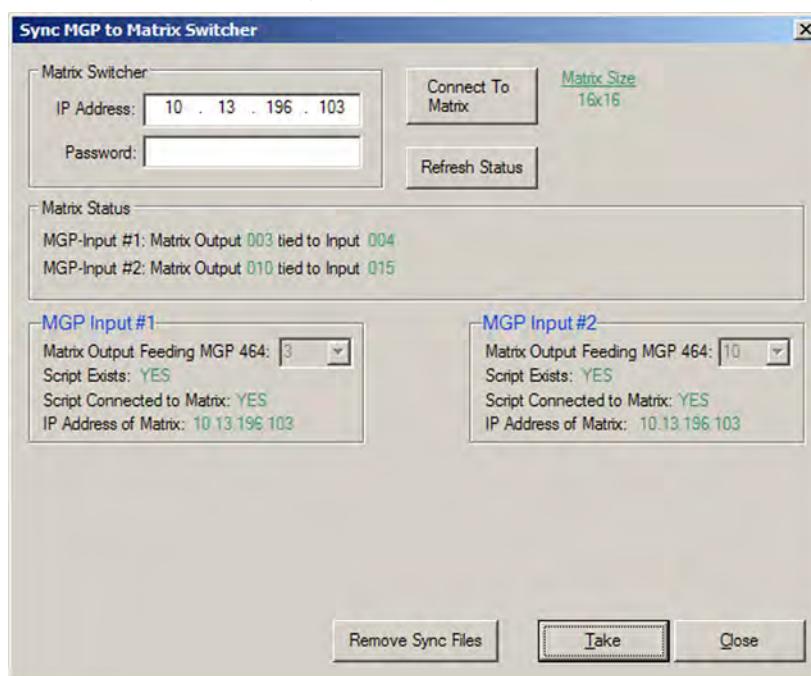


Figure 41. Example of a Sync MGP Pro to Matrix Switcher Window for an MGP 464 Pro with Input Ties to a Switcher

Using the MGP Pro and the matrix MGP Pro after the MGP Pro is synchronized to the matrix switcher

After you have performed step 6 on the previous page, be sure to do the following when using the switcher with the MGP Pro:

- Set up the inputs so that MGP Pro window 1 always displays input 1, window 2 displays input 2, window 3 displays input 3, and window 4 displays input 4.
- Perform all input switching using the matrix switcher. A 1-second RGB delay is recommended to minimize the amount of video sync noise while the processor locks onto the new signal.
- Window presets can be recalled, but they must be recalled “without input,” so that the inputs remain matched to the windows with the same numbers.
- Input presets do not have to be issued manually to the MGP Pro. The MGP Pro senses when the matrix switcher changes input ties and recalls the matching preset.

Minimizing synchronization problems when *not* using the Sync to Matrix feature

When operating the system using a manually configured control system (for which Sync to Matrix was not used), you can avoid synchronization problems that cause unwanted image blanking or scrambling during input switches by doing the following:

1. While setting up the matrix switcher and the MGP Pro to work together, set the RGB delay on the switcher to greater than or equal to 1.0 second.
2. Create a tie on the matrix switcher from desired input X to the output number that corresponds to MGP Pro window Y, in which input X will be displayed.
3. Immediately (within 1 second) recall the input preset with the same number as switcher input X that you selected in step 2 (preset X), to MGP Pro window Y.

NOTE: Input presets cannot be recalled via the MGP Pro front panel. You can recall them using SIS commands (see the **Remote Configuration and Control** section beginning on page 42) or the Preset Selector software program, which is installed with the MGP Series Control Program (see the MGP Series help file).

Application 2: Connecting Multiple MGP Pros in Succession (Daisy-chaining)

By connecting multiple MGP Pros together in succession (“daisy-chaining”) via the HDMI Output and HDMI Background connectors, you can display up to 12 windows on the output screen. You can connect up to three MGPs in this way (see the examples on the next two pages).

NOTE: This application can also be used with an MGP 462 Pro. However, because the MGP 462 Pro has only two windows, you are able to display half the number of windows that the MGP 464 Pro can support. For example, when you daisy-chain three MGP 462 Pro processors together, 6 windows are provided instead of 12.

Connecting via the HDMI Background connector has the advantage of the input not being scaled. Therefore, no analog or digital sampling is required and there is no signal loss.

NOTE: In figures **42**, **43**, and **44** on the next two pages, the MGPs are given letters in the order of their priority, starting with A being the unit closest to the output display. Therefore, the first MGP Pro in the chain is shown as unit C (or B, if there are only two MGPs). The second MGP Pro is designated as unit B, and the third is unit A.

1. **8-window configuration:** Two MGP Pros are daisy-chained together, so that eight windows (four from each MGP Pro) are displayed on the output screen. (On the MGP 462 Pro, this is a 2-window configuration.)

8-window Configuration

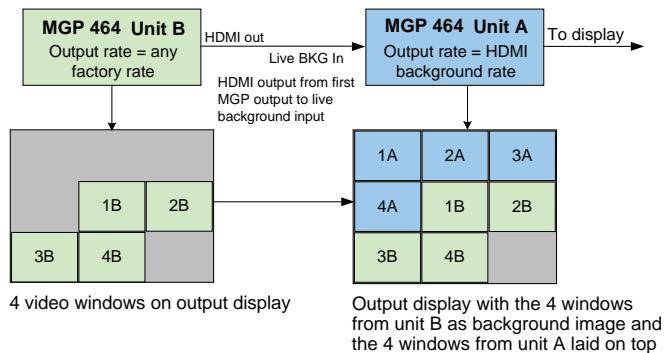


Figure 42. Daisy Chaining Application, 8 Windows

- The HDMI Output of the first MGP Pro (unit B) is connected to the HDMI Background input of the second MGP Pro (unit A).
 - The first diagram in the row shows the output display with one MGP Pro attached. The second diagram shows the display with two MGPs attached.
2. **12-window configuration:** Three MGPs are daisy-chained so that 12 windows are displayed on the output screen. (On the MGP 462 Pro, this is a 6-window configuration.)

12-window Configuration

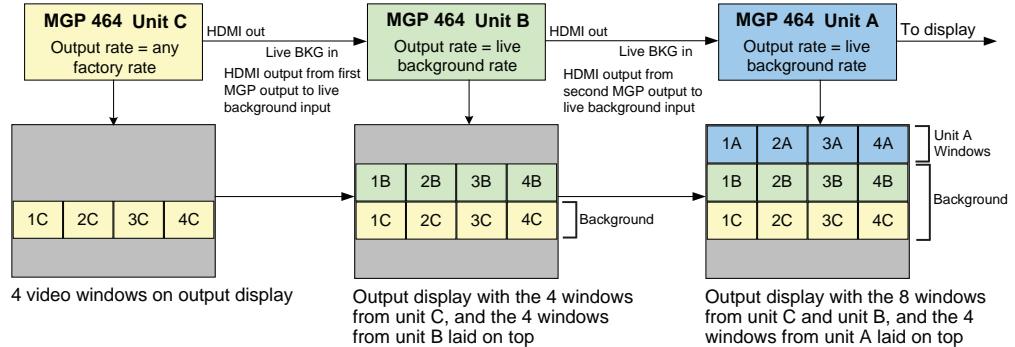


Figure 43. Daisy Chaining Application, 12 Windows

- The HDMI Output of the first MGP Pro (unit C) is connected to the HDMI Background input of the second MGP Pro (unit B).
- The HDMI Output of the second MGP Pro (unit B) is connected to the HDMI Background input of the third MGP Pro (unit A).
- The first diagram in the row shows the output display with one MGP Pro attached. The second diagram shows the display with two MGPs attached. The third diagram shows the display with all three units connected.

- 3. 8-window with live background configuration:** An HDMI computer (or another HDMI source) is daisy-chained to two MGPs, so that eight windows are displayed in front of a live video background from the HDMI source.

8-window Configuration with a Live Computer Background

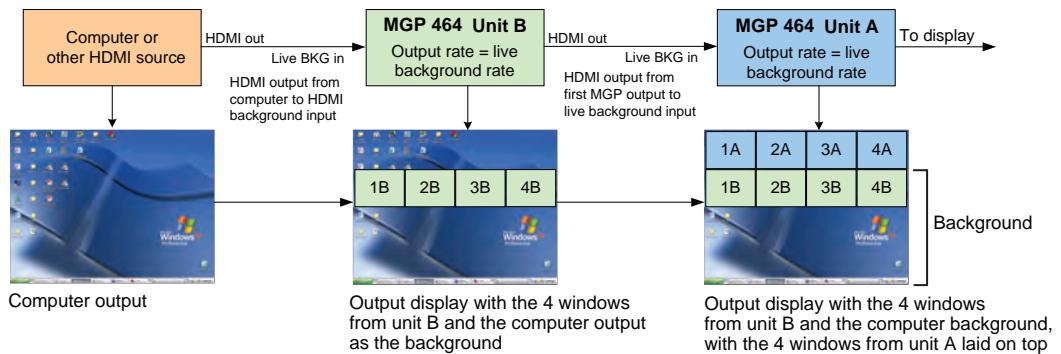


Figure 44. Daisy-chaining Application, 8 Windows with Live Background

- The HDMI source is connected to the HDMI Background input of the first MGP Pro (unit B).
- The HDMI output of the first MGP Pro (unit B) is connected to the HDMI Background input of the second MGP Pro (unit A).
- The first diagram in the row shows the HDMI computer, which is the input source. The second diagram shows the display with one MGP Pro attached. The third diagram shows the display connected to two MGPs. (On the MGP 462 Pro, this is a 4-window configuration.)

Setting up MGPs for Daisy-chaining

To set up one to three MGPs in a daisy-chain formation:

- Connect input sources to the MGP Pro to be displayed in the windows.
- Connect the HDMI output of the first MGP Pro (the unit farthest from the display) to the HDMI Background connector of the second MGP Pro. If you are daisy-chaining three units, connect the HDMI output of the second MGP Pro to the HDMI Background connector of the third unit (the unit connected to the display, unit A).
- Configure the output as follows:
 - Set the output resolution/refresh rate of the first MGP Pro (the unit farthest from the display, unit C) to the native rate of your output display.

NOTE: Do not set this unit to the HDMI background rate.

- Set the output rates of the second and, if appropriate, the third MGP Pro to **Live Background Rate**. This setting uses the incoming HDMI resolution and pixel clock as the output rate of the MGPs, which is essential in order to avoid any sampling of the incoming HDMI signal.

NOTE: By default, the resolution provided in the Extended Display Identification Data (EDID) is the last selected factory rate. To manually set the resolution information provided in the EDID data, see the **Set output resolution and scan rate** SIS command on page 60.

- c. If it has not yet been selected, set the background of the second and third MGPs to **HDMI Background**. When you do this, these two units set their output rates to the HDMI background rate.

NOTE: The live background rate remains in effect, even when the background is not set for **Live Background**. This prevents any image scrambling on the display when the system is switching between the live background source and other background images or colors.

4. Configure the windows on all the MGPs as follows:
 - a. Mute the windows on the second and third MGPs to view the windows on the first MGP Pro only.
 - b. Set the size and position of the four windows on the first MGP Pro, either manually or by selecting a window preset.
 - c. Save the configuration for the first MGP Pro as a window preset, for future use.
 - d. Unmute the windows for the second MGP Pro in the chain and configure them as desired. Save this window configuration as a preset.

NOTE: The default presets provided with the MGP Pro have no background selected. For the second and third MGPs in the chain, you must select **Live Background** as the background.

- e. Repeat step **d** for the third MGP Pro if appropriate.

NOTE: It is recommended that you save the window configurations on the second and third MGPs with the same preset number. This is required if you are using the Preset Selector software for both MGPs, because the Preset Selector recalls the same preset number for all MGPs that have been added to it.

See the MGP Series Control Program help file for information on using the Preset Selector.

Reference Information

This section provides reference information on the MGP Products. Topics include:

- [Mounting the MGP Pro](#)
- [IP Address](#)
- [Updating the Firmware](#)

Mounting the MGP Pro

Tabletop Use

Four self-adhesive rubber feet are included with the MGP Pro. For tabletop use, attach one foot to each corner of the bottom side of the unit and place the unit in the desired location.

Rack Mounting

UL guidelines for rack mounting

The following Underwriters Laboratories (UL) guidelines pertain to the installation of the MGP Pro into a rack:

- **Elevated operating ambient temperature** — If the equipment is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the MGP in an environment compatible with the maximum ambient temperature ($T_{ma} = +122^{\circ}\text{F}$, $+50^{\circ}\text{C}$) specified by Extron.
- **Reduced air flow** — Install the equipment in the rack so that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical loading** — Mount the equipment in the rack so that uneven mechanical loading does not create a hazardous condition.
- **Circuit overloading** — When connecting the equipment to the supply circuit, consider the connection of the equipment to the supply circuit and the effect that circuit overloading might have on overcurrent protection and supply wiring. Consider equipment nameplate ratings when addressing this concern.
- **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (such as the use of power strips).

Rack Mounting Procedure

For optional rack mounting, do not install the rubber feet. Mount the MGP Pro in the rack as follows:

1. Attach the included rack/through-desk mounting brackets to the unit, using eight of the machine screws supplied with the mounting kit (see figure 43).
2. Insert the unit into the rack and align the holes in the mounting brackets with the holes in the rack. Use four machine screws to attach the brackets to the rack.

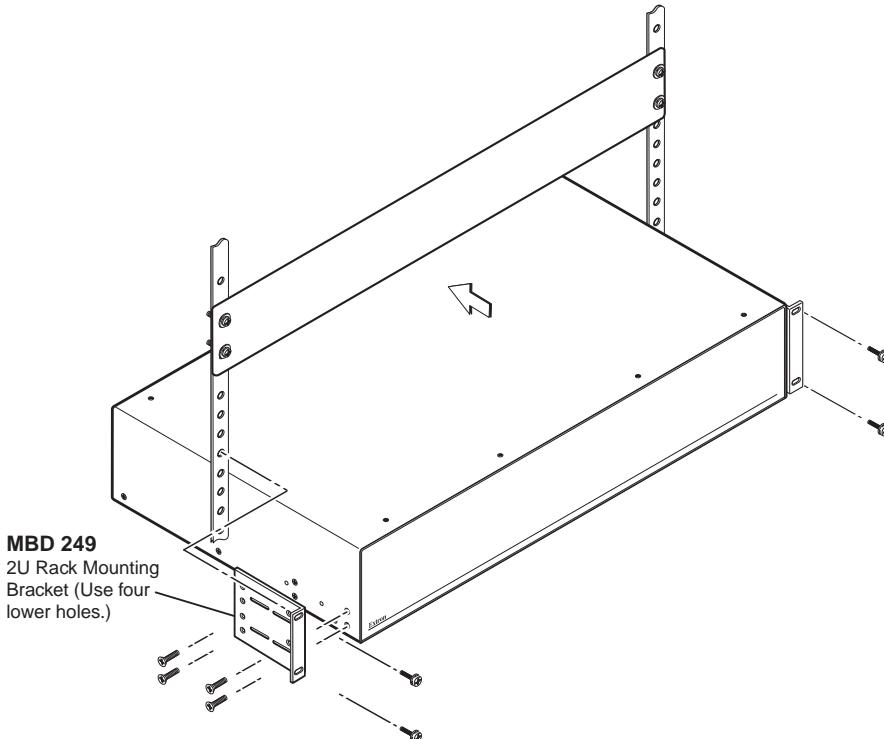


Figure 45. Rack Mounting an MGP Pro

IP Address

What is an IP Address?

An IP address is a 32-bit binary number that is used to identify each device on an Ethernet network. This number is usually represented by four decimal numbers (called “octets”), each in the range of 0 through 255 and separated by dots, for example, 198.123.34.240. This is called “dotted decimal notation.”

An IP address is divided into two parts:

- Network identifier
- Host identifier

Each address on a given network must have the same network identifier value but have a unique host identifier. As a result, there are different classes of addresses that define the range of valid addresses and the parts of the address that are used for the network and host identifiers.

The most common IP address classes are:

Class Name	Valid Address Range	Identifier Arrangement
Class A	0.0.0.1 to 127.255.255.254	NNN.HHH.HHH.HHH
Class B	128.0.0.1 to 191.255.255.254	NNN.NNN.HHH.HHH
Class C	192.0.0.1 to 223.255.255.254	NNN.NNN.NNN.HHH

NNN refers to the network identifier and *HHH* refers to the host identifier.

Choosing IP Addresses

If the computer and the MGP Pro are directly connected or connected via their own independent network, follow the guidelines below for choosing the IP addresses.

However, if you intend to connect your computer and MGP Pro to an existing network, you need to advise the network administrator and ask the administrator to allocate suitable IP addresses.

On an independent network, it is generally recommended that you use the Class C format (from 192.0.0.1 to 223.255.255.254).

There are two rules for choosing IP addresses:

- Network identifier must be the same for each IP address
- Host identifier must be unique for each address.

Applying these rules to Class C addresses, the first three decimal values of your IP address must all be the same while the last value is used to uniquely identify each device.

The following is an example of a **valid** Class C addressing scheme:

Device	IP Address
Computer running the Windows-based control software	208.132.180.41
MGP Pro Signal Processor	208.132.180.42

NOTE: The host identifiers (41 and 42 in the above example) do not need to be sequential or in any particular order. However, it is recommended that you group the numbers for simplicity.

The following is an example of an **invalid** Class C addressing scheme:

Device	IP Address
Computer running the Windows-based control software	208.132.180.41
MGP Pro Signal Processor	192.157.180.42

NOTE: The above addresses are invalid because the network identifier for each address is not the same even though each IP address is unique.

You can perform a test from your computer to check that a device at a particular address is responding correctly or to determine its address (see [Pinging for the IP Address](#) on the next page).

Subnet Mask

The subnet mask is another 32-bit binary number that is used to “mask” certain bits of the IP address. This provides a method of extending the number of network options for a given IP address. It works by allowing part of the host identifier to be used as a subnet identifier.

It is important that you set the correct value for the subnet mask. The basic values depend on the class of IP address being used.

Class Name	Subnet Mask
Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

See [Subnetting, a Primer](#) on page 110 for more information.

Pinging for the IP Address

To access the MGP Pro via the Ethernet port, you need the processor IP address. If the address has been changed to an address comprised of words and characters, the actual numeric IP address can be determined using the Ping utility. If the address has not been changed, the factory-specified default is 192.168.254.254.

Ping can also be used to test the Ethernet link to the MGP Pro.

Ping to determine IP address of the device

The Ping utility is available at the command prompt. Ping tests the Ethernet interface between the computer and the MGP Pro. Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the MGP Pro as follows:

- 1. For Windows XP or earlier:** From the Windows **Start** menu, select **Run . . .**. The Run window opens.
For Windows 7 or later: Click **Start** on the Windows taskbar.
- 2. For Windows XP or earlier:** In the **Open** text field, enter command.
For Windows 7 or later: In the **Search programs and files** field, enter command.
- 3.** Click **OK** or press <Enter>. A command window opens.
- 4.** At the command prompt, enter **ping IP address**, where the IP address is the numeric address or an alias. The computer returns a display similar to figure 47.

The line **Pinging . . .** reports the actual numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

```
C:\>ping 192.168.254.254

Pinging 192.168.254.254 with 32 bytes of data:
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128

Ping statistics for 192.168.254.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Figure 46. Ping Command and Response Example

Ping to determine web IP address

The Ping utility has a modifier, - a, that directs the command to return the web address rather than the numeric IP address.

At the prompt, enter ping - a *IP address*. The reply that the computer returns is similar to the Ping response shown in **figure 46** on the previous page, except that when you specify the - a modifier, the line Pinging... reports the web IP address instead of the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

Connecting as a Telnet Client

The Telnet utility is available from the command prompt. Telnet allows you to input SIS commands to the MGP Pro from the PC via the Ethernet link and the LAN.

Starting Telnet

Access the command prompt and start Telnet as follows:

1. **For Windows XP or earlier:** From the Windows **Start** menu, select **Run . . .**. The Run window opens.
For Windows 7 or later: Click **Start** on the Windows taskbar.
2. **For Windows XP or earlier:** In the **Open** text field, enter **command**.
For Windows 7 or later: In the **Search programs and files** field, enter **command**.
3. Click **OK** or press <Enter>. A command window opens.
4. At the prompt, enter **telnet**. The computer returns a display similar to figure 47.

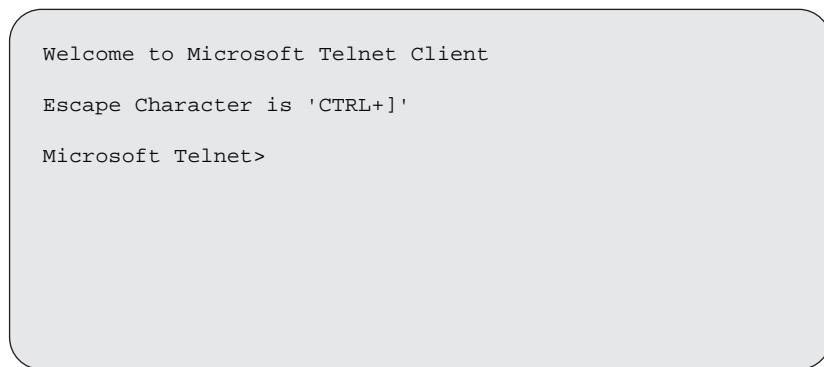


Figure 47. Telnet Screen

Operating using Telnet

This guide does not detail all of the operations and functionality of Telnet. However, some basic level of understanding is necessary for operating the MGP Pro via Telnet.

Connecting to the MGP Pro (Open command)

You connect to the MGP Pro using the **open** command. After your computer is connected to the processor, you can enter the SIS commands the same as you would if you were using the RS-232 or RS-422 link.

Connect to the MGP Pro as follows:

1. At the Telnet prompt, enter **open *IP address***.
 - **If the MGP Pro is not password-protected**, no further prompts are displayed until you disconnect from the unit.
 - **If the MGP Pro is password-protected**, Telnet displays the password prompt.

2. If necessary, enter the password at the password prompt.

Connection to the MGP Pro via the Ethernet can be password protected. There are two levels of password protection: administrator and user.

- A person logged on as an administrator has full access to all MGP Pro capabilities and editing functions.
- Users can select test patterns, mute or unmute the output, select a blue screen, and view all settings with the exception of passwords. By default, the MGP Pro is delivered with both passwords set to the carriage return character.

When you are logged in, the MGP Pro returns either **Login Administrator** or **Login User**. No further prompts are displayed until you disconnect from the MGP Pro.

Escape character and <Esc> key

Many SIS commands include the keyboard <Esc> key. Consequently, some confusion may exist between the **Escape** character and the <Esc> key.

When Telnet is first started, the utility advises that the **Escape character is “Ctrl+J”**. This means that the Telnet **Escape** character is a key combination: the <Ctrl> key and the <J> key pressed simultaneously. Pressing these keys displays the Telnet prompt while leaving the connection to the MGP Pro intact.

Local echo

Once your computer is connected to the MGP Pro, by default Telnet does not display your keystrokes on the screen. SIS commands are entered blindly, and only the SIS responses are displayed on the screen. To command Telnet to show all keystrokes, enter **set local_echo** at the Telnet prompt before you open the connection to the MGP Pro.

With local echo turned on, keystrokes and the MGP Pro responses are displayed on the same line.

Example: **1*1!In1 Out1 A11,**

where **1*1!** is the SIS command and **In1 Out1 A11** is the response.

Note that all keystrokes are displayed, even those that should be masked, such as the password entry. For example, when entering a password with local echo turned on, you see a display such as **a*d*m*i*n***, where **admin** is the keyed-in password and ********* is the masked response.

Local echo can be turned off by entering **unset local_echo** at the Telnet prompt. If your computer is connected to the MGP Pro and you need to access the Telnet prompt to turn local echo off, enter the **Escape** sequence (<Ctrl + J>).

Setting carriage return-line feed

Unless commanded otherwise, Telnet transmits a line feed character only (no carriage return) to the connected MGP Pro when you press the <Enter> key. This is the correct setting for SIS communication with the MGP Pro. The Telnet **set crlf** command forces Telnet to transmit carriage return and line feed characters when <Enter> is pressed. However, if **crlf** is set, the SIS link with the MGP Pro does not function properly.

Closing the link to the MGP Pro

To close the link to the MGP Pro, access the **Telnet** prompt by entering the escape sequence (<Ctrl + J>). At the **Telnet** prompt, enter **close**.

Help

For Telnet command definitions, enter **?** at the Telnet prompt.

Exiting Telnet (Quit command)

Exit the Telnet utility by entering **quit** at the Telnet prompt. If you are connected to the MGP Pro, access the Telnet prompt by entering the Escape sequence (<Ctrl +]>).

Subnetting, a Primer

A subnet is a **subset** of a **network** — a set of IP devices that have portions of their IP addresses in common. It is not the purpose of this guide to describe TCP/IP protocol in detail. However, some understanding of TCP/IP subnetting is necessary in order to understand the interaction of the MGP Pro and the mail server gateway. To understand subnetting at the level required to install and operate the MGP Pro, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

Gateways

The MGP Pro can communicate with the e-mail server that it uses for e-mail notification directly (if they are on the same subnet), or the communication can be routed via a gateway (a computer that provides a link between different subnets).

Local and remote devices

The local and remote devices are defined from the point of view of the function being described. In this guide, subnetting is an issue when you are using the controlling computer to set TCP/IP and e-mail values via SIS commands on the MGP Pro (see **IP Setup Commands** beginning on page 73 and **Email Commands**, also on page 73). When you are setting up the variables for e-mail notification, the MGP Pro is the local device and the e-mail server is the remote device.

IP addresses and octets

Valid IP addresses consist of four 1-, 2-, or 3-digit numeric sub-fields, called “octets,” which are separated by dots (periods) (figure 49). Each octet can be numbered from 000 through 255. Leading zeros, up to 3 digits total per octet, are optional. Values of 256 and above are invalid.

Typical IP Address: 192.168.254.254
Octets

Figure 48. IP Address and Octets

Subnet masks and octets

The subnet mask (figure 50) is used to determine whether the local and remote devices are on the same subnet or different subnets. The subnet mask consists of four numeric octets separated by dots. Each octet can be numbered from 000 through 255. Leading zeros, up to 3 digits total per octet, are optional. Each octet typically contains either 255 or 0. The octets determine whether or not the same octets of two IP addresses will be compared when determining if two devices are on the same subnet.

255 indicates that this octet will be compared between two IP addresses.
0 indicates that this octet will **not** be compared between two IP addresses.
Typical Subnet Mask: 255.255.0.0
Octets

Figure 49. Subnet Mask and Octets

Determining whether devices are on the same subnet

To determine the subnet, the local device IP address is compared to the remote device IP address (see figure 51). The octets of each address are compared or not, depending on the value in the related subnet mask octet.

- If a subnet mask octet contains the value 255, the related octets of the local device address and the remote device IP address are unmasked.
 - **Unmasked octets are compared** (indicated by ? in figure 51).
- If the subnet mask octet contains the value 0, the related octets of the local device and remote device IP addresses are masked.
 - **Masked octets are not compared** (indicated by n in figure 51).

If the unmasked octets of the two IP addresses **match** (indicated by = in example 1 of figure 51), the two addresses **are on the same subnet**.

If the two unmasked fields **do not match** (indicated by an unequal sign [=] in figure 51, examples 2 and 3), the addresses **are not on the same subnet**.

	Example 1	Example 2	Example 3
Local IP Address:	192.168.254.254	192.168.254.254	192.168.254.254
Subnet Mask:	255.255.0.0 (??.X.X)	255.255.0.0 (??.X.X)	255.255.0.0 (??.X.X)
Remote IP Address:	<u>192.168.2.25</u>	<u>190.190.2.25</u>	<u>192.190.2.25</u>
Match?:	=.=.X.X — Match (Same subnet)	¹ .X.X — No match (Different subnet)	¹ .X.X — No match (Different subnet)

Figure 50. Comparing the IP Addresses

Updating the Firmware

Updates to the Extron MGP Pro Series Multi-Graphic Processor firmware are made available periodically via the Extron website. If the need arises, you can replace the MGP Pro main firmware via an IP connection without opening the unit.

Determining the Firmware Version

There are three ways to check which version of firmware the MGP Pro is using: view the front panel LCD window during power-on, view the System Status page of the MGP Pro embedded web pages, or select **About MGP Pro** from the MGP Series Control Program **Help** menu.

Using the LCD display at Power-on

Watch the LCD window as you connect the MGP Pro to a power source. The first piece of information displayed on the screen is the firmware version (along with the product name).

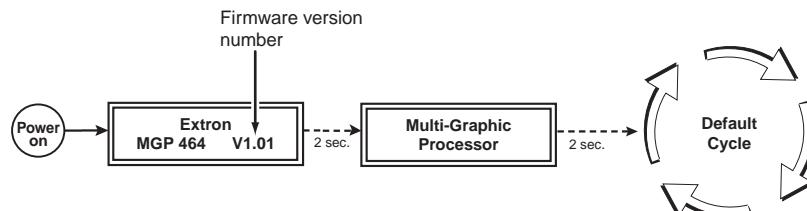


Figure 51. Displaying the Firmware Version at Power-up

Using a web browser

The MGP Pro comes from the factory with a set of default embedded web pages. The System Status web page displays the firmware version of your unit, along with other information such as your MGP Pro IP address and part number.

NOTE: The firmware update screen examples in this section all show MGP 464 Pro pages. The MGP Pro web pages are identical in content and appearance except for the product names.

To use the web pages to find out the current firmware version number:

1. Power on and connect the MGP Pro to a PC via an Ethernet connection (using a crossover cable), or connect the MGP Pro and the PC to a network, using a straight-through cable (see [Rear Panel Features](#) on page 6 for details).
2. Start a web browser program (such as Microsoft Internet Explorer).
3. Enter the MGP Pro IP address in the browser address field.

NOTE: If your local system administrators have not changed the value, use the factory-specified default, 192.168.254.254, for this field.

4. Press the <Enter> key. If the MGP Pro HTML pages are not password protected, the browser displays the System Status page.

If the MGP Pro HTML pages are password protected, the browser displays a dialog box requesting a network password. Depending on your browser, these boxes may appear different. Figure 52 shows two examples.

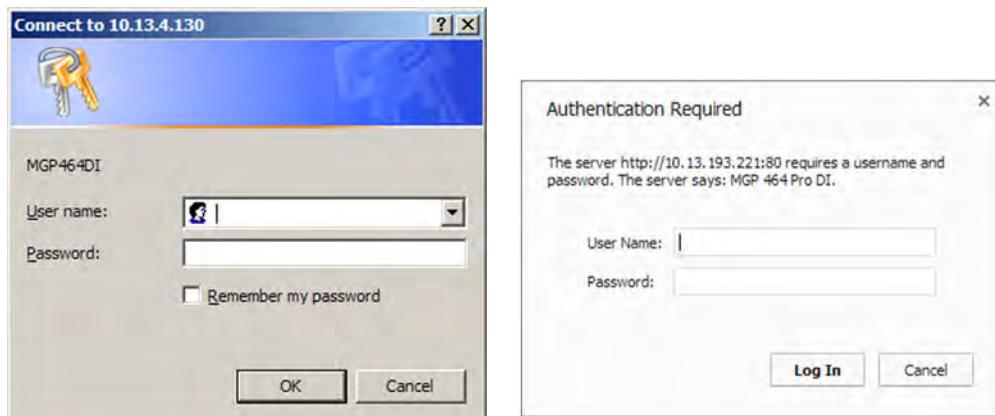


Figure 52. Examples of Password Requesting Dialog Boxes

- a. Enter the appropriate administrator password in the Password field.

NOTE: A User name is not required.

- b. If desired, select the check box to have the system input your password the next time you enter your MGP Pro IP address.
- c. Click **OK**. The System Status page or your custom start page opens.

- Access the System Status page if it is not already displayed. The firmware version is listed in the System Description area (see figure 53, ①).

The screenshot shows the 'System Status' page of the Extron Electronics control software. At the top, there's a navigation bar with tabs for Status, Configuration, File Management, and Background. On the right side of the header, it says 'Logged on: Admin', 'Log Off', and 'Contact Us'. The phone number '800.633.9876' is also present. The main content area is titled 'System Status' and contains sections for 'System Description' and 'IP Settings'. In the 'System Description' section, the 'Firmware Version' is listed as 1.03, which is circled with a red marker labeled '①'. Below that, there's a table with various system parameters like Model, Description, Part Number, Date, Time, Temperature, and Number of Connections. The 'IP Settings' section lists Unit Name, DHCP, IP Address, Gateway IP Address, Subnet Mask, and MAC Address. The 'Serial Port Settings' section shows configurations for Port 1 and Port 2.

Figure 53. Current Firmware Version on System Status Page

Using the Windows-based Control Software

A third way to find out the firmware version is via the MGP Series control software.

- Open the control software (see [Windows-based Control Software](#) on page 81).
- From the **Help** menu, select **About**. The following dialog box appears, providing information about the current MGP Pro firmware version.



Figure 54. The About MGP Pro Series Control Program Screen

- When finished viewing the information, click **OK** to close the window.

Downloading the Firmware

To obtain the latest version of MGP Pro Series firmware file and install it on your computer:

1. Go to www.extron.com and click the **Download** tab.
2. On the Download page, click the **Firmware** link on the left sidebar.
3. On the Download Center – Firmware page, click the letter **M** in the alphabet displayed at the top and bottom of the page, then scroll down to the MGP Pro and WindoWall Pro Series line.
4. Click the **Download** link located at the far right of the MGP Pro line.
5. On the next page, fill in the required information, then click the button named **Download_MGPPro_FirmwareUpgradeVn.nn.exe**. A File Download - Security Warning window opens.
6. Click the **Download MGPSeriesSetupVnxn.exe** button. Depending on your browser and Windows version, one of the following appears:
 - A File Download - Security Warning window opens. On this window, click **Run**. When a second File Download - Security Warning window opens, click **Run** on it to start the firmware installation wizard.
 - A button containing the name of the firmware file appears at the bottom of the browser screen. Click this button to display an Open File - Security Warning window. Click **Run** on this window to start the software installation wizard.
 - A confirmation window appears at the bottom of the browser screen. Click **Run** on this prompt to start the installation wizard.

NOTE: If you want to save the installation file to your computer hard drive to run later, click **Save**. On the Save As window that opens, save the setup file to the desired location. When you are ready to install the software, double-click on the **MGPSeriesSetupnxn.exe** icon, click **Run** on the download screen that opens, and restart this procedure at step 8.

7. Click **Save**. A Save As window opens.
If you want to install the firmware on your computer immediately, click **Run** instead of **Save**, and skip to step 10.
8. Browse to locate the folder where you want to save the firmware installation file on your computer and click **Save**.
9. When ready to install the new firmware on your computer, locate the downloaded file, and double-click on it to open it.
10. Follow the instructions on the Installation Wizard screens to install the new firmware on your computer. A Release Notes file, giving information on what has changed in the new firmware version, and a note about what happened during the upload are also loaded.

Uploading the Firmware to the MGP Pro

After you have installed the new firmware on your computer, you must upload it to the MGP Pro. Firmware uploads can be performed via the MGP Pro internal web pages or the MGP Series Control Program. The computer and the MGP Pro must both be connected to an Ethernet network in order to update the main firmware. It is recommended that you always perform firmware upgrades via an IP connection.

NOTE: Check the Extron Web site for firmware-related documents, instructions, patch files, and new firmware files before loading new firmware into the unit.

Uploading the firmware using the MGP Pro web pages

To update the firmware on the MGP using the web pages:

1. Download and install the latest MGP Pro firmware version on your computer (see [Downloading the Firmware](#) on page 114 for the procedure).
2. On the MGP Pro **Configuration** tab, select **Firmware Upgrade** from the sidebar menu to display the Firmware Upgrade page.
3. Click **Browse** to open the Choose File to Upload (or Choose File) window (see figure 55) and locate the firmware file on your computer or server. The file extension must be **.S19**.

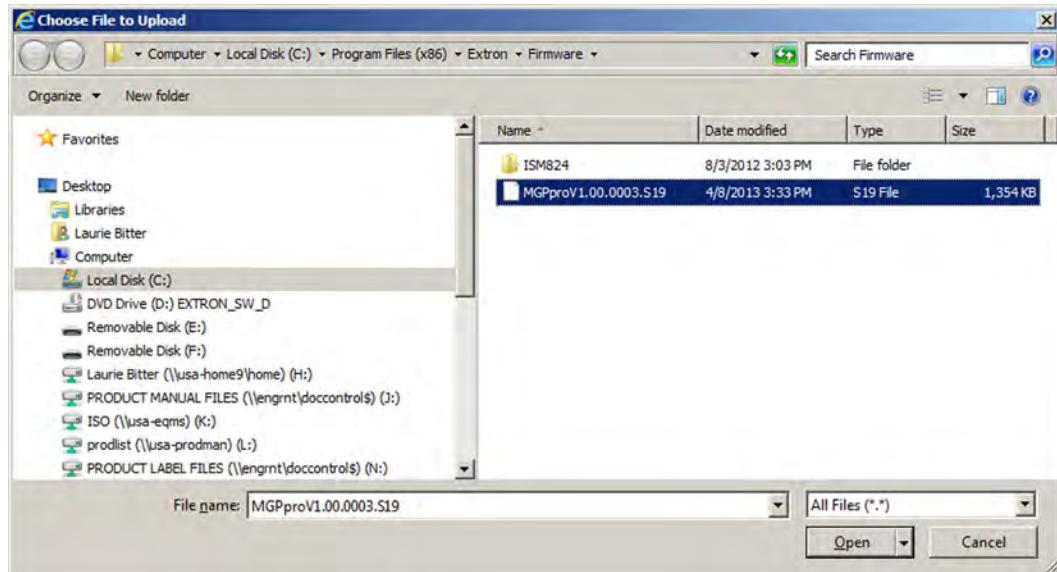


Figure 55. Choose File to Upload Window

ATTENTION: Valid firmware files must have the file extension .S19. A file with any other extension is not a firmware upgrade for this device and could cause the device to stop functioning.

4. Open the firmware file. Its name appears below the Current Firmware Version on the Firmware Upgrade page.
5. Click the **Upload** button on the Firmware Upgrade page to start the firmware update process. While the firmware is being uploaded, the **Upload** button changes to **Uploading...** and the LCD window on the MGP Pro displays first **Firmware Upload Please Wait!!!**, then **Firmware Reboot Please Wait!!!**

NOTE: While the firmware is uploading and rebooting, do not press any front panel buttons or make any selections on the web pages.

When the uploading process is complete, the **Uploading...** button on the screen changes back to **Upload**.

Uploading the firmware using the MGP Series Control Program

To update the firmware on the MGP Pro using the control software:

1. Open the control program, using an IP connection (see [Windows-based Control Software](#) on page 81 for information on accessing this program).
2. From the **Tools** menu, select **Upload Firmware....** An Open window appears.
3. Browse to locate the firmware file that you saved to your computer. The file extension must be **.S19**.

ATTENTION: Valid firmware files must have the file extension .S19. A file with any other extension is not a firmware upgrade for this device and could cause the device to stop functioning.

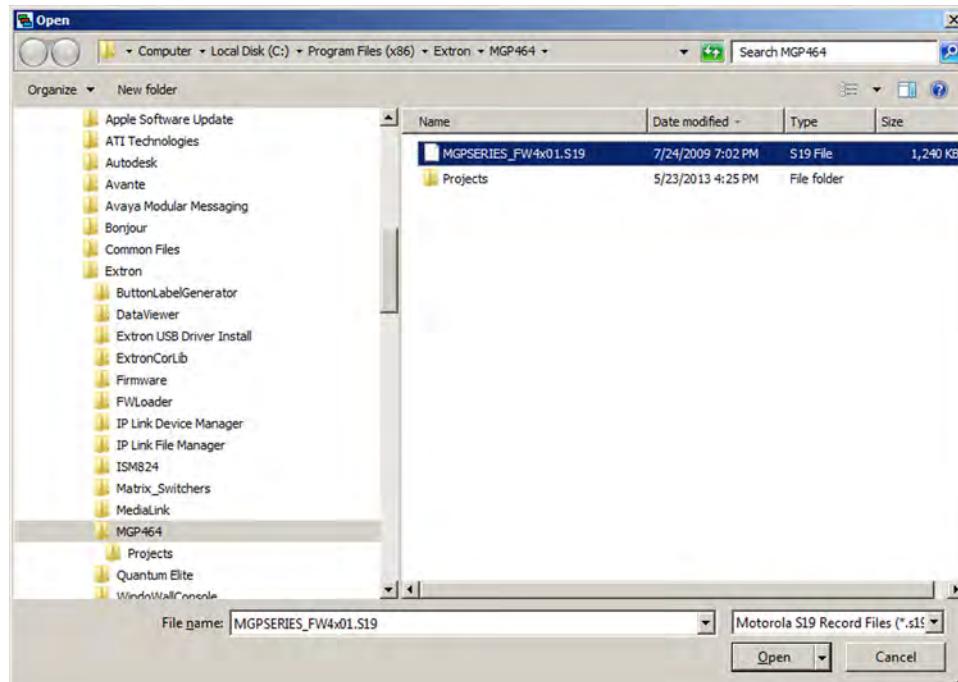


Figure 56. Open Window with Firmware File Selected

4. Double-click on the firmware file icon. The firmware uploading process begins. While the firmware is loading, a progress bar is displayed and the MGP Pro front panel LCD screen displays **Firmware Upload Please Wait**.



Figure 57. Firmware Update Progress Bar

5. When the firmware update is complete, the progress bar closes.

Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:

Extron Electronics
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

Europe and Africa:

Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

Asia:

Extron Asia Pte Ltd
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363
Singapore

Japan:

Extron Electronics, Japan
Kyodo Building, 16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

China:

Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Middle East:

Extron Middle East
Dubai Airport Free Zone
F12, PO Box 293666
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions, or if modifications were made to the product that were not authorized by Extron.

NOTE: If a product is defective, please call Extron and ask for an Application Engineer to receive an RA (Return Authorization) number. This will begin the repair process.

USA: 714.491.1500 or 800.633.9876
Asia: 65.6383.4400

Europe: 31.33.453.4040
Japan: 81.3.3511.7655

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

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