MGP Pro Series

Multi-Graphic Processors

Extron® Electronics
INTERFACING, SWITCHING AND CONTROL

Safety Instructions

Safety Instructions • English

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> **ATTENTION:** This symbol, ⚠, when used on the product, is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

For information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the Extron Safety and Regulatory Compliance Guide, part number 68-290-01, on the Extron website, **www.extron.com.**

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Chinese Traditional（繁體中文）

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有關安全性指導方針、法規遵守、EMI/EMF 相容性、存取範圍和相關主題的詳細資訊，請瀏覽 Extron 網站：**www.extron.cn**，然後參閱《Extron 安全性與法規遵守手冊》，準則編號 68-290-01。

Japanese

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> **注意:** この記号 ⚠ が製品上に表示されている場合は、本機の取扱説明書に記載されている重要な操作と保守(整備)の指示についてユーザーの**注意**を喚起するものです。

安全上のご注意、法規厳守、EMI/EMF適合性、その他の関連項目については、エクストロンのウェブサイト**www.extron.jp** より『Extron Safety and Regulatory Compliance Guide』(P/N 68-290-01) をご覧ください。

Korean

> **경고:** 이 기호 ⚠, 가 제품에 사용될 경우, 제품의 인클로저 내에 있는 접지되지 않은 위험한 전류로 인해 사용자가 감전될 위험이 있음을 경고합니다.

> **주의:** 이 기호 ⚠, 가 제품에 사용될 경우, 장비와 함께 제공된 책자에 나와 있는 주요 운영 및 유지보수(정비) 지침을 경고합니다.

안전 가이드라인, 규제 준수, EMI/EMF 호환성, 접근성, 그리고 관련 항목에 대한 자세한 내용은 Extron 웹 사이트(**www.extron.co.kr**)의 Extron 안전 및 규제 준수 안내서, 68-290-01 조항을 참조하십시오.

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. The Class A limits provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference; the user must correct the interference at his own expense.

NOTE: For more information on safety guidelines, regulatory compliances, EMI/EMF compatibility, accessibility, and related topics, see the **Extron Safety and Regulatory Compliance Guide** on the Extron website.

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

> **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 ^B 51 ^W^C
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

```
Esc X1 * X17 * X20 * X23 * X21 CE ←
```

> **NOTE:** For commands and examples of computer or device responses mentioned in this guide, the character "Ø" is used for the number zero and "0" is the capital letter "o."

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

```
Reply from 2Ø8.132.18Ø.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**.

Contents

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 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; 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; and 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 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
  - 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 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.

- **Front panel security lockout (executive mode)** — Access to front panel controls can be disabled or limited to prevent unauthorized use in non-secure environments.

- **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.
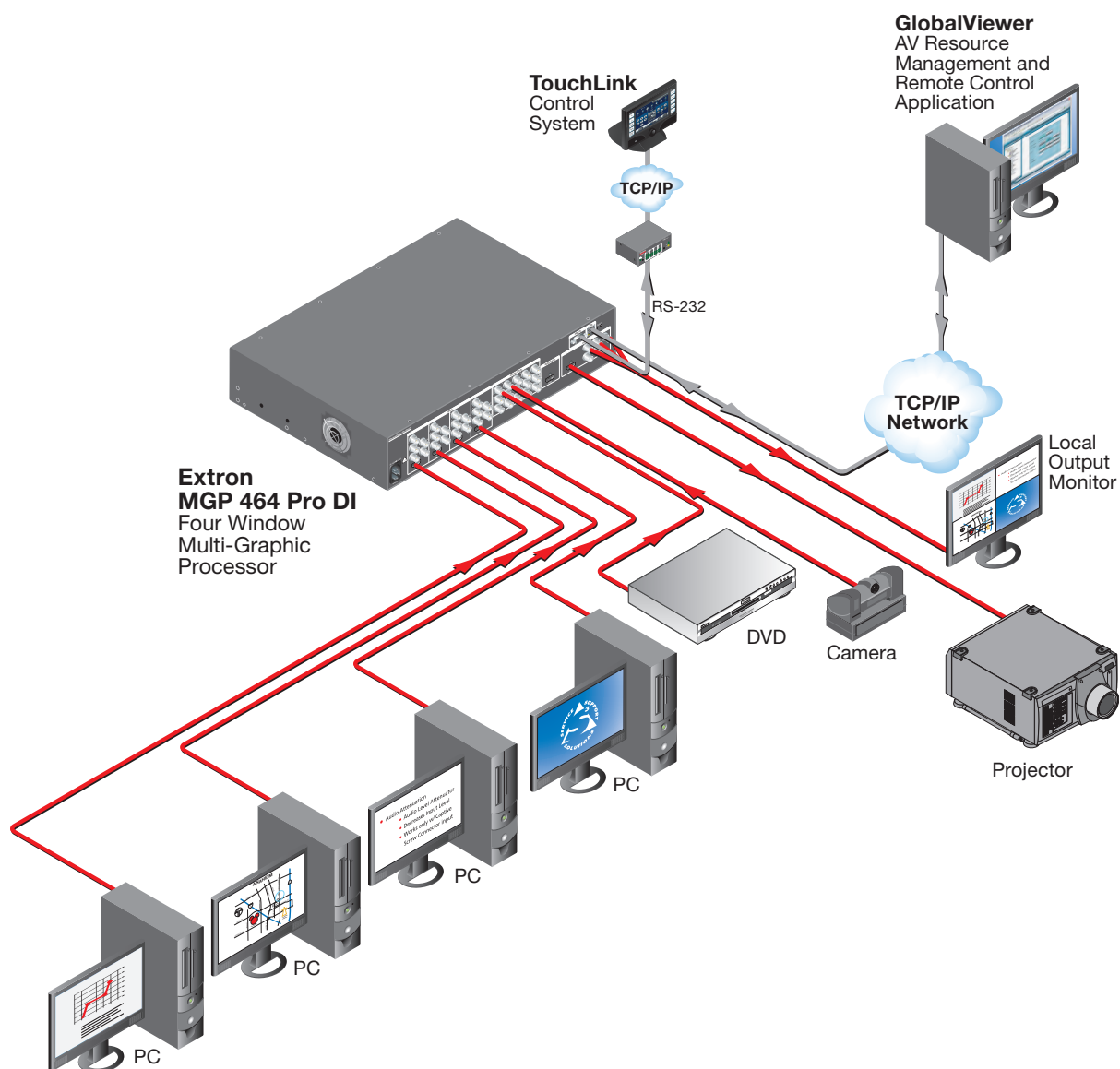
Figure 1. Connection Diagram for an MGP 464 Pro DI

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 ① **BNC Inputs 1 through 4** on page 6 or ② **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 ③ **RS-232/422 connector** on page 7) or to the front panel Config port (see ⑩ **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 ④ **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 has 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.
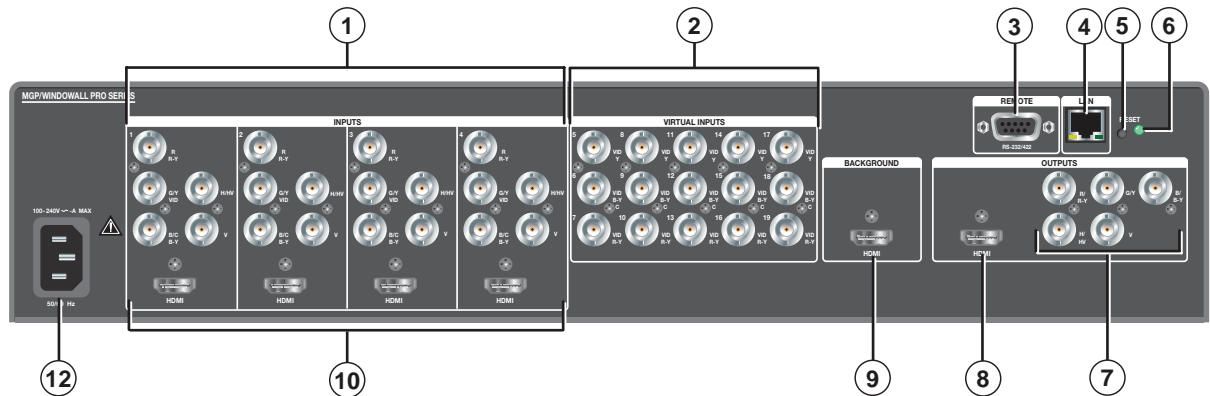
Figure 2. MGP 464 Pro DI and MGP 462 Pro DI Rear Panel
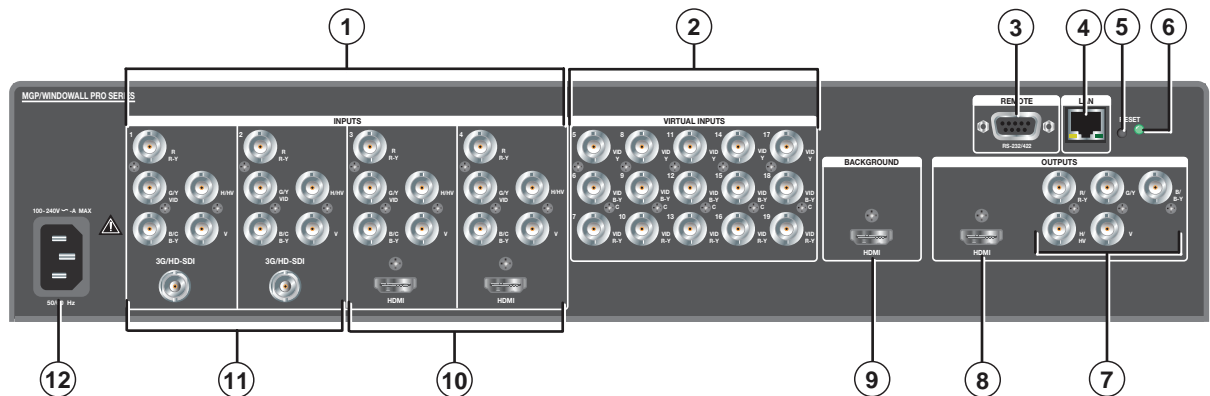
Figure 3. MGP 464 Pro 3G-SDI and MGP 462 Pro 3G-SDI Rear Panel

① **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 Pro web pages.

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

② **Virtual inputs (inputs 5 through 19)** — Connect standard definition component video, S-video, or composite video sources to these BNC connectors. The 15 connectors for the virtual inputs are arranged in columns of three BNCs.

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. If desired, 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).
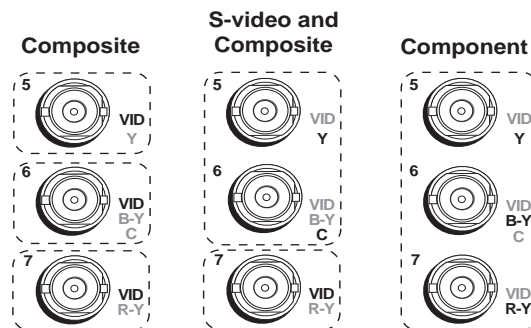
Figure 5.   Virtual Input Connector Configuration Examples

You can configure these virtual inputs for the desired signal types using the Windows-based control software (see the control software help file) or SIS commands (see the **Remote Configuration and Control** section beginning on page 41. 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.

③ **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** on the next page (see the **Remote Configuration and Control** section 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 TRS connector on the front panel. For information on this port, see ⑩ **Config port** on page 14.

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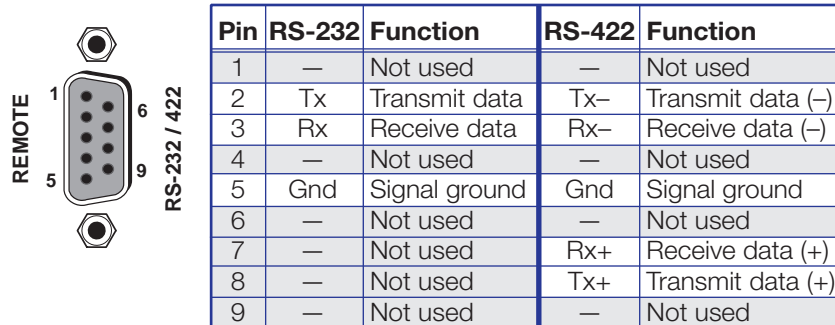
Figure 6.   RS-232/422 Connector Pin Configuration

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.

④ **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.
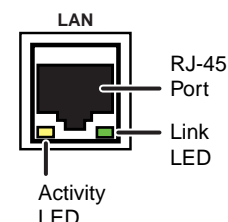
Use a straight-through cable to connect to a network, or a crossover cable to connect directly to a computer.

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

Pins:
1 2 3 4 5 6 7 8
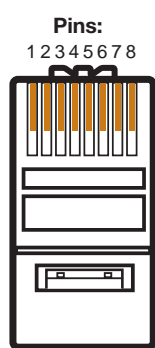
Insert Twisted Pair Wires

RJ-45 Connector

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
	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.

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
	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 in the **Command and Response Table for IP SIS** commands on page 65) or by using the Comm./IP Configuration menu on the front panel (see **Comm./IP Configuration Menu** on page 28). The LAN port defaults are:

IP address: 192.168.254.254
Gateway IP address: 0.0.0.0
Subnet mask: 255.255.0.0
DHCP: off

⑤ **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 39 for more information).

⑥ **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).

⑦ **BNC output connectors** — Plug an output device into these five BNC connectors, as shown in figure 8.
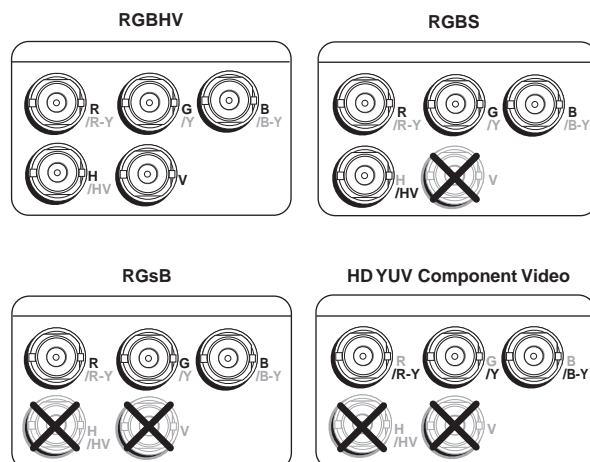
Figure 8.   Connecting to BNC Output Connectors

⑧ **HDMI output** — Plug an HDMI or DVI output device into this HDMI connector.
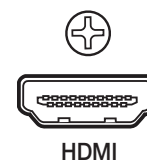
HDMI

> **NOTES:**
> - When two output devices are attached (one to each output connector), they both 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**.

⑨ **HDMI background input —** Connect a 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 a 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.

⑩ **HDMI inputs** — Connect up to four (MGP Pro DI) or two (MGP Pro 3G-SDI) HDMI input sources to these HDMI input connectors, as an alternative to using 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.

⑪ **3G/HD-SDI inputs (MGP Pro 3G-SDI models only**) — Connect one or two SDI inputs to these SDI BNC input connectors.   **3G/HD-SDI**

> **NOTE:** Standard definition SDI is not supported on these 3G/HD-SDI inputs.

⑫ **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).

Remove the button assembly from MGP Pro 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).

②
Pry the button from the base.
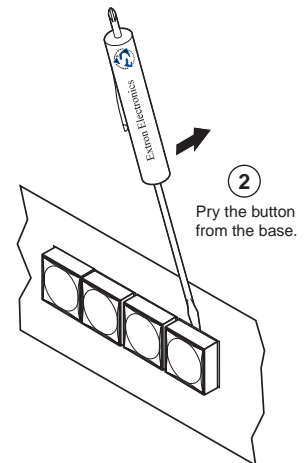
3. Locate the small corner notch on the lens cap, and slide the screwdriver between the lens cap and the diffuser (see ③ in figure 9.)

4. Using a rotating motion of the screwdriver, carefully pry the two pieces apart (see ④ in figure 9.)
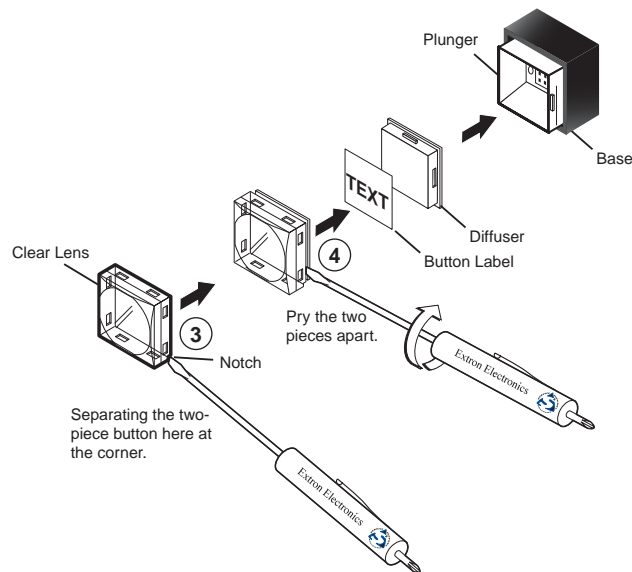
Figure 9. **Replacing a Button Label**

5. Lift out the transparent square label that you want to replace, being careful not to damage the circuits beneath it. 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 backing plate 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 set up 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 41. For Ethernet, see the **HTML Configuration and Control** section beginning on page 84.

Front Panel Features
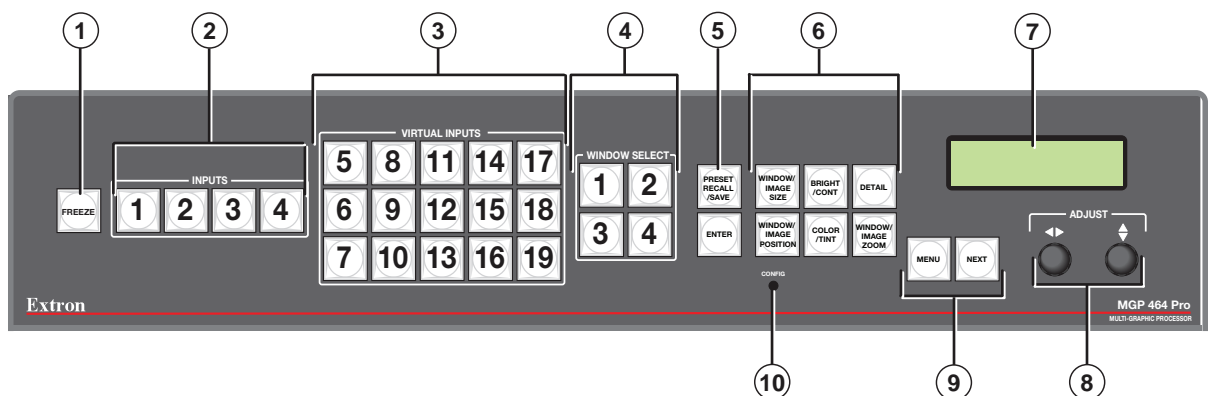
Figure 10.   MGP 464 Pro Front Panel
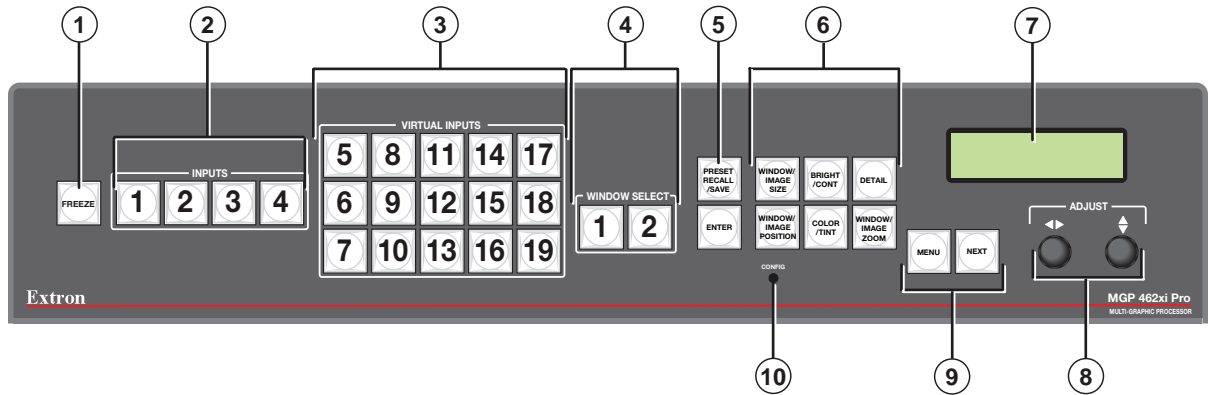
Figure 11. MGP 462 Pro Front Panel

① **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.

② **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 (④).

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 with 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).

③ **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/462 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.

④ **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; the MGP 462 Pro models have two.

⑤ **Window Preset buttons** — Press the Preset Recall/Save and Enter buttons to save or recall window presets (see **Window Presets** on page 35).

⑥ **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 33).

⑦ **LCD screen** — This screen displays messages, menu information, and your selections (see **Menus, Configuration, and Adjustments** on page 16.)

⑧ **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**).

⑨ **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**).

⑩ **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 **Rear Panel Features** on page 6 for a description of the rear panel RS-232/422 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 Windows-based control software. Both serial ports can be active at the same time.

The protocol for this configuration port is as follows:

- 9600 baud
- 8 data bits
- 1 stop bit
- No parity
- Always RS-232

An optional 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.

9-pin D	Connection	TRS Plug
Pin 2	Computer Rx line	Tip
Pin 3	Computer Tx line	Ring
Pin 5	Computer signal ground	Sleeve
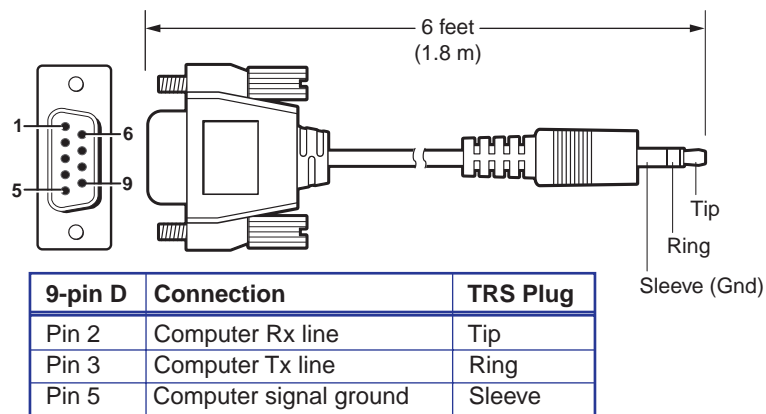
Figure 12.   Optional 2.5 mm Connector Cable for the Front Panel Config Port

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.
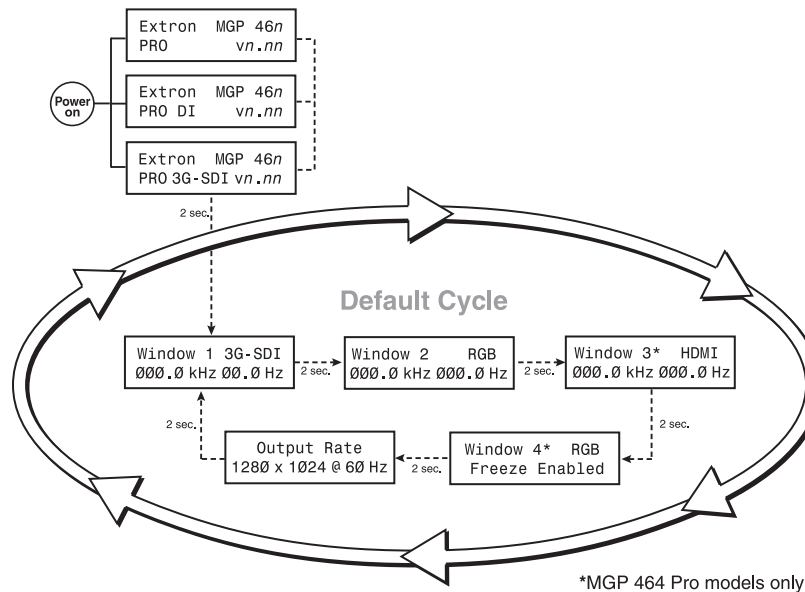
Figure 13. Default Cycle Example

> **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 Pro) or four (MGP 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 33 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, 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 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 to the lower-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** — 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** — The third level of menu selections consists of sub-menu options that are selected by turning the horizontal (◄►) and vertical (⬍) Adjust knobs. When you have displayed the submenu option that you want to configure, turn the knobs clockwise or counterclockwise to display the parameters available for the selected 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 39).

> **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.

Menu flow
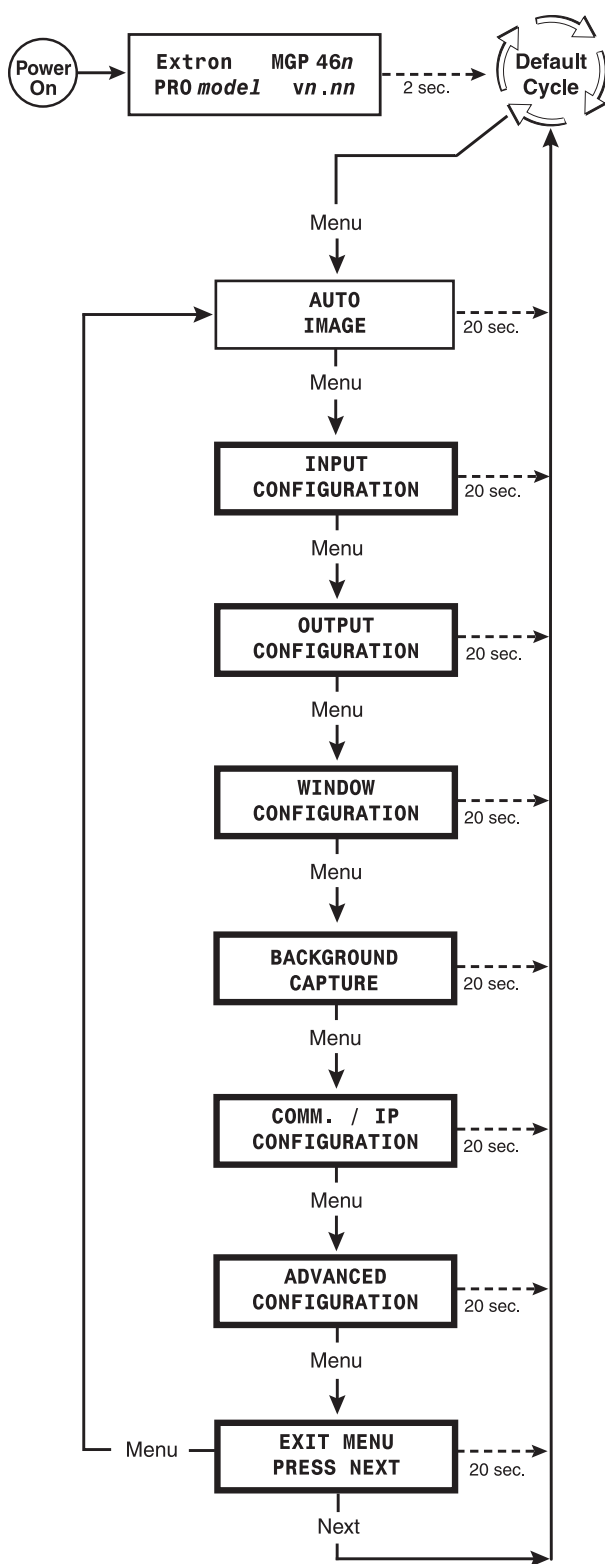
Figure 14.   Main Menu Flow

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.
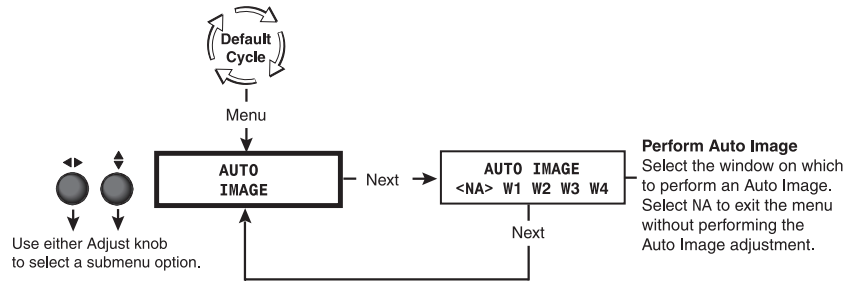
Figure 15. Auto Image Menu Flow

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 option.

3. Rotate the horizontal (◄►) or vertical (⬍) 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 the four windows (except for YUVi, S-video, and composite video inputs), total pixels, active pixels, and active lines for each input. Rotate the horizontal Adjust (◄►) knob to cycle through the four inputs, and the vertical Adjust knob (↕) 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.

```
                  AUTO
                  IMAGE
                   |
                 Menu
                   |
                   v
              INPUT
           CONFIGURATION
                   |
                 Next
                   |
                   v
   INPUT #0n    Next   INPUT #0n     Next   INPUT #0n     Next   INPUT #0n      Next   INPUT #0n
      RGB              Film Mode  On       Vert Start 0128     Horz Start 0128      PxPhs Win#1  16

Input         Input video type    Input        Film Mode       Input        Vertical Start      Input        Horizontal Start     Input        Pixel Phase 1    Next
• INPUT #01   Select a signal     • INPUT #01   Turn film mode  • INPUT #01   Select a vertical  • INPUT #01   Select a horizontal  • INPUT #01   Adjust the pixel
• INPUT #02   format:             • INPUT #02   on or off (for  • INPUT #02   start line position • INPUT #02   start pixel position • INPUT #02   sampling point
• INPUT #03   • RGB               • INPUT #03   low-resolution  • INPUT #03   for the top edge of • INPUT #03   for the left edge of • INPUT #03   for window 1 for
• INPUT #04   • YUV-HD            • INPUT #04   devices).       • INPUT #04   the active video.  • INPUT #04   the active video.   • INPUT #04   each input.
              • RGBcvS
              • YUVi                                                                                                              INPUT #0n
              • S-Video                                                                                                          PxPhs Win#2  16
              • Composite
              • HDMI (MGP Pro DI and                                                                                             Input        Pixel Phase 2    Next
                MGP Pro 3G-SDI models only)                                                                                      • INPUT #01   Adjust the pixel
              • 3G/HD-SDI (MGP Pro 3G-SDI                                                                                        • INPUT #02   sampling point
                models only)                                                                                                    • INPUT #03   for window 2 for
                                                                                                                                • INPUT #04   each input.
Next
   INPUT #0n     Next   INPUT #0n     Next   INPUT #0n     Next   INPUT #0n      Next   INPUT #0n
Active Lns 1024      Active Pxl 1280     Total Pxl  1688     PxPhs Win#4  16       PxPhs Win#3  16

Input        Active Lines        Input        Active Pixels   Input        Total Pixels       Input        Pixel Phase 4    Input        Pixel Phase 3
• INPUT #01   Specify the height  • INPUT #01   Specify the     • INPUT #01   Specify the width  • INPUT #01   Adjust the pixel   • INPUT #01   Adjust the pixel
• INPUT #02   in lines of the     • INPUT #02   width in pixels • INPUT #02   in pixels of the   • INPUT #02   sampling point for • INPUT #02   sampling point for
• INPUT #03   active image area   • INPUT #03   of the active   • INPUT #03   total image area   • INPUT #03   window 4 for each  • INPUT #03   window 3 for each
• INPUT #04   to be sampled.      • INPUT #04   image area to   • INPUT #04   to be sampled.     • INPUT #04   input.             • INPUT #04   input.
                                              be sampled.
```

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.

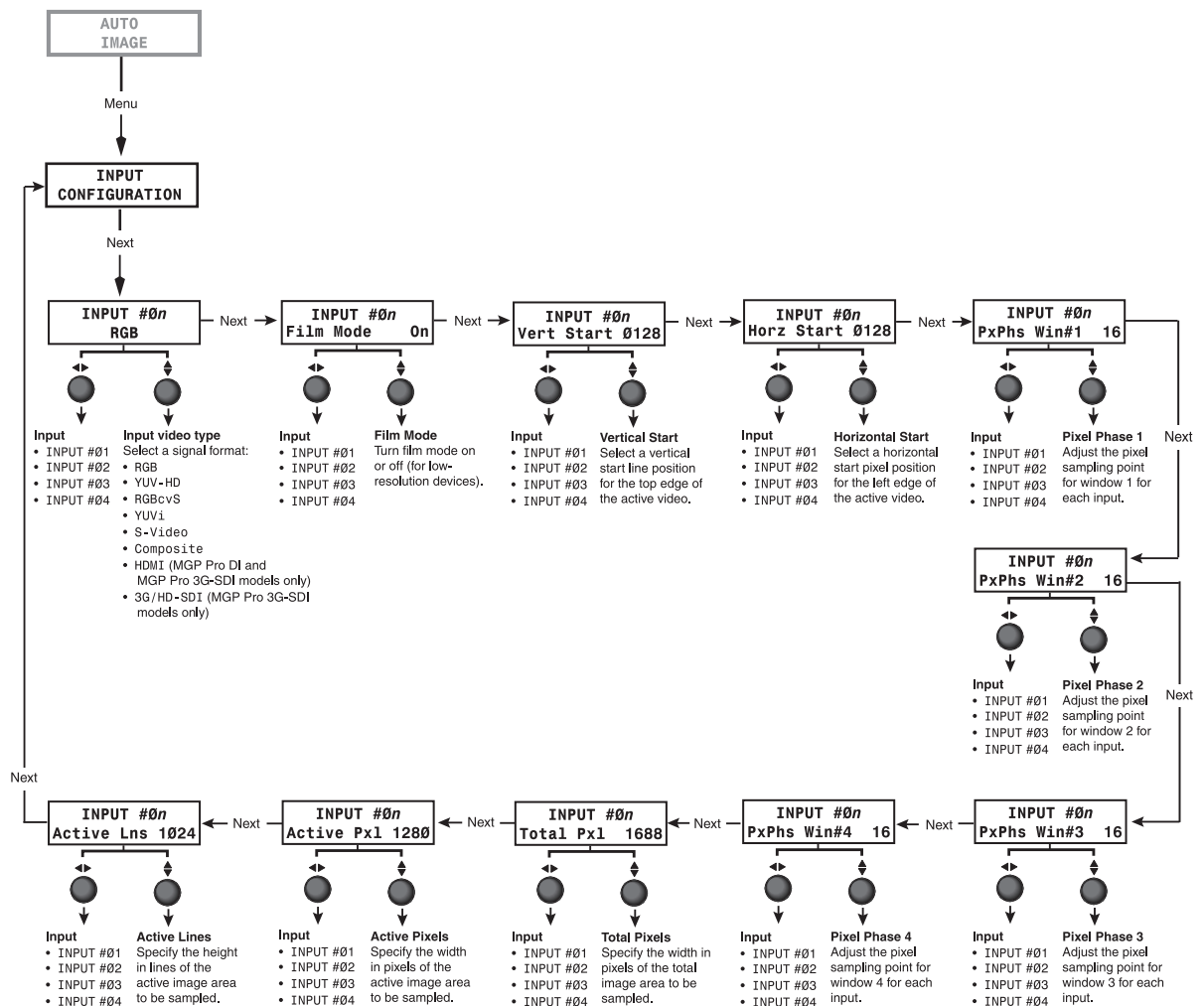| Input Configuration Submenu	Horizontal Knob Adjustment	Vertical Knob Adjustment
Video type Accepted video signal types include: **RGB**　　　**S-video** **RGBcvS**　　**3G/HD-SDI** (MGP Pro 3G-SDI models only) **YUV-HD**　　**Composite video** **YUVi**　　　**HDMI** (MGP Pro DI and MGP Pro 3G-SDI only)	Select 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.
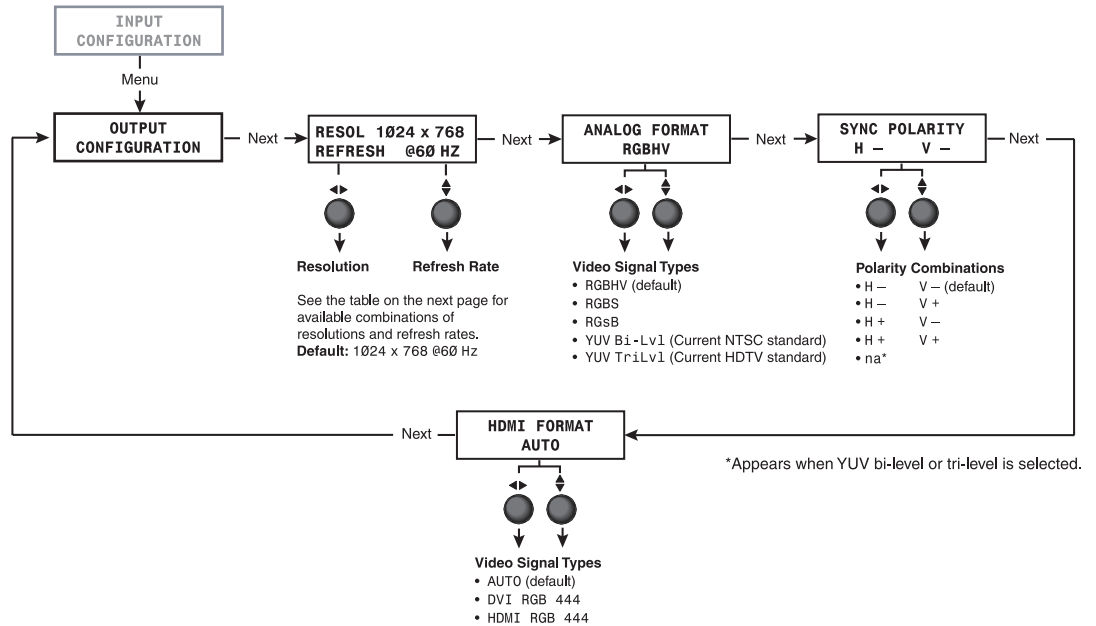
Figure 17. Output Configuration Menu Flow

Resolution and Refresh Rate submenu

While this submenu is displayed, rotate the horizontal Adjust (◄►) knob to select one of the available resolutions, or rotate the vertical Adjust (🔾) 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 50.

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									

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

[2] When 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 (◄►) or the vertical Adjust (◄►) 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 (◄►) or the vertical Adjust (◄►) 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.
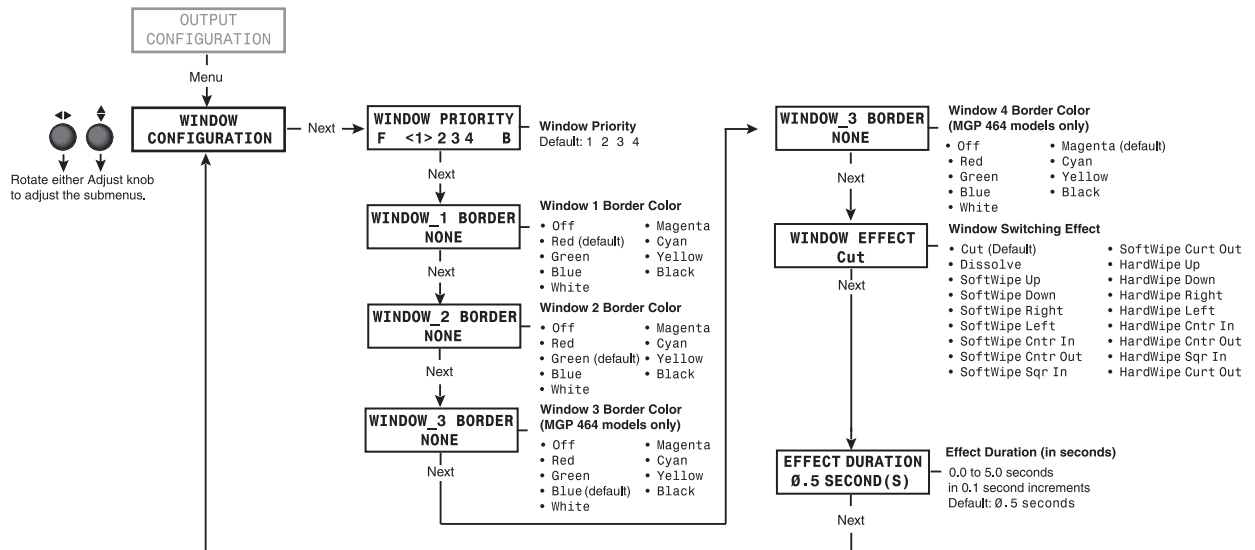

Figure 18. **Window Configuration Menu Flow**

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, 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. 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.

2. 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.

3. 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.
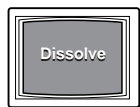
- **Standard wipe** — A standard wipe causes the new window to appear to unroll over the other one. The new window can roll from the top, bottom, left, or right.
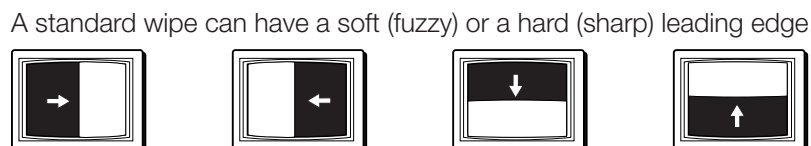
  A standard wipe can have a soft (fuzzy) or a hard (sharp) leading edge.

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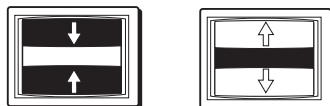
- **Square wipe** — A square wipe causes the new window to appear to unroll over the other one in one of two ways:

  - 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 Window Configuration is displayed on the LCD screen.

2. Press the Next button until EFFECT DURATION is displayed.

3. Rotate either the horizontal Adjust (◄►) 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 Windows-based Control Program help file).
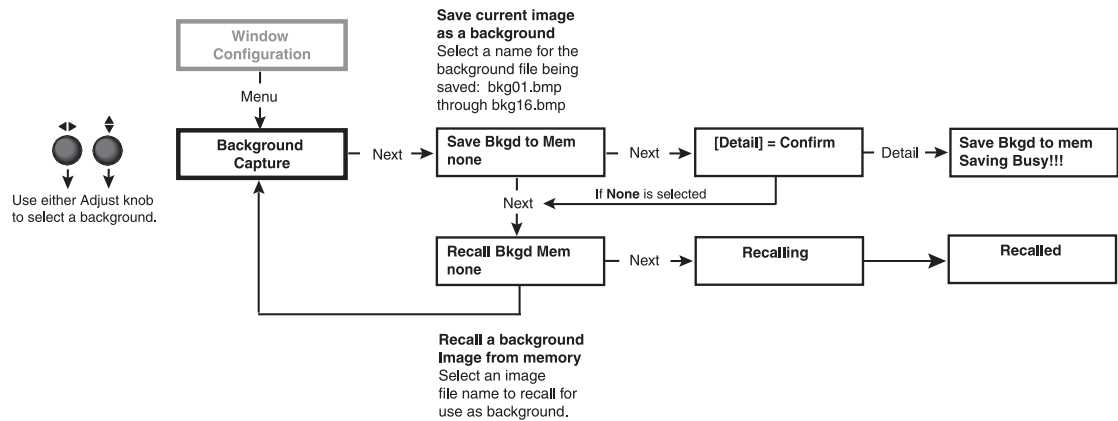
Figure 19. Background Capture Submenu Flowchart

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:

file size (in kilobytes) = (*horizontal* x *vertical* x 3) + 54 (*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 make up 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 Windows-based 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`.

> **NOTE:** The unit supports 24-bit bitmap files only. Their file names must have no more than 16 characters, including the .bmp extension.

> **ATTENTION:** 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. It is not recommended that you attempt to save or recall another background image during this process.

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.

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 (◄►) to move the angle brackets to the desired setting. Rotate the vertical Adjust knob (▲▼) to adjust the setting.

4. When finished editing the settings for the selected item, either press Next 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.
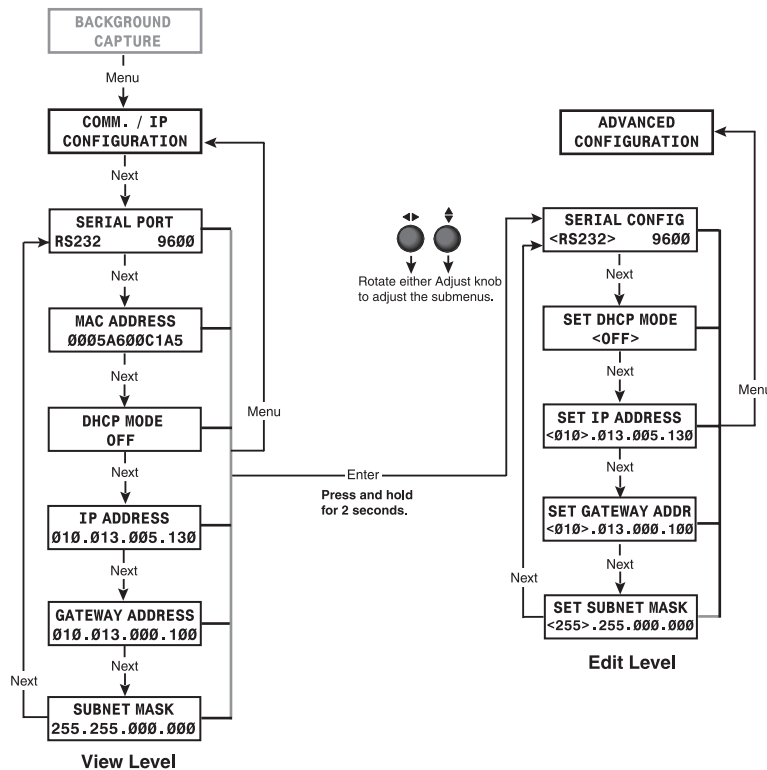

Figure 20. Communication/IP Configuration Menu Flow

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.
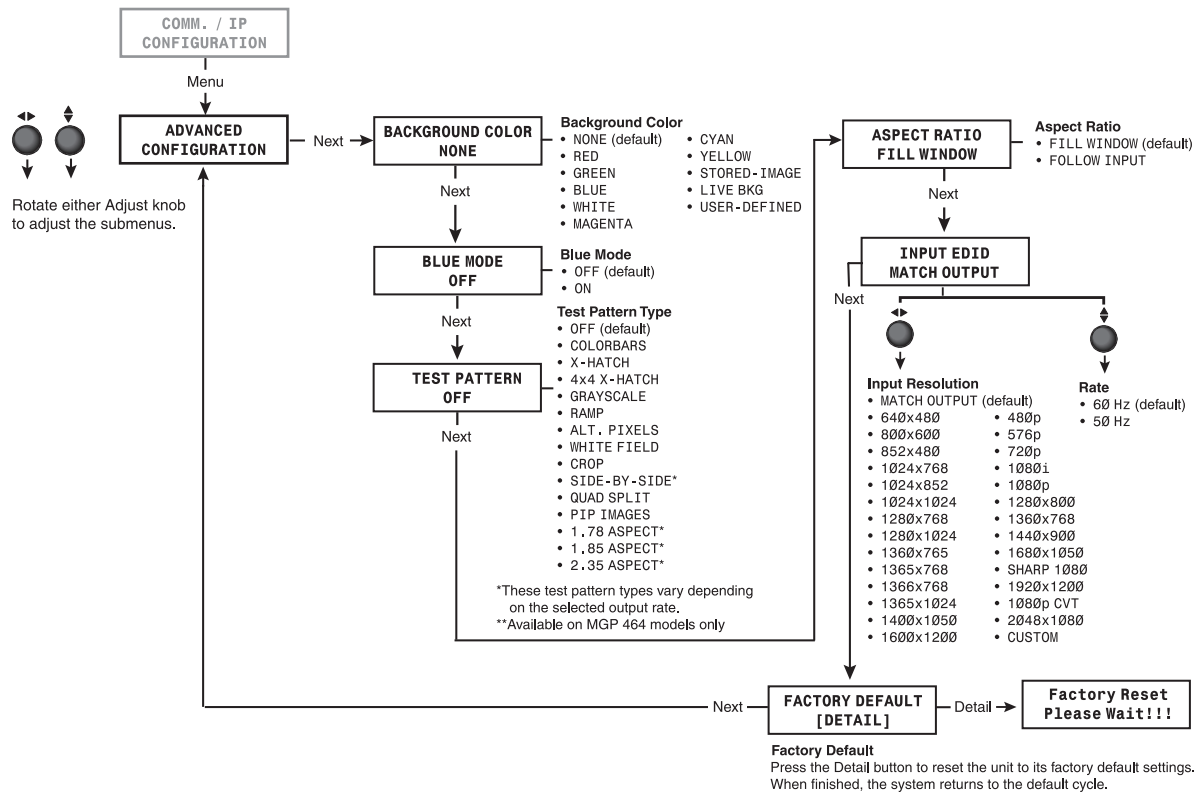
```
┌──────────────────┐
│   COMM. / IP     │
│  CONFIGURATION   │
└──────────────────┘
        │ Menu
        ▼
┌──────────────────┐   Next →  ┌──────────────────┐      Background Color
│    ADVANCED      │           │ BACKGROUND COLOR │      • NONE (default)   • CYAN
│  CONFIGURATION   │           │      NONE        │      • RED              • YELLOW
└──────────────────┘           └──────────────────┘      • GREEN            • STORED-IMAGE
                                        │ Next            • BLUE             • LIVE BKG
Rotate either Adjust knob                ▼                • WHITE            • USER-DEFINED
to adjust the submenus.        ┌──────────────────┐      • MAGENTA
                               │   BLUE MODE      │       Blue Mode
                               │      OFF         │       • OFF (default)
                               └──────────────────┘       • ON
                                        │ Next            Test Pattern Type
                                        ▼                 • OFF (default)
                               ┌──────────────────┐       • COLORBARS
                               │  TEST PATTERN    │       • X-HATCH
                               │      OFF         │       • 4x4 X-HATCH
                               └──────────────────┘       • GRAYSCALE
                                        │ Next            • RAMP
                                                          • ALT. PIXELS
                                                          • WHITE FIELD
                                                          • CROP
                                                          • SIDE-BY-SIDE*
                                                          • QUAD SPLIT
                                                          • PIP IMAGES
                                                          • 1.78 ASPECT*
                                                          • 1.85 ASPECT*
                                                          • 2.35 ASPECT*

                                          *These test pattern types vary depending
                                           on the selected output rate.
                                          **Available on MGP 464 models only
```

```
┌──────────────────┐     Aspect Ratio
│  ASPECT RATIO    │     • FILL WINDOW (default)
│  FILL WINDOW     │     • FOLLOW INPUT
└──────────────────┘
        │ Next
        ▼
┌──────────────────┐
│   INPUT EDID     │
│  MATCH OUTPUT    │
└──────────────────┘
   │ Next

Input Resolution                    Rate
• MATCH OUTPUT (default)             • 60 Hz (default)
• 640x480        • 480p             • 50 Hz
• 800x600        • 576p
• 852x480        • 720p
• 1024x768       • 1080i
• 1024x852       • 1080p
• 1024x1024      • 1280x800
• 1280x768       • 1360x768
• 1280x1024      • 1440x900
• 1360x765       • 1680x1050
• 1365x768       • SHARP 1080
• 1366x768       • 1920x1200
• 1365x1024      • 1080p CVT
• 1400x1050      • 2048x1080
• 1600x1200      • CUSTOM
```

```
                    ┌──────────────────┐            ┌──────────────────┐
Next ───────────────│ FACTORY DEFAULT  │ Detail →   │  Factory Reset   │
                    │    [DETAIL]      │            │  Please Wait!!!  │
                    └──────────────────┘            └──────────────────┘

Factory Default
Press the Detail button to reset the unit to its factory default settings.
When finished, the system returns to the default cycle.
```

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 crop)
- `PIP IMAGES` (4x3 or 16 x 9 picture-in-picture images)
- `1.78 ASPECT` (film aspect ratio 1.78)
- `1.85 ASPECT` (film aspect ratio 1.85)
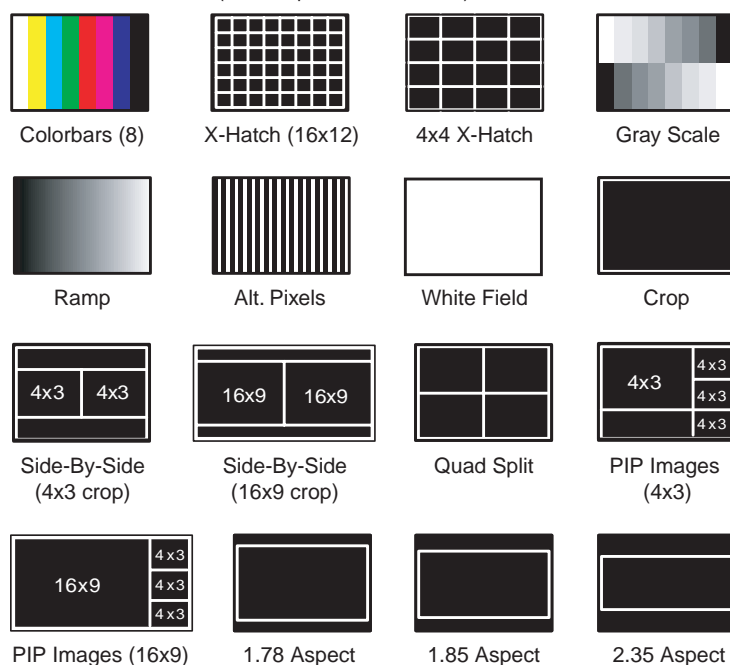- `2.35 ASPECT` (film aspect ratio 2.35)

Colorbars (8)	X-Hatch (16x12)	4x4 X-Hatch	Gray Scale
Ramp	Alt. Pixels	White Field	Crop
Side-By-Side (4x3 crop)	Side-By-Side (16x9 crop)	Quad Split	PIP Images (4x3)
PIP Images (16x9)	1.78 Aspect	1.85 Aspect	2.35 Aspect

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 rate fills the entire display raster (default).
- FOLLOW INPUT — Each input rate 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 EDIDs 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	–	–

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; 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 41).

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). See **Additional Functions** on page 38 for an explanation of these button functions.

> **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 the Display column, *n* is a single digit, 0 through 9.)

Button	Display	Function	Range	Adjust Knob
Window/ Image Size	`WINDOW_n SIZE:` `H=nnnn    V=nnnn`	Enlarge or shrink window 1, 2, 3, or 4.	**Min:** 1/16 of the output rate **Max:** Output rate	**For H (width):** Horizontal ◄► Adjust knob **For V (height):** Vertical ⬍ Adjust knob

	(Press button twice.)
	`IMAGE #nn SIZE:`
	`H=nnnn    V=nnnn`
		Enlarge or shrink the image within the window.	**Min:** 1/16 of the output rate
			
			Max: 2 times the output rate	

Bright/ Cont	`BRIT    CONT` `nnnn    nnnn`	**Brightness:** Increase or decrease intensity of video light on screen. **Contrast:** Increase or decrease range of image light and dark values.	**Brightness:** Ø00-127 **Default:** Ø64 **Contrast:** Ø00-127 **Default:** Ø64	**Bright:** Horizontal ◄► Adjust knob **Contrast:** Vertical ⬍ Adjust knob
Detail	`DETAIL` `nnnn`	Adjust image sharpness.	Ø00-127 **Default:** Ø64	Either
Window/ Image Position	`WINDOW_n  CNTR:` `H=±nnnn   V=±nnnn`	Position window 1, 2, 3, or 4 on the output screen in relation to center.	**Default:** ØØØØ ± the output rate	**For H:** Horizontal ◄► Adjust knob **For V:** Vertical ⬍ Adjust knob

	(Press button twice.)
	`IMAGE #nn  START:`
	`H=±nnnn    V=±nnnn`
		Position the image within the window in relation to the window center.	**Default:** ØØØØ ± the output rate	

Color/ Tint	`COLOR       TINT` `nnnn        nnnn`	**Color:** Adjust color intensity. (At the lowest adjustment, all colors are shades of gray.) **Tint:** Change the appearance of colors.	**Color:** Ø00-127 **Default:** Ø64 **Tint:** Ø00-127 **Default:** Ø64	**Color:** Horizontal ◄► Adjust knob **Tint:** Vertical ⬍ Adjust knob
Window/ Image Zoom	`WINDOW_n  ZOOM:` `H=nnnn    V=nnnn`	Increase/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 ◄► Adjust knob **For V:** Vertical ⬍ Adjust knob

	(Press button twice.)
	`IMAGE #nn  ZOOM:`
	`H=nnnn    V=nnnn`
		Increase/decrease the size of the image in the selected window while keeping the aspect ratio constant.	**Min:** 1/16 of the output rate
			
			Max: 2 times the output rate	

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 41).

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 input **with** the preset (`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).
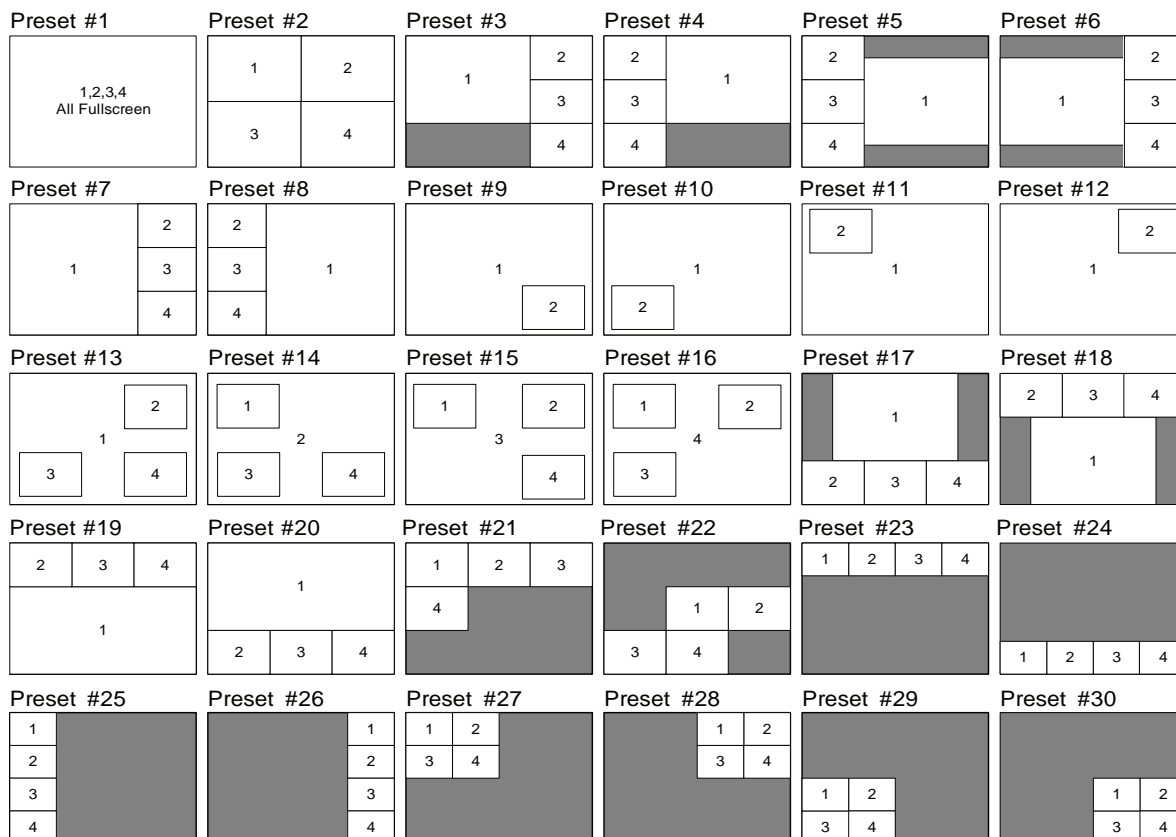

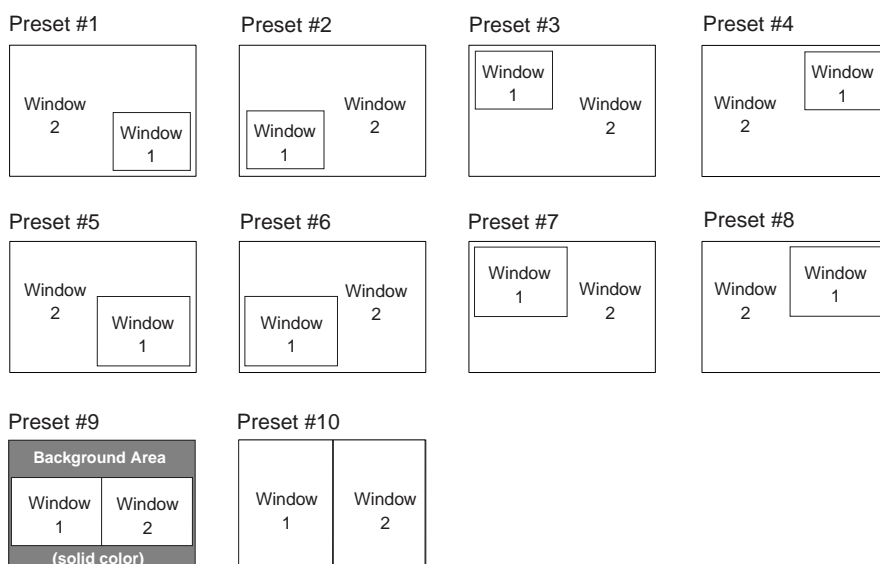**Figure 23.** Factory Default Preset Configurations for MGP 464 Pro Models

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 41).

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 MGP Pro. This allows a matrix MGP Pro 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 MGP Pro to any of the four MGP Pro 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 Windows-based 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 use only the HDMI output of the MGP Pro to a display (sink) that supported HDCP, there would be no issue. 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 authorized disabled 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 64) or via the MGP Control Software (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 41 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 2 mode, 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	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	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 (such as on and off. During resetting, the Reset LED blinks two times if events are starting or three times if events are stopping.	Mode 3 is useful for troubleshooting.
4	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).	• 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. The Reset LED blinks four times in quick succession during the reset.	Mode 4 enables you to set IP address information using ARP and the MAC address. It does not replace any user-installed firmware.

5	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:
		• Everything mode 4 does
		• Reset of almost all real time adjustments:
		  • Clears all ties, presets, audio or RS-232 mutes, and I/O grouping.
		  • Resets all IP options.
		  • Removes or clears all MGP Pro files.
		The reset LED blinks four times in quick succession during the reset.
			Mode 5 is useful if you want to start over with configuration and uploading and also to replace events.

	\multicolumn{3}{l}{**NOTE:** Mode 5 reset clears most adjustments. To save these settings, use the Windows-based 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.

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:

- **SIS Commands**
- **Windows-based Control Software**

The MGP Pro can be configured and controlled by software 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 Pro software help file.

SIS Commands

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. The default protocol for these ports is:

9600 baud, 8 data bits, 1 stop bit, no parity, no flow control

The MGP Pro 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.

- **Rear Panel RS-232/422 port:** The rear panel 9-pin D female connector labeled Remote RS232/RS422 can be connected to the serial port of a host device for RS-232 or RS-422 control of the MGP Pro (see **Remote RS-232/422 connector** on page 7 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 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 ⑩ **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 ④ **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 Addressing** 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

Communication Software

There are several programs that enable you to connect the MGP Pro to a computer or control device via the RS-232 or RS-422 interface, and to enter commands. Extron DataViewer is one such program that is commonly used on PCs. In addition, the MGP Pro has a Windows-based control software program that is available through the RS-232/422 port, the front panel Config port, or via Ethernet (see the MGP Pro software help file for information on using the software to configure the MGP Pro).

For any program that you use, set up communication using the following protocol:

Baud rate: 9600	**Stop Bits:** 1
Data bits: 8	**Flow Control:** None
Parity: None	

Host-to-MGP Pro Communications

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).

<u>(c) Copyright 20*nn*, Extron Electronics, MGP *model number* PRO [*model type*],
     V*n.nn*, 6Ø-*nnnn*-*nn*</u>
<u>*Www*, *DD Mmm YYYY HH*:*MM*:*SS*</u>

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`. V*n.n* is the firmware version number, and `6Ø-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`.)

<u>Reconfig</u>
<u>Reconfig</u>
<u>Reconfig</u>
<u>Reconfig</u>

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

<u>Out *n* In *nn*</u> (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:

`EØ1` — Invalid input channel number (too large)
`EØ9` — 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

The MGP Pro can also be controlled 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 50, and **Command and Response Table for IP SIS Commands**, beginning on page 65)**.**

ASCII to Hex Conversion Table												Esc	1B	CR	ØD	LF	ØA
Space	2Ø	!	21	"	22	#	23	$	24	%	25	&	26	'	27
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F
Ø	3Ø	1	31	2	32	3	33	4	34	5	35	6	36	7	37
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F
@	4Ø	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	5Ø	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
`	6Ø	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	7Ø	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.

- 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://192.168.1ØØ.1Ø/myform.htm.

  - Some characters differ depending on what method you use to send the commands:

Telnet	Web Browser
Escape key (hex 1B)	W [must not be encoded]
Carriage return (hex ØD)	Pipe character (	) [must not be encoded]

    NOTE: With Telnet you can use either the Escape 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] = Superscripts indicate the error message displayed if the command is entered incorrectly or with invalid parameters (see **Error Responses** on page 43).

MGP Pro Commands

X1 = Input number (**1 - 2Ø**). **2Ø** = live background (for HDCP status only)

X2 = Window number
Ø = 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
7 = HDMI or 3G/HD-SDI

X4 = On or off status
Ø = off or disabled
1 = on or enabled

X5 = Test pattern
Ø = 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)
1Ø = 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
Ø = 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: Ø - 9
Letters: Lowercase a - z and uppercase A - Z

X8 = Picture adjustment range (applies to color, tint, brightness, and contrast)
(Ø - 127; default = 64)

X9 = Scaler resolution
Ø = Match output rate (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
1Ø = 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
2Ø = Live background input resolution
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 (EDID Resolution command only)

NOTE: Live background input resolution does not apply to input EDID.

`X10` = Detected input signal standard
Ø = none
1 = NTSC
2 = PAL
4 = SECAM
— = Not applicable (occurs when input is set for RGB or YUV)

`X11` = Sharpness (detail) level (Ø - 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
1Ø = 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
2Ø = Hard wipe square out
21 = Hard wipe curtain in
22 = Hard wipe curtain out

`X13` = Blanking adjustment range (Ø - 255; default is 128.)

`X14` = Window preset (1 - 128)

`X15` = Input preset (1 - 128)

`X16` = Scaler refresh rate
Ø = Match output or user defined rates (applies to EDID command only)
1 = 50 Hz
2 = 60 Hz
3 = 72 Hz
4 = 96 Hz
5 = 100 Hz
6 = 120 Hz
7 = Live background input refresh rate
8 = 24 Hz
9 = 59.94 Hz
1Ø = 29.97 Hz
11 = 30 Hz

> **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.
Example: Ø1 = 0.1 second, 5Ø = 5.0 seconds)

`X20` = Internal temperature in degrees Fahrenheit

`X21` = Image or window position (Zero location is 2Ø48, and limits are ± the output resolution.)
Example: Front panel displays +5Ø, but the response to the SIS command is 2Ø98.

`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

> **NOTE:** 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 audio, no InfoFrames)
2 = HDMI 444 RGB (0-255, audio, 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:** 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+

X37 = Output sync format
1 = RGBHV
2 = RGBS
3 = RGsB
4 = YUV bi-level
5 = YUV tri-level

X38 = Label text size
1 = small
2 = medium
3 = large

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

X40 = Label text color
1 = red
2 = green
3 = blue
4 = white
5 = magenta
6 = cyan
7 = yellow
8 = black

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

X42 = Window border color
Ø = off (no border)
1 = red
2 = green
3 = blue
4 = white
5 = magenta
6 = cyan
7 = yellow
8 = black

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

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

IP-specific Commands

X101 = Specific port number (Ø1-99)
The port number is represented as two ASCII characters (2 bytes). For example, port 05 would be represented as 3Ø 35 in hexadecimal.

Ø1 = RS-232/422 port (rear panel)
Ø2 = 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 3Ø**)
> - Plus sign (Hex 2B) must be encoded as %2B (hex **25 32 42**).

X103 = Greenwich Mean Time (GMT) offset value (-12:ØØ–14:ØØ) 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 (Ø-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:
Ø6/21/Ø2-1Ø:54:ØØ

Read format (day of the week, day month year); for example, *HH:MM:SS*); for example:
Fri, 26 Sep 2ØØ8 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 = 1Ø (100 ms)
Maximum = 32767

X110 = Time in tens of milliseconds to wait between characters received via the serial port
Default = 2Ø (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 = Ø)

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
Ø = clear/none
1 = verbose mode
2 = tagged responses for queries
3 = verbose mode and tagged responses for queries
Default = Ø for Telnet connections; 1 for RS-232 or RS-422 control.

> **NOTE:** If tagged responses are enabled, all read commands return the constant string plus the data. Example:
> Command: [Esc] CN ←
> Response: Ipn • **X105** ↵

X115 = Priority status for the port receiving timeouts.
Ø = Use Send data string command parameters
1 = Use Configure receive timeout command parameters. The response includes leading zeros. (Default = Ø.)

X116 = Baud rate: 24ØØ, 48ØØ, 96ØØ, 192ØØ, 384ØØ, or 1152ØØ

X117 = Parity (only the first letter is needed):
Odd
Even
None
Mark
Space

X118 = Data bits: 7 or 8

X119 = Stop bits: 1 or 2

X120 = Port type
Ø = RS-232
1 = RS-422

X121 = Flow control
H = hardware
S = software
N = none

X122 = Data pacing (ØØØØ-ØØØ1 ms between bytes)
Default = Ø ms

X123 = Password (12 characters = maximum length; no special characters are allowed.)

> **NOTE:** A user password cannot be assigned if no administrator password exists; the E14 error code is returned. If the administrator password is cleared, the user password is also removed.

X124 = Daylight saving time (used in the northern hemisphere [USA] and parts of Europe and Brazil)
Ø = off or ignore
1 = on in northern hemisphere
2 = on in Europe
3 = on in Brazil

X125 = Event number, range = Ø - 99

X126 = Event buffer
Ø = receive
1 = user
2 = NVRAM

X127 = Event buffer offset (range = Ø to *MaxBufferSize*)

X128 = Event data size
b = bit
B = byte (8 bits)
S = short (16 bits)
L = long (32 bits)

> **NOTE:** This parameter is case sensitive.

X129 = Event data to write

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.

X131 = Number of bytes to read

X132 = E-mail event number (1-64)

X133 = E-mail recipient address

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.

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)

X136 = Extended security (password) levels: 1-1Ø
The response is 2 digits with a leading zero.

X137 = Connection security level
Ø = anonymous
1-1Ø = extended security level
11 = user
12 = administrator

X138 = (Ethernet only) Number of seconds (stated in tens of seconds) before timeout on IP connections (min = 1 (10 seconds), max = 65ØØØ (650,000 seconds), and default = 3Ø (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.

X139 = ASCII digits representing the numeric value of the data element read from the event buffer (leading zeros are suppressed)

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

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).

The response is returned as 2 digits with a leading zero if needed.

X142 = Number of seconds (in tens of seconds) before timeout on IP connections

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	X1 * X2 !	Out X2 •In X1 ↵	Select input source X1 for window X2.
View input	X2 !	X1 ↵	View the input channel for the selected window. X1 = 1 - 19. X2 = Ø - 4; Ø = all windows.
Input Video Type			
Set video type	X1 * X3 \	X1 Typ X3 ↵	Set input X1 to format X3.
View video type	X1 \	X3 ↵	View video signal type X3 for input X1. For X3: 1 = RGB 2 = YUV-HD 3 = RGBcvS 4 = YUVi 5 = S-video 6 = Composite video 7 = HDMI or 3G/HD-SDI

> **NOTE:** It is recommended that virtual inputs be configured using the Windows-based control software (see the software help file for the procedures).

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
EDID Resolution and Refresh Rate			
Set input EDID resolution and rate	Esc A X9 * X16 EDID ←	Edid A X9 * X16 ↵	Set EDID resolution to scaler resolution X9 and the refresh rate to X16. **For X9:** 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 1Ø = 1365x768 25 = 1080p Sharp 11 = 1366x768 26 = 1920x1200 12 = 1365x1024 27 = 1080p CVT 13 = 1400x1050 28 = 2048x1080 99 = Custom **For X16:** 1 = 50 Hz 2 = 60 Hz

> **NOTES:**
> - The default is to match the output resolution: X9 = Ø, X16 = Ø.
> - EDID resolutions are available only at 50 Hz and 60 Hz. If another rate is selected, the MGP Pro issues an **E13** error code.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
View EDID resolution and rate	Esc A EDID ←	X9 * X16 ↵	View current EDID resolution X9 and rate X16.
Save EDID	Esc S ØEDID ←	Edid S Ø ↵	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 a selected transition effect. x2 = Ø-4; Ø = all windows.
Unmute window	x2 * ØB	x2 BlkØ ↵	Display (unmute) window x2 using a 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 1Ø = 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 2Ø = Hard wipe sq. out 21 = Hard wipe curtain in 22 = Hard wipe curt. out
View effect	4 #	x12 ↵	View the currently selected window transition effect.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
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.
Window Preset Effect			
NOTE: For information on setting the transition effect for window presets, see the MGP Pro Windows-based control software help file.			
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			
Specific value	X2 * X11 D	X2 Det X11 ↵	Set the detail (sharpness) level for window X2 to X11. X2 = Ø-4; Ø = all windows. X11 = Ø-127.
Increment detail level	X2 + D	X2 Det X11 ↵	Select the next higher sharpness level.
Decrement detail level	X2 − D	X2 Det X11 ↵	Select the next lower sharpness level.
View detail value	X2 D	X11 ↵	View the current sharpness level setting.
Horizontal Shift (Window)			

> **NOTE:** For the shift values shown for the next two commands, the zero location is 2Ø48. 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.
>
> *Example:* The LCD window displays +5Ø, but the response to the SIS command is 2Ø98.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Specific value	1 * X2 * X21 H	X2 Whp X21 ↵	Set the horizontal centering of window X2 to X21. For X21: Ø = 2048. Limits are ± the output resolution.
Increment horizontal image shift	1 * X2 + H	X2 Whp X21 ↵	Shift window X2 right.
Decrement horizontal window shift	1 * X2 − H	X2 Whp X21 ↵	Shift window X2 left.
View horizontal window shift amount	1 * X2 H	X21 ↵	View the amount of horizontal window shift.
Vertical Shift (Window)			
Specific value	1 * X2 * X21 /	X2 Wvp X21 ↵	Set the vertical centering of window X2 to X21.
Increment vertical window shift	1 * X2 + /	X2 Wvp X21 ↵	Shift window X2 up.
Decrement vertical window shift	1 * X2 − /	X2 Wvp X21 ↵	Shift window X2 down.
View vertical window shift amount	1 * X2 /	X21 ↵	View the amount of vertical shift.
Horizontal Shift (Image)			
Specific value	2 * X2 * X21 H	X2 Ihp X21 ↵	Set the horizontal centering of the image in window X2 to X21.
Increment horizontal image shift	2 * X2 + H	X2 Ihp X21 ↵	Shift the image in window X2 right.
Decrement horizontal image shift	2 * X2 − H	X2 Ihp X21 ↵	Shift the image in window X2 left.
View horizontal image shift amount	2 * X2 H	X21 ↵	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)			
Specific value	2 * X2 * X21 /	X2 Ivp X21 ↵	Set the vertical centering of the image in window X2 to X21. X2 = Ø - 4; Ø = all windows. For X21: Ø = 2048; limits are ± the output resolution.
Increment vertical image shift	2 * X2 + /	X2 Ivp X21 ↵	Shift image in window X2 up.
Decrement vertical image shift	2 * X2 − /	X2 Ivp X21 ↵	Shift image in window X2 down.
View vertical image shift amount	2 * X2 /	X21 ↵	View the current setting for vertical centering of the image in window X2.
Horizontal Size (Window)			
Specific value	1 * X2 * X22 :	X2 Whs X22 ↵	Set the width of window X2 to X22. For X22: Minimum = 1/16 the size of the active output area. Maximum = size of the active output area.
Increase horizontal size of window	1 * X2 + :	X2 Whs X22 ↵	Widen the window.
Decrease horizontal size of window	1 * X2 − :	X2 Whs X22 ↵	Narrow the window.
View horizontal size of window	1 * X2 :	X22 ↵	View the width of the window.
Vertical Size (Window)			
Specific value	1 * X2 * X22 ;	X2 Wvs X22 ↵	Set the height of window X2 to X22.
Increase vertical size of window	1 * X2 + ;	X2 Wvs X22 ↵	Increase the height of the window.
Decrease vertical size of window	1 * X2 − ;	X2 Wvs X22 ↵	Decrease the height of the window.
View vertical size of window	1 * X2 ;	X22 ↵	View the height of the window.
Horizontal Size (Image)			
Specific value	2 * X2 * X23 :	X2 Ihs X23 ↵	Set the width of the image in window X2 to X23. For X23: 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 * X2 + :	X2 Ihs X23 ↵	Widen the image.
Decrease horizontal size of image	2 * X2 − :	X2 Ihs X23 ↵	Narrow the image.
View horizontal size of image	2 * X2 :	X23 ↵	View the width of the image.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Vertical Size (Image)			
Specific value	2 * X2 * X23 ;	X2 Ivs X23 ↵	Set the height of the image in window X2 to X23. X2 = Ø-4. Ø = all windows. For X23: 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 * X2 + ;	X2 Ivs X23 ↵	Increase the height of the image in window X2.
Decrease vertical size of image	2 * X2 − ;	X2 Ivs X23 ↵	Decrease the height of the image in window X2.
View vertical size of image	2 * X2 ;	X23 ↵	View the height of the image in window X2.
Picture Control Copy			
Copy picture controls	21 * X2 #	Pcc X1 ↵	Copy the picture controls for currently displayed input X1 to window X2. X1 = 1-19.
Window Size and Position			
Set window size and position	Esc X2 , X21 * X21 * X22 * X22 X Y ← Wxy X2 , X21 * X21 * X22 * X22 ↵		
NOTE: The variables must be entered in the following order: Horizontal position (X21), vertical position (X21), horizontal size (X22), vertical size (X22).			For window X2, set the position (horizontal and vertical) to X21 and the size (width and height) to X22. For X21: Ø = 2048; limits are ± the output resolution. For X22: Minimum = 1/16 the size of the active output area. Maximum = size of the active output area.
View window size and position	Esc X2 X Y ←	X2 , X21 * X21 * X22 * X22 ↵ View the position and size of window X2.	
Image Size and Position			
Set image size and position	Esc X2 , X21 * X21 * X23 * X23 I Y ← Ixy X2 , X21 * X21 * X23 * X23 ↵		
NOTE: The variables must be entered in the following order: Horizontal position (X21), vertical position (X21), horizontal size (X23), vertical size (X23).			For the image in window X2, set the position (horizontal and vertical) to X21 and the size (width and height) to X23. X2 = Ø-4. Ø = all windows. For X21: Ø = 2048. Limits are ± the output resolution. For X23: Minimum = 1/16 the size of the active input area. Maximum = double the active output area for 200% zoom.
View image size and position	Esc X2 I Y ←	X2 , X21 * X21 * X23 * X23 ↵ View the position and size of the image in window X2.	

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, width and height, and horizontal and vertical position 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 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 Pro Windows-based control software 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			
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			
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)			
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			
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			
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			
Specific value	13 * X1 * X18 #	Aln 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 + #	Aln X1 * X18 ↵	Select the next higher active lines value.
Decrement active lines value	13 * X1 − #	Aln 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	X9 * X16 =	Rte X9 * X16 ↵	Select scaler output resolution X9 and scan rate X16. For X9:
		1 = 640x480 2 = 800x600 3 = 852x480 4 = 1024x768 5 = 1024x852 6 = 1024x1024 7 = 1280x768 8 = 1280x1024 9 = 1360x765 10 = 1365x768 11 = 1366x768 12 = 1365x1024 13 = 1400x1050 14 = 1600x1200	15 = 480p 16 = 576p 17 = 720p 18 = 1080i 19 = 1080p 2Ø = Live background resolution 21 = 1280x800 22 = 1360x768 23 = 1440x900 24 = 1680x1050 25 = 1080p Sharp 26 = 1920x1200 27 = 1080p CVT 28 = 2048x1080
			For X16: 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 1Ø = 29.97 Hz 11 = 30 Hz
View output rate settings	=	X9 * X16 ↵	View the current output resolution X9 and refresh rate X16 settings.
View output rate details	Ø =	*width * height * refresh rate* ↵	View the current output resolution and refresh rate in actual numbers.

> **NOTE:** The output rate detail command can display the actual resolution of the output when the MGP Pro is configured to use the live background rate.

Example:	Ø =	1Ø24*Ø768*Ø6Ø ↵	The output resolution is 1024x768; the rate is 60 Hz.
Freeze			
Enable freeze	X2 * 1 F	X2 Frz 1 ↵	Freeze the output video image in window X2. X2 = Ø - 4; Ø = all windows.
Disable freeze	X2 * Ø F	X2 Frz Ø ↵	Unfreeze the output image
View freeze status	X2 F	X4 ↵	View freeze status X4. For X4: 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 (16x12) 3 = 4x4 X-hatch 4 = Grayscale 5 = Ramp 6 = Alt. pixels 7 = White field 8 = Crop 9 = Side By Side (4x3 crop) 1Ø = Quad Split (4x4) 11 = Pip Images (4x3 or 6x9 PIP columns) 12 = 1.78 Aspect (4x3/16x9) 13 = 1.85 Aspect (4x3/16x9) 14 = 2.35 Aspect (4x3/16x9) **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 enabled.			
Disable executive mode	Ø X	Exe Ø ↵	Unlock all front panel controls.
Enable executive mode	1 X	Exe 1 ↵	Lock front panel control 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 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+
Example:	1 * 2 #	Pol 2 ↵	Output sync polarity is H+/V–.
View output polarity	1 #	[X36] ↵	View the current output polarity setting [X36].
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].

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Special Functions (continued)			
Blue mode	3 * X4 #	Blu X4 ↵	Turn blue mode on and off. For X4: Ø = blue mode off. 1 = blue mode on.
View blue mode status	3 #	X4 ↵	View the current blue mode status.
Text position	6 * X2 * X6 #	X2 Tlc 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.
Text size	1Ø * X38 #	Tsz X38 ↵	Set the size of the label text. For X38: 1 = Small 2 = Medium 3 = Large
View text size	1Ø #	X38 ↵	View the current size (X38) of the label text.
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.
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.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
Special Functions (continued)			
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].
Window border color	9 * [X2] * [X42] #	[X2] Brd [X42] ↵	Set the color of the border around window [X2] to [X42]. [X2] = 0 through 4; 0 = all windows. For [X42]: 0 = 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].
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]).
Custom color	22 * [X25] * [X25] * [X25] #	Ubk [X25] * [X25] * [X25] ↵	Set custom color values ([X25]) for 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 color.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
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` Flm 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` Flm 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`: 0 = 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
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 IØØ * `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.

Command	ASCII (Telnet) (Host to Processor)	Response (Processor to Host)	Additional Description
HDMI Output Format			
Set format	`Esc` `X31` VTPO ←	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 audio and no InfoFrames) 2 = HDMI 444 RGB (Ø-255, with audio and InfoFrames) Default is Ø.
View format setting	`Esc` VTPO ←	`X31` ↵	View the current output colorspace for the HDMI output.
HDCP Input Authorization (HDMI inputs only)			
HDCP authorized device On	`Esc` E `X1` * 1 HDCP ←	Hdcp E `X1` * 1 ↵	Select HDCP authorization for input `X1`.
HDCP authorized device Off	`Esc` E `X1` * Ø HDCP ←	Hdcp E `X1` * Ø ↵	Deselect HDCP authorization for input `X1`.
Query 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).
General Information			
General system information	`X2` * I	Chn `X1` • Typ `X3` • Std `X10` • Blk `X5` ↵	View input number, video signal type, input signal standard, and blanking (muting) status in window `X2`. `X1` = 1-19. `X3` = signal type. For `X3`: 1 = RGB 2 = YUV-HD 3 = RGBcvS 4 = YUVi 5 = S-video 6 = Composite video 7 = HDMI or 3G/HD-SDI `X10` = signal standard. For `X10`: Ø = None 1 = NTSC 2 = PAL 4 = SECAM — = Not applicable `X4` = muting status. For `X4`: 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
Bi-directional Serial Data Port				
Send data string	`Esc` `X101` * `X109` * `X110` * `X111` RS ← `X110` W `X101` %2A `X101` %2A `X110` %2A `X111` RS | `X102` {*Response from command*} ↵			
Example:	`Esc` Ø5 * 4 * 7 * 3L RS ← *<data>* • W Ø5 %2A 4 %2A 7 %2A 3L RS | {*data*} {*Response from command*}			

> **NOTES:**
> - `X101` = Port number (Ø1-99)
> - `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.
> - The * `X109` * `X110` * `X111` sequence is optional. If `X109` and `X110` are not specified, the default values are used.

Command	ASCII (Telnet)	URL Encoded (Web)	Response	Additional Description
Configure serial port parameters[24]	`Esc` `X101` * `X116` , `X117` , `X118` , `X119` CP ← W `X101` %2A `X116` %2A `X117` %2A `X118` %2A `X119` CP		Cpn `X101` • Ccp `X116` , `X117` , `X118` , `X119` CP ↵	Set baud rate `X116`, parity `X117`, data bits `X118`, and stop bits `X119` for port `X101`. `X116` = 24ØØ, 48ØØ, 96ØØ, 192ØØ, 384ØØ, or 1152ØØ. `X117` = **o**dd, **e**ven, **n**one, **m**ark, or **s**pace. (Only the first letter is required.) `X118` = 7 or 8 `X119` = 1 or 2
View serial port parameters	`Esc` `X101` CP ←	W `X101` CP |	`X116` , `X117` , `X118` , `X119` CP ↵	
Configure mode[24]	`Esc` 1 * `X120` CY ←	W 1 %2A `X120` CY |	Cpn1 • Cty `X120` ↵	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.

Command	ASCII (Telnet)	URL Encoded (Web)	Response	Additional Description
View serial mode	`Esc` `X101` CY ←	W `X101` CY |	`X120` ↵	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` `%Ø2A` `X121` `%Ø2C` `X122` `CF` |	`Cpn` `X101` • `Cfl` `X121` `,` `X122` ↵	Set flow control type `X121` with `X122` ms between bytes. For `X121`: H = Hardware. S = Software. N = None (default). `X122` = ØØØØ through ØØØ1. 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` ↵	Set the time that the MGP Pro will wait for a response before terminating the command.

NOTES:

- `X101` = Port number (Ø1-99)
- `X102` = Command data section. For web encoding for `X102`, be sure to convert non-alphanumeric characters to hex numbers.
- `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.
- `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 Data Port				
Set current connection port timeout	`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	`Esc` ØTC ←	W ØTC |	`X138` ↵	
Set global IP port timeout	`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	`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.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Query firmware version	**Q** or **1Q**	**Q** or **1Q**	`X104` ↵ *With tagged response – verbose modes 2 and 3:* VerØ1 * `X104` ↵	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.
Example:	**1Q**	**1Q**	**1.Ø1**	
Query verbose version information	**ØQ**	**ØQ**	Sum of responses from **2Q-3Q-4Q** ↵ *With tagged response – verbose modes 2 and 3:* VerØØ * *Sum of responses from* **2Q-3Q-4Q** ↵	Show bootstrap, factory-installed, and updated firmware versions (see Query commands **2Q**, **3Q**, and **4Q** on the following lines).
Example:	**ØQ**	**ØQ**	**1.ØØ-Ø.ØØ (1.48-MGP Pro Series -Wed, 16 Jan 2Ø13 18:37:59 GMT)-2.Ø2***	
Query bootstrap version	**2Q**	**2Q**	`X104` ↵ *With tagged response – verbose modes 2 and 3:* VerØ2 * `X104` ↵	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				
Query factory firmware version	3Q	3Q	X104 (plus *web ver.-desc-UL date/time*) ↵ *With tagged response – verbose modes 2 and 3:* Ver03 * X104 (plus *web ver.-desc-UL date/time*)↵	
				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 39).
Example:	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 *web ver.-desc-UL date/time*) ↵ *With tagged response – verbose modes 2 and 3:* Ver04 * X104 (plus *web ver.-desc-UL date/time*)↵	
				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.
Example:	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.
Information Requests				
Request unit part number	N	N	60-1258-*nn* or 60-1259-*nn* ↵ *With tagged response – verbose modes 2 and 3:* Pno 60-1258-*nn* or Pno 60-1259-*nn* ↵	
				Show unit part number. MGP 462 Pro is 60-1258-*nn*. MGP 464 Pro is 60-1259-*nn*. For *nn*: 01 = standard model 02 = DI model 03 = 3G-SDI model

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Information Requests (continued)				

Request model name	`1I`	`1I`	X44 ↵
			
			With tagged response – verbose modes 2 and 3:
			`Inf01 *` X44
				Show unit model name X44. X44 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:* `Inf02 * 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:* `Inf03 *` *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:* `Inf04 *` *n* `bytes used out of` *n* `kBytes` ↵ Show amount of user memory used and total available user memory.	
Event Control				
Read event buffer memory[27]	Esc X125 `,` X126 `,` X127 `,` X128 `E` ← `W` X125 `,` X126 `,` X127 `,` X128 `E |` X139 ↵			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 *max. buffer size*. 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).

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Event Control (continued)				
Write event to memory buffer[24][27]	`Esc X125 , X126 , X127 , X129 , X128 E ←`	`W X125 , X126 , X127 , X129 , X128 E |`	`Ewr X125 , X129 ↵`	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]	`Esc X125 , X126 , X127 , X131 FE ←`	`W X125 , X126 , X127 , X131 FE |`	`{string} ↵`	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]	`Esc X129 , X125 , X126 , X127 FE ←`	`W X129 , %2A X125 , X126 , X127 FE |`	`Ewr X125 , X129 ↵`	Write data string X129 from event X125, buffer X127, offset by X127.
Start events [24][27]	`Esc 1AE ←`	`W 1AE |`	`Ego ↵`	Initiate all programmed events.
Stop events [24][27]	`Esc ØAE ←`	`W ØAE |`	`Est ↵`	Stop all programmed events.
Read number of events running	`Esc AE ←`	`W AE |`	`Enm nn ↵` *With tagged response – verbose modes 2 and 3:* `Enm nnnnn`	*nn* = 2-digit number *nnnnn* = 5-digit number
E-mail Commands				
Configure e-mail events[24]	`X132 , X133 , X134 CR ←`	`W X132 , X133 , X134 CR |`	`Ipr X132 , X133 , X134 ↵`	X132 = e-mail event number (1-64). X133 = e-mail recipient address. X134 = name of e-mail 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 %4Ø 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 ↵`	

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
E-mail (continued)				
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.
Set unit name to factory default[24]	`Esc` • CN ←	W %20 CN |	Ipn • `X135` ↵	`X135` is the name the processor was shipped with: MGP46*n-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-Ø9-44-92	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 *MM/DD/YY-HH:MM:SS*. (The hours, minutes, and seconds can also be separated by periods.) *Examples:* 11/13/Ø6-1Ø:54:ØØ or 11/13/Ø6-1Ø.54.ØØ

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
IP Setup Commands (continued)				
Read time/date	`Esc` CT ←	W CT |	`X106` ↵	The read format is: *Www* [day of the week]**,** *DD Mmm YYYY HH:MM:SS*. *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 (± *hh:mm* relative to Greenwich, England). The plus sign and leading zero are optional. `X103` is in the format *hh:mm*. *Example:* **5:3Ø** or **5.3Ø** = +05:30.
Read GMT offset	`Esc` CZ ←	W CZ |	`X103` ↵	View the current GMT offset.
Set daylight saving time[24]	`Esc` `X124` CX ←	W `X124` CX |	Ipx `X124` ↵	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`: **Ø** = Off or ignore **1** = On in northern hemisphere **2** = On in Europe **3** = On in Brazil *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, and Arizona (excluding the Navajo Nation).
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 *nnn.nnn.nnn.nnn*). Leading zeros in each of the four fields are optional.

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
IP Setup Commands (continued)				
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 *xx-xx-xx-xx-xx-xx*.
Set subnet mask[24]	[Esc] [X113] CS ←	W [X113] CS |	Ips • [X113] ↵	Set unit subnet mask [X113] (*nnn.nnn.nnn.nnn*) 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.
Set gateway address[24]	[Esc] [X107] CG ←	W [X107] CG |	Ipg • [X107] ↵	Set IP address [X107] for your gateway (*nnn.nnn.nnn.nnn*). 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] ↵	Set administrator access password [X123]. [X123] = 4 to 12 alphanumeric characters. The password is case sensitive. Special characters (spaces or symbols) are not allowed. [X130] = displayed password. With an RS-232 or RS-422 connection, the password is displayed. With an IP connection, masked characters (four asterisks) are displayed (****).
Clear administrator password[24]	[Esc] • CA ←	W %2Ø 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 %2Ø CU |	Ipu • ↵	Clear the user password only

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
IP Setup Commands (continued)				
View user password	`Esc` CU ←	W CU |	X130 ↵	View password X130, shown with leading zeros.
Query session security level	`Esc` CK ←	W CK |	X137 ↵ *With tagged response – verbose modes 2 and 3:* `Pvl` X137 ↵	View security level X137 of the current connection. For X137: Ø = Anonymous 1 - 1Ø = Extended security level 11 = User 12 = Administrator
Set verbose mode[24]	`Esc` X114 CV ←	W X114 CV |	X114 ↵	Enable or disable verbose mode type X114. For X114: Ø = verbose mode and tagged responses disabled 1 = verbose mode enabled 2 = tagged responses for queries enabled 3 = verbose mode and tagged responses for queries enabled Default is Ø for Telnet connections and 1 for RS-232 or RS-422 control.

> **NOTE:** The processor can send out unsolicited information (such as notice of a change in volume, input or some other setting). That is called a verbose (wordy) relationship between the processor and a connected device. For a direct RS-232 or RS-422 connection, the processor is set for verbose mode by default. When the MGP Pro is connected via Ethernet, verbose mode is disabled by default in order to reduce the amount of communication traffic on the network. If you want to use the verbose mode with a processor connected via Ethernet, this mode must be set to On each time you reconnect to the processor.

Command	ASCII (Telnet)	URL Encoded (Web)	Response	Additional Description
Read verbose mode	`Esc` CV ←	W CV |	X114 ↵	
Remap Port Designations				
Set Telnet port map[24]	`Esc` {port#} MT ←	W {port#} MT |	Pmt {port#} ↵	

> **NOTES:**
> - 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 **8Ø** or **23** or disabling it by resetting it to **Ø** can be done only to ports numbered 1024 or higher.

Command	ASCII (Telnet)	URL Encoded (Web)	Response	Additional Description
Reset Telnet port map[24]	`Esc` 23MT ←	W 23MT |	Pmt ØØØ23 ↵	
Disable Telnet port map[24]	`Esc` ØMT ←	W ØMT |	Pmt ØØØØØ ↵	
Read Telnet port map	`Esc` MT ←	W MT |	{port#} ↵	
Set web port map[24]	`Esc` {port#} MH ←	W {port#} MH |	Pmh {port#} ↵	
Reset web port map[24]	`Esc` 8ØMH ←	W 8ØMH |	Pmh ØØØ8Ø ↵	
Disable web port map[24]	`Esc` ØMH ←	W ØMH |	Pmh ØØØØØ ↵	

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Remap Port Designations (continued)				
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` 0MD ←	W 0MD |	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.

Unit web responses (HTML sample code):
```
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';
```

Unit Telnet text responses:
```
filename x • date/time • length ↵
filename x • date/time • length ↵
filename x • date/time • length ↵
filename x • date/time • length ↵
...
space_remaining • bytes left ↵ ↵
```

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
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 file	
Example	`http://192.168.254.254/mypage.html?cmd=WSF` |			
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 filesize*}			
			Upl ↵	
Retrieve file from user flash memory	`Esc` *filename* SF ←	W *filename* SF	Responds with 4 bytes of file size + raw unprocessed data in file.	

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Mail Server Setup Commands				
Set mail server address and unit domain name[24]	`Esc` `X107` , `X108` , `X123` CM ← 	W `X107` %2C X1Ø* %2C `X123` CM ←	Ipm `X107` , `X108` , `X123` ↵	`X107` = IP address, format *nnn.nnn.nnn.nnn*. `X108` = mail domain name. `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*} / {*directory*} / 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 / EF |	Ddl ↵	
Erase current directory and subdirectories[24][28]	`Esc` // EF ←	W // EF |	Ddl ↵	
Erase flash memory	`Esc` ZFFF ←	W ZFFF |	Zpf ↵	
Reset all device settings to factory default[24]	`Esc` ZXXX ←	W ZXXX |	Zpx ↵	No IP-related settings are 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).

Command	ASCII (Telnet) (Host to Processor)	URL Encoded (Web) (Host to Processor)	Response (Processor to Host)	Additional Description
Reset (Zap) / Erase Commands (continued)				
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 Pro Series Windows-based control software 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.

Using the software, you can do the following to configure your MGP Pro:

- **Input configuration** — Specify a name, video signal type, size in pixels of the active video area, horizontal and vertical start 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; and 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.

Installing the Software

The MGP Pro Series configuration software is provided on a disk that is delivered with your MGP Pro unit. To use the software, you must install the program on your PC. Follow these steps:

1. Insert the Software Products DVD into your CD or DVD drive. The disk should start automatically. If it does not, open your Windows Explorer and double-click `LAUNCH.EXE` on the CD or DVD drive to start it.

2. On the Extron Software **DVD screen** (shown on the next page), click the `Software` button, shown at right.

Figure 26. **DVD Main Screen**

3. In the table on the Control Software screen, scroll to locate the MGP Pro, and click the `Install` link in the far right column.

Figure 27. **MGP Pro Series Link on the DVD Control Software Screen**

4. On the File Download window that appears, click **Run** to begin installing the program.
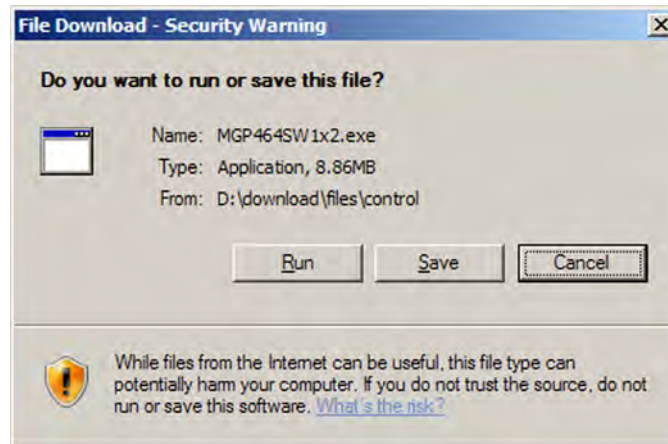
Figure 28. **File Download window**

> **NOTE:** If you want to save the installation file (MGPSeriesSW*nxn*.exe) to your desktop to run later, click **Save** instead of **Run**. On the Save As window, save the setup file to the desired location on your PC. When you are ready to install the software, double-click on the setup file icon, click **Run** on the Security prompt, and restart the procedure at step 4.

5. Another Security prompt appears. Click **Run** on this window to continue with the installation.

6. Follow the instructions on the InstallShield Wizard screens to complete the program installation.

    By default the installation creates a folder called "MGP464" or "MGP462" in one of the following locations on your computer:

    `c:\Program Files\Extron\MGP464 (or \MGP462)` [for Windows XP and earlier] **or**

    `c:\Program Files (86)\Extron\MGP464 (or \MGP462)` [for Windows 7 and later]

    If there is no Extron folder in your Program Files folder, the installation program creates it as well.   .

7. When installation is complete, close the Software Products screen. You can now start the Windows-based control program.

Downloading the MGP Pro Series Software from the Web

The MGP Pro Series Windows-based control program is also available on the Extron website at **www.extron.com**. From this site, you can also download updates to the MGP Pro 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 Center screen, click the **Control Software** button (shown at right). A Control Software screen displays, containing a list of control software products.

    Control Software

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 Pro, and click the `Download` link at the far right.
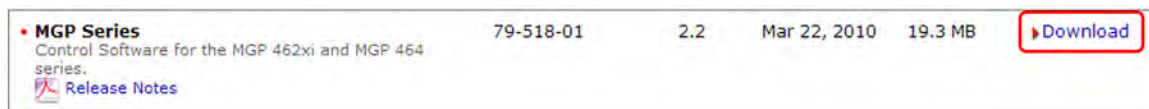
Figure 29.   MGP Pro Link on the Extron Website

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

6. Click the `Download MGPSeriesSW`*`nxn`*`.exe` button.

7. On the File Download - Security Warning window that appears, click **Run** to begin downloading the installer file.

> **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 `MGPSeriesSW`*`nxn`*`.exe` icon, click **Run** on the download screen that opens, and restart this procedure at step 8.

8. On the second security prompt window that opens, click **Run** again to start the installation process.

9. Follow the instructions on the InstallShield Wizard screens to complete the software program installation. By default the installation creates a folder called "MGPPro" 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 Pro Series software help program provides information on settings and on how to use the control program itself.

1. To run the MGP Pro 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 `MGP464`.

        e. Select `MGP464 Control Program`.

    The Communication Type Selection window appears (**figure 24** 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 or 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.
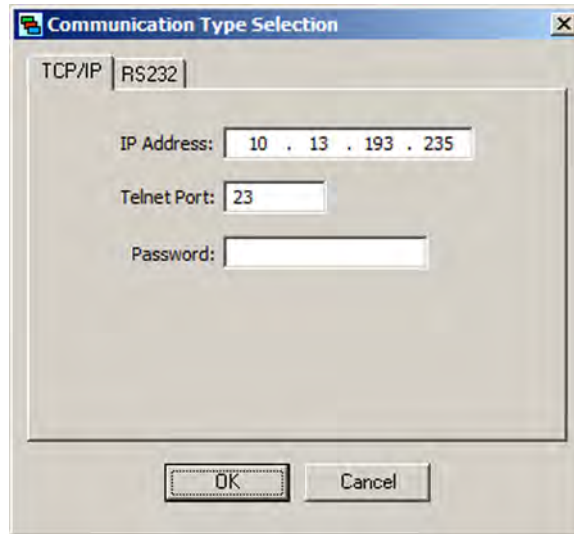
Figure 30.   Comm Port Selection Window with TCP/IP and RS232 Tabs

- Select the `TCP/IP` tab if you are using the LAN port.

    > **NOTE:**   If you will be uploading firmware, you should use this connection.

- Select the `RS232` tab if you are using either of the serial ports. (The front panel TRS configuration port supports only RS-232. The 9-pin rear panel serial port supports both RS-232 and RS-422.)

3. On the selected tab, enter the information required for the type of communication you chose.

    - `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.

4. Click **OK**. After a few seconds, the MGP Pro Series main window opens.
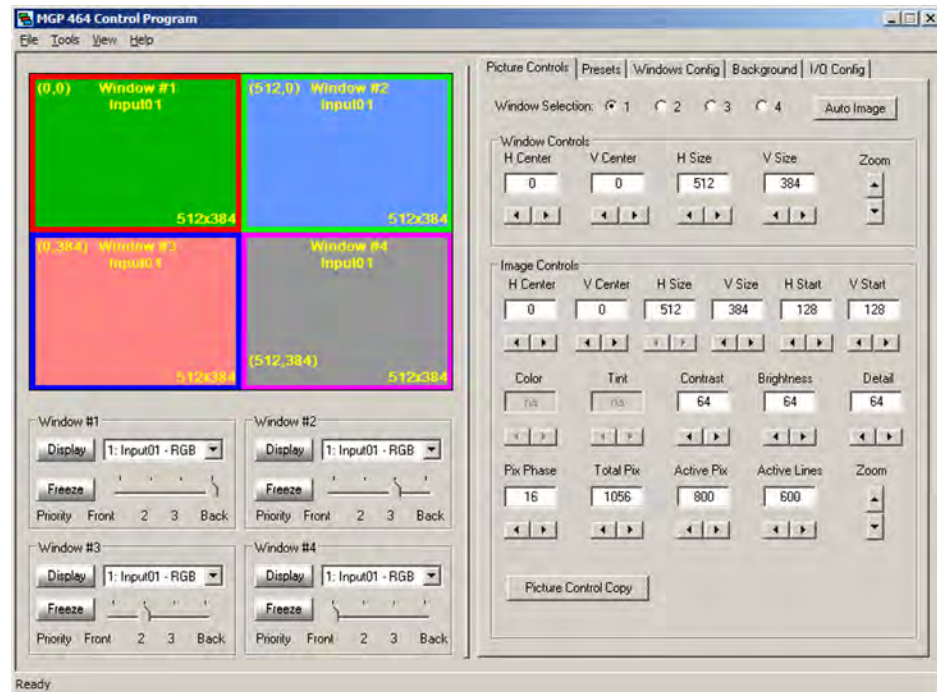
Figure 31. **MGP Series Control Program Main Window (MGP 464 Pro)**

5. For information on configuring the MGP Pro using the Windows-based software, refer to the program 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 page (such as a custom page that you have created and uploaded), 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 Connect To dialog box.
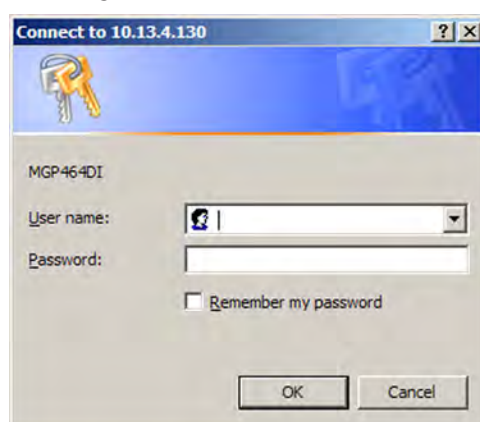
Figure 32.   Example of a Connect To Dialog Box

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

> **NOTE:** A User Name entry is not required.

b. 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 Pro Series Windows-based configuration software, 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 33 shows a typical MGP Pro System Status web page.

Figure 33. **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 34), you can set IP parameters for the MGP Pro.

Figure 34. **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. The new settings appear in the fields.

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 to 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 **ØØØ** 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 35. 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 35).

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.

> **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 36. 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.

Figure 37. Firmware Upgrade Page

Determining the current firmware version

There are two 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 piece of 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 in the System Description section.

Downloading the firmware file

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

1. Go to the Extron website **(www.extron.com**) and click the `Download` tab.

2. On the Download Center page, click the `Firmware` link on the left sidebar.

3. On the 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 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 `Download_MGPPro_FWx.xx.exe` button. A File Download - Security Warning window is displayed.

6. 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 9.

7. Browse to the folder where you want to save the firmware installation file on your computer, and click `Save`.

8. When ready to install the new firmware on your computer, locate the downloaded file, and double-click on it to open it.

9. 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 set of instructions for updating the firmware are also loaded to your computer.

Updating the firmware on the MGP Pro

After you have installed the new firmware on your computer, you must upload it to the MGP Pro. To upload the firmware using the web pages:

1. On the MGP Pro **Configuration** tab, select **Firmware Upgrade** from the sidebar menu to display the Firmware Upgrade page.

2. Click **Browse** to open the Choose File to Upload (or Choose File) window, and locate the firmware file on your computer or server. The file extension must be **.S19**.
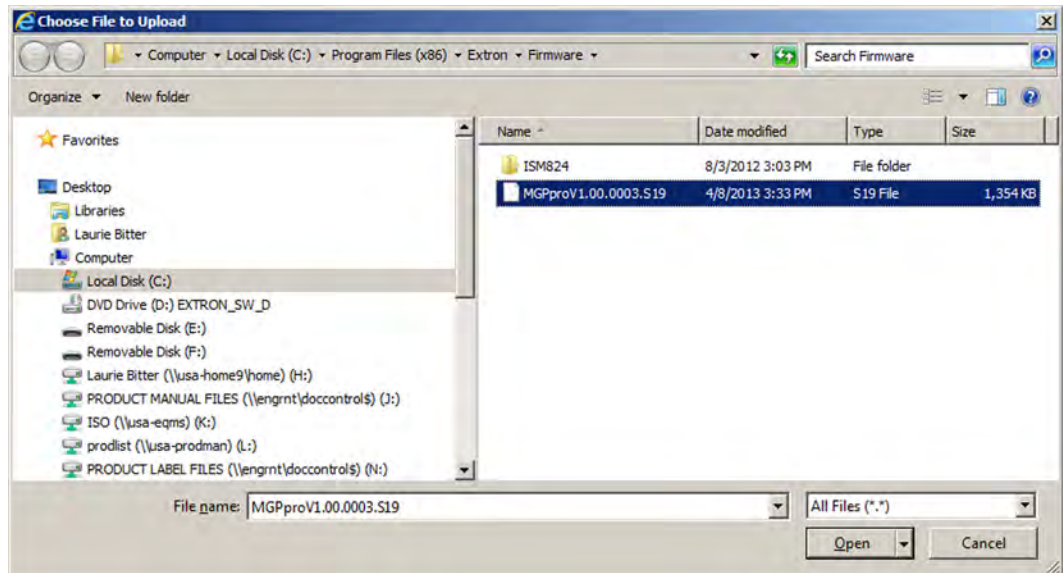

Figure 38. **Choose File to Upload Window**

> **ATTENTION:** Uploading a file with an extension other than .S19 may cause the unit to stop functioning.

3. Open the firmware file. Its name appears below the Current Firmware Version on the Firmware Upgrade page.

4. Click the **Upload** button on the Firmware Update 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**.

> **NOTE:** As an alternative method of updating the MGP Pro firmware, you can use the Firmware Loader software (see **Uploading using the Firmware Loader** on page 117 for information on downloading and using this software).

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."
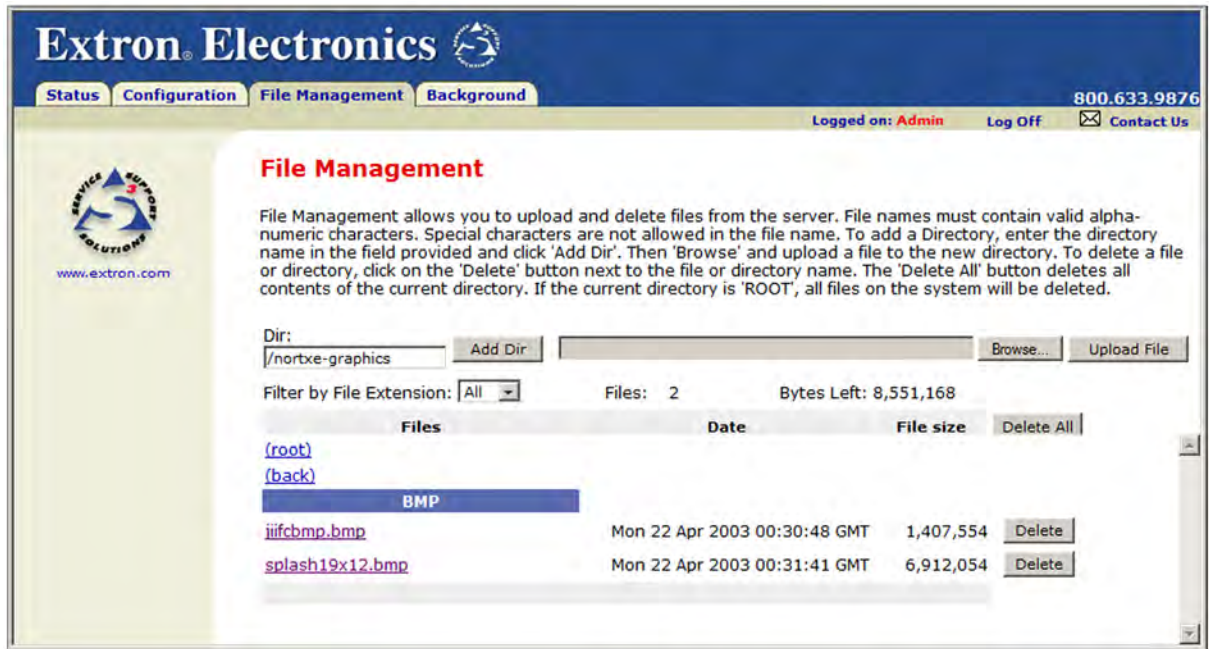

Figure 39. **File Management Page**

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. To exit the directory, click **(root)** or **(back)**.
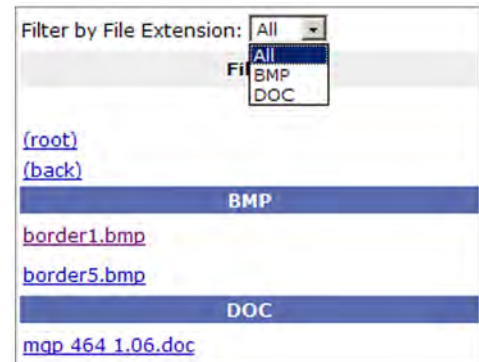
Other File Management Activities

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.

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. This menu lets you choose to display only files with the extension you select. Select `All` to display all uploaded 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.
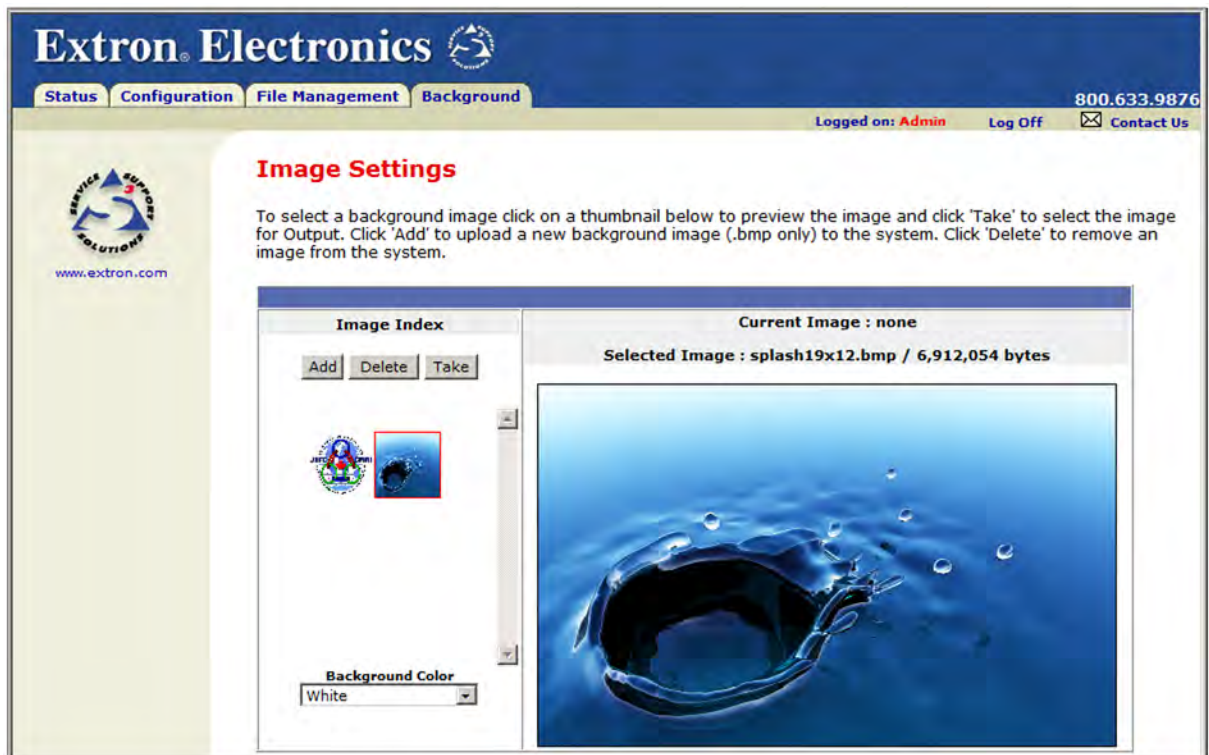
Figure 40. Image Settings Screen

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 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

The Image Settings screen lets you upload bitmap images, including those saved via background capture, from your computer to the MGP Pro; and to 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 field, click **Add**. The **Add Image** field is displayed.
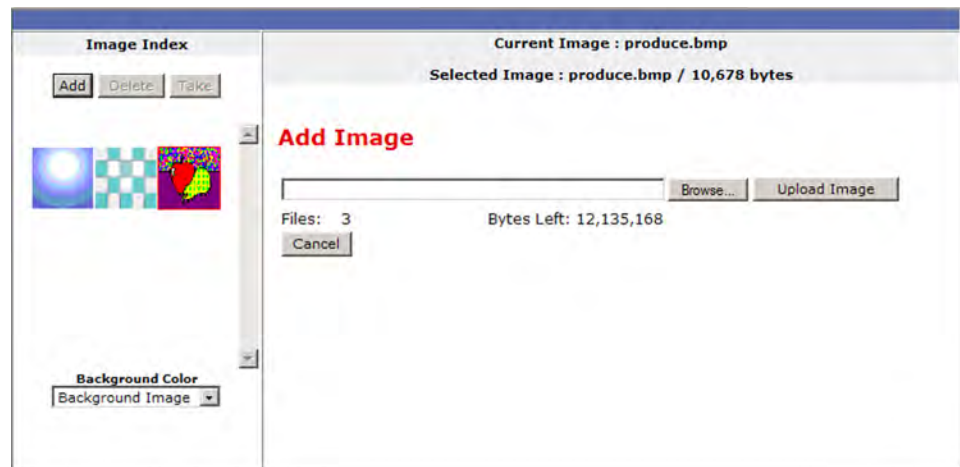
Figure 41.   Add Image Field on the Image Settings Screen

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 being loaded.

5. When the uploading is complete, a thumbnail image of the uploaded file is displayed in the Image Index section.

Selecting a background image

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

1. In the Image Index section, 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)**

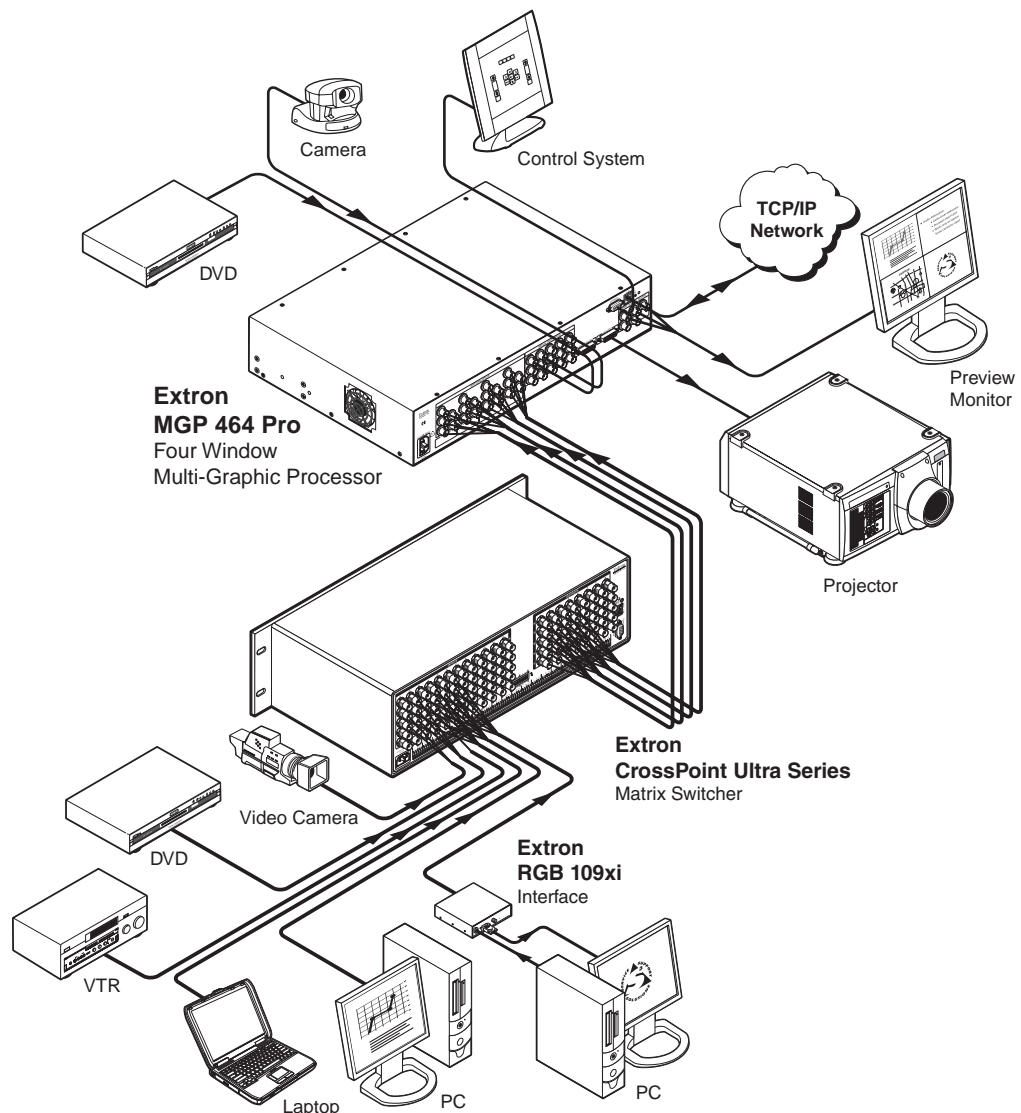## Application 1: Connecting the MGP Pro to a Matrix Switcher

Figure 42. **Application Diagram for a MGP 464 Pro Connected to a Matrix Switcher**

When the MGP Pro is attached to a matrix MGP Pro, such as the CrossPoint Ultra shown below, inputs 1 through 4 come to the MGP Pro through the MGP Pro, 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 Pro with this application, only inputs 1 and 2 are connected from the MGP Pro.

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 MGP Pro instead of at the MGP Pro.
* Input presets are recalled on the MGP Pro to correctly set up the input coming from the MGP Pro. 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 41).
* 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**, 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 43).
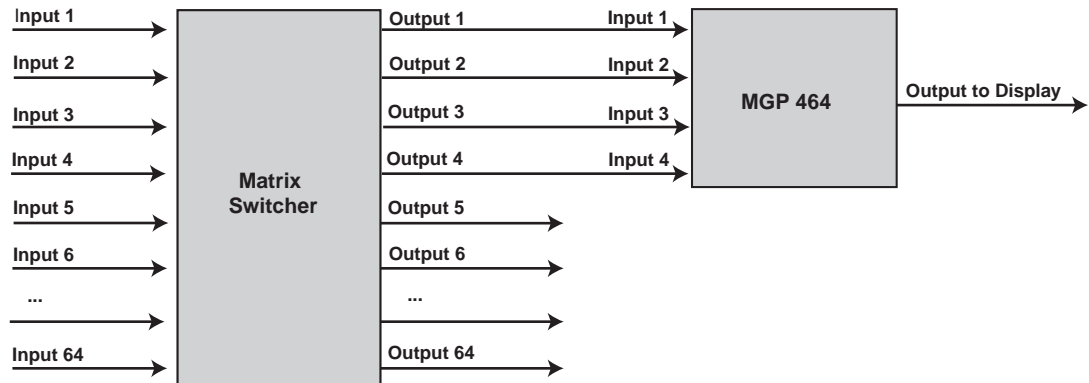

Figure 43. Connecting the Matrix Switcher to an MGP Pro

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 four switcher outputs that are connected to the MGP Pro (see your matrix switcher user guide for the 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. Repeat this step for windows 2, 3, and 4.

    d. Save the adjusted settings as Input Preset 1.

5. Repeat step 4 for every input on the switcher that will be displayed on the output screen via the processor, saving the settings for each input as Input Preset 2, 3, and so on.

> **NOTE:** Each input preset must be saved with the same number as the MGP Pro input.

6. Synchronize the MGP Pro to the matrix switcher as follows:

    a. Open the Windows-based control software.

    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 displayed in the Matrix Status section below.

    e. From the drop-down menu in the MGP Pro **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.
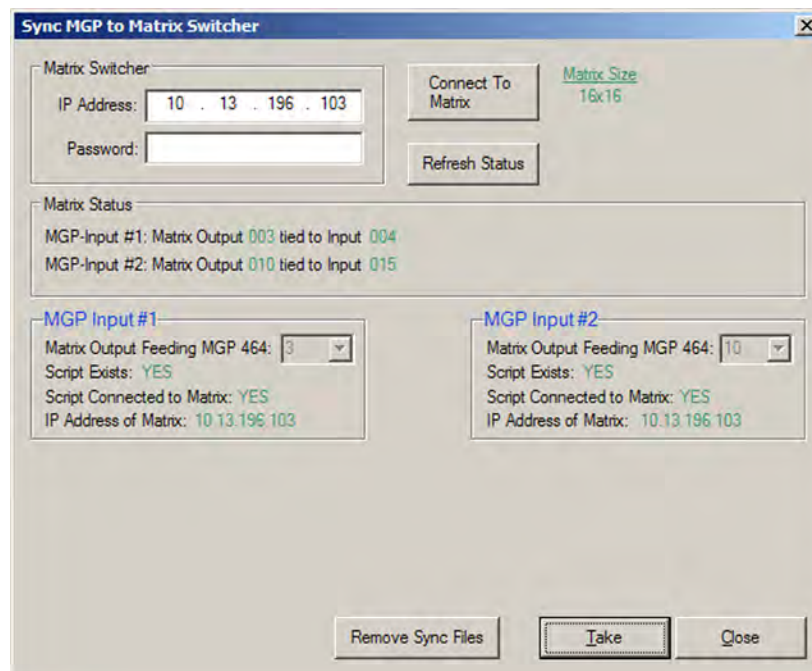

Figure 44. **Example of a Sync MGP Pro to Matrix Switcher Window for an MGP 464 Pro with Input Ties to a Switcher**

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

After you have performed step 6 on the previous page, be sure to do the following when using the MGP Pro 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 MGP Pro. 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 MGP Pro 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 41) or the for the Windows-based control software and the Preset Selector software program (see the software 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 in **figure 45** on the next page).

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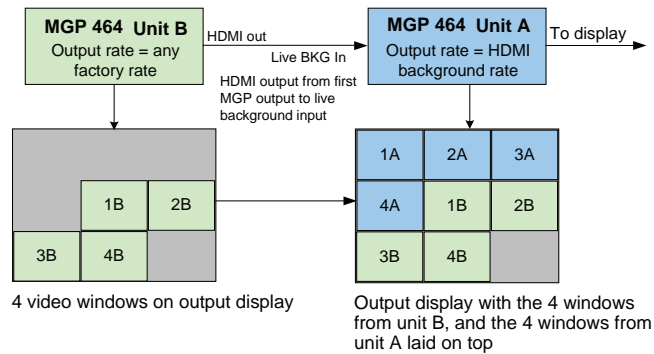
Connecting via the HDMI Background connector has the advantage of the input not being scaled. Therefore, no analog or digital sampling is required and there is no signal loss.

> **NOTE:** In **figure 45**, the MGPs are given letters in the order of their priority, starting with 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.
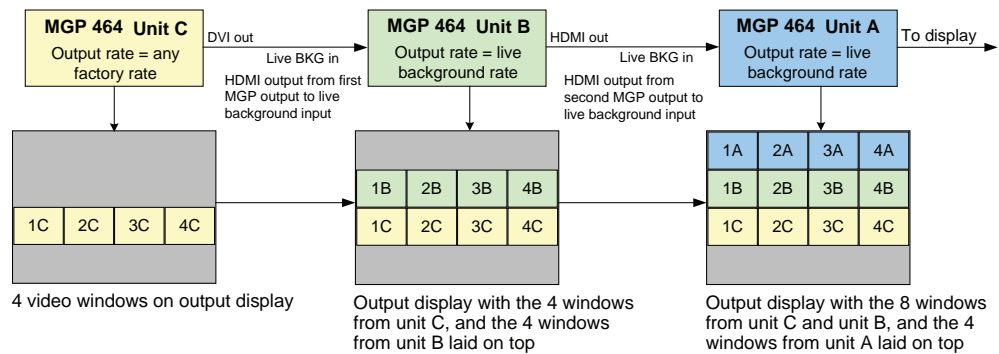
Figure 45 shows diagrams of three possible configurations for an MGP Pro.

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 Pro, this is a 4-window configuration.)

    • 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.)

    • 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.

    • 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.)

1. 8-window Configuration

MGP 464 Unit B Output rate = any factory rate	

HDMI out
Live BKG In

HDMI output from first
MGP output to live
background input

| **MGP 464 Unit A**
Output rate = HDMI
background rate |
To display

	1B	2B
3B	4B	

4 video windows on output display

1A	2A	3A
4A	1B	2B
3B	4B	

Output display with the 4 windows
from unit B, and the 4 windows from
unit A laid on top

2. 12-window Configuration

| **MGP 464 Unit C**
Output rate = any
factory rate |
DVI out
Live BKG in

HDMI output from first
MGP output to live
background input

| **MGP 464 Unit B**
Output rate = live
background rate |
HDMI out
Live BKG in

HDMI output from
second MGP output to
live background input

| **MGP 464 Unit A**
Output rate = live
background rate |
To display

1C	2C	3C	4C

4 video windows on output display

1B	2B	3B	4B
1C	2C	3C	4C

Output display with the 4 windows
from unit C, and the 4 windows
from unit B laid on top

1A	2A	3A	4A
1B	2B	3B	4B
1C	2C	3C	4C

Output display with the 8 windows
from unit C and unit B, and the 4
windows from unit A laid on top

3. 8-window Configuration with a Live Computer Background

| Computer or
other HDMI source |
HDMI out
Live BKG in

HDMI output from
computer to HDMI
background input

| **MGP 464 Unit B**
Output rate = live
background rate |
HDMI out
Live BKG in

HDMI output from
first MGP output to
live background input

| **MGP 464 Unit A**
Output rate = live
background rate |
To display

Computer output

1B	2B	3B	4B

Output display with the 4 windows
from unit B and the computer output
as the background

1A	2A	3A	4A
1B	2B	3B	4B

Output display with the 4 windows
from unit B and the computer background,
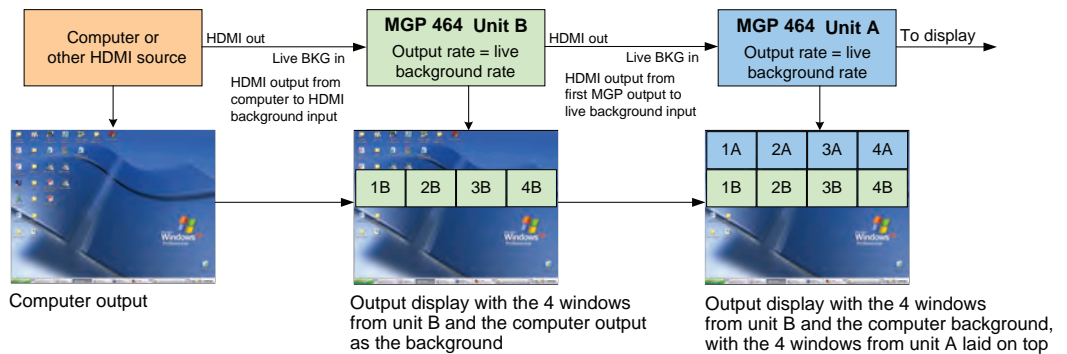with the 4 windows from unit A laid on top

Figure 45. MGP Pro Daisy-chaining Configuration Examples

Setting up MGPs for Daisy-chaining

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

1. Connect input sources to the MGP Pro to be displayed in the windows.

2. 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).

3. Configure the output as follows:

    a. Set the output resolution/refresh rate of the first MGP Pro (the unit farthest from the display) to the native rate of your output display.

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

    b. 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 59.

    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 Windows-based control software 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 Addressing**
- **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. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

- **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 46).

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.
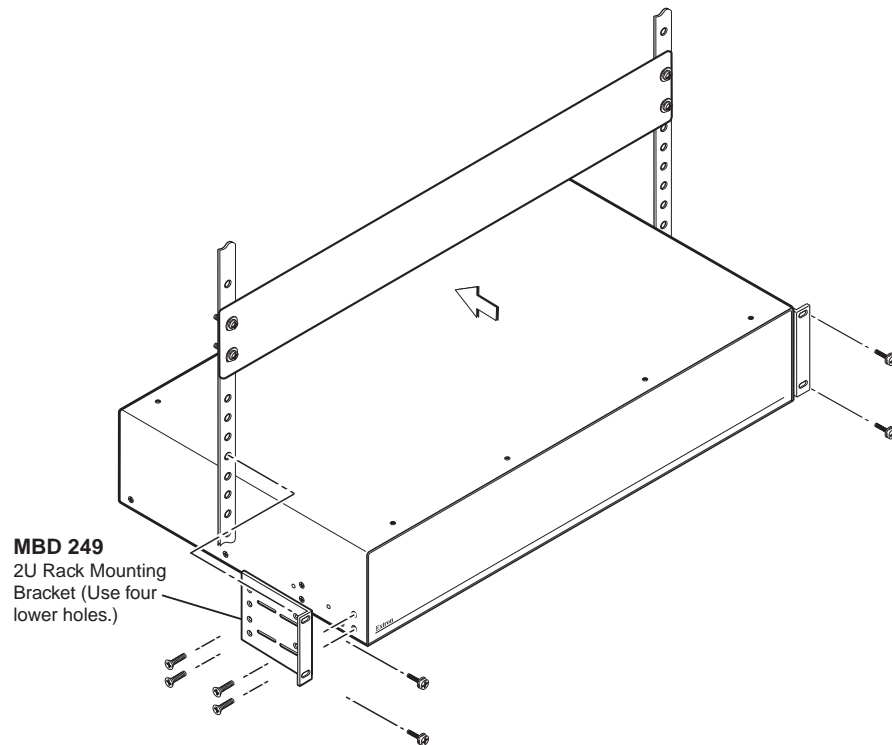

MBD 249
2U Rack Mounting
Bracket (Use four
lower holes.)

Figure 46.   Rack Mounting an MGP Pro

IP Addressing

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
Windows-based Control Software computer	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
Windows-based Control Software computer	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 Extron IP address

The Microsoft 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. From the Windows **Start** menu, select **Run...** . The Run window opens.

2. In the **Open** text field, enter `command`.

3. Click **OK**. A command window opens.

4. At the command prompt, enter `ping IP address`. 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
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
Reply from 192.168.254.254: bytes=32 time<10ms TTL=128
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 47.   Ping Response

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 display that the computer returns is similar to the `Ping` response shown in **figure 47** on the previous page, except that when you specify the `-a` modifier, the line `Pinging mail...` 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 Microsoft 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. From the **Start** menu, select **Run...**. The Run window opens.

2. In the **Open** text field, enter `command`.

3. Click **OK**. A command window opens.

4. At the prompt, enter `telnet`. The computer returns a display similar to figure 48.

```
Microsoft (R) windows 2000 (TM) Version 5.0 (Build 2195)
Welcome to Microsoft Telnet Client
Telnet Client Build 5.00.99203.1

Escape Character is 'CTRL+]'

Microsoft Telnet>
```

Figure 48.   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 "carriage return."

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+]`." This means that the Telnet `Escape` character is a key combination: the <Ctrl> key and the <]> 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 All`,

where `1*1!` is the SIS command and `In1 Out1 All` 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 +]>).

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 +]>). 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 **sub**set of a **net**work — a set of IP devices that have portions of their IP addresses in common. It is not the purpose of this manual 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 71 and **Email Commands** beginning on page 70). 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 49. 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 50. 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 Ø, 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:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	=.=.*X.X* — **Match**	≠.≠.*X.X* — **No match**	=.≠.*X.X* — **No match**
	(Same subnet)	(Different subnet)	(Different subnet)

Figure 51. **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 Web site. 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 Windows-based control software 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).
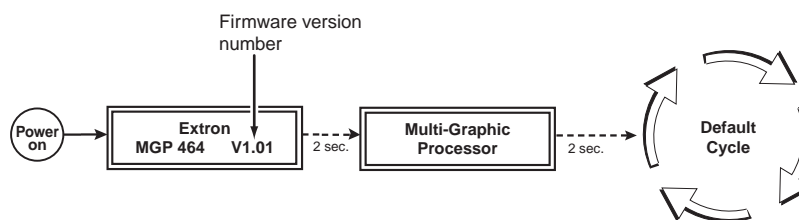

Figure 52. **Power-up Cycle Flow Diagram**

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. 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 the Enter Network Password dialog box (see figure 53).
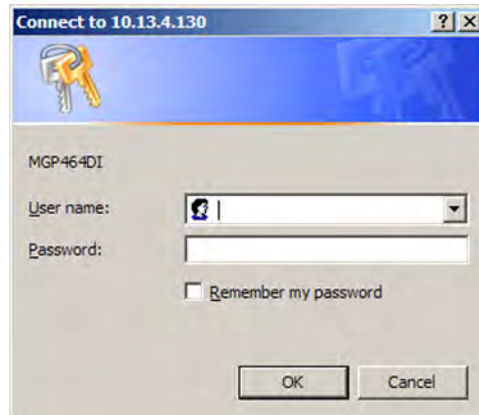

Figure 53.   Example of an Enter Network Password Dialog Box

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

   > **NOTE:** A User name entry 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.

5. Access the System Status page if it is not already displayed. The firmware version is listed in the System Description area (figure 54).

Extron Electronics

| Status | Configuration | File Management | Background | 800.633.9876 |

Logged on: **Admin**   **Log Off**   ✉ **Contact Us**

www.extron.com

System Status

Below are your Unit's current system settings. To make changes, click on the 'Configuration' tab.

System Description

Model:	MGP462xi 3G-SDI PRO		
Description:	Multi-Graphic Processor w/ HDSDI-HDMI option		
Part Number:	60-1258-03	Firmware Version:	0.90
Date	6/19/2003	Temperature:	082.40 F / 28.00 C
Time:	07:03 AM	# of Connections:	006

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 54. 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 Pro control software.

1. Open the control software (see **Windows-based Control Software** on page 78).
2. From the **Help** menu, select **About...**. The following dialog box appears, providing information about the current MGP Pro version.
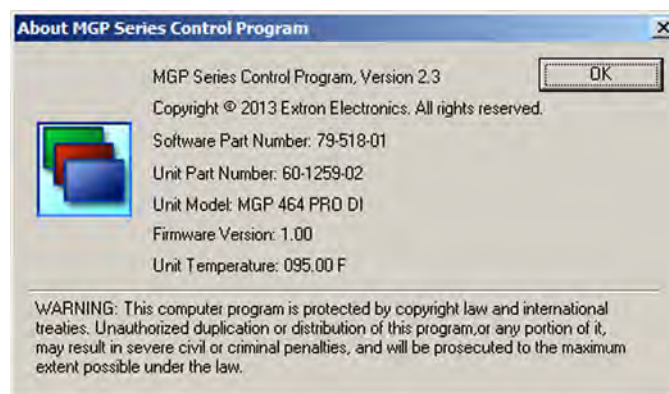

About MGP Series Control Program   [X]

MGP Series Control Program, Version 2.3   [OK]

Copyright © 2013 Extron Electronics. All rights reserved.

Software Part Number: 79-518-01

Unit Part Number: 60-1259-02

Unit Model: MGP 464 PRO DI

Firmware Version: 1.00

Unit Temperature: 095.00 F

WARNING: This computer program is protected by copyright law and international treaties. Unauthorized duplication or distribution of this program, or any portion of it, may result in severe civil or criminal penalties, and will be prosecuted to the maximum extent possible under the law.

Figure 55. About MGP Pro Series Control Program Screen

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

Downloading the Firmware

Obtain the latest MGP Pro firmware by downloading it from the Extron website as follows:

1. Go to the Extron website (**www.extron.com**) and click the `Download` tab.

2. On the Download Center page, click the `Firmware` link on the left sidebar menu.

3. On the Firmware page, click the letter `M` in the alphabet displayed at the top and bottom of the page, then scroll down to the MGP 464 Pro or the MGP 462 Pro 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 `Download_MGPSeries_MGP Pro_FWn.nn.exe` button (*n.nn* indicates the firmware version number). A File Download - Security Warning dialog box is displayed.

6. Click `Save`. A Save As dialog box opens.

    If you want to install the firmware on your computer immediately, click `Run` instead of `Save`, and skip to step 9.

7. Browse to the folder where you want to save the firmware installation file on your computer, and click `Save`.

8. When ready to install the new firmware, locate the downloaded file, and double-click on it to open it.

9. 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 set of instructions for updating the firmware are also loaded.

Uploading the Firmware

After you have installed the new firmware on your computer, you must upload it to the MGP Pro. Firmware uploads can be performed via a Web browser, the MGP Pro internal web pages, or the Firmware Loader software. The computer and the MGP Pro must both be connected to an Ethernet network in order to update the main firmware. Unless you are using the Firmware Loader (see **Uploading using the Firmware Loader** on page 117), 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 using the web pages

Follow these steps to update the firmware using the MGP Pro web pages.

1. Launch a web browser (for example, Internet Explorer) on the connected computer, and enter the MGP Pro IP address in the address field.

2. If no password has been assigned, the MGP Pro web page opens, displaying the System Status screen.

    If an administrator password has been assigned to the MGP Pro, the Enter Network Password dialog box opens (shown in **figure 56** on the next page). Enter the administrator password in the Password field (a user name is not required), and click `OK`. The MGP Pro web page appears.

> **NOTE:** Passwords must contain 4 to 12 alphanumeric characters. Symbols and spaces are **not** allowed, and the passwords are case sensitive.
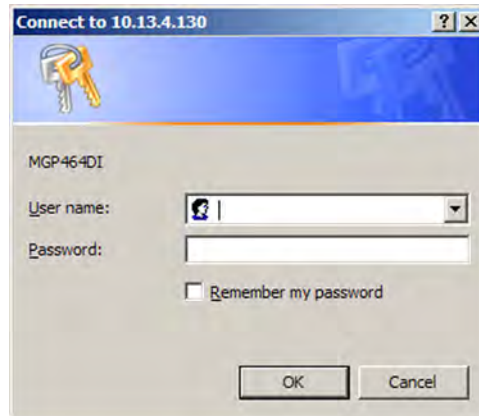
Figure 56. Enter Network Password Dialog Box

3. On the MGP Pro `Configuration` tab, select `Firmware Upgrade` from the left panel menu to display the Firmware Upgrade screen.

Figure 57. Firmware Upgrade Screen

4. Click `Choose File` to open the Choose File to Upload window, and locate the firmware file on your computer or server. The file extension must be **.S19**.

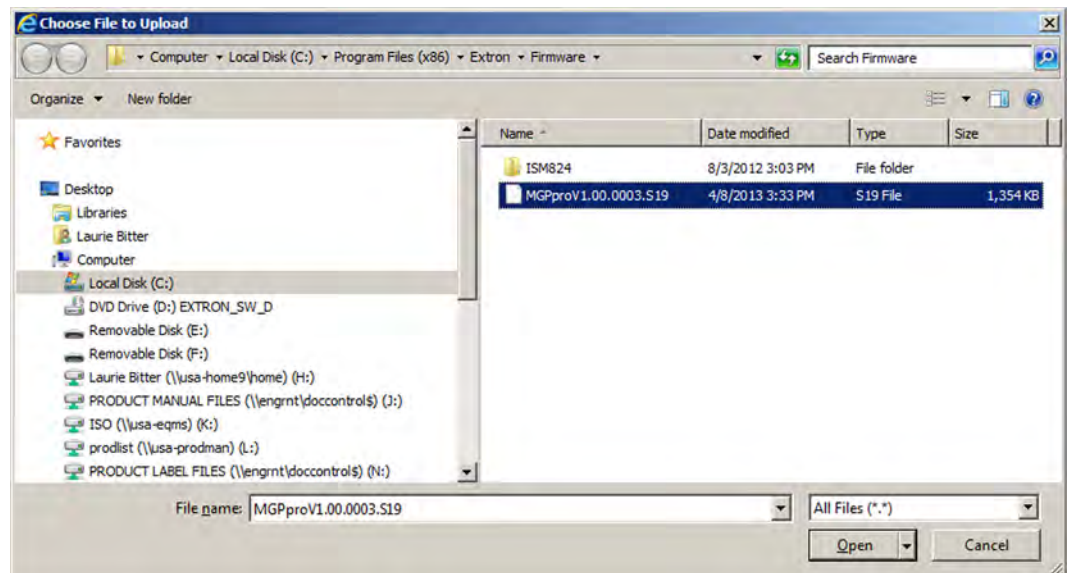> **ATTENTION:** Uploading a file with an incorrect extension may cause the unit to stop working.

Figure 58. Choose File to Upload Window with Firmware File Selected

5. Open the firmware file. Its name appears in the field below the Current Firmware Version on the Firmware Upgrade screen.

6. Click the **Upload** button on the Firmware Update screen 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**.

When the update is complete, the new firmware version number is displayed in the **Current Firmware Version** field. The LCD screen on the unit displays the first screen that appears on power-up, containing the new firmware version number.

7. If you want to further verify that the new version has been loaded, click the **Status** tab and view the current firmware version on the System Status screen.

Uploading using the Windows-based Control Software

To update the firmware on the MGP Pro using the Windows-based control software:

1. Open the Windows-based control software, using an IP connection (see **Windows-based Control Software** on page 78 for information on accessing this program).

2. From the **Options** menu, select **Update 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:**   Uploading a file with an incorrect extension may cause the unit to stop working.
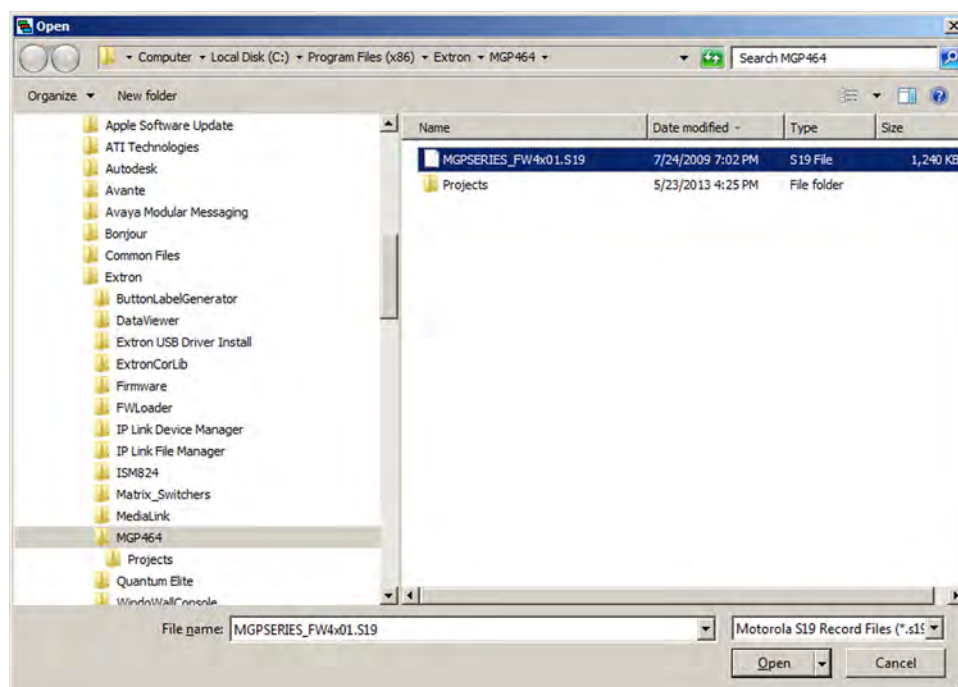

Figure 59.   Open Window with Firmware File Selected

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 60.   Firmware Update Progress Bar

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

Uploading using the Firmware Loader

An alternative way to update the MGP Pro firmware is to download and run the Firmware Loader software.

1. Download the Firmware Loader installer executable file to your computer.

    a. On the Extron web page, click the **Download** tab.

    b. On the Download Center page, click **Software** on the left sidebar menu.

    c. Locate the "Firmware Loader" line and click the **Download** link at the far right.

    d. Follow the instructions on the download screens to save the installer file to your computer.

2. If necessary, download the latest version of MGP Pro firmware and install it on your computer (see **Downloading the Firmware** on the page 114).

3. Open the Firmware Loader via your desktop **Start** menu by making the following selections:

    Start > **All Programs** > **Extron Electronics** > **Firmware Loader** > **Firmware Loader**

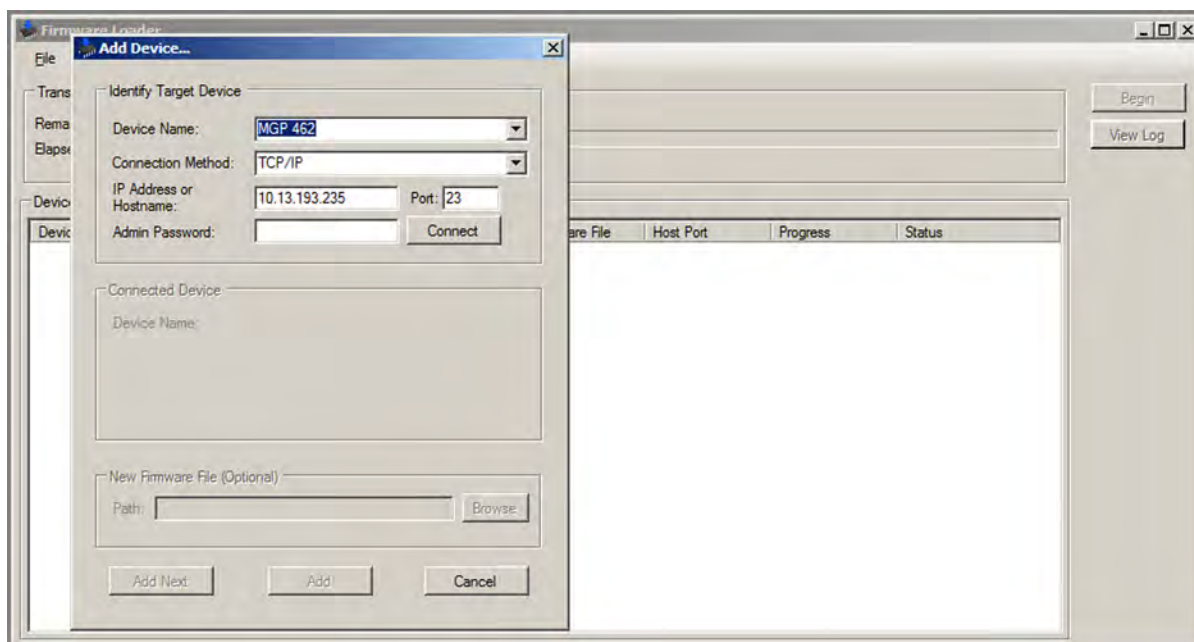   The Firmware Loader dialog box opens with the Add Device dialog box in front of it.

Figure 61.   Add Device Dialog Box

4. On the Add Device window, select `MGP Pro Series` from the `Device Names` drop-down menu.

5. Click `Connect`. If the connection is successful, `MGP Pro 46n Pro` is displayed in green in the Connected Device section, followed by a green check mark.

6. Click the `Browse` button in the New Firmware File (Optional) section.

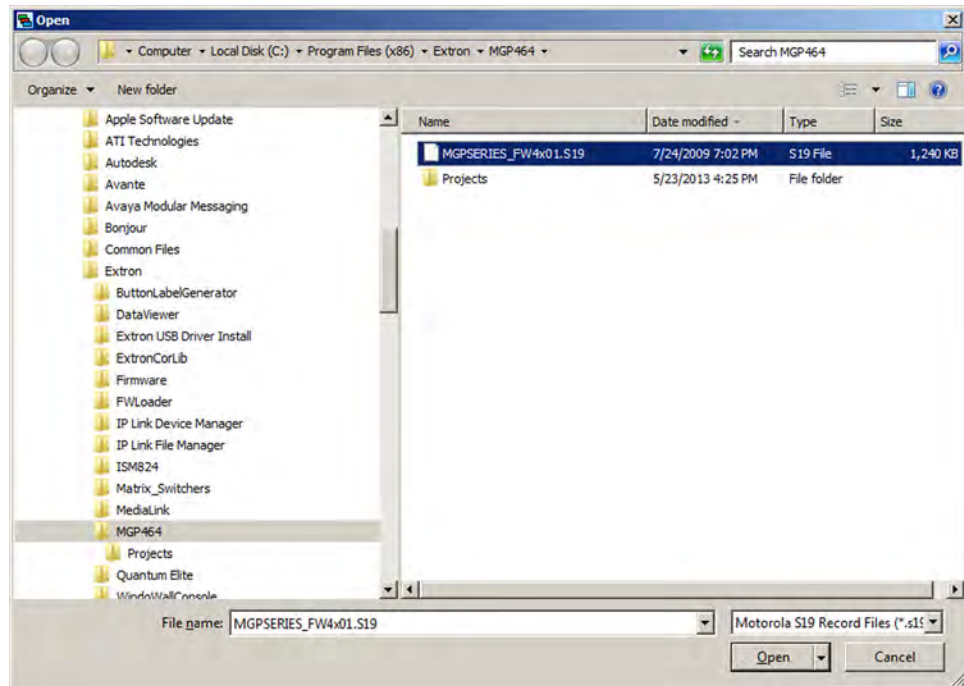7. On the Open window, navigate to the new firmware file, which has an **S19** extension, and double-click it.

Figure 62. **Open Window for Firmware File Selection**

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

> **NOTES:**
> - The original factory-installed firmware is permanently available on the MGP Pro. If the attempted firmware upload fails for any reason, the MGP Pro reverts to the factory version.
> - When downloaded from the Extron website, by default the firmware is placed in a folder at:
>   `C:\Program Files\Extron\Firmware\MGP Pro` (Windows XP) or
>   `C:\Program Files (x86)\Extron\Firmware\MGP Pro` (Windows 7).

On the Add Device window, the path to the new firmware file is displayed in the `Path` field.

8. **If this is the only device to which you are uploading firmware,** click **Add**. The MGP Pro information is added to the Devices panel of the Firmware Loader dialog box, and the Add Device dialog box closes.

    If you will be uploading the firmware to multiple MGP Pro MGPs that are connected to your computer, do the following:

    a. Click **Add Next**. Your first device is added to the Devices panel of Firmware Loader dialog box, and the Add Device dialog box remains open.

    b. For each additional device you want to add to the Firmware Loader dialog box, repeat steps 4 through 7, then click **Add Next**.

    c. For the **last** device, click **Add** (instead of **Add Next**) to add the device and to close the Add Device window.
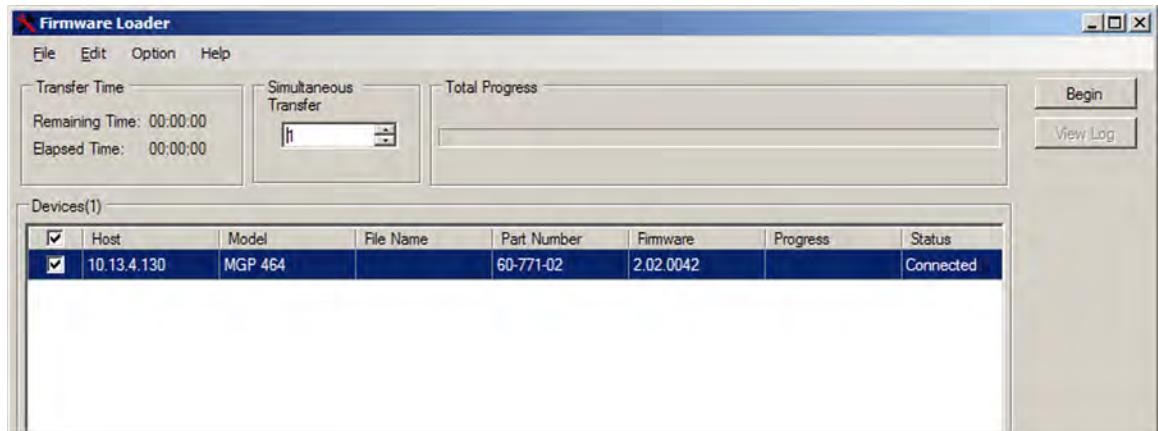

Figure 63. **Firmware Loader Dialog Box with an MGP Added**

9. If you want to remove a device from the Devices panel, do the following:

    a. Click on the names of the devices to be deleted, to highlight them.

    b. Select **Remove Selected Device(s)** from the **Edit** menu.

    c. On the Remove Device(s) dialog box, select or deselect any devices on the list as desired, then click **Remove**.

    To remove **all** devices, select **Remove All Devices** from the **Edit** menu.

10. Click **Begin**. The following indicators show the progress of the update (see **figure 64** on the next page):

    • The Transfer Time panel shows the amounts of remaining and elapsed time for the update.

    • The Total Progress panel displays a progress bar with `Uploading...` above it.

    • In the Devices panel, the Progress column displays an incrementing percentage and another progress bar. The Status column displays `Uploading`.
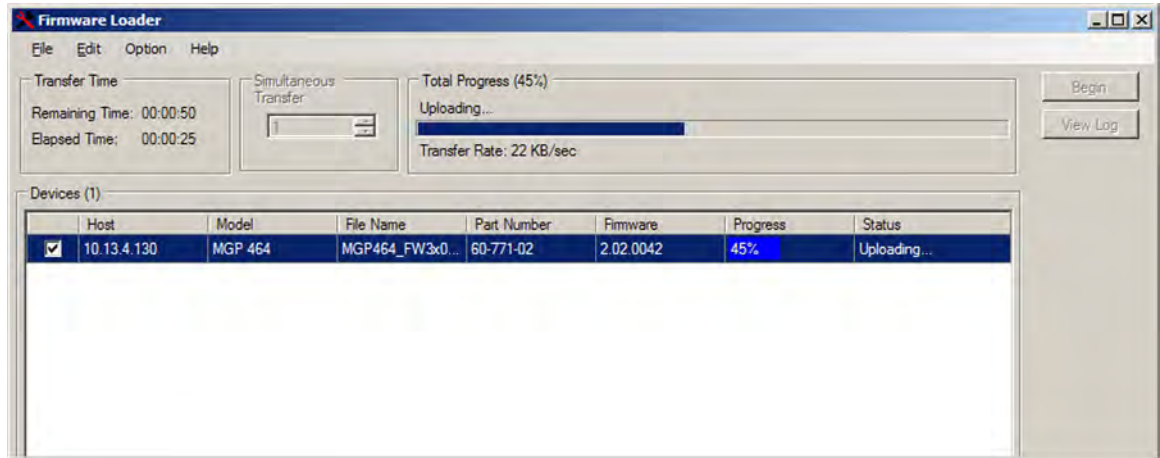
Figure 64. **Firmware Upload in Progress**

11. The upload is complete when the **Remaining Time** field shows `00.00.00`, the Progress column shows `100%`, and `Completed` is displayed above the progress bar and in the **Status** field. Close the Firmware Loader dialog box.

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:
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Anaheim, CA 92805
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Europe and Africa:
Extron Europe
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Singapore 368363
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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 | **Europe**: | 31.33.453.4040 |
> | **Asia**: | 65.6383.4400 | **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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Extron USA - West / Extron USA - East	+31.33.453.4040	+65.6383.4664 FAX	+81.3.3511.7656 FAX	+86.21.3760.1566 FAX	+971.4.299.1880 FAX	+82.2.3444.1575 FAX	+91.80.3055.3777
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