User Guide

Signal Processors

MGP 641

Multi-Graphic Processor



Extron

68-2396-01 Rev. C
03 22

Safety Instructions

Safety Instructions • English

WARNING: This symbol, ⚠, when used on the product, is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

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**.

تعليمات السلامة • العربية

تحذير: هذا الرمز، ⚠، عند استخدامه على المنتج، مخصص لتنبيه المستخدم فيما يتعلق بوجود جهد كهربائي غير معزول على الغلاف الخارجي للمنتج وهو ما قد ينطوي على مخاطر حدوث صدمة كهربائية.

انتبه: هذا الرمز، ⚠، عند استخدامه على المنتج، مخصص لتنبيه المستخدم بتعليمات التشغيل والصيانة الهامة (الخدمة) في المواد التي يتم توفيرها مع المعدات.

للحصول على المزيد من المعلومات حول إرشادات السلامة، والتوافقات التنظيمية، والتوافق الكهرومغناطيسي/المجال الكهرومغناطيسي، وإمكانية الوصول، والموضوعات ذات الصلة، يُرجى مراجعة دليل السلامة والتوافق التنظيمي الخاص بإكسترون، الجزء رقم 68-290-01، على موقع إكسترون، **www.extron.com**.

Sicherheitsanweisungen • Deutsch

WARUNG: Dieses Symbol ⚠ auf demProdukt soll den Benutzer darauf aufmerksam machen, dass im Inneren des Gehäuses dieses Produktes gefährliche Spannungen herrschen, die nicht isoliert sind und die einen elektrischen Schlag verursachen können.

VORSICHT: Dieses Symbol ⚠ auf dem Produkt soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Weitere Informationen über die Sicherheitsrichtlinien, Produkthandhabung, EMI/EMF-Kompatibilität, Zugänglichkeit und verwandte Themen finden Sie in den Extron-Richtlinien für Sicherheit und Handhabung (Artikelnummer 68-290-01) auf der Extron-Website, **www.extron.com**.

Instrucciones de seguridad • Español

ADVERTENCIA: Este símbolo, ⚠, cuando se utiliza en el producto, avisa al usuario de la presencia de voltaje peligroso sin aislar dentro del producto, lo que puede representar un riesgo de descarga eléctrica.

ATENCIÓN: Este símbolo, ⚠, cuando se utiliza en el producto, avisa al usuario de la presencia de importantes instrucciones de uso y mantenimiento estas estan incluidas en la documentación proporcionada con el equipo.

Para obtener información sobre directrices de seguridad, cumplimiento de normativas, compatibilidad electromagnética, accesibilidad y temas relacionados, consulte la Guía de cumplimiento de normativas y seguridad de Extron, referencia 68-290-01, en el sitio Web de Extron, **www.extron.com**.

Instructions de sécurité • Français

AVERTISSEMENT : Ce pictogramme, ⚠, lorsqu'il est utilisé sur le produit, signale à l'utilisateur la présence à l'intérieur du boîtier du produit d'une tension électrique dangereuse susceptible de provoquer un choc électrique.

ATTENTION : Ce pictogramme, ⚠, lorsqu'il est utilisé sur le produit, signale à l'utilisateur des instructions d'utilisation ou de maintenance importantes qui se trouvent dans la documentation fournie avec l'équipement.

Pour en savoir plus sur les règles de sécurité, la conformité à la réglementation, la compatibilité EMI/EMF, l'accessibilité, et autres sujets connexes, lisez les informations de sécurité et de conformité Extron, réf. 68-290-01, sur le site Extron, **www.extron.com**.

Istruzioni di sicurezza • Italiano

AVVERTENZA: Il simbolo, ⚠, se usato sul prodotto, serve ad avvertire l'utente della presenza di tensione non isolata pericolosa all'interno del contenitore del prodotto che può costituire un rischio di scosse elettriche.

ATTENTZIONE: Il simbolo, ⚠, se usato sul prodotto, serve ad avvertire l'utente della presenza di importanti istruzioni di funzionamento e manutenzione nella documentazione fornita con l'apparecchio.

Per informazioni su parametri di sicurezza, conformità alle normative, compatibilità EMI/EMF, accessibilità e argomenti simili, fare riferimento alla Guida alla conformità normativa e di sicurezza di Extron, cod. articolo 68-290-01, sul sito web di Extron, **www.extron.com**.

Instrukcje bezpieczeństwa • Polska

OSTRZEŻENIE: Ten symbol, ⚠, gdy używany na produkt, ma na celu poinformować użytkownika o obecności izolowanego i niebezpiecznego napięcia wewnątrz obudowy produktu, który może stanowić zagrożenie porażenia prądem elektrycznym.

UWAGI: Ten symbol, ⚠, gdy używany na produkt, jest przeznaczony do ostrzegania użytkownika ważne operacyjne oraz instrukcje konserwacji (obsługi) w literaturze, wyposażone w sprzęt.

Informacji na temat wytycznych w sprawie bezpieczeństwa, regulacji wzajemnej zgodności, zgodność EMI/EMF, dostępności i Tematy pokrewne, zobacz Extron bezpieczeństwa i regulacyjnego zgodności przewodnik, część numer 68-290-01, na stronie internetowej Extron, **www.extron.com**.

Инструкция по технике безопасности • Русский

ПРЕДУПРЕЖДЕНИЕ: Данный символ, ⚠, если указан на продукте, предупреждает пользователя о наличии неизолированного опасного напряжения внутри корпуса продукта, которое может привести к поражению электрическим током.

ВНИМАНИЕ: Данный символ, ⚠, если указан на продукте, предупреждает пользователя о наличии важных инструкций по эксплуатации и обслуживанию в руководстве, прилагаемом к данному оборудованию.

Для получения информации о правилах техники безопасности, соблюдении нормативных требований, электромагнитной совместимости (ЭМП/ЭДС), возможности доступа и других вопросах см. руководство по безопасности и соблюдению нормативных требований Extron на сайте Extron: , **www.extron.com**, номер по каталогу - 68-290-01.

安全说明 • 简体中文

警告: 产品上的这个标志意在警告用户，该产品机壳内有暴露的危险电压，有触电危险。

注意: 产品上的这个标志意在提示用户，设备随附的用户手册中有重要的操作和维护(维修)说明。

关于我们产品的安全指南、遵循的规范、EMI/EMF 的兼容性、无障碍使用的特性等相关内容，
敬请访问 Extron 网站，**www.extron.com**，参见 Extron 安全规范指南，产品编号 68-290-01。

安全記事 • 繁體中文

警告: 若產品上使用此符號，是為了提醒使用者，產品機殼內存在未隔離的危險電壓，可能會導致觸電之風險。

注意 若產品上使用此符號，是為了提醒使用者，設備隨附的用戶手冊中有重要的操作和維護（維修）說明。

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.com**，然後參閱《Extron 安全性與法規遵守手冊》，準則編號 68-290-01。

安全上のご注意 • 日本語

警告: この記号 が製品上に表示されている場合は、筐体内に絶縁されていない高電圧が流れ、感電の危険があることを示しています。

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.com** より『Extron Safety and Regulatory Compliance Guide』(P/N 68-290-01) をご覧ください。

안전 지침 • 한국어

경고: 이 기호가 제품에 사용될 경우, 제품의 인클로저 내에 있는 접지되지 않은 위험한 전류로 인해 사용자가 감전될 위험이 있음을 경고합니다.

주의: 이 기호가 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.com**)의 Extron 안전 및 규제 준수 안내서, 68-290-01 조항을 참조하십시오.

Copyright
© 2021-2022 Extron. All rights reserved. **www.extron.com**

Trademarks
All trademarks mentioned in this guide are the properties of their respective owners.
The following registered trademarks (®), registered service marks (℠), and trademarks (™) are the property of RGB Systems, Inc. or Extron (see the current list of trademarks on the **Terms of Use** page at **www.extron.com**):

Registered Trademarks (®)
Extron, Cable Cubby, ControlScript, CrossPoint, DTP, eBUS, EDID Manager, EDID Minder, eLink, Flat Field, FlexOS, Glitch Free, Global Configurator, Global Scripter, GlobalViewer, Hideaway, HyperLane, IP Intercom, IP Link, Key Minder, LinkLicense, LockIt, MediaLink, MediaPort, NAV, NetPA, PlenumVault, PoleVault, PowerCage, PURE3, Quantum, ShareLink, Show Me, SoundField, SpeedMount, SpeedSwitch, StudioStation, System *INTEGRATOR*, TeamWork, TouchLink, V-Lock, VN-Matrix, VoiceLift, WallVault, WindoWall, XPA, XTP, XTP Systems, and ZipClip
Registered Service Mark(℠) : S3 Service Support Solutions
Trademarks (™)
AAP, AFL (Accu-RATE Frame Lock), ADSP (Advanced Digital Sync Processing), AVEdge, CableCover, CDRS (Class D Ripple Suppression), Codec Connect, DDSP (Digital Display Sync Processing), DMI (Dynamic Motion Interpolation), Driver Configurator, DSP Configurator, DSVP (Digital Sync Validation Processing), EQIP, Everlast, FastBite, Flex55, FOX, FOXBOX, IP Intercom HelpDesk, MAAP, MicroDigital, Opti-Torque, PendantConnect, ProDSP, QS-FPC (QuickSwitch Front Panel Controller), Room Agent, Scope-Trigger, SIS, Simple Instruction Set, Skew-Free, SpeedNav, Triple-Action Switching, True4K, True8K, Vector™ 4K, WebShare, XTRA, and ZipCaddy

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. This interference must be corrected at the expense of the user.

ATTENTION:

- The Twisted Pair Extension technology works with unshielded twisted pair (UTP) or shielded twisted pair (STP) cables; **but to ensure FCC Class A and CE compliance, STP cables and STP Connectors are required**.
- La technologie extension paires torsadées fonctionne avec les câbles paires torsadées blindées (UTP) ou non blindées (STP). Afin de s'assurer de la compatibilité entre FCC Classe A et CE, les câbles STP et les connecteurs STP sont nécessaires.

NOTES:

- This unit was tested with shielded I/O cables on the peripheral devices. Shielded cables must be used to ensure compliance with FCC emissions limits.
- 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.

VCCI-A Notice

この装置は、クラスＡ情報技術装置です。この装置を家庭環境で使用すると、電波妨害を引き起こすことがあります。その場合には使用者が適切な対策を講ずるよう要求されることがあります。
ＶＣＣＩ－Ａ

Battery Notice

This product contains a battery. **Do not open the unit to replace the battery**. If the battery needs replacing, return the entire unit to Extron (for the correct address, see the Extron Warranty section on the last page of this guide).

CAUTION: Risk of explosion. Do not replace the battery with an incorrect type. Dispose of used batteries according to the instructions.

ATTENTION : Risque d'explosion. Ne pas remplacer la pile par le mauvais type de pile. Débarrassez-vous des piles usagées selon le mode d'emploi.

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

CAUTION: Risk of minor personal injury.

ATTENTION : Risque de blessure mineure.

ATTENTION:

- Risk of property damage.
- Risque de dommages matériels.

NOTE: A note draws attention to important information.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,0p1 scene 1,1 ^B 51 ^W^C.0
[01] R 0004 00300 00400 00800 00600 [02] 35 [17] [03]
Esc X1 *X17* X20* X23* X21 CE←
```

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

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

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

Variables are written in slanted form as shown here:

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

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

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

Click the **OK** button.

Specifications Availability

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

Extron Glossary of Terms

A glossary of terms is available at **https://www.extron.com/technology/glossary.aspx**.

Contents

Introduction 1

About this Guide 1
About the MGP 641 Multi-Graphic Processor 1
Features 1
Application Diagram 5

Installation 6

Installation Overview 6
Rear Panel Features and Connections 7
Installing the LockIt HDMI Cable Lacing Brackets 10
Twisted Pair Recommendations for DTP, XTP, and HDBT Communication 11
RS-232 and IR Signal Insertion 11
Connecting for Ethernet to RS-232 Insertion 12

Operation 13

Front Panel Features 13
Power-up and Default Cycle 14
Selecting a Window and Input 15
Window Select Buttons 15
Muting and Freezing a Window 16
Mute 16
Freeze 16
Presets 16
Window Presets 16
Input Presets 18
Picture Controls 19
Adjusting the Picture Controls 19
Picture Controls Summary 20
Menus, Configuration, and Adjustments 21
Menu System Overview 21
Input Configuration Menu 23
Output Configuration Menu 24
Window Configuration Menu 27
Image/Logo Configuration Menu 29
Advanced Configuration Menu 31
Comm Settings Menu 34
Additional Functions 35
HDCP Authorization 35
Locking the Front Panel (Executive Mode) 36
Resetting 36

Remote Configuration and Control 38

Host and Processor Communication 38
Connecting the MGP to the host 38
Initial Power Up Messages 39
Password Messages 39
Processor-initiated Messages 40
Error Responses 40
SIS Overview 41
Using the Command and Response Tables 41
Symbol Definitions 41
Command and Response Table for MGP 641 SIS Commands 48
Command and Response Table for IP SIS Commands 66
Videowall Configuration Software (VCS) Program 73
Downloading VCS from the Website 73
Starting the Configuration Program 75

HTML Configuration and Control 79

Accessing the Web Page 79
Disabling Compatibility Mode 80
Web Page Components 81
Device Info Panel 82
Inputs Panel 82
Roles and Permissions Panel 83
Device Status Panel 84
Outputs Panel 86
Firmware Panel 86
Network Settings Panel 87
RS-232 Panel 88

Reference Information 89

Best Practices for Cleaning Your Extron Products 89
Mounting the MGP 641 90
Tabletop Use 90
Rack Mounting 90
Updating the Firmware 91
Determining the Firmware Version 91
Downloading the Firmware 93
Uploading the Firmware to the MGP 641 95
IP Address 95
What is an IP Address? 95
Choosing IP Addresses 96
Subnet Mask 96
Pinging for the IP Address 97
Subnetting, a Primer 98

Introduction

This section provides an overview of the MGP 641 Multi-Graphic Processor, including information about the following:

- About this Guide
- About the MGP 641 Multi-Graphic Processor
- Features
- Application Diagram

About this Guide

This guide discusses how to install, configure, and operate the Extron MGP 641 processors.

Throughout this guide, the terms “MGP,” “MGP 641,” and “processor” are used interchangeably to refer to the product.

About the MGP 641 Multi-Graphic Processor

The Extron MGP 641 is a multi-window processor that scales and presents up to four 4K @ 60 Hz source signals on a single screen. It features advanced Extron Vector 4K scaling technology for high image quality. The HDCP 2.3-compliant processor includes four HDMI 2.0 inputs and an additional HDMI background input for presenting live, non-scaled content behind source windows. HDMI and DTP2 4K @ 60 Hz outputs deliver duplicate signals to local and remote displays. Fully customizable window layouts, logo and video keying, and window transition effects enhance presentation of the source content. Source and output rotation enable use with portrait displays, and audio de-embedding simplifies integration. Configurations can be saved as presets and recalled as needed.

The MGP 641 can be controlled and configured remotely using the Extron Simple Instruction Set (SIS) commands via the RS-232, USB, or Ethernet LAN connections, the Videowall Configuration Software (VCS) via an Ethernet LAN or USB, the MGP 641 embedded web pages, and the front panel buttons and knobs.

Features

- **Displays up to four source windows on a single screen with a live or static background** — Simplifies system design by reducing the need for multiple displays.
- **Four HDMI 2.0 inputs**
- **HDMI 2.0 background input** — A dedicated, non-scaled input accepts live background content from an HDMI source.
- **HDMI 2.0 and DTP2 outputs** — The MGP 641 features one HDMI output and a duplicate DTP2 output.
- **Supports resolutions up to 4K/60 @ 4:4:4** — Supports HDMI 2.0 input and output signals up to 4096 x 2160 at 60 Hz with 4:4:4 color sampling.
- **Supported HDMI 2.0 specification features include data rates up to 18 Gbps, Deep Color, and HD lossless audio formats**

- **Advanced Extron Vector 4K scaling engine** — The Vector 4K scaling engine is specifically designed for critical-quality 4K imagery, with image upscaling and downscaling.
- **Multiple window transition effects** — Windows can be transitioned into and out of the window preset using dissolve and cut effects.
- **Integrated DTP2 extension supports transmission of 4K @ 60 Hz video up to 330' (100 m) over a shielded CATx cable**
- **Compatible with all DTP-enabled products, plus XTP CrossPoint matrix switchers** — Enables mixing and matching with desktop and wallplate endpoints, as well as other DTP and DTP2-enabled products to meet application requirements. The MGP 641 processor can be integrated with XTP and XTP II CrossPoint matrix switchers to provide connectivity between presentation spaces and a larger, facility-wide system.
- **DTP2 output is compatible with HDBaseT-enabled devices** — The DTP output can be configured to send video and embedded audio, plus bidirectional RS-232 and IR signals to an HDBaseT-enabled display.
- **HDCP 2.3 compliant** — Ensures display of content-protected media and interoperability with other HDCP-compliant devices.
- **User-selectable HDCP authorization** — Allows individual inputs to appear HDCP compliant or non-HDCP compliant to the connected source, which is beneficial if the source automatically encrypts all content when connected to an HDCP-compliant device. Protected material is not passed in non-HDCP mode.
- **HDCP Visual Confirmation** — When HDCP-encrypted content is transmitted to a non-HDCP compliant display, green video is sent to the display for immediate visual confirmation that protected content cannot be viewed on that display.
- **Key Minder continuously verifies HDCP compliance for quick, reliable switching** — 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 two or more displays.
- **EDID Minder automatically manages EDID communication between connected devices** — EDID Minder ensures that all sources reliably output content at power up.
- **Supports custom EDID and output resolutions** — User-defined output resolutions up to 600 MHz pixel clock can be supported by uploading custom EDID files or capturing EDID from a display or other destination device.
- **Logo image keying and display** — A logo graphic can be positioned and keyed over live video. Graphics files in BMP, JPG, PNG, or TIFF format may be uploaded to the unit. Full-screen images up to 4K resolution can also be displayed to eliminate loss of video between presentations. Up to 32 logo images can be stored on the processor.
- **Video keying** — Title information or other content from any window can be keyed over lower priority windows or background content.
- **Cascade multiple MGP 641 processors for additional windows** — Up to four MGP 641 units can be cascaded via the HDMI 2.0 background input to present up to 16 windows on a single display.
- **Fully customizable window layouts** — The four windows can be sized, positioned, and overlapped anywhere on the display, with additional adjustments for image zoom and priority.
- **Output rotation** — The duplicate HDMI and DTP2 output signals can be rotated 90 degrees, accommodating displays arranged in portrait or landscape orientations.

- **Source rotation** — Inputs 2 and 4 can be rotated + or - 90 degrees, providing flexible and creative presentation options for live content.
- **Dynamic input detection** — Instead of conventional lookup tables, Vector 4K technology dynamically analyzes incoming digital video signal parameters for precise signal detection, conversion, and scaling. This capability facilitates fast, flexible detection of both standard and custom resolutions.
- **Custom output resolutions** — Maximizes compatibility with evolving display technology, non-standard displays, and direct-view LED systems.
- **Auto-Layout Mode** — Automatically configures the window layout to a full screen, side by side, pyramid, or a quad arrangement, based on which inputs have an active signal.
- **Seamless presentation of signals sourced from upstream devices** — Signals sourced from an upstream switcher can be transitioned using cut to black, fade to black, seamless cut, or seamless fade. In addition, low latency mode allows the window to display the new signal as quickly as possible.
- **Image freeze contro**l — Any window can be frozen via the front panel, RS-232, or Ethernet control.
- **Window mute control** — Any window can be added or removed via the front panel, RS-232, or Ethernet control.
- **Customizable window borders** — To provide easy identification of displayed content, window border options include semi-transparent borders and text labels with adjustable size, color, and location.
- **128 window configuration presets** — A total of 128 default window presets are available and customizable to allow quick saving and recall of size, positioning, priority, and border style for each window.
- **Window preset effects** — Transitions between presets can be set to Cut or Animated. The Animated effect dynamically resizes and repositions the four windows to the locations determined by a new preset. Duration is adjustable.
- **Screen Saver Mode** — Can be set to automatically mute video and sync output to the display device when there are no active connections or logos displayed. The connected display automatically enters standby mode to conserve energy.
- **Customizable on-screen clock** — A single on-screen clock in a digital time format can be presented anywhere on screen, with user-definable size, color, time, and date formatting.
- **Stereo audio de-embedding** — Embedded HDMI two-channel PCM audio can be extended over the DTP2 output or extracted as balanced or unbalanced stereo audio to the analog outputs.
- **Aspect ratio control** — The aspect ratio of the image in a window can be controlled by selecting a fill mode that provides a full window display or a follow mode, which preserves the original aspect ratio of the input signal.
- **Front panel controls with LCD display** — Back-lit front panel buttons and an LCD menu system with navigation controls provide quick access to configuration settings.
- **Front panel USB configuration port** — Enables system configuration without having to access the rear panel.
- **Configuration and control software** — Extron VCS reduces configuration and preset programming time with a task-oriented, intuitive interface.
- **Built-in web pages** — Enable the use of a standard browser for device monitoring and troubleshooting over an intuitive web interface.

- **Internal video test patterns and pink noise generator for calibration and setup** — Offers a selection of video test patterns and audio pink noise to facilitate proper system setup and calibration of display devices.
- **Ethernet monitoring and control** — Enables control and monitoring over a LAN or WAN.
- **RS-232 control port** — Facilitates the use of serial commands for integration into a control system. Extron products use the SIS protocol, a set of basic ASCII commands that allow for quick and easy programming.
- **Front panel security lockout** — Locks out front panel functions. All functions remain available through Ethernet, USB, or RS-232 control.
- **Rack-mountable 1U, full rack width metal enclosure**
- **LockIt HDMI cable lacing brackets** — Prevent HDMI devices from being accidently unplugged from the rear panel.
- **Internal Extron Everlast™ power supply** — Provides worldwide power compatibility, with high-demonstrated reliability and low power consumption.
- **Extron Everlast Power Supply is covered by a 7-year parts and labor warranty.**

Application Diagram

Figure 1 shows an example of how devices can be connected to the MGP 641.

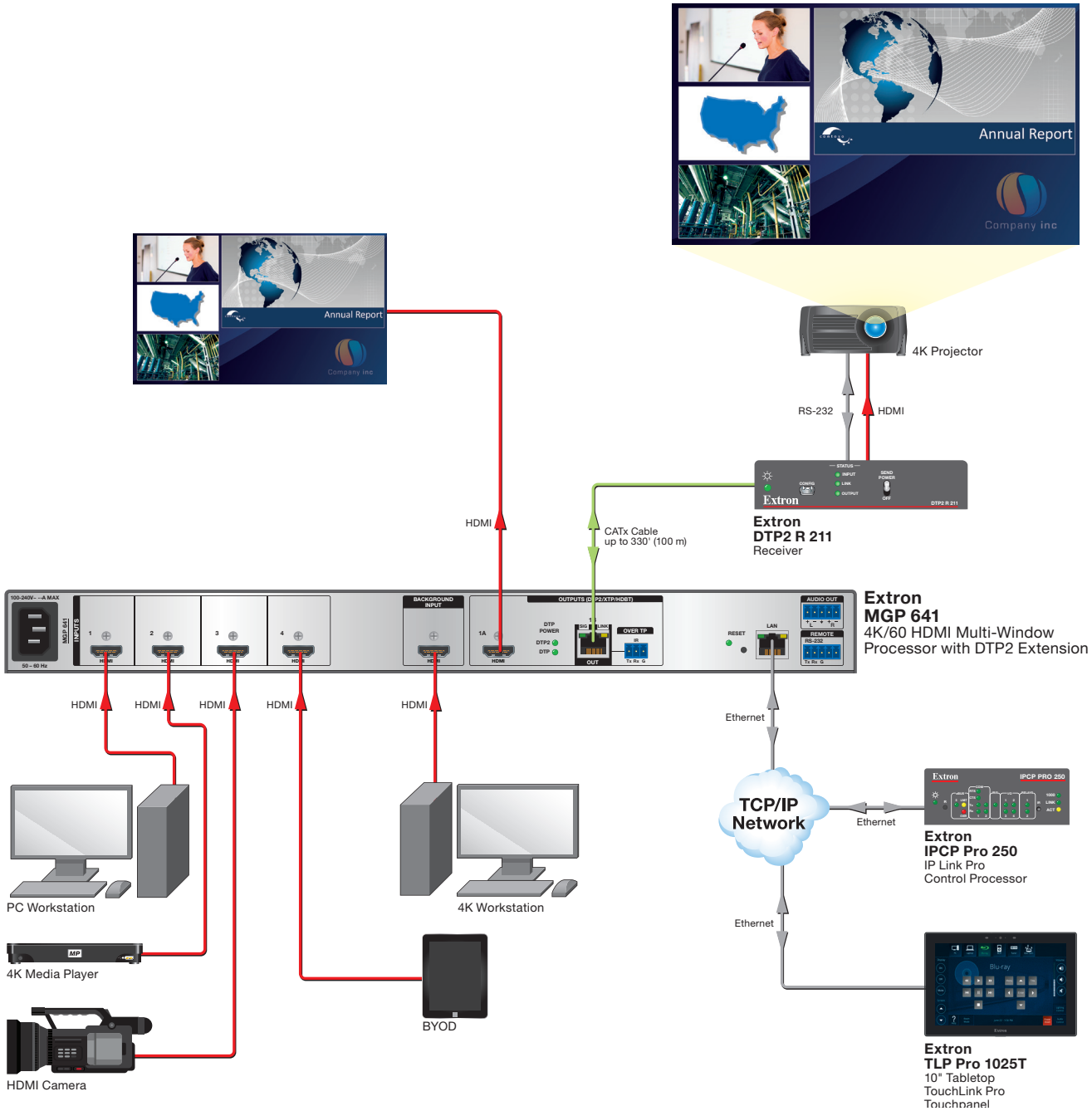


Figure 1. Connection Diagram for an MGP 641

Installation

This section describes the installation procedures for the MGP 641 Multi-Graphic Processor and the connectors on the rear panel. Topics include:

- **Installation Overview**
- **Rear Panel Features and Connections**
- **Installing the LockIt HDMI Cable Lacing Brackets**
- **Twisted Pair Recommendations for DTP, XTP, and HDBT Communication**
- **RS-232 and IR Signal Insertion**

Installation Overview

The MGP Processor can be connected to up to four input devices simultaneously, and up to two output devices. Follow these steps to install the MGP 641:

1. Mount the MGP to a rack using the pre-installed side mounting brackets. The MGP 641 has a 1U high, full rack wide enclosure.

   Alternatively, attach the four provided rubber feet to the bottom of the MGP and place the unit in the desired location.

2. Connect HDMI or DVI (with an appropriate adapter) sources to the HDMI input connectors (inputs 1 through 4), (see **figure 2**, **B** on the next page).

3. If desired, connect a source to the HDMI live background connector (**C**). The MGP 641 windows are displayed in front of this unscaled background video source.

   NOTE: You must set the output resolution to match that of the background source, or the background video is not displayed. The refresh rates do **not** need to match.

4. Make the following output connections as needed:

   - Connect an HDMI, or DVI with an appropriate adapter, display to the HDMI output 1A connector (**D**).
   - Connect a DTP endpoint, XTP matrix switcher, or HDBaseT compatible receiver to the buffered DTP/XTP/HDBT output connector 1B (**F**). For cable wiring and recommendations, see **Twisted Pair Recommendations for DTP, XTP, and HDBT Communication** on page 11.
   - To pass infrared data, connect a control device to the 3-pole Over TP IR captive screw connector (see **OVER TP IR pass-through connector** on page 8).

5. Connect a balanced or unbalanced analog audio output device (such as a DSP device or an amplifier) to the 5-pole captive screw AUDIO OUT connector (**J**) for 2-Ch audio from the selected input. This connector is configurable via VCS (see the *VCS Help File*) or SIS (see **Audio Output Format commands** on page 58) as two discrete mono outputs or as one stereo output.

6. If the MGP 641 is to be connected to a computer or to a host controller for remote control, connect an RS-232 cable from the host to the 5-pole REMOTE RS-232 rear panel connector (see figure 2, K) or to the front panel USB mini-B CONFIG port (see **figure 8**, A, on page 13). The default protocol for the RS-232 port is 9600 baud, 1 stop bit, no parity, and 8 data bits, with no flow control.

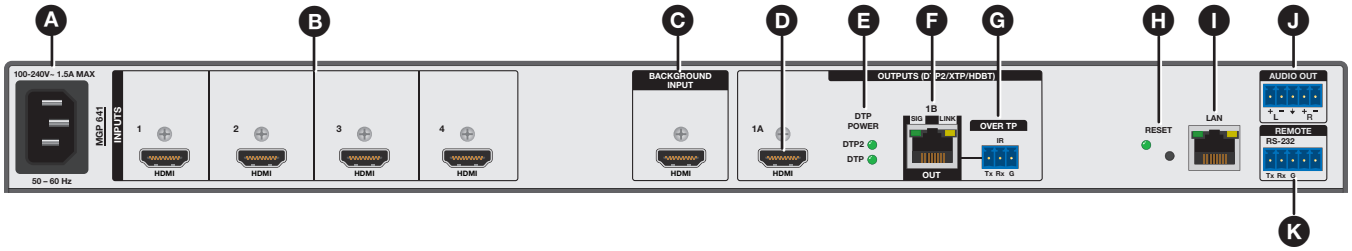
   Alternatively, connect an RJ-45 network cable to the rear panel LAN port for remote configuration and control.

7. Connect power to the MGP by plugging a standard IEC power cord (provided) from a 100 to 240 VAC, 50-60 Hz power source into the power receptacle (see figure 2, A).

8. Apply power to all other devices.

Rear Panel Features and Connections

The rear panel of the MGP 641 has the following connectors:



- A **AC power connector**
- B **HDMI inputs**
- C **HDMI live BACKGROUND INPUT**
- D **HDMI output (output 1A)**
- E **DTP remote power LEDs**
- F **DTP/XTP/HDBT output (output 1B)**
- G **OVER TP IR pass-through connector**
- H **RESET button and LED**
- I **LAN connector**
- J **Analog audio output connector**
- K **REMOTE RS-232 connector**

Figure 2. Rear Panel

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

B **HDMI inputs (inputs 1 through 4)** — Connect HDMI (or DVI with an appropriate adapter) sources to these four HDMI connectors, which feed directly to the windows with the same numbers. These windows support pixel clocks up to 600 MHz and raster sizes up to 4096 x 2400.

C **HDMI live BACKGROUND INPUT** — Connect an HDMI or DVI (with an appropriate adapter) input source to this HDMI connector in order to display the video source live as a background on the output screen. The background HDMI source is displayed behind the four MGP 641 windows and any auxiliary content. This input is not scaled.

D **HDMI output (output 1A)** — Plug an HDMI (or DVI with an appropriate adapter) output device into this HDMI connector. The HDMI output port supports resolutions up to 4K @ 60 Hz.

E **DTP remote power LEDs** — These green LEDs light to indicate when either DTP2 or DTP remote power is being provided to a receiver via the DTP output.

> **NOTE:** Remote power is not available when the DTP Out port is set to XTP or HDBT.

F **DTP/XTP/HDBT output (output 1B)** — This connector and the HDMI output connector (1A) are mirrored, meaning that they display the same image (see **figure 2**, **F**, on the previous page).

- Connect a DTP or DTP2 receiver, an XTP matrix switcher, or an HDBaseT compatible receiver to this RJ-45 twisted pair Out connector. For cable wiring and recommendations, see **Twisted Pair Recommendations for DTP, XTP, and HDBT Communication** on page 11.
- This output also allows for remote powering of DTP and DTP2 receivers, as well as over-DTP analog audio which matches the 5-pole analog audio output of the MGP. (It does not support remote power to XTP or HDBT devices.)
- To transmit or receive infrared data to and from a sink connected to the DTP/DTP2/HDBT receiver or XTP matrix, connect a control device to the 3-pole IR Over TP captive screw output port (see **G**, "Over TP IR pass-through connector," below).

ATTENTION:

- Do not connect this connector to a computer or telecommunications network.
- Ne connectez pas ce port à des données informatiques ou à un réseau de télécommunications.
- DTP remote power is intended for indoor use only. No part of the network that uses DTP remote power should be routed outdoors.
- L'alimentation DTP2 à distance est exclusivement réservée à un usage en intérieur. Un réseau utilisant une alimentation à distance ne peut pas être routé en extérieur.

Signal Support	
DTP Mode	**XTP Matrix and HDBaseT Mode**
• HDCP-compliant digital video • Embedded audio into the TMDS output or analog audio • IR pass-through signals on the associated Over TP 3-pole captive screw connector • Ethernet insertion of RS-232 control signals (see **RS-232 and IR Signal Insertion** on page 11) • Remote power to a DTP receiver	• HDCP-compliant digital video • Embedded audio into the TMDS output • IR pass-through signals on the associated Over TP 3-pole captive screw connector • Ethernet insertion of RS-232 control signals (see **RS-232 and IR Signal Insertion** on page 11)

G **OVER TP IR pass-through connector** — To transmit or receive infrared data to and from a sink connected to a DTP or DTP2 receiver, XTP matrix, or HDBaseT display, connect a control device to the 3-pole Over TP IR captive screw port (see **figure 2**, **G** on the previous page). Figure 3 shows how to wire the connector.

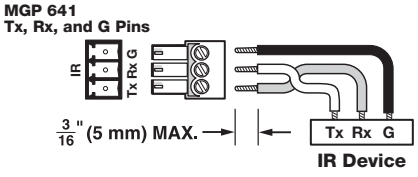


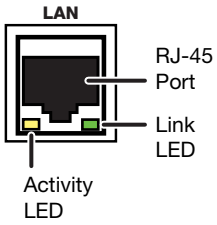
Figure 3. Wiring the Over TP IR Connector

NOTE: RS-232 communication can also be sent to the far end of the twisted pair connection, but it must be done through RS-232 insertion via Ethernet. A control signal applied to an MGP 641 LAN port can be routed to the RS-232 port of any connected twisted pair device (see **Connecting for Ethernet to RS-232 Insertion** on page 12).

H **RESET button and LED** — Pressing the recessed **RESET** button causes various settings to be reset to the factory defaults (see **Resetting** on page 36 for more information).

The green RESET LED, located to the upper-left of the reset button, blinks a varying number of times to indicate which reset mode has been entered.

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

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

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

See figure 4 for LAN port wiring information.

Pin	TIA/EIA T568B Wire Color
1	White-orange
2	Orange
3	White-green
4	Blue
5	White-blue
6	Green
7	White-brown
8	Brown

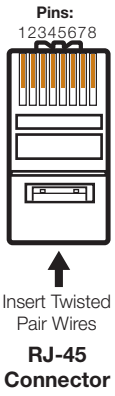


Figure 4. Wiring the LAN Connector

If desired, configure the LAN port by using SIS commands (see the LAN port setup commands, beginning with **Set IP address** on page 69) or by using the `Comm Settings` menu on the front panel (see **Comm Settings Menu** on page 34). The LAN port default settings are:

IP address: 192.168.254.254
Gateway IP address: 0.0.0.0
Subnet mask: 255.255.255.0
DHCP: off

J **Analog audio output connector** — Connect audio output devices to this 5-pole captive screw connector. Wire the connector for line level, balanced or unbalanced, analog stereo.

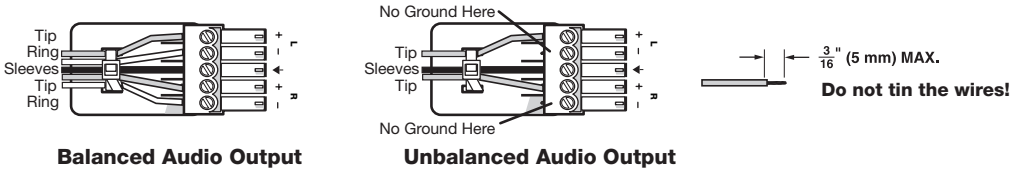


Figure 5. Audio Output Connector Wiring

K **REMOTE RS-232 connector** — Plug a computer or other RS-232 host device into the three left-most pins (Tx, Rx, and G) of this 5-pole captive screw connector.

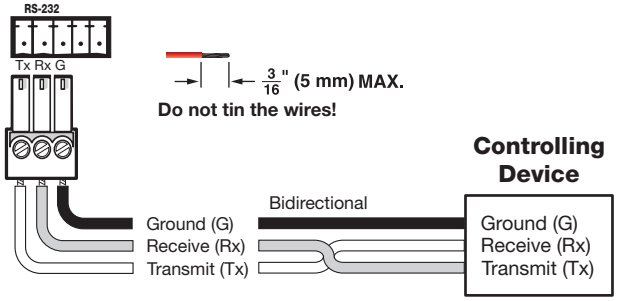
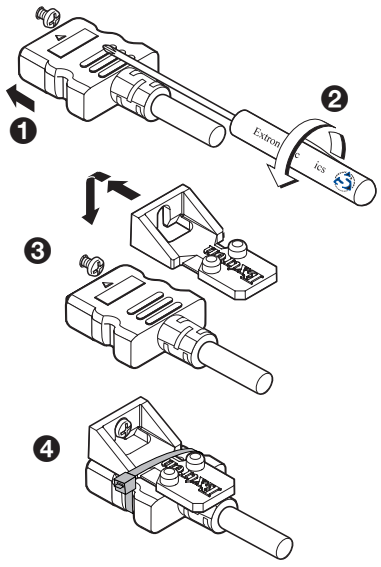


Figure 6. RS-232 Connection

Installing the LockIt HDMI Cable Lacing Brackets

The Extron LockIt lacing brackets make it possible to simply and universally secure a standard HDMI cable to most HDMI devices.

NOTE: The HDMI device must have an HDMI connection mounting screw for this bracket to be used.



To securely fasten an HDMI cable to a device:

1. Plug the HDMI cable into the panel connection.
2. Loosen the HDMI connection mounting screw from the panel enough to allow the LockIt lacing bracket to be placed over it. The screw does not have to be removed.
3. Place the LockIt lacing bracket on the screw and against the HDMI connector, then tighten the screw to secure the bracket.
4. Loosely place the included tie wrap around the HDMI connector and the LockIt lacing bracket as shown.
5. While holding the connector securely against the lacing bracket, tighten the tie wrap, then remove any excess length.

ATTENTION:

- Do not overtighten the HDMI connection mounting screw. The shield to which it is fastened is very thin and can easily be stripped.
- Ne serrez pas trop la vis de montage du connecteur HDMI. Le blindage auquel elle est attachée est très fin et peut facilement être dénudé.

Twisted Pair Recommendations for DTP, XTP, and HDBT Communication

The MGP 641 is compatible with shielded twisted pair (F/UTP, SF/UTP, and S/FTP) cable DTP, XTP, or HDBaseT communication.

ATTENTION:

- Do not use Extron UTP23SF-4 Enhanced Skew-Free AV UTP cable or STP201 cable to link the device with DTP transmitters or receivers.
- N'utilisez pas le câble AV Skew-Free UTP version améliorée UTP23SF d'Extron ou le câble STP201 pour relier le appareil avec les émetteurs ou les récepteurs DTP.

Extron recommends using the following practices to achieve full transmission distances and reduce transmission errors.

- Use the following Extron XTP DTP 24 SF/UTP cables and connectors for the best performance:
  - **XTP DTP 24/1000** Non-Plenum 1000 ' (305 m) spool
  - **XTP DTP 24P/1000** Plenum 1000 ' (305 m) spool
  - **XTP DTP 24 Plug** Package of 10
- If not using XTP DTP 24 cable, at a minimum, Extron recommends 24 AWG, solid conductor, STP cable with a minimum bandwidth of 400 MHz.
- Terminate cables with shielded connectors to the TIA/EIA-T568B standard.
- Limit the use of more than two pass-through points, which may include patch points, punch down connectors, couplers, and power injectors. If these pass-through points are required, use shielded couplers and punch down connectors.

NOTE: When using shielded twisted pair cable in bundles or conduits, consider the following:

- Do not exceed 40% fill capacity in conduits.
- Do not comb the cable for the first 20 meters, where cables are straightened, aligned, and secured in tight bundles.
- Loosely place cables and limit the use of tie wraps or hook-and-loop fasteners.
- Separate twisted pair cables from AC power cables.

RS-232 and IR Signal Insertion

The twisted pair output port allows you to insert RS-232 and IR control signals onto the same cable that carries video and audio to extend them to the over TP port on a connected endpoint (see **figure 7** on page 12).

A control signal applied to an MGP 641 LAN port can be routed to the RS-232 port of the connected twisted pair device. The RS-232 inputs and outputs inserted via Ethernet can support up to a 115 K baud rate.

When connected to an Ethernet LAN, the MGP can be accessed from a computer running a standard Internet browser. Connect the MGP to a computer, control device, router, or switch (see **figure 4** on page 9 to wire the crossover cable).

The default IP address of the MGP 641 is 192.168.254.254, the default subnet mask is 255.255.255.0, and the default gateway address is 0.0.0.0.

Connecting for Ethernet to RS-232 Insertion

Figure 7 shows a connection example of an Ethernet to RS-232 insertion, in which an Extron IPCP Pro control processor provides control of a display via the MGP 641. Configure this type of insertion as follows:

1. Connect a twisted pair cable from the control processor to the MGP 641 LAN port, directly or via a network.
2. If necessary to match the device to be controlled, use VCS (see the *VCS Help File*) or SIS commands (see the **Serial Port Configuration** commands on page 66) to configure the port RS-232 protocol (baud rate, parity, data bits, and stop bits).
3. Connect the TP cable from the MGP 641 DTP Out connector to the input of the DTP endpoint (receiver).
4. Connect a serial cable from the DTP receiver to the device to be controlled.

Port number

For Ethernet to RS-232 insertion, the insertion port number must be stated from a specific universal asynchronous receiver-transmitter (UART) start point. This number is entered as the IP port number when you establish communication with the insertion port. The output insertion port number is automatically assigned as 2001 and cannot be changed.

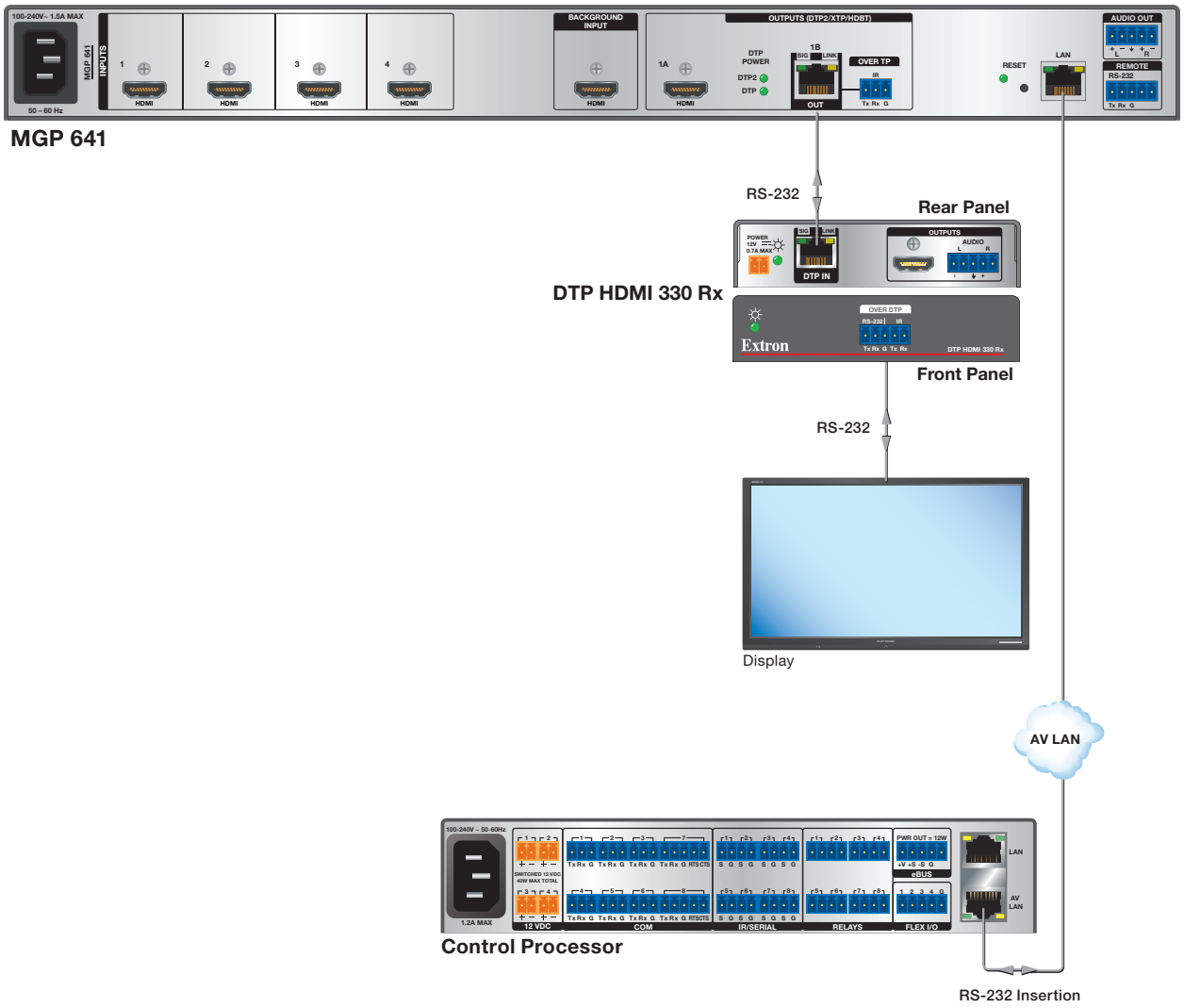


Figure 7. Typical Ethernet to RS-232 Insertion to an Endpoint

Operation

This section describes setup and operating procedures for the MGP 641 available from the front panel. The following topics are discussed:

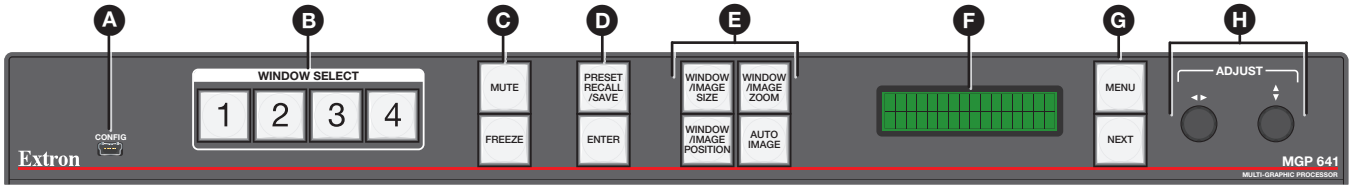
- **Front Panel Features**
- **Power-up and Default Cycle**
- **Selecting a Window and Input**
- **Muting and Freezing a Window**
- **Presets**
- **Menus, Configuration, and Adjustments**
- **Additional Functions**

You can set up and operate the MGP 641 using:

- The front panel controls
- A computer or any other device that can send and receive communications through the remote RS-232 port or the LAN port. Settings can be adjusted through the host computer using SIS commands or VCS.
- A computer or other device using an Ethernet connection and IP protocol (Telnet, SSH, or a web browser).

For details on setup and control, see **Remote Configuration and Control** starting on page 38. For web page control, see the **HTML Configuration and Control** starting on page 79. For configuration and control via VCS, see the *VCS Help File*.

Front Panel Features



A **USB CONFIG port**
B **Window and input selection buttons**
C **MUTE and FREEZE buttons**
D **PRESETPRESET RECALL/SAVE and ENTER buttons**
E **Picture control buttons**
F **LCD screen**
G **Menu navigation buttons**
H **ADJUST knobs**

Figure 8. MGP 641 Front Panel

A **USB CONFIG port** — Connect a host device to this USB mini-B port for device configuration, control, file transfer, and firmware upgrades.

B **Window and input selection buttons** — Press one of these buttons to select windows 1 through 4 for configuration. The selected button lights orange.

C **MUTE and FREEZE buttons** —

- **MUTE** — Press this button to mute the selected window. The button lights orange when the mute is enabled. To unmute, press the lit **MUTE** button again.
- **FREEZE** — Press this button to freeze the selected window. The button lights orange when freeze is enabled. To unfreeze the window, press the lit **FREEZE** button again.

D **PRESET RECALL/SAVE and ENTER buttons** — In combination, these buttons save the current settings to a window preset or recall a stored preset (up to 128). Press **PRESET RECALL/SAVE**, then rotate the **ADJUST** knobs to select a window preset to recall. Press **ENTER** to complete the action.

Press and hold **PRESET RECALL/SAVE** to save a window preset.

E **Picture control buttons** — Press these buttons to adjust the size, position, and zoom, or to perform an auto-image adjustment on the selected window.

- Press **WINDOW/IMAGE SIZE**, **WINDOW/IMAGE POSITION**, or **WINDOW/IMAGE ZOOM** once to select the window (the button lights orange) or twice to select the image within the window (the button lights green).

  Use the horizontal (◄►) and vertical (▲▼) **ADJUST** knobs to adjust the settings shown on the left and right sides of the LCD screen, respectively.
- Press **AUTO-IMAGE** to perform an Auto Image adjustment on the selected input window. Press it again to confirm the adjustment.

F **LCD screen** — Displays the configuration menus, messages, and your selections.

G **Menu navigation buttons** — Press **MENU** to step through the menus on the LCD screen. From each menu, press **NEXT** to step through its submenus.

H **ADJUST knobs** — Turn the horizontal (◄►) and vertical (▲▼) **ADJUST** knobs to scroll through submenu options and preset memory slots, and to adjust picture controls.

Power-up and Default Cycle

When the MGP 641 first powers up, the LCD screen displays an initial sequence of three screens:

1. `Extron`
2. `MGP 641`
3. `60-1574-01` or `60-1574-01` (product part number)
   `FW n.nn.nnnn` (firmware version)

The initial sequence 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. **Figure 9** on the next page shows a flow diagram of the order in which these screens are repeated.

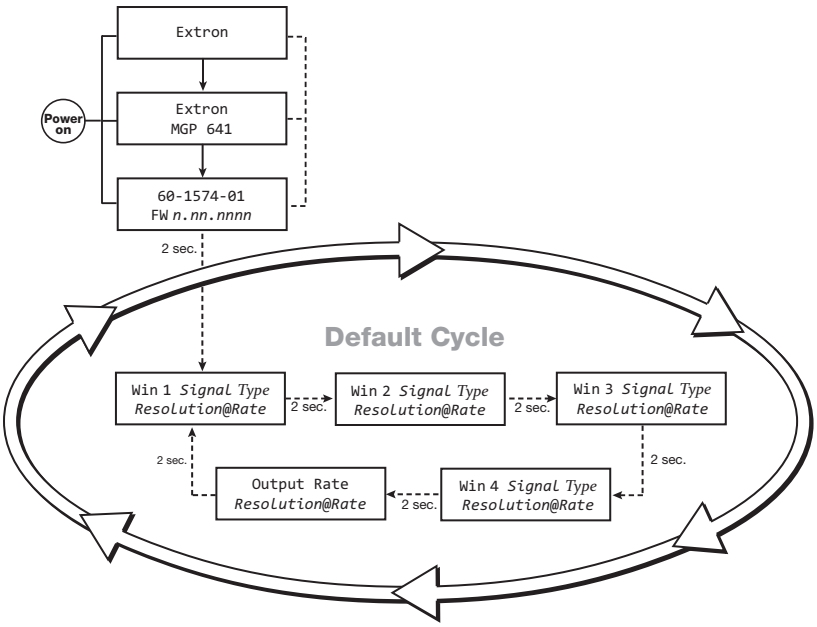


Figure 9. Default Cycle Example

NOTE: From any menu or submenu, the MGP 641 saves all adjustment settings and times out to the default screens after 30 seconds of inactivity.

Selecting a Window and Input

The MGP 641 has four windows in which to display sources. To select a window is to select its associated input or logo, if assigned.

Window Select Buttons



The four **WINDOW SELECT** buttons let you select which window is affected by the **MUTE**, **FREEZE**, and **PICTURE CONTROL** buttons, as well as the menu selections on the LCD screen.

When you select a picture control, the window whose button was previously selected is affected (see **Picture Controls** on page 19 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 SELET** button. Only one window can be selected at a time.

Muting and Freezing a Window

Mute



The **MUTE** button is located to the right of the **WINDOW SELECT** buttons on the front panel (see **figure 8** on page 13). To mute a window (remove the window from being displayed on the output):

1. Select the desired **WINDOW SELECT** button.
2. Press **MUTE**. The button lights orange and remains lit while the input is muted.

To unmute the window, press **MUTE** again.

When a window is muted or unmuted, the currently selected transition effect (cut or fade), if any, is employed as the window on the display closes or opens (see **Window Configuration Menu** on page 27 for information on transition effects).

You can also mute and unmute the windows using VCS (see the *VCS Help File*) or SIS commands (see the **Window Mute** commands on page 50).

If the unit loses power, the mute status is maintained and the output of the MGP appears as it did when power was lost.

If a window is muted and the source to that window is changed or removed, the window remains muted until manually frozen.

Freeze

The front panel **FREEZE** button is located below the **MUTE** button (see **figure 8**). Press **FREEZE** to freeze the image in the selected window. When the window is frozen, this button lights orange and remains lit while Freeze is enabled. To unfreeze the image, press **FREEZE** again. The button LED turns off.

You can also freeze the windows using VCS (see the *VCS Help File*) or SIS commands (see the **Freeze commands** on page 50).

If the unit loses power, the freeze function is disabled when power is restored. If an image is frozen and the source to that window is changed or removed, the image remains frozen until manually unfrozen.

Presets

A preset is a set of window (input) parameters that you create and save as a preset in MGP 641 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 the MGP 641 simultaneously.

Window Presets



The MGP 641 provides 128 slots for window presets that save information for all the windows. Use the **PRESET RECALL/SAVE** and **ENTER** buttons on the front panel to save and recall presets. Window presets can also be saved, recalled, and named using VCS (see the *VCS Help File*) or SIS commands via RS-232 (SIS only), USB, or Ethernet connection (see the **Presets commands** starting on page 56).

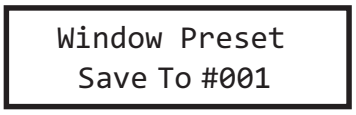
The **table** on the next page shows the settings that are saved in a window preset.

Window Settings	Global Settings
• Window size and position • Image size and position in the window • Window mute status • Active window border style • Window priority • Window source (HDMI or logo preset)	• Background source • Background logo preset number (if used) • Foreground logo preset number (if used) • User defined color (if used)

Saving a window preset

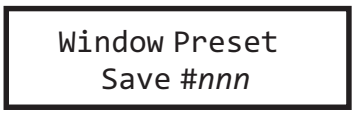
To save a window preset using the front panel buttons:

Press and hold the **PRESET RECALL/SAVE** button until the message shown at right appears (approximately 2 seconds). The **PRESET RECALL/SAVE** button lights green.



3. Rotate either **ADJUST** knob to select one of the 128 available window preset slots.
4. Press the **ENTER** button, located below the **PRESET RECALL/SAVE** button, to save the current window settings in the selected preset location.

   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 (see the images at right).



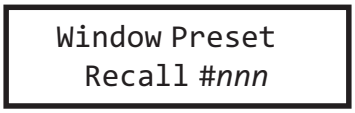


   If you want to exit the preset dialog without saving any changes, press the **MENU** button or wait until the **PRESET RECALL/SAVE** button turns off (about 30 seconds).

Recalling a window preset

To recall a window preset using the front panel buttons:

1. Press and release the **PRESET RECALL/SAVE** button. The button lights orange and the LCD screen displays the message shown at right.



2. Use either **ADJUST** knob to select a window preset number to recall.
3. Press the **ENTER** button to recall the selected preset selected. The LCD screen shows a message indicating that the preset was recalled (see the image at right).



Recalled presets apply to both outputs.

Default window presets

Figure 10 shows the 16 different factory default preset window configurations for the MGP 641. These presets can be used for any output rate, and do not have border styles associated with them (see the **Presets commands** on page 56). By default, the 16 presets are repeated to fill all 128 preset locations.

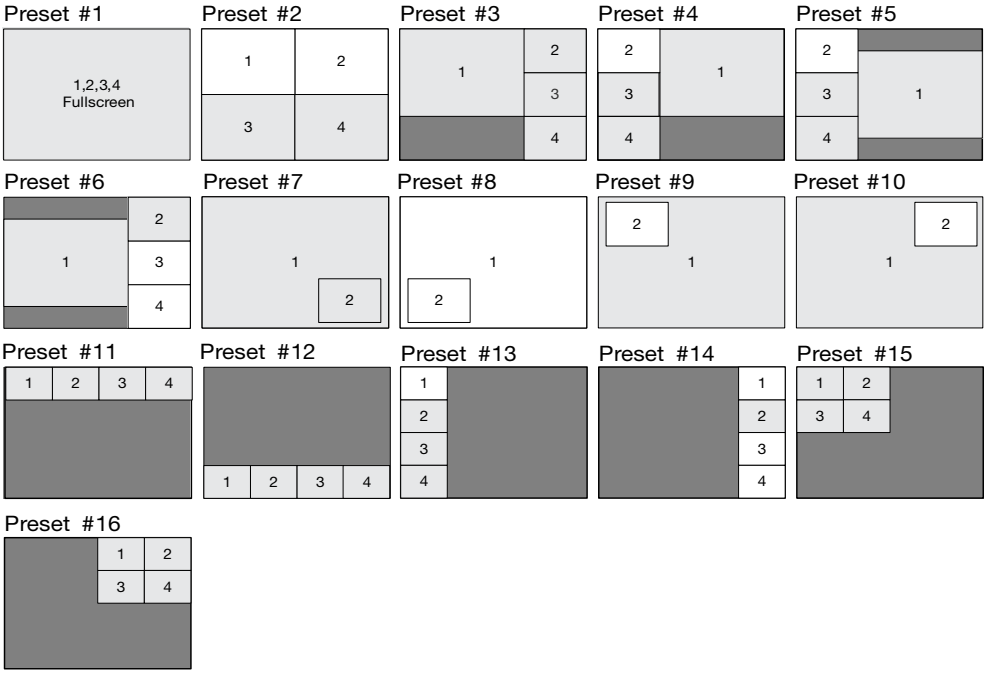


Figure 10. Factory Default Preset Configurations

Input Presets

The MGP 641 has 128 input preset slots that are global, containing all of the settings for an input when the MGP 641 is used with an upstream matrix switcher. Input presets allow a matrix switcher with multiple types of video inputs to be connected to the MGP 641 to expand the number of input video sources.

Each input should be switched into the MGP 641, configured (size, position, and preset name), then saved as a preset for recall by the control system when that input is sent from the switcher to any of the four MGP inputs.

Input presets can be saved and recalled using VCS (see the *VCS Help File*) or by SIS commands (see the **Input Presets commands** on page 57).

The following settings are contained in the input presets:

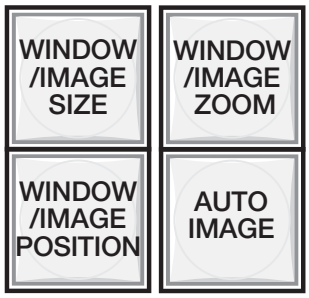
- Input type
- Input name
- Image position
- Image size
- Window size (for reference)

Image size and position are saved based on the percentage of the window filled, so the preset can be used for the input in any window size. Therefore, the preset can be saved from any window and the saved size and position is scaled proportionally when recalled in another window.

When an input preset is recalled to a window, it fills the window based on the sizing and positioning that the preset had at the time that it was saved. For example, if a video source had been zoomed into when it was saved as a full screen window, it is still displayed zoomed in if it is recalled to a smaller window.

Since all inputs are digital, input presets can be saved based on one input rate and recalled to a different input rate. This enables presets to be used to set aspect ratio or for other quick sizing shortcuts.

Picture Controls



The MGP 641 has four picture control buttons located on the front panel to the left of the **PRESET RECALL/SAVE** and **ENTER** buttons. Use these buttons to adjust horizontal and vertical size, horizontal and vertical position, Auto Image, and magnified focus (zoom).

NOTE: Picture controls are window-dependent. The values must be set separately for each window.

- Pressing a picture control button once displays the picture control for the selected window on the LCD screen. While the control is displayed, pressing any of the other window buttons displays the picture control settings for that window.
- For the **WINDOW/IMAGE SIZE**, **WINDOW/IMAGE POSITION**, and **WINDOW/IMAGE ZOOM** buttons, press the button repeatedly to switch between window settings and image settings.

The selected window displays a blinking blue border, whether or not a border is enabled for that window.

Adjusting the Picture Controls

Use the picture controls buttons to make adjustments to an input window or perform an Auto-Image. When you select one of these buttons, the button for the most recently selected window lights, indicating that the window is being adjusted.

Adjusting window and image picture controls for position, size, or zoom

1. Press the **WINDOW SELECT** button for the window (input) to adjust.
2. Press the button for the desired picture control: **WINDOW/IMAGE SIZE** (sizing), **WINDOW/IMAGE POSITION** (moving and centering), **WINDOW/IMAGE ZOOM** (magnification), and **Auto-Image**. The controls are displayed on the LCD screen.
3. Rotate the horizontal **ADJUST** (◄►) or vertical **ADJUST** (▲▼) knob to select a level from the available range.
4. Repeat steps 1 through 3 for each window or image adjustment to be made for the selected input.

Performing Auto-Image

1. Press the **WINDOW SELECT** button for the window to adjust.
2. Press the **AUTO IMAGE** button. The button blinks green, and the message shown at right appears on the LCD screen.

```
Auto Image Win n
Press Auto = Go
```

3. Press **AUTO IMAGE** again to initiate the Auto Image. When the process is complete, the **AUTO IMAGE** button turns off. A message appears briefly on the LCD screen (see the image at right), then the screen returns to the default cycle.

```
Auto Image Win n
Complete!
```

Picture Controls Summary

The following table summarizes the functions of the picture control buttons and how to make adjustments.

Button	Display	Function	Range	ADJUST Knob
WINDOW/ IMAGE SIZE	`Size: Window 1` `H=960 V=540`	Enlarge or shrink window *n*.	**Min:** 1/16 of output rate **Max:** 2 times output rate	**For H (width):** Horizontal ◄► **ADJUST** knob **For V (height):** Vertical ▲▼ **ADJUST** knob

	(Press button twice.)
	`Size: Image 1`
	`H=960 V=540`
		Enlarge or shrink the image of input *nn* within the window.	**Min:** 1/16 of output rate
			Max: 2 times output rate	

WINDOW/ IMAGE POSITION	`Center: Window 1` `H=+0 V=+0`	Position the upper-left corner of window *n* on the display in relation to the display center.	**Default:** `0000` ± output rate	**For H:** Horizontal ◄► **ADJUST** knob **For V:** Vertical ▲▼ **ADJUST** knob

	(Press button twice.)
	`Center: Image 1`
	`H=0 V=0`
		Position the upper-left corner of the image of input *nn* within the window in relation to the window center.	**Default:** `0000` ± output rate	

WINDOW/ IMAGE ZOOM	`Zoom: Window 1` `H=960 V=540`	Increase or decrease the size of the selected window while keeping the aspect ratio constant.	**Min:** 1/16 of output rate **Max:** 2 times output rate	**For H:** Horizontal ◄► **ADJUST** knob **For V:** Vertical ▲▼ **ADJUST** knob

	(Press button twice.)
	`Zoom: Image 1`
	`H=960 V=540`
		Increase or decrease the size of the image of input *n* in the selected window while keeping the aspect ratio constant.	**Min:** 1/16 of output rate
			Max: 2 times output rate	

AUTO IMAGE	`Auto Image Win 1` `Press Auto = Go`	Performs an Auto Image adjustment to the currently selected window. Size and position are reset to defaults for the input aspect ratio setting.	**Fill:** Horizontal and vertical image position return to `0,0`, and the image size is set to match the current window size. **Follow:** Horizontal and vertical image position and size are set to maintain the native aspect ratio for the input rate with respect to the window being affected.	

	(Press button again.)
	When completed:
	`Auto Image Win 1`
	`Complete!`			

Menus, Configuration, and Adjustments

The MGP 641 menus enable you to configure the processor. The names of the menu, submenus, and options are displayed on the LCD screen on the front panel. The menu navigation buttons (**MENU** and **NEXT**) are located to the right of the LCD screen (see figure 11). Press these buttons to cycle through the available menu and submenu options.

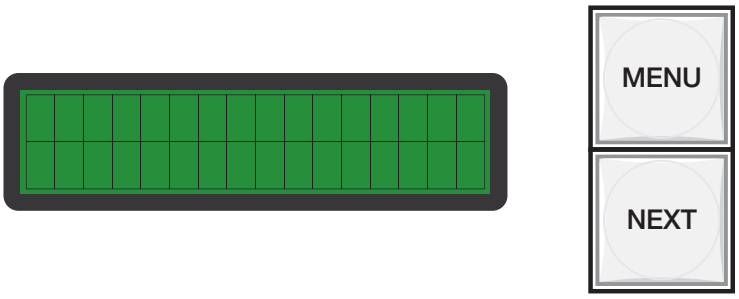


Figure 11. LCD Screen with MENU and NEXT Buttons

Menu System Overview

The MGP 641 menu system consists of a main menu with seven options (menus). Each of these seven menus has a set of submenus, which enable you to make desired adjustments (see the Main Menu Flow diagram in **figure 12** on page 22).

Using the menus

Access the different levels of menus by pressing the **MENU** and **NEXT** buttons and turning the **ADJUST** knobs as follows:

1. **Main menu access** — To access the main menu, press the **MENU** button. The first main menu option (`Input Configuration`) is displayed on the screen.
2. **Main menu options (menus)** — Repeatedly pressing the **MENU** button cycles through the main menu options. Press the **MENU** button until the desired menu is displayed.
3. **Submenu options** — When the desired main menu item that you want to configure is displayed on the LCD screen, press the **NEXT** button to cycle through the submenu options of the displayed menu.
4. **Adjustments** — With a desired submenu option displayed, rotate the horizontal (◄►) and vertical (▲▼) **ADJUST** knobs clockwise or counterclockwise to display and select the parameters available for the option.
5. **Implementation** — To save and implement the adjustments you have selected, do one of the following:
   - Press **NEXT** to display another submenu option to adjust.
   - Press **MENU** repeatedly until the `EXIT` menu screen appears, then press **NEXT**.
   - Do nothing more, and wait until the LCD screen returns to the default cycle (approximately 30 seconds).

Your adjustments remain in effect until you change them or reset the unit to factory defaults (see **Resetting** on page 36).

NOTE: The menus time out and the default cycle displays after 30 seconds of inactivity. Any selections made with the **ADJUST** knobs prior to time-out are saved and remain in effect.

Main menu flow

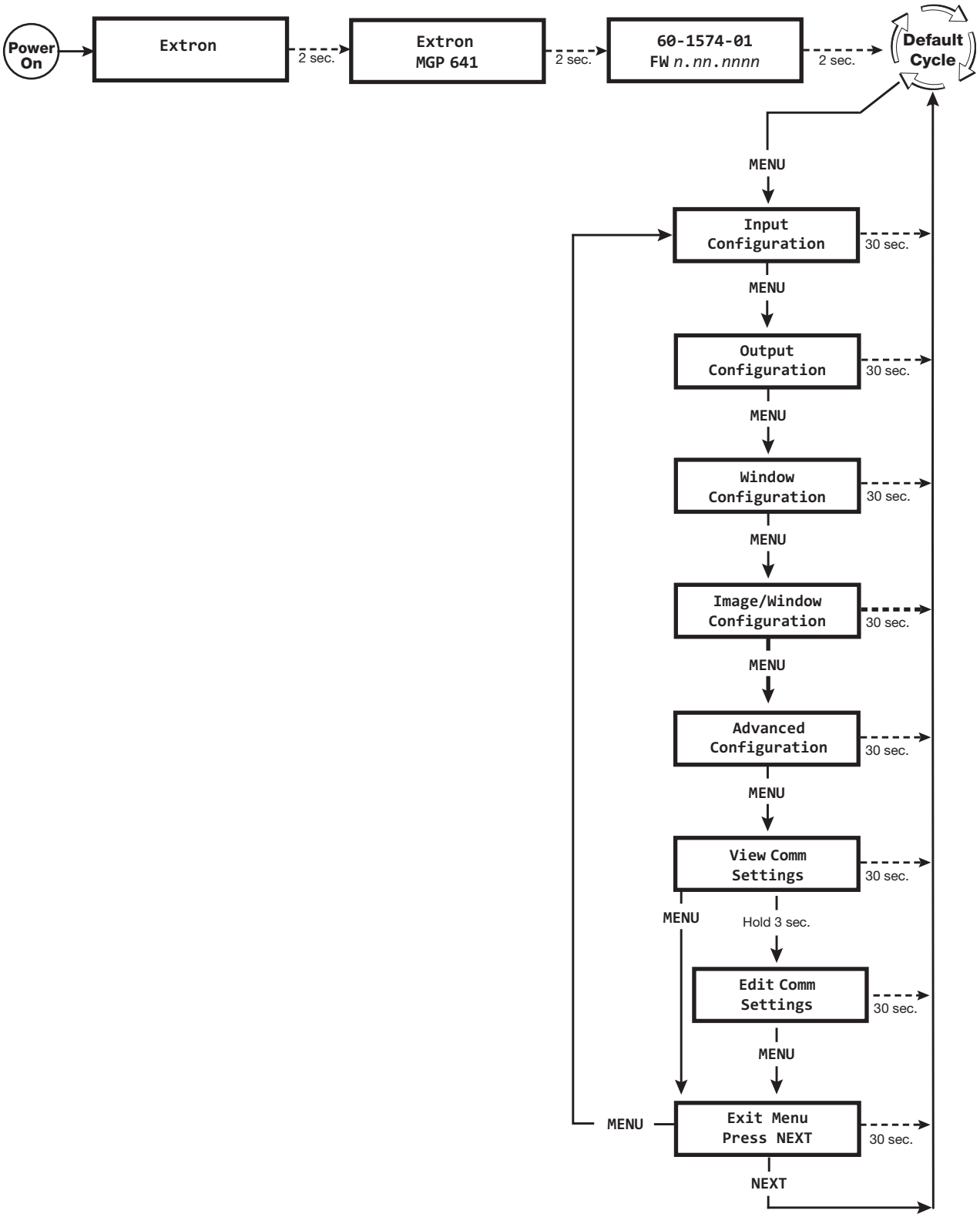


Figure 12. Main Menu Flow

NOTE: From any menu or submenu, the MGP 641 saves all adjustment settings and times out to the default screens after 30 seconds of inactivity.

Input Configuration Menu

The `Input Configuration` menu allows you to configure settings for the HDMI input associated with the selected window. The input being configured is determined by the window number currently selected on the front panel.

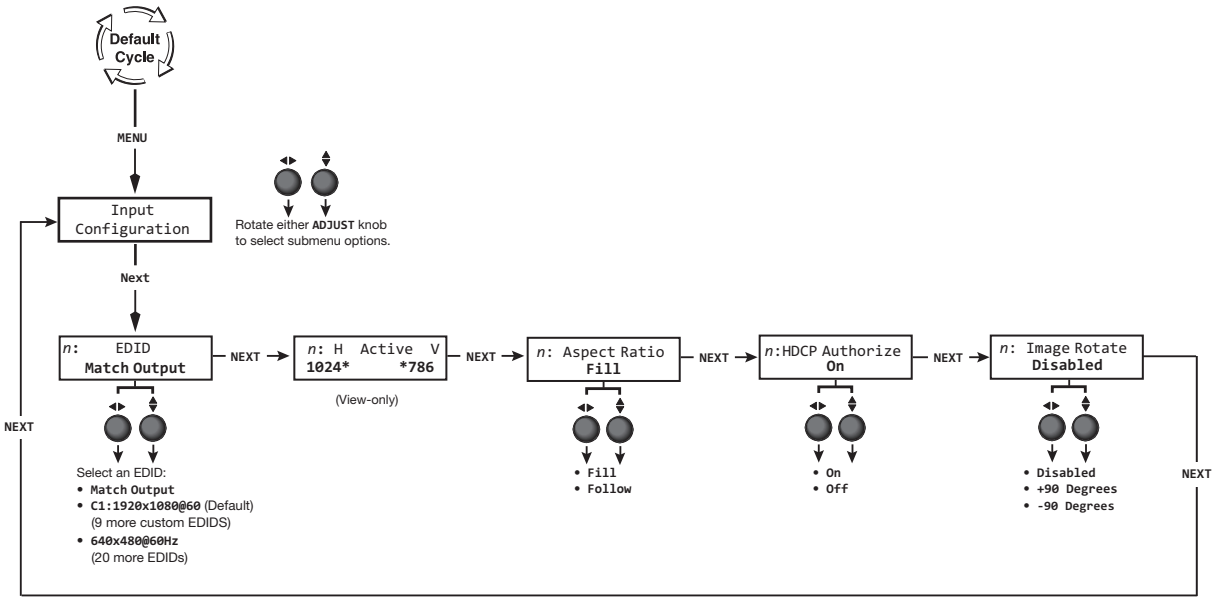


Figure 13. Input Configuration Menu Flow

Input Configuration submenu options

- **EDID** — Rotate either **`ADJUST`** knob to select an EDID for the current input from a list of 20 factory-supplied EDIDs, or select **`Match Output`** (default) to use the current output resolution and refresh rate.

  In addition, 10 custom EDID slots are provided. These EDIDs can be captured from a connected display device or uploaded via SIS or VCS. The 10 custom, user-defined output rates default to 1080p @ 60 Hz when no custom EDID is captured or uploaded. (See **Output Resolutions and EDID Emulation** on page 43 for a list of the available EDIDs.)

- **Active** — This view-only screen shows the active pixels (H) and lines (V) of the detected input signal on the currently selected window.

- **Aspect Ratio** — Select the aspect ratio of the image relative to the window in which it is displayed. The options are:

  - **`Fill`** — Each input signal fills its entire window (default).
  - **`Follow`** — Each input signal is displayed with its native aspect ratio.

- **HDCP Authorize** — Select **`On`** (default) or **`Off`**. This option lets you disable HDCP communication on discrete inputs.

  For source devices that require encryption, select **`On`** to enable HDCP authorization. This setting is useful for devices such as Mac computers, iPhones, iPads, and some Windows sources that always encrypt their output, regardless of whether they are displaying HDCP content, if the downstream sink is capable of HDCP. By not allowing HDCP signals on an input, the MGP can pass most content from these sources as a non-encrypted signal to analog and digital video outputs.

  When HDCP authorization is disabled, the window displaying an encrypted source does not display content that requires HDCP. Instead, the window displays either a black screen or a warning message generated by the source.

NOTE: All windows must not be displaying HDCP content for the MGP output to not be encrypted.

- **Image Rotate** — This option enables you to rotate the individual inputs 90 degrees clockwise or counterclockwise, allowing for support of either portrait inputs on a standard landscape oriented output or landscape sources on a portrait oriented output. Image rotation is available for all MGP resolutions and rates.

  NOTE: Image rotation is available only on windows 2 and 4. If the selected window is 1 or 3, the screen shows `Not Available` for this option.

  Rotation selections include:

  - **`Disabled`** (default)
  - **`+ 90 degrees`** (90° clockwise)
  - **`- 90 degrees`** (90° counterclockwise)

Output Configuration Menu

The `Output Configuration` menu allows you to set output resolution and 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.

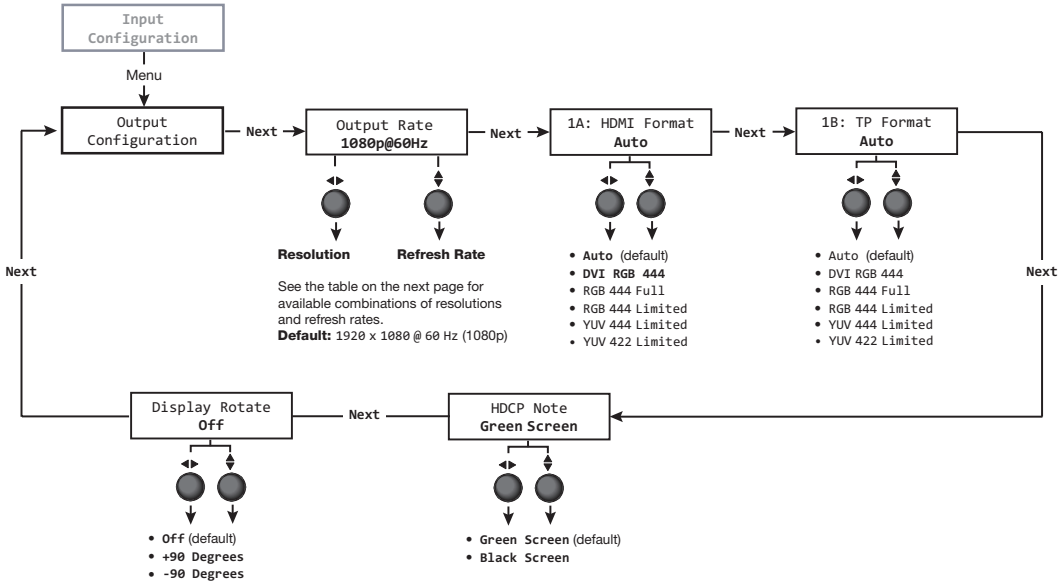


Figure 14. Output Configuration Menu Flow

- **Output Rate** — While this option 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 refresh rates. The resolutions and refresh rates are listed in the **Refresh Rates in Hz Table** on page 25.

Resolution	Refresh Rates in Hz Table							
	23.98 Hz	24 Hz	25 Hz	29.97 Hz	30 Hz	50 Hz	59.94 Hz	60 Hz
640 x 480								X
800 x 600								X
852 x 480								X
1024 x 768								X
1280 x 768								X
1280 x 800								X
1280 x 1024								X
1360 x 768								X
1366 x 768								X
1440 x 900								X
1400 x 1050								X
1600 x 900								X
1680 x 1050								X
1600 x 1200								X
1920 x 1200								X
480p							X	X
576p						X		
720p			X	X	X	X	X	X
1080i						X	X	X
1080p	X	X	X	X	X	X	X	X*
2048 x 1080	X	X	X	X	X	X	X	X
2048 x 1200								X
2048 x 1536								X
2560 x 1080								X
2560 x 1440								X
2560 x 1600								X
3840 x 2160	X	X	X	X	X	X	X	X
4096 x 2160**	X	X	X	X	X	X	X	X
Custom 1 - 10	For new resolutions							

* Default

** Resolution not available as an EDID, only as an output rate option

By default, the resolution provided in the EDID is the last selected factory rate. To manually set the resolution information provided in the EDID data, see **Output Resolutions and EDID Emulation** on page 43.

NOTES:

- If the output rate is set to 3840x2160 or 4096x2160 at 50 Hz, 59.94 Hz, or 60 Hz, the twisted pair outputs are active only if connected to a DTP2 receiver or an XTP matrix switcher with an XTP II CP 4i board installed.
- When an HDMI background is used, the MGP 641 output must be set to the same resolution as the HDMI background source. It is not necessary to set the refresh rate to match the background because this is done automatically.

  If the selected output resolution is different from that of the HDMI background, the display shows a black screen or blue screen (depending on the selected screen saver setting) as the background. (See the **Advanced Configuration Menu** on page 31 to enable the background input.)

- **1A: HDMI Format** — Rotate either **ADJUST** knob to select the digital format of HDMI output 1A. If **Auto** (the default) is selected, the MGP 641 uses the EDID from the connected sink device to determine the output format.

  Available signal types are:

  - **Auto** (default)
  - **DVI RGB 444**
  - **RGB 444 Full**
  - **RGB 444 Limited**
  - **YUV 444 Limited**
  - **YUV 422 Limited**

- **1B: TP Format** — Rotate either **ADJUST** knob to select the twisted pair output 1B signal type. Available formats are the same as for the HDMI output:

  - **Auto** (default)
  - **DVI RGB 444**
  - **RGB 444 Full**
  - **RGB 444 Limited**
  - **YUV 444 Limited**
  - **YUV 422 Limited**

- **HDCP Note** — Rotate either **ADJUST** knob to select what is displayed on the HDMI output when any of the four windows or the background input contains HDCP-protected content and the output is a non-HDCP sink. Options are:

  - **Green Screen** (default)
  - **Black Screen**

- **Display Rotate** — This option enables you to rotate the output 90 degrees clockwise or counterclockwise, allowing for support of either portrait inputs on a standard landscape oriented output or landscape sources on a portrait oriented output. Output rotation is available for all MGP resolutions and rates.

  Rotation selections include:

  - **Off** (default)
  - **+ 90 degrees** (90° clockwise)
  - **- 90 degrees** (90° counterclockwise)

Window Configuration Menu

The `Window Configuration` menu allows you to set window front and back priority, add user-defined borders to the windows, select the window transition effect to use when muting (closing) and unmuting (displaying) a window, select the transition effect to use when recalling a window preset, and specify the duration of the selected mute and preset effects.

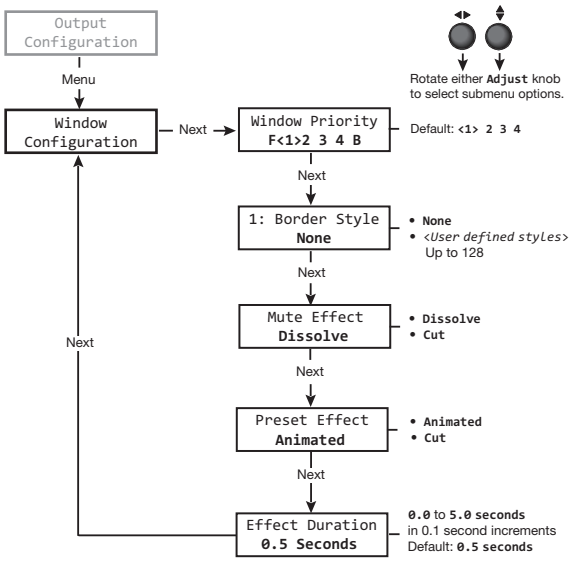


Figure 15. Window Configuration Menu Flow

The `Window Configuration` submenu contains the following options:

- **Window Priority** — This option enables you to set how the windows overlap one another or "stack" on the display. For example, by default the window with priority 1 is displayed in front of all the other windows. If the top priority window is sized to fill the screen, the other windows are not visible.

  By default, the `Window Priority` LCD screen displays the numbers of the windows in order, from left to right, with window 1 having first priority (shown with angle brackets).

  To change the priority of a window:

  1. From the `Window Configuration` screen, press **`NEXT`** once to display the `Window Priority` screen.
  2. Rotate the vertical **`ADJUST`** (▲▼) knob to move the angle brackets to the window whose priority level you want to change.
  3. Rotate the horizontal **`ADJUST`** (◄►) knob to move the bracketed window number to the desired priority position. For example, if you want window 2 to display in front of all the other windows (priority 1), move `<2>` all the way to the left, following the letter `F` on the LCD screen.
  4. Repeat steps 1 and 2 as desired for each additional window whose priority you want to change.

- **Border Style** — Use this submenu to select border presets for the windows. The window border presets can be created and saved only in VCS (see the *VCS Help File*). However, you can use the front panel controls to select (recall) presets that have already been defined.

  To select a border preset to recall:

  1. From the `Window Configuration` screen, press **NEXT** twice to display the `Window Border Style` screen.
  2. Rotate either **ADJUST** knob to scroll through the numbers of the user-defined presets until the desired one is displayed.

  You can also select **None** (the default), which specifies no border. If no presets have been defined, this is the only option on this submenu.

- **Mute Effect** — Use this submenu to select a transition effect for the MGP 641 to use when muting and unmuting windows. To select a transition effect:

  1. From the `Window Configuration` screen, press **NEXT** three times to display the `Mute Effect` screen.
  2. Rotate either **ADJUST** knob to select a mute effect. Options are:
     - **Cut** — The windows are instantly muted to a black screen.
     - **Dissolve** (default) — A dissolve causes the window to fade gradually to black.

- **Preset Effect** — Use this submenu to select a transition effect for the MGP 641 to use when recalling window presets. To select a transition effect:

  1. From the `Window Configuration` screen, press **NEXT** four times to display the `Preset Effect` screen.
  2. Rotate either **ADJUST** knob to select a preset transition effect. Options are:
     - **Cut** — The windows instantly change to the new size and location on the display defined by the recalled preset.
     - **Animated** (default) — The windows move and resize dynamically on screen to the location and size defined by the recalled preset. The display shows the four windows stretching or shrinking as well as moving to the new location at a smooth rate according to the effect duration.

- **Effect Duration** — Use this submenu to set the amount of time the MGP 641 takes to complete a mute or preset transition effect. Select from durations of 0.0 to 5.0 seconds, in 0.1 second increments. (Effect duration is not available with the cut effect.) To set an effect duration:

  1. Press the **NEXT** button five times, until `Effect Duration` is displayed.
  2. Rotate either the horizontal (◄►) or the vertical (▲▼) **ADJUST** knob to select an effect duration.

Image/Logo Configuration Menu

This menu lets you recall and display images or logos that have been preassigned via SIS commands (see **Image, Logo, and Clock Configuration** starting on page 59) or via VCS (see the *VCS Help File*). The MGP supports BMP, JPG, PNG, and TIFF image file formats. You can configure images using VCS.

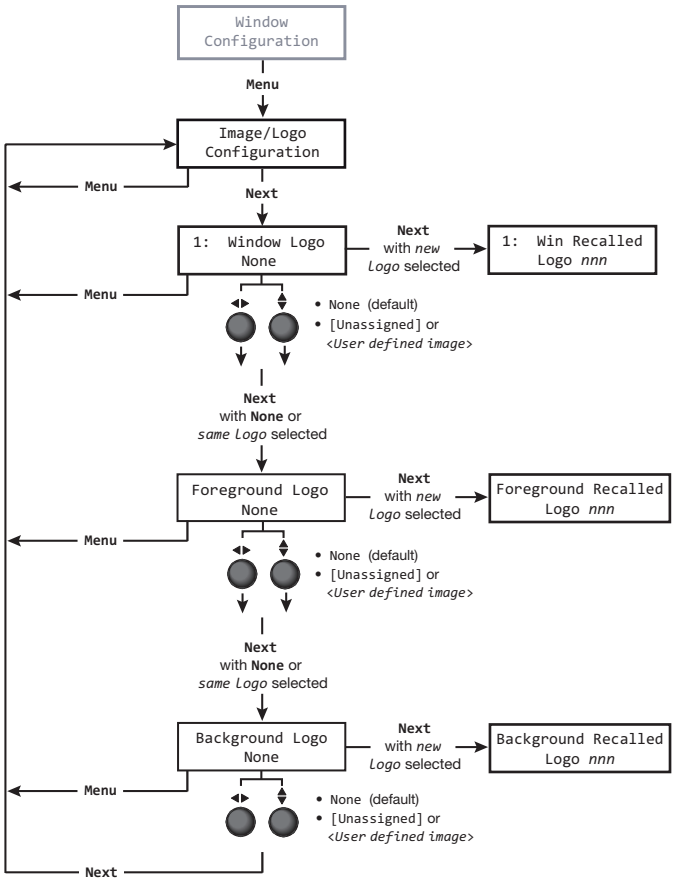


Figure 16. Image/Logo Configuration Menu Flow

Recalling logo presets

To display an image in the foreground, background, or at a desired location on a window, you can recall a previously configured logo preset.

To recall an image:

1. From the `Image/Logo Configuration` menu, press **`NEXT`** repeatedly until the desired image type is displayed on the LCD screen. Available selections are:

   - **`Window Logo`** — Displays an image scaled to fit the selected window (any size or proportion) to which it is recalled, while obeying the aspect ratio setting for the window. This image replaces the active video in the window.

     NOTE: All image keying parameters configured via VCS as part of the logo preset are applied to the image when it is scaled in a window (see the *VCS Help File* to configure logos).

- **`Foreground Logo`** — Displays an unscaled image in front of any other window content. Using VCS, you can position the foreground logo anywhere on the screen and apply a logo key effect to it if desired (see the *VCS Help File*). When a foreground logo in the selected window is changed or muted, it cuts to the new logo image.
- **`Background Logo`** — Displays an unscaled, static background image. Recalled background images are always centered regardless of whether they are smaller or larger than the output raster.

2. Rotate either **`ADJUST`** knob to scroll through the numbers of the user-defined logo presets until the desired one is displayed, or:
   - If no presets have been defined, the only option (other than **`None`**) is **`[unassigned]`**.
   - Select **`None`** to display **no** images in the selected position (foreground, background, or in the window). Selecting **`None`**, then pressing **`NEXT`** removes the current logo image from the selected position.
3. Press **`NEXT`**. Depending on your selection in step 2, the following appears on the LCD screen:
   - If **`None`** or the same logo is selected, the LCD screen displays the next item on the `Image/Configuration` menu (or returns to the `Image/Configuration` menu screen).
   - If a new logo was selected, one of the following screens appears:
     - {*`Window number`*}`: Win Recalled`
`Logo` *`nnn`*
     - `Foregnd Recalled`
`Logo` *`nnn`*
     - `Backgnd Recalled`
`Logo` *`nnn`*

     Press **`NEXT`** again to move to the next `Image/Logo Configuration` menu item.

Advanced Configuration Menu

Use the **Advanced Configuration** menu to set features that are not intended to be changed frequently. You can also view the internal temperature of the unit.

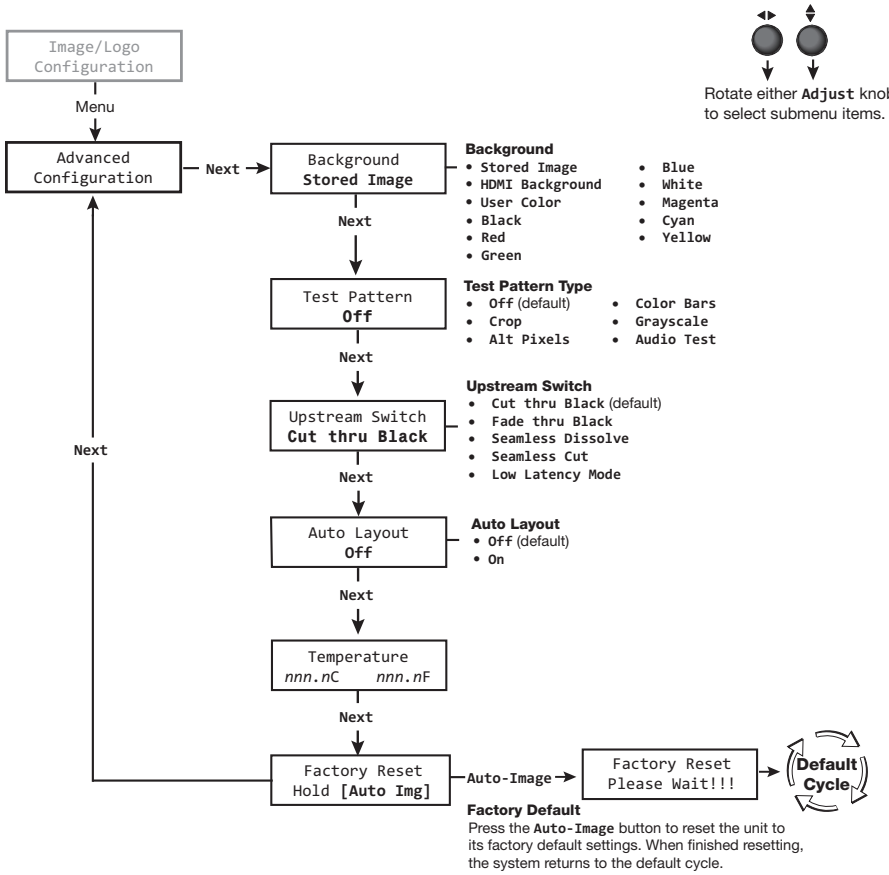


Figure 17. Advanced Configuration Menu Flow

The **Advanced Configuration** menu contains the following submenus:

- **Background** — Rotate either **ADJUST** knob to select a background color for the output screen. Options are:
  - **Stored Image** —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.
  - **HDMI Background** — Displays the unscaled image from the live background input as the background on the screen. When this option is selected, the MGP 641 changes the live background refresh **rate** (not the resolution) to match that of the output.

NOTES:

- The live background input does not support the 1080i resolution.
- If you select this background, you must set the output **resolution** to that of the HDMI background input (the refresh rate is changed automatically). Otherwise, the background is black or blue, depending on the screen saver setting.

- **Test Pattern** — Several test patterns are available via this submenu to adjust the display device for color, convergence, focus, resolution, contrast, grayscale, and aspect ratio. The available pattern selections are:
  - **`Off`** (default)
  - **`Crop`**
  - **`Alt Pixels`**
  - **`Crosshatch`**
  - **`Color Bars`**
  - **`Grayscale`**
  - **`Audio Test`**

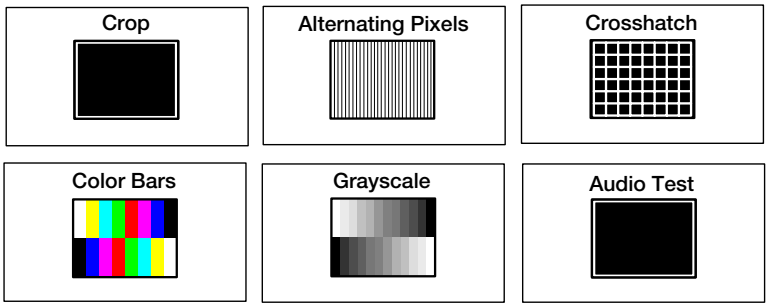


Figure 18. Test Patterns Available for the MGP 641

NOTES:

- By default all test patterns include a single pixel wide crop pattern line.
- The Audio Test pattern displays a crop pattern and also outputs pink noise at 48 kHz, 24 bit.
- Test pattern selections persist through a power cycle.

- **Upstream Switch** — Enables selection of a transition effect to be used when the signal from an upstream matrix switcher is lost and when it is restored. All fade switch effects have a duration of 0.5 seconds. Available effects are:
  - **`Cut thru Black`** — The video in the window immediately mutes to black when the signal is lost and cuts to the new signal when it is restored (default).
  - **`Fade thru Black`** — The window freezes the last solid frame before the signal was lost and fades the image to black. The window fades in the new signal when it is restored.
  - **`Seamless Cut`** — The window freezes the last solid frame before the signal was lost and seamlessly cuts to the new signal when it is restored. If no signal is applied for 8 seconds, the image within the window cuts to black.
  - **`Seamless Dissolve`** — The window freezes the last solid frame before the signal was lost and performs a seamless dissolve to the new signal when it is applied. If no signal is applied for 8 seconds, the image within the window fades to black.
  - **`Low Latency Mode`** — The window attempts to display the new signal as quickly as possible. Two frames of video delay are also removed from the video processing logic of the MGP, which may introduce video artifacts during the switch transition.

- **Auto Layout mode** — Enables or disables Auto Layout mode. This mode automatically configures the window layout to full screen, side by side, pyramid, or quad arrangement (see figure 19), based on which windows have an active signal or logo preset. When a signal is newly detected or removed, the MGP rearranges the windows accordingly using the defined window preset effect.

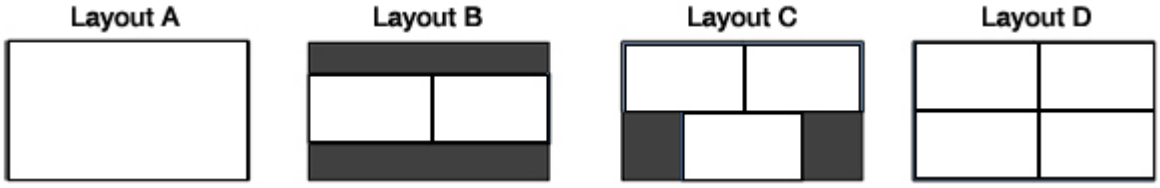


Figure 19. Auto Layout Mode Window Configurations

The layouts in figure 19 are not part of the 128 available window presets and the combination of windows being displayed is not fixed. For example, layout B can include windows 1 and 2, 1 and 3, 1 and 4, 2 and 3, 2 and 4, or 3 and 4. The same applies to layouts C and D.

If no signal is present and Auto Layout is enabled, all windows are muted and the screen saver is displayed.

While the MGP is in Auto Layout mode, the front panel remains unlocked and any desired changes can be made. However, these changes may be overwritten once the status on any of the four inputs changes.

- **Internal Temperature screen** — Displays the current internal temperature of the unit temperature in degrees Fahrenheit and Celsius. This is an information-only screen and no adjustments can be made to it.
- **Factory Reset** — Resets the unit to its factory default values (removing any user-specified values) while retaining all network settings. From this screen, press the **`Auto-Image`** button to initiate the reset. When the reset is complete, the LCD screen displays the default cycle.

> **NOTE:** The equivalent SIS command is Esc ZXXX ←. This command does **not** affect the current password, including the initial factory-set serial number.

For other reset methods, see **Resetting** on page 36.

Comm Settings Menu

Use the Comm Settings menu to view and edit the serial communication port configuration and the MGP 641 IP addresses. This menu consists of two levels: View Comm Settings and Edit Comm Settings (Edit Comm Settings is accessed through View Comm Settings).

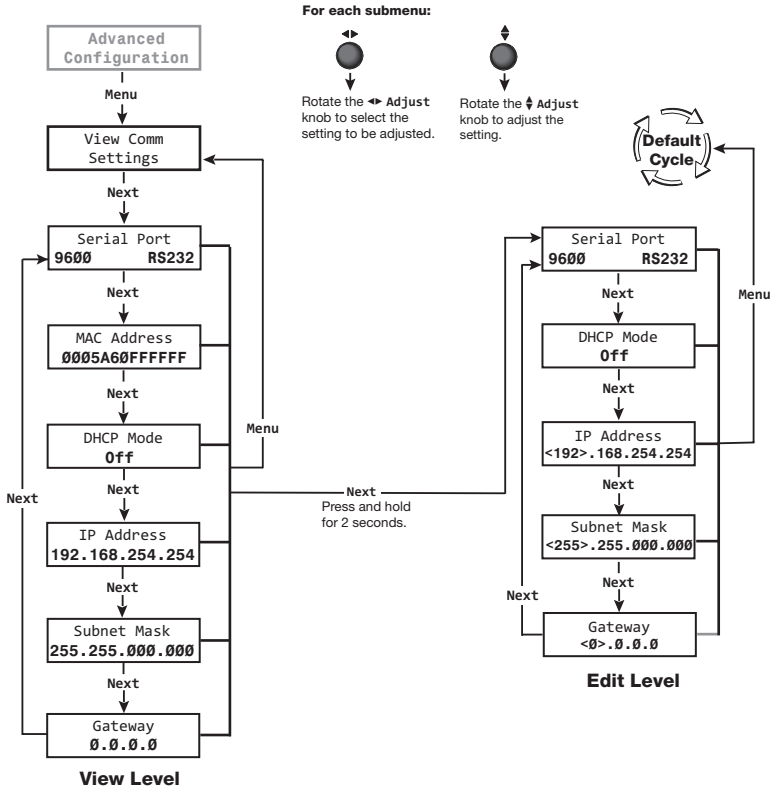


Figure 20. View and Edit Comm Settings Menu Flow

Viewing serial port and IP settings

When you first reach the Comm Settings menu, the View Comm Settings level is displayed. At this level, all screens that are cycled through by pressing **NEXT** show the current settings. The **ADJUST** knobs are disabled, and no changes can be made via the LCD screen.

To view the serial port and IP settings:

1. From the View Comm Settings menu, 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.
2. Press **MENU** to return to the View Comm Settings screen.

Editing serial port and IP settings

To make changes to the serial port configuration, IP address, DHCP mode, gateway address, and subnet mask, access the `Edit Comm Settings` menu, then rotate the **ADJUST** knobs as described below.

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

1. With any `View Comm Settings` menu view-level screen displayed, press the **NEXT** button and hold it until the Serial Port screen appears (approximately 3 seconds).
2. Press **NEXT** repeatedly to cycle through the edit level screens.
3. To enter or change information on each screen:
   - `Serial Port` — Rotate the horizontal **ADJUST** knob (◄►) to select the baud rate (the default is **9600**).
   - `DHCP Mode` — Rotate either **ADJUST** knob to select **On** or **Off**.
   - `IP Address`, `Subnet Mask`, and `Gateway` — Rotate the horizontal **ADJUST** knob (◄►) to move the angle brackets to the desired octet. Rotate the vertical **ADJUST** knob (▲▼) to adjust the number. Repeat as needed.

     NOTE: DHCP must be set to **Off** before you can edit the IP addresses.
4. When finished editing the settings for the selected item, either press **NEXT** to display the next item, or press **MENU** to exit the **Edit Comm Settings** menu and go to the default cycle.

Additional Functions

HDCP Authorization

The HDCP Authorized function allows the MGP 641 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 may encrypt the HDMI, because it can see that the MGP 641 HDMI input supports HDCP authorization. If you were going to send only the HDMI output of the MGP 641 to a display (sink) that supported HDCP, there would be no problem. However, if you wanted to use the MGP analog output to an analog sink, the green HDCP notification screen would be displayed, due to the source unnecessarily enabling encryption on its HDMI output.

Disabling HDCP authorization on one of the MGP 641 HDMI inputs ensures that the PC with non-HDCP protected content determines that the signal path does not support HDCP, and therefore does 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 641. With HDCP authorization enabled on an input, if HDCP protected content is selected on the source, the source either simply mutes its video output to black, or displays a warning message.

HDCP authorization is available also via SIS commands (see the **HDCP Authorization commands** on page 48 or via VCS (see the *VCS Help File*).

Locking the Front Panel (Executive Mode)

To prevent access by unauthorized users or accidental changes to the MGP 641 settings, some of the front panel controls can be locked using executive mode (the rear panel RS-232, front panel Config, and the LAN ports remain unlocked).

The following lock modes are available via SIS commands (see **Front Panel Lock Mode (Executive Mode)** on page 62) and VCS (see the *VCS Help File*). Only mode 2 is available from the front panel.

- **Mode 0 (default)** — All front panel locks are disabled, allowing access to all front panel functions.
- **Mode 1** — All front panel buttons and knobs are disabled.
- **Mode 2** — Limited front panel controls are available, including **MUTE**, **FREEZE**, **AUTO IMAGE**, and **PRESET RECALL/SAVE** buttons.

  NOTE: This is the only mode that can be enabled via the front panel.

  You can enable or disable executive mode 2 from the front panel when the system is in the default cycle. To turn lock mode on, press the **MENU** and **NEXT** buttons simultaneously, and hold them until the following message appears on the LCD screen (approximately 2 seconds).

  ```
  EXEC MODE 2
  ENABLED
  ```

  Figure 21. Front Panel Lock Mode Message

To disable front panel lock mode 2, press and hold the **MENU** and **NEXT** buttons until the message shown at right appears in the LCD window (approximately 2 seconds).

```
EXEC MODE
DISABLED
```

Resetting

Resetting the unit causes various settings to revert to factory defaults. There are three reset modes (numbered 1, 4, and 5 to facilitate comparison with Extron IP Link products) that are initiated by pressing the **RESET** button on the rear panel. This button is recessed, and can be pressed by a pointed stylus, ballpoint pen, or small screwdriver such as the Extron Tweeker (provided). The **Reset Modes Summary table** on the next page summarizes 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 641.	• The factory-installed default firmware version is restored for a single power cycle. • All user files and settings (drivers, audio adjustments, IP settings, and so on) are maintained. • Does not clear the current configuration.	Use mode 1 to remove a version of firmware if incompatibility issues arise.
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).	• Sets port mapping to the factory default. • Turns DHCP off. The Reset LED blinks four times in quick succession during the reset.	Mode 4 resets all IP settings to factory defaults.

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).
	Nothing happens if the momentary press does not occur within 1 second.
		Performs a complete reset to factory defaults (with the exception of the firmware), which includes:
		• Everything mode 4 does
		• Reset of most real time adjustments:
		  • Clears all ties, presets, and video settings.
		  • Resets all IP options.
		  • Removes or clears all MGP user files.
		• Resets the initial factory-configured password (the unit serial number) to `extron.`
		The reset LED blinks four times in quick succession during the reset.
			Mode 5 is useful if you want to start over with the configuration.
			This is the equivalent of the SIS command Esc Z Q Q Q ← (absolute system reset).

	NOTE: The mode 5 reset clears all adjustments. To save these settings, use VCS to back up the current configuration (see the *VCS Help File* for information).		

Remote Configuration and Control

The MGP 641 can be configured and controlled via Extron Simple Instruction Set (SIS) commands when connected to a host computer or other device (such as a control system). Attach the host device to the rear panel RS-232 connector or LAN connector, or to the front panel USB port. The default protocol for the RS-232 connection is 9600 baud, 8 data bits, 1 stop bit, no parity, and no flow control. This section describes SIS communication and control. Topics in this section include:

- **Host and Processor Communication**
- **SIS Overview**
- **Command and Response Table for MGP 641 SIS Commands**
- **Command and Response Table for IP SIS Commands**
- **Videowall Configuration Software (VCS) Program**

Host and Processor Communication

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command sequence. When the MGP determines that a command is valid, it executes the command and sends a response to the host device. All responses from the MGP to the host end with a carriage return and a line feed (CR/LF = ↵), indicating the end of the response character string (one or more characters).

Connecting the MGP to the host

Use one of the following methods to establish communication between the host and the MGP:

- **RS-232** — Connect the unit to the host via the rear panel Remote RS-232 connector. To enter SIS commands, use a communication utility such as Extron DataViewer, available at **www.extron.com**.
- **Ethernet** — Ensure the unit is connected to the host via the rear panel LAN port. To enter SIS commands, use a secure communication utility that supports Secure Shell (SSH). Enter the MGP IP address where requested and use `22023` as the port number.
- **Ethernet over USB** — Connect the host to the front panel USB Config port. To enter SIS commands, use a secure communication utility that supports Secure Shell (SSH). Enter **`203.0.113.22`** for the IP address where requested and **`22023`** as the port number.

To log in to the MGP via Ethernet or Ethernet over USB:

- **User name** = `admin`
- **Password** = {*unit serial number*} if the unit is new, `extron` if the unit has had an absolute system reset.

  NOTE: Performing a unit factory reset (entering a `ZQQQ` (**Absolute system reset**) SIS command or a **mode 5 reset** via the rear panel **Reset** button) changes the serial number password to `extron`.

- **USB** — (Ethernet over USB) Connect the unit to the host via the front panel USB Config port. To enter SIS commands, use a secure communications utility that supports Secure Shell (SSH).

  Where requested by the communications software, enter the information for USB connections:

  - Autoconfiguration Enabled: **Yes**
  - Subnet Mask: **255.255.255.248**
  - Default DHCP server address (Ethernet over the MGP 641 USB port): **203.0.113.22**

Initial Power Up Messages

The copyright message is displayed upon connecting to the unit via SSH, TCP/IP, or Telnet or after a power cycle via RS-232.

↵ `(c) Copyright` *`YYYY`*`, Extron Electronics, MGP 641, V`*`n.nn`*`, 60-1574-01`↵
`Ddd, DD MMM YYYY HH:MM:SS` ↵ (day, date, and time as in `Wed, 07 Oct 2020 11:27:33`)

- *`YYYY`* is the year.
- `V`*`n.nn`* is the firmware version number.

Password Messages

If the MGP 641 is protected by a password, the following password message prompts you for the password to access the MGP features.

↵`Password`↵

The prompt requires a password, followed by a carriage return. The prompt is repeated if the correct password is not entered.

- **For initial setup** — The factory-configured passwords for all accounts on the MGP have been set to the device serial number. Passwords are case-sensitive.

  This means that, for initial setup, you must enter the serial number of your unit at the password prompt (the serial number can be found on a label on the rear panel). This password allows administrator level access.

  If the correct password is entered, access is granted and the command prompt is displayed. If the password is incorrect, the ↵`Password`↵ prompt reappears.

- **After initial access** — You can keep the serial number password or change it. You can also set administrator and user level passwords (see **Passwords** on page 72).

  NOTE: Performing a unit factory reset (entering an Esc`ZQQQ`↵ [**Absolute system reset**] SIS command or a **mode 5 reset** via the rear panel **RESET** button) converts the serial number password to `extron`.

When you enter the new password correctly, the unit responds with one of the following, depending on the password entered:

- ↵Login Administrator↵
- ↵Login User↵

(If the password is **not** accepted, the Password prompt reappears.)

The Login Administrator response represents administrator level access, while the Login User response represents user level access. If the passwords are the same for both administrator and user, the unit defaults to administrator privileges.

If the unit is **not** password-protected, it is ready to accept SIS commands immediately after it sends the copyright message.

Processor-initiated Messages

When certain local events occur, such as a change in the input or output HDCP status, the MGP responds by sending a message to the host. No response is required from the host. The following messages may be sent:

- Reconfig X1↵ A change in the input frequency was detected for input X1.
- HplgO X2↵ A hot plug event was detected on output X2.
- HdcpI X1*X44↵ A change was detected in the HDCP status (X44) of input X1.
- HdcpO X2*X44↵ A change was detected in the HDCP status (X44) of output X2.
- IN00•X61*...*X61↵ This message appears when a sync change (detected or removed) occurs on any input.

  X61 is the video signal status for each input. For X61, 0 = no input signal detected, 1 = input signal detected.

Error Responses

When the MGP receives a valid command, it executes the command and sends a response to the host device. If the unit is unable to execute the command, it returns an error response to the host.

E01 — Invalid input number
E10 — Invalid command
E11 — Invalid preset number
E12 — Invalid port or output number
E13 — Invalid parameter
E14 — Not valid for this configuration
E17 — Invalid command for signal type
E22 — Busy
E24 — Privilege violation
E25 — Device not present
E26 — Maximum number of connections exceeded
E28 — Bad filename or file not found
E33 — Bad file type or size

SIS Overview

Using the Command and Response Tables

The **command and response tables for SIS commands**, starting on page 48, list the commands that the processor recognizes as valid, the responses that are returned to the host, a description of the command function or the results of executing the command, and examples of commands in ASCII (Telnet).

ASCII to Hex Conversion Table

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	I	7C	}	7D	~	7E	DEL	7F

Esc 1B CR ØD LF ØA

Figure 22. ASCII to Hexadecimal Character Conversion Table

Symbol Definitions

↵ = Carriage return with line feed (hex `0D 0A`)

← or | = Carriage return (no line feed) (hex `0D`)
For web browser commands, use the pipe character (`|`) instead of the soft return (←).

• = Space character

Esc or `W` = <**`Escape`**> key (hex `1B`)

24 = Error code response from the unit if a command is entered incorrectly (linked to **Error Responses** on page 40).

MGP 641 command definitions

X1 = Input (window) selection
Response is two digits, padded with a zero.
`0` = All windows
`1` = Window 1
`2` = Window 2
`3` = Window 3
`4` = Window 4
`98` = Foreground (logo commands only)
`99` = Background (valid only for EDID, HDCP authorization, HDCP status, audio, and information request commands)

X2 = Output number
`1` = HDMI output
`2` = TP output
`3` = Analog audio output — local 5-pole captive screw and remote DTP analog audio (valid only for audio mute commands)
`99` = All outputs

X3 = Input video type
`1` = HDMI or DVI

X8 = Active pixels
Response is four digits, padded with zeros.

X9 = Active lines
Response is four digits, padded with zeros.

X10 = On or off, enable or disable
`0` = Off or disable
`1` = On or enable

X12 = Internal temperature in degrees Celsius
Response is two digits, padded with a zero.

X13 = Horizontal and vertical frequencies
Response is three digits with one decimal place and padded with zeros. Example: `075.3`

X14 = Text label or name — Up to 32 characters.
- **Cannot** contain `,` `*` `|`.
- The first character must be a **letter**.
- The last character **cannot** be a hyphen.
- No distinction is made between uppercase and lowercase letters.

Default names:
- Unsaved locations = *`[unassigned]`*
- Saved window preset = `Window Preset` *`nnn`*
  Example: `Window Preset 005`.
- Saved input preset = `Input Preset` *`nnn`*
  Example: `Input Preset 012`
- Saved logo = `Logo` *`nn`*. Example: `Logo 05`
- Input name: `Input` *`n`* Example: Input 4

Saving a blank or a single space repopulates with the default name.

X15 = Picture adjustment — `0` to `127`
Default = `64`
Response is three digits, padded with zeros.

X16 = Horizontal and vertical shift (center or position)
- Range for image and windows: `-32768` to `+32768`
- Range for logo and clock: `0` to `+4096`

Limits are ± the output resolution.
Response is five digits, padded with zeros and preceded by `+` or `–`.

X17 = Horizontal and vertical size range for image and window:
`10` to `32768`
Minimum = 1/16 the size of the active output area.
Maximum = 2x the size of the active output area.
Response is five digits, padded with zeros.

X18 = Detected input format
`0` = no signal
`1` = HDMI
`2` = DVI

X21 = Output resolution and EDID emulation
Response is two digits, padded with a zero.

See **Output resolutions and EDID emulation** on the next page.

X22 = Test patterns
`0` = off (default)
`1` = Crop
`2` = Alternating Pixels
`3` = Crosshatch
`4` = Colorbars
`5` = Grayscale
`6` = Audio Test
- Displays Crop pattern with on-screen text `Audio Test`.
- Outputs pink noise at 48 KHz, 24 bit, stereo.

X25 = Window preset — `1` - `128`
Response is three digits, padded with zeros.

X26 = Input preset — `1` - `128`
Response is three digits, padded with zeros.

X27 = Logo or image assignments — `1` - `32`
Response is three digits, padded with zeros.

X28 = Output sync timeout — Number of seconds before output sync times out.
`1` - `500` seconds, in 1-second increments
`0` = Output sync is instantly disabled with no active video on any of the inputs.
`501` = Output sync never times out.

X29 = Front panel lock (executive mode) status
`0` = Unlocked (default)
`1` = All front panel controls locked
`2` = Partial front panel lock: window preset recall, mute, freeze, and auto image buttons are available.

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

Output resolutions and EDID emulation — X21

Automatic (EDID matches current processor output resolution)**	0**
Output A HDMI (EDID export only)	1
Output B DTP2 (EDID export only)	2

Resolution	23.98 Hz	24 Hz	25 Hz	29.97 Hz	30 Hz	50 Hz	59.94 Hz	60 Hz
640x480								10
800x600								11
1024x768								12
1280x768								13
1280x800								14
1280x1024								15
1360x768								16
1366x768								17
1440x900								18
1400x1050								19
1600x900								20
1680x1050								21
1600x1200								22
1920x1200								23
480p							24	25
576p						26		
720p			29	30	31	32	33	34
1080i						35	36	37
1080p	38	39	40	41	42	43	44	45*
2048x1080 (2K)	46	47	48	49	50	51	52	53
2048x1200								54
2048x1536								55
2560x1080								56
2560x1440								57
2560x1600								58
3840x2160	59	60	61	62	63	64	65	66
4096x2160***	69	70	71	73	73	74	75	76
Custom EDID/Output rate 1			201		Custom EDID/Output rate 2			202
Custom EDID/Output rate 3			203		Custom EDID/Output rate 4			204
Custom EDID/Output rate 5			205		Custom EDID/Output rate 6			206
Custom EDID/Output rate 7			207		Custom EDID/Output rate 8			208
Custom EDID/Output rate 9			209		Custom EDID/Output rate 10			210

*Default output resolution
**Default EDID
***Not available as an EDID, only as an output rate option

X39 = Aspect ratio setting
1 = Fill — Each input rate fills the entire window (default).
2 = Follow — Each input rate is displayed with its native aspect ratio.

X40 = Screen saver mode
1 = Disabled (default)
2 = Blue screen

X42 = Window (video output) mute
0 = Unmute (default)
1 = Mute video to black screen
2 = Mute video and sync (for output mute only).

X44 = HDCP input status
0 = No source device detected
1 = Source detected but no HDCP present
2 = Source detected with HDCP

X45 = HDCP output status
0 = No sink device detected
1 = Sink detected but no HDCP present
2 = Sink detected with HDCP

X46 = HDCP output mode
0 = Off — Disable all HDCP authentication and encryption attempts.
1 = Follow input (with a maximum of 10 seconds of authentication trials, default).
2 = Encrypt output (with a maximum of 10 seconds of authentication trials.
3 = Follow input (with continuous trials).
4 = Encrypt output (with continuous trials).

X47 = HDCP notification mode
0 = Black screen — Notification disabled (mute output)
1 = Green screen (default)

X48 = Digital output format
0 = Auto — HDMI RGB Full to a CEA sink, or DVI to a non-CEA sink (default)
1 = DVI — RGB 444, 0-255, no audio packet or InfoFrames.
2 = HDMI RGB Full — RGB 444, 0-255, audio packet, InfoFrames
3 = HDMI RGB Limited — RGB 444, 16-235, audio packet, InfoFrames
5 = HDMI YUV 444 Limited — YUV 444, 16-235, audio packet, InfoFrames
7 = HDMI YUV 422 Limited — YUV 422, 16-235, audio packet, InfoFrames

X61 = Video signal status
0 = Video or TMDS signal not detected
1 = Video or TMDS signal detected

X63 = Screen saver status
0 = Active input detected, timer not running
1 = No active input, timer running, output sync still active
2 = No active input, timer expired, output sync disabled

X69 = Image or display rotation
0 = Disabled (default)
1 = 90 degrees clockwise (the LCD panel displays +90 degrees)
2 = 90 degrees counterclockwise (the LCD panel displays -90 degrees)

X70 = Effect variable
0 = Transparency (not available for background color)
1 = Red of RGB key or background color
2 = Green of RGB key or background color
3 = Blue of RGB key or background color
4 = Level key (not available for background color)

X71 = Effect level setting — 0 - 255

X72 = Window preset effect
0 = Cut — The windows instantly cut to the new location and size defined by the recalled preset.
1 = Animated — The windows move and resize dynamically on screen to the location and size defined by the recalled preset.

X73 = Effect duration — 00 - 50 in 0.1-second increments
Default = 05 = 0.5 seconds.

X74 = Logo or video key effect
0 = Disabled (default)
1 = Transparency
2 = RGB key
3 = Level key

X75 = Background options
0 = Black (default)
1 = Red
2 = Green
3 = Blue
4 = White
5 = Magenta
6 = Cyan
7 = Yellow
8 = User defined color
9 = User defined image
10 = Live background input

X76 = Window border style presets — 0 - 128
0 = No border
Response is three digits, padded with zeros.

X77 = Upstream switch effect (video signal change within a window)
0 = Cut — Immediately switch to black on loss or change of signal (default).
1 = Fade — Freeze last frame on loss or change of sync and fade to black.
2 = Seamless fade — Freeze last frame on loss or change of sync and seamlessly dissolve to new signal when it is locked.
3 = Seamless cut — Freeze last frame on loss or change of sync and seamlessly cut to new signal when it is locked.
4 = Low latency mode — The MGP attempts to display the new signal as quickly as possible. Also removes two frames of video delay from the video processing logic and may introduce video artifacts during the switch.

X78 = Window mute effect
0 = Cut
1 = Dissolve

X79 = Twisted pair format
0 = DTP (default)
1 = XTP
2 = HDBaseT

X80 = DTP remote power
0 = No remote power (default)
1 = DTP (non-DTP2), 12 VDC
2 = DTP2, 48 VDC

X81 = Audio output format
1 = Dual mono
2 = Stereo (default)

X82 = Audio input format
0 = None (muted). Configures input EDID with no audio support.
2 = LPCM-2Ch — Configures input EDID for LPCM-2Ch support. Passes all digital audio input signals to the HDMI outputs. If LPCM-2Ch audio is present, it is also de-embedded to the 5-pole captive screw analog output (default).
3 = Multi-Ch — Configures input EDID for Multi-Ch support. Passes all digital audio input signals to the HDMI outputs. If LPCM-2Ch audio is present it is also de-embedded to the 5-pole captive screw analog output.

X83 = Configuration file type.

NOTE: Configuration files are stored on directory/nortxe-backup, created on the unit when the configuration is saved.

0 = IP config file (ip.cfg)
2 = Unit-specific parameters file (box.cfg)

X99 = Video output bit depth
0 = Auto — 10-bit to sinks with deep color support (interface and rate permitting), 8-bit to all others
1 = Force 8-bit

IP, RS-232, and query command definitions

X101 = Port number
1 = RS-232 port (3-pole captive screw)
2 = UART on DTP output

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

X111 = Firmware version number (listed to two decimal places)

X113 = Local date and time format - **set**:
MMM/DD/YY-HH:MM:SS
Example: 06/21/20-10:54:12

Local date and time format - **view**:
Ddd, DD Mmm YYYY HH:MM:SS
Example: Fri, 26 Sep 2008 18:19:33

X114 = 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.

X118 = Hardware (MAC) address (*xx-xx-xx-xx-xx-xx*)

X119 = 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.

X122 = Verbose response mode
0 = Clear/none (default for Telnet connections).
1 = Verbose mode is on (enabled) (default for RS-232 connections).
2 = Verbose mode is off, tagged responses are sent for queries (tagged responses are enabled).
3 = Verbose mode is on (enabled) and tagged responses are enabled and sent for queries

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

Command: Esc CN↵
Response: Ipn • X14 ↵

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

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

X122 Value	Verbose Responses **Receive unsolicited responses (messages) for all actions** initiated via any source (touchpanel, port input, internal web page changes, or commands) instead of only for SIS commands	Tagged Responses **Receive tagged responses to read or view commands** (Responses to SIS commands are always tagged. Turning tagged responses on adds tags to the responses to SIS read requests.)
0		
1	✓	
2		✓
3	✓	✓

See the **Set verbose mode** command (Esc CV ↵) on page 68 in the "Command and Response Table for IP Commands" for a brief explanation of what this communication mode is and what it does.

X125 = Baud rate — 9600, 19200, 38400, or 115200

X126 = Parity (only the first letter is needed):
O[dd], E[ven], N[one], S[pace]

X127 = Data bits — 7 or 8

X128 = Stop bits — 1 or 2

X132 = Password — view
- RS-232 connection responds with the password.
- The IP connection responds with four asterisks (****) if a password exists, and with an empty space if none exists (instead of with an actual password).

X133 = Password — set
- Length is 1-128 characters.
- All human-readable characters are allowed except |.
- The password cannot be a single space.
- Passwords are case-sensitive.
- A user password cannot be assigned if no administrator password exists. An E14 error code is returned.
- If the admin password is cleared, the user password is cleared as well.

NOTE: The factory configured passwords for all accounts on this device have been set to the device serial number. In the event of a complete system reset, the passwords convert to the default, which is extron.

X149 = Default name — A combination of the model name and the last three character pairs of the unit MAC address. Example: MGP-641-00-02-3D)

X152 = Connection security level
0 = Not logged in
1 = User
2 = Administrator

X169 = Time zone code —The code is an acronym for the time zone (2-6 letters) (see the **List all time zones** command on page 66 to view a list of available time zones).

X170 = Time zone description — The UTC equivalent for a particular time zone as well as a general description of the geographical area. The description is formatted as {*UTC offset*} : {*location name*}.

X171 = Network Time Protocol (NTP) setting
0 = Enabled
1 = Disabled
2 = Synced

X172 = Number of Ethernet port connections

X199 = Prefix representing subnet mask bits (subnet mask value in CISG commands).
Default = /16, which represents the default subnet mask, 255.255.0.0.

Example: 255.255.240.0 is represented as /20.

Command and Response Table for MGP 641 SIS Commands

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Input Configuration			
Input Video Format			
View detected input format	X1*\	X18↵ *Verbose modes 2 and 3:* VtypX1*X18↵	View video format X18 detected on input X1.
Input EDID			
Specify an EDID value	EscAX1*X21EDID←	EdidAX1*X21↵	Assign EDID X21 to input X1.
View assigned EDID	EscAX1EDID←	X21↵	View EDID X21 for input X1.
Save the output EDID to a custom slot	EscSX2*X21EDID←	EdidSX2*X21↵	Save the EDID of output X2 to X21.
NOTE: For the Save command, X21 can be 201 - 210 only.			
Export EDID file	EscEX21,<*filename*>EDID←		
		EdidEX21↵	Export EDID X21 to <*filename*>.
Import EDID file	EscIX21,<*filename*>EDID←		Import EDID X21 from <*filename*>.
		EdidIX21↵	
NOTES: • For the Import EDID command, X21 can be 201 - 210. • <*Filename*> can optionally be a full path name. The EDID file format is 128 or 256 bytes of binary data with a **.bin** extension.			
HDCP Authorization			
Enable HDCP authorization	EscEX1*1HDCP←	HdcpEX1*1↵	Enable HDCP authorization for input X1 (default).
Disable HDCP authorization	EscEX1*0HDCP←	HdcpEX1*0↵	Disable HDCP authorization for input X1.
View HDCP authorization status	EscEX1HDCP←	X10↵	View HDCP authorization status X10.

KEY:

X1 = Input (window) selection
- 0 = All windows
- 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4
- 99 = Background (valid only for EDID, HDCP authorization, HDCP status, audio, and information request commands)

X2 = Output number
- 1 = HDMI output
- 2 = TP output
- 3 = Analog audio output — local 5-pole captive screw and remote DTP analog audio (valid only for audio mute commands)
- 99 = All outputs

X10 = On or Off status
- 0 = Off or disabled
- 1 = On or enabled (default)

X18 = Detected input format
- 0 = no signal, 1 = HDMI, 2 = DVI

X21 = Output resolution and EDID emulation
- Response is two digits, padded with a zero.
- See **Output Resolutions and EDID Emulation** on page 43.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Input Configuration (continued)			
Input Aspect Ratio			
Set for fill	Esc X1 *1ASPR ←	Aspr X1 *1 ↵	Set input X1 to always fill the entire window (default).
Set to follow	Esc X1 *2ASPR ←	Aspr X1 *2 ↵	Set input X1 to maintain its current native aspect ratio in the window.
View aspect setting	Esc X1 ASPR ←	X39 ↵	View current aspect ratio setting X39 for input X1.
Input Name			
Write input name	Esc X1 , X14 NI ←	Nmi X2 , X14 ↵	Set name X14 for input X1.
NOTE: To reset an input name to the default, enter a single space for X14.			
View input name	Esc X1 NI ←	X14 ↵	View name X14 of input X1.
Auto-Image			
Execute	X1 *0A	Img X1 *0 ↵	Execute an Auto-Image for the current input (follows the current aspect ratio setting).
Execute and fill	X1 *1A	Img X1 *1 ↵	Execute an Auto-Image and fill the window.
Execute and follow	X1 *2A	Img X1 *2 ↵	Execute an Auto-Image and maintain the aspect ratio of the current input.
Active Pixels and Lines			
View active pixels	Esc X1 APIX ←	X8 ↵ *Verbose modes 2 and 3:* Apix X1 * X8 ↵	View active pixels X8 for input X1.
View active lines	Esc X1 ALIN ←	X9 ↵ *Verbose modes 2 and 3:* Alin X1 * X9 ↵	View active lines X9 for input X1.

KEY:

X1 = Input (window) selection
- 0 = All windows
- 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4
- 99 = Background (valid only for EDID, HDCP authorization, HDCP status, audio, and information request commands)

X8 = Active pixels

X9 = Active lines

X14 = Input name

Text label or name — Up to 32 characters.
- **Cannot** contain , * |.
- The first character must be a **letter**.
- The last character **cannot** be a hyphen.
- Names are not case-sensitive.
- Default input name: Input *n* (example: Input 4). Saving a single space repopulates with the default name.

X39 = Aspect ratio setting
- 1 = Fill — Each input rate fills the entire window (default).
- 2 = Follow — Each input rate is displayed with its native aspect ratio.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Input Configuration (continued)			
Input Image Rotation (Inputs 2 and 4 Only)			
Set rotation direction	Esc I X1 * X69 ROTA ←	RotaI X1 * X69 ↵	Set the direction of rotation for input X1 to X69.
View rotation direction	Esc I X1 ROTA ←	X69 ↵	View rotation direction X69 for input X1.
Picture Adjustments			
Window Mute			
Mute window	X1 *1B	Vmt X1 *1 ↵	Mute (blank) window (input) X1.
Unmute window	X1 *0B	Vmt X1 *0 ↵	Unmute (display) window X1.
View mute status	X1 B	X42 ↵	View mute status X42 for window X1.
Output Mute			
Mute output to black	99*1B	Vmt99*1 ↵	Mute the output to black.
Mute output and sync	99*2B	Vmt99*2 ↵	Mute the output and disable the sync.
Unmute output	99*0B	Vmt99*0 ↵	Unmute output. Window mute status persists.
View output mute status	99B	X42 ↵	View output mute status X42.
NOTE: Window mute status is not affected by the output mute setting.			
Window Priority			
Set priority	X1 * X1 * X1 * X1 ~	Pri X1 * X1 * X1 * X1 ↵	Set the priority of the windows to the order entered.
View priority	~	X1 * X1 * X1 * X1 ↵	Display the priorities of the windows.
Freeze			
Enable	X1 *1F	Frz X1 *1 ↵	Freeze window X1.
Disable	X1 *0F	Frz X1 *0 ↵	Unfreeze window X1.
View	X1 F	X10 ↵	Show the freeze status of window X1.

KEY:

X1 = Input (window) selection
- 0 = All windows
- 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4

X10 = On or Off status
- 0 = Off or disabled
- 1 = On or enabled

X42 = Window (video output) mute
- 0 = Unmute (default)
- 1 = Mute video to black screen
- 2 = Mute video and sync (for output mute only).

X69 = Image or display rotation
- 0 = Disabled (default)
- 1 = 90 degrees clockwise (the LCD panel displays +90 degrees)
- 2 = 90 degrees counterclockwise (the LCD panel displays -90 degrees)

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Picture Adjustments (continued)			
Horizontal Shift (Window)			
Set a specific horizontal shift value for the window	Esc W X1*X16HCTR←	Hctr W X1*X16↵	Set the horizontal centering of window X1 to X16.
Increment horizontal window shift	Esc W X1 + HCTR←	Hctr W X1*X16↵	Shift window X1 **right**.
Decrement horizontal window shift	Esc W X1 – HCTR←	Hctr W X1*X16↵	Shift window X1 **left**.
View horizontal window shift amount	Esc W X1HCTR←	X16↵	View the amount of horizontal window shift (X16).
Vertical Shift (Window)			
Set a specific vertical shift value for the window	Esc W X1*X16VCTR←	Vctr W X1*X16↵	Set the vertical centering of window X1 to X16.
Increment vertical window shift	Esc W X1 + VCTR←	Vctr W X1*X16↵	Shift window X1 **down**.
Decrement vertical window shift	Esc W X1 – VCTR←	Vctr W X1*X16↵	Shift window X1 **up**.
View vertical window shift amount	Esc W X1VCTR←	X16↵	View the amount of horizontal window shift (X16).
Horizontal Size (Window)			
Set a specific value	Esc W X1*X17HSIZ←	Hsiz W X1*X17↵	Set the width of window X1 to X17.
Increase the horizontal size of the window	Esc W X1 + HSIZ←	Hsiz W X1*X17↵	Widen the window.
Decrease the horizontal size of the window	Esc W X1 – HSIZ←	Hsiz W X1*X17↵	Narrow the window.
View the horizontal size of the window	Esc W X1HSIZ←	X17↵	View the width (X17) of the window.
Vertical Size (Window)			
Set a specific value for the vertical size of the window	Esc W X1*X17VSIZ←	Vsiz W X1*X17↵	Set the height of window X1 to X17.
Increase the vertical size of window	Esc W X1 + VSIZ←	Vsiz W X1*X17↵	Increase the height of the window.
Decrease vertical size of the window	Esc W X1 – VSIZ←	Vsiz W X1*X17↵	Decrease the height of the window.
View the vertical size of the window	Esc W X1VSIZ←	X17↵	View the height (X17) of the window.

KEY:

X1 = Window (input) number
- 0 = All windows
- 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4

X16 = Horizontal and vertical shift (center or position)
- -32768 to +32768
- Limits are ± the output resolution.
- Response is five digits, padded with zeros and preceded by + or –.

NOTE: A negative (**–**) number shifts the window to the **left**. A positive (**+**) number shifts it to the **right**.

X17 = Horizontal and vertical size (width and height)
- 10 to 32768
- Minimum = 1/16 the size of the active output area.
- Maximum = 2x size of the active output area.
- Response is five digits, padded with zeros.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Picture Adjustments (continued)			
Horizontal Shift (Image)			
Set a specific horizontal shift value for the image	Esc I X1*X16HCTR←	Hctr I X1*X16↵	Set the horizontal centering of the image in window X1 to X16.
Increment the horizontal image shift	Esc I X1 + HCTR←	Hctr I X1*X16↵	Shift the image in window X1 **right**.
Decrement the horizontal image shift	Esc I X1 – HCTR←	Hctr I X1*X16↵	Shift the image in window X1 **left**.
View the horizontal image shift amount	Esc I X1HCTR←	X16↵	View the amount of horizontal image shift (X16).
Vertical Shift (Image)			
Set a specific vertical shift value for the image	Esc I X1*X16VCTR←	Vctr I X1*X16↵	Set the vertical centering of the image in window X1 to X16.
Increment the vertical image shift	Esc I X1 + VCTR←	Vctr I X1*X16↵	Shift the image in window X1 **down**.
Decrement the vertical image shift	Esc I X1 – VCTR←	Vctr I X1*X16↵	Shift the image in window X1 **up**.
View the vertical image shift amount	Esc I X1VCTR←	X16↵	View the amount of horizontal image shift (X16).
Horizontal Size (Image)			
Set a specific horizontal size value for the image	Esc I X1*X17HSIZ←	Hsiz I X1*X17↵	Set the width of the image in window X1 to X17.
Increase the horizontal size of the image	Esc I X1 + HSIZ←	Hsiz I X1*X17↵	Widen the image in window X1.
Decrease the horizontal size of the image	Esc I X1 – HSIZ←	Hsiz I X1*X17↵	Narrow the image in window X1.
View the horizontal size of the image	Esc I X1HSIZ←	X17↵	View the width (X17) of the image in window X1.
Vertical Size (Image)			
Set a specific value for the vertical size of the image	Esc I X1*X17VSIZ←	Vsiz I X1*X17↵	Set the height of the image in window X1 to X17.
Increase the vertical size of the image	Esc I X1 + VSIZ←	Vsiz I X1*X17↵	Increase the height of the image in window X1.
Decrease the vertical size of the image	Esc I X1 – VSIZ←	Vsiz I X1*X17↵	Decrease the height of the image in window X1.
View the vertical size of image	Esc I X1VSIZ←	X17↵	View the height (X17) of the image in window X1.

KEY:

X1 = Window (input) number

0 = All windows
1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4

X16 = Horizontal and vertical shift (center or position)

-32768 to +32768
0 = 2048. Limits are ± the output resolution.
Response is five digits, padded with zeros and preceded by + or –.

NOTE: A negative (**–**) number shifts the image to the **left** within the window. A positive (**+**) number shifts it to the **right**.

X17 = Horizontal and vertical size (width and height)

10 to 32768
Minimum = 1/16 the size of the active output area.
Maximum = 2x size of the active output area.
Response is five digits, padded with zeros.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Picture Adjustments (continued)			
Compound Window Size and Position			
Set window size and position	Esc X1,X16*X16*X17*X17 XWIN←	Xwin X1,X16*X16*X17*X17↵	For window X1, set the position (horizontal and vertical) to X16 and the size (width and height) to X17.
NOTE: The variables must be entered in the following order: horizontal position (X16), vertical position (X16), horizontal size (X17), vertical size (X17).			
View window size and position	Esc X1 XWIN←	X16*X16*X17*X17↵	View the position and size of window X1.
Compound Image Size and Position			
Set image size and position	Esc X1,X16*X16*X17*X17 XIMG←	Ximg X1,X16*X16*X17*X17↵	For the image in window X1, set the position (horizontal and vertical) to X16 and the size (width and height) to X17. X1 = 0-4. 0 = all windows. For X17: Minimum = 1/16 the size of the active input area. Maximum = double the active output area for 200% zoom.
NOTE: The variables must be entered in the following order: horizontal position (X16), vertical position (X16), horizontal size (X17), vertical size (X17).			
View image size and position	Esc X1 XIMG←	X16*X16*X17*X17↵	View the position (X16) and size (X17) of the image in window X1.

KEY:

X1 = Window (input) number
0 = All windows
1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4

X16 = Horizontal and vertical shift (center or position)
-32768 to +32768
Limits are ± the output resolution.
Response is five digits, padded with zeros and preceded by + or –.

NOTE: A negative (**–**) number shifts the window or image to the **left**. A positive (**+**) number shifts them to the **right**.

X17 = Horizontal and vertical size (width and height)
10 to 32768
Minimum = 1/16 the size of the active output area.
Maximum = 2x size of the active output area.
Response is five digits, padded with zeros.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Output Configuration			
Output Rate			
Set output rate	Esc X21RATE↵	RateX21↵	Select the output resolution and refresh rate (X21).
View output rate	EscRATE↵	X21↵	View the selected output rate.
HDMI Output Format			
Set output format	Esc X2*X48VTPO↵	VtpoX2*X48↵	Set the colorspace and format for output X2 to X48.
View format setting	Esc X2VTPO↵	X48↵	View the current output colorspace and format for output X2.
View auto output format	Esc X2*VTPO↵	X48↵	View the output format when X48 is set to 0 (Auto).
HDCP Output Mode			
Set HDCP mode	EscSX2*X46 HDCP↵	Hdcp SX2*X46↵	Set the HDCP mode for output X2 to X46.
View HDCP mode	EscSX2 HDCP↵	X46↵	View the HDCP mode for output X2.
Display Rotation			
Set display direction	EscOX69 ROTA↵	Rota OX69↵	Set the rotation of the display screen to X69.
View display rotation setting	EscO ROTA↵	X69↵	View current output rotation status X69.

KEY:

X2 = Output number
1 = HDMI output, 2 = TP output, 3 = Analog audio output (valid only for audio mute and audio format commands)
99 = All outputs

X21 = Output resolution and EDID emulation
Response is two digits, padded with a zero.
See **Output Resolutions and EDID Emulation** on page 43.

X46 = HDCP output mode
0 = Off — Disable all HDCP authentication and encryption attempts.
1 = Follow input (with a maximum of 10 seconds of authentication trials, default).
2 = Encrypt output (with a maximum of 10 seconds of authentication trials.
3 = Follow input (with continuous trials).
4 = Encrypt output (with continuous trials).

X48 = HDMI output format
0 = Auto — HDMI RGB Full to a CEA sink, or DVI to a non-CEA sink (default)
1 = DVI — RGB 444, 0-255, no audio packet or InfoFrames.
2 = HDMI RGB Full — RGB 444, 0-255, audio packet, InfoFrames
3 = HDMI RGB Limited — RGB 444, 16-235, audio packet, InfoFrames
5 = HDMI YUV 444 Limited — YUV 444, 16-235, audio packet, InfoFrames
7 = HDMI YUV 422 Limited — YUV 422, 16-235, audio packet, InfoFrames

X69 = Input or display rotation
0 = Disabled (default)
1 = 90 degrees clockwise (the LCD panel displays +90 degrees)
2 = 90 degrees counterclockwise (the LCD panel displays -90 degrees)

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Output Configuration (continued)			
Screen Saver (The action takes place when there is no active video or defined logo graphic in any of the windows or the background.)			
Set mode	Esc M X40 SSAV ←	Ssav M X40 ↵	Set the screen saver mode to X40.
View mode	Esc M SSAV ←	X40 ↵	View current screen saver mode X40 for the output.
Set screen saver duration before output sync timeout	Esc T X28 SSAV ←	Ssav T X28 ↵	Set the screen saver timeout duration to X28 seconds. Default = 501 seconds = never.
View screen saver duration before output sync timeout	Esc T SSAV ←	X28 ↵	View screen saver timeout duration X28.
View screen saver status	Esc S SSAV ←	X63 ↵ *Verbose modes 2 and 3:* Ssav S 1* X63 ↵	View screen saver status X63.
Window Configuration			
Window Border Style			
Set border style	Esc B X1*X76 WNDW ←	Wndw B X1*X76 ↵	Set the window border style to X76.
View setting	Esc B X1 WNDW ←	X76 ↵	View border style setting X76.

KEY:

X1 = Window (input) number
- 0 = All windows
- 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4

X28 = Output sync timeout (number of seconds before output sync times out)
- 1 - 500 seconds, in 1-second increments
- 0 = Output sync is instantly disabled with no active video on any of the inputs.
- 501 = Output sync never times out.

X40 = Screen saver mode
- 1 = Black screen (default)
- 2 = Blue screen

X63 = Screen saver status
- 0 = Active input detected, timer not running
- 1 = No active input, timer running, output sync still active
- 2 = No active input, timer expired, output sync disabled

X76 = Window border style
- Window border style presets — 0 - 128
- 0 = No border
- Response is three digits, padded with zeros.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Window Configuration (continued)			
Video Key Effect Selection			
Disable	Esc X1 *0 VKEF ←	Vkef X1 *0 ↵	Disable key effect for window X1.
Transparency	Esc X1 *1 VKEF ←	Vkef X1 *1 ↵	Enable transparency for window X1.
RGB Key	Esc X1 *2 VKEF ←	Vkef X1 *2 ↵	Enable RGB key for window X1.
Level Key	Esc X1 *3 VKEF ←	Vkef X1 *3 ↵	Enable Level key for window X1.
View setting	Esc X1 VKEF ←	X74 ↵ *Verbose modes 2 and 3:* Vkef X1 * X74 ↵	View current key effect X74 for window X1.
Video Key Effect Level			
Set specific value	Esc X1 * X70 * X71 VKEY ←	Vkey X1 * X70 * X71 ↵	Set the key level for X70 to X71.
View level setting	Esc X1 * X70 VKEY ←	X71 ↵	View the current setting for X70.

KEY:

X1 = Window (input) number
- 0 = All windows
- 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4

X70 = Effect variable
- 0 = Transparency (not available for background)
- 1 = Red of RGB key or background color
- 2 = Green of RGB key or background color
- 3 = Blue of RGB key or background color
- 4 = Level key (not available for background color)

X71 = Effect level setting
- 0 - 255

X74 = Video key effect
- 0 = Disabled (default)
- 1 = Transparency
- 2 = RGB key
- 3 = Level key

Presets

Save and Recall Window Presets

Recall preset	1 * X25 .	1Rpr X25 ↵	Recall window preset X25.
Save preset	1 * X25 ,	1Spr X25 ↵	Save the current layout to preset X25.
View last recalled preset	Esc L1 PRST ←	X25 ↵ *Verbose modes 2 and 3:* Prst L 1 * X25 ↵	View last recalled window preset X25.
Delete preset	Esc X1 * X25 PRST ←	Prst X 1 * X25 ↵	Reset window preset X25 to default.

Window Preset Name

Write preset name	Esc 1 * X25 , X14 PNAM ←	Pnam1 * X25 , X14 ↵	Set name X14 for window preset X25.

NOTE: To restore a window preset name to the default (Window Preset *nnn*), enter a single space for X14.

View preset name	Esc 1 * X25 PNAM ←	X14 ↵	View window preset name X14.

KEY:

X14 = Window preset name
- Can have up to 32 characters.
- Cannot contain , * |.
- The first character must be a letter.
- The last character cannot be a hyphen.
- Not case-sensitive.

X25 = Window preset number
- 1 - 128

Response is three digits, padded with zeros.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Presets (continued)			
Window Preset Effect			
Cut	Esc 0 WPEF ←	Wpef0 ↵	Set the window preset effect to cut.
Animated	Esc 1 WPEF ←	Wpef1 ↵	Set the window preset effect to animated (default).
View effect setting	Esc WPEF ←	X72 ↵	View window preset switch effect setting X72.
Window Mute Effect			
Cut	Esc 0 WMEF ←	Wmef0 ↵	Set the window mute effect to cut.
Dissolve	Esc 1 WMEF ←	Wmef1 ↵	Set the window mute effect to dissolve (default).
View mute effect setting	Esc WMEF ←	X78 ↵	View window preset switch effect setting X78.
Effect Duration — Window Mute and Window Preset Effects			
Set effect duration	Esc X73 EDUR ←	Edur X73 ↵	Set the duration of the current effect preset or mute effect to X73.
View effect duration	Esc EDUR ←	X73 ↵	View duration X73 of the current effect.

KEY:

X72 = Window preset effect
- 0 = Cut — The windows instantly cut to the new location and size defined by the recalled preset.
- 1 = Animated — The windows move and resize dynamically on screen to the location and size defined by the recalled preset.

X73 = Window effect duration — 00 – 50 in 0.1-second increments. Default = 05 = 0.5 seconds.

X78 = Window mute effect — 0 = Cut, 1 = Dissolve

Input Presets			
Recall input preset	2*X1*X26.	2Rpr X1*X26 ↵	Recall input preset X26 to window X1.
Save input preset	2*X1*X26,	2Spr X1*X26 ↵	Save the input settings for window X1 to input preset X26.
Delete input preset	Esc X2*X26 PRST ←	PrstX2*X26 ↵	Clear input preset X26 and set it to *[unassigned]*.
Input Preset Naming			
Write input preset name	Esc 2*X26,X14 PNAM ←	Pnam2*X26,X14 ↵	Set name X14 for input preset X26.
View input preset name	Esc 2*X26 PNAM ←	X14 ↵	View input preset name X14.

NOTE: To restore an input preset name to the default (`Input Preset` *nnn*), enter a single space for X14.

KEY:

X1 = Window (input) number — 0 = All windows, 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4

X14 = Input preset name
- Can have up to 32 characters.
- Cannot contain , * |.
- The first character must be a letter.
- The last character cannot be a hyphen.
- Not case-sensitive.

X26 = Input preset number — 1 - 128. Response is three digits, padded with zeros.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Presets (continued)			
Auto Layout Mode			
Disable	Esc 0 AUSW←	Ausw 0↵	Disable auto window layout mode (default).
Enable	Esc 1 AUSW←	Ausw 1↵	Enable auto window layout mode.
View layout mode status	Esc AUSW←	X10 ↵	View auto layout status X10.
Audio Configuration			
Audio Input Switching			
Select audio source	X1$	In X1 •Aud↵	Select the audio from input X1.
View selected audio input	$	X1 ↵	View currently selected audio input.
Audio Mute — Digital and Analog			
NOTES: • The mute setting persists after a power cycle. • Global audio mute is enabled by default.			
Enable global audio mute	1Z	Amt1↵	Mute all audio outputs.
Disable global audio mute	0Z	Amt0↵	Unmute all audio outputs.
Enable or disable discrete audio mutes	X2*X10Z	Amt X2 *X10↵	Set the mute status of audio output X2 to X10.
View discrete audio mute	X2*Z	X10↵	View mute status X10 of audio output X2.
View global mute status	Z	X10 •X10 •X10↵ *In verbose modes 2 and 3:* Amt X10 •X10 •X10↵	View audio mute status X10 of HDMI, DTP, and analog outputs.
Audio Input Format			
Set none	Esc I X1 *0 AFMT←	Afmt I X1 *0↵	Mute all audio for input X1.
Set LPCM-2Ch digital	Esc I X1 *2 AFMT←	Afmt I X1 *2↵	Select 2Ch digital audio for input X1.
Set Multi-Ch digital	Esc I X1 *3 AFMT←	Afmt I X1 *3↵	Select multi-Ch digital audio for input X1.
View format	Esc I X1 AFMT←	X82↵	View audio input type X82 for input X1.
Audio Output Format			
Set format	Esc O 1*X81 AFMT←	Afmt O 1*X81↵	Set the format for the audio output to X81.
View format	Esc O 1 AFMT←	X81↵	View audio output format X81.

KEY:

X1 = Window (input) number	0 = All windows, 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4
X2 = Output number	1 = HDMI output, 2 = TP output, 3 = Analog audio output (valid only for audio mute commands), 99 = All outputs
X10 = On or off status	0 = Off or disabled, 1 = On or enabled
X81 = Audio output format	1 = Dual mono, 2 = Stereo (default)
X82 = Audio input format (See the **symbol definitions for Audio input format** X82 on page 45 for more information.)	0 = None (muted). Configures input EDID with no audio support. 2 = LPCM-2Ch — Configures input EDID for LPCM-2Ch support. Passes all digital audio input signals to the HDMI outputs. 3 = Multi-Ch — Configures input EDID for Multi-Ch support. Passes all digital audio input signals to the HDMI outputs.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Image, Logo, and Clock Configuration			
Logo and Image Configuration			
Select image file	Esc A X27 , *filename* LOGO ←	LogoA X27 , *filename* ↵	Assign logo *filename* to logo preset slot X27.
NOTE: The image or logo file must be present in the Graphics directory. BMP, JPG, PNG, and TIFF images are allowed.			
Clear logo assignment	Esc X 3* X27 PRST ←	Prst X 3* X27 ↵	Clear logo X27 slot and set the logo name to [unassigned].
Query logo availability	Esc Q LOGO ←	{*32 characters*} ↵ *In verbose modes 2 and 3:* LogoQ 00*{*32 characters*} ↵	View status (saved or empty) of all logo and screen saver slots.
NOTE: The first 32 digits indicate the logo image slots.			
Logo Name			
Write logo name	Esc L X27 , X14 UNAM ←	UnamL X27 , X14 ↵	Set name X14 for logo X27.
NOTE: To restore a logo name to the default (Logo *nn*), enter a single space for X14.			
View logo name	Esc L X27 UNAM ←	X14 ↵	View name X14 of logo X27.
Logo, Image, or Background Recall			
Recall to window	Esc E X1 * X27 LOGO ←	LogoE X1 * X27 ↵	Recall logo X27 to be displayed in window X1.
Recall to foreground	Esc E 98* X27 LOGO ←	LogoE 98* X27 ↵	Recall logo X27 to be displayed in the foreground of window X1.
Recall to background	Esc E 99* X27 LOGO ←	LogoE 99* X27 ↵	Recall logo X27 to be displayed in the background of window X1.
Disable window image	Esc E X1 *0 LOGO ←	LogoE X1 *0 ↵	Remove the image from window X1 and display live video.
Disable foreground image	Esc E 98*0 LOGO ←	LogoE 98*0 ↵	Remove the logo image from the foreground.
Disable background image	Esc E 99*0 LOGO ←	LogoE 99*0 ↵	Remove the logo image from the background.
View window image	Esc E X1 LOGO ←	X27 ↵	View the logo or image currently displayed in window X1.
View foreground image	Esc E 98 LOGO ←	X27 ↵	View the logo or image currently displayed in the foreground.
View background image	Esc E 99 LOGO ←	X27 ↵	View the logo or image currently displayed in the background.

KEY:

X1 = Window number
0 = All windows, 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4

X14 = Logo or image name
- Can have up to 32 characters.
- Cannot contain , * |.
- The first character must be a letter.
- The last character cannot be a hyphen.
- Not case-sensitive.

X27 = Logo or image slot number
1 - 32. Response is three digits, padded with zeros.
0 = No image

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Image, Logo, and Clock Configuration (continued)			
Background Settings			
Set background source	Esc S X75 BSET ←	BsetS X75 ↵	Set the background color or source to X75.
View background source	Esc S BSET ←	X75 ↵	View background source X75.
Set user defined color	Esc C X70 * X71 BSET ←	BsetC X70 * X71 ↵	Select background color effect X70 and set the color level to X71.
View user defined color setting	Esc C X70 BSET ←	X71 ↵	View level setting X71 for background color effect X70.

KEY:

X70 = Background color effect variable
1 = Red of background color
2 = Green of background color
3 = Blue of background color

X71 = Color effect level setting
0 - 255

X75 = Background options
0 = Black (default), 1 = Red, 2 = Green, 3 = Blue, 4 = White, 5 = Magenta, 6 = Cyan, 7 = Yellow, 8 = User defined color, 9 = User defined image, 10 = Live background input

Logo Key Effect			
Disabled	Esc X27 *0 LKEF ←	Lkef X27 *0 ↵	Disable key effect for logo X27.
Transparency	Esc X27 *1 LKEF ←	Lkef X27 *1 ↵	Enable transparency key for logo X27.
RGB key	Esc X27 *2 LKEF ←	Lkef X27 *2 ↵	Enable RGB key for logo X27.
Level key	Esc X27 *3 LKEF ←	Lkef X27 *3 ↵	Enable level key for logo X27.
View key setting	Esc X27 LKEF ←	X74 ↵ *In verbose modes 2 and 3:* Lkef X27 * X74 ↵	View key setting X74 for logo X27.
Set logo key effect level	Esc X27 * X70 * X71 LKEY ←	Lkey X27 * X70 * X71 ↵	Set level for key effect X70 to X71 for logo X27.
View key effect level setting	Esc X27 * X70 LKEY ←	X71 ↵	View current level setting X71 for key effect X70 for logo X27.

KEY:

X27 = Logo or image assignment
1 - 32, 101 = No signal image

X70 = Logo effect variable
0 = Transparency
1 = Red of RGB key
2 = Green of RGB key
3 = Blue of RGB key
4 = Level key

X71 = Logo effect level setting
0 - 255

X74 = Logo key effect
0 = Disabled (default), 1 = Transparency, 2 = RGB key, 3 = Level key

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Image, Logo, and Clock Configuration (continued)			
Horizontal Shift (Logo)			
Set a specific horizontal shift value for the foreground logo	Esc L X27*X16 HCTR←	Hctr L X27*X16↵	Set the horizontal centering of the foreground logo X27 to X16.
Increment the horizontal foreground logo shift	Esc L X27 + HCTR←	Hctr L X27*X16↵	Shift foreground logo X27 **right**.
Decrement the horizontal foreground logo shift	Esc L X27 – HCTR←	Hctr L X27*X16↵	Shift foreground logo X27 **left**.
View horizontal centering of the logo	Esc L X27 HCTR←	X16↵	View the amount of horizontal shift (X16) for foreground logo X27.
Vertical Shift (Logo)			
Set a specific vertical shift value for the foreground logo	Esc L X27*X16VCTR←	Vctr L X27*X16↵	Set the vertical centering of foreground logo X27 to X16.
Increment vertical image shift	Esc L X27 + VCTR←	Vctr L X27*X16↵	Shift foreground logo X27 **down**.
Decrement vertical image shift	Esc L X27 – VCTR←	Vctr L X27*X16↵	Shift foreground logo X27 **up**.
View vertical image shift amount	Esc L X27 VCTR←	X16↵	View the amount of vertical image shift (X16).
On-screen Clock and Date			
Enable on-screen clock	Esc 1 TIME←	Time1↵	Display the time on the video output.
Disable on-screen clock	Esc 0 TIME←	Time0↵	Remove the time from the video output.
View the time setting	Esc TIME←	X10 ↵	View the time On or Off status.
Horizontal Shift (Clock)			
Set a specific horizontal shift value for the on-screen clock	Esc K X16 HCTR←	Hctr K X16↵	Set the horizontal centering of the on-screen clock to X16.
Increment the horizontal shift of the on-screen clock	Esc K +HCTR←	Hctr K X16↵	Shift the on-screen clock **right**.
Decrement the horizontal shift of the on-screen clock	Esc K –HCTR←	Hctr K X16↵	Shift the on-screen clock **left**.
View horizontal centering of the on-screen clock	Esc K HCTR←	X16↵	View the amount of horizontal shift (X16) for the on-screen clock.
Vertical Shift (Clock)			
Set a specific vertical shift value for the on-screen clock	Esc K X16 VCTR←	Vctr K X16↵	Set the vertical centering of the on-screen clock to X16.
Increment the vertical shift of the on-screen clock	Esc K +VCTR←	Vctr K X16↵	Shift the on-screen clock **down**.
Decrement vertical foreground logo shift	Esc K –VCTR←	Vctr K X16↵	Shift the on-screen clock **up**.
View vertical centering of the on-screen clock	Esc K VCTR←	X16↵	View the amount of vertical shift (X16) for the on-screen clock.

KEY:

X27 = Logo or image assignment

X16 = Horizontal and vertical shift (center or position)

1 - 32, 101 = No signal image
Range for logo and clock: -4096 to +4096
Limits are ± the output resolution.
Response is five digits, padded with zeros and preceded by + or –.

NOTE: A negative (–) number shifts the clock or logo to the left. A positive (+) number shifts it to the right.

X10 = On or off status

0 = Off or disabled (default), 1 = On or enabled

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Advanced Configuration			
Test Pattern			
Set test pattern	Esc X22 Test←	TestX22↵	Select test pattern X22.
View test pattern	EscTest←	X22↵	View selected test pattern X22.
Upstream Video Switch Effect (Occurs when an input frequency is changed within a window.)			
Select effect	Esc U1*X77SWEF←	Swef U1*X77↵	Set the upstream switch effect to X77.
View upstream switch effect	Esc U1 SWEF←	X77↵	View switch effect selection X77.
Front Panel Lock Mode (Executive Mode)			
Enable lock mode 1	1X	Exe1↵	Lock the entire front panel.
Enable lock mode 2	2X	Exe2↵	Allow limited front panel access.
Disable front panel lock	0X	Exe0↵	Unlock the entire front panel.
View lock mode	X	X29↵ *In verbose modes 2 and 3:* ExeX29↵	View current front panel lock mode X29.

KEY:

X22 = Test patterns

- 0 = off (default)
- 1 = Crop
- 2 = Alternating Pixels
- 3 = Crosshatch
- 4 = Colorbars
- 5 = Grayscale
- 6 = Audio Test
  - Displays Crop pattern with on-screen text `Audio Test`.
  - Outputs pink noise at 48 KHz, 24 bit, stereo.

X29 = Front panel lock (executive mode) status

- 0 = Unlocked (default)
- 1 = All front panel controls locked
- 2 = Partial front panel lock: window preset recall, mute, freeze, and auto image buttons are available.

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

X77 = Upstream video switch effect (video signal change within a window)

- 0 = Cut — Immediately switch to black on loss or change of signal (default).
- 1 = Fade — Freeze last frame on loss or change of sync and fade to black.
- 2 = Seamless fade — Freeze last frame on loss or change of sync and seamlessly dissolve to new signal when it is locked.
- 3 = Seamless cut — Freeze last frame on loss or change of sync and seamlessly cut to new signal when it is locked.
- 4 = Low latency mode — Display the new signal as quickly as possible.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Advanced Configuration (continued)			
HDCP Notification (Green Screen)			
Set the notification mode	Esc N1*X47 HDCP←	Hdcp N1*X47↵	Set the HDCP notification to X47.
View HDCP notification	Esc N1 HDCP←	X47↵	View current HDCP notification type X47.
HDCP Status			
Query input HDCP status	Esc I X1 HDCP←	X44↵ *In verbose modes 2 and 3:* Hdcp I X1*X44↵	View HDCP status X44 of input X1.
Query output HDCP status	Esc O X2 HDCP←	X45↵ *In verbose modes 2 and 3:* Hdcp O X2*X45↵	View HDCP status X45 of output X2.
Query HDCP status for all inputs	Esc I HDCP←	X44,X44,X44,X44,X44↵ *In verbose modes 2 and 3:* HdcpIX44,X44,X44,X44,X44↵	View HDCP status X44 of all inputs.
Query HDCP status for all outputs	Esc O HDCP←	X45,X45↵ *In verbose modes 2 and 3:* HdcpOX45,X45↵	View HDCP status X45 of all outputs.
Video Signal Presence			
View video input signal presence	Esc0 LS←	X61*X61*X61*X61*X61↵ *In verbose modes 2 and 3:* In00•X61*X61*X61*X61*X61↵ Response format for the X61s: *Input1*Input2*Input3*Input4*Background Input*	View signal presence for all inputs (X61).
Twisted Pair Protocol			
DTP/XTP/HDBT format	Esc0 2*X79HDBT←	Hdbt 0 2*X79↵	Set protocol X79 for the TP output.
View the TP setting	Esc0 2 HDBT←	X79↵	View protocol X79 for the TP output.

KEY:

X44 = HDCP input status
0 = No source device detected
1 = Source detected but no HDCP present
2 = Source detected with HDCP
Response format:
Input1,Input2,Input3,Input4,Background Input

X45 = HDCP output status
0 = No sink device detected
1 = Sink detected but no HDCP present
2 = Sink detected with HDCP
Response format: *Output1,Output2*

X47 = HDCP notification mode
Affects the window, but not the entire output.
0 = Black screen — Notification disabled (mute output)
1 = Green screen (default)

X61 = Video signal status
0 = Video or TMDS signal not detected
1 = Video or TMDS signal detected
Response format:
*Input1*Input2*Input3*Input4*Background Input*

X79 = Twisted pair format
0 = DTP (default), 1 = XTP, 2 = HDBaseT

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Advanced Configuration (continued)			
DTP Remote Power			
ATTENTION: • Ensure that the correct remote DTP power setting is used. Sending DTP2 power to a DTP (series 1) endpoint can result in hardware damage. Enable DTP2 power only to a compatible DTP2 endpoint. • Assurez-vous de bien régler l'alimentation DTP à distance. L'envoi d'une alimentation DTP2 à un point de connexion DTP (ancienne gamme) peut provoquer des dommages matériels. Assurez une alimentation DTP2 uniquement vers un point de connexion DTP2 compatible			
Set DTP output remote power	Esc O 2*X80 RPWR ←	Rpwr O 2*X80 ↵	Set the remote power on the TP output to X80.
View remote power setting	Esc O 2 RPWR ←	X80 ↵	View remote power setting X80.
General Information Requests			
See also **Information Requests** on page 68, in the Command and Response Table for IP SIS Commands.			
General Information	X1*I	Vid X1 •Typ X3 •Blk X42 •Hrt X13 •Vrt X13 ↵ *In verbose modes 2 and 3:* Inf00*Vid X1 •Typ X3 •Blk X42 •Hrt X13 •Vrt X13 ↵	View the selected window and input number (X1), input type (X3), mute status (X42), horizontal frequency (X13), and vertical frequency (X13).
Internal temperature	Esc 2Ø STAT ←	X12 ↵ *In verbose modes 2 and 3:* Stat 20•X12 ↵	View the internal temperature (X12) of the unit in degrees Celsius.

KEY:

X1 = Window (input) number	0 = All windows, 1 = Window 1, 2 = Window 2, 3 = Window 3, 4 = Window 4
X3 = Input type	1 = HDMI or DVI
X12 = Internal temperature in degrees Celsius	Response is two digits, padded with a zero.
X13 = Horizontal and vertical frequencies	Response is three digits with one decimal place and padded with zeros. Example: 075.3
X42 = Video mute	0 = Unmute (default), 1 = Mute video to black screen 2 = Mute video and sync (for output mute only).
X80 = DTP remote power	0 = No remote power (default), 1 = DTP (non-DTP2) /12 VDC, 2 = DTP2/48 VDC

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Backup and Restore Configuration			
Save unit configuration	Esc 1*X83 XF ←	Cfg 1*X83 XF ↵	Back up the current unit configuration to the file system.
Restore unit configuration	Esc 0*X83 XF ←	Cfg 0*X83 XF ↵	Restore the saved configuration to the unit.

KEY:

X83 = Configuration file type
0 = IP config file (ip.cfg)
2 = Unit-specific parameters file (box.cfg)

NOTE: Configuration files are stored on directory/nortxe-backup, which is created on the unit when the configuration is saved.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Resets			
Erase Files and Directories			
Erase a user-supplied file	Esc*filename* EF←	Del•*filename*↵	Delete user file *filename* from the unit.
Erase current directory and its files	Esc/EF←	Ddl↵	Delete the current directory and all files in it from the unit.
Erase current directory and its subdirectories	Esc//EF←	Ddl↵	Delete the current directory, all its subdirectories, and all files in the subdirectories from the unit.
Reset the Unit			
Erase flash memory	EscZFFF←	Zpf↵	Delete the flash memory files from the user space on the unit. This includes backup and restore files, software configuration tools, image captures, user-supplied HTML files, and so on.
Reset all device settings to factory default	EscZXXX←	Zpx↵	Reset product-specific settings, including verbose mode, to factory defaults. **Excludes** IP settings such as IP address, subnet mask, unit name, and gateway address and passwords.
Absolute system reset	EscZQQQ←	Zpq↵	Reset all device settings except the firmware version to factory defaults. The device password is reset to extron.
Absolute system reset, retaining IP	EscZY←	Zpy↵	Reset all device settings except IP settings such as IP address, DHCP setting, global port timeout, and port mapping (telnet, web, and direct access) to preserve communication with the device (recommended after a firmware update). The serial port settings revert to factory defaults.
Restart network	Esc2BOOT←	Boot2↵	

NOTE: This command is required after any changes are made to the IP address, subnet mask, DHCP, or gateway, unless the changes are made via a CISG command (see **Set Multiple IP Parameters with a Single Command (CISG Commands)** on page 70).

Command and Response Table for IP SIS Commands

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Serial Port Configuration — RS-232 Insertion over Ethernet			
NOTE: These commands are available only when the TP mode is set to DTP on the input or output.			
Configure port parameters	Esc X101*X125,X126,X127,X128CP←	Cpn X101•Ccp X125,X126,X127,X128↵	Set the Remote RS-232 or DTP UART port X101 parameters.
View serial port parameters	Esc X101CP←	X125,X126,X127,X128↵	View parameters of port X101.
KEY: X101 = Port number		1 = Remote RS-232 port (3-pole captive screw) 2 = UART on DTP output	
X125 = Baud rate		9600 (default), 19200, 38400, or 115200	
X126 = Parity		Only the first letter is needed: O[dd], E[ven], N[one], S[pace]	
X127 = Data bits		7 or 8 (default)	
X128 = Stop bits		1 (default) or 2	
Time, Date, and Time Zone Configuration			
Time Zone			
List all time zones	Esc *TZON←	X169*X170↵ ... X169*X170↵↵	View a list of available time zones (X169) and their descriptions (X170).
Set time zone[24]	Esc X169*TZON←	Tzon•X169*X170↵	Set time zone for the unit. The response is the time zone code (X169) and description (X170).
NOTE: Use the List all time zones command to determine the desired time zone code.			
View current time zone	Esc TZON←	X169*X170↵	View the set time zone X169 followed by zone description X170.
View GMT offset	Esc CZ←	X103↵ *In verbose modes 2 and 3:* Ipz X103↵	View Greenwich Mean Time (GMT) offset value X103 for the MGP 641 location (-12:00-14:00) in hours and minutes (*hh*:*mm*).
KEY: X103 = Greenwich Mean Time (GMT) offset value		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.	
X169 = Time zone code		The code is an acronym for the time zone (2-6 letters) (enter the List all time zones command to view a list of available time zones). The list of time zones is provided in the order of UTC offset.	
X170 = Time zone description		The UTC equivalent for a particular time zone as well as a general description of the geographical area. The description is formatted as {*UTC offset*} : {*Location name*}.	

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Time, Date, and Time Zone Configuration (continued)			
Time and Date			
Set time and date	Esc X113 CT ←	Ipt•X113 ↵	X113 is the local date and time. The set format is *MM/DD/YYHH:MM:SS*. (The hours, minutes, and seconds can also be separated by periods.) *Examples:* 11/13/06-10:54:00 or 11/13/06-10.54.00
View time and date	Esc CT ←	X113 ↵	View date and time X113. The read format is: *Www, DD Mmm YYYY HH:MM:SS* (Www = day of the week). *Example:* Tue, 18 Nov 2006 18:19:33.
Network Time Protocol (NTP)			
NTP Enable			
Enable, disable, or sync NTP to set the time[24]	Esc X171 NTEN ←	Nten X171 ↵	Set NTP status to X171.
View NTP status	Esc NTEN ←	X171 ↵	View NTP status X171.
NTP Server IP or Name			
Set NTP IP address[24]	Esc X114 NTIP ←	Ntip X114 ↵	Set NTP server IP address X114.
Set NTP IP address to default[24]	Esc •NTIP ←	Ntip ↵	Set the NTP IP address to an **empty string** (default).
View NTP IP address	Esc NTIP ←	X114 ↵	View the current NTP IP address.
NTP Port Selection			
Set NTP port map[24]	Esc N{*port number*}PMAP ←	PmapN {*port number*} ↵	Set the NTP port number.
Reset NTP port map to default[24]	Esc N123PMAP ←	PmapN00123 ↵	Reset the NTP port number to 00123, the default.
Disable the NTP port	Esc N 0 123PMAP ←	PmapN00000 ↵	Disable the NTP port (set the port number to 00000).
View NTP port mapping	Esc N PMAP ←	{*port number*} ↵	View the number of the current NTP port.

KEY:

X113 = Local date and time
Set format: *MMM/DD/YY-HH:MM:SS* Example: 06/21/20-10:54:12
View format: *Ddd, DD Mmm YYYY HH:MM:SS* Example: Fri, 26 Sep 2008 18:19:33

X114 = IP address
Format *nnn.nnn.nnn.nnn*). Leading zeros in each of the four fields are optional in setting values and are suppressed in returned values.
Default: Empty string (enter a single space)

X171 = Network Time Protocol (NTP) setting
0 = Enabled, 1 = Disabled, 2 = Sync now

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Information Requests			
Query firmware version	Q	X111↵ *In verbose modes 2 and 3:* Ver01*X111↵	View the firmware version to the second decimal place (*n.nn*).
Query firmware and build version	*Q	X111↵ *In verbose modes 2 and 3:* BldX111↵	View the firmware version with its build number (*n.nn.nnnn*).
Query part number	N	60-1574-01 or 60-1574-02↵ *In verbose modes 2 and 3:* Pno 60-1574-01 or 60-1574-02↵	View MGP 641 part number.
Query model name	1I	MGP•641↵ *In verbose modes 2 and 3:* Inf01*MGP•641↵	View the unit model name.
View unit description	2I	Multi•Graphic•Processor↵ *In verbose modes 2 and 3:* Inf02*Multi•Graphic•Processor↵	
Query system memory usage	3I	{*Number of bytes used out of number of KBytes*}↵ *In verbose modes 2 and 3:* Inf03*{*Number of bytes used out of number of KBytes*}↵	
Query system memory usage	4I	{*Number of bytes used out of number of KBytes*}↵ *In verbose modes 2 and 3:* Inf04*{*Number of bytes used out of number of KBytes*}↵	

KEY:

X111 = Firmware version number — Listed to two decimal places (*n.nn*).

IP Configuration

NOTES:

- Changes made to any TCP/IP settings do not take effect until the reboot network command (Esc 2BOOT↵) is issued.
- IP address setup commands that are followed by [24] require Administrator permission to enter. Attempts to issue them without Administrator status result in an E24 (privilege violation) error message.

Set verbose mode	EscX122CV↵	VrbX122↵	Set the verbose mode to X122, with or without tagged responses.
View verbose mode	EscCV↵	X122↵	View current verbose mode X122.
Set DHCP mode[24]	EscX10DH↵	IdhX10↵	Enable or disable DHCP.
View DHCP mode	EscDH↵	X10↵	View the DHCP mode setting.

KEY:

X10 = Enabled or disabled — 0 = DHCP disabled (default), 1 = DHCP enabled

X122 = Verbose mode (see **Verbose response mode** on page 46 for more information)
- 0 = Clear/none (default for Telnet connections).
- 1 = Verbose mode is on (enabled) (default for RS-232 connections).
- 2 = Verbose mode is off, tagged responses are sent for queries (tagged responses are enabled).
- 3 = Verbose mode is on (enabled) and tagged responses are enabled and sent for queries.

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
IP Configuration (continued)			
NOTES: • Changes made to any TCP/IP settings do not take effect until the reboot network command (Esc 2BOOT ↵) is issued. • IP address setup commands that are followed by [24] require administrator permission to enter. Attempts to issue them without administrator status result in an E24 (privilege violation) error message.			
Set IP address[24]	Esc X114 CI ↵	Ipi•X114 ↵	Set the IP address to X114.
View IP address	Esc CI ↵	X114 ↵	View the current IP address.
Set subnet mask[24]	Esc X119 CS ↵	Ips•X119 ↵	Set the subnet mask to X119.
View subnet mask	Esc CS ↵	X119 ↵	View the subnet mask setting.
Set gateway IP address[24]	Esc X114 CG ↵	Ipg•X114 ↵	Set the gateway IP address to X114.
View gateway IP address	Esc CG ↵	X114 ↵	View the gateway IP address.
View MAC address (View-only)	Esc CH ↵	X118 ↵ *In verbose modes 2 and 3:* Iph•X118 ↵	View unit Media Access Code (MAC) address X118 of the unit.
Reboot networking	Esc 2BOOT ↵	Boot2 ↵	Restart the network after IP setting or DHCP changes.
Set unit name	Esc X112 CN ↵	Ipn•X112 ↵	Assign a name for the unit.
Set unit name to factory default	Esc •CN ↵	Ipn•X149 ↵	Reset the unit name to its factory default name (X149).
View unit name	Esc CN ↵	X112 ↵	View current unit name X112.
View session security level	Esc CK ↵	X152 ↵ *In verbose modes 2 and 3:* Pvl X152 ↵	View security level X152 of the current connection.

KEY:

X114 =	IP address	Format *nnn.nnn.nnn.nnn* (192.168.254.254 = default) Leading zeros in each of the four octets are optional in setting values, and are suppressed in returned values.
X114 =	Gateway IP address	*nnn.nnn.nnn.nnn* (0.0.0.0 = default)
X118 =	Hardware (MAC) address	00-05-A6-*xx-xx-xx*
X119 =	Subnet mask	*nnn.nnn.nnn.nnn* (255.255.255.0 = default)
X149 =	Default unit name	A combination of the model name and the last three character pairs of the unit MAC address. *Example*: MGP-641-00-02-3D)
X152 =	Session security level	0 = Not logged in, 1 = User, 2 = Administrator

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
IP Configuration (continued)			
Set Multiple IP Parameters with a Single Command (CISG Commands)			
NOTE: Setting any values with a `CISG` command changes the DHCP setting to Off and the `Cisg` response is followed by `Boot2` response (when the unit is in **Verbose response mode** 2 or 3).			
Set IP address, subnet mask, and gateway address	Esc 1*X114/X199*X114CISG←	Cisg•1*X114/X199*X114↵	Set the IP address to X114 for the LAN port, the subnet mask prefix to /X199, and the gateway IP address to X114 at the same time.
Set IP address and subnet mask	Esc 1*X114/X199CISG←	Cisg•1*X114/X199*X114↵	Set only the IP address and the subnet mask prefix. The response shows all CISG values.
Set the IP address	Esc 1*X114CISG←	Cisg•1*X114/X199*X114↵	Set only the IP address. The response shows all CISG values.
View all IP settings	Esc 1 CISG←	X114/X199*X114↵	View the IP address, subnet mask (prefix), and gateway IP address of the unit.
KEY: X114 = IP address		Format *nnn.nnn.nnn.nnn* (`192.168.254.254` = default) Leading zeros in each of the four octets are optional in setting values, and are suppressed in returned values.	
X114 = Gateway IP address		*nnn.nnn.nnn.nnn* (`0.0.0.0` = default)	
X199 = Subnet mask in CISG commands		Prefix representing subnet mask bits (subnet mask value in CISG commands). Default = `/24`, which represents the default subnet mask, 255.255.255.0.	
Ethernet Port Configuration			
Query the number of open connections	Esc CC←	X172↵ *Verbose modes 2 and 3:* ICCX172↵	View the number of open Ethernet connections.
Set current connection port timeout	Esc 0*X173TC←	Pti 0*X173↵	
View connection port timeout	Esc 0TC←	X173↵	
Set global IP port timeout	Esc 1*X173TC←	Pti 1*X173↵	Set global port timeout to X173.
View global IP port timeout	Esc 1TC←	X173↵	
KEY: X172 = Number of port connections			
X173 = Port timeout		Number of seconds (stated in tens of seconds) before timeout of IP connections (min = `1` (10 seconds), max = `65000` (650,000 seconds), and default = `30` (300 seconds). If no data is received during the timeout period, the Ethernet connection is closed. Each step is 10 seconds.	

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
IP Configuration (continued)			
NOTES: • Changes made to any TCP/IP settings do not take effect until the reboot network command (Esc 2BOOT←) is issued. • IP address setup commands that are followed by [24] require Administrator permission to enter. Attempts to issue them without Administrator status result in an E24 (privilege violation) error message.			
Ethernet Port Configuration (continued)			
Set web port map[24]	Esc W {*port number*}PMAP←	Pmap W{*port number*}↵	Set the web port number.
Reset web port map	Esc W 80 PMAP←	Pmap W 00080↵	Set the web port number to 80 (default).
Disable web port	Esc W 0 PMAP←	Pmap W 00000↵	Disable the web port.
View web port mapping[24]	Esc W PMAP←	{*port number*}↵	View the currently set web port.
Set Telnet port map[24]	Esc Z {*port number*}PMAP←	Pmap Z{*port number*}↵	Set the Telnet port number.
NOTE: Telnet port 23 is disabled by default.			
Reset Telnet port map	Esc Z 23 PMAP←	Pmap Z 00023↵	Set the Telnet port number to 23 (default).
Disable Telnet port	Esc Z 0 PMAP←	Pmap Z 00000↵	Disable the Telnet port.
View Telnet port mapping[24]	Esc Z PMAP←	{*port number*}↵	View the current Telnet port.
SIS-over-SSH			
NOTES: • The echo setting must match the type of SSH client used. With echo **enabled** (default), characters that are typed into the client window are echoed in the window along with the SIS response, and are also sent to the server. • With echo **disabled**, the characters are not echoed but are simply sent to the server. • The echo setting applies only to current (not global) connection. • Control systems should turn echo off after connecting.			
Enable echo (default)	Esc 1ECHO←	Echo 1↵	Echo on: All data sent is echoed back to the sender, followed by the response. Extra carriage returns may also be received when echo is on.
Disable echo	Esc 0ECHO←	Echo0↵	Echo off: only the response is sent to the sender.
View echo status	Esc ECHO←	X10↵	View the echo setting
Set SIS-over-SSH port map[24]	Esc BX76*{*port number*} PMAP←	PmapB•X76*{*port number*}↵	Set the SIS-over-SSH port
Reset SIS-over-SSH port map[24]	Esc BX76*22023 PMAP←	PmapB•X76*22023↵	Reset the SSH port to the default 22023.
Disable SIS-over-SSH port[24]	Esc BX76*0 PMAP←	PmapB•X76*00000↵	Disable the SIS-over-SSH port.
View the SIS-over-SSH port[24] mapping	Esc BX76 PMAP←	{*port number*}↵	View the current SIS-over-SSH port.

KEY:

X10 = Echo status — 0 = disabled, 1 = enabled

X76 = Network interface card (NIC) number — 1-3

Command	ASCII (Host to Processor)	Response (Processor to Host)	Additional Description
Passwords			
NOTE: The initial passwords set at the factory are the serial number of the unit. However, if the unit is reset (via the ZQQQ SIS command or the rear panel **Reset** button), this password reverts to extron.			
Set administrator password[24]	Esc X133 CA ←	Ipa•X133↵	Set the administrator password to X133.
View administrator password	Esc CA ←	****↵ or ↵ *In verbose modes 2 and 3:* Ipa•****↵ or Ipa↵	View the administrator password.
Reset administrator password[24]	Esc•CA ←	Ipa•↵	Reset the administrator password to extron.
Set user password[14,24]	Esc X133 CU ←	Ipu•X133↵	Set the user password.
View user password	Esc CU ←	****↵ or ↵ *In verbose modes 2 and 3:* Ipu•****↵ or Ipu↵	View the user password.
Reset user password[24]	Esc•CU ←	Ipu•↵	Reset the user password to extron.

KEY:

X133 = Password

- Length is 1-128 characters.
- All human-readable characters are permitted except |.
- The password cannot be a single space.
- Passwords are case-sensitive.

NOTE: If there is a valid password, the response is ****↵. If there is no password, the response is ↵.

Videowall Configuration Software (VCS) Program

The Extron VCS program is a PC-based program for the MGP 641 that provides a convenient way to configure the processor. System configuration is broken down into logical tasks, including output and wall configuration, source setup, window preset design, and EDID Minder. Online and offline editing allows creation and configuration of systems with or without an MGP 641 connected.

Window presets are created by dragging and dropping sources onto a virtual representation of the videowall. Offline configuration allows for videowall configuration files to be created when the MGP is temporarily unavailable.

Downloading VCS from the Website

To use the Videowall Configuration Software, download the latest version of the program from the Extron web page and install it on the PC that is to be connected to the MGP, as described in the following sections. You can also download updates to VCS as they become available. To access the software:

1. On the Extron website, hover the mouse pointer over the **Download** tab (see figure 23, ❶), then move the pointer to the **Software** link (❷) in the Downloads column and click it.

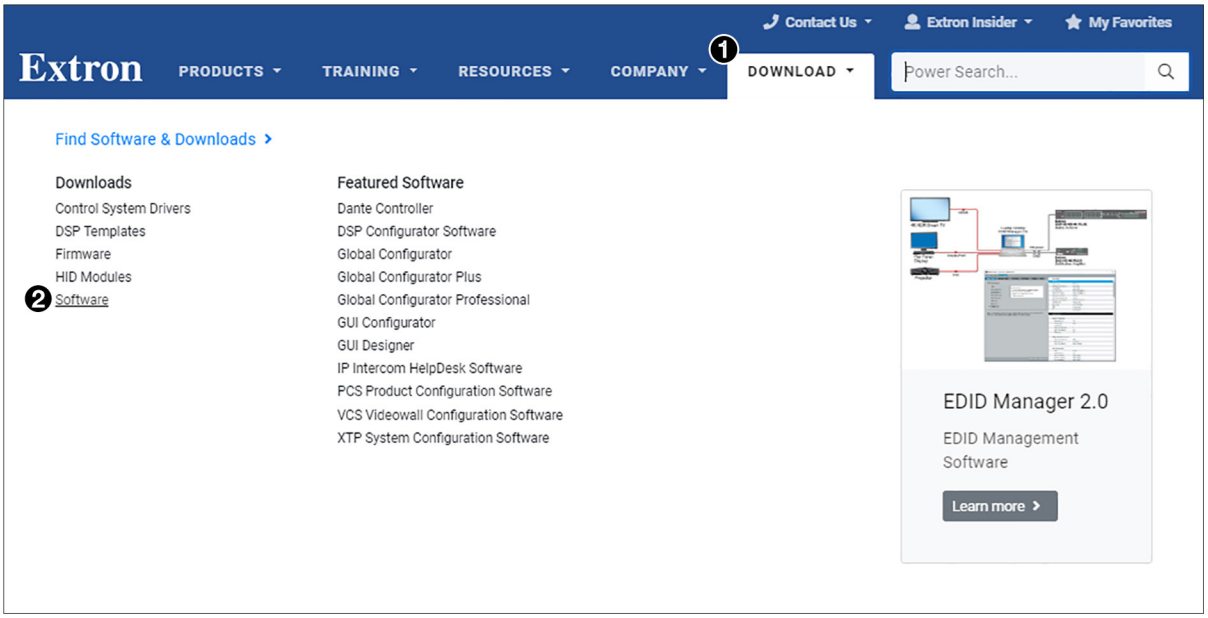


Figure 23. Software Link on the Download Page

2. On the `Download Center` screen, click the **`V`** link (see figure 24, ❶).

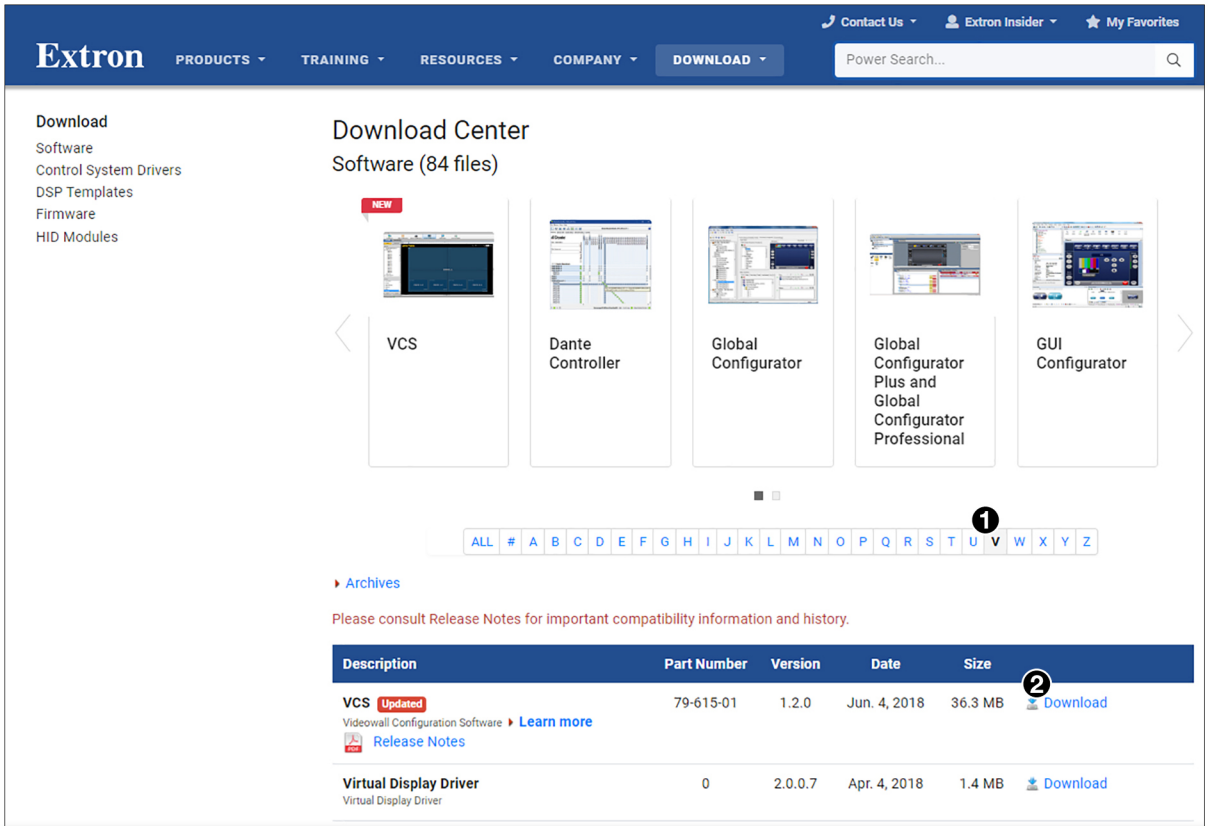


Figure 24. VCS Links on Download Center Page

3. Locate `VCS` on the list of available software programs and click the **`Download`** link (❷) to the right of the name.
4. On the login page that appears next, fill in the required information to log into the **www.extron.com** website (if you need an ID number, see your Extron representative).
5. Follow the instructions on the subsequent screens to complete the software program installation. By default, the installation places the program files at: `C:\Program Files (x86)\Extron\Extron VCS`.

   If there is not already an Extron folder in your Program Files x86 folder, the installation program creates it as well.

Starting the Configuration Program

To start using the VCS program:

1. Open the software program either by double-clicking the **VCS** icon (shown at right) if one was placed on your desktop during installation, or by clicking **Start** > **All Programs** > **Extron** > **Videowall Configuration Software**.

   VCS opens with the **Start** screen for the MGP 641. The **Connect** side tab (see figure 25, ❶) is selected, and the **Connect to Device** panel on the **Discover** tab (❷) is displayed. (The **New** and **Open** side tabs are not used by the MGP 641.)

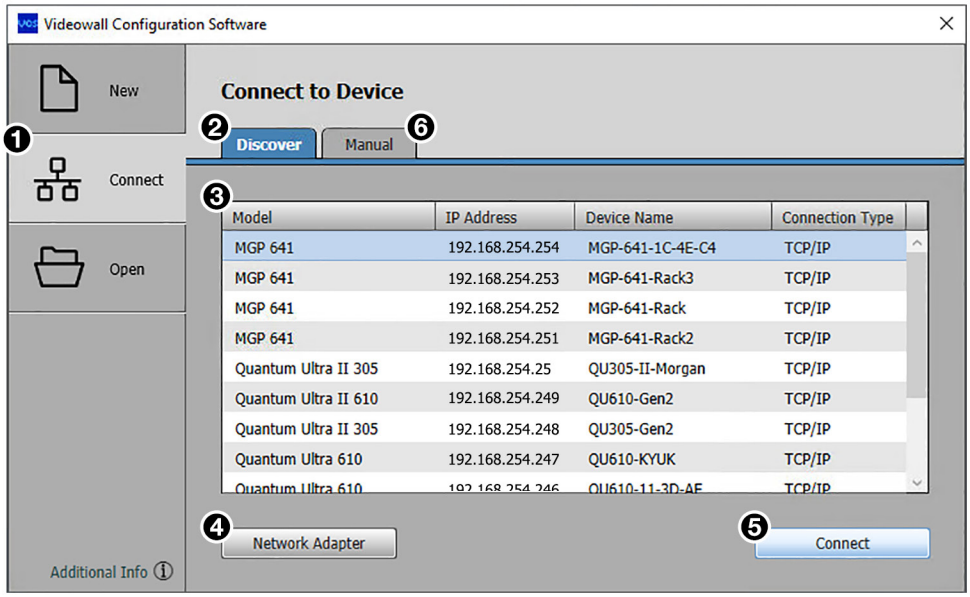


Figure 25. Start Screen

2. In the **Connect to Device** panel (❸), click on the MGP 641 to which you want to connect.

   - If necessary, click the **Network Adapter** button (❹) to select an adapter to enable you to view more devices on the network.

     a. On the **Network Adapter** screen, select the desired network adapter to use to connect to the MGP.

     b. If no network adapters appear on the screen, select the **Show All Network Adapters** checkbox (see **figure 26**, ❶ on the next page).

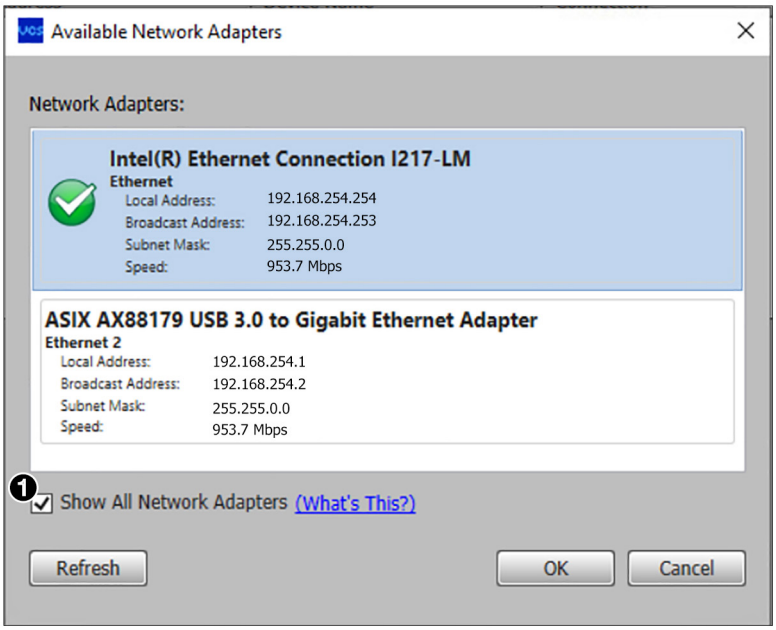


Figure 26. Network Adapter Screen

c. Click **OK** to confirm your selection. the `Network Adapter` screen closes.

- If the desired MGP does not appear in the `Connect to Device` panel:

a. Click the **Manual** tab (see **figure 25**, ❻ on the previous page). The `Manually Add Device` window opens.

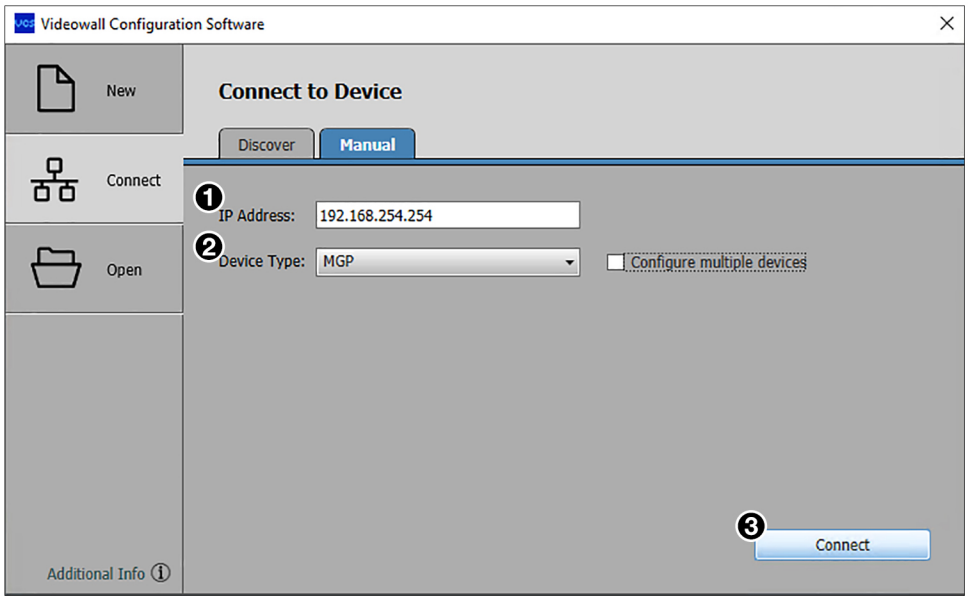


Figure 27. Manually Add Device Window

b. In the **IP Address** field, enter the address of the MGP to be connected (see figure 27, ❶).

c. Ensure that MGP is selected from the `Device Type` drop-down list (❷).

NOTE: A unit added this way is **not** shown in the `Select Devices to Add` panel.

3. Click the **Connect** button (❸) to connect to the device.

The login screen opens.

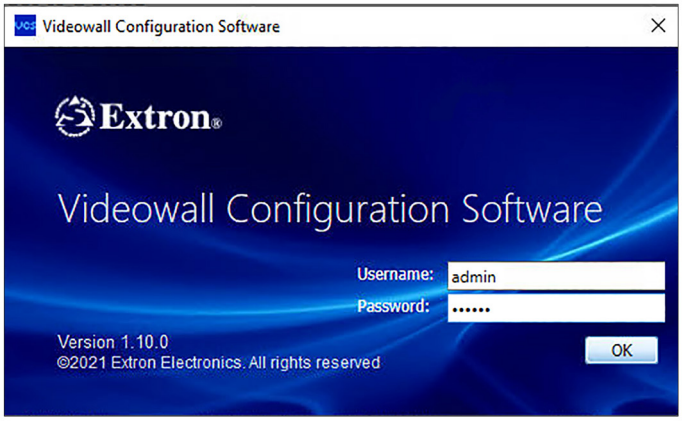


Figure 28. VCS Login Screen

4. On the login screen:
   - In the **Username** field, enter the user name for the MGP. By default, this is **admin**.
   - In the **Password** field, enter the password for the MGP. By default, this is the serial number of the MGP (see the note below).

   NOTE: The factory configured passwords for all accounts on this device are initially set to the device serial number. In the event of a complete system reset, the passwords convert to the default, which is **extron**.

5. The main window appears, displaying the **Connection** screen with the selected device information and connection status displayed in the right (**System Devices**) panel (see figure 29, ❶). The designation **Added** (❷) appears in front of the selected MGP in the **Select Device(s) to Add** panel.

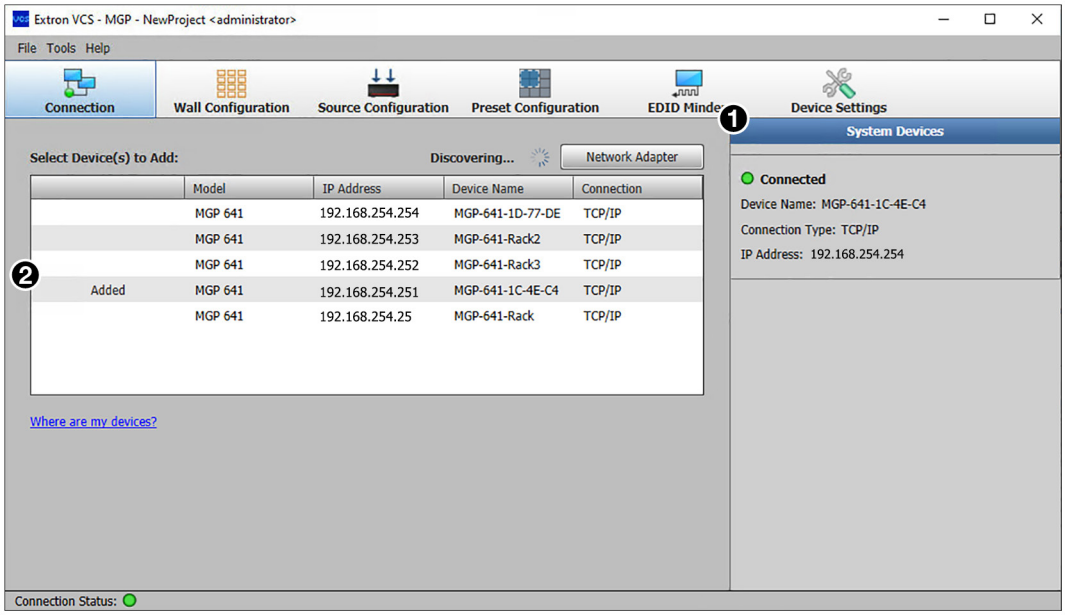


Figure 29. Connection Screen

Configuring multiple devices

To create a configuration with more than one MGP 641, use the `Manual` tab of the `Connect to Device` screen to add devices to the configuration. A configuration can contain up to four devices (see the *VCS Help File* to add devices to a configuration).

NOTE: It is not possible to add devices to an existing configuration from the `Select Device(s) to Add` screen. You must create a new configuration manually.

For detailed instructions on using VCS to configure the videowall, see the *VCS Help File*.

HTML Configuration and Control

The MGP 641 features an internal web server, displayed as a web page. This page allows you to monitor and adjust certain settings of the MGP via a LAN connection. Use a web browser to view the pages on a PC connected to the MGP LAN port.

NOTE: The internal web page does not support compatibility mode in Microsoft® Internet Explorer® (see **Disabling Compatibility Mode** on page 80). Extron recommends using Microsoft Edge®, Mozilla® Firefox®, or Google Chrome™.

This section gives an overview of the internal web page, which is always available and cannot be erased or overwritten. Topics in this section include:

- **Accessing the Web Page**
- **Web Page Components**

Accessing the Web Page

1. Connect the MGP 641 to a LAN using the rear panel RJ-45 LAN connector (see **figure 2**, ❶, on page 7).
2. Open a web browser on a connected PC.
3. Enter the IP address of the device in the browser **`Address`** field.

   To access the web page via Ethernet over USB, enter **`203.0.113.22`** for the IP address.
4. Press the <**`Enter`**> key on the keyboard. The `Sign in` window opens (see **figure 30** on the next page).
5. In the **`Username`** field (❶), enter `admin` or `user` (optional).



Figure 30. Example of a Network Password Dialog Box

6. Enter the password if one is assigned.

   NOTE: The factory configured passwords for all accounts on this device have been set to the device serial number. Passwords are case sensitive. In the event of an absolute system reset, these passwords are reset to `extron`.

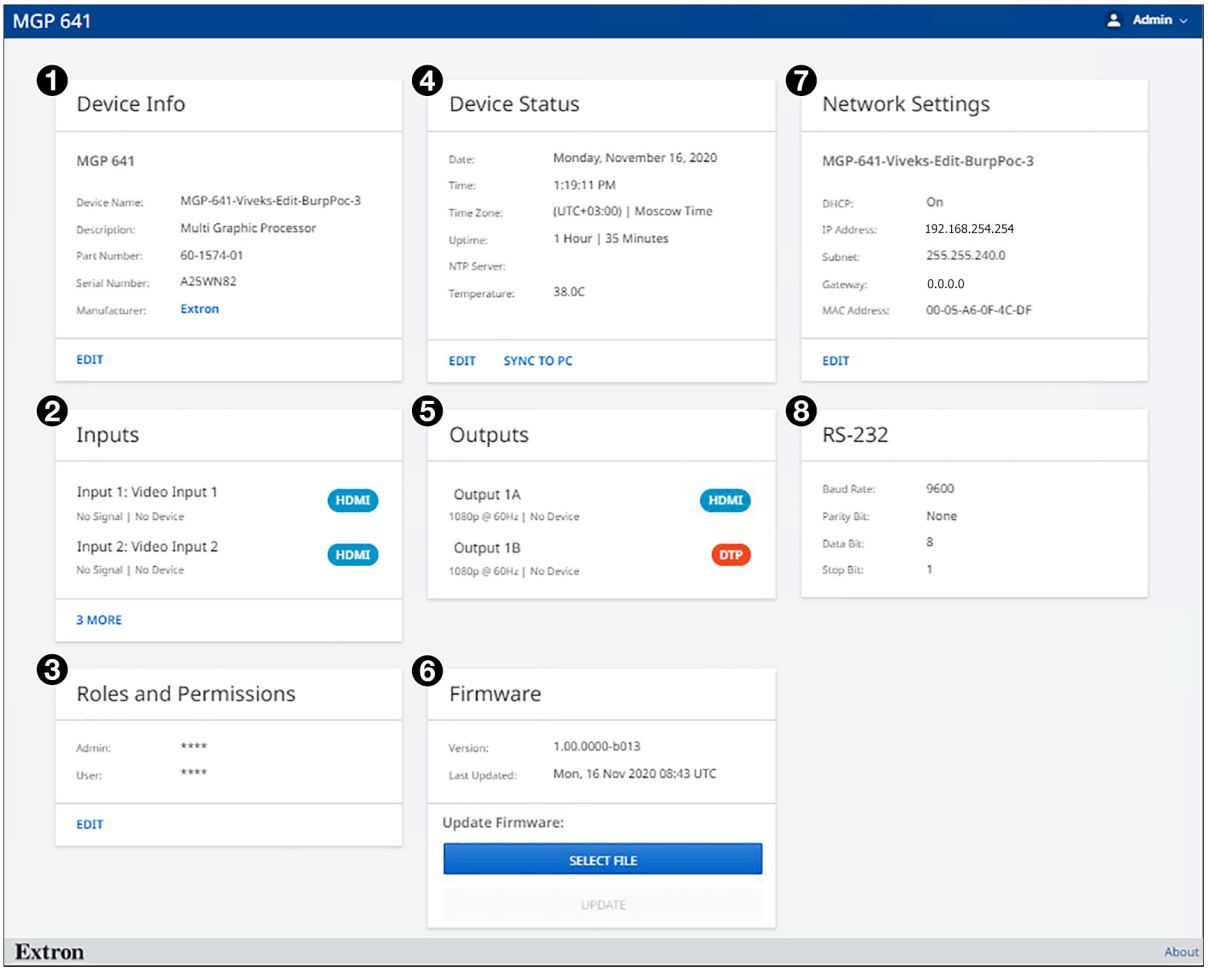
   To change the password, see **Setting a password** on page 83.

7. Click the **`Sign In`** button (see figure 30, ❷).

Disabling Compatibility Mode

The internal web page does not support compatibility mode in Microsoft Internet Explorer. To check compatibility view settings, select **`Compatibility View Settings`** from the `Tools` menu of the browser. The `Compatibility View Settings` dialog box opens. Be sure that the **`Display all websites in Compatibility View`** checkbox is **clear**, and that the IP address of the MGP 641 is **not** in the list of websites that have been added to Compatibility View.

Web Page Components



1 **Device Info Panel**
2 **Inputs Panel**
3 **Roles and Permissions Panel**
4 **Device Status Panel**
5 **Outputs Panel**
6 **Firmware Panel**
7 **Network Settings Panel**
8 **RS-232 Panel**

Figure 31. Internal Web Page

Device Info Panel

The `Device Info` panel (see **figure 31**, ❶ on the previous page), displays the device name, a brief product description, and part number, with the option to edit the device name. The panel also contains an **`Extron`** link which opens **www.extron.com** in a new window.

Setting the device name

To edit the device name (TCP/IP hostname), click the **`EDIT`** button in the lower-left corner of the `Device Info` panel. The `Device Info Settings` dialog box opens.

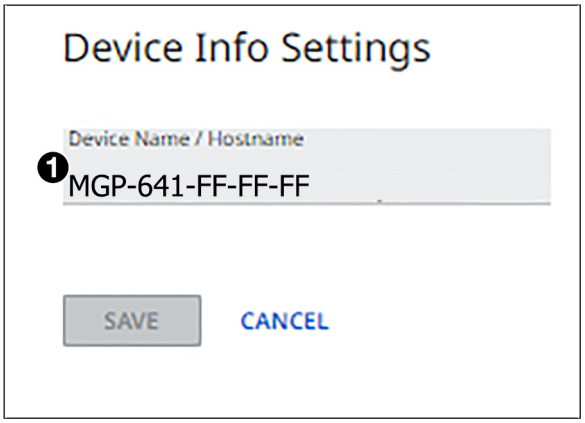


Figure 32. Device Info Settings Dialog Box

To change the name:

1. Click in the **`Device Name/Hostname`** field (see figure 32, ❶). A cursor appears.
2. Enter a name for the MGP 641.
3. Click **`SAVE`** to apply the new name and close the dialog box, or click **`CANCEL`** to close the dialog box without renaming the device.

Inputs Panel

The `Inputs` panel (see **figure 31**, ❷ on the previous page) displays the name and signal type of the active input signal as well as its HDCP status.

The following HDCP status indicators may be displayed for a connected input:

Symbol	Definition
	The signal is HDCP encrypted.
	The signal is not encrypted.
`No Signal`	There is no signal detected.

To view the status and type of all inputs, click the **`3 MORE`** link in the lower-left corner of the `Inputs` panel to view the `Inputs` dialog box (see **figure 33** on the next page for an example).

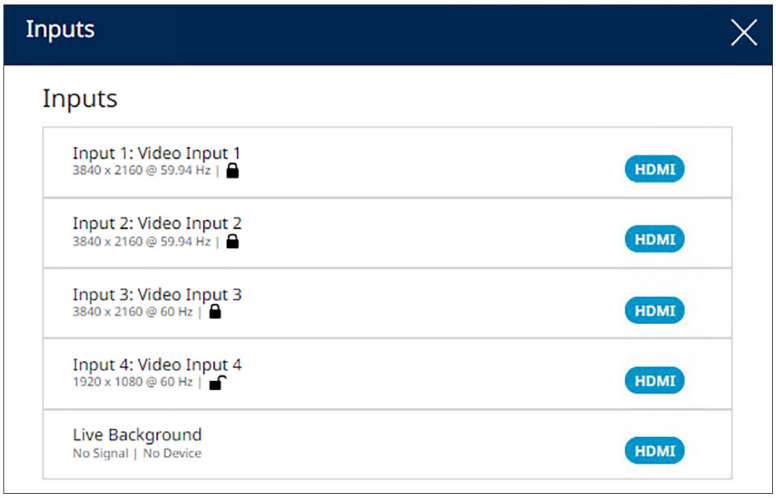


Figure 33. Inputs Dialog Box for an MGP 641

When finished viewing the input information, click the **X** in the upper-right corner of the dialog box to close it.

Roles and Permissions Panel

In this panel (see **figure 31**, ❸ on page 81) you can set and remove administrator and user passwords. The web password is administrator level.

NOTES:

- The initial factory configured passwords for all accounts on this device have been set to the device serial number. Passwords are case sensitive. In the event of an absolute system reset, the passwords are reset to `extron`.
- The following rules apply to passwords:
  - Length is 1-128 characters.
  - All human-readable characters are permitted except `|`.
  - The password cannot be a single space unless you are removing the password entirely.
  - Passwords are case-sensitive.
  - A user password cannot be assigned if no administrator password exists.
  - If the Admin password is cleared, the user password is cleared as well.

Setting a password

To assign new administrator and user passwords:

1. In the `Roles and Permissions` panel, click **`EDIT`**. The `Role and Permission Settings` dialog box opens
2. In the `Admin` panel, click the **`Change Admin Password`** link and enter the new administrator password in the field below (see **figure 34**, ❶ on the next page).

3. Click in the **Confirm Admin Password** field (see figure 34, ❷) and repeat the password from the **Change Admin Password** field.

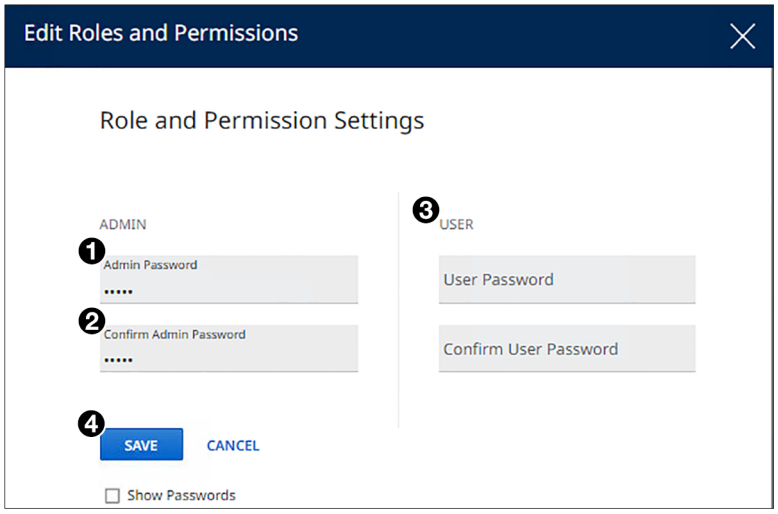


Figure 34. Passwords Dialog Box with Administrator Password Entered

4. If you want to assign a user password, repeat steps 2 and 3 in the **User** panel (❸).
5. When finished, click **SAVE** (❹) to set the passwords. To close the window without saving a password, click **CANCEL** or the **X** in the upper-right corner.

To reset an assigned password:

1. In the **Change Admin Password** or **Change User Password** field, enter a single space.
2. Enter a single space in the appropriate **Confirm Password** field.
3. Click **SAVE**. The password is reset to **extron**.

Device Status Panel

The **Device Status** panel (see **figure 31**, ❹ on page 81) displays the current date, time, time zone, the amount of time the device has been running (**Uptime**), and internal temperature in degrees Celsius.

Syncing the date and time on the MGP 641 to the PC

To set the MGP 641 date and time to match that of your computer:

Click **Sync to PC** at the bottom of the **Device Status** panel. When the sync is completed, the message shown in figure 35 appears in the upper-right corner of the screen.



Figure 35. Sync to PC Success Message

Editing the date, time, and time zone

1. Click the **Edit** link in the lower-left corner of the panel. The Edit Device Status dialog box opens.

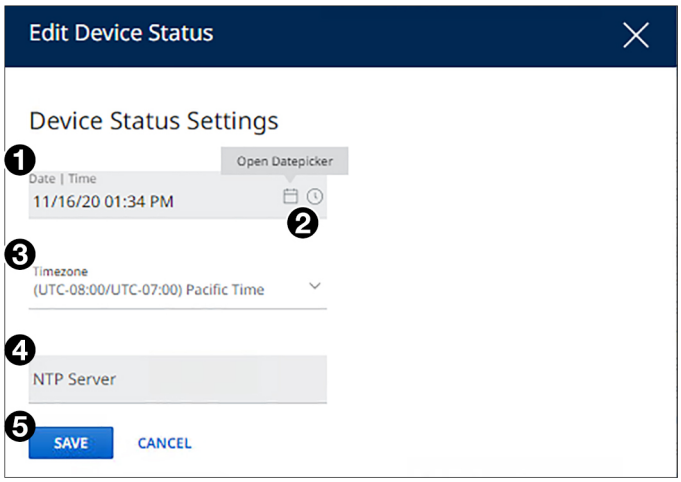
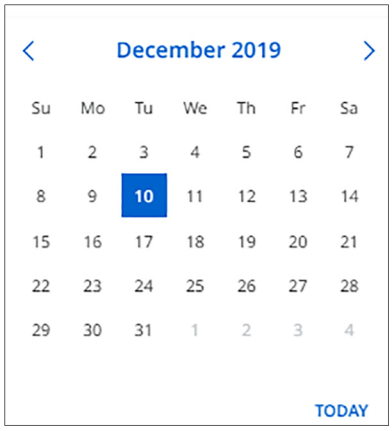


Figure 36. Edit Device Status Panel for Date and Time Setting

2. Set the time, date, and time zone as desired:

   - **Date and Time** — In the **Date | Time** field (see figure 36, ❶), either click on the hour and minute text fields and type in the time, or click the **Datepicker** or **Timepicker** icons (❷) to display the following panels:



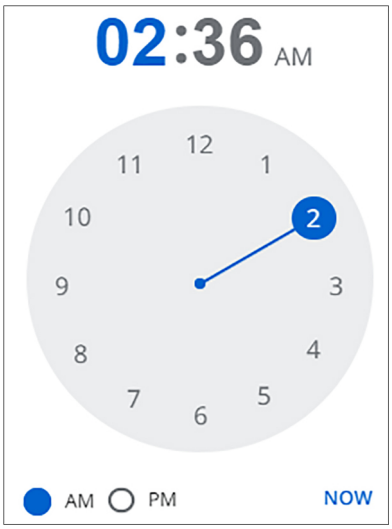


Figure 37. Datepicker and Timepicker Screens

   - **Date** — On the **Datepicker** screen, either select the desired date from the calendar (current month only) or click **TODAY** to display the current date in the **Date | Time** field. To select a different month, click the right and left arrows at the top of the screen to display the desired month and year.
   - **Time** — On the **Timepicker** screen, click on the hour or minutes above the clock, then click on the desired number on the clock. To display the current time in the **Date | Time** field, click **NOW**. Select the **AM** or **PM** radio button.
   - **Time Zone** — In the **Timezone** field, select the desired time zone from the drop-down menu (❸).
   - **NTP Server** — If appropriate, enter the name of the network server from which the MGP obtains the date and time (❹).

3. When finished entering settings, click **SAVE** (see **figure 36**, ❺ on the previous page) to confirm them, or **CANCEL** to close the dialog box without implementing the settings.

Outputs Panel

The Outputs panel (see **figure 31**, ❺ on page 81) displays the resolution and refresh rate, signal type (HDMI, DTP, or DVI), and HDCP status of all connected outputs.

The following status symbols may be displayed for connected outputs:

Symbol	Definition
	The display is HDCP compliant.
	The display is not HDCP compliant.
No Display	No display is connected.

Firmware Panel

The Firmware panel (❻) displays the current firmware version and the date it was last updated. You can also update the firmware on your MGP 641 from this panel (firmware files can be downloaded from **www.extron.com**, see **Downloading the Firmware** on page 93). To update firmware:

1. In the Firmware panel, click the **Select File** button.
2. In the Open dialog box, browse to locate the new firmware file on your computer (by default the file is stored at C:\Program Files (x86)\Extron\Firmware).

ATTENTION:

- Valid firmware files must have the file extension .eff. A file with any other extension is not a firmware upgrade for this device and could cause the unit to stop functioning.
- Les fichiers firmware valides doivent contenir l'extension fichier .eff. Un fichier avec n'importe quelle autre extension n'est pas une mise à jour de firmware pour cet appareil et l'appareil pourrait arrêter de fonctionner.

3. Double-click the firmware file name. The Open window closes, and the firmware file name appears in the Update Firmware panel on the web page (see figure 38, ❶).

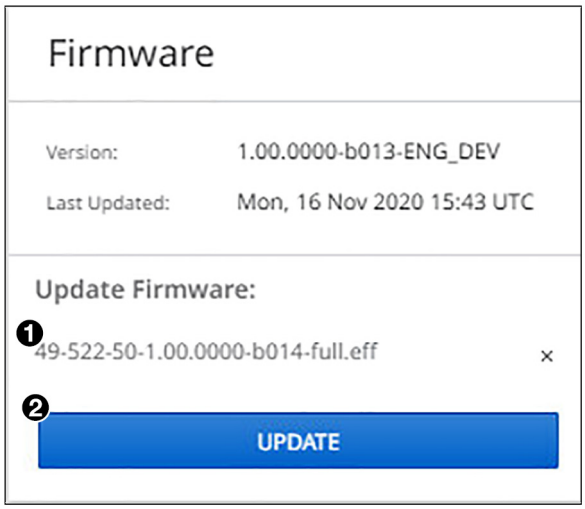


Figure 38. Firmware Update Dialog Box with a Firmware File Selected

4. Click **Update** (see **figure 38**, ❷ on the previous page) to begin uploading the firmware. (If you want to cancel the update, click the **X** button in the upper-right corner of the Update Firmware panel.)

   During the updating process, a window appears in the middle of the screen, showing the progress of the update: Uploading, Initializing, Writing to Flash, and Rebooting (see figure 39).

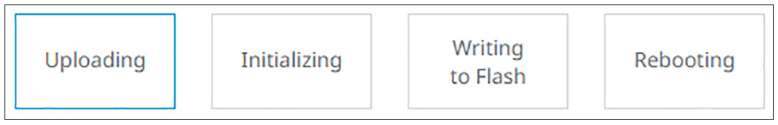


Figure 39. Firmware Update Progress Window

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 update is completed, unit restarts, then the progress window closes and the message Firmware Upload Complete appears near the top of the screen. The new firmware filename appears beside Version in the Firmware panel of the web page.

Network Settings Panel

In the Network Settings panel (see **figure 31**, ❼ on page 81), you can set the IP address, subnet mask, and gateway address for your MGP 641, and turn DHCP on and off. You can also view the MAC address of the unit. To set the IP addresses:

1. Click **Edit** in the lower-left corner of the Network Settings panel. The EDIT Network Settings screen opens.

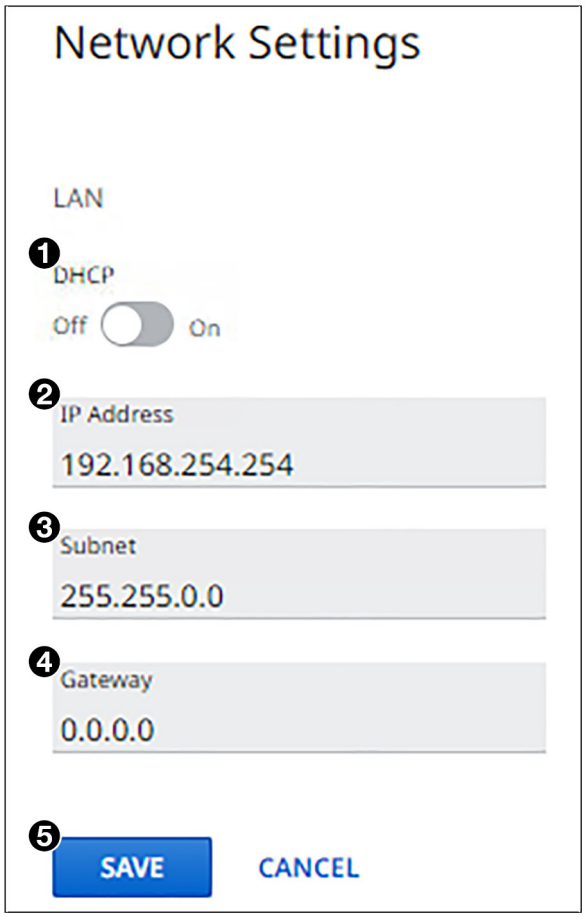


Figure 40. Edit Network Settings Screen

2. Edit the network settings as desired:
   - **DHCP** — Click the **DHCP** button (see **figure 40**, ❶ on the previous page) to toggle DHCP on and off. When DHCP is enabled (**On**), the unit configures its IP address and other network settings from the DHCP server. The default is **Off**.
   - **IP Address, (❷), Subnet mask (❸), and Gateway address (❹)** — To set any of these addresses, click in the desired field and enter the address.
3. When finished editing, click **SAVE** (❺) to confirm your changes or **CANCEL** to close the window without making changes. You can also close the window by clicking the **X** in the upper-right corner of the screen.

NOTE: If DHCP is being enabled, the web page attempts to redirect and connect to the unit via the unit name (TCP/IP hostname). If a static IP address is being set, the web page attempts to connect to the new IP address.

RS-232 Panel

The view-only RS-232 panel (see **figure 31**, ❽ on page 81) displays the RS-232 protocol for the MGP 641 serial port. The defaults are:

- Baud rate — 9600
- Parity Bit — N (none)
- Data bits — 8
- Stop bits — 1

Reference Information

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

- **Best Practices for Cleaning Your Extron Products**
- **Mounting the MGP 641**
- **Updating the Firmware**
- **IP Address**

Best Practices for Cleaning Your Extron Products

Depending on the device, application, and location, there may be times when it becomes necessary to clean your Extron product. Frequently touched devices, such as touchscreens and button panels, require regular cleaning to ensure their surfaces remain sanitary. Plastic surfaces and cosmetic finishes can be damaged by long term exposure to chemicals. Therefore, Extron recommends the following guidelines when cleaning our products.



All Extron products can be safely cleaned with:

- 70% concentration or higher Isopropyl Alcohol
- Disinfectant cleaners that:
  - Are non-ammonium based (for example, contains no ammonium chloride).
  - Contain 2% or less sodium hypochlorite (for example, 2% bleach, 98% water).

Regardless of the device, it is important to follow these general guidelines when cleaning:

1. If possible, unplug the device.
2. Spray the cleaner on a lint-free cloth until the cloth is damp.
3. Do not spray the cleaner directly onto the product.
4. Gently clean the product surface using the cloth.

Your health and safety are an Extron priority. Keeping devices clean, especially those in high-traffic environments and high-use applications, is a crucial step in minimizing the spread of infections. Please contact Extron if you have any questions about the guidelines outlined in this section or if you have a question about cleaning a specific Extron product.

Mounting the MGP 641

Tabletop Use

Four self-adhesive rubber feet are included with the MGP 641. 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

The MGP 641 can be mounted to a standard 19-inch rack shelf. Mounting kits are available at **www.extron.com**. To mount the unit, see the instructions provided with the kit.

UL guidelines for rack mounting

The following Underwriters Laboratories (UL) guidelines pertain to the safe installation of the MGP 641 in a rack.

CAUTION:

- **Elevated operating ambient temperature** — If the equipment is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the equipment in an environment compatible with the maximum ambient temperature (TMA = +122 °F, +50 °C) specified by Extron.
- **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
- **Mechanical loading** — When mounting the equipment in the rack, ensure that uneven mechanical loading does not cause a hazardous condition.
- **Circuit overloading** — When connecting the equipment to the supply circuit, consider 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 (for example, use of power strips).

Consignes UL pour le Montage en Rack

Les consignes UL (« Underwriters Laboratories ») suivantes concernent l'installation en rack d'un boîtier DSC HD-HD :

ATTENTION :

- **Température ambiante élevée** — En cas d'installation de l'équipement dans un rack fermé ou composé de plusieurs unités, la température du rack peut être supérieure à la température ambiante. Par conséquent, il est préférable d'installer l'équipement dans un environnement qui respecte la température ambiante maximale (Tma) spécifiée par Extron.
- **Réduction du flux d'air** — Si l'équipement est installé dans un rack, veillez à ce que le flux d'air nécessaire pour un fonctionnement sécurisé de l'équipement soit respecté.
- **Charge mécanique** — Installez l'équipement en rack de manière à éviter toute situation dangereuse causée par le déséquilibre de la charge mécanique.
- **Surcharge électrique** — Lorsque vous connectez l'équipement au circuit d'alimentation, observez la connexion de l'équipement et étudiez les effets possibles d'une surcharge du circuit sur les protections contre les surintensités et les conducteurs d'alimentation. Consultez à cet égard les indications de la plaque d'identification de l'équipement.
- **Mise à la terre** — Assurez-vous que l'équipement est correctement mis à la terre. Accordez une attention particulière aux connexions électriques autres que les connexions directes au circuit de dérivation (ex. : les multiprises).

Updating the Firmware

Updates to the Extron MGP 641 Multi-Graphic Processor firmware are made available periodically via the Extron website. If the need arises, you can replace the MGP 641 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 641 is using: view the front panel LCD window during power-on, the `Firmware` panel of the MGP 641 embedded web page, or the `Device Settings` tab in VCS.

Using the LCD display at Power-on

Watch the LCD window as you connect the MGP 641 to a power source. The third introductory screen (see figure 41, ❶) contains device part number and the firmware version and build.

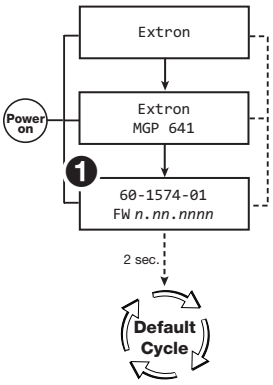


Figure 41. Displaying the Firmware Version at Power-up

Using the web page

The MGP 641 comes from the factory with a default embedded web page. The `Firmware` panel displays the firmware version of your unit, as well as an **`Update`** button which enables you to update the firmware on your MGP (see **Firmware Panel** on page 86).

Using the configuration software

To view the firmware version number from VCS:

1. Open the VCS program on your computer (see **Videowall Configuration Software (VCS) Program** starting on page 73 to obtain and open VCS).
2. On the VCS screen, select the **`Device Settings`** tab (see figure 42, ❶).

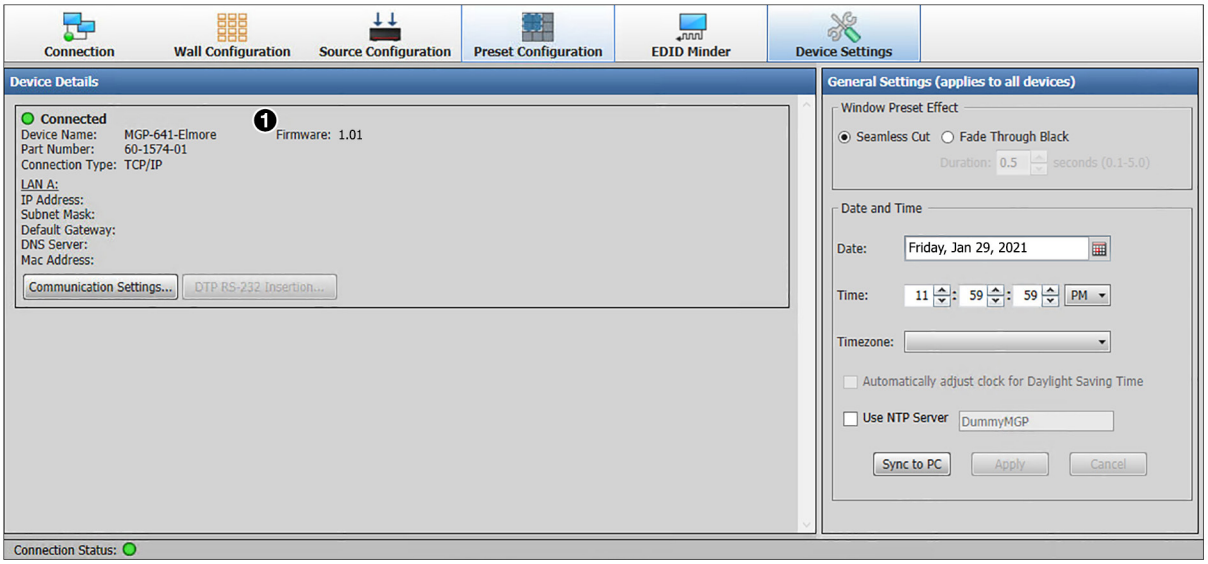


Figure 42. Firmware Version on Device Settings Screen

3. On the `Device Settings` screen, locate `Firmware` (❷) in the last column of information. The current firmware version and build are displayed (see the *VCS Help File* to update firmware using VCS).

Downloading the Firmware

To obtain the latest version of MGP 641 firmware file and install it on your computer:

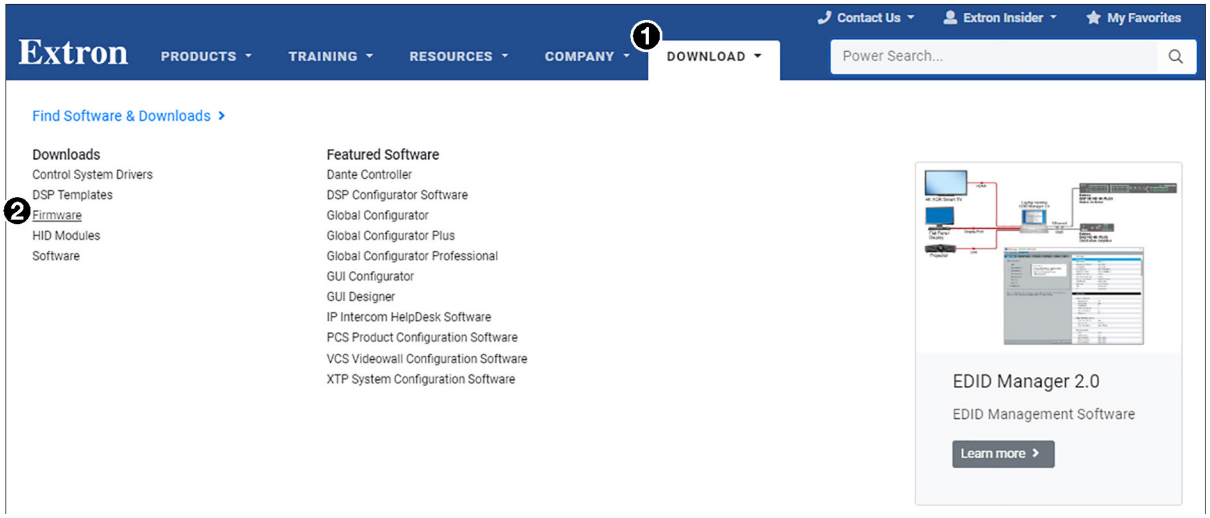


Figure 43. Downloading Firmware from the Extron Website

1. On **www.extron.com**, click the **Download** tab (see figure 43, ❶).
2. Click the **Firmware** link (❷) in the Downloads column.

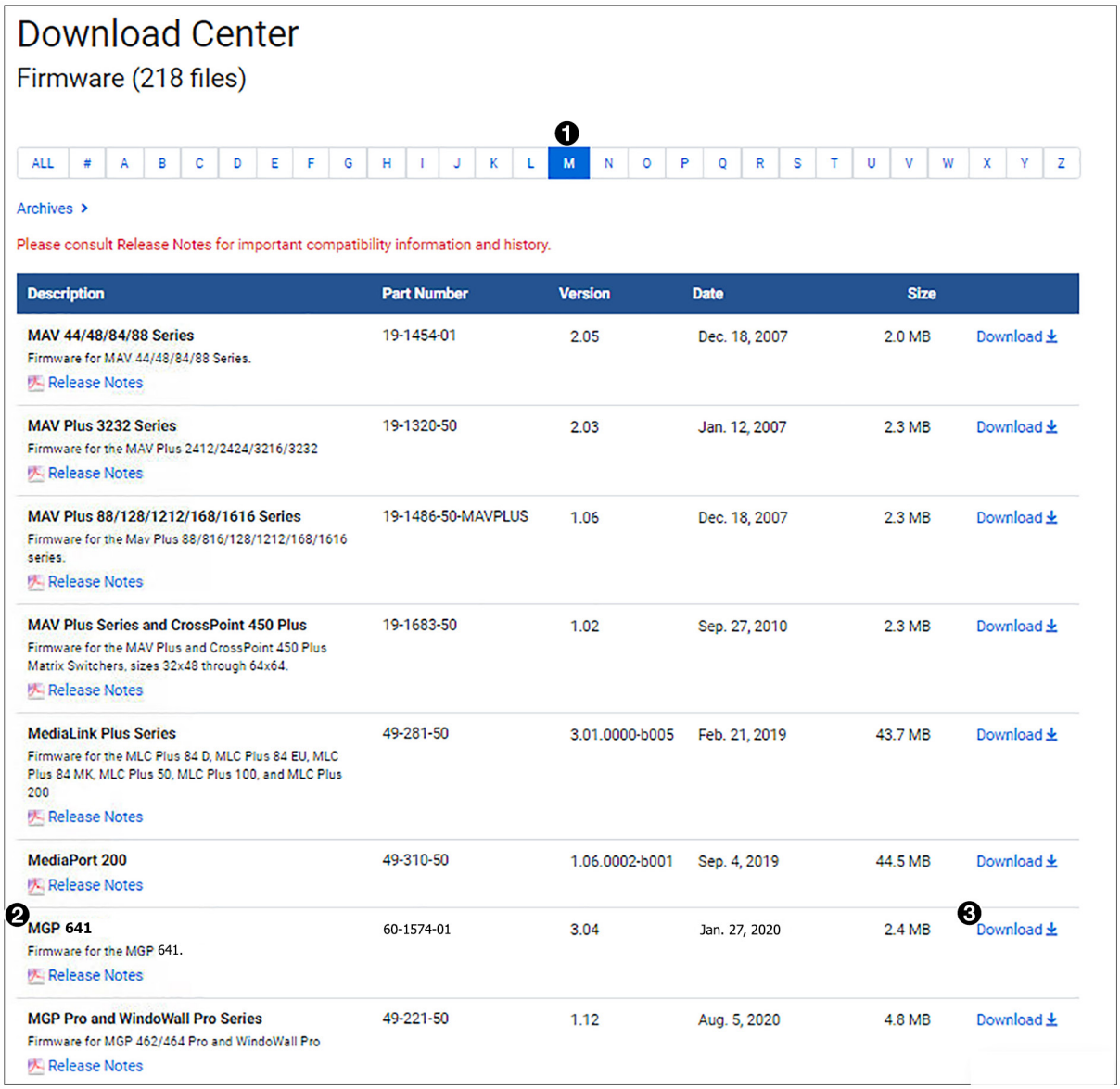


Figure 44. M Link on Firmware Download Center Page

3. On the `Download Center` screen, click the **`M`** link (see figure 44, ❶).
4. Ensure the available firmware version is a later version than the one on the device.

   NOTE: The firmware release notes provide details about the changes between different firmware versions. The file can be downloaded from the same page as the firmware.

5. Scroll to locate the MGP 641 on the page (❷).
6. Click the **`Download`** link (❸) at the right edge of the MGP 641 row.
7. On the login page that appears next, fill in the required information to log in to **www.extron.com** (if you need an Insider Account, see your Extron representative).
8. Follow the instructions on the subsequent screens to complete the software program installation. By default, the firmware file is stored on your computer at `C:\Program Files(x86)\Extron\Firmware\MGP 641`.

   If there is not already an Extron folder in your Program Files x86 folder, the installation program creates it as well.

Uploading the Firmware to the MGP 641

After you have installed the new firmware on your computer, you must upload it to the MGP 641. Firmware uploads can be performed via the MGP 641 internal web page (see **Firmware Panel** on page 86) or the VCS program (see the *VCS Help File*).

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

The computer and the MGP 641 must both be connected to an Ethernet network in order to update the main firmware. It is recommended that you always perform firmware upgrades via an IP connection.

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

IP Address

What is an IP Address?

An IP address is a 32-bit binary number that is used to identify each device on an Ethernet network. This number is usually represented by four decimal numbers (called "octets"), each in the range of 0 through 255 and separated by dots, for example, 192.168.254.254. 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 641 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 641 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 the IP address must all be the same while the last value is used to uniquely identify each device.

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

Device	IP Address
Computer running VCS	192.168.254.41
MGP 641	192.168.254.42

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

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

Device	IP Address
Computer running VCS	208.132.180.41
MGP 641	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 page 97).

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 98 for more information.

Pinging for the IP Address

To access the MGP 641 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 641.

Ping to determine IP address of the device

The Ping utility is available at the command prompt. Ping tests the Ethernet interface between the computer and the MGP 641. Ping can also be used to determine the actual numeric IP address from an alias and to determine the web address.

Ping the MGP 641 as follows:

1. Click the **Start** icon in the lower-left corner of the Windows desktop.
2. On the applications list, scroll to select **Windows System** > **Command Prompt**. The **Command Prompt** window opens.
3. At the drive prompt, enter **ping** {*IP address*}, where the IP address is the numeric address or an alias.
4. Press <**Enter**> on your keyboard. The computer returns a display similar to figure 45.

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

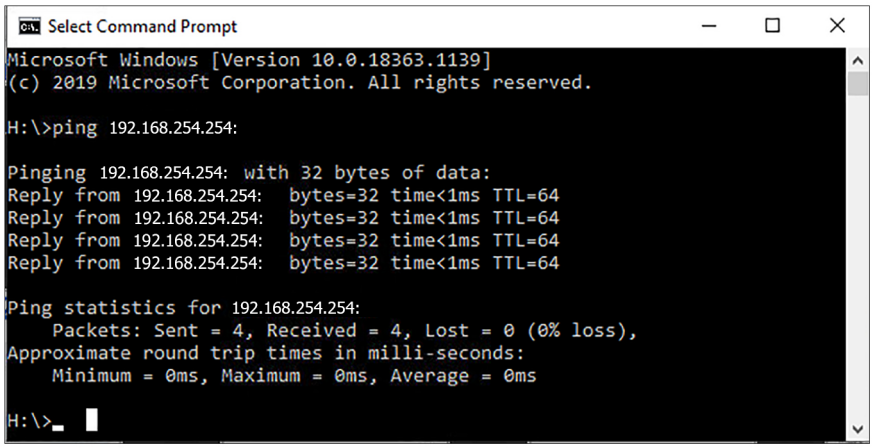


Figure 45. Ping Command and Response Example

Ping to determine web IP address

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

At the prompt, enter **ping -a** *IP address*. The reply that the computer returns is similar to the **Ping** response shown in figure 45, except that when you specify the **-a** modifier, the line **Pinging...** reports the web IP address instead of the numeric IP address, regardless of whether you entered the actual numeric IP address or an alias name.

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. To understand subnetting at the level required to install and operate the MGP 641, you must understand the concepts of a gateway, local and remote devices, IP addresses and octets, and subnet masks and octets.

Gateways

The MGP 641 can communicate with devices on different subnets via a gateway, which is 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 values via SIS commands on the MGP 641 (see the **Command and Response Table for IP SIS Commands** starting on page 66).

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 46). 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.

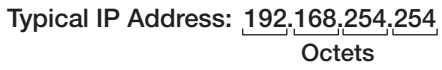


Figure 46. IP Address and Octets

Subnet masks and octets

The subnet mask (figure 47) 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 three 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 are compared when determining if two devices are on the same subnet.

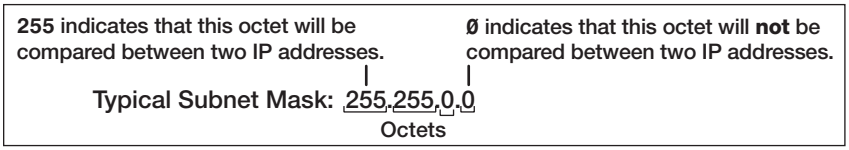


Figure 47. Subnet Mask and Octets

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 48). 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 48).

- If the subnet mask octet contains the value `0`, the related octets of the local device and remote device IP addresses are masked.

  Masked octets are not compared (indicated by *n* in figure 48).

If the unmasked octets of the two IP addresses **match** (indicated by = in example 1 of figure 48), the two addresses **are on the same subnet**.

If the two unmasked fields **do not match** (indicated by an unequal sign [≠] in figure 48, 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 (*?.?.n.n)*	255.255.0.0 (*?.?.n.n)*	255.255.0.0 (*?.?.n.n)*
Remote IP Address:	192.168.2.25	190.190.2.25	192.190.2.25
Match?:	= . = *.n.n* — **Match** (Same subnet)	≠ . ≠ *.n.n* — **No match** (Different subnet)	= . ≠ *.n.n* — **No match** (Different subnet)

Figure 48. Comparing the IP Addresses

Extron Warranty

Extron 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 will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:
Extron
1230 South Lewis Street
Anaheim, CA 92805
U.S.A.

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

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

Europe:
Extron Europe
Hanzeboulevard 10
3825 PH Amersfoort
The Netherlands

China:
Extron China
686 Ronghua Road
Songjiang District
Shanghai 201611
China

Middle East:
Extron Middle East
Dubai Airport Free Zone
F13, PO Box 293666
United Arab Emirates, Dubai

Africa:
Extron South Africa
3rd Floor, South Tower
160 Jan Smuts Avenue
Rosebank 2196, South Africa

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

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

USA:	714.491.1500 or 800.633.9876	**Asia**:	65.6383.4400
Europe:	31.33.453.4040 or 800.3987.6673	**Japan**:	81.3.3511.7655
Africa:	27.11.447.6162	**Middle East**:	971.4.299.1800

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 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 be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron 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.