Multi-Window Processing for Enhanced Presentation of 4K Video Content

- Display up to four source windows on a single screen with a live or static background
- Supports computer and video resolutions up to 4K/60 @ 4:4:4
- Fully customizable window layouts
- Four HDMI 2.0 inputs plus an HDMI 2.0 background input
- HDMI 2.0 and DTP2 outputs
- Multiple window transition effects
- Advanced Extron Vector™ 4K scaling engine

Extron
The Extron MGP 641 is a multi-window processor that scales and presents up to four 4K/60 source signals on a single screen. It features advanced Extron Vector 4K scaling technology for unequaled 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 outputs deliver duplicate signals to local and remote displays. Fully customizable window layouts, logo keying, and window transition effects enhance presentation of the source material. Source and output rotation enable use with portrait displays, and audio de-embedding simplifies integration. These features enable the MGP 641 processor to deliver professional presentations that are ideal for high-end environments and live events.
FEATURES

Source and Output Rotation

**Source Rotation**
Content received on Inputs 2 and 4 can be rotated 90 degrees, providing flexible and creative presentation options for live content.

**Output Rotation**
The duplicate HDMI and DTP2 output signals can be rotated clockwise or counter-clockwise 90 degrees, accommodating displays arranged in portrait or landscape orientations.

HDMI 2.0 Background Input

**Live video background from a dedicated HDMI source**
Live and non-scaled full-motion content from an HDMI source can be used as a background for any presentation, providing an additional input for backgrounds, tickers, or other content.

**Cascade multiple MGP 641 processors**
The background input can also accommodate additional MGP 641 processors to create large-scale displays with up to 16 fully customizable windows. All windows can be sized, overlapped, and positioned anywhere on the screen.

Logos, Transparency, and Keying

**Logo and Image Storage**
A graphic image can be uploaded to the processor in BMP, JPG, PNG, or TIFF formats and positioned and keyed over live video. Full screen images up to 4096x2160 can also be displayed to eliminate loss of video between presentations. Up to 32 logo images can be stored.

**Image Keying and Transparency**
A logo or text can be inserted over live video and configured using level keying, RGB color keying, or transparency. Flexible positioning controls allow placement of the logo anywhere over the active controls.
FEATURES

Display 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.

Supports computer and video resolutions up to 4K/60 @ 4:4:4
Supports HDMI 2.0 signals up to 4096x2160 at 60 Hz with 4:4:4 color sampling.

Integrated DTP2 extension supports transmission of 4K/60 video up to 330' (100 m) over a shielded CATx cable

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, a green window provides 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, while enabling simultaneous distribution of a single source signal to two or more displays.

EDID Minder® automatically manages EDID communication between connected devices

Fully customizable window layouts
Up to four windows can be sized, positioned, and overlapped anywhere on the display, with additional adjustments for zoom and priority.

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 for clean, professional-looking presentations.

Image freeze control
Any window can be frozen and unfrozen 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.

128 presets for simple, fast recall of window layouts
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 no active connections or logos are displayed.

Customizable on-screen clock
An on-screen digital clock can be presented anywhere on screen, with user-definable size, color, and time/date formatting.

Capture and store images to a USB flash drive, internal memory, or network location
An image can be captured as a snapshot of the video output and saved to internal memory, a removable USB flash drive, or a network location for archiving.

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

Front panel controls with LCD display
Back-lit front panel buttons and an LCD menu system with navigation controls ensure simplified operation and setup.

Built-in USB configuration port

Built-in Web pages
Enables the use of a standard browser for device monitoring and simple troubleshooting over an intuitive Web interface.

Easy-to-use configuration and control software
Extron Videowall Configuration Software - VCS reduces configuration and preset programming time with a task-oriented, intuitive interface.

Ethernet monitoring and control
Enables control and proactive monitoring over a LAN or WAN.

RS-232 control port

Front panel security lockout
Locks out front panel functions; all functions remain available through Ethernet, USB, or RS-232 control.

Compatible with all DTP®-enabled products, XTP CrossPoint® matrix switchers, and HDBaseT-enabled devices

Rack-mountable 1U, full rack width metal enclosure

Internal Extron Everlast™ power supply
Provides worldwide power compatibility, with high demonstrated reliability and low power consumption for reduced operating cost.
**Extron Vector 4K Scaling Technology**

For over 20 years, Extron has been engineering scaling and signal processing solutions that deliver uncompromised image quality and performance. As a result, we have become an industry leader in scaling technology, designing best-in-class products renowned for their quality, reliability, and ease of use. We have continually refined our technology to keep pace with evolving video formats – from standard definition to high definition signals, and now, 4K.

**Engineered by Extron from the Ground Up**

Vector 4K was developed internally by Extron’s expert team of signal processing engineers. Extron engineers have crafted patented image processing technologies that set the industry benchmark for visual performance. Features such as 4:4:4 chroma sampling and bicubic scaling ensure very high image quality and preserve detail present in the original source material.

**4:4:4 Chroma Sampling**

Vector 4K processing is always performed in the RGB domain with full 4:4:4 color bandwidth, which is critical for processing fine image details. Competing 4K scalers commonly process in the component domain, employing 4:2:2 or 4:2:0 chroma subsampling. This decreases the bandwidth required to process the signal, at the expense of reduced color detail. Chroma subsampling may be acceptable when processing full-motion video content, but with computer-generated content, subsampled color negatively impacts the clarity of the image. Vector 4K 4:4:4 color processing retains the fine color details present in the original source.

**Bicubic Interpolation**

The Vector 4K scaling engine incorporates Extron-patented, multi-tap, bicubic interpolation, which creates a new pixel by averaging adjacent pixels above, below, to the sides, and diagonally of the new pixel. This produces sharp, accurate output, preserving single-pixel detail that other scaling methods lack. Vector 4K algorithms continually and dynamically adapt, ensuring optimal processing for upscaling, downscaling, or 1:1 pass-through applications.

**Dynamic Digital Input Detection and Auto-Image™**

Today’s computer video standards allow for signal customization to suit the needs of a particular application or display. Such sources can present a challenge for signal processors that rely solely on fixed lookup tables of common resolutions, which are typically incomplete and quickly become obsolete. Vector 4K goes beyond conventional lookup tables, incorporating dynamic input detection which analyzes incoming digital video signals and accurately identifies the signal parameters before processing them for precise conversion and scaling.

**Integration Features**

Vector 4K technology also provides features that aid in system integration, such as aspect ratio control, auto-memory and user presets, advanced HDCP management, and more.

**Learn More**

To learn more about Vector 4K scaling, visit [www.extron.com/vector4k](http://www.extron.com/vector4k), where you can see interactive demonstrations of Vector 4K technology, view an informational video highlighting key features, and download the Vector 4K brochure.
DISPLAY CONTENT FROM UP TO FOUR SOURCES ON A SINGLE SCREEN
Simplifies system design by reducing the need for multiple displays.

128 WINDOW CONFIGURATION PRESETS
Allows for quick saving and recall of size, positioning, priority, and border style of each window.

SEALED PRESENTATION OF SIGNALS SOURCED FROM UPSTREAM DEVICES
Includes various cut and fade transitions for professional-looking presentations.

USER-FRIENDLY INTERFACE
An LCD display, direct access buttons, and rotary controls enable detailed adjustment of image settings and simplified configuration.

FULLY CUSTOMIZABLE WINDOW LAYOUTS
Control window size, zoom, priority, position, and overlapping anywhere on the screen.

Back-lit buttons on front panel
Simplify live operation and source status identification.

WINDOW MUTE
Any window can be added or removed via the front panel, RS-232, or Ethernet.

IMAGE FREEZE
Any window can be frozen and unfrozen via the front panel, RS-232, or Ethernet.

LOGO IMAGE KEYING AND DISPLAY
Up to 32 logo graphics in BMP, JPG, PNG, or TIFF format may be uploaded to the unit.

CUSTOM OUTPUT RESOLUTIONS
Maximizes compatibility with evolving display technologies, non-standard displays, and direct-view LED systems.

Dynamic input detection
Facilitates fast, flexible detection of both standard and custom resolutions.

HDCP 2.3 COMPLIANCE
Ensures display of content-protected 4K video media and interoperability with other HDCP-compliant devices.

HDMI 2.0 BACKGROUND INPUT
Accepts non-scaled live background content from a computer or HDMI source.

CASCADE MULTIPLE MGP 641 PROCESSORS
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.

STEREO AUDIO DE-EMBEDDING
HDMI two-channel PCM audio can be extended over the DTP2 output or extracted as balanced or unbalanced stereo audio to the analog outputs.

INTERNAL EXTRON EVERLAST POWER SUPPLY
Provides high-demonstrated reliability and low power consumption for reduced operating cost.

HDMI 2.0 INPUTS
Accept signals up to 4096x2160 @ 60 Hz with full 4:4:4 color processing.

HDMI 2.0 AND DTP2 OUTPUTS
Duplicate HDMI and DTP2 outputs support connection to local and remote displays.

Ethernet monitoring and control
Enables operation using a network-based control system or Extron Videowall Configuration Software - VCS.

RS-232 monitoring and control
Facilitates integration with a control system.
Corporate Auditorium

An MGP 641 in a corporate auditorium receives content from a PC workstation, a 4K media player, an HDMI camera, and a personal device. The PC workstation and BYOD input allow users to present slide shows and other supporting materials, while the 4K media player enables playback of corporate videos. An HDMI camera captures the speaker for presentation on the video screen. The HDMI 2.0 and DTP2 outputs send duplicate signals to a local preview monitor and the 4K video projector. Window positionings are stored as presets and recalled using a TLP Pro 1025T TouchLink® Pro Touchpanel. To enhance corporate branding throughout the presentation, a locally stored logo is displayed over the content. Also, the background input accepts signals from a 4K workstation PC used for sharing full-motion backgrounds.
# Specifications

### True4K Specification

#### Max 4K Capabilities

<table>
<thead>
<tr>
<th>Resolution and Refresh Rate</th>
<th>Chroma Sampling</th>
<th>Max Bit Depth per Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>4096 x 2160 at 60 Hz</td>
<td>4:4:4</td>
<td>8 bit</td>
</tr>
<tr>
<td>3840 x 2160 at 60 Hz</td>
<td>4:4:4</td>
<td>8 bit</td>
</tr>
<tr>
<td>4096 x 2160 at 30 Hz</td>
<td>4:2:0</td>
<td>10 bit</td>
</tr>
<tr>
<td>3840 x 2160 at 30 Hz</td>
<td>4:2:0</td>
<td>10 bit</td>
</tr>
</tbody>
</table>

**Frame rate:** 24, 25, 30, 50, or 60 fps

**Chroma Sampling:** 4:4:4, 4:2:2, and 4:2:0

**Color bit depth:** 8 or 10 bits per color

**Signal type:** DVI 1.0, HDMI 1.4 and 2.0, HDCP 1.4 and 2.3

**Max. video data rate:** 18 Gbps (6 Gbps per color)

**NOTE:** Subject to the maximum data rate limit. Use our calculator at [www.extron.com/8Kdatarate](http://www.extron.com/8Kdatarate) to determine video parameters supported by this data rate. 4096 x 2160@50-60 at 4:4:4 is available only for HDMI connections.

### Video Input

#### Number/signal type

- 4 HDMI/DVI (HDCP 1.4 and 2.3 compliant)
- 1 HDMI/DVI (HDCP 1.4 and 2.3 compliant) (Live Background)

#### Connectors

- 4 female HDMI type A
- 1 female HDMI type A (Live Background)

#### Resolution range

- 1080p, 1080i, 1080p, 2K, 3840x2160 (up to 60 Hz), 4096x2160
- 1920x1200, 2048x1200, 2048x1536, 2560x1080, 1600x900, 1400x1050, 1680x1050, 1600x1200, 1920x1200, 2048x1200, 2048x1536, 2560x1080, 2560x1440, 2560x1600, 2048x1536, and Custom 1 through 10

#### Standards

- DVI 1.0, HDMI 2.0, HDCP 1.4, HDCP 2.3

### Video Processing

#### Digital sampling

30 bit, 10 bits per color, 600 MHz pixel clock maximum

#### Maximum video data rate

17.82 Gbps (5.94 Gbps per color)

#### Colors

1 billion (10 bit processing with full 4:4:4 sampling)

### Logs

#### Number

32 logs

#### Resolution range

Up to 4096x2160

#### Image file formats

BMP, JPEG, PNG, TIFF (TIFF files using JPEG compression are not supported)

### Video Output

#### Number/signal type

- 1 HDMI/DVI (HDCP compliant)
- 1 DTP2/XTP/HDBT configurable (HDCP compliant)

#### Connectors

- 1 female HDMI type A
- 1 female RJ-45

#### Power for active cables

250 mA for the HDMI output

#### Scaled resolution

4096x2160, 3840x2160, 1024x768, 1280x1024, 1366x768, 1440x900, 1600x900, 1440x1080, 1680x1050, 1600x1200, 1920x1080, 2048x1200, 2400x1440, 2560x1440, and Custom 1 through 10

#### Standards

DVI 1.0, HDMI 2.0, HDCP 1.4, HDCP 2.3

### Audio Input

#### Number/signal type

- 5 HDMI embedded audio (including HDMI background input)

#### Connectors

5 female HDMI

### Audio Output

#### Number/signal type

1 balanced or unbalanced stereo

#### Connectors

1 female HDMI
1 female RJ-45

#### Impedance

50 ohms unbalanced, 100 ohms balanced

#### Maximum level

> -41 dBm balanced, >+15 dBf unbalanced

### Control/Remote

#### Serial control port

1 RS-232 on captive screw connector on back panel

#### Baud rate and protocol

9600, 8-bit, 1 stop bit, no parity (default)

#### Ethernet control port

1 female RJ-45 connector

#### USB control port

1, 2 USB, female mini USB B on front panel

#### USB version

USB 2.0

#### Program control

Extron Simple Instruction Set® (SIS®)

#### Control/Remote — External Device (RS-232/IR over TP)

NOTE: RS-232 can be transmitted to and from DTP/XTP/HDBT Tx via Ethernet insertion only.

#### Baud rates

9600 to 115200

#### IR pass-through control port

TTL level (0 to 5 V) modulated infrared control from 30 kHz up to 60 kHz

#### MGP 641 outputs/DTP Rx

(1) 3.5 mm captive screw connector, 3 pole

#### IR control pin configuration

1 = IR Tx, 2 = IR Rx, 3 = GND

### General

#### Power supply

Internal

- Input: 100-240 VAC, 50-60 Hz

#### Cooling

Fans, right to left (as viewed from the front panel)

#### Mounting

Rack mountable

#### Enclosure dimensions (per unit)

1.75” H x 17.5” W x 12.0” D (1U high, full rack wide)

#### Regulatory compliance

- CE, c-UL, UL, C-tick, FCC Class A, ICES, VCCI, RoHs, and WEEE

#### Product warranty

3 years parts and labor

#### Everlast power supply warranty

7 years parts and labor

### Specifications

For complete specifications, please go to [www.extron.com](http://www.extron.com)

Specifications are subject to change without notice.

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**Note:** All nominal levels are at ±10%.

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