User Guide

HDMI

HAE 100 4K Plus

HDMI Audio Extractor

Extron

68-3113-01 Rev. B
01 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**.

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Instrucciones de seguridad • Español

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Instructions de sécurité • Français

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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.

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

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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.

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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。

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안전 지침 • 한국어

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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.

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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.

NOTE: 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.

Conventions Used in this Guide

Notifications

The following notifications are used in this guide:

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

NOTE: A note draws attention to important information.

Software Commands

Commands are written in the fonts shown here:

```
^AR Merge Scene,,Op1 scene 1,1 ^B51 ^W^C
[Ø1] R ØØØ4 ØØ3ØØ ØØ4ØØ ØØ8ØØ ØØ6ØØ [Ø2] 35 [17] [Ø3]
```

Esc X1 * X17 * X20 * X23 * X21 CE ←

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

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

```
Reply from 2Ø8.132.18Ø.48: bytes=32 times=2ms TTL=32
C:\Program Files\Extron
```

Variables are written in slanted form as shown here:

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

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

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

Click the **OK** button.

Specifications Availability

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

Contents

Introduction

This section covers the following topics:

- **About the HAE 100 4K Plus HDMI Audio Extractor**
- **Features**

About the HAE 100 4K Plus HDMI Audio Extractor

The HAE 100 4K Plus is a one HDMI input, one HDMI output audio de-embedder that extracts the audio from an HDMI signal, including audio from 4K sources. It accepts an HDMI input, extracts the digital audio from the HDMI signal, and provides a digital S/PDIF audio output and an analog stereo audio output. It provides outputs for stereo and dual mono analog audio signals, as well as digital multi-channel or two-channel S/PDIF audio.

It is HDCP compliant, supports data rates up to 10.2 Gbps, and is compatible with video resolutions up to 4K.

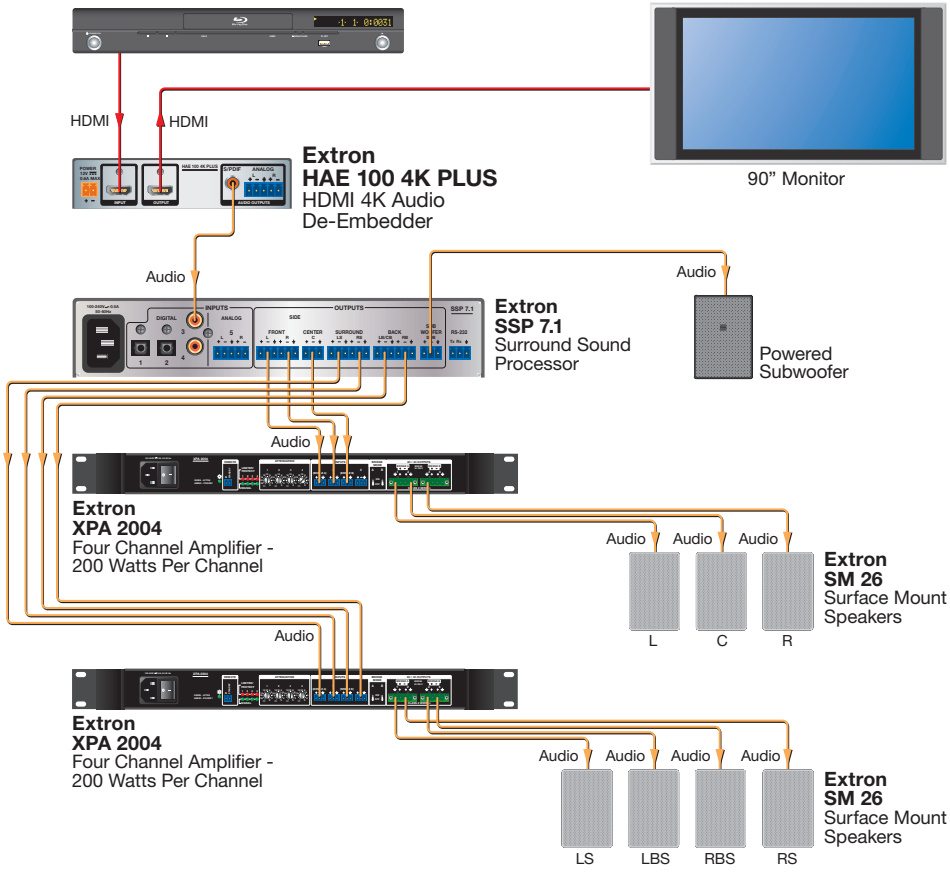


Figure 1. HAE 100 4K Plus Application Diagram

NOTE: This product does not decode or downmix Dolby® Digital or DTS® audio formats.

Features

- **De-embeds two-channel analog and S/PDIF digital audio from an HDMI signal** — The HAE 100 4K Plus offers the flexibility to support analog stereo, dual mono, or two-channel LPCM audio. Dolby® or DTS® multi-channel surround formats are supported on an S/PDIF output. This is especially convenient for surround sound processors without HDMI inputs.
- **Supports 4K/60 @ 4:4:4** — 4K (4096x2160) @ 60 Hz or UHD (3840 x 2160) @ 60 Hz with 4:4:4 chroma sampling
- **Supported HDMI 2.0b specification features include data rates up to 18 Gbps, HDR, Deep Color up to 12-bit, 3D, and HD lossless audio formats.**
- **HDCP compliant with user-selectable authorization** — Ensures display of content-protected media and interoperability with other HDCP-compliant devices. 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.
- **EDID Minder® automatically manages EDID communication between connected devices** — EDID Minder ensures that the source powers up properly and reliably outputs content for display.
- **Selectable output format** — Allows the output video format and color space to be manually configured.
- **Automatic HDMI input cable equalization** — Actively conditions incoming HDMI signals to compensate for signal loss when using long cables, low quality cables, or source devices with poor signal output.
- **Comprehensive, real-time status LED indicators for troubleshooting and monitoring** — Front panel LEDs verify the presence of HDMI input and output signals, HDCP authentication, and the de-embedded audio format.
- **Easy setup and commissioning with Extron PCS - Product Configuration Software** — Conveniently configure multiple products using a single software application. SIS also available.
- **600 MHz pixel clock** — Industry's highest pixel clock for cutting edge performance
- **Independent muting for audio and video**
- **Rack-mountable 1" (2.5 cm) high, quarter rack width metal enclosure**
- **Includes LockIt® HDMI cable lacing brackets**

Panels and Cabling

This section covers the following:

Front Panel Features

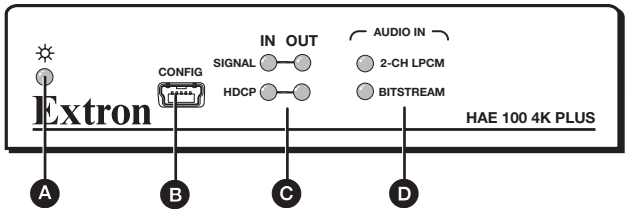


Figure 2. HAE 100 4K Plus Front Panel

A Power LED — The LED indicator lights when the unit is receiving power.

B Config port — Use this female type B mini USB to update the firmware, configure various functions of the unit, and view the current status of the unit.

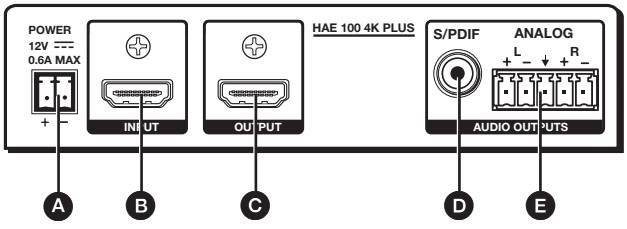
C Input and Output LEDs — These four LEDs provide the status of the HDMI input:

- **Signal** — This LED lights when the unit is receiving a signal on the HDMI input.
- **HDCP** — This LED lights when the input signal is HDCP encrypted.

D Audio input LEDs — These two LEDs provide the status of the various HDMI and audio input functions:

- **2-CH PCM** — This LED lights when the incoming embedded audio signal is a 2-channel Digital LPCM audio format.
- **Bitstream** — This LED lights when the incoming embedded audio signal is a Dolby Digital or DTS audio format.

Rear Panel Features and Cabling



A Power input (see the **next page**)

B HDMI input (see **page 5**)

C HDMI output (see **page 5**)

D S/PDIF output (see **page 5**)

E Analog output (see **page 5**)

Figure 3. HAE 100 4K Plus Rear Panel

Ⓐ **Power input** — Connect the provided power supply to the 3.5 mm, 2-pole captive screw power receptacle (see figure 4).

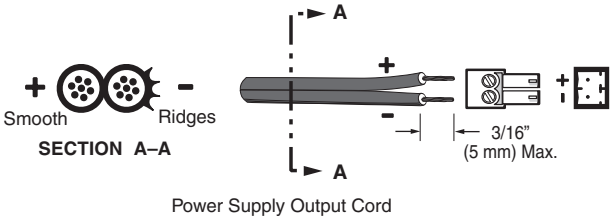


Figure 4. Power Connection

ATTENTION:

- The length of the exposed wires in the stripping process is critical. The ideal length is 3/16 inches (5 mm). Any longer and the exposed wires may touch, causing a short circuit between them. Any shorter and the wires can be easily pulled out even if tightly fastened by the captive screws.
- La longueur des câbles exposés est primordiale lorsque l'on entreprend de les dénuder. La longueur idéale est de 5 mm (3/16 inches). S'ils sont un peu plus longs, les câbles exposés pourraient se toucher et provoquer un court circuit. S'ils sont un peu plus courts, ils pourraient sortir, même s'ils sont attachés par les vis captives.

- Always use a power supply supplied by or specified by Extron. Use of an unauthorized power supply voids all regulatory compliance certification and may cause damage to the supply and the end product.
- Utilisez toujours une source d'alimentation fournie par Extron. L'utilisation d'une source d'alimentation non autorisée annule toute conformité réglementaire et peut endommager la source d'alimentation ainsi que l'unité.

- If not provided with a power supply, this product is intended to be supplied by a power source marked "Class 2" or "LPS" and rated at 12 VDC and a minimum of 0.6 A.
- Si ce produit ne dispose pas de sa propre source d'alimentation électrique, il doit être alimenté par une source d'alimentation de classe 2 ou LPS et paramétré à 12 V et 0.6 A minimum.

- Unless otherwise stated, the AC/DC adapters are not suitable for use in air handling spaces or in wall cavities. The power supply is to be located within the same vicinity as the Extron AV processing equipment in an ordinary location, Pollution Degree 2, secured to the equipment rack within the dedicated closet, podium, or desk.
- Sauf mention contraire, les adaptateurs AC/DC ne sont pas appropriés pour une utilisation dans les espaces d'aération ou dans les cavités murales. La source d'alimentation doit être située à proximité de l'équipement de traitement audiovisuel dans un endroit ordinaire, avec un degré 2 de pollution, fixé à un équipement de rack à l'intérieur d'un placard, d'une estrade, ou d'un bureau.

- The installation must always be in accordance with the applicable provisions of National Electrical Code ANSI/NFPA 70, article 725 and the Canadian Electrical Code part 1, section 16. The power supply shall not be permanently fixed to building structure or similar structure.
- Cette installation doit toujours être en accord avec les mesures qui s'applique au National Electrical Code ANSI/NFPA 70, article 725, et au Canadian Electrical Code, partie 1, section 16. La source d'alimentation ne devra pas être fixée de façon permanente à une structure de bâtiment ou à une structure similaire.

B **HDMI input** — Connect an HDMI input source into this female HDMI type A connector.

NOTE: By default, the EDID stored at the HDMI input is set to 1080p at 60 Hz with 2-channel audio. EDID can be configured using Extron PCS software.

C **HDMI output** — Connect an HDMI output device into this female HDMI type A connector.

NOTES:

- It is not required to connect an HDMI output device to extract audio from the HDMI input signal.
- The HDMI output passes all audio formats, regardless of configuration. The embedded audio output can also be muted through SIS command.
- If the HDMI input signal is HDCP encrypted, the HDMI output signal is also encrypted. If the HDMI input signal is not HDCP encrypted, the output signal is not encrypted.
- If the HDMI input signal is HDCP encrypted and the HDMI output device is not HDCP compliant, the unit outputs a green screen.

D **S/PDIF audio output** — Connect an S/PDIF audio output device into this female RCA connector. This connector outputs digital S/PDIF audio formats (2-channel LPCM, Dolby Digital, or DTS) that are extracted from the HDMI input signal.

NOTE: The audio format is determined by the EDID assigned.

- Using 2-channel EDID restricts the source device to outputting 2-channel LPCM, and then extract and output it on the Analog and S/PDIF connectors.
- Using S/PDIF EDID allows 2-channel LPCM, Dolby Digital and DTS to be output by the source device (Dolby Digital and DTS are only extracted on the S/PDIF connector).

See **EDID Minder** on the next page.

E **Analog audio output** — Connect an audio output device to this 5-pole 3.5 mm captive screw connector (see figure 5 for wiring). This connector outputs a 2-channel LPCM (converted to analog) that is extracted from the HDMI input signal.

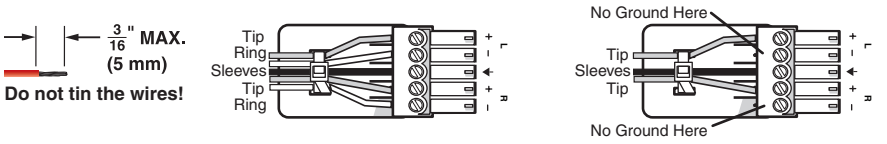


Figure 5. Analog Output Connector Wiring

ATTENTION:

- Connect the sleeve to the ground (Gnd) terminal. Connecting the sleeve to a negative (-) terminal damages the audio output circuits.
- Connectez le manchon à la terminaison terre (Gnd). Connecter le manchon à une terminaison négative (-) endommagera les circuits de la sortie audio.

Configuration

To ensure that the sink devices can handle the signal provided, the following HAE 100 4K Plus features can be configured using Extron PCS Software or SIS commands (see **PCS Software** on page 14, or **SIS Commands** on page 8). This section provides information on:

- **EDID Minder**
- **Output Compatibility Correction**
- **HDCP**

EDID Minder

EDID Minder allows a source device connected to the HAE 100 4K Plus input to continuously see the EDID of a sink device, even if the sink is not physically connected.

By default, the EDID is set to 1080p @ 60 Hz with 2-channel audio.

EDID can be configured using PCS software (see **PCS Software** on page 14).

Output Compatibility Correction

EDID Minder manages the EDID stored at the HDMI input and presented to the source device. However, additional functionality may be required to ensure that all output devices remain compatible with the signal from the source.

The HAE 100 4K Plus scans and monitors the EDID of the sink device connected to the HDMI output. It determines the interface (DVI or HDMI) and color depth, and uses that information to adjust the signal so that it is compatible with the output device.

TMDS Output Format

The TMDS output format has three components:

- **Video format** — either DVI or HDMI
- **Color space** — RGB 4:4:4, YUV 4:2:2, or YUV 4:4:4
- **Quantization range** — either full (0-255) or limited (16-235)

To set the TMDS output format, use the SIS commands shown on **page 10**.

By default, the output format is configured for Auto, which automatically forces RGB 4:4:4 Full. The video format depends on the source signal and the sink capabilities.

NOTE: When the source signal is detected as 4K/UHD @ 60 Hz with YUV 4:2:0 (based on AVI infoframe data), it passes unaltered, overriding the TMDS output format setting. If the TMDS output format is changed while the signal is passing, the setting is applied, but with no observable change. The TMDS output format resumes as configured when the source signal changes to a signal other than 4K/UHD @ 60 Hz with YUV 4:2:0.

Other TMDS output formats, which can be set using the **Output TMDS Format** SIS command on page 10, include:

- DVI RGB 4:4:4
- HDMI RGB 4:4:4 Full
- HDMI RGB 4:4:4 Limited
- HDMI YUV 4:4:4 Limited
- HDMI YUV 4:2:2 Limited

Color bit depth support

If the incoming signal uses deep color but the sink device does not support it, the color depth is truncated to the next best color depth, as reported in the sink EDID. The options are:

- 12-bit > 10-bit
- 12-bit > 8-bit
- 10-bit > 8-bit

This feature can be set to always force 8-bit, using the **Output Color Bit Depth** SIS command on page 10.

Hot Plug Detect (HPD)

The HAE 100 4K Plus monitors HPD on the HDMI output to determine if a new sink has been connected. If necessary, the signal for that output is modified in response to the EDID of the connected device.

HDCP

Input

The HAE 100 4K Plus input authenticates HDCP with the source device if the source requires HDCP encryption. The authentication process is repeated whenever the stored EDID is changed or updated.

HDCP support can be disabled using the **Input HDCP Authorization** SIS Command on page 10.

Output

The output is authenticated and encrypted according to the configured HDCP output mode (see output modes below). If the output requires encryption but the connected sink device cannot be authenticated, the HAE 100 4K Plus outputs a green screen.

HDCP output modes

- **Follow input** — Output is always authenticated but only encrypted when required by input. HDMI authentication is continuous. DVI authentication occurs for a maximum of 10 seconds, then fails. This is the default mode.
- **Always encrypt output** — Output is always authenticated and encrypted. HDMI authentication is continuous. DVI authentication occurs for a maximum of 10 seconds, then fails.
- **Follow input (with continuous DVI trials)** — Output is always authenticated but only encrypted when required by input. Both HDMI and DVI authentication are continuous.
- **Always encrypt output (with continuous DVI trials)** — Output is always authenticated and encrypted. Both HDMI and DVI authentication are continuous.

SIS Commands

This section provides information on:

- **Connecting a Control Computer**
- **Simple Instruction Set (SIS) Control**
- **Command and Response Table for SIS Commands**

Connecting a Control Computer

Connect a control PC to the front panel config port using a USB cable (see **Front Panel Features** on page 3). Remote communications are via Simple Instruction Set (SIS) commands. Use a communication utility, such as Extron DataViewer, to send SIS commands and view the responses.

Simple Instruction Set (SIS) Control

Host-to-Interface Communications

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

Error Responses

When the HAE 100 4K Plus receives a valid SIS command, it executes the command and sends a response to the host device. If the HAE 100 4K Plus is unable to execute the command because the command is invalid or it contains invalid parameters, it returns an error response to the host.

The error response codes and their descriptions are as follows:

```
E10 – Invalid command

E13 – Invalid parameter
```

Timeout

Pauses of 10 seconds or longer between command ASCII characters result in a timeout. The command operation is aborted with no other indication.

Using the Command and Response Table

The Command and Response Table below shows SIS commands for the HAE 100 4K Plus. Command and response examples are shown throughout the table. Symbols are used throughout the table to represent variables in the command and response fields. Use the ASCII to HEX Conversion Table with the Command and Response Table.

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

Command and Response Table for SIS Commands

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Signal status			
Input/Output Signal Status	Esc ØLS ↵	X3•X3 ↵	Input•Output
		Sig X3•X3 ↵	Verbose mode 2/3
Input HDCP Status	Esc IHDCP ↵	X12 ↵	
		HdcpI X12 ↵	Verbose mode 2/3
Output HDCP Status	Esc OHDCP ↵	X13 ↵	
		HdcpO X13 ↵	Verbose mode 2/3
Input Audio Status	1S	X1 ↵	
		AudI X1 ↵	Verbose mode 2/3
EDID Minder			
View EDID in HEX format	Esc REDID ↵	X7 ↵	HEX data from currently assigned EDID
View EDID Native Rate	Esc NEDID ↵	X8 ↵	*Example:* 1080P@60.0Hz

KEY:

X1 = Input audio status:
Ø = No audio detected or detected audio cannot be de-embedded
1 = S/PDIF Bitstream audio detected 2 = 2-Ch LPCM detected

X3 = Ø = off, disabled or not detected 1 = on, enabled, or detected

X7 = 128 or 256 Byte EDID raw HEX (text form) from currently assigned EDID

X8 = Native resolution and refresh rate from currently assigned EDID (Ex: 1920x1080 @60 Hz)

X12 = Input HDCP status:
Ø = No active video source detected
1 = Video detected without HDCP (not encrypted) 2 = Video detected with HDCP (encrypted)

X13 = Output HDCP status:
Ø = No sink detected 1 = Non-HDCP sink detected (sink is not HDCP compliant)
2 = HDCP sink detected not encrypted 3 = HDCP sink detected and encrypted

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Video			
Video Mute	X2B	VmtX2↵	
Video Mute Status	B	X2↵	
Input HDCP Authorization	EscEX3HDCP←	HdcpEX3↵	
HDCP Authorization Status	EscEHDCP←	X3↵	
Output HDCP Mode	EscSX4HDCP←	HdcpSX4↵	
Output HDCP Mode Status	EscSHDCP←	X4↵	
Output TMDS Format	EscX5VTPO←	VtpoX5↵	
Output TMDS Format Status	EscVTPO←	X5↵	
Output Color Bit Depth	EscVX9BITD←	BitdVX9↵	
Output Color Bit Depth Status	EscVBITD←	X9↵	
Set Output Hot-Plug Mode (5V)	EscMX14HPLG←	HplgMX14↵	
Output Hot-Plug Mode (5V) Status	EscMHPLG←	X14↵	

KEY:

X2 = Video mute:
Ø = off (default),
1 = video only,
2 = video + sync

X3 = Ø = off, disabled or not detected 1 = on, enabled, or detected

X4 = Output HDCP mode:
1 = (default) Encrypt as required by input. Continuous trials for HDMI sinks, attempt for 10s on DVI sinks (then fail)
2 = Always encrypt. Continuous trials for HDMI sinks, attempt for 10s on DVI sinks (then fail).

X5 = Output TMDS format:
1 = Auto (default)
2 = DVI RGB 444 Full
3 = HDMI RGB Full
4 = HDMI RGB Limited
5 = HDMI YUV 444 Limited
6 = HDMI YUV 422 Limited

X9 = Output color bit depth:
1 = auto based on sink EDID (default)
2 = force 8-bit/color

X14 = Output 5 V mode:
1 = Auto

NOTE: 5 V is enabled when a source with 5 V is present; otherwise, it is off.

2 = 5 V always enabled (default)

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Audio			
Disable TMDS Audio Output	Esc00AFMT←	AfmtO0↵	
Enable TMDS Audio Output	Esc01AFMT←	AfmtO1↵	Default
TMDS Audio Output Status	EscOAFMT←	X3↵	
Set Analog Output Mode	EscSX16AFMT←	AfmtSX16↵	X16 = 1 (stereo - default), 2 (dual mono)
View Analog Output Mode	EscSAFMT←	X16↵	
Audio Mute Per Output	X17*X3Z	AmtX17*X3↵	X17 = 1 (analog), 2 (S/PDIF)
Audio Mute All Outputs	X3Z	AmtX3↵	
View Audio Mute Status	Z	X3•X3↵	Analog out • S/PDIF out
		AmtX3•X3↵	Verbose mode 2/3
Info/Other			
Information	I	AudIX1•SigX3•X3 •HdcpIX12•HdcpOX13↵	Input audio, input/output signal, and HDCP status

KEY:

X1 = Input audio status:
Ø = No audio detected or detected audio cannot be de-embedded
1 = S/PDIF Bitstream audio detected, 2 = 2-Ch LPCM detected

X3 = Ø = off, disabled or not detected
1 = on, enabled, or detected

X12 = Input HDCP status:
Ø = No active video source detected
1 = Video detected without HDCP (not encrypted)
2 = Video detected with HDCP (encrypted)

X13 = Output HDCP status:
Ø = No sink detected
1 = Non-HDCP sink detected (sink is not HDCP compliant)
2 = HDCP sink detected not encrypted
3 = HDCP sink detected and encrypted

X16 = Analog audio output configuration:
1 = Stereo (default)
2 = Dual Mono

X17 = Audio output:
1 = Analog output
2 = S/PDIF output

Command	ASCII Command (host to unit)	Response (unit to host)	Additional Description
Set Verbose Mode	Esc X10 CV ←	Vrb X10 ↵	
Verbose Mode Status	Esc CV ←	X10 ↵	
Set Unit Name	Esc X11 CN ←	Ipn•X11 ↵	
Set Unit Name to Default	Esc•CN ←	Ipn•HAE-100-4K-PLUS ↵	
View Unit Name	Esc CN ←	X11 ↵	
Query Part Number	N	60-1681-01 ↵ Pno•60-1681-01 ↵	Verbose mode 2/3
Query Model Name	1I	HAE-100-4K-PLUS ↵ Inf01*HAE-100-4K-PLUS ↵	Verbose mode 2/3
Query Model Description	2I	HDMI Audio De-Embedder ↵ Inf02*HDMI Audio De-Embedder ↵	Verbose mode 2/3
Query Firmware Version	Q	x.xx ↵	
Query Firmware Version with Build	*Q	x.xx.xxxx ↵	

KEY:

X10 = Verbose mode:
- Ø = clear/none
- 1 = verbose mode (default)
- 2 = tagged responses for queries
- 3 = verbose mode and tagged responses for queries

X11 = Device name

NOTE: The name is a text string of up to 24 characters drawn from the alphabet (A-Z), digits (0-9), and minus sign/hyphen (-). No blank or space characters are permitted as part of a name. The first letter must a letter, and the last character must not be a minus sign/hyphen. The factory default is "HAE-100-4K-PLUS".

Reference Information

This section contains mounting information and updating firmware methods. Topics in this section include:

- **Mounting**
- **PCS Software**
- **Firmware Update**

Mounting

Tabletop Placement

Attach the four provided rubber feet to the bottom of the unit and place it in any convenient location.

Rack Mounting

UL Guidelines for Rack Mounting

The following Underwriters Laboratories (UL) guidelines are relevant to the safe installation of these products in a rack:

1. **Elevated operating ambient temperature** — If the unit 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.
2. **Reduced air flow** — Install the equipment in the rack so that safe operation and adequate air flow is provided to the unit.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Consider the equipment nameplate ratings when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections.

Rack Mounting Procedure

These units can be mounted on an optional rack systems listed on the website (see **www.extron.com**). To mount the unit on a rack shelf, follow the instructions provided with the shelf accessories.

Back of the Rack Mounting Procedure

The HAE 100 4K Plus can be mounted to the rear of a rack using an optional back of rack mounting kit (see **www.extron.com**). The kit allows the product to be vertically mounted to the front or rear rack supports and face either the front or the rear of the rack. To mount the unit, follow the instructions provided with the kit.

Under-desk and Furniture Mounting

Mount the unit under a desk or podium, using the under-desk mounting kit. Follow the instructions provided with the kit.

PCS Software

The PCS software application can be used to update firmware and configure the HAE 100 4K Plus.

Downloading PCS

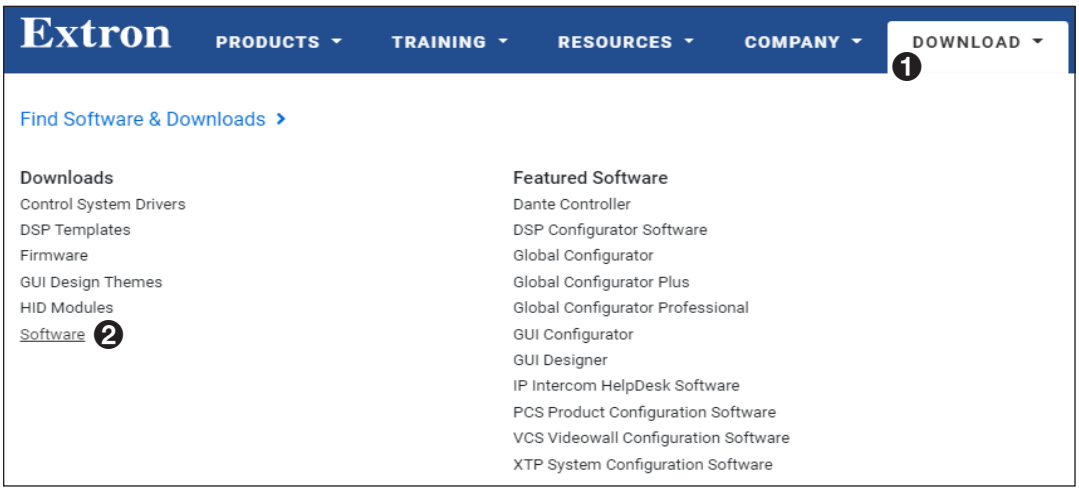


Figure 6. Software on the Extron Website

1. On the Extron website, go to the **`Download`** tab (see figure 6, ❶) and click **`Software`** (❷). A list of available software opens.
2. Navigate to `PCS` (see figure 7, ❶), and click **`Download`** link on the right (see figure 7, ❷).

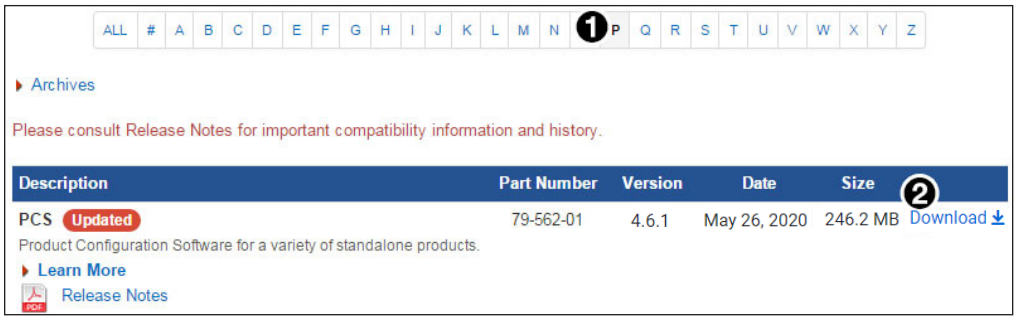


Figure 7. PCS on the Extron Website

3. Submit any required information to start the download.

Using PCS

1. Connect a control PC to the HAE 100 4K Plus front panel Config port (see **figure 2**, Ⓑ, on page 3).
2. Open the PCS software on the control PC. Click **`Start > Programs > Extron Electronics > Extron Product Configuration Software > Extron Product Configuration Software`**.

NOTE: The PCS Help File contains complete information about using the program to configure the HAE 100 4K Plus.

Firmware Download

To download the latest firmware for the HAE 100 4K Plus:

1. On the Extron website, **www.extron.com**, go to the **`Download`** tab and click **`Firmware`** (see figure 9, ❶).

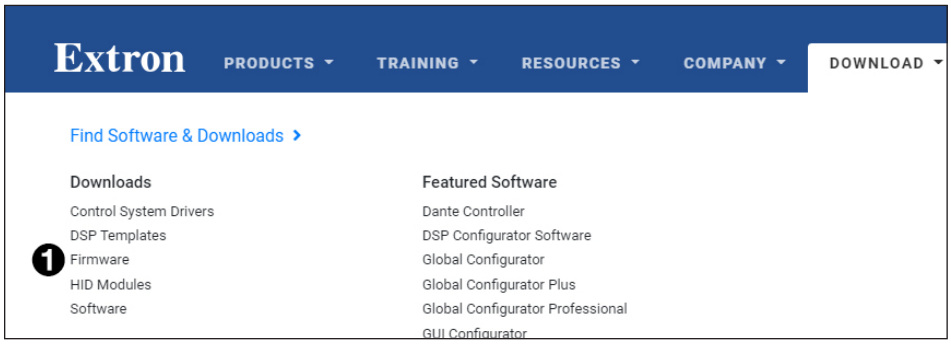


Figure 8. Firmware Link on the Download Tab

2. In the `Download Center` screen, navigate to the HAE 100 4K Plus (see figure 9, ❶).

NOTE: Your product appears in this list only if a new version of the firmware has been released since the product was first introduced.

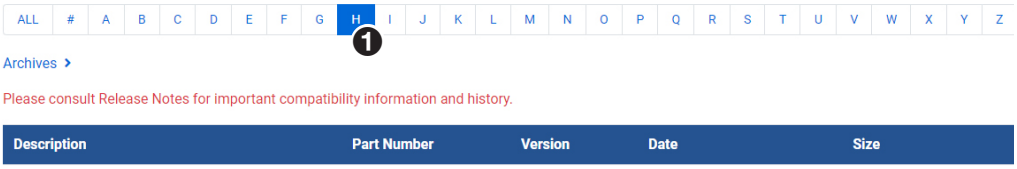


Figure 9. Firmware Download Center

3. Ensure the available firmware version is a later version than the current one on the device, and click the **`Download`** link.

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.

4. Submit any required information to start the download. Note where the file is saved.

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.