

IN1608

EIGHT INPUT HDCP-COMPLIANT
SCALING PRESENTATION SWITCHER
WITH TWISTED PAIR INPUTS
AND OUTPUT

Complete AV Switching and
Processing in One Box

- ▶ Integrates HDMI, HDTV, RGB, video, and audio sources into presentation systems
- ▶ Inputs: Two Extron DTP 230 twisted pair, four HDMI, two universal analog video
- ▶ Outputs: One Extron DTP 230 twisted pair, two HDMI
- ▶ Two mic/line mix inputs with 48 volt phantom power and ducking
- ▶ HDMI audio embedding and de-embedding
- ▶ Optional integrated stereo or mono Class D power amplifiers



Extron Electronics
INTERFACING, SWITCHING AND CONTROL

Introduction

The Extron **IN1608** is an HDCP-compliant scaling presentation switcher with four HDMI inputs, two universal analog video inputs, and two Extron DTP 230 twisted pair inputs. It also includes dual HDMI outputs and one DTP 230 output. The DTP 230 inputs and DTP 230 output extend HDMI, audio, and bidirectional control signals to DTP 230 transmitters and receivers, each over a single CATx cable up to 230 feet (70 meters). The IN1608 provides the convenience of supporting local and remote sources and displays, with fast and reliable source switching, and a high performance scaling engine that converts all HDMI and analog sources to the optimal resolution. Selectable output resolutions are available up to 1920x1200, including 1080p and 2K. The two universal analog video inputs are configurable for RGB computer-video, HDTV, component video, S-video, or composite video. The IN1608 also includes a host of audio switching and processing features, available power amplification, flexible control options, and more, providing complete AV system integration capabilities.

Integrated Digital Twisted Pair Extension

The two DTP 230 twisted pair inputs can receive signals from remote DTP 230 transmitters in areas such as a conference table, lectern, or wall for connecting a guest laptop. The DTP 230 twisted pair output can be used to transmit from an IN1608 in a rack to a DTP 230 receiver behind a flat-panel display on a wall, above a ceiling-mounted projector, or any other remote location. DTP 230 transmitters and receivers are available in compact, low-profile enclosures or Decora® wallplate versions.

The DTP 230 twisted pair inputs and output include additional convenient, integrator-friendly features designed to help simplify installation. Bidirectional RS-232 and IR signals can be inserted from a control system and transmitted over the single CATx cable together with the video and audio, enabling control of a source or

display. Additionally, the IN1608 can send power to each of the DTP 230 transmitters and receiver over the same CATx cable, streamlining system design and installation.

Built for Digital Video Integration

To simplify integration of HDMI sources and displays, and to help ensure optimal system performance and dependability, the IN1608 features three Extron-exclusive technologies: EDID Minder®, Key Minder®, and SpeedSwitch®. EDID Minder manages EDID communication between the display devices and input sources to ensure that the correct video formats are displayed reliably. For HDMI signals with protected content, Key Minder authenticates and maintains continuous HDCP encryption between input and output devices to ensure quick and reliable switching. With SpeedSwitch Technology, the IN1608 delivers exceptional, virtually instantaneous switching speeds for HDCP-encrypted content.

High Performance Video Processing

The IN1608 features an advanced scaling engine that can scale HDMI, RGB, component, and standard definition video signals to a common high resolution output. It provides high performance 1080i deinterlacing and Deep Color processing for optimal image quality. Additionally, the color space and chroma subsampling of the HDMI output can be automatically set to ensure compatibility with a connected DVI or HDMI display. The IN1608 accepts and outputs signals up to 1920x1200, including HDTV 1080p/60 and 2K or 2048x1080.

Audio Integration Capabilities with Available Power Amplification

In addition to video switching and processing, the IN1608 can serve as the central component for audio system integration. It includes eight-input audio switching, two mic/line inputs, HDMI audio embedding and de-embedding, and several audio processing features for mixing, ducking, tone adjustments, and more.

Two IN1608 models feature integrated power amplifiers. The IN1608 SA delivers stereo power amplification with 50 watts rms per channel into 4 ohms and 25 watts rms per channel into 8 ohms, while the IN1608 MA provides mono 70 volt amplification with 100 watts rms output. Both of these models feature an Extron exclusive Class D amplifier design with patented CDRS™ - Class D Ripple Suppression technology that provides a smooth, clean audio waveform, as well as an improvement in signal fidelity over conventional Class D amplifier designs.



Introduction

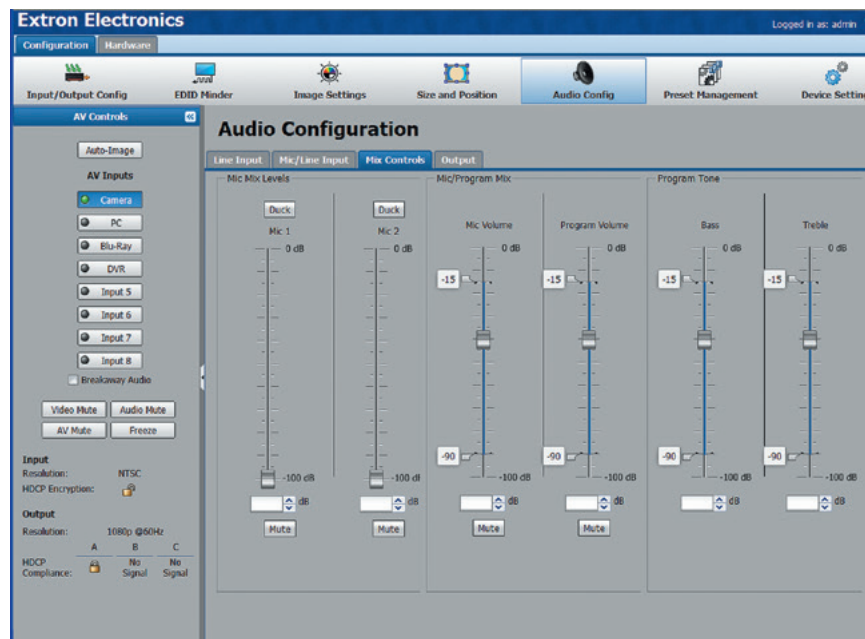
COMPATIBLE WITH ALL EXTRON DTP 230 TRANSMITTERS AND RECEIVERS

The IN1608 includes two DTP 230 twisted pair inputs and one DTP 230 output that support transmission of HDMI, stereo audio, and bidirectional RS-232 and IR signals over a single CATx cable up to 230 feet (70 meters). They can be mixed and matched with DTP 230 transmitters and receivers, available in low-profile enclosures and Decora wallplate models for HDMI or DVI. The IN1608 can conveniently power these devices over the same CATx cable, and directly interface with control systems for sending RS-232 and IR control to remote devices. These capabilities allow system integrators to create flexible yet efficient system designs serving local and remote source and display locations in a variety of presentation environments.



ADVANCED AUDIO CAPABILITIES

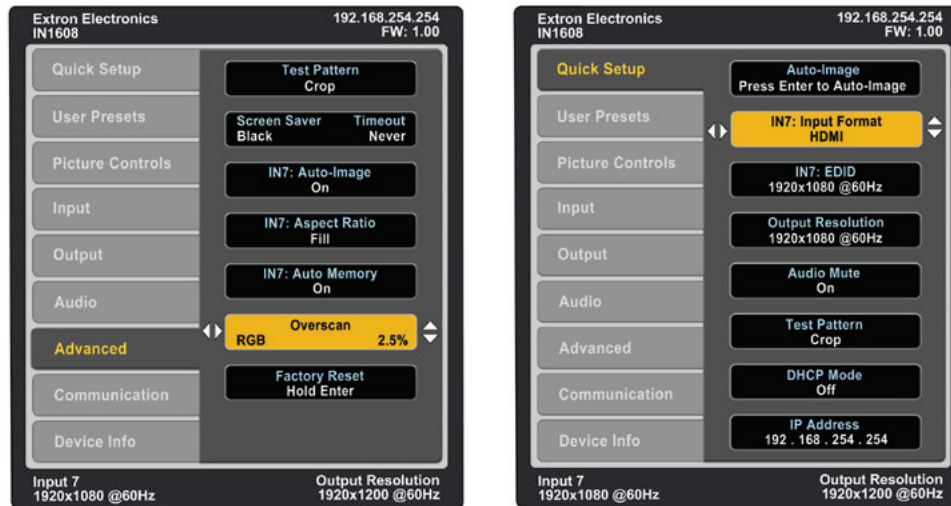
The IN1608 provides many advanced audio features in a presentation switcher that allow for complete audio system integration. They include an integrated eight-input audio switcher, two mic/line inputs with flexible mixing and ducking capabilities, HDMI audio embedding and de-embedding, tone controls, input and output gain adjustments, and options for serving multiple audio destinations. Audio configuration features and options can easily be accessed through the internal Web pages, with an intuitive GUI that provides access to all available adjustments and settings. AV integrators and technicians can fine-tune gain controls using the graphical sliders. Real-time meters are available at all inputs and outputs, including audio embedding for the HDMI outputs, to set proper gain structure for the audio system.



IN1608 User Interface

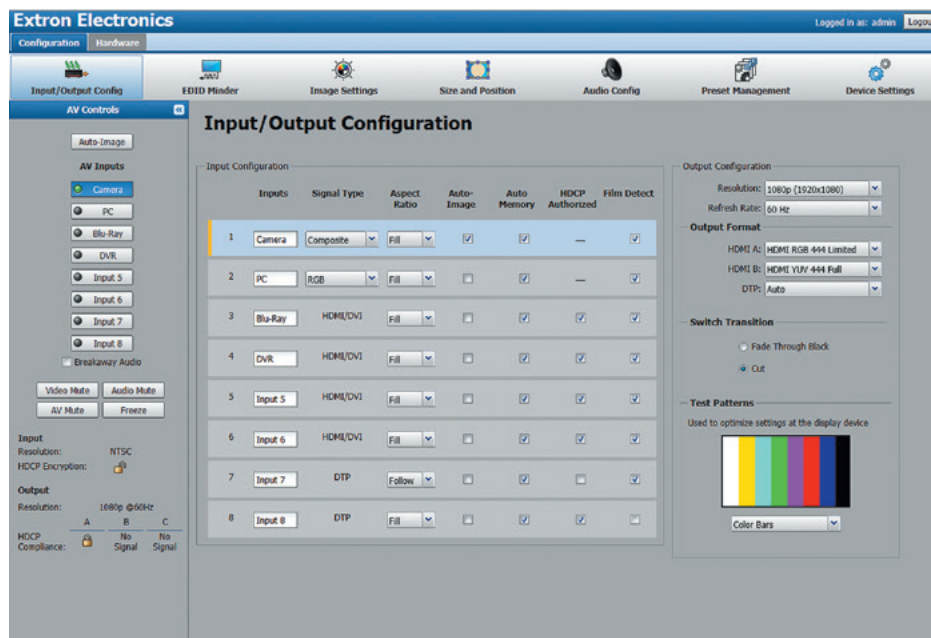
COMPREHENSIVE ON-SCREEN MENUS

The IN1608 features intuitive on-screen menus for setup, operation, and monitoring using the front panel controls. Key parameters such as input and output video formats and resolutions are conveniently grouped on the initial Quick Setup screen, while additional screens provide full control over the scaler's other functions and settings.



BUILT-IN WEB INTERFACE FOR INTUITIVE SETUP AND OPERATION

The Web interface integrated into the IN1608 is a user-friendly GUI that is very easy to navigate, allowing for expedited setup and configuration, as well as real-time operation and monitoring. Users can view details about the current input and output, such as signal format, resolution, and HDCP status. In addition to input switching, picture and audio settings are available, such as image brightness, contrast, positioning, sizing, and more. The intuitive user-interface also offers preset management and makes it easy to set EDID for any input, providing the option to select factory default EDID, EDID captured from connected output devices, or a custom EDID uploaded to the unit.



Overview

HDCP Compliant

Worry-free display of protected content from digital video sources.

Advanced Scaling

High-quality graphics and video upscaling and downscaling, 1080i deinterlacing, and HDMI Deep Color processing.

Signal Presence and HDCP Status LEDs

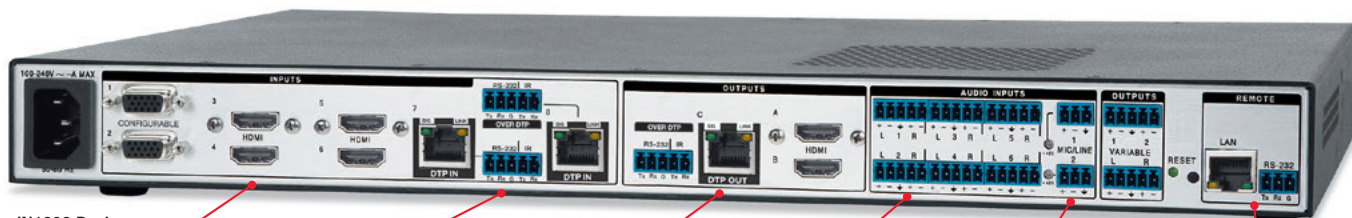
Provide simple, real-time verification of signal activity and HDCP status for all inputs and outputs.

User-Friendly Interface

Direct access buttons, adjustment controls, on-screen menu navigation, and volume control simplify system setup and operation.



IN1608 Front



IN1608 Back

HDMI Inputs and Universal Analog Inputs

Ensure compatibility with a wide variety of video sources.

Inputs and Output for DTP 230 Extension

Support digital signal transmission up to 230 feet (70 meters) over a single twisted pair cable.

Three Simultaneous Outputs

One DTP 230 output and two HDMI outputs can drive three displays.

HDMI Audio Embedding and De-Embedding

The IN1608 can embed analog input audio signals onto the HDMI outputs, and extract embedded two-channel audio from HDMI inputs.

Mic/Line Inputs with 48 V Phantom Power and Ducking

Two mic/line inputs are available for mixing microphones or line level sources into the audio outputs.

Ethernet and RS-232 Control

The IN1608 can be controlled and monitored using serial commands or over Ethernet.



IN1608 SA Front and Back

Optional Integrated Power Amplifier

Two models are available with efficient Class D amplifiers: a stereo power amplifier with 50 watts rms output per channel into 4 ohms, and a mono 70 volt power amplifier with 100 watts rms output.

Features

Two DTP 230 Twisted Pair Inputs, Four HDMI Inputs, and Two Universal Analog Video Inputs

The IN1608 allows for switching between HDMI and analog video sources. Two universal analog inputs accept all standard analog video formats, including RGB, RGBcvs, HD component video, S-video, and composite video signals.

Three Simultaneous Video Outputs

One DTP 230 twisted pair output and two HDMI outputs are available for driving three displays.

Compatible with all DTP 230 Series Models

The IN1608 supports DTP 230 twisted pair signal transmission of HDMI or DVI, analog audio, control, and remote power up to 230 feet (70 meters) over a single CATx cable.

Compatible with CAT 5e, CAT 6, and CAT 7 Twisted Pair Cable

Extron XTP DTP 24 Shielded Twisted Pair Cable Recommended

XTP DTP 24 cable is highly recommended for optimum signal transmission between the IN1608 and DTP 230 transmitters and receivers.

Bidirectional RS-232 and IR Insertion

Bidirectional RS-232 control and IR signals can be transmitted alongside video and audio over DTP 230 twisted pair cable, simplifying integration with a control system for managing AV devices.

Two Mic/Line Inputs with 48 Volt Phantom Power

Two mic or line level audio sources can be independently mixed with program audio and embedded onto the HDMI outputs. Selectable 48 volt phantom power allows the use of condenser microphones.

Mic Ducking

Automatically reduces program audio when a microphone signal is detected, eliminating the need for a separate audio ducking processor.

Auto-Switching Between Inputs

HDMI Audio Embedding

Analog input audio signals can be embedded onto the HDMI output signals.

HDMI Audio De-Embedding

Embedded HDMI two-channel PCM audio can be extracted to the analog outputs, or multi-channel bitstream formats can be passed to the HDMI outputs.

Selectable Output Rates

Available output rates include computer-video up to 1920x1200, HDTV rates up to 1080p/60, and 2K or 2048x1080.

Advanced Scaling Engine with 30-bit Processing and 1080i Deinterlacing

Image scaling and video format conversion are performed at 30-bit precision for enhanced color accuracy and picture detail. High performance deinterlacing for 1080i signals from HD sources delivers optimized image quality.

HDCP Compliant

The IN1608 fully supports HDCP-encrypted sources, with selectable authorization for unencrypted content.

Supported HDMI Specification Features Include Data Rates up to 6.75 Gbps, Deep Color, and HD Lossless Audio Formats

Key Minder

Authenticates and maintains continuous HDCP encryption between input and output devices to ensure quick and reliable switching in professional AV environments.

EDID Minder

Automatically manages EDID communication between connected devices. EDID Minder ensures that all sources power up properly and reliably output content for display.

SpeedSwitch Technology

Provides exceptional switching speed for HDCP-encrypted content.

Aspect Ratio Control

The aspect ratio of the video output can be controlled by selecting a FILL mode, which provides a full screen output, or a FOLLOW mode, which preserves the original aspect ratio of the input signal.

HDCP Visual Confirmation

When processing HDCP-encrypted content, the IN1608 outputs a full-screen green signal on any video output connected to a non-HDCP compliant display for immediate visual confirmation that protected content cannot be viewed on the display.

HDMI to DVI Interface Format Correction

Automatically enables or disables embedded audio and infoframes, and sets the correct color space for proper connection to HDMI and DVI displays.

Auto-Image Setup

When activated, the unit automatically detects the resolution of an incoming analog video signal and sets the total pixels, active pixels, active lines, and the horizontal and vertical starting points. This saves time and effort in setting up a newly connected source.

Auto Input Memory

When activated, the IN1608 automatically stores size, position, and picture settings based on the incoming signal. When the same signal is detected again, these image settings are automatically recalled from memory.

Output Standby Mode

The unit can be set to automatically mute video and sync output to the display device when no active input signal is detected. This allows the projector or flat-panel display to automatically enter into standby mode to save energy and enhance lamp or panel life.

Power Save Mode

The IN1608 can be placed in a low power standby state to conserve energy when not in use.

Automatic 3:2 and 2:2 Pulldown Detection

Advanced film mode processing techniques that help maximize image detail and sharpness for NTSC, PAL, and HDTV 1080i sources that originated from film.

Quad Standard Video Decoding

A temporal, 3D adaptive comb filter provides advanced decoding of composite NTSC 3.58, NTSC 4.43, PAL, and SECAM for integration into systems worldwide.

Internal Test Patterns for Calibration and Setup

The IN1608 offers a crop pattern, grayscale, color bars, alternating pixels, blue mode, and audio pink noise.

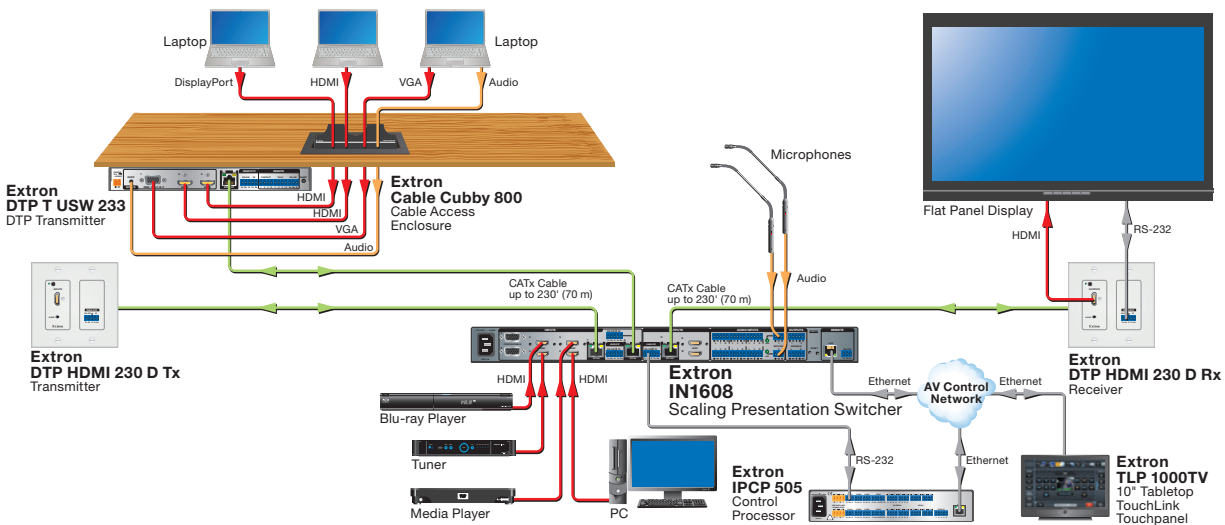
Ethernet, USB, and RS-232 Control

The IN1608 provides multiple control and monitoring options in addition to the front panel.

Applications

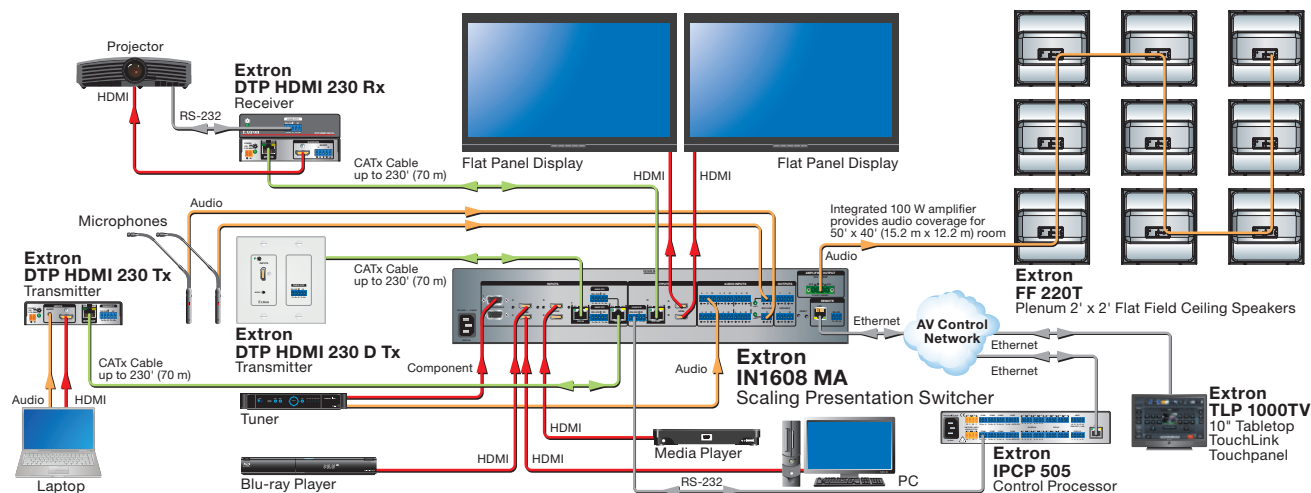
CONFERENCE ROOM

The IN1608 can serve as the central integration component for source switching, supporting wall and table locations for connecting devices, microphone audio mixing, and optimizing source video to the display. The IN1608 is housed within a credenza, together with a variety of resident sources connected via HDMI. The DTP 230 twisted pair inputs and output go into CATx cable runs to the conference table and a wallplate for guest laptops, and a wallplate behind the flat-panel display. The IN1608 mixes input signals from two conference table microphones into a mono output for a sound reinforcement system, while sending program audio via DTP 230 to the flat-panel display.



TRAINING ROOM

For this 50 x 40 foot (15.2 x 12.2 m) training room, an IN1608 can provide source switching, support for remote device locations, audio mixing and processing, sound reinforcement, and scale source signals to the native resolution of the displays. An IN1608 MA is installed in a lectern, together with local resident sources. Despite the size of this room, the DTP 230 transmission capabilities are sufficient to reach a wallplate at the rear of the room, as well as a student presentation station and a ceiling-mounted projector. The integrated 100 watt mono amplifier feeds the 70 volt speaker system to provide ample sound reinforcement. Speech and program audio mixing, mic ducking, and gain controls with metering are available within the IN1608, allowing an AV technician to perform proper sound system setup. As an additional integration convenience, the projector can be controlled via RS-232, with the IN1608 transmitting signals inserted from a control processor.



Specifications

VIDEO INPUT	
Number/signal type	2 RGB, RGBcV, component video (YUVI or YUVp/HDTV), S-video, composite video 4 HDMI digital video (HDCP-compliant) 2 DTP 230 (HDCP-compliant)
Connectors	2 female 15-pin HD 4 female HDMI 2 female RJ-45 connectors
VIDEO PROCESSING	
Decoder	12 bit digital (3D-adaptive comb filter)
Analog sampling	12 bits per color; 13.5 MHz standard (video) 170 MHz standard (RGB)
Digital pixel data bit depth	8, 10, or 12 bits per channel; 165 MHz pixel clock (HDMI)
VIDEO OUTPUT	
Number/signal type	2 HDMI (HDCP-compliant) 1 DTP 230 (HDCP-compliant)
Connectors	2 female HDMI 1 female RJ-45 connector
AUDIO	
Frequency response	20 Hz to 20k Hz, ± 0.5 dB
S/N	>90 dB at maximum balanced output (unweighted)
AUDIO INPUT	
Number/signal type	8 stereo line level balanced or unbalanced 2 mono mic/line level balanced or unbalanced (with available phantom power) 4 stereo, de-embedded from HDMI (PCM only) 2 DTP 230
Connectors	(6) 3.5 mm, 5 pole captive screw connectors for line (2) 3.5 mm, 3 pole captive screw connector for mic/line 4 female HDMI type A (2) RJ-45 connectors
Maximum level	Line inputs: +21 dBu balanced, +15 dBu unbalanced Mic/line inputs: +12 dBV (2 Vrms) when gain is set to 0 dB
DC phantom power	+48 VDC $\pm 10\%$ (can be switched on or off per mic/line input)
AUDIO OUTPUT	
Number/signal type	1 balanced or unbalanced stereo (variable) 1 balanced or unbalanced stereo; can be configured as stereo or two independently mixed mono channels 2 HDMI embedded 1 DTP 230
Connectors	(2) 3.5 mm captive screw connectors, 5 pole 2 female HDMI 1 RJ-45 connector
Maximum level (Hi-Z)	>+12 dBu, balanced; >+6 dBu, unbalanced
AUDIO OUTPUT — POWER AMPLIFIER (AMPLIFIER MODELS ONLY)	
Number/signal type	
IN1608 SA	1 stereo (default) or 2 mono (2 channels total)
IN1608 MA	1 mono, 70 V line

Connector	(1) 5 mm screw lock captive screw connector, 4 pole	
Load impedance		
IN1608 SA	4 ohms minimum	
IN1608 MA	50 ohms minimum	
Output power		
IN1608 SA	25 watts per channel, 8 ohms, 1 kHz, 0.1% THD 50 watts per channel, 4 ohms, 1 kHz, 0.1% THD	
IN1608 MA	100 watts (rms) @ 70 V, 1 kHz, 1% THD	
Protection	Clip limiting, thermal, short circuit, DC output	
CONTROL/REMOTE		
Serial control port	1 bidirectional RS-232, 3.5 mm captive screw connector, 3 pole (rear panel)	
USB control ports	1 front panel female mini USB B	
Ethernet control port	1 female RJ-45 connector	
CONTROL/REMOTE		
External device (pass-through, unidirectional or bidirectional) (RS-232/IR over DTP)		
Serial control pass-through ports		
IN1608 input/DTP Tx	RS-232 via (2) 3.5 mm, 5 pole captive screw connectors (shared with IR ports)	
IN1608 output/DTP Rx	RS-232 via (1) 3.5 mm, 5 pole captive screw connector (shared with IR port)	
IR pass-through control ports	TTL level (0 to 5 V) modulated infrared control from 30 kHz up to 60 kHz	
GENERAL		
Power supply	Internal Input: 100-240 VAC, 50-60 Hz	
Mounting		
Rack mount	Yes, with included, pre-installed brackets	
Enclosure dimensions		
IN1608	1.75" H x 17.5" W x 9.5" D (1U high, full rack wide) (4.4 cm H x 44.4 cm W x 26.7 cm D) (Depth excludes connectors and knobs. Width excludes rack ears.)	
IN1608 SA, IN1608 MA	3.5" H x 17.5" W x 9.5" D (2U high, full rack wide) (8.1 cm H x 44.4 cm W x 26.7 cm D) (Depth excludes connectors and knobs. Width excludes rack ears.)	
Regulatory compliance		
Safety	CE, c-UL, UL	
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI	
Environmental	Complies with the appropriate requirements of RoHS, WEEE.	
Warranty	3 years parts and labor	
NOTE: All nominal levels are at ±10%.		
Model	Version Description	Part number
IN1608	Standard Version	60-1238-01
IN1608 SA	2x50 Watt Stereo Power Amplifier	60-1238-02
IN1608 MA	100 Watt 70 Volt Mono Power Amplifier	60-1238-03

For complete specifications, please go to www.extron.com
Specifications are subject to change without notice.

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