

# ACT 4

## 13.3 HD audio pre-amp processor

The ACT 4 represents a revolution in home cinema processors. Designed to be the headquarters of a modern UHD home theater, the ACT 4 combines ultimate audio performance, control flexibility, HDCP2.2, and the latest immersive sound technologies. Large room loudspeaker layouts up to 7.3.6 or 9.3.2 are supported.

The ACT 4 also sets a new standard for ease of installation and use. An intuitive, full-color touch-sensitive front panel display simplifies setup and operation. Controllable via 3rd-party systems, the ACT 4 also offers web setup and control which enables operation of an ACT 4 theater from anywhere within the home via mobile device. Both balanced and unbalanced outputs allow for connectivity flexibility.



### highlights

- 13.3-channel processor
- 3rd party controllable
- decodes Dolby Atmos® & DTSX™
- 5-year warranty
- HDCP2.2 I/O
- up to 7.3.6 or 9.3.2 layouts
- upgradable

### applications

- residential home theater
- corporate meeting rooms
- multi-purpose home theater
- mastering studios

### availability

- shipping now
- ready to install
- made in the USA

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### specifications

#### electrical

frequency response	20 - 20kHz ± 0.1dB
SNR	> 110dB (A-wt)
THD	< 0.02% (20 - 20kHz)
max output	3.5V RCA, 7V XLR
power consumption	70W (max), 1W (standby)

#### decoding and post processing

decoding	Dolby Atmos, DTS:X, up to 7.1.6 or 9.1.2
post processing	Dolby Surround Upmixer, NeuralX Upmixer
loudspeaker adjustments (i)	delay, polarity, large/small, crossover
loudspeaker adjustments (ii)	PEQ (4 bands + 2 shelving filters)
charging port	2 x USB 5V, 2A

#### audio/video

stereo analog inputs	4 x gold-plated RCA L/R unbalanced, 1 x XLR L/R balanced
stereo phono input	1 x gold-plated RCA L/R
digital inputs	3 x coax, 3 x optical
multi-channel analog inputs	8 x gold-plated RCA in 7.1 configuration
multi-channel analog outputs	14 x gold-plated RCA, 14 x XLR in 11.3 configuration
digital video inputs	8 x HDMI, 4k pass-thru (1 x HDCP 2.2)
digital video outputs	2 x HDMI (1 x HDCP 2.2)

#### accessories and documentation

accessory rack ear kit (ARM-4)
owner's manual
maintenance manual
ethernet and RS232 protocols
2-D CAD files
3-D CAD files
3rd-party control drivers

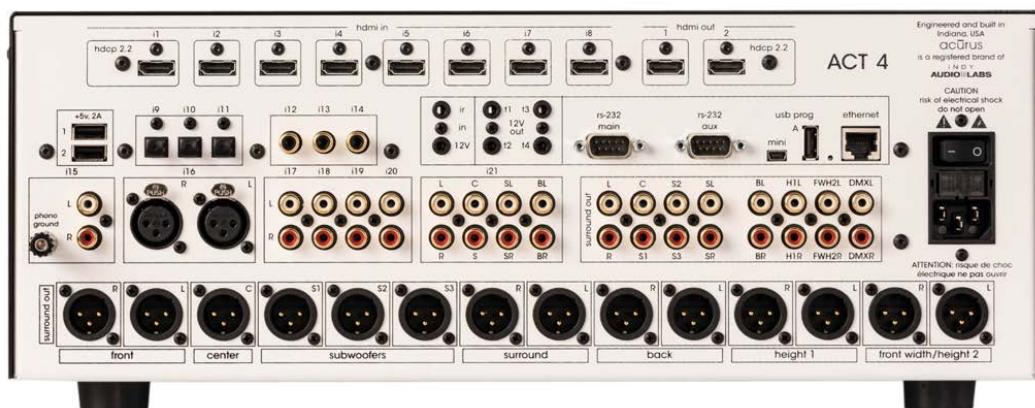
#### control

front panel display	7" LCD touch-panel
serial	2 x DB9, full 2-way control, 1 x USBA programming port
ethernet	1 x ethernet, web interface + 2-way IP UDP control
12V trigger	1 x 3.5mm IN, 4 x 3.5mm OUT
charging port	2 x USB 5V, 2A



#### physical

product dimensions	7" x 17" x 15" (17.8cm x 43.2cm x 38.1cm)
product weight	25 lbs (11.3 kg)
carton dimensions	12" x 22" x 20" (25cm x 56cm x 51cm)
carton weight	30 lbs (13.6 kg)
finish	black satin anodization, laser-etched logo, white rear panel



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# ACT 4

## 13.3 HD audio pre-amp processor – system EQ

The ACT 4's built-in EQ system is designed to provide the "finishing touches" sonically in a high-end installed home theater.

### Overview

The EQ system in the ACT 4 (as of firmware version 0.9) is easy to operate, flexible, and is very effective at minimizing acoustical response errors due to room modes, loudspeaker response variances, and loudspeaker mounting location effects. The ACT 4 EQ system works with several of the most popular room analysis software tools on the market such as Room EQ Wizard or Omnimic.

### Acoustic Measurement Software

For consistency in describing EQ operation in this application note, we assume use of a specific tool, Omnimic. While several other tools can be used with the ACT 4 EQ system, Omnimic is chosen for illustration here. Omnimic can be purchased at the link below:

<http://www.daytonaudio.com/index.php/test-measurement/omnimic-v2-precision-measurement-system.html>

### Global and Channel-based Parametric EQs

Each loudspeaker driven by the ACT 4 can have up to 6 parametric EQ filters applied to tailor its room response. One high-pass shelf filter and one low-pass shelf filter is applied globally to all channels and is used for tailoring the overall slope or "tilt" of the room response curve. Additionally, four adjustable "bell-shaped" parametric EQs can be added and adjusted completely independently on each channel. Besides these six parametric filters, each channel also has a defeatable high-pass filter in the form of the "large"/"small" speaker selection in the speaker parameters page.

### Built-in Tone Generators

Internal test tones can be used to quickly set speaker relative levels or check for correctness of channel hookups. Provided in the ACT 4 are a sine tone (440Hz for full range loudspeakers and 80 Hz for subwoofers), white noise, and pink noise. Pink noise provides good results for quickly checking the levels of each loudspeaker in the room.

### External Input

Omnimic, like several other measurement software packages, provides its own recommended sweep-based test signal for measuring room acoustics. The "EXT" button on the ACT 4 EQ settings page enables the selected input audio source to be mixed down to mono and played through either one or all speakers depending whether one is adjusting the four parametric filters or the two global shelving EQ filters. One can also run music as a source through the "EXT" function to hear the sonic contribution of any one particular loudspeaker in the surround layout.

### EQ On and Off (per loudspeaker)

To quickly activate and de-activate the four ACT 4 EQ filters on a given channel, simply touch the PEQ button in the upper left of the EQ display. When the filters are toggled off with this button, the values are still retained in memory for later recall by simply pressing the button again.

### Reset

To erase the EQ settings in a particular channel and start over, simply press the PEQ reset button on the PEQ page for that loudspeaker. To reset all loudspeaker EQ settings, go to the settings -> factory reset page and press the PEQ reset button.

### Remote Control

The ACT 4 web server control (as of firmware version 0.9) enables controlling all EQ parameters and signal generators using a PC, Mac, iOS device or Android device. This can be used instead of the front panel of the ACT 4, particularly when the ACT 4 is located far from the Main Listening Position (MLP).

### EQ Process Steps

To use the built-in EQ in the ACT 4 to tune a home theater room, the following general process is used:

- 1) Locate the MLP in the room and place a measurement microphone in that position at ear height.
- 2) Determine a frequency range for optimization. Generally this range will include the lowest frequencies though to some mid-frequency. Assuming reasonably flat loudspeakers and average room acoustics, frequencies above, say, 8kHz or so can and should be left alone.
- 3) Ensure that the ACT 4 speaker parameters are set properly for the size of each speaker (small vs large) and that delays for each are set according to the physical distance between the loudspeaker and the MLP.
- 4) Use the PC to analyze and EQ each front, center, and subwoofer loudspeaker using the measurement mic and Omnimic software. The target curve is set to reduce audible response peaks, not to boost nulls or dips.
- 5) Analyze and EQ audio bed surround and overhead speakers (optional)
- 6) Analyze and EQ the overall composite response of all loudspeakers using the ACT 4 global high and low frequency shelf filters.
- 7) Copy the filter values for the optimized response curve (frequency, gain, Q) to the ACT 4 from the Omnimic application.
- 8) Finally, check and make any necessary adjustments to the resulting EQ in the ACT 4 with a variety of signal sources.