

## SQ-Rack

### Technical Datasheet



### Features

- Rack-mountable 4U digital mixer for Live, Studio and Installation use
- 48x Input Channels
- 16x Local Mic/Line Inputs (XLR)
- 2x 1/4" Stereo Inputs (TRS)
- 1x 3.5mm Stereo Input
- 36x Total Busses
- 12x Stereo Mix (Aux or Group) + Main
- PAFL Bus
- 14x Assignable Local Analogue Outputs (12x XLR + 2x 1/4" TRS)
- AES Digital Output
- Dedicated Talkback mic input (XLR)
- 1/4" TRS Stereo Headphone out with dedicated control
- SLink EtherCON connection for remote audio using dSnake/ME, DX or GigaACE/GX protocol (128x128 channels)
- I/O Port for Option Card (including 3<sup>rd</sup> party protocols – Dante/Waves/MADI)
- 8x Mute Groups
- 8x DCA Groups
- 8x Stereo FX with dedicated FX Returns
- DEEP Processing Ready
- RackExtraFX Effects suite
- 7" capacitive touchscreen
- 8x Assignable SoftKeys
- 4x Assignable SoftRotaries
- 6x Layers for 96 assignable Channel Strips across Fader, Processing and Routing screens
- Dedicated Faders screen
- Dedicated SQ-Control screen
- Single/Dual Footswitch Control
- Input channel pairs switchable mono/stereo
- Patchable Insert points
- Input processing – Trim, HPF, Gate, PEQ, Compressor, Delay
- Output processing – Graphic EQ, PEQ, Compressor, Delay
- DEEP Automatic Mic Mixing
- 2x 31/61 Band Real Time Analysers
- Quick copy/paste/reset for parameters
- User Permissions to restrict operator access
- 300x Scene memories per Show
- Channel Safes, Global and per Scene Recall Filters
- FX, processing and channel Libraries
- SQ-Drive for stereo and multitrack recording/playback direct to USB drive
- USB transfer of Scenes, Libraries, Shows
- 32x32 channel, class compliant USB-B audio interface
- A&H MIDI Control driver for MIDI control via USB or TCP/IP
- Remote mixing apps for iPad, Android, Mac and PC
- Compatible with ME personal monitoring range

## A&E Specification

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The mixer shall be a compact, 4U rack-mountable digital mixer built around a 96kHz XCVI FPGA core with 48 input channels mixing to LR and 12 stereo mix outputs.

Local analogue inputs shall use balanced XLR sockets and connect to fully recallable digitally controlled preamplifiers. These shall be able to provide up to +60dB of gain, industry standard 48V phantom power, and include a switchable -20dB Pad to allow a maximum input level of +30dBu.

Local analogue outputs shall be provided on 12 XLR sockets and 2 balanced TRS ¼ inch Jack sockets. These will have a nominal line output of +4dBu and a maximum output of +22dBu.

There shall be a local "SLink" Ethernet audio expansion port with locking EtherCON connector, supporting multiple AoIP protocols and providing access to 128x128 digital channels, connected over a single cable 'digital snake' and allowing remote preamp control of Allen & Heath Everything I/O expanders, connection to Allen & Heath ME Personal Mixing Systems and direct connection to other A&H mixers where supported.

A digital I/O Port shall be provided to accept optional cards, supporting 64x64 channels for 3<sup>rd</sup> party protocols such as Dante, Waves or MADI, and 128x128 channels where an SLink card is used.

All input and output processing, routing options and system configuration shall be accessed and adjusted via a 7-inch colour touchscreen and associated dedicated rotary control.

A dedicated screen shall be provided for easy access to channel faders, PAFL and Mute control. This screen shall also include the ability to control send levels to mixes using a 'sends on fader' approach.

A dedicated 'SQ-Control' screen shall be provided for simplified control of the mixer. This screen will include multiple tabs which can be custom populated with controls including those for send levels, mutes and SoftKeys. This screen will match the layout and functionality of an associated 'SQ-Control' cross-platform app.

8 user-assignable SoftKeys with variable colour LED illumination shall be provided for quick access to Input/Mix/DCA/Group Mutes, Tap Tempo, Scene Controls, MMC and SQ-Drive Controls.

4 user-assignable Soft Rotaries with associated keys and LCD displays shall be provided for quick access to levels and variable processing parameters.

A footswitch connection shall be provided to allow assignable control from an optional single or dual footswitch.

There shall be dedicated keys for Copy/Paste/Reset of parameters.

All input channels shall contain the following processing: Polarity, Trim, High Pass Filter, Gate, Insert, Parametric EQ, Compressor, Delay, Pan.

All FX Return channels shall contain the following: Parametric EQ, Pan.

All output mix channels shall contain the following processing: External input with Polarity and Trim, Insert, Graphic EQ, Parametric EQ, Compressor, Delay, Balance.

All signal delays in the system shall be adjustable in Milliseconds, Meters (with metric temperature adjustment) or Feet (with imperial temperature adjustment).

The mixer will allow the insertion of Allen & Heath DEEP processing models to channels, without affecting latency or processing abilities.

8 user-assignable effect racks shall be provided with a library of factory preset FX emulations. The FX racks shall be individually configurable as send/return from a channel or FX/Mix, or inserted into input or output channels.

There shall be 8 DCA groups and 8 Mute groups.

An Automatic Mic Mixer shall be provided for automatic and dynamic assignment of gain in spoken word applications.

A global source option for the direct out of each input channel shall be provided. The tap-off point shall be adjusted to the following positions in the processing path: post Preamp, post HPF, post Gate, post Insert return, post PEQ, post Compressor, and post Delay. There shall be further global options to follow Fader, DCA and Mute.

Direct outputs shall be assignable via the mixer soft patch bay.

A Talkback facility shall be provided with the ability to send to any output mix with on screen status indication. An option to enable talkback latching and HPF shall be provided.

A signal generator shall be provided with the ability to send a variable level signal to any output mix with visual assignment status on-screen. The following types of signals shall be available: Sine, White Noise, Pink Noise, and Band-Pass.

Comprehensive input, output, and FX channel and RTA metering shall be provided on-screen.

A default Mains to PAFL sub-mix shall be provided.

There shall be a USB Type-A connector for stereo/multitrack recording/playback, data-transfer and firmware updating.

On the rear panel there shall be a USB-B connection following the USB 2.0 standard for multi-channel, bi-directional audio streaming and MIDI control between the mixer and a computer.

A DAW transport control using popular DAW control protocols for computer shall be available via the touch-screen.

Stereo digital output shall be provided on XLR following the AES/EBU standard and with switchable sample rates.

The mixer shall provide a Fast Ethernet (100 Mbit/s) port for Cat5 cable connection to a wireless router, access point, existing network or direct connection to a computer for live mixing control using control apps supported on multiple popular platforms, and for MIDI over TCP/IP control of mixer parameters.

Input and output channel processing and parameters in the mixer shall be saved on demand as a user library item for recall in other channels. All library items shall be archived with a show-file. Library items shall be transferrable to USB drive as portable data to be used in other systems.

The mixer shall provide the facility to save 300 scenes of the settings of the mixing system and these scenes shall be nameable.

Channel 'safes' shall be provided to prevent selected items from being changed from their state when the safe was enabled. A suitable selection of global and per-scene filters shall be provided to Allow / Block each parameter saved in a scene from being changed as that scene is recalled.

An option shall be provided for password protection for log-in of several users with different levels of system access and permissions. A particular scene may be chosen to be recalled per change of user-login if desired.

The mixing system shall periodically record all current settings and return the mixer to that state after reboot following a power-cycle.

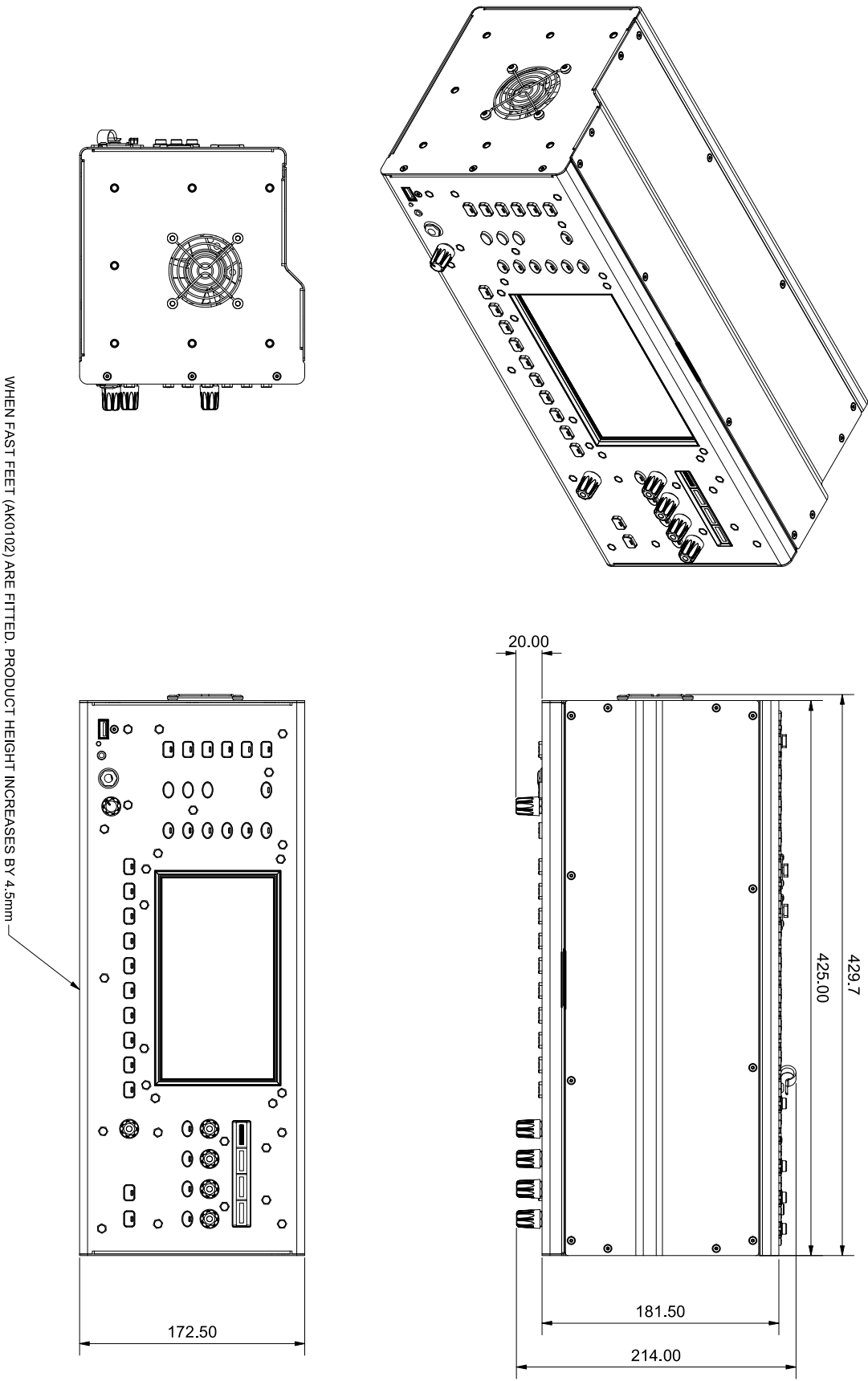
The mixing control surface shall have a built in power supply accepting AC mains voltages of 100–240V, 50/60 Hz, 75W max via an earthed 3-pin IEC male connector mounted on the rear chassis. A Two Pole Push-Button switch shall be provided near the mains input.

Rack ears will be provided with multiple fixing points to enable mounting front facing or rear facing in a standard 19" rack unit at a variety of angles. Additionally, the ears may be used to stand the unit on a flat surface.

Recommended operating temperature for the mixer shall be 5 to 35 degrees Celsius.

The mixer shall be the Allen & Heath SQ-Rack.

Dimensions (mm)

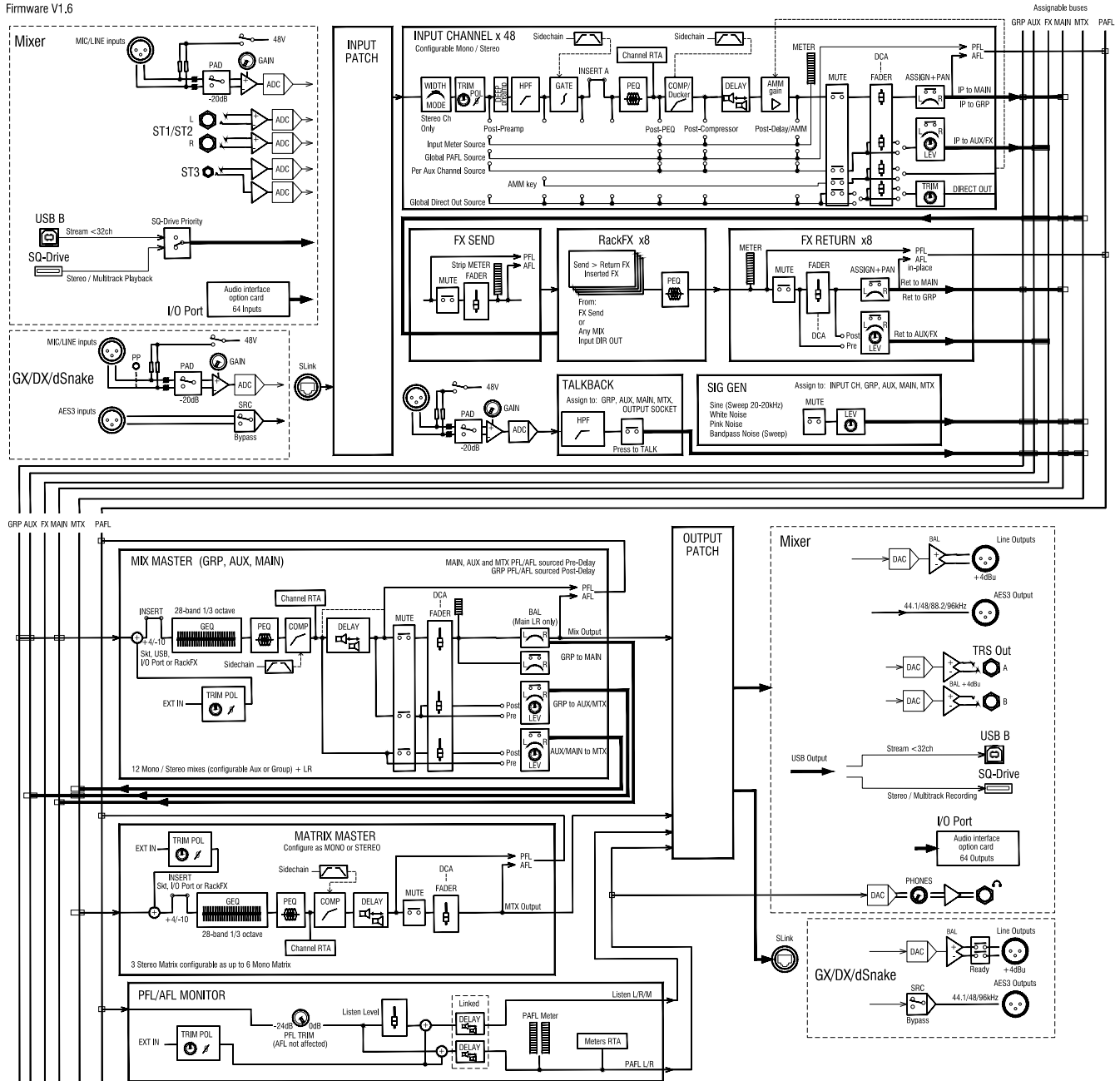


# Block Diagram

## SQ SYSTEM BLOCK DIAGRAM

Firmware V1.6

48 input channels x 36 bus Mix Engine



## Technical Specification

Inputs	<b>Mic/Line Inputs</b>	Balanced XLR, fully recallable -60 to +0dBu -20dB 0dB to +60dB, 1dB steps +30dBu >5kΩ 0.002% -92dBu (20Hz-20kHz, AES Direct Out, @0dBu 1kHz) 0.003% -91dBu (20Hz-20kHz, AES Direct Out, @-30dBu INPUT 1kHz) +48V (+3V / -2V)
	Input Sensitivity Switchable Pad Analogue Gain Maximum Input Level Input Impedance THD+N, Unity gain 0dB THD+N, Mid gain +30dB  Phantom Power <b>Stereo Line Inputs</b> ST1, ST2 connectors ST3 connector Input Sensitivity (ST1, ST2 / ST3) Trim Maximum Input Level (ST1,ST2 / ST3) Input Impedance	Balanced, 1/4" TRS jack Unbalanced, stereo 3.5mm Mini Jack Nominal +4dBu ST1, ST2 / 0dBu ST3 +/-24dB +22dBu / +18dBu >7kΩ
Outputs	<b>XLR Outputs</b>	Balanced, XLR
	<b>Outputs A and B</b> Source Output Impedance Nominal Output Maximum Output Level Residual Output Noise  <b>AES Digital Output</b>	Balanced 1/4" TRS Jack Patchable <75Ω +4dBu = 0dB meter reading +22dBu -90dBu (muted, 20Hz-20kHz)  Balanced XLR 2 channel, 96kHz sampling rate (Default with SRC Bypassed) Switchable output sample rates, 44.1kHz/ 48kHz/ 88.2kHz/ (96kHz) 2.5Vpp balanced terminated 110Ω
SLink	<b>Connection</b>	Neutrik EtherCON (RJ45)
	<b>dsnae mode (48kHz devices)</b> <b>DX mode (96kHz devices)</b> <b>GigaACE/GX (96kHz devices)</b> <b>Inputs</b> <b>Outputs</b> <b>Sync/SRC</b>	40 input 20+40(ME) output channels 32 input 32 output channels 128 input 128 output channels Fully Patchable Fully Patchable Assignable as master audio sync for all modes, 48kHz<>96kHz SRC
I/O Port	<b>Inputs</b>	Multi-channel I/O option module
	<b>Outputs</b> <b>Sync/SRC</b>	Fully Patchable Fully Patchable Assignable as master audio sync
System	Dynamic Range Frequency Response Headroom Internal operating Level THD+N, Mic/Line routed to Main L/R Out dBFS Alignment Meter Calibration Main Meter Type Channel Meter Type Peak Indication Sampling Rate Bit Depth Latency	Measured balanced XLR in to XLR out, 0dB gain, 0dBu input 112 dB +0/-0.5dB 20Hz to 20kHz +18dB 0dBu Unity gain faders@0dB, 0.006%, -84dBu (20 - 20kHz) +18dBu = 0dBFS (+22dBu at XLR output) 0dB meter = -18dBFS (+4dBu at XLR out) 2 x 12 segment, fast (peak) response Chromatic Channel Metering, fully programmable colour/brightness -3dBFS (+19dBu at XLR out), multi-point sensing 96kHz Uses XCVI core custom bit widths in algorithms, up to 96bits <0.7mS, Local Mic Input to Main L/R
	Operating Temperature Range Mains Power Max Power Consumption	0 deg C to 40 deg C (32 deg F to 104 deg F) 100-240V AC, 50/60Hz 75W
Dimensions & Weights	Unit only (rack ears not fitted)	Width x Depth x Height 430 x 214 x 173 mm (16.9" x 8.4" x 6.8")
	Packed in shipping box Unpacked weight Packed weight	545 x 350 x 265 mm (21.5" x 13.8" x 10.5") 5.8 kg (12.8 lbs) 8 kg (17.7 lbs)
Control	Touch Screen	7" Capacitive, 800 x 480 resolution, 24 bit RGB
	SoftKeys SoftRotaries Mute Groups / DCA Groups Network MIDI Footswitch	8 4 8 / 8 TCP/IP Ethernet for MIDI and Control TCP/IP and USB-B Single or Dual, Momentary or Latching

Input Processing	<b>Source</b> CH1-48 USB Global Source	Fully patchable SQ-Drive or USB-B Streaming (Auto Switching)
	<b>Polarity</b> <b>Trim</b> <b>High Pass Filter</b> <b>Insert</b> (Pre EQ/Comp) <b>Delay</b>	Normal/Invert -24 to +24dB 12/18/24dB per octave 20Hz – 2kHz Fully Patchable Up to 341ms
	<b>Gate</b> Sidechain filter Threshold / Depth Attack / Hold / Release	Patchable Sidechain Hi-pass (20-5k), band-pass (120-10k), Lo-pass (120-20k) -72dBu to +18dBu / 0 to 60dB 50µs to 300ms / 10ms to 5s / 10ms to 1s
	<b>PEQ</b> Band 1, Band 4 Band 2, Band 3 Bell Width	4-Band fully parametric, 20-20kHz, +/-15dB Selectable Shelving (Baxandall), Bell, HPF/LPF 12dB/octave Bell Variable Q, 1.5 to 1/9th octave
	<b>Compressor</b> Sidechain filter Threshold / Ratio Attack / Release Knee Detector response Parallel Path Compression	Patchable Sidechain, DEEP options Hi-pass (20-5k), band-pass (120-10k), Lo-pass (120-20k), Q=1 -46dBu to 18dBu / 1:1 to infinity 30µs to 300ms / 50ms to 2s Soft/Hard Peak/RMS switchable dry/wet -infin to 0dB
	<b>Channel Direct Out</b> Source select	Follow Fader, Mute, Mute Group, DCA (global all ch) Post-Preamp, Post-HPF, Post-Gate, Insert Return, Post-PEQ, Post-Comp, Post-Delay trim -infin to 10dB per channel
Mix Processing	<b>Insert</b> (Pre EQ/Comp) <b>Delay</b> <b>GEQ</b> <b>PEQ</b> <b>Compressor</b>	Fully Patchable Up to 682ms 28 bands 31Hz-16kHz, +/-12dB Gain, Constant 1/3 oct, DEEP options As Input PEQ As Input Compressor
	FX Internal FX Types  8 dedicated Stereo FX returns	8 x RackFX engine, Send>Return or Inserted (4 dedicated FX bus) SMR Reverb, Stereo Tap Delay, Gated Reverb, ADT, Blue Chorus Symphonic Chorus, Flanger, Phaser Fader, Pan, Mute, Routing to Mix/LR, 4-Band PEQ
Audio Tools	<b>PAFL</b> <b>Talkback</b> <b>Signal Generator</b> <b>RTA's</b>	PFL or stereo in-place AFL, 0 to -24dB Trim, PAFL Delay Up to 682ms Dedicated input, Assignable to any mix, Gain, Pad, 48V, 12dB/oct HPF Assignable to any input or mix, Sine/White/Pink/Bandpass Noise 2x 31-Band 1/3 octave (Stereo) or 61-Band 1/6 octave (Mono) 20-20kHz. PAFL/Selected Channel or Fixed Source
USB Audio	<b>SQ-Drive</b> Stereo Record Stereo Playback Multitrack Record Multitrack Playback	USB-A 2 channel, WAV, 96kHz, 24-bit, source fully patchable 1/2 channel, WAV, 44.1, 48, 96kHz 16,24-bit, source fully patchable 1-16 channel 96kHz, 1-32 channel 48kHz, 24-bit, WAV, fully patchable 1-16 channel 96kHz, 1-32 channel 48kHz, 24-bit, WAV, fully patchable
	<b>USB Audio Streaming</b> Send (upstream) Return (downstream)	USB-B, Core Audio compliant, ASIO/WDM for Windows 32 channel, 48/96kHz, 24-bit 32 channel, 48/96kHz, 24-bit
AMMs	Configuration Type Sidechain Filter HPF / LPF Priority	2x 24ch or 1x 48ch, freely assignable Gain Sharing 12dB/octave 20Hz – 5kHz / 120Hz - 20kHz -15dB to +15dB per channel
Add-ons	DEEP Preamps DEEP Compressors DEEP GEQ's RackFX units	Tube Stage Opto, 16T, 16VU, PeakLimiter76, Mighty, OptTronik, Bus Proportional-Q, DiGi-GEQ, Hybrid De-Esser, DynEQ4, MultiBD3, MultiBD4, Bucket Brigade, Echo, Hypabass