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 ¼" 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 ¼" TRS)
- AES Digital Output
- Dedicated Talkback mic input (XLR)
- ¼" 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 3rd 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

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 3rd 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.

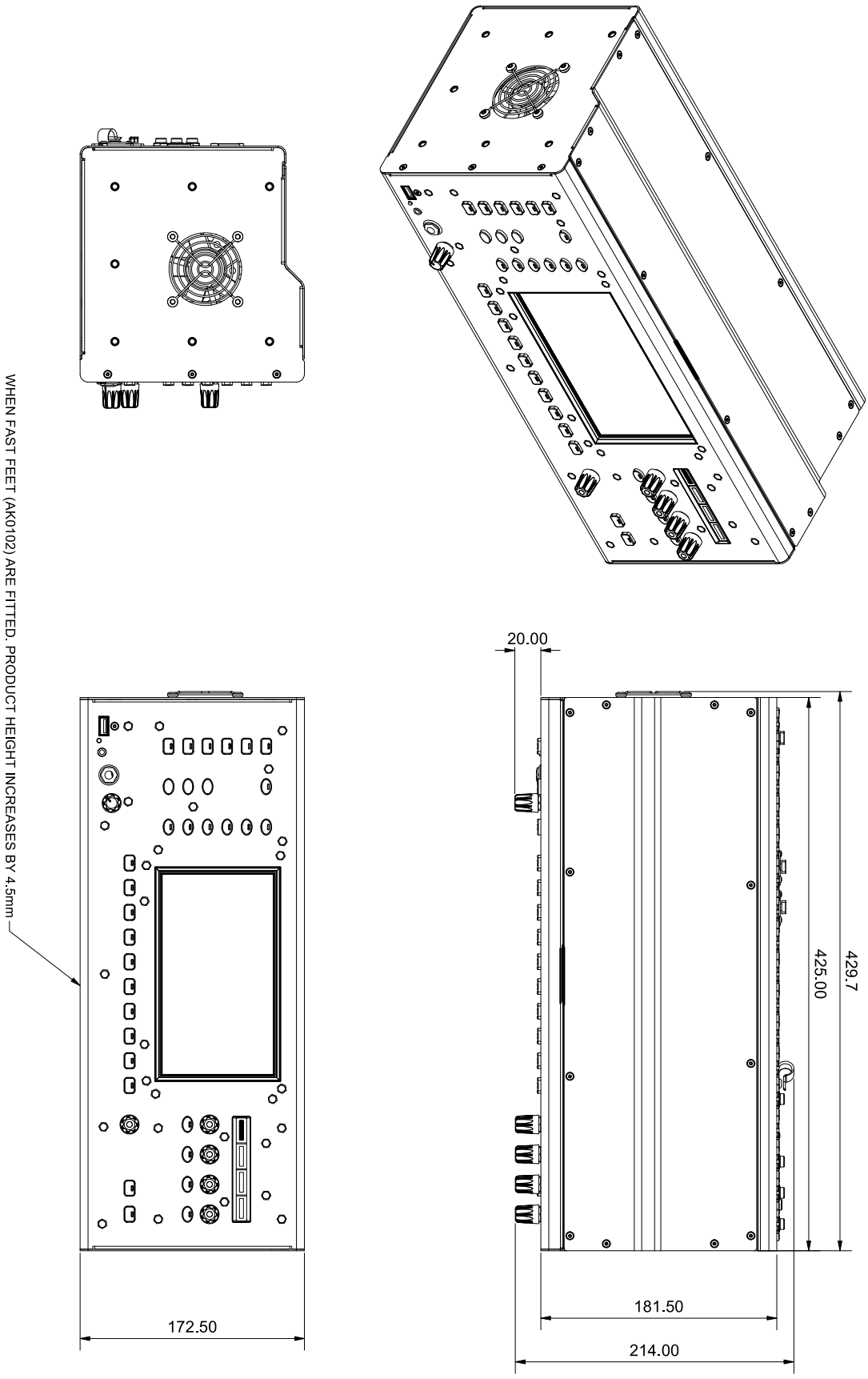
The mixing control surface shall have a built in power supply accepting AC mains voltages of 100~240V, 50/60 Hz, 75W max via an earthed 3-pin IEC male connector mounted on the rear chassis. A Two Pole Push-Button switch shall be provided near the mains input.

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.

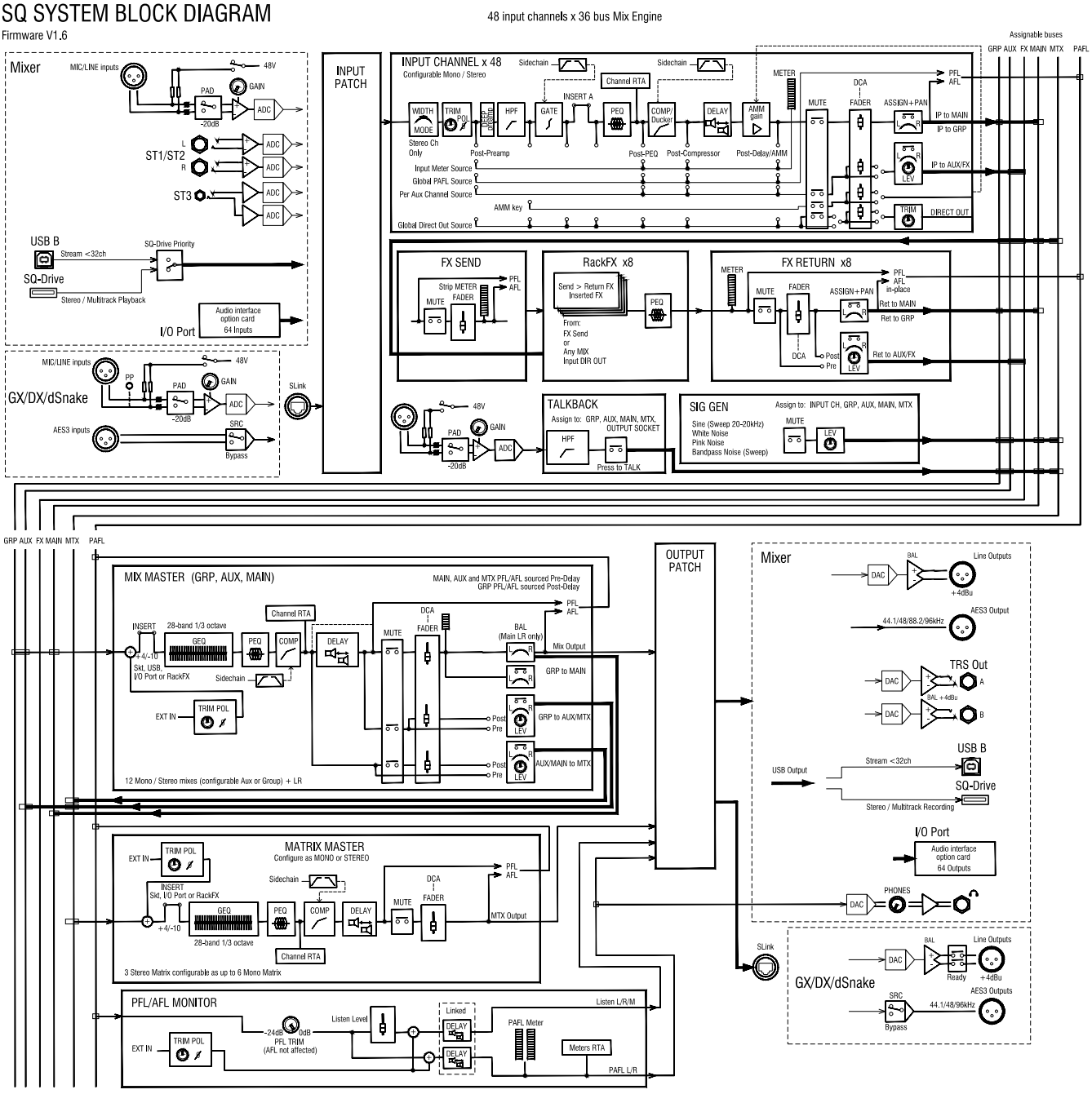
Recommended operating temperature for the mixer shall be 5 to 35 degrees Celsius.

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

Dimensions (mm)



Block Diagram



Technical Specification

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

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