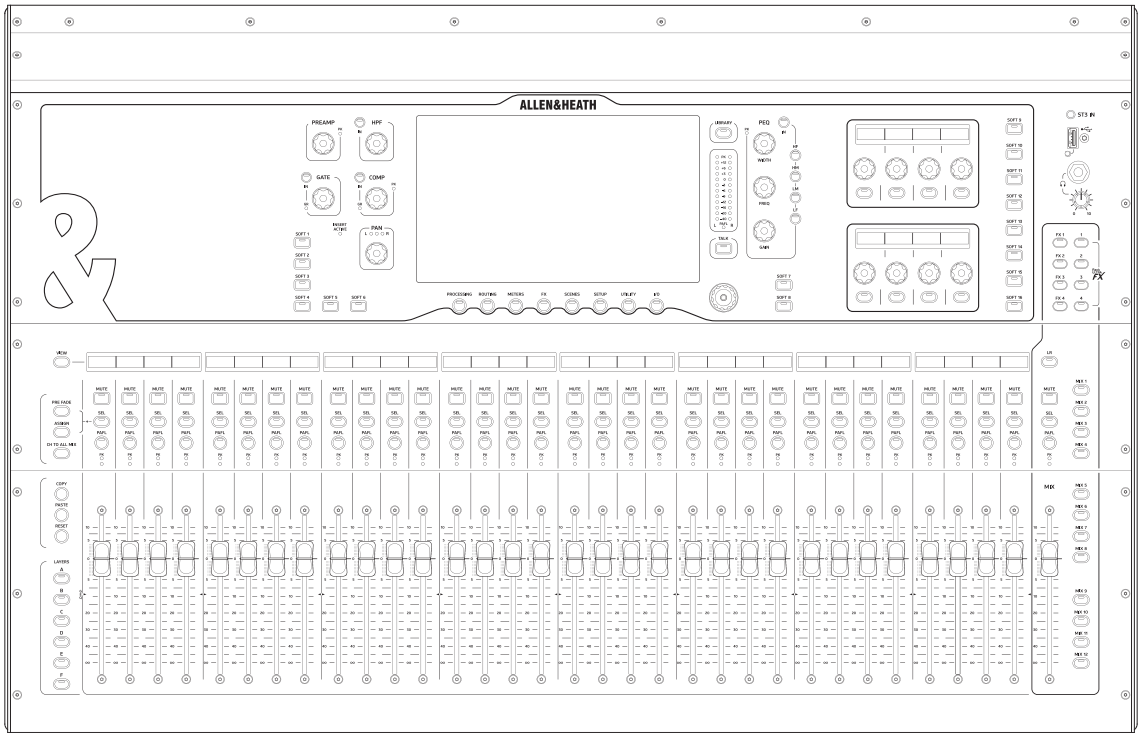
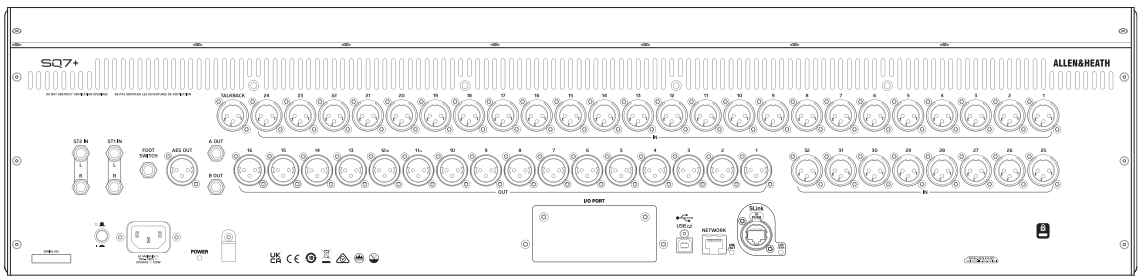
SQ7+

Technical Datasheet





Features

- 96kHz XCVI Core
  variable bit-depth up to 96bit, <0.7ms latency
- 48x Input Processing Channels
- Stereo Main LR Output
- 12x Mixes (Mono/Stereo, Aux/Group)
- 4x FX Sends
- 4x RackUltra FX Sends
- 6x Mono/Linkable Matrix Mixes
- 32x XLR Mic/Line Input Sockets
- 2x Stereo Line Input Sockets (each 2x TRS)
- 1x XLR Talkback Socket
- 16x XLR Output Sockets
- 2x TRS Output Sockets
- 1x AES3 Stereo Digital Output Socket
- 128x128 SLink Port for Everything I/O expansion and system connections
- 64x64 I/O Port for Option Cards
  (128x128 with SLink card fitted)
- Stereo Headphone Output
- 9” Capacitive Touchscreen
- 33x 100mm Motorised Faders
- 6x Customisable Channel Strip Layers
- 16x SoftKeys
- 8x Soft Rotaries
- Configurable single/dual Footswitch Connection
- Configurable Chromatic Channel Meter LED’s
- IEC Mains Connection with Worldwide PSU
- RJ45 Network Socket for control
- USB-A For stereo/multichannel audio record/playback and data
  (Stereo @48/96kHz, 24bit. 16 Channels @96kHz, 24bit. 32 Channels @48kHz, 24bit.)
- USB-B Audio interface for multichannel record/playback (32x32 @48/96kHz, 16/24bit)
- Input processing – Trim, HPF, Gate/Expander, Parametric EQ, Compressor, Channel Delay
- Mix processing – Graphic EQ, PEQ, Compressor, Channel Delay
- Fully patchable Insert points on all Input and Mix Channels
- 8x Multi-FX Engines with dedicated Stereo Return Channels and PEQ
- 4x RackUltra FX Engines with dedicated Stereo Return Channels and PEQ
- 2x 24 Channel or 1x 48 channel, zero latency, DEEP Automatic Mic Mixer
- 2x Real Time Analysers
- 300 Scene memories per Show
- Channel Safes, Global/Per-Scene Recall Filters
- FX, Processing, Channel, User Permissions, Input Patch Libraries
- 10 Configurable Users with Permissions to restrict operator access
- DAW Control emulation via USB or TCP/IP
- Compatible with ME personal monitoring range
- Remote control via free apps – Windows/MacOS/iOS/Android

Architectural & Engineering Specification

The mixer shall be a standalone digital mixer built around a 96kHz XCVI FPGA core with 48 input sources mixing to 44 busses, with a system latency of <0.7ms.

All input and mix processing, routing options and system configuration shall be accessed and adjusted via a 9-inch capacitive touchscreen with associated screen menu keys along with a dedicated rotary control for 'touch and turn' operation.

The surface shall include moving faders with 6 layers, each having dedicated keys, giving easy access to input channels, mixes, FX sends, FX returns, DCA masters and MIDI control.

Each fader strip shall have dedicated Select, Mute and PAFL buttons with indicators, a variable LED meter, a peak indicator LED and a coloured backlit LCD display.

There shall be dedicated physical controls which allow for adjustment of key processing parameters, and which follow the select button for the input and mix channels.

Send levels to mixes shall be displayed and adjusted using the faders in conjunction with dedicated Mix keys.

A 'CH to All Mix' key will be provided to allow viewing and adjustment of all send levels from the selected channel.

Quick access to assignment and switching of Pre/Post send points will be provided using dedicated keys.

The fader and rotary controls shall include a white skirt in contrast to the colour of the surface for visibility during operation in low light conditions.

16 user-assignable SoftKeys with multi-colour LED illumination shall be provided for quick access to switched functions such as Input/Mix/DCA/Group Mutes, Tap Tempo, Scene Controls, MMC and SQ-Drive Controls.

8 user-assignable Soft Rotary controls with associated backlit LCD displays and keys shall also be provided for adjustment of variable parameters, including processing values and routing levels.

There shall be dedicated Copy/Paste/Reset keys for parameter data.

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

A view key shall allow the temporary display of channel number and patching on the channel strip LCD displays.

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, with a switchable -20dB Pad for use with line level signals. Industry standard 48V phantom power shall be switchable per socket.

The number of local preamps will match the number of faders, to allow a simple, standalone, analogue-like 1-to-1 setup.

An extra, fully patchable, XLR socket with preamp specification matching that of the other XLR inputs shall be provided for default Talkback use.

Two stereo input connections will be provided, each using 2 balanced TRS ¼ inch Jack sockets that can be freely patched.

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

A stereo digital, professional AES3 output shall be provided via an industry standard 110ohm XLR connection with options for sample rate conversion.

A high-power headphone output shall be provided for monitoring using a TRS ¼ inch Jack socket, with associated level control and dual 12 segment LED meter.

There shall be a USB Type-A connector to allow use of standard USB storage for firmware updating, data-transfer and uncompressed stereo or multichannel audio recording/playback.

There shall be a USB-B connection following the USB 2.0 standard for class compliant multi-channel, bi-directional audio streaming and MIDI control between the mixer and a host device such as a computer.

There shall be an intelligent "SLink" Ethernet audio expansion port with locking EtherCON connector, supporting multiple A&H digital protocols and providing access to 128x128 digital channels, connected over a single cable 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 wherever supported.

An I/O Port shall be provided to allow the fitting of option cards for interoperability between the mixer and third party protocols including Dante, Waves and MADI.

All Input channels shall contain the following processing: Polarity, Trim, High Pass Filter, Gate or Expander, Insert point, Parametric EQ, Compressor, Delay, Pan/Balance.

All Input channels will have the ability to send a direct output signal, with global source point and follow options along with independent level trim.

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

All Mix channels shall contain the following processing: Insert point, Graphic EQ, Parametric EQ, Compressor, Delay, Balance.

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 with a dedicated stereo return channel and sourced from a dedicated FX send bus, a Mix bus or directly from an Input channel, or a unit may be inserted directly into any input or mix channel.

A further 4 effect racks shall be provided with the same capabilities and function as the other 8, along with the power to run RackUltra FX algorithms.

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

Two 24 channel Automatic Mic Mixers shall be provided for automatic and dynamic assignment of gain in spoken word applications. These may be combined into a single 48 channel Automatic Mic Mixer if desired.

There shall be 8 DCA groups and 8 Mute groups.

A Talkback facility shall be provided with the ability to send to any 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 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, mix, and FX channel and RTA metering shall be provided on-screen.

A PAFL sub-mix shall be provided, for the purposes of monitoring one or more signals and at different points in the signal path.

All signal delays in the system shall be adjustable in Samples, Milliseconds, Meters or Feet. Metric or imperial temperature adjustment will be included to account for changes in the speed of sound through air when using units of Meters or Feet.

MIDI Transport Control shall be available via the touchscreen and as SoftKey options.

MIDI messaging to and from common core parameters including send levels and muting will use MIDI NRPN messaging. Scene recall will send and respect standard MIDI Program Change and Show Control messaging.

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 messaging.

Input and mix channel processing and parameters in the mixer shall be saved on demand as a user library item for recall in other channels. Library items shall be transferrable to USB drive as portable data to be used in other units.

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

All mixer config settings, Scenes, Library items and the current state of the mixer shall be archived with a Show file.

The mixer shall allow the recall of data stored on earlier versions of the SQ hardware/firmware.

Channel ‘safes’ shall be provided to prevent selected items from being changed by a scene recall 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.

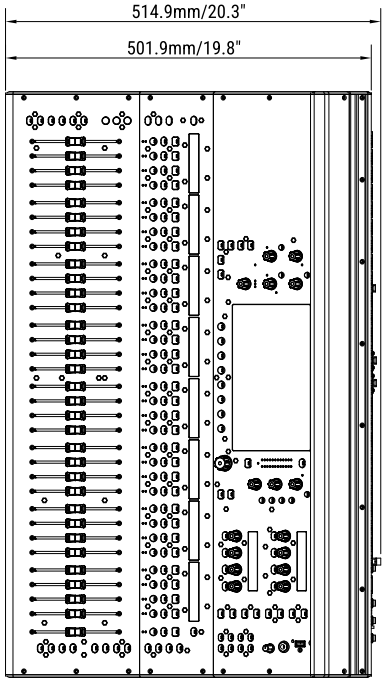
The mixing system shall periodically record all current settings and return the mixer to that state after reboot following a power-cycle.

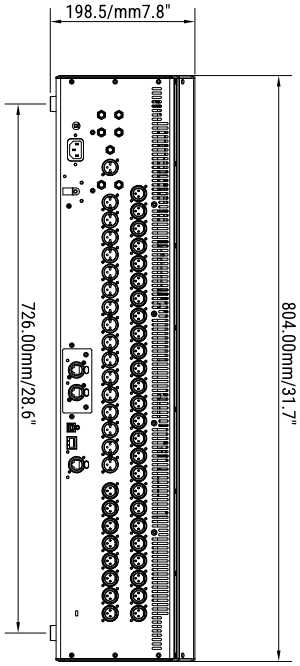
The mixer shall have a built-in power supply accepting AC mains voltages of 100~240V, 50/60 Hz via an earthed 3-pin IEC male connector mounted on the rear chassis. A two pole push-button power switch shall be provided near the mains input.

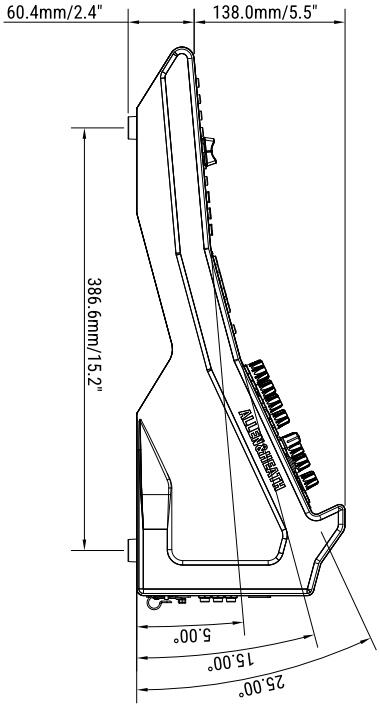
Recommended operating temperature for the mixer shall be between 5 to 40 degrees Celsius (41 to 104 degrees Fahrenheit).

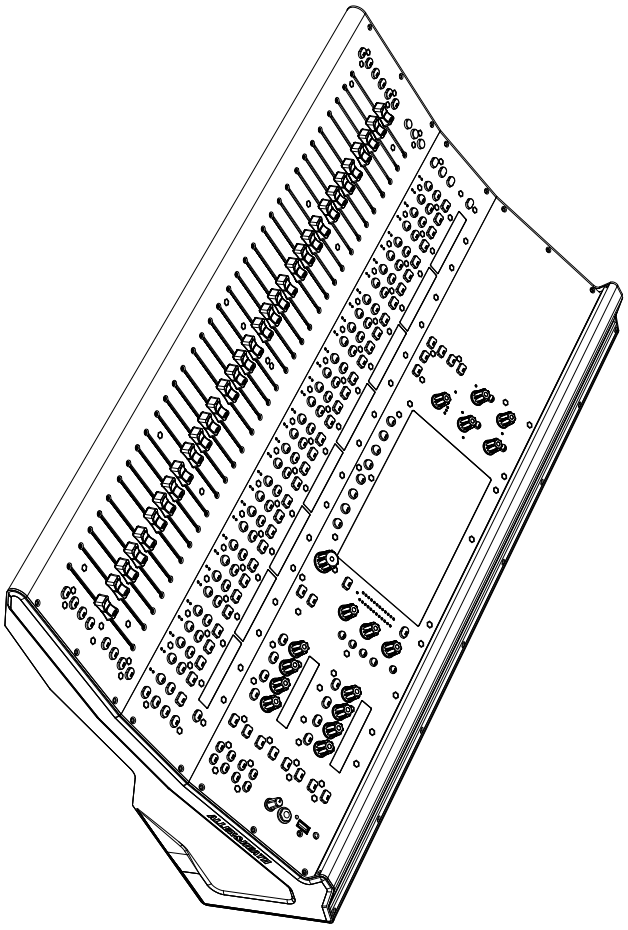
The mixer shall be the Allen & Heath SQ7+.

Weights & Dimensions







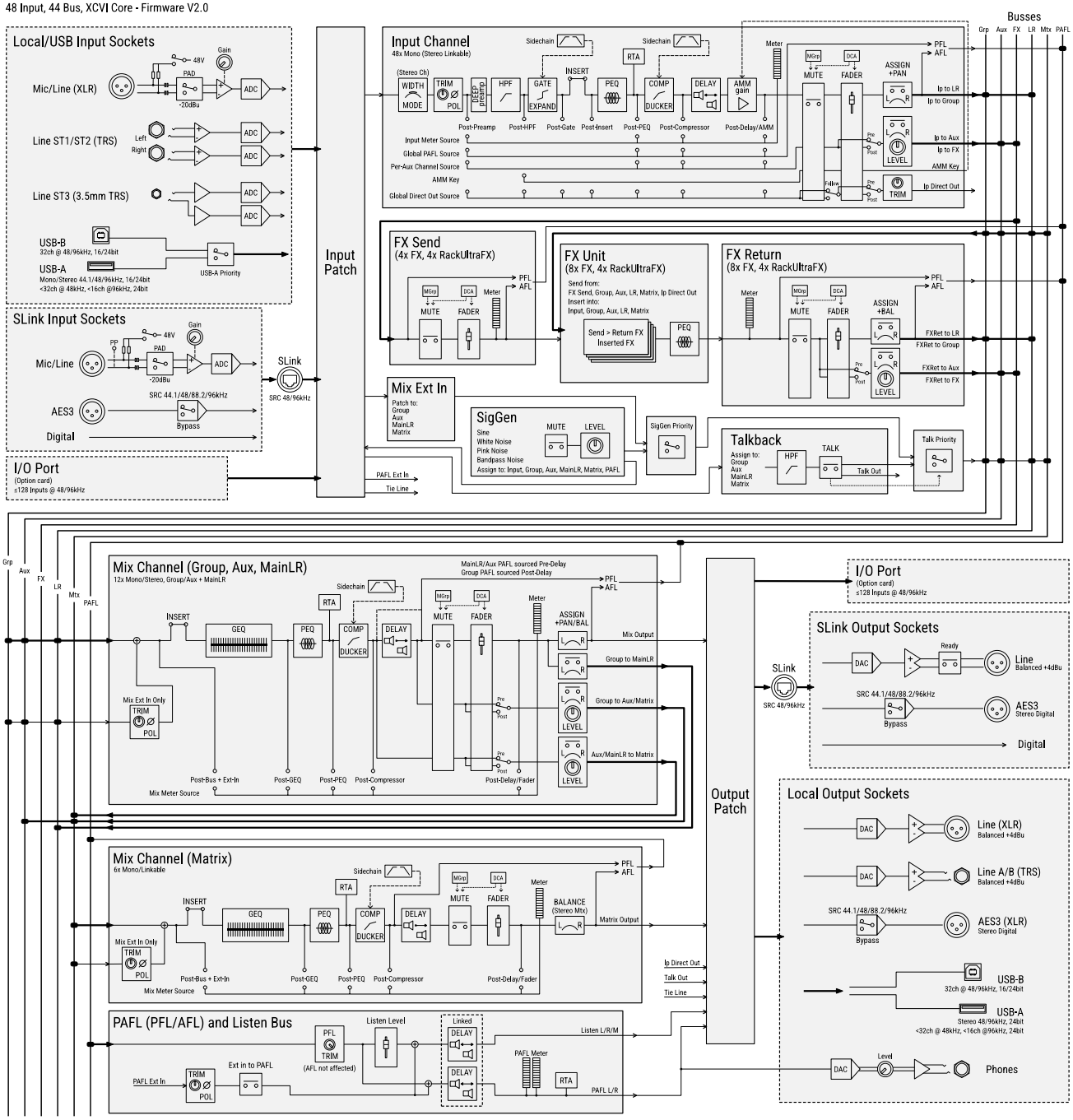


Product Dims	Length	514.9mm	20.3"
	Width	804mm	31.7"
	Height	198.5mm	7.8"
	Weight	18.42kg	40.6lbs
Packaged Dims	Length	700mm	27.6"
	Width	970mm	38.2"
	Height	360mm	14.2"
	Weight	23.69kg	52.2lbs

Block Diagram

SQ+ SYSTEM BLOCK DIAGRAM

48 Input, 44 Bus, XCVI Core - Firmware V2.0



Technical Specifications

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 (With pad engaged)
	Input Impedance	>4kΩ
	THD+N, Unity gain 0dB	0.0015% -96dB (20Hz-20kHz, AES Direct Out, @0dBu 1kHz)
	THD+N, Mid gain +30dB	0.003% -91dB (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 / 0dBu
	Trim	+/-24dB
	Maximum Input Level (ST1,ST2 / ST3)	+22dBu / +18dBu
	Input Impedance	>6kΩ
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	-91dBu (muted, 20Hz-20kHz)
	AES Digital Output	Balanced XLR 2 channel
		96kHz sampling rate (Default with SRC Bypassed)
		Switchable output sample rates with SRC, 44.1kHz / 48kHz / 88.2kHz / 96kHz
		2.5Vpp balanced terminated 110Ω
SLink	**Connection**	Neutrik EtherCON (RJ45)
	dSnake mode	40 input 20+40(ME) output channels, 48kHz
	DX mode	32 input 32 output channels, 96kHz
	GigaACE/GX	128 input 128 output channels, 96kHz
	Inputs	Fully Patchable
	Outputs	Fully Patchable
	Sync/SRC	Assignable as audio clock source, 48kHz<>96kHz SRC
I/O Port		Multi-channel I/O option module
	Inputs	Fully Patchable
	Outputs	Fully Patchable
	Sync/SRC	Assignable as audio clock source, SRC on option card
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

Control	Faders	100mm motorised
	Touch Screen	9" Capacitive, 1024 x 600 resolution, 24 bit RGB
	SoftKeys	8 (SQ5+), 16 (SQ6+, SQ7+)
	SoftRotarys	4 (SQ6+), 8 (SQ7+)
	Mute Groups / DCA Groups	8 / 8
	Network	TCP/IP Ethernet for Control and MIDI
	MIDI	TCP/IP and USB-B
	Footswitch	Single or Dual, Momentary or Latching
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	Unity gain faders@0dB, 0.002%, -93dB (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 Local Output, all processing switched in
	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 (SQ5+ / SQ6+ / SQ7+)	95W / 105W / 135W
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/Expander	Patchable Sidechain
	Sidechain filter	Hi-pass (20-5k), band-pass (120-10k), Lo-pass (120-20k), Q=1
	Threshold / Depth	-72dBu to +18dBu / 0 to 60dB
	Attack / Hold / Release	50µs to 300ms / 10ms to 5s / 10ms to 1s
	Expander Ratio	1:1 to 1:20
	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 -inf to 0dB

	Channel Direct Out	Follow Fader / Mute / Mute Group / DCA (global option)
	Source select	Post Preamp, Post HPF, Post Gate, Post Insert Return, Post PEQ, Post Compressor, Post Delay trim -inf to +10dB per channel
Mix	**Insert** (Pre EQ/Comp)	Fully Patchable
Processing	**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	**Rack FX Engines**	8 x RackFX engine, Send>Return or Inserted (4 dedicated FX sends)
	Types	SMR Reverb, Stereo Tap Delay, Gated Reverb, ADT, Blue Chorus, Symphonic Chorus, Flanger, Phaser (Plus optional Rack FX Add-Ons)
	8 dedicated Stereo FX returns	Fader, Pan, Mute, Routing to Mix/LR, 4-Band PEQ
	RackUltra FX Engines	4 x RackFX engine, Send>Return or Inserted (4 dedicated FX sends)
	Types	SMR Reverb, Stereo Tap Delay, Gated Reverb, ADT, Blue Chorus, Symphonic Chorus, Flanger, Phaser (Plus optional Rack FX and RackUltra FX Add-Ons)
	4 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, External Input Option
	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
	Metering RTA	2x 31-Band 1/3 octave (Stereo) or 61-Band 1/6 octave (Mono) 20-20kHz.
	Channel RTA	PAFL/Selected Channel or Fixed Source
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 Expanders	Source Expander, Dual Threshold Expander
	DEEP Compressors	Opto, 16T, 16VU, PeakLimiter76, Mighty, OptTronik, Bus, CompStortion
	DEEP GEQ's	Proportional-Q, DiGi-GEQ, Hybrid
	RackFX units	De-Esser, DynEQ4, MultiBD3, MultiBD4, Bucket Brigade, Echo, Hypabass
	RackUltra FX	Spaces Reverb, Plate Reverb, Vocal Tuner, Vocal Gridder, Vocal Shifter, Dual Autokey Harmoniser, Quad Harmoniser, Amp+Cab Distortion, Saturator
Dimensions	**SQ5+**	
& Weights	Unit only	514.9mm x 440mm x 198mm (20.3" x 17.3" x 7.8")
	Packed in shipping box	605mm x 702xx x 353mm (23.8" x 27.6" x 13.9")
	Unit weight	11.2kg (24.7lbs)
	Packed weight	14.9kg (32.8lbs)
	SQ6+	
	Unit only	514.9mm x 638mm x 198.5mm (20.3" x 25.1" x 7.8")
	Packed in shipping box	705mm x 810mm x 350mm (27.8" x 31.9" x 13.8")
	Unit weight	15.15kg (33.5lbs)
	Packed weight	19.69kg (43.4lbs)
	SQ7+	
	Unit only	514.9mm x 804mm x 198.5mm (20.3" x 31.7" x 7.8")
	Packed in shipping box	700mm x 970mm x 360mm (27.6" x 38.2" x 14.2")
	Unit weight	18.42kg (40.6lbs)
	Packed weight	23.69kg (52.2lbs)