

This protocol is for use with the Qu-16, Qu-24, Qu-32, Qu-Pac and Qu-SB loaded with firmware version V1.9 or later.

Note Firmware V1.9 added new MIDI messages for:

- Remote shutdown.

Note For firmware V1.5 onwards the MIDI channel numbers and NRPN ID previously used by Mute Groups were re-allocated to the added DCA Groups to be consistent with other Allen & Heath mixers. Mute Groups channel numbers were changed and are as detailed in this specification.

Qu transmits MIDI messages when changes are made to the mix. It also responds to parameter changes it receives via MIDI, for example from a computer or an external MIDI controller.

MIDI communicates via:

USB – Rear panel USB-B port for direct connection to a computer. This connection also carries audio and is recommended for DAW control and integration.

Note The Qu USB-B interface is class compliant so no driver is required for use with Mac. A driver for Windows computers can be downloaded from <http://www.allen-heath.com>.

TCP – Rear panel network port for use with a computer, controller or other hardware with configurable MIDI over a TCP/IP port.

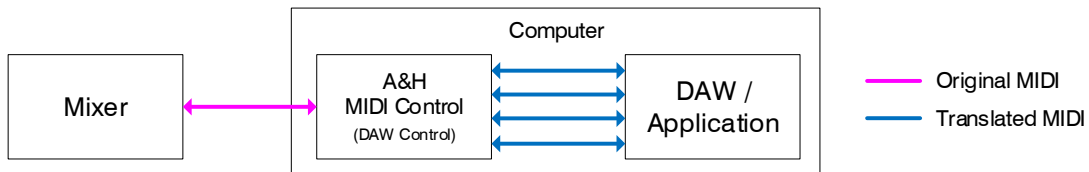
Note TCP MIDI requires an ‘active’ connection using either the A&H MIDI Control application available from the Allen & Heath website or a BomeBox (<https://www.bome.com/products/bomebox>) running firmware V1.2 or later.

Note Qu allows only one TCP MIDI connection at a time over its Network port.

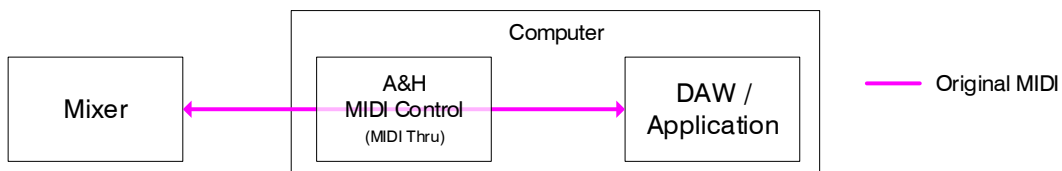
A&H MIDI Control (DAW Control):

Previously known as the ‘DAW Control Driver’, Allen & Heath MIDI Control works by creating virtual MIDI ports in Mac OS or Windows and then facilitating a MIDI connection between these virtual ports and the mixer either with or without translation.

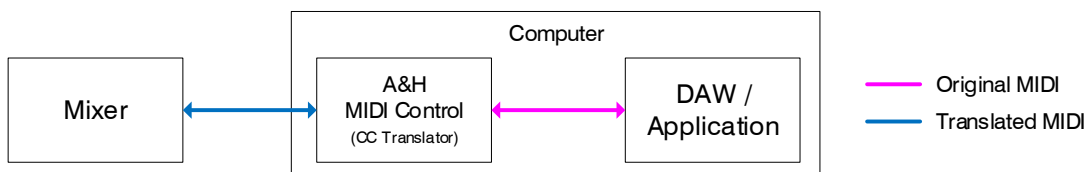
This enables compatible Allen & Heath mixers (including the Qu) to control DAW software on Mac OS or Windows by emulating popular HUI or Mackie Control protocols with the custom layer MIDI channel strips:



It can be used to send and receive MIDI control messages directly to and from a digital mixer’s core for remote control of mixing parameters, scene changes and other functions using the messages detailed in this document:



Simplified control of the most common mixer parameters with MIDI CC messages from the computer is also made possible with the ‘CC Translator’ options:



Visit <http://www.allen-heath.com> to download A&H MIDI Control and refer to the MIDI Control help document for further information on setup and operation.

The following Qu audio functions can be controlled via MIDI:

- Mutes
- Faders and Pan
- Mix and FX sends - Level, Pan, Assign, Pre/Post
- Matrix sends (not Qu-16) – Level, Pan, Assign, Pre/Post
- Audio Groups (not Qu-16) – Assign, (plus Level, Pan, Pre/Post if in Mix mode)
- Mute Groups – Assign, Master Mute
- DCA Groups – Assign, Master Level, Master Mute
- PAFL select
- Input Channel source
- Preamp (local and dSNAKE) – Gain, Pad, 48V
- Insert In/Out
- Input Channel processing – Trim, Polarity, Gate, PEQ, Compressor, Delay
- Mix processing - PEQ, GEQ, Compressor, Delay
- Group and Matrix processing – PEQ, GEQ, Compressor, Delay (not Qu-16)
- Channel Names
- Scene Recall
- FX Tap Tempo
- MMC Transport Control
- Remote Shutdown

MIDI fader strips:

MIDI fader strips can be assigned to the Custom Layer or accessed directly in the app. These send/receive CC and note on/off messages using a different MIDI channel to the one used for the Qu functions described above. The MIDI fader strip sends/receives messages relating to:

- Fader position
- Mute key / indicator
- Sel key / indicator
- PAFL key / indicator
- DAW Bank Up/Down (via Soft Key)

You can work with these messages directly or use the Allen & Heath MIDI Control application to translate them for use with a DAW.

Reference

Refer to the table at the end of this document for value listings.

All MIDI message numbers shown in blue in this document are [Hexadecimal](#)

Key

- Blue** Hexadecimal number, e.g. **F0**
- Green** Variable referred to in table or note, eg, **VA** = parameter value
- Red** NRPN **ID** number for parameter type, eg. Polarity = **6A**
- Orange** NRPN Index to specify a second value, eg, **VX**

MIDI channel number **N** (see table)

MIDI channel 1 to 16 = **0** to **F**

Qu functions use MIDI channel = **N**

MIDI strips (DAW controls) use MIDI channel = **N+1**

Channel numbers **CH** (see table)

FX Send 1 to 4 = **00** to **03**

FX Return 1 to 4 = **08** to **0B**

DCA Groups 1 to 4 = **10** to **13**

Input 1 to 32 = **20** to **3F**

Stereo Channels = **40** to **42**

Mute Groups 1 to 4 = **50** to **53**

Group 1-2 to 7-8 = **68** to **6B**

Mix 1 to 10 = **60** to **66**

Main LR = **67**

Matrix 1-2, 3-4 = **6C**, **6D**

Active Sensing

Qu supports MIDI Active Sensing over its TCP/IP Ethernet connection to detect connection status. Qu will send an initial Active Sense byte (**FE**) once an Ethernet connection is established, and then once every 300ms or so during any period of inactivity.

Qu also responds to Active Sense. If it receives an Active Sense byte it will expect to receive regular MIDI data from that point onwards (either valid control data, or more Active Sense bytes during any period of inactivity). If it does not receive any data for 12 seconds, it will close the Ethernet connection.

DAW control

MIDI strips assigned to the Custom Layer can provide DAW control.

DAW messages can be translated into HUI or Mackie Control protocol using the Allen & Heath **DAW Control** driver which can be downloaded from the [Allen & Heath web site](#).

DAW messages use a different MIDI channel to other Qu MIDI messages:

Qu MIDI channel = **N**

DAW MIDI channel = **N+1**

MIDI strip controls send and respond to the following messages:

Strip Fader

Control Change message:

B(N+1), FD, VA

Where **FD** = Strip fader **00** to **1F** (see [table](#))

VA = Fader min to max position = **00** to **7F**

Strip keys

The strip keys use **NOTE ON** followed by **NOTE OFF** messages.

Pressing keys send messages.

Key LED indicators respond to received messages.

9(N+1), KY, 7F, 9(N+1), KY, 00

Where **KY** = **Mute** Strip 1-32 = **00** to **1F** (see [table](#))

Sel Strip 1-32 = **20** to **3F**

PAFL Strip 1-32 = **40** to **5F**

Bank Up/Down

Qu SoftKeys can be assigned as DAW Bank Up or Bank Down keys.

These use **NOTE ON** followed by **NOTE OFF** messages which are converted by DAW Control to become the Bank Up/Down control.

Bank Up **9(N+1), 7E, 7F, 9(N+1), 7E, 00**

Bank Down **9(N+1), 7F, 7F, 9(N+1), 7F, 00**

MMC (MIDI Machine Control)

Available on-screen and as SoftKey functions.

Sysex message **F0, 7F, 7F, 06, TC, F7**

Where **TC** transport control:

01 = Stop

02 = Play

04 = Fast Forward

05 = Rewind

06 = Record Strobe

09 = Pause

Mute control

Mute on **NOTE ON** with velocity > or = 40 followed by NOTE OFF
 9N, CH, 7F, 9N, CH, 00

Mute off **NOTE ON** with velocity < 40 followed by NOTE OFF
 9N, CH, 3F, 9N, CH, 00

Received Mute messages

Velocity 00 and NOTE OFF messages are ignored
 Velocity 01 to 3F = Mute off
 Velocity 40 to 7F = Mute on

NRPN Parameter control

Qu mixer parameters are transmitted and received as MIDI **NRPN** (Non-Registered Parameter Number) messages. The MSB (most significant byte) selects the mixer channel (CH), and the LSB (least significant byte) selects the parameter number (ID). The data entry MSB sets the parameter value (VA) and LSB sets the index value for its range (VX) where needed.

(NRPN MSB)	(NRPN LSB)	(Data MSB)	(Data LSB)
BN, 63, CH,	BN, 62, ID,	BN, 06, VA	BN, 26, VX

Group Mode BN, 63, CH, BN, 62, 5E, BN, 06, VA BN, 26, 00

Where VA Group mode = 00, Mix mode = 01

Note This is unidirectional – Sent from mixer but not received

Fader BN, 63, CH, BN, 62, 17, BN, 06, VA BN, 26, 07

Where VA -inf to +10dB = 00 to 7F (0dB = 62, see [table](#))

Pan BN, 63, CH, BN, 62, 16, BN, 06, VA BN, 26, VX

Where VA Full Left = 00, to Centre = 25, to Full Right = 4A

VX 04, 05, 06, 07 = Mix 5-6, 7-8, 9-10, LR

VX 08, 09, 0A, 0B = Grp 1-2, 3-4, 5-6, 7-8

VX 0C, 0D = MTX1-2, 3-4 (not Qu-16)

LR Assign BN, 63, CH, BN, 62, 18, BN, 06, VA BN, 26, 07

Where VA Off = 00, On = 01

Mix Assign BN, 63, CH, BN, 62, 55, BN, 06, VA BN, 26, VX

Where VA Off = 00, On = 01

VX 00 to 0B = Mix1 to 9-10, LR

VX 10 to 13 = FX send 1-4 (Qu-16 FX1,2 only)

VX 08, 09, 0A, 0B, 0C, 0D = Grp1-2 to 7-8, MTX1-2 to 3-4

Mute Grp Assign BN, 63, CH, BN, 62, 5C, BN, 06, VA BN, 26, 07

Where VA Off Mute Grp 1-4 = 00 to 03,

On Mute Grp 1-4 = 40 to 43

DCA Grp Assign	BN, 63, CH,	BN, 62, 40,	BN, 06, VA	BN, 26, 07
Where	VA	Off Mute Grp 1-4 = 00 to 03 , On Mute Grp 1-4 = 40 to 43		
Mix Pre/Post	BN, 63, CH,	BN, 62, 50,	BN, 06, VA	BN, 26, VX
Where	VA	Post = 00 , Pre = 01		
	VX	00 to 06 = Mix1 to 9-10		
	VX	08 to 0B = Grp1-2 to 7-8 (in Mix mode)		
	VX	10 to 13 = FX send 1-4 (Qu-16 FX1,2 only)		
	VX	0C, 0D = MTX1-2, 3-4 (not Qu-16)		
Send Level	BN, 63, CH,	BN, 62, 20,	BN, 06, VA	BN, 26, VX
Where	VA	-inf to +10dB = 00 to 7F (see table)		
	VX	00 to 06 = Mix1 to 9-10		
	VX	08 to 0B = Grp1-2 to 7-8 (in Mix mode)		
	VX	10 to 13 = FX send 1-4 (Qu-16 FX1,2 only)		
	VX	0C, 0D = MTX1-2, 3-4 (not Qu-16)		
PAFL select	BN, 63, CH,	BN, 62, 51,	BN, 06, VA	BN, 26, 07
Where	VA	Off = 00 , On = 01		
Ch USB Source	Switches between channel current Preamp and current USB source			
	BN, 63, CH,	BN, 62, 12,	BN, 06, VA	BN, 26, 00
Where	VA	Off (Preamp) = 00 , On (USB) = 01		
Ch Preamp Source	Switches between mixer rear panel and remote AR rack input source			
	BN, 63, CH,	BN, 62, 57,	BN, 06, VA	BN, 26, 00
Where	VA	Off (Local) = 00 , On (dSNAKE) = 01		
dSNAKE Patch	BN, 63, CH,	BN, 62, 5D,	BN, 06, VA	BN, 26, 00
Where	VA	dSNAKE input socket index 00 to 27		
Note	This is unidirectional – Sent from mixer but not received			
Local Preamp	Applies to rear panel local inputs only			
	BN, 63, CH,	BN, 62, ID,	BN, 06, VA	BN, 26, 07
Where	Gain	ID = 19 VA	Gain -5dB to +60dB = 00 to 7F (see table)	
	48V PP	ID = 69 VA	Off = 00 , On = 01	
dSNAKE Preamp	Applies to remote AR rack inputs only			
	BN, 63, CH,	BN, 62, ID,	BN, 06, VA	BN, 26, VX
Where	Gain	ID = 58 VA	Gain +5dB to +60dB = 00 to 7F (see table)	
	Pad	ID = 59 VA	Out = 00 , In = 01	
	48V PP	ID = 5A VA	Off = 00 , On = 01	
	VX	= dSNAKE socket index (00 to 27) (dSNAKE input patch)		

Digital Trim	Applies to USB source to channel only BN, 63, CH, BN, 62, 52, BN, 06, VA BN, 26, 07 Where VA Trim -24 to +24dB = 00 to 7F 0dB = 40
Stereo Trim	Applies to local ST1, ST2 and ST3 inputs only BN, 63, CH, BN, 62, 54, BN, 06, VA BN, 26, 07 Where VA Trim -24 to +24dB = 00 to 7F 0dB = 40
Polarity	BN, 63, CH, BN, 62, 6A, BN, 06, VA BN, 26, 07 Where VA Off (normal) = 00 , On (reversed) = 01
Insert In/Out	BN, 63, CH, BN, 62, 6B, BN, 06, VA BN, 26, 07 Where VA Out = 00 , In = 01
PEQ	BN, 63, CH, BN, 62, ID, BN, 06, VA BN, 26, 07 Where LF Gain ID = 01 VA -12 to +12dB = 00 to 7F (0dB = 40) LF Freq ID = 02 VA 20Hz to 20 kHz = 00 to 7F LF Width ID = 03 VA 1.5 to 1/9 Oct = 00 to 7F LF Type ID = 04 VA Bell = 00 , Shelf = 06 LM Gain ID = 05 VA -12 to +12dB = 00 to 7F (0dB = 40) LM Freq ID = 06 VA 20Hz to 20 kHz = 00 to 7F LM Width ID = 07 VA 1.5 to 1/9 Oct = 00 to 7F HM Gain ID = 09 VA -12 to +12dB = 00 to 7F (0dB = 40) HM Freq ID = 0A VA 20Hz to 20 kHz = 00 to 7F HM Width ID = 0B VA 1.5 to 1/9 Oct = 00 to 7F HF Gain ID = 0D VA -12 to +12dB = 00 to 7F (0dB = 40) HF Freq ID = 0E VA 20Hz to 20 kHz = 00 to 7F HF Width ID = 0F VA 1.5 to 1/9 Oct = 00 to 7F HF Type ID = 10 VA Bell = 00 , Shelf = 06
PEQ	In/Out BN, 63, CH, BN, 62, 11, BN, 06, VA BN, 26, 00 Where VA Out = 00 , In = 01
HPF	Freq BN, 63, CH, BN, 62, 13, BN, 06, VA BN, 26, 07 Where VA 20Hz to 20kHz = 00 to 7F
HPF	In/Out BN, 63, CH, BN, 62, 14, BN, 06, VA BN, 26, 00 Where VA Out = 00 , In = 01
GEQ	Gain BN, 63, CH, BN, 62, 70, BN, 06, VA BN, 26, VX Where VA Gain -12 to +12dB = 00 to 7F VX 00 to 1B = Each of 28 bands (see table)
GEQ	In/Out BN, 63, CH, BN, 62, 71, BN, 06, VA BN, 26, 00 Where VA Out = 00 , In = 01

Gate		BN, 63, CH,	BN, 62, ID,	BN, 06, VA	BN, 26, 07
	Where				
	Attack	ID = 41	VA	50us to 300ms =	00 to 7F
	Release	ID = 42	VA	10ms to 1s =	00 to 7F
	Hold	ID = 43	VA	10ms to 5s =	00 to 7F
	Threshold	ID = 44	VA	-72 to +18dB =	00 to 7F
	Depth	ID = 45	VA	0 to 60dB =	00 to 7F
Gate	In/Out	BN, 63, CH,	BN, 62, 46,	BN, 06, VA	BN, 26, 00
	Where	VA	Out =	00,	In = 01
Comp		BN, 63, CH,	BN, 62, ID,	BN, 06, VA	BN, 26, 07
	Where				
	Type	ID = 61	VA	4 types =	00, 01, 02, 03
	Attack	ID = 62	VA	300us to 300ms =	00 to 7F
	Release	ID = 63	VA	100ms to 2s =	00 to 7F
	Knee	ID = 64	VA	Hard knee =	00, Soft knee = 01
	Ratio	ID = 65	VA	1:1 to inf =	00 to 7F, 2.6:1 = 50
	Threshold	ID = 66	VA	-46 to +18dB =	00 to 7F
	Gain	ID = 67	VA	0 +18dB =	00 to 7F
Comp	In/Out	BN, 63, CH,	BN, 62, 68,	BN, 06, VA	BN, 26, 00
	Where	VA	Out =	00,	In = 01
Delay	Time	BN, 63, CH,	BN, 62, 6C,	BN, 06, VA	BN, 26, 07
	Where	VA	Input 0 to 85ms =	00 to 40	(linear)
		VA	Mix 0 to 170ms =	00 to 7F	(linear)
		VA	Group 0 to 170ms =	00 to 7F	(linear)
		VA	Matrix 0 to 170ms =	00 to 7F	(linear)
Delay	In/Out	BN, 63, CH,	BN, 62, 6D,	BN, 06, VA	BN, 26, 00
	Where	VA	Out =	00,	In = 01
Remote Shutdown		B0, 63, 00	B0, 62, 5F	B0, 06, 00	B0, 26, 00

Note: The QU mixer will require a hard power reset to switch on the mixer.

FX Parameter Control

Delay FX Time

To set delay time. Can be used for Tap Tempo.
Can use one or two NRPN messages:
Use MSB message only for course time value resolution.
Use LSB followed by MSB message for fine resolution.

LSB: **BN, 63, CH**, **BN, 62, 49**, **BN, 06, VAf** **BN, 26, VX**

MSB: **BN, 63, CH**, **BN, 62, 48**, **BN, 06, VAc** **BN, 26, VX**

Where **VAf** Fine resolution time value = **00** to **7F**
VAc Course resolution time value = **00** to **7F**
(See [table](#) for examples of time values)
VX Delay parameter **05** = Left tap,
07 = Right tap

Delay FX Link

To link or unlink the Left and Right tap time.

BN, 63, CH, **BN, 62, 48**, **BN, 06, VA** **BN, 26, 06**

Where **VA** Off (unlinked) = **00**,
On (linked) = **7F**

Scene Recall

Qu uses **Bank Select** and **Program Change** messages for Scene recall. Only Bank 1 is used.

Transmitted Scene message

Qu transmits this message when a Scene is recalled using the touch screen or a SoftKey:

(Bank1 MSB) (Bank1 LSB) Recall Scene
BN, 00, 00, **BN, 20, 00**, **CN, SS**

Where **SS** = Scene 1 to 100 = **00** to **63** (see [table](#))

Received Scene message

Qu responds to the following message if Bank1 is currently selected:

Recall Scene
CN, SS

Where **SS** = Scene 1 to 100 = **00** to **63** (see [table](#))

To set Bank1

Qu will ignore Scene change messages if the Bank is not set to 1.

(Bank1 MSB) (Bank1 LSB)
BN, 00, 00, **BN, 20, 00**

Device Connection

Note Qu currently allows only one TCP MIDI connection at a time over its Network port.

TCP Client Configuration

Clients should be configured to use TCP port **51325**

Active Sensing

Qu supports MIDI Active Sensing over its TCP/IP Ethernet connection to detect connection status. Qu will send an initial Active Sense byte (**FE**) once an Ethernet connection is established, and then once every 300ms or so during any period of inactivity.

Qu also responds to Active Sense. If it receives an Active Sense byte it will expect to receive regular MIDI data from that point onwards (either valid control data, or more Active Sense bytes during any period of inactivity). If it does not receive any data for 12 seconds, it will close the Ethernet connection.

Qu uses Sysex messages to communicate much of its data.

Sysex Header

	A&H ID	Qu mixer	Major/Minor version	MIDI channel
F0,	00, 00, 1A,	50, 11,	01, 00,	0N

Get System State

An external controller such as an iPad running the Qu-Pad app can use MIDI **Sysex** messages to request and receive the current parameter state of the Qu mixer.

Note On request, the mixer MIDI channel (**N**) is not known therefore an 'All Call' Sysex Header is sent. The reply returns the MIDI channel number. This number should be used in subsequent messages.

REQUEST: **Sysex Header (All Call), 10 <iPadFlag>, F7**

Where **Sysex Header (All Call)** = **F0, 00, 00, 1A, 50, 11, 01, 00, 7F**

And **<iPadFlag>** = **1** identifies the incoming connection as Qu-pad.

REPLY: **Sysex Header, 11, < BoxID >, < Version >, F7**

Where **< BoxID >** identifies the outgoing connection Qu mixer model:

Where **1** = Qu-16

2 = Qu-24

3 = Qu-32

4 = Qu-Pac

5 = Qu-SB

< Version > = **<Major>**, **<Minor>** = Qu firmware version (7bit data)

Subsequent push of NRPN messages to update current state.

Subsequent End Sync Response:

Sysex Header, 14, F7

If **<iPadFlag>** is set in the initial request the Qu mixer will expect to receive an Active Sense byte within 5 seconds. If not, it will close the Ethernet connection. This is how the lost communication mechanism is enforced for Qu-Pad.

Channel Naming

Get Name from Qu

REQUEST: Sysex Header, 01, CH, F7

REPLY: Sysex Header, 02, CH, <Name>, F7

Where < Name > = String of hex ascii characters

Set Name Sysex Header, 03, CH, <Name>, F7

Where < Name > = String of hex ascii characters

Get Meter Data

An external controller such as an iPad running the Qu-Pad app can use MIDI Sysex messages to request and receive the current meter data from the Qu mixer.

REQUEST:

Sysex Header, 12, < MeterOnOff >, F7

REPLY:

Sysex Header, 13, < MeterData >, F7

Where < MeterData > = Push of all meter data (Described below).

Where < MeterOnOff > = 0 (meters Off), 1 (meters On)

Meter values are signed dB values, coded as fixed point 7Q8 offset 8000 format, stored as unsigned 16 bit numbers, (transmitted in "7-bit-ized" format in the Sysex).

Encoding of meter data:

The 8-bit file data needs to be converted to 7-bit form, with the result that every 7 bytes of file data translates to 8 bytes in the MIDI stream.

For each group of 7 bytes of file data, the top bit from each is used to construct an eighth byte, which is sent first. For example:

AAAAaaaa BBBBbbbb CCCccccc DDDDdddd EEEEeeee FFFFffff GGGGgggg

becomes:

0ABCDEFG 0AAAAaaaa 0BBBBbbbb 0CCCccccc 0DDDdddd 0EEEeeee 0FFFffff 0GGGgggg

The final group may have less than 7 bytes, and is coded as follows (example with 2 bytes in the final group):

0AB00000 0AAAAaaaa 0BBBBbbbb

Example:	7-bit-ized binary	00100000 01111100 00000000
	Unpacks to 8-bit-ized binary	01111100 10000000
	Equivalent to hexadecimal	7C80
	Remove the offset:	(int16_t) 7C80 - (int16_t) 8000 = FC80
	Float and scale:	(float) FC80 / 256.0f = -3.5dB

Transmission of meter data:

The meter data is transmitted in blocks in the following order:

Qu-24

16 Mono Input blocks
80 unused meters
3 Stereo Input blocks
20 unused meters
4 Mono Mix blocks
4 Stereo Mix blocks
1 Stereo Monitor block
4 Stereo FX blocks

Qu-24

24 Mono Input blocks
3 Stereo Input blocks
180 unused meters
4 Mono Mix blocks
4 Stereo Mix blocks
2 Stereo Group blocks
2 Stereo Matrix blocks
1 Stereo Monitor block
4 Stereo FX blocks

Qu-32, Qu-Pac, Qu-SB

24 Mono Input blocks (CH1-24)
3 Stereo Input blocks
20 unused meters
8 Mono Input blocks (CH25-32)
4 Mono Mix blocks
4 Stereo Mix blocks
4 Stereo Group blocks
2 Stereo Matrix blocks
1 Stereo Monitor block
4 Stereo FX blocks

Note Stereo Mix blocks include Mix 5-6, 7-8, 9-10, LR

Each block contains the following meters:

Mono Input block

Post Preamp
Post PEQ
Post Compressor
Post Delay
Gate Side Chain
Compressor Side Chain
Direct Out
Gate Gain reduction
Compressor Gain Reduction
Ducker Gain Reduction

Stereo Input block

Post Preamp L
Post PEQ L
Post Compressor L
Post Delay L
Gate Side Chain L
Compressor Side Chain L
Direct Out L
Gate Gain reduction L
Compressor Gain Reduction L
Ducker Gain Reduction L
Post Preamp R
Post PEQ R
Post Compressor R
Post Delay R
Gate Side Chain R
Compressor Side Chain R
Direct Out R
Gate Gain reduction R
Compressor Gain Reduction R
Ducker Gain Reduction R

Mono Mix block

TB/SigGen
Pre-Insert
Post-PEQ
Post-GEQ
Post Compressor
Post Fader
Post insert
Compressor Side Chain
Compressor Gain Reduction
Ducker Gain Reduction

Stereo Mix/Grp/Mtx block

TB/SigGen L
Pre Insert L
Post PEQ L
Post GEQ L
Post Compressor L
Post Fader L
Post Insert L
Compressor Side Chain L
Compressor Gain Reduction L
Ducker Gain Reduction L
TB/SigGen R
Pre Insert R
Post PEQ R
Post GEQ R
Post Compressor R
Post Fader R
Post Insert R
Compressor Side Chain R
Compressor Gain Reduction R
Ducker Gain Reduction R

Stereo Monitor block

PAFL L
PAFL R
PAFL Mono sum
Talkback
Signal Generator
Main Pre Fader L
Main Pre Fader R
Main Post Fader L
Main Post Fader R
Main Mono Sum Pre Fader
Main Mono Sum Post Fader
USB A Record Out L
USB A Record Out R
3 Unused Meters
RTA 31 bands L
RTA 31 bands R

Stereo FX block

Send L (at FX device input)
Send R (at FX device input)
Send Mono sum
Pre PEQ L
Pre PEQ R
Tap Tempo L
Tap Tempo R
Post PEQ L
Post PEQ R
9 unused meters

Reference Tables

In the following tables, Qu mixing (audio core) parameters have a blue border and MIDI channel strip messages (used for DAW control) have an orange border.

MIDI channel		Input Channel		Mix			Local Gain		GEQ Bands		Scene Number				
N	N+1	CH	CH	CH	VX	19	VA	70, 71	VX	SS	SS				
Qu	Hex	DAW	Hex	CH	Hex	Mix	Hex	dB	Hex	Freq	Hex	Scene	Hex	Scene	Hex
1	0	2	1	1	20	1	60 00	+60	7F	31.5Hz	00	1	00	51	32
2	1	3	2	2	21	2	61 01	+50	6B	40Hz	01	2	01	52	33
3	2	4	3	3	22	3	62 02	+40	57	50Hz	02	3	02	53	34
4	3	5	4	4	23	4	63 03	+30	44	63Hz	03	4	03	54	35
5	4	6	5	5	24	5-6	64 04	+20	30	80Hz	04	5	04	55	36
6	5	7	6	6	25	7-8	65 05	+10	1D	100Hz	05	6	05	56	37
7	6	8	7	7	26	9-10	66 06	+5	13	125Hz	06	7	06	57	38
8	7	9	8	8	27	LR	67 07	0	0A	160Hz	07	8	07	58	39
9	8	10	9	9	28			-5	00	200Hz	08	9	08	59	3A
10	9	11	A	10	29	Grp1-2	68 08			250Hz	09	10	09	60	3B
11	A	12	B	11	2A	Grp3-4	69 09			315Hz	0A	11	0A	61	3C
12	B	13	C	12	2B	Grp5-6	6A 0A			400Hz	0B	12	0B	62	3D
13	C	14	D	13	2C	Grp7-8	6B 0B			500Hz	0C	13	0C	63	3E
14	D	15	E	14	2D	MTX1-2	6C 0C			630Hz	0D	14	0D	64	3F
15	E	16	F	15	2E	MTX3-4	6D 0D			800Hz	0E	15	0E	65	40
16	F	1	0	16	2F					1kHz	0F	16	0F	66	41
				17	30					1k25	10	17	10	67	42
				18	31					1k6	11	18	11	68	43
				19	32					2kHz	12	19	12	69	44
				20	33					2k5	13	20	13	70	45
				21	34					3k15	14	21	14	71	46
				22	35					4kHz	15	22	15	72	47
				23	36					5kHz	16	23	16	73	48
				24	37					6k3	17	24	17	74	49
				25	38					8kHz	18	25	18	75	4A
				26	39					10kHz	19	26	19	76	4B
				27	3A					12k5	1A	27	1A	77	4C
				28	3B					16kHz	1B	28	1B	78	4D
				29	3C							29	1C	79	4E
				30	3D							30	1D	80	4F
				31	3E							31	1E	81	50
				32	3F							32	1F	82	51
				ST1	40							33	20	83	52
				ST2	41							34	21	84	53
				ST3	42							35	22	85	54
												36	23	86	55
												37	24	87	56
												38	25	88	57
												39	26	89	58
												40	27	90	59
												41	28	91	5A
												42	29	92	5B
												43	2A	93	5C
												44	2B	94	5D
												45	2C	95	5E
												46	2D	96	5F
												47	2E	97	60
												48	2F	98	61
												49	30	99	62
												50	31	100	63

MIDI Strip Fader		MIDI Strip Keys (Mute / Sel / PAFL)			
MS	Hex	KY	KY	KY	KY
Strip	Hex	Strip	Hex	Hex	Hex
1	00	1	00	20	40
2	01	2	01	21	41
3	02	3	02	22	42
4	03	4	03	23	43
5	04	5	04	24	44
6	05	6	05	25	45
7	06	7	06	26	46
8	07	8	07	27	47
9	08	9	08	28	48
10	09	10	09	29	49
11	0A	11	0A	2A	4A
12	0B	12	0B	2B	4B
13	0C	13	0C	2C	4C
14	0D	14	0D	2D	4D
15	0E	15	0E	2E	4E
16	0F	16	0F	2F	4F
17	10	17	10	30	50
18	11	18	11	31	51
19	12	19	12	32	52
20	13	20	13	33	53
21	14	21	14	34	54
22	15	22	15	35	55
23	16	23	16	36	56
24	17	24	17	37	57
25	18	25	18	38	58
26	19	26	19	39	59
27	1A	27	1A	3A	5A
28	1B	28	1B	3B	5B
29	1C	29	1C	3C	5C
30	1D	30	1D	3D	5D
31	1E	31	1E	3E	5E
32	1F	32	1F	3F	5F

FX Ret		FX Send	
CH	Hex	CH	VX
1	08	1	00 10
2	09	2	01 11
3	0A	3	02 12
4	0B	4	03 13

Mute Group		Mute Grp Assign	
CH	Hex	MG	off on
1	50	1	00 40
2	51	2	01 41
3	52	3	02 42
4	53	4	03 43

DCA Group		DCA Grp Assign	
CH	Hex	DG	off on
1	10	1	00 40
2	11	2	01 41
3	12	3	02 42
4	13	4	03 43

Local Gain		dSNAKE Gain	
19	VA	58	VA
dB	Hex	dB	Hex
+60	7F	+60	7F
+50	6B	+50	67
+40	57	+40	50
+30	44	+35	45
+20	30	+30	39
+10	1D	+25	2E
+5	13	+20	22
0	0A	+10	0B
-5	00	+5	00

Fader / Send Level		Compressor Type	
dBu	Hex	61	VA
		Type	Hex
+10	7F	Manual Peak	00
+5	72	Manual RMS	01
0	62	Auto Slow Opto	02
-5	4F	Auto Punchbag	03
-10	3F		
-15	36		
-20	2F		
-25	27		
-30	1F		
-35	17		
-40	10		
-45	0C		
-inf	00		

Delay FX time		
Va	VAc	Hex
5ms	00	00
100ms	31	44
200ms	22	54
400ms	05	64
800ms	70	73
1.36sec	7F	7F