


dLive MIDI Over TCP/IP Protocol

Firmware V2.0

 This protocol is for use with dLive systems loaded with firmware version V2.0 and later.

TCP/IP control is available via any **Network** port on the dLive Surface or MixRack. Messages are sent using the MIDI format, as described in this document.

All MIDI message **numbers** shown in this specification are hexadecimal. Refer to the end of this specification for a table of values for each of the parameters listed here. All variables are shown in **green**.

To connect to the MixRack, clients should be configured to use either:

Without encryption - Rendezvous port TCP **51325**.

With TLS/SSL encryption - Rendezvous port TCP **51327**.

To connect to the Surface, clients should be configured to use either:

Without encryption - Rendezvous port TCP **51328**.

With TLS/SSL encryption - Rendezvous port TCP **51329**.

MIDI Controllable Functions and Parameters:

• Fader levels	NRPN	<i>Input, Mix master, FX send, FX return, DCA</i>
• Mutes	Note On	<i>Input, Mix master, FX send, FX return, DCA, Mute Groups</i>
• Send levels	SysEx	<i>Aux, FX and Matrix sends</i>
• DCA assign	NRPN	
• Input to Main assign	NRPN	
• Preamp - Gain	Pitchbend	
• Preamp - Pad, 48V	SysEx	
• Name & Colour	SysEx	
• Scene \ Cue Recall	Program Change	
• PEQ control	NRPN	
• HPF control	NRPN	
• MIDI transport	MIDI Machine Control (MMC)	
• Global UFX Parameters	Control Change	<i>Key, Scale</i>
• UFX Unit Parameters	Control Change	
• Scene Go \ Next \ Previous	Control Change	

Authentication

When the TLS/SSL socket is opened, the first data sent to the dLive should be the following message:

UserProfile, UserPassword

Where UserProfile = **00** to **1F**

If the username and password match, then the unit will respond with the six characters "AuthOK", otherwise the connection will be dropped.

MIDI Running Status

dLive uses MIDI running status. This maximises MIDI transmission efficiency by allowing a MIDI message to be sent without its Status byte if the previous transmitted message had the same Status.

For example, turning Mute on for Inputs 1, 2 and 3 on MIDI channel 12:

Without running status – Full message string **9B, 00, 7F, 9B, 01, 7F, 9B, 02, 7F**

With running status – Shorter message string **9B, 00, 7F, 01, 7F, 02, 7F**

The omitted bytes will be shown below in square brackets (eg [9N]).

MIDI channel number

N

MIDI channel 1 to 12 = **0** to **B**

In order to extend the range of audio channels that can be controlled by MIDI messages the dLive MIDI protocol uses a range of MIDI channels to select between audio channel types. The base MIDI channel **N** is the lowest channel of the range selected in **Utility / Control / MIDI**. The audio channel type is selected by offsetting the MIDI channel used in the message and the audio channel number is selected using the note number, as detailed in 'Channel Selection' below.

Preamp control, Scene recall and MIDI transport use the base MIDI channel **N**.

Channel Selection

CH (refer to table)

Channels are selected using the channel number and note number as follows:

- Inputs 1 to 128: N = N, CH = 00 to 7F
- Mono Groups 1 to 62: N = N + 1, CH = 00 to 3D
- Stereo Groups 1 to 31: N = N + 1, CH = 40 to 5E
- Mono Aux 1 to 62: N = N + 2, CH = 00 to 3D
- Stereo Aux 1 to 31: N = N + 2, CH = 40 to 5E
- Mono Matrix 1 to 62: N = N + 3, CH = 00 to 3D
- Stereo Matrix 1 to 31: N = N + 3, CH = 40 to 5E
- Mono FX Send 1 to 16: N = N + 4, CH = 00 to 0F
- Stereo FX Send 1 to 16: N = N + 4, CH = 10 to 1F
- FX Return 1 to 16: N = N + 4, CH = 20 to 2F
- Mains 1 to 6: N = N + 4, CH = 30 to 35
- DCA 1 to 24: N = N + 4, CH = 36 to 4D
- Mute Group 1 to 8: N = N + 4, CH = 4E to 55
- Stereo UFX Send 1 to 8: N = N + 4, CH = 56 to 5D
- Stereo UFX Return 1 to 8: N = N + 4, CH = 5E to 65

SysEx Header

SysEx Header

This applies to all SysEx messages described later in this specification.

F0, 00, 00, 1A, 50, 10, MV, mV

Where MV = 01 (Major version)

mV = 00 (Minor version)

Mute ON

NOTE ON with velocity > 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

Get Mute Status

SysEx message

SysEx Header, 0N, 05, 09, CH, F7

The unit will then transmit the appropriate Channel Mute ON or OFF message.

Fader Level

NRPN with parameter ID 17

Fader value LV –inf to +10dB = 00 to 7F (refer to table)

Select channel	Parameter	Set fader value
BN, 63, CH,	[BN], 62, 17,	[BN], 06, LV

Get Fader Level

SysEx message

SysEx Header, 0N, 05, 0B, 17, CH, F7

The unit will then transmit the appropriate Fader Level message.

Channel Assignment to Main Mix ON

NRPN with parameter ID 18

ON value = 40 to 7F

Select channel	Parameter	Set ON
BN, 63, CH,	[BN], 62, 18,	[BN], 06, 7F

Channel Assignment to Main Mix OFF

NRPN with parameter ID 18

OFF value = 00 to 3F

Select channel	Parameter	Set OFF
BN, 63, CH,	[BN], 62, 18,	[BN], 06, 3F

Get Channel Assignment to Main Mix

SysEx message

SysEx Header, 0N, 05, 0B, 18, CH, F7

The unit will then transmit the appropriate Channel Assignment to Main Mix message.

AUX / FX / Matrix Send Level

SysEx message

Where SndN and SndCH are the MIDI channel and note number for the channel to be sent to.

Send value LV -inf to +10dB = 00 to 7F

Message:

Sysex Header, 0N, 0D, CH, SndN, SndCH, LV, F7

Get:

SysEx Header, 0N, 05, 0F, 0D, CH, SndN, SndCH, F7

Input to Group / Aux ON

SysEx message

Where SndN and SndCH are the MIDI channel and note number for the channel to be sent to.

V On value = 40 to 7F

Message:

Sysex Header, 0N, 0E, CH, SndN, SndCH, V, F7

Get:

SysEx Header, 0N, 05, 0F, 0E, CH, SndN, SndCH, F7

DCA Assignment ON

NRPN with parameter ID 40

ON value DB for DCA 1 to 24 = 40 to 57

Select channel	Parameter	Set ON
BN, 63, CH,	[BN], 62, 40,	[BN], 06, DB

DCA Assignment OFF

NRPN with parameter ID 40

OFF value DA for DCA 1 to 24 = 00 to 17

Select channel	Parameter	Set OFF
BN, 63, CH,	[BN], 62, 40,	[BN], 06, DA

Mute Group Assignment ON

NRPN with parameter ID 40

ON value DB for Mute Group 1 to 8 = 58 to 5F

Select channel	Parameter	Set ON
BN, 63, CH,	[BN], 62, 40,	[BN], 06, DB

Mute Group Assignment OFF

NRPN with parameter ID 40

OFF value DA for Mute Group 1 to 8 = 18 to 1F

Select channel	Parameter	Set OFF
BN, 63, CH,	[BN], 62, 40,	[BN], 06, DA

Socket Preamp numbers (refer to table)

Mixrack sockets 1-64 MP = 00 to 3F

Mixrack DX 1/2 1-32 MP = 40 to 5F

Mixrack DX 3/4 1-32 MP = 60 to 7F

Set Socket Preamp Gain

Pitchbend message
Gain value **GV** min to max = 00 to 7F (refer to table)
EN, MP, GV

Get Socket Preamp Gain

SysEx message
SysEx Header, 0N, 05, 0B, 19, CH, F7

The unit will then transmit the appropriate Socket Preamp Gain message.

Set Socket Preamp Pad

SysEx message
SysEx Header, 0N, 09, MP, Pad, F7 where **Pad** OFF= 00 to 3F, ON = 40 to 7F

Get Socket Preamp Pad

SysEx message
SysEx Header, 0N, 07, MP, F7

The unit will then transmit the following message:

Reply... **SysEx Header, 0N, 08, MP, Pad, F7** where **Pad** OFF= 00, ON = 7F

Set Socket Preamp 48V

SysEx message
SysEx Header, 0N, 0C, MP, 48V, F7 where **48V** OFF = 00 to 3F, ON = 40 to 7F

Get Socket Preamp 48V

SysEx Header, 0N, 0A, MP, F7
The unit will then transmit the following message:
SysEx Header, 0N, 0B, MP, 48V, F7 where **48V** OFF = 00, ON = 7F

Set Channel Name

SysEx message
SysEx Header, 0N, 03, CH, Name, F7 where **Name** = Hex ASCII String

Get Channel Name

SysEx message
SysEx Header, 0N, 01, CH, F7

The unit will then transmit the following message:

SysEx Header, 0N, 02, CH, Name, F7 where **Name** = Hex ASCII String

Set Channel Colour

SysEx message
SysEx Header, 0N, 06, CH, Col, F7 where **Col** = 00 to 07 (refer to table)

Get Channel Colour

SysEx Header, 0N, 04, CH, F7
The unit will then transmit the following message:
SysEx Header, 0N, 05, CH, Col, F7 where **Col** = 00 to 07 (refer to table)

Scene Recall (MixRack Only)

Bank and Program Change message
To recall one of the 500 Scenes (4 banks)
Also transmits this message when a Scene is recalled from the dLive screen

For Scene 1 to 128
Scene **SS** 1 to 128 = 00 to 7F (refer to table)

Select bank	Recall Scene
BN, 00, 00,	CN, SS

For Scene 129 to 256
Scene **SS** 129 to 256 = 00 to 7F (refer to table)

Select bank	Recall Scene
BN, 00, 01,	CN, SS

For Scene 257 to 384

Scene **SS** 257 to 384 = 00 to 7F (refer to table)

Select bank	Recall Scene
BN, 00, 02,	CN, SS

For Scene 385 to 500

Scene **SS** 385 to 500 = 00 to 73 (refer to table)

Select bank	Recall Scene
BN, 00, 03,	CN, SS

Cue List Recall (Surface Only)

Bank and **Program Change** message

To recall a cue using one of the 2000 user assignable Recall Ids (16 banks).

Also transmits this message when a cue is recalled from the dLive console.

The MIDI message required can also be viewed by selecting the Surface MIDI display option in the dLive Scene Manager.

For Recall Id 0 to 127 Recall Id **SS** 0 to 127 = 00 to 7F Bank Number **RR** = 00

For Recall Id 128 to 255 Recall Id **SS** 128 to 255 = 00 to 7F Bank Number **RR** = 01

For Recall Id 256 to 383 Recall Id **SS** 256 to 383 = 00 to 7F Bank Number **RR** = 02

For Recall Id 384 to 511 Recall Id **SS** 384 to 511 = 00 to 7F Bank Number **RR** = 03

For Recall Id 512 to 639 Recall Id **SS** 512 to 639 = 00 to 7F Bank Number **RR** = 04

For Recall Id 640 to 767 Recall Id **SS** 640 to 767 = 00 to 7F Bank Number **RR** = 05

For Recall Id 768 to 895 Recall Id **SS** 768 to 895 = 00 to 7F Bank Number **RR** = 06

For Recall Id 896 to 1023 Recall Id **SS** 896 to 1023 = 00 to 7F Bank Number **RR** = 07

For Recall Id 1024 to 1151 Recall Id **SS** 1024 to 1151 = 00 to 7F Bank Number **RR** = 08

For Recall Id 1152 to 1279 Recall Id **SS** 1152 to 1279 = 00 to 7F Bank Number **RR** = 09

For Recall Id 1280 to 1407 Recall Id **SS** 1280 to 1407 = 00 to 7F Bank Number **RR** = 0A

For Recall Id 1408 to 1535 Recall Id **SS** 1408 to 1535 = 00 to 7F Bank Number **RR** = 0B

For Recall Id 1536 to 1663 Recall Id **SS** 1536 to 1663 = 00 to 7F Bank Number **RR** = 0C

For Recall Id 1664 to 1791 Recall Id **SS** 1664 to 1791 = 00 to 7F Bank Number **RR** = 0D

For Recall Id 1792 to 1919 Recall Id **SS** 1792 to 1919 = 00 to 7F Bank Number **RR** = 0E

For Recall Id 1920 to 1999 Recall Id **SS** 1920 to 1999 = 00 to 4F Bank Number **RR** = 0F

MIDI Message

Select bank	Recall Cue
BN, 00, RR,	CN, SS

(refer to table)

Go / Next / Previous (Surface Only)

Control Change message with user defined Control Number and Value.

Go / Next / Previous Scene controls can be triggered by user defined CC messages setup in the dLive Utility \ Control \ MIDI page. Note that not all CC messages are available as some are reserved for use by other MIDI controls.

Control Change

BN, Number, Value

where **Number** is Control Number

Value is Control Value

Parametric EQ

NRPN with **parameter ID** between 1A and 29 depending on function and band (see table)

Select channel	Parameter	Set Value
BN, 63, CH,	[BN], 62, nn,	[BN], 06, vv

nn Parameter ID:

	Type	Frequency	Width	Gain
Band 0	1A	1B	1C	1D
Band 1	1E	1F	20	21
Band 2	22	23	24	25
Band 3	26	27	28	29

vv For Type

From table:

Type	Vv (dec)	Vv (hex)	Notes
Bell	0	00	Only use on bands 0 and 3
LF Shelf	1	01	Only use on band 0
HF Shelf	2	02	Only use on band 3
L Pass	3	03	Only use on band 3
H Pass	4	04	Only use on band 0

vv For Frequency

For frequencies between 20Hz and 20kHz

$Vv = INT(127*((4608*LOG10(FREQUENCY/4)/LOG10(2))-10699)/45922)$

eg.

Frequency	Vv (dec)	Vv (hex)
20Hz	0	00
50Hz	16	10
100Hz	29	1D
500Hz	59	3B

1kHz	71	47
10kHz	114	72
20kHz	127	7F

vv For Gain

For gains from -15dB to +15dB

$Vv = (GAIN + 15) * 126 / 30$

eg.

Gain	Vv (dec)	Vv (hex)
-15dB	0	00
-10dB	21	15
-5db	42	2A
0dB	63	3F
5db	84	54
10db	105	69
15db	126	7F

vv For Width

From table:

Width	Vv (dec)	Vv (hex)
1.5	0	00
1.4	1	01
1.3	2	02
1.2	3	03
1.1	4	04
1	5	05
0.95	6	06
0.9	7	07
0.85	8	08
0.8	9	09
3/4	10	0A

0.7	11	0B
2/3	12	0C
0.6	13	0D
0.55	14	0E
0.5	15	0F
0.45	16	10
0.4	17	11
1/3	18	12
0.3	19	13
1/4	20	14
0.2	21	15
1/6	22	16
0.13	23	17
1/9	24	18

Get Parametric EQ

SysEx message
SysEx Header, 0N, 05, 0B, nn, CH, F7

The unit will then transmit the appropriate Parametric EQ message.

HPF Frequency

NRPN with parameter ID 30

Select channel	Parameter	Set Value
BN, 63, CH,	[BN], 62, 30,	[BN], 06, vv

vv = INT(127*((4608 * LOG10(FREQUENCY / 4) / LOG10(2)) - 10699) / 41314)

Get HPF Frequency

SysEx message
SysEx Header, 0N, 05, 0B, 30, CH, F7

The unit will then transmit the appropriate HPF Frequency message.

Set HPF On/Off

NRPN with parameter ID 31

Select channel	Parameter	Set Value
BN, 63, CH,	[BN], 62, 31,	[BN], 06, HPF

where HPF OFF= 00 to 3F, ON = 40 to 7F

Get HPF On/Off

SysEx message
SysEx Header, 0N, 05, 0B, 31, CH, F7

The unit will then transmit the appropriate HPF On/Off message.

Set UFX Global Key

Control Change message with control number 0C

BN, 0C, Key	where Key = 00 to 0B (refer to table)
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Set UFX Global Scale

Control Change message with control number 0D

BN, 0D, Scale	where Scale = 00 to 01 (refer to table)
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UFX Unit MIDI Channel Numbers

M

Optionally, a MIDI channel **M** per UFX unit may be assigned to control UFX parameters, configured either in **Utility / Control / MIDI** or **FX / UFX / Show Routing / MIDI Settings**.

These MIDI channels must not be within the range of MIDI channels configured for controlling the rest of the dLive system (i.e., **N** through **N + 4**). Multiple UFX units may share the same MIDI channel **M**.

Parameters are controlled by an **CC** message as described below. The mapping between the control number and the UFX parameter is configured for individual UFX units in **FX / UFX / Show Routing / MIDI Settings**.

Set UFX Unit Parameter

CC message to UFX MIDI channel **M** and value **vv**, with control number **nn** configured by user.

Select channel	Parameter	Set Value
BM ,	nn ,	vv

Note that key and scale messages to local UFX unit are treated as UFX parameters. Thus, key and scale UFX **parameters** and **Global Key / Scale** do not share the same CC value. Instead, CC value is scaled to cover the full range of UFX parameters. Please refer to the examples below.

UFX Parameter "Key"	CC Value Start (dec)	CC Value End (dec)	CC Value Start (hex)	CC Value Start (hex)
C	0	10	00	0A
C#	11	21	0B	15
D	22	31	16	1F
D#	32	42	20	2A
E	43	52	2B	34
F	53	63	35	3F
F#	64	74	40	4A
G	75	84	4B	54
G#	85	95	55	5F
A	96	105	60	69
A#	106	116	6A	74
B	117	127	75	7F

UFX Parameter "Scale"	CC Value Start (dec)	CC Value End (dec)	CC Value Start (hex)	CC Value Start (hex)
Major	0	42	00	2A
Minor	43	84	2B	54
Chromatic	85	127	55	7F

MIDI Strips

Custom MIDI messages

Fader strips within the Banks can be assigned as MIDI Strips. There are 32 MIDI Strips available.

Each fader strip control can be assigned to transmit a custom MIDI message. This is used for controlling audio within a Digital Audio Workstation (DAW), a slave mixer, or parameters on external equipment such as effects devices. MIDI Strips can be named and coloured. They are stored within Scenes and can be made Safe from Scene recall.

The Template Shows load the following factory default messages for the MIDI Strip controls. These can be restored by recalling Scene 9 within the Template Show:

- FaderB1, 00, <VAR> to B1, 1F, <VAR>
 - Rotary GainB2, 00, <VAR> to B2, 1F, <VAR>
 - Rotary PanB2, 20, <VAR> to B2, 3F, <VAR>
 - Rotary Custom 1B2, 40, <VAR> to B2, 5F, <VAR>
 - Rotary Custom 2B2, 60, <VAR> to B2, 7F, <VAR>
 - Rotary Custom 3B2, 40, <VAR> to B2, 5F, <VAR>
 - Rotary Custom 4B2, 60, <VAR> to B2, 7F, <VAR>
 - Mute key =91, 00, <VAR> to 91, 1F, <VAR>
 - Mix key =91, 20, <VAR> to 91, 3F, <VAR>
 - PAFL key =91, 40, <VAR> to 91, 5F, <VAR>

Where <VAR> is the value determined by the position of the control.

- i** The **Sel** key is not included as this is required to select this Processing screen for configuring the MIDI Strip.

i By default, **Rotary Custom 3** uses the same values as **Rotary Custom 1** and **Rotary Custom 4** uses the same values as **Rotary Custom 2**

ALLEN&HEATH

dLive MIDI TCP/IP Reference Table - v2.0

Scene Number

SS Bank 1 Bank 2 Bank 3 Bank 4 Hex

1	129	257	385	00
2	130	258	386	01
3	131	259	387	02
4	132	260	388	03
5	133	261	389	04
6	134	262	390	05
7	135	263	391	06
8	136	264	392	07
9	137	265	393	08
10	138	266	394	09
11	139	267	395	0A
12	140	268	396	0B
13	141	269	397	0C
14	142	270	398	0D
15	143	271	399	0E
16	144	272	400	0F
17	145	273	401	10
18	146	274	402	11
19	147	275	403	12
20	148	276	404	13
21	149	277	405	14
22	150	278	406	15
23	151	279	407	16
24	152	280	408	17
25	153	281	409	18
26	154	282	410	19
27	155	283	411	1A
28	156	284	412	1B
29	157	285	413	1C
30	158	286	414	1D
31	159	287	415	1E
32	160	288	416	1F
33	161	289	417	20
34	162	290	418	21
35	163	291	419	22
36	164	292	420	23
37	165	293	421	24
38	166	294	422	25
39	167	295	423	26
40	168	296	424	27
41	169	297	425	28
42	170	298	426	29
43	171	299	427	2A
44	172	300	428	2B
45	173	301	429	2C
46	174	302	430	2D
47	175	303	431	2E
48	176	304	432	2F
49	177	305	433	30
50	178	306	434	31
51	179	307	435	32
52	180	308	436	33
53	181	309	437	34
54	182	310	438	35
55	183	311	439	36
56	184	312	440	37
57	185	313	441	38
58	186	314	442	39
59	187	315	443	3A
60	188	316	444	3B
61	189	317	445	3C
62	190	318	446	3D
63	191	319	447	3E
64	192	320	448	3F

Scene Number

SS Bank 1 Bank 2 Bank 3 Bank 4 Hex

65	193	321	449	40
66	194	322	450	41
67	195	323	451	42
68	196	324	452	43
69	197	325	453	44
70	198	326	454	45
71	199	327	455	46
72	200	328	456	47
73	201	329	457	48
74	202	330	458	49
75	203	331	459	4A
76	204	332	460	4B
77	205	333	461	4C
78	206	334	462	4D
79	207	335	463	4E
80	208	336	464	4F
81	209	337	465	50
82	210	338	466	51
83	211	339	467	52
84	212	340	468	53
85	213	341	469	54
86	214	342	470	55
87	215	343	471	56
88	216	344	472	57
89	217	345	473	58
90	218	346	474	59
91	219	347	475	5A
92	220	348	476	5B
93	221	349	477	5C
94	222	350	478	5D
95	223	351	479	5E
96	224	352	480	5F
97	225	353	481	60
98	226	354	482	61
99	227	355	483	62
100	228	356	484	63
101	229	357	485	64
102	230	358	486	65
103	231	359	487	66
104	232	360	488	67
105	233	361	489	68
106	234	362	490	69
107	235	363	491	6A
108	236	364	492	6B
109	237	365	493	6C
110	238	366	494	6D
111	239	367	495	6E
112	240	368	496	6F
113	241	369	497	70
114	242	370	498	71
115	243	371	499	72
116	244	372	500	73
117	245	373		74
118	246	374		75
119	247	375		76
120	248	376		77
121	249	377		78
122	250	378		79
123	251	379		7A
124	252	380		7B
125	253	381		7C
126	254	382		7D
127	255	383		7E
128	256	384		7F

Input Channel

CH Hex CH Hex

1	00	33	20
2	01	34	21
3	02	35	22
4	03	36	23
5	04	37	24
6	05	38	25
7	06	39	26
8	07	40	27
9	08	41	28
10	09	42	29
11	0A	43	2A
12	0B	44	2B
13	0C	45	2C
14	0D	46	2D
15	0E	47	2E
16	0F	48	2F
17	10	49	30
18	11	50	31
19	12	51	32
20	13	52	33
21	14	53	34
22	15	54	35
23	16	55	36
24	17	56	37
25	18	57	38
26	19	58	39
27	1A	59	3A
28	1B	60	3B
29	1C	61	3C
30	1D	62	3D
31	1E	63	3E
32	1F	64	3F

Mono Aux

CH Hex CH Hex

1	00	33	20
2	01	34	21
3	02	35	22
4	03	36	23
5	04	37	24
6	05	38	25
7	06	39	26
8	07	40	27
9	08	41	28
10	09	42	29
11	0A	43	2A
12	0B	44	2B
13	0C	45	2C
14	0D	46	2D
15	0E	47	2E
16	0F	48	2F
17	10	49	30
18	11	50	31
19	12	51	32
20	13	52	33
21	14	53	34
22	15	54	35
23	16	55	36
24	17	56	37
25	18	57	38
26	19	58	39
27	1A	59	3A
28	1B	60	3B
29	1C	61	3C
30	1D	62	3D
31	1E		
32	1F		

Input Channel

CH Hex CH Hex

65	40	97	60
66	41	98	61
67	42	99	62
68	43	100	63
69	44	101	64
70	45	102	65
71	46	103	66
72	47	104	67
73	48	105	68
74	49	106	69
75	4A	107	6A
76	4B	108	6B
77	4C	109	6C
78	4D	110	6D
79	4E	111	6E
80	4F	112	6F
81	50	113	70
82	51	114	71
83	52	115	72
84	53	116	73
85	54	117	74
86	55	118	75
87	56	119	76
88	57	120	77
89	58	121	78
90	59	122	79
91	5A	123	7A
92	5B	124	7B
93	5C	125	7C
94	5D	126	7D
95	5E	127	7E
96	5F	128	7F

Stereo Aux

CH Hex CH Hex

1	40
2	41
3	42
4	43
5	44
6	45
7	46
8	47
9	48
10	49
11	4A
12	4B
13	4C
14	4D
15	4E
16	4F
17	50
18	51
19	52
20	53
21	54
22	55
23	56
24	57
25	58
26	59
27	5A
28	5B
29	5C
30	5D
31	5E

Mono Group

CH Hex CH Hex

1	00	33	20
2	01	34	21
3	02	35	22
4	03	36	23
5	04	37	24
6	05	38	25
7	06	39	26
8	07	40	27
9	08	41	28
10	09	42	29
11	0A	43	2A
12	0B	44	2B
13	0C	45	2C
14	0D	46	2D
15	0E	47	2E
16	0F	48	2F
17	10	49	30
18	11	50	31
19	12	51	32
20	13	52	33
21	14	53	34
22	15	54	35
23	16	55	36
24	17	56	37
25	18	57	38
26	19	58	39
27	1A	59	3A
28	1B	60	3B
29	1C	61	3C
30	1D	62	3D
31	1E		
32	1F		

Mono Matrix

CH Hex CH Hex

1	00	33	20
2	01	34	21
3	02	35	22
4	03	36	23
5	04	37	24
6	05	38	25
7	06	39	26
8	07	40	27
9	08	41	28
10	09	42	29
11	0A	43	2A
12	0B	44	2B
13	0C	45	2C
14	0D	46	2D
15	0E	47	2E
16	0F	48	2F
17	10	49	30
18	11	50	31
19	12	51	32
20	13	52	33
21	14	53	34
22	15	54	35
23	16	55	36
24	17	56	37
25	18	57	38
26	19	58	39
27	1A	59	3A
28	1B	60	3B
29	1C	61	3C
30	1D	62	3D
31	1E		
32	1F		

Stereo Group

CH Hex CH Hex

1	40	CH	1
2	41	CH	2
3	42	CH	3
4	43	CH	4
5	44	CH	5
6	45	CH	6
7	46	CH	7
8	47	CH	8
9	48	CH	9
10	49	CH	10
11	4A	CH	11
12	4B	CH	12
13	4C	CH	13
14	4D	CH	14
15	4E	CH	15
16	4F	CH	16
17	50	CH	17
18	51	CH	18
19	52	CH	19
20	53	CH	20
21	54	CH	21
22	55	CH	22
23	56	CH	23
24	57	CH	24
25	58	CH	25
26	59	CH	26
27	5A	CH	27
28	5B	CH	28
29	5C	CH	29
30	5D	CH	30
31	5E	CH	31