ALLEN&HEATH

MIDI Protocol

Issue 2

SQ Firmware V1.5.0 or later

Contents

1. Introduction and setup

MIDI (**M**usical **I**nstrument **D**igital **I**nterface) is a standardised communication protocol that enables digital devices to communicate and allows one piece of equipment to control another.

The SQ sends and receives MIDI over USB (via the USB-B port) as well as over ethernet (using MIDI over TCP/IP via the network port).

These can be broken down into two sets of bi-directional messages. Those that are used with SQ mixing parameters (i.e. level control of SQ audio channels), and those used to control external software or equipment (i.e. to control a DAW).

1.1 Connection

When connected to a computer using the USB-B port, the SQ will appear as a MIDI input and output device. This can be used with software directly or through use of the DAW Control Driver for translation.

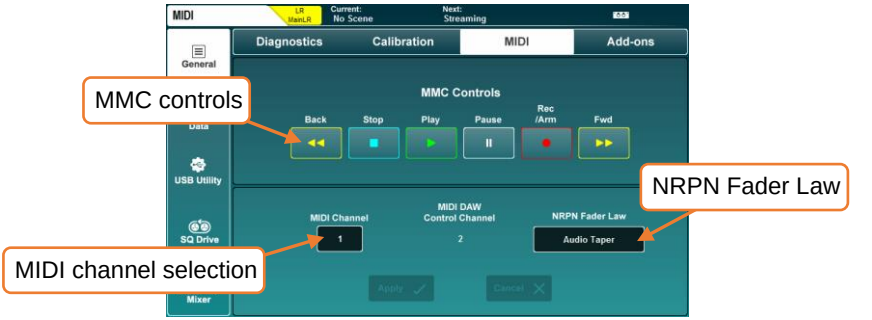
To connect a computer to the SQ over a network, the DAW Control Driver can be used.

All other clients used for network communication should be configured to send messages to the SQ's IP address and use port `51325`.

1.2 MIDI channels

There are 16 MIDI channels available, and the SQ makes use of 2 of these, one for mixer control and one for use with the DAW Control Driver.

Press the '**Utility**' screen key, then touch the '**General**' tab followed by the '**MIDI**' tab to view and adjust the MIDI channel setting. This screen also displays MMC (**M**IDI **M**achine **C**ontrol) buttons for control of computer sequencers and DAW's.



- Touch the '**MIDI Channel**' value and use the touchscreen rotary to adjust.
- Touch the '**Apply**' or '**Cancel**' buttons to apply or disregard changes.
- Touch the '**NRPN Fader Law**' value to switch NRPN level control (to and from the SQ core) between Linear Taper or Audio Taper.

The channel used by the Allen & Heath DAW Control Driver (and therefore all MIDI fader strips) is always one higher than the MIDI Channel the rest of the SQ is set to use. To use MIDI channel 1 for the DAW Control Channel, set the main SQ MIDI channel to 16.

The audio taper option allows the SQ level control to be used with external linear controls such as MIDI faders or pots and have them behave in the same way as SQ faders.

ⓘ See the 3.4 Levels section for more information on Fader Laws.

Touching any of the MMC Controls sends standard MMC transport messages to **all** channels. These are also used by the DAW control driver to send transport messages for the control surface emulation being used.

1.3 Types of message

MIDI messages can be presented in different ways in various hardware and software, including plain text, binary, decimal and hexadecimal.

As an example, here are four representations of the same message:

Plain text	`MIDI Channel 1, C-1, Note on`
Binary	`1001 0000 0000 0000 0111 1111`
Decimal	`144 0 127`
Hexadecimal	`0x90 0x00 0x7F`

This document uses the representations you are most likely to come across for each kind of message when communicating with the SQ.

Note On/Off – The SQ uses a note on followed by a note off for any key press.

MMC – **M**IDI **M**achine **C**ontrol is used to send transport control messages from the SQ.

ⓘ MMC messages are 'Real Time Universal System Exclusive' messages and are sent to all connected devices rather than being assigned to a single MIDI channel.

CC (**C**ontinuous **C**ontroller) – For each MIDI channel there are 128 continuous controllers, each of which can have a value between 0 and 127 (128 steps). These are used by MIDI strip faders, MIDI on Soft Rotaries and other parameters with more than just an on or off state.

NRPN (**N**on-**R**egistered **P**arameter **N**umber) – For high-resolution control (16384 steps) and access to many more parameters, NRPN messages are used to communicate with SQ to control levels, panning, mutes and assignments.

NRPN messages can be thought of as a specific string of CC messages, with MSB (**M**ost **S**ignificant **B**yte) and LSB (**L**east **S**ignificant **B**yte) representing a parameter number and data bytes representing parameter value.

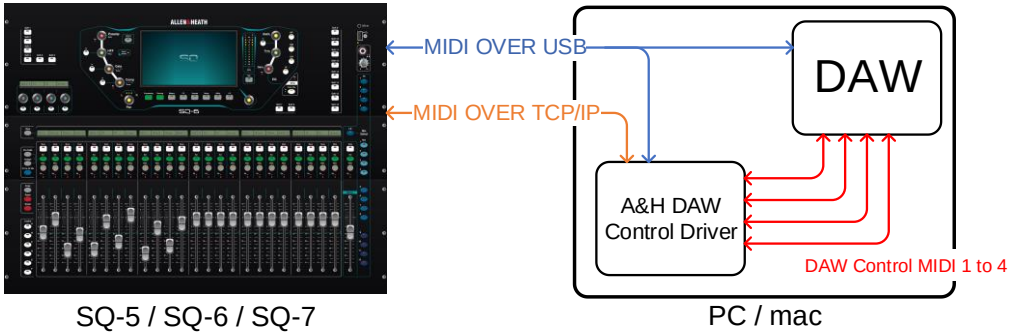
NRPNs can be used to set the absolute value of a parameter, or to increment or decrement a parameter.

These are displayed as hexadecimal values in this document and it should be noted that the '`0x`' prefix has been removed for brevity.

1.4 DAW Control Driver

The SQ has 32 MIDI fader strips and options for Soft Keys that enable it to be used as a control surface for all major Digital Audio Workstations through use of the DAW Control Driver.

The DAW Control Driver is a program that connects to the SQ via MIDI over USB or TCP/IP and creates virtual MIDI ports in the computer. It can then translate MIDI messages from the SQ into either HUI or MCU control surface messages for use with a DAW.



In addition to the translations, a '**MIDI Thru**' option is provided which allows MIDI messages to pass through unaffected. This is the easiest way to communicate with an SQ on a network by using MIDI over TCP/IP.

Visit the Allen & Heath website (www.allen-heath.com) to download the latest version of the DAW Control Driver and read the DAW Control Help document for information on setup and configuration.

2. MIDI Faders and Soft Controls

2.1 MIDI faders

The SQ has 32 freely assignable MIDI fader strips. Refer to the SQ Reference Guide for information on strip assignments.

Each strip sends and responds to the following messages sent on the 'MIDI DAW Control Channel':

MIDI Strip	Mute Key	Sel Key	PAFL Key	Fader
1	C-1 Note ON/OFF	G#1 Note ON/OFF	E4 Note ON/OFF	CC#0
2	C#-1 Note ON/OFF	A1 Note ON/OFF	F4 Note ON/OFF	CC#1
3	D-1 Note ON/OFF	A#1 Note ON/OFF	F#4 Note ON/OFF	CC#2
4	D#-1 Note ON/OFF	B1 Note ON/OFF	G4 Note ON/OFF	CC#3
5	E-1 Note ON/OFF	C2 Note ON/OFF	G#4 Note ON/OFF	CC#4
6	F-1 Note ON/OFF	C#2 Note ON/OFF	A4 Note ON/OFF	CC#5
7	F#-1 Note ON/OFF	D2 Note ON/OFF	A#4 Note ON/OFF	CC#6
8	G-1 Note ON/OFF	D#2 Note ON/OFF	B4 Note ON/OFF	CC#7
9	G#-1 Note ON/OFF	E2 Note ON/OFF	C5 Note ON/OFF	CC#8
10	A-1 Note ON/OFF	F2 Note ON/OFF	C#5 Note ON/OFF	CC#9
11	A#-1 Note ON/OFF	F#2 Note ON/OFF	D5 Note ON/OFF	CC#10
12	B-1 Note ON/OFF	G2 Note ON/OFF	D#5 Note ON/OFF	CC#11
13	C0 Note ON/OFF	G#2 Note ON/OFF	E5 Note ON/OFF	CC#12
14	C#0 Note ON/OFF	A2 Note ON/OFF	F5 Note ON/OFF	CC#13
15	D0 Note ON/OFF	A#2 Note ON/OFF	F#5 Note ON/OFF	CC#14
16	D#0 Note ON/OFF	B2 Note ON/OFF	G5 Note ON/OFF	CC#15
17	E0 Note ON/OFF	C3 Note ON/OFF	G#5 Note ON/OFF	CC#16
18	F0 Note ON/OFF	C#3 Note ON/OFF	A5 Note ON/OFF	CC#17
19	F#0 Note ON/OFF	D3 Note ON/OFF	A#5 Note ON/OFF	CC#18
20	G0 Note ON/OFF	D#3 Note ON/OFF	B5 Note ON/OFF	CC#19
21	G#0 Note ON/OFF	E3 Note ON/OFF	C6 Note ON/OFF	CC#20
22	A0 Note ON/OFF	F3 Note ON/OFF	C#6 Note ON/OFF	CC#21
23	A#0 Note ON/OFF	F#3 Note ON/OFF	D6 Note ON/OFF	CC#22
24	B0 Note ON/OFF	G3 Note ON/OFF	D#6 Note ON/OFF	CC#23
25	C1 Note ON/OFF	G#3 Note ON/OFF	E6 Note ON/OFF	CC#24
26	C#1 Note ON/OFF	A3 Note ON/OFF	F6 Note ON/OFF	CC#25
27	D1 Note ON/OFF	A#3 Note ON/OFF	F#6 Note ON/OFF	CC#26
28	D#1 Note ON/OFF	B3 Note ON/OFF	G6 Note ON/OFF	CC#27
29	E1 Note ON/OFF	C4 Note ON/OFF	G#6 Note ON/OFF	CC#28
30	F1 Note ON/OFF	C#4 Note ON/OFF	A6 Note ON/OFF	CC#29
31	F#1 Note ON/OFF	D4 Note ON/OFF	A#6 Note ON/OFF	CC#30
32	G1 Note ON/OFF	D#4 Note ON/OFF	B6 Note ON/OFF	CC#31

2.2 Soft Keys and Footswitch

The SQ-5 features 8 assignable Soft Keys, while the SQ-6 and SQ-7 both feature 16 assignable Soft Keys and all SQ models feature a dual footswitch input. Any of these can be assigned the following MIDI functions:

Function	Option 1	Option 2
MMC	-	Rewind, Play, Pause, Stop, FFwd, Record
DAW Control	-	Bank Up, Bank Down
MIDI note On/Off	MIDI Channel 1 to 16	C-1 (0) to G9 (127)
Program Change	MIDI Channel 1 to 16	0 to 127

ⓘ Refer to the SQ Reference Guide for information on assigning Soft Key and footswitch functions.

2.3 Soft Rotaries

The SQ-6 and SQ-7 feature 4 and 8 Soft Rotaries respectively, with options for these to send the following messages:

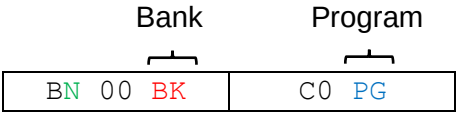
Function	Option 1	Option 2	Key Option
MIDI Absolute	MIDI Channel 1 to 16	CC# 0 to 127	Unassigned, Note On/Off C-1 (0) to G9 (127)
MIDI Relative	MIDI Channel 1 to 16	CC# 0 to 127	Unassigned, Note On/Off C-1 (0) to G9 (127)
Program Change	MIDI Channel 1 to 16	0 to 127	Sends MIDI

ⓘ Refer to the SQ Reference Guide for information on assigning Soft Rotary functions.

3. Control to and from the Mixer

3.1 Scene change

A scene change uses a bank change followed by a program change.



Where: N= MIDI Channel, BK = Bank, PG = Program

The bank change (BK) selects between three ranges of scenes:

Scenes 1 to 128 = Bank 1 = 00
Scenes 129 to 256 = Bank 2 = 01
Scenes 257 to 300 = Bank 3 = 02

The program change (PG) is then a value between 00 and 7F (decimal 0-127), which selects a scene in that range.

ⓘ Note that there is an offset of -1 between the SQ values and the MIDI values due to the SQ counting from 1 to 128 and MIDI counting from 0 to 127.

So scene 96 is bank change 00 (1) and program change 5F (95) and scene 264 is bank change 02 (3) and program change 07 (8).

The scene being recalled must exist as a saved scene in the SQ, blank scenes cannot be recalled.

Examples:

Scene, MIDI Ch	Message
Scene 7, Ch1	B0 00 00 C0 06
Scene 120, Ch1	B0 00 00 C0 77
Scene 156, Ch1	B0 00 01 C0 1B
Scene 156, Ch3	B2 00 01 C0 1B

3.2 Soft Keys

The SQ Soft Keys can be controlled using standard MIDI Note On/Off messages, allowing the control of many more internal functions of the SQ by proxy.

ⓘ The SQ does not send note on/off messages when a Soft Key is pressed unless the Soft Key is set to a MIDI note on/off function. See the Soft Keys and Footswitch section for more details.

A key press is triggered with note on and a release is triggered separately with a note off, this means it is possible to replicate a held key (i.e. for use with the talkback function).

Each Soft Key is controlled with a different sequential note starting at C3 (30).

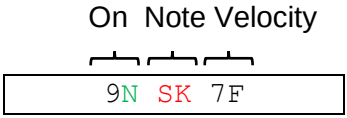
SoftKey	Note	HEX
1	C3	30
2	C#3	31
3	D3	32
4	D#3	33

SoftKey	Note	HEX
5	E3	34
6	F3	35
7	F#3	36
8	G3	37

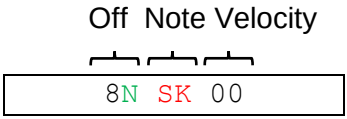
SoftKey	Note	HEX
9	G#3	38
10	A3	39
11	A#3	3A
12	B3	3B

SoftKey	Note	HEX
13	C4	3C
14	C#4	3D
15	D4	3E
16	D#4	3F

Note On (Soft Key press)



Note Off (Soft Key release)



Both where: N= MIDI Channel, SK = Soft Key Note

ⓘ The SQ will respond to both MIDI note off standards, i.e. a specific note off message or a note on message with zero velocity.

Examples:

Soft Key, MIDI Ch	Message (Press)	Message (Release)
Soft Key #1, Ch1	90 30 7F	80 30 00
Soft Key #7, Ch5	94 36 7F	84 36 00

3.3 Mutes

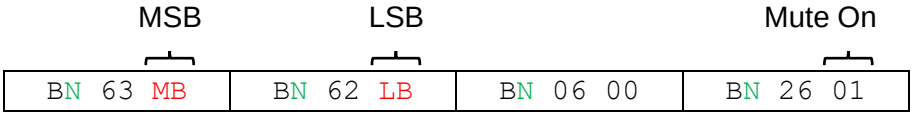
The SQ sends and receives absolute On or Off mute messages. It will also toggle the mute state when either an increment or decrement message is received.

MSB and LSB are a parameter number for the channel you wish to mute or unmute.

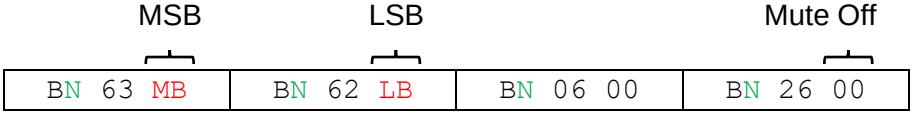
ⓘ MSB/LSB parameter numbers are shown in the reference tables section.

The last byte of the full message then represents a mute on or off.

Mute On



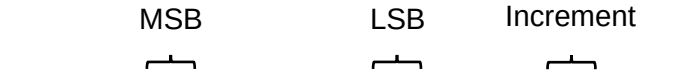
Mute Off



Both where: N= MIDI Channel, MB/LB = MSB/LSB Parameter number

When either a data increment or decrement message is received, the SQ will toggle between states, in the same way as pressing a mute key on the SQ does.

Mute Toggle (increment)



Where: N= MIDI Channel, MB/LB = MSB/LSB Parameter number

Examples:

Channel, Cmnd, MIDI Ch	Message
Ip1, Mute On, Ch1	B0 63 00 B0 62 00 B0 06 00 B0 26 01
LR mix, Mute Off, Ch1	B0 63 00 B0 62 44 B0 06 00 B0 26 00
Mute Grp 4, Mute On, Ch7	B6 63 04 B6 62 03 B6 06 00 B6 26 01
Ip1, Mute Toggle, Ch1	B0 63 00 B0 62 00 B0 60 00

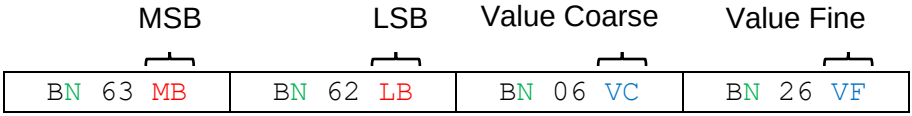
3.4 Levels

Levels can be set using either absolute values or in relative 1dB increments/decrements.

MSB and LSB are a parameter number showing where the signal is being sent from and where it is being sent to.

ⓘ MSB/LSB parameter numbers are shown in the reference tables.

An absolute level is represented with a combination of course and fine values.



Where: N= MIDI Channel, MB/LB = MSB/LSB Parameter number, VC/VF = Value

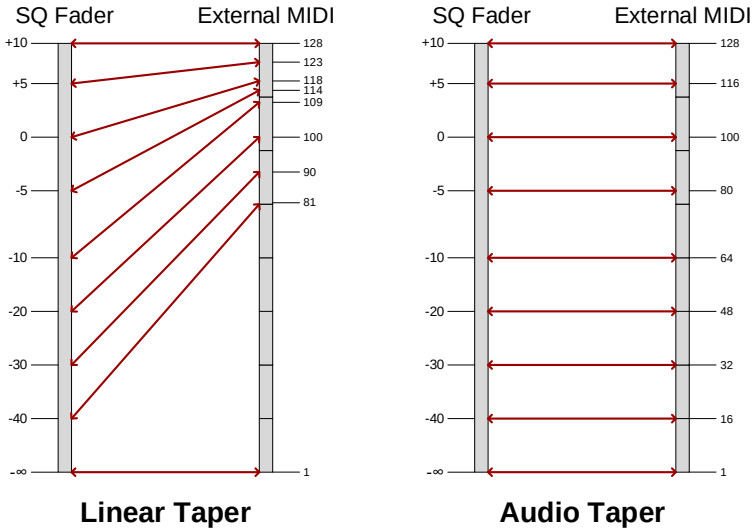
NRPN Fader Law

The way the SQ responds to and sends level messages can be switched between two modes.

Press the '**Utility**' screen key, then touch the '**General**' tab followed by the '**MIDI**' tab to view and adjust this setting.

The standard mode is a high-resolution Linear Taper, with 16384 possible values.

Audio taper has a lower resolution, with 255 possible values, but allows mapped external linear controls (e.g. MIDI faders or pots) to work in a similar way to the SQ faders, with more control about the unity gain (0dB) position.



ⓘ See ‘Example Linear Taper Level Values’ and ‘Approximate Audio Taper Level Values’ in the reference tables.

Standard (Linear) Examples:

Address, Value, MIDI Ch	Message
Ip1 to LR, 0dB, Ch1	B0 63 40 B0 62 00 B0 06 76 B0 26 5C
Ip1 to LR, -20dB, Ch1	B0 63 40 B0 62 00 B0 06 63 B0 26 49
Ip40 to LR, -20dB, Ch1	B0 63 40 B0 62 27 B0 06 63 B0 26 49
Ip40 to Aux5, -20dB, Ch1	B0 63 44 B0 62 1C B0 06 63 B0 26 49
Ip40 to Aux5, -12dB, Ch4	B3 63 44 B3 62 1C B3 06 6B B3 26 06
Grp4 to Aux8, -24dB, Ch4	B3 63 45 B3 62 2F B3 06 5F B3 26 57
Ip36 to FX3, -12dB, Ch14	BD 63 4D BD 62 22 BD 06 6B BD 26 06

Audio Taper Examples:

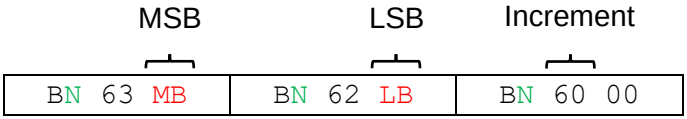
Address, Value, MIDI Ch	Message
Ip1 to LR, 0dB, Ch1	B0 63 40 B0 62 00 B0 06 62 B0 26 00
Ip1 to LR, -20dB, Ch1	B0 63 40 B0 62 00 B0 06 2E B0 26 40
Ip40 to LR, -20dB, Ch1	B0 63 40 B0 62 27 B0 06 2E B0 26 40
Ip40 to Aux5, -20dB, Ch1	B0 63 44 B0 62 1C B0 06 2E B0 26 40
Ip40 to Aux5, -12dB, Ch4	B3 63 44 B3 62 1C B3 06 3B B3 26 00
Grp4 to Aux8, -24dB, Ch4	B3 63 45 B3 62 2F B3 06 28 B3 26 40
Ip36 to FX3, -12dB, Ch14	BD 63 4D BD 62 22 BD 06 3B BD 26 00

A relative level message uses the same parameter number, but with an increment or decrement byte.

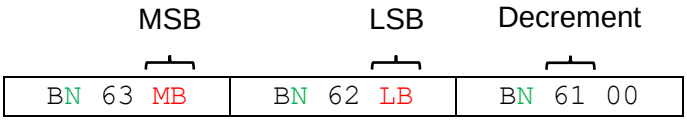
This raises or lowers a level in 1dB steps.

ⓘ The NRPN Fader Law setting has no effect on relative control.

+1dB (increment)



-1dB (decrement)



Both where: N= MIDI Channel, MB/LB = MSB/LSB Parameter number

Examples:

Address, Inc/Dec, MIDI Ch	Message
Ip1 to LR, Increment, Ch1	B0 63 40 B0 62 00 B0 60 00
Grp5 to LR, Decrement, Ch5	B4 63 40 B4 62 34 B4 61 00
FX2Rtn to Aux3, Increment, Ch12	BB 63 46 BB 62 22 BB 60 00

3.5 Panning/Balance

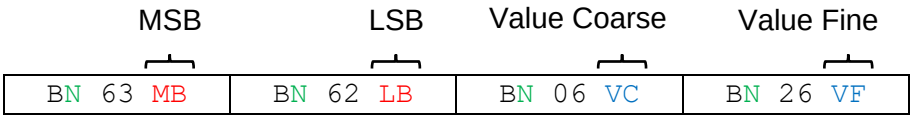
Panning (mono sources) or balance (stereo sources) can be set using either absolute values or in relative increments/decrements.

MSB and LSB represent a parameter number showing where the signal is being sent from and where it is being sent to.

ⓘ MSB/LSB parameter numbers are shown in the reference tables.

Absolute values are set with a combination of coarse and fine values. Ranging from `00 00` (full left) to `7F 7F` (full right), with centre being `3F 7F`.

ⓘ See 'Example Pan/Balance Values' in the reference tables.



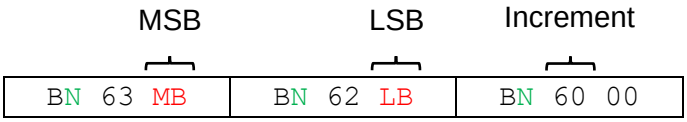
Where: `N`= MIDI Channel, `MB/LB` = MSB/LSB Parameter number, `VC/VF` = Value

Examples:

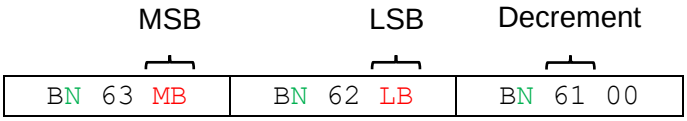
Address, Value, MIDI Ch	Message
Ip1 to LR, L100%%, Ch1	`B0 63 50 B0 62 00 B0 06 00 B0 26 00`
Ip1 to LR, CTR, Ch1	`B0 63 50 B0 62 00 B0 06 3F B0 26 7F`
Ip24 to LR, R20%, Ch1	`B0 63 50 B0 62 17 B0 06 4C B0 26 65`
Ip24 to Aux5, R20%, Ch1	`B0 63 52 B0 62 5C B0 06 4C B0 26 65`
Ip24 to Aux5, L50%, Ch4	`B3 63 52 B3 62 5C B3 06 1F B3 26 7F`
Grp3 to Aux2, L50%, Ch4	`B3 63 55 B3 62 1D B3 06 1F B3 26 7F`
LR to Mtx3, R100%, Ch11	`BA 63 5E BA 62 26 BA 06 7F BA 26 7F`

A relative pan/balance message uses the same parameter number, but with an increment or decrement byte. Incrementing moves to the right and decrementing moves to the left.

Right one step (increment)



Left one step (decrement)



Both where: N= MIDI Channel, MB/LB = MSB/LSB Parameter number

Examples:

Address, Left/Right, MIDI Ch	Message
Ip1 to LR, Right, Ch1	B0 63 50 B0 62 00 B0 60 00
Ip1 to LR, Left, Ch1	B0 63 50 B0 62 00 B0 61 00
Ip37 to Aux8, Right, Ch1	B0 63 53 B0 62 7B B0 60 00
Aux5 to Mtx1, Right, Ch3	B2 63 5E B2 62 33 B2 60 00

3.6 Mix Assignments

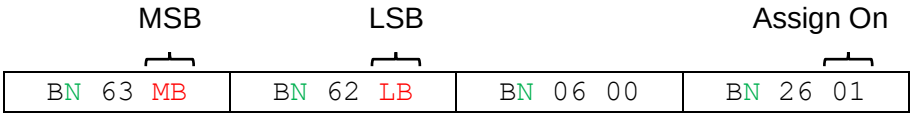
The SQ sends and receives absolute On or Off assign messages. It will also toggle the assign state when either an increment or decrement message is received.

MSB and LSB represent a parameter number showing where the signal is being sent from and where it is being sent to.

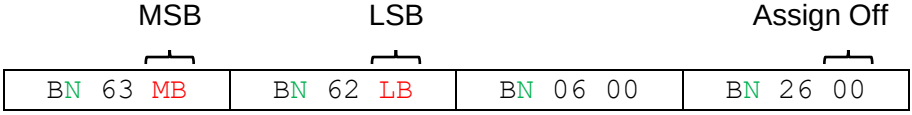
ⓘ MSB/LSB parameter numbers are shown in the reference tables section.

The last byte of the full message then represents assignment on or off.

Assign On



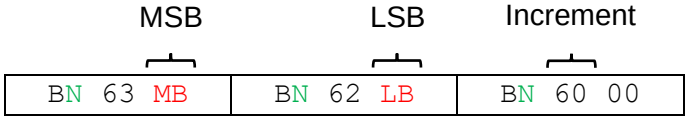
Assign Off



Both where: N= MIDI Channel, MB/LB = MSB/LSB Parameter number

When either a data increment or decrement message is received, the SQ will toggle between assign states, in the same way as holding the Assign key and pressing a Sel key on the SQ does.

Assign Toggle (increment)



Where: N= MIDI Channel, MB/LB = MSB/LSB Parameter number

Examples:

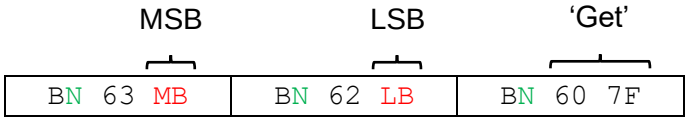
Channel, Cmnd, MIDI Ch	Message
Ip1 to LR, On, Ch1	B0 63 60 B0 62 00 B0 06 00 B0 26 01
Ip1 to LR, Off, Ch1	B0 63 60 B0 62 00 B0 06 00 B0 26 00
FX1Rtn to Aux 7, On, Ch1	B0 63 66 B0 62 1A B0 06 00 B0 26 01
Grp1 to Aux3, Off, Ch2	B1 63 65 B1 62 06 B1 06 00 B1 26 00
Grp2 to Mtx2, Toggle, Ch4	B3 63 6E B3 62 4F B3 60 00

3.7 Getting values

A ‘get’ command can be sent to the SQ in order to return the current value of any mute, level, pan/balance or assignment parameter listed in this document.

MSB and LSB represent the parameter number of the value being requested, followed by a data increment with value `7F` (i.e. the same as a standard increment message but with a value of `7F` instead of `00`).

ⓘ All MSB/LSB parameter numbers are shown in the reference tables, be sure to use the correct parameter number for either mute, level, panning/balance or assignments.



Where: `N`= MIDI Channel, `MB/LB` = MSB/LSB Parameter number

Examples:

Parameter Requested, MIDI Ch	Message
LR Mute, Ch1	B0 63 06 B0 62 00 B0 60 7F
Ip1 to LR Level, Ch1	B0 63 40 B0 62 00 B0 60 7F
Ip30 to Aux5 Pan, Ch1	B0 63 53 B0 62 24 B0 60 7F
Aux7 to Mtx1 Balance, Ch5	B4 63 5E B4 62 39 B4 60 7F
FX2Rtn to FX3Snd Assign, Ch12	BB 63 6E BB 62 0A BB 60 7F

4. Reference Tables

MIDI channels 1 to 16 (N)

Channel	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Hex	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

SQ Value to Note to Hexadecimal (PG and other values from 1-128)

VAL	HEX	Note
1	00	C-1
2	01	C#-1
3	02	D-1
4	03	D#-1
5	04	E-1
6	05	F-1
7	06	F#-1
8	07	G-1
9	08	G#-1
10	09	A-1
11	0A	A#-1
12	0B	B-1
13	0C	C0
14	0D	C#0
15	0E	D0
16	0F	D#0
17	10	E0
18	11	F0
19	12	F#0
20	13	G0
21	14	G#0
22	15	A0
23	16	A#0
24	17	B0
25	18	C1
26	19	C#1
27	1A	D1
28	1B	D#1
29	1C	E1
30	1D	F1
31	1E	F#1
32	1F	G1

VAL	HEX	Note
33	20	G#1
34	21	A1
35	22	A#1
36	23	B1
37	24	C2
38	25	C#2
39	26	D2
40	27	D#2
41	28	E2
42	29	F2
43	2A	F#2
44	2B	G2
45	2C	G#2
46	2D	A2
47	2E	A#2
48	2F	B2
49	30	C3
50	31	C#3
51	32	D3
52	33	D#3
53	34	E3
54	35	F3
55	36	F#3
56	37	G3
57	38	G#3
58	39	A3
59	3A	A#3
60	3B	B3
61	3C	C4
62	3D	C#4
63	3E	D4
64	3F	D#4

VAL	HEX	Note
65	40	E4
66	41	F4
67	42	F#4
68	43	G4
69	44	G#4
70	45	A4
71	46	A#4
72	47	B4
73	48	C5
74	49	C#5
75	4A	D5
76	4B	D#5
77	4C	E5
78	4D	F5
79	4E	F#5
80	4F	G5
81	50	G#5
82	51	A5
83	52	A#5
84	53	B5
85	54	C6
86	55	C#6
87	56	D6
88	57	D#6
89	58	E6
90	59	F6
91	5A	F#6
92	5B	G6
93	5C	G#6
94	5D	A6
95	5E	A#6
96	5F	B6

VAL	HEX	Note
97	60	C7
98	61	C#7
99	62	D7
100	63	D#7
101	64	E7
102	65	F7
103	66	F#7
104	67	G7
105	68	G#7
106	69	A7
107	6A	A#7
108	6B	B7
109	6C	C8
110	6D	C#8
111	6E	D8
112	6F	D#8
113	70	E8
114	71	F8
115	72	F#8
116	73	G8
117	74	G#8
118	75	A8
119	76	A#8
120	77	B8
121	78	C9
122	79	C#9
123	7A	D9
124	7B	D#9
125	7C	E9
126	7D	F9
127	7E	F#9
128	7F	G9

Soft Key Notes and Hexadecimal Values (SK)

SoftKey	Note	HEX
1	C3	30
2	C#3	31
3	D3	32
4	D#3	33

SoftKey	Note	HEX
5	E3	34
6	F3	35
7	F#3	36
8	G3	37

SoftKey	Note	HEX
9	G#3	38
10	A3	39
11	A#3	3A
12	B3	3B

SoftKey	Note	HEX
13	C4	3C
14	C#4	3D
15	D4	3E
16	D#4	3F

Example Linear Taper Level Values (VC/VF)

dB	VC	VF
-inf	00	00
-89	24	16
-85	27	71
-80	2C	42
-75	31	14
-70	35	65
-65	3A	37
-60	3F	09
-55	43	5A
-50	48	2C

dB	VC	VF
-45	4C	7D
-40	51	4F
-38	53	3C
-36	55	2A
-35	56	21
-34	57	17
-33	58	0E
-32	59	05
-31	59	7C
-30	5A	72

dB	VC	VF
-29	5B	69
-28	5C	60
-27	5D	56
-26	5E	4D
-25	5F	44
-24	60	3B
-23	61	31
-22	62	28
-21	63	1F
-20	64	16

dB	VC	VF
-19	65	0C
-18	66	03
-17	66	7A
-16	67	70
-15	68	67
-14	69	5E
-13	6A	55
-12	6B	4B
-11	6C	42
-10	6D	39

dB	VC	VF
-9	6E	2F
-8	6F	26
-7	70	1D
-6	71	14
-5	72	0A
-4	73	01
-3	73	78
-2	74	6F
-1	75	65
0	76	5C

dB	VC	VF
+1	77	53
+2	78	49
+3	79	40
+4	7A	37
+5	7B	2E
+6	7C	24
+7	7D	1B
+8	7E	12
+9	7F	08
+10	7F	7F

Approximate Audio Taper Level Values (VC/VF)

dB	VC	VF
-inf	00	00
-89	01	40
-85	02	00
-80	02	40
-75	03	40
-70	04	00
-65	05	00
-60	06	00
-55	07	00
-50	08	00

dB	VC	VF
-45	0C	00
-40	0F	40
-38	12	40
-36	15	40
-35	17	00
-34	19	00
-33	1A	40
-32	1C	00
-31	1D	40
-30	1F	00

dB	VC	VF
-29	20	40
-28	22	00
-27	23	40
-26	25	00
-25	26	40
-24	28	40
-23	2A	00
-22	2B	40
-21	2D	00
-20	2E	40

dB	VC	VF
-19	30	00
-18	31	40
-17	33	00
-16	34	40
-15	36	00
-14	38	00
-13	39	40
-12	3B	00
-11	3C	40
-10	3E	00

dB	VC	VF
-9	41	40
-8	44	40
-7	48	00
-6	4B	00
-5	4E	40
-4	52	40
-3	56	40
-2	5A	00
-1	5E	00
0	62	00

dB	VC	VF
+1	65	40
+2	69	00
+3	6C	40
+4	70	00
+5	73	40
+6	75	40
+7	78	00
+8	7A	40
+9	7D	00
+10	7F	40

Example Pan/Balance Values (VC/VF)

L/R	VC	VF
L100%	00	00
L90%	06	33
L80%	0C	66
L70%	13	19
L60%	19	4C

L/R	VC	VF
L50%	1F	7F
L40%	26	32
L30%	2C	65
L20%	33	18
L15%	36	32

L/R	VC	VF
L10%	39	4B
L5%	3C	65
CTR	3F	7F
R5%	43	18
R10%	46	32

L/R	VC	VF
R15%	49	4B
R20%	4C	65
R30%	53	18
R40%	59	4B
R50%	5F	7F

L/R	VC	VF
R60%	66	32
R70%	6C	65
R80%	73	18
R90%	79	4B
R100%	7F	7F

In the following tables, the source is shown on the left and the destination is shown at the top.

Each parameter number includes one MSB (MB) and one LSB (LB).

Mute Parameter Numbers – Inputs to LR/Aux (MB/LB)

	MUTE	
	MSB	LSB
Ip1	00	00
Ip2	00	01
Ip3	00	02
Ip4	00	03
Ip5	00	04
Ip6	00	05
Ip7	00	06
Ip8	00	07
Ip9	00	08
Ip10	00	09
Ip11	00	0A
Ip12	00	0B
Ip13	00	0C
Ip14	00	0D
Ip15	00	0E
Ip16	00	0F
Ip17	00	10
Ip18	00	11
Ip19	00	12
Ip20	00	13
Ip21	00	14
Ip22	00	15
Ip23	00	16
Ip24	00	17

	MUTE	
	MSB	LSB
Ip25	00	18
Ip26	00	19
Ip27	00	1A
Ip28	00	1B
Ip29	00	1C
Ip30	00	1D
Ip31	00	1E
Ip32	00	1F
Ip33	00	20
Ip34	00	21
Ip35	00	22
Ip36	00	23
Ip37	00	24
Ip38	00	25
Ip39	00	26
Ip40	00	27
Ip41	00	28
Ip42	00	29
Ip43	00	2A
Ip44	00	2B
Ip45	00	2C
Ip46	00	2D
Ip47	00	2E
Ip48	00	2F

	MUTE	
	MSB	LSB
Grp1	00	30
Grp2	00	31
Grp3	00	32
Grp4	00	33
Grp5	00	34
Grp6	00	35
Grp7	00	36
Grp8	00	37
Grp9	00	38
Grp10	00	39
Grp11	00	3A
Grp12	00	3B

	MUTE	
	MSB	LSB
FX1Rtn	00	3C
FX2Rtn	00	3D
FX3Rtn	00	3E
FX4Rtn	00	3F
FX5Rtn	00	40
FX6Rtn	00	41
FX7Rtn	00	42
FX8Rtn	00	43

	MUTE	
	MSB	LSB
LR	00	44
Aux1	00	45
Aux2	00	46
Aux3	00	47
Aux4	00	48
Aux5	00	49
Aux6	00	4A
Aux7	00	4B
Aux8	00	4C
Aux9	00	4D
Aux10	00	4E
Aux11	00	4F
Aux12	00	50

	MUTE	
	MSB	LSB
FX1Snd	00	51
FX2Snd	00	52
FX3Snd	00	53
FX4Snd	00	54

	MUTE	
	MSB	LSB
Mtx1	00	55
Mtx1	00	56
Mtx1	00	57

	MUTE	
	MSB	LSB
DCA1	02	00
DCA2	02	01
DCA3	02	02
DCA4	02	03
DCA5	02	04
DCA6	02	05
DCA7	02	06
DCA8	02	07

	MUTE	
	MSB	LSB
MGRP1	04	00
MGRP2	04	01
MGRP3	04	02
MGRP4	04	03
MGRP5	04	04
MGRP6	04	05
MGRP7	04	06
MGRP8	04	07

Level Parameter Numbers – Inputs to LR (+Groups) and Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Ip1	40	00	40	44	40	45	40	46	40	47	40	48	40	49	40	4A	40	4B	40	4C	40	4D	40	4E	40	4F
Ip2	40	01	40	50	40	51	40	52	40	53	40	54	40	55	40	56	40	57	40	58	40	59	40	5A	40	5B
Ip3	40	02	40	5C	40	5D	40	5E	40	5F	40	60	40	61	40	62	40	63	40	64	40	65	40	66	40	67
Ip4	40	03	40	68	40	69	40	6A	40	6B	40	6C	40	6D	40	6E	40	6F	40	70	40	71	40	72	40	73
Ip5	40	04	40	74	40	75	40	76	40	77	40	78	40	79	40	7A	40	7B	40	7C	40	7D	40	7E	40	7F
Ip6	40	05	41	00	41	01	41	02	41	03	41	04	41	05	41	06	41	07	41	08	41	09	41	0A	41	0B
Ip7	40	06	41	0C	41	0D	41	0E	41	0F	41	10	41	11	41	12	41	13	41	14	41	15	41	16	41	17
Ip8	40	07	41	18	41	19	41	1A	41	1B	41	1C	41	1D	41	1E	41	1F	41	20	41	21	41	22	41	23
Ip9	40	08	41	24	41	25	41	26	41	27	41	28	41	29	41	2A	41	2B	41	2C	41	2D	41	2E	41	2F
Ip10	40	09	41	30	41	31	41	32	41	33	41	34	41	35	41	36	41	37	41	38	41	39	41	3A	41	3B
Ip11	40	0A	41	3C	41	3D	41	3E	41	3F	41	40	41	41	41	42	41	43	41	44	41	45	41	46	41	47
Ip12	40	0B	41	48	41	49	41	4A	41	4B	41	4C	41	4D	41	4E	41	4F	41	50	41	51	41	52	41	53
Ip13	40	0C	41	54	41	55	41	56	41	57	41	58	41	59	41	5A	41	5B	41	5C	41	5D	41	5E	41	5F
Ip14	40	0D	41	60	41	61	41	62	41	63	41	64	41	65	41	66	41	67	41	68	41	69	41	6A	41	6B
Ip15	40	0E	41	6C	41	6D	41	6E	41	6F	41	70	41	71	41	72	41	73	41	74	41	75	41	76	41	77
Ip16	40	0F	41	78	41	79	41	7A	41	7B	41	7C	41	7D	41	7E	41	7F	42	00	42	01	42	02	42	03
Ip17	40	10	42	04	42	05	42	06	42	07	42	08	42	09	42	0A	42	0B	42	0C	42	0D	42	0E	42	0F
Ip18	40	11	42	10	42	11	42	12	42	13	42	14	42	15	42	16	42	17	42	18	42	19	42	1A	42	1B
Ip19	40	12	42	1C	42	1D	42	1E	42	1F	42	20	42	21	42	22	42	23	42	24	42	25	42	26	42	27
Ip20	40	13	42	28	42	29	42	2A	42	2B	42	2C	42	2D	42	2E	42	2F	42	30	42	31	42	32	42	33
Ip21	40	14	42	34	42	35	42	36	42	37	42	38	42	39	42	3A	42	3B	42	3C	42	3D	42	3E	42	3F
Ip22	40	15	42	40	42	41	42	42	42	43	42	44	42	45	42	46	42	47	42	48	42	49	42	4A	42	4B
Ip23	40	16	42	4C	42	4D	42	4E	42	4F	42	50	42	51	42	52	42	53	42	54	42	55	42	56	42	57
Ip24	40	17	42	58	42	59	42	5A	42	5B	42	5C	42	5D	42	5E	42	5F	42	60	42	61	42	62	42	63
Ip25	40	18	42	64	42	65	42	66	42	67	42	68	42	69	42	6A	42	6B	42	6C	42	6D	42	6E	42	6F
Ip26	40	19	42	70	42	71	42	72	42	73	42	74	42	75	42	76	42	77	42	78	42	79	42	7A	42	7B
Ip27	40	1A	42	7C	42	7D	42	7E	42	7F	43	00	43	01	43	02	43	03	43	04	43	05	43	06	43	07
Ip28	40	1B	43	08	43	09	43	0A	43	0B	43	0C	43	0D	43	0E	43	0F	43	10	43	11	43	12	43	13
Ip29	40	1C	43	14	43	15	43	16	43	17	43	18	43	19	43	1A	43	1B	43	1C	43	1D	43	1E	43	1F
Ip30	40	1D	43	20	43	21	43	22	43	23	43	24	43	25	43	26	43	27	43	28	43	29	43	2A	43	2B
Ip31	40	1E	43	2C	43	2D	43	2E	43	2F	43	30	43	31	43	32	43	33	43	34	43	35	43	36	43	37
Ip32	40	1F	43	38	43	39	43	3A	43	3B	43	3C	43	3D	43	3E	43	3F	43	40	43	41	43	42	43	43
Ip33	40	20	43	44	43	45	43	46	43	47	43	48	43	49	43	4A	43	4B	43	4C	43	4D	43	4E	43	4F
Ip34	40	21	43	50	43	51	43	52	43	53	43	54	43	55	43	56	43	57	43	58	43	59	43	5A	43	5B
Ip35	40	22	43	5C	43	5D	43	5E	43	5F	43	60	43	61	43	62	43	63	43	64	43	65	43	66	43	67
Ip36	40	23	43	68	43	69	43	6A	43	6B	43	6C	43	6D	43	6E	43	6F	43	70	43	71	43	72	43	73
Ip37	40	24	43	74	43	75	43	76	43	77	43	78	43	79	43	7A	43	7B	43	7C	43	7D	43	7E	43	7F
Ip38	40	25	44	00	44	01	44	02	44	03	44	04	44	05	44	06	44	07	44	08	44	09	44	0A	44	0B
Ip39	40	26	44	0C	44	0D	44	0E	44	0F	44	10	44	11	44	12	44	13	44	14	44	15	44	16	44	17
Ip40	40	27	44	18	44	19	44	1A	44	1B	44	1C	44	1D	44	1E	44	1F	44	20	44	21	44	22	44	23
Ip41	40	28	44	24	44	25	44	26	44	27	44	28	44	29	44	2A	44	2B	44	2C	44	2D	44	2E	44	2F
Ip42	40	29	44	30	44	31	44	32	44	33	44	34	44	35	44	36	44	37	44	38	44	39	44	3A	44	3B
Ip43	40	2A	44	3C	44	3D	44	3E	44	3F	44	40	44	41	44	42	44	43	44	44	44	45	44	46	44	47
Ip44	40	2B	44	48	44	49	44	4A	44	4B	44	4C	44	4D	44	4E	44	4F	44	50	44	51	44	52	44	53
Ip45	40	2C	44	54	44	55	44	56	44	57	44	58	44	59	44	5A	44	5B	44	5C	44	5D	44	5E	44	5F
Ip46	40	2D	44	60	44	61	44	62	44	63	44	64	44	65	44	66	44	67	44	68	44	69	44	6A	44	6B
Ip47	40	2E	44	6C	44	6D	44	6E	44	6F	44	70	44	71	44	72	44	73	44	74	44	75	44	76	44	77
Ip48	40	2F	44	78	44	79	44	7A	44	7B	44	7C	44	7D	44	7E	44	7F	45	00	45	01	45	02	45	03

Level Parameter Numbers – Groups to LR/Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Grp1	40	30	45	04	45	05	45	06	45	07	45	08	45	09	45	0A	45	0B	45	0C	45	0D	45	0E	–	–
Grp2	40	31	45	10	45	11	45	12	45	13	45	14	45	15	45	16	45	17	45	18	45	19	–	–	–	–
Grp3	40	32	45	1C	45	1D	45	1E	45	1F	45	20	45	21	45	22	45	23	45	24	–	–	–	–	–	–
Grp4	40	33	45	28	45	29	45	2A	45	2B	45	2C	45	2D	45	2E	45	2F	–	–	–	–	–	–	–	–
Grp5	40	34	45	34	45	35	45	36	45	37	45	38	45	39	45	3A	–	–	–	–	–	–	–	–	–	–
Grp6	40	35	45	40	45	41	45	42	45	43	45	44	45	45	–	–	–	–	–	–	–	–	–	–	–	–
Grp7	40	36	45	4C	45	4D	45	4E	45	4F	45	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp8	40	37	45	58	45	59	45	5A	45	5B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp9	40	38	45	64	45	65	45	66	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp10	40	39	45	70	45	71	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp11	40	3A	45	7C	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp12	40	3B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Level Parameter Numbers – FX Returns to LR/Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
FX1Rtn	40	3C	46	14	46	15	46	16	46	17	46	18	46	19	46	1A	46	1B	46	1C	46	1D	46	1E	46	1F
FX2Rtn	40	3D	46	20	46	21	46	22	46	23	46	24	46	25	46	26	46	27	46	28	46	29	46	2A	46	2B
FX3Rtn	40	3E	46	2C	46	2D	46	2E	46	2F	46	30	46	31	46	32	46	33	46	34	46	35	46	36	46	37
FX4Rtn	40	3F	46	38	46	39	46	3A	46	3B	46	3C	46	3D	46	3E	46	3F	46	40	46	41	46	42	46	43
FX5Rtn	40	40	46	44	46	45	46	46	46	47	46	48	46	49	46	4A	46	4B	46	4C	46	4D	46	4E	46	4F
FX6Rtn	40	41	46	50	46	51	46	52	46	53	46	54	46	55	46	56	46	57	46	58	46	59	46	5A	46	5B
FX7Rtn	40	42	46	5C	46	5D	46	5E	46	5F	46	60	46	61	46	62	46	63	46	64	46	65	46	66	46	67
FX8Rtn	40	43	46	68	46	69	46	6A	46	6B	46	6C	46	6D	46	6E	46	6F	46	70	46	71	46	72	46	73

Level Parameter Numbers – FX Returns to Groups (MB/LB)

	Grp1		Grp2		Grp3		Grp4		Grp5		Grp6		Grp7		Grp8		Grp9		Grp10		Grp11		Grp12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
FX1Rtn	4B	34	4B	35	4B	36	4B	37	4B	38	4B	39	4B	3A	4B	3B	4B	3C	4B	3D	4B	3E	4B	3F
FX2Rtn	4B	40	4B	41	4B	42	4B	43	4B	44	4B	45	4B	46	4B	47	4B	48	4B	49	4B	4A	4B	4B
FX3Rtn	4B	4C	4B	4D	4B	4E	4B	4F	4B	50	4B	51	4B	52	4B	53	4B	54	4B	55	4B	56	4B	57
FX4Rtn	4B	58	4B	59	4B	5A	4B	5B	4B	5C	4B	5D	4B	5E	4B	5F	4B	60	4B	61	4B	62	4B	63
FX5Rtn	4B	64	4B	65	4B	66	4B	67	4B	68	4B	69	4B	6A	4B	6B	4B	6C	4B	6D	4B	6E	4B	6F
FX6Rtn	4B	70	4B	71	4B	72	4B	73	4B	74	4B	75	4B	76	4B	77	4B	78	4B	79	4B	7A	4B	7B
FX7Rtn	4B	7C	4B	7D	4B	7E	4B	7F	4C	00	4C	01	4C	02	4C	03	4C	04	4C	05	4C	06	4C	07
FX8Rtn	4C	08	4C	09	4C	0A	4C	0B	4C	0C	4C	0D	4C	0E	4C	0F	4C	10	4C	11	4C	12	4C	13

Level Parameter Numbers – FX Sends (MB/LB)

	FX1Snd		FX2Snd		FX3Snd		FX4Snd	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Ip1	4C	14	4C	15	4C	16	4C	17
Ip2	4C	18	4C	19	4C	1A	4C	1B
Ip3	4C	1C	4C	1D	4C	1E	4C	1F
Ip4	4C	20	4C	21	4C	22	4C	23
Ip5	4C	24	4C	25	4C	26	4C	27
Ip6	4C	28	4C	29	4C	2A	4C	2B
Ip7	4C	2C	4C	2D	4C	2E	4C	2F
Ip8	4C	30	4C	31	4C	32	4C	33
Ip9	4C	34	4C	35	4C	36	4C	37
Ip10	4C	38	4C	39	4C	3A	4C	3B
Ip11	4C	3C	4C	3D	4C	3E	4C	3F
Ip12	4C	40	4C	41	4C	42	4C	43
Ip13	4C	44	4C	45	4C	46	4C	47
Ip14	4C	48	4C	49	4C	4A	4C	4B
Ip15	4C	4C	4C	4D	4C	4E	4C	4F
Ip16	4C	50	4C	51	4C	52	4C	53
Ip17	4C	54	4C	55	4C	56	4C	57
Ip18	4C	58	4C	59	4C	5A	4C	5B
Ip19	4C	5C	4C	5D	4C	5E	4C	5F
Ip20	4C	60	4C	61	4C	62	4C	63
Ip21	4C	64	4C	65	4C	66	4C	67
Ip22	4C	68	4C	69	4C	6A	4C	6B
Ip23	4C	6C	4C	6D	4C	6E	4C	6F
Ip24	4C	70	4C	71	4C	72	4C	73

	FX1Snd		FX2Snd		FX3Snd		FX4Snd	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Ip25	4C	74	4C	75	4C	76	4C	77
Ip26	4C	78	4C	79	4C	7A	4C	7B
Ip27	4C	7C	4C	7D	4C	7E	4C	7F
Ip28	4D	00	4D	01	4D	02	4D	03
Ip29	4D	04	4D	05	4D	06	4D	07
Ip30	4D	08	4D	09	4D	0A	4D	0B
Ip31	4D	0C	4D	0D	4D	0E	4D	0F
Ip32	4D	10	4D	11	4D	12	4D	13
Ip33	4D	14	4D	15	4D	16	4D	17
Ip34	4D	18	4D	19	4D	1A	4D	1B
Ip35	4D	1C	4D	1D	4D	1E	4D	1F
Ip36	4D	20	4D	21	4D	22	4D	23
Ip37	4D	24	4D	25	4D	26	4D	27
Ip38	4D	28	4D	29	4D	2A	4D	2B
Ip39	4D	2C	4D	2D	4D	2E	4D	2F
Ip40	4D	30	4D	31	4D	32	4D	33
Ip41	4D	34	4D	35	4D	36	4D	37
Ip42	4D	38	4D	39	4D	3A	4D	3B
Ip43	4D	3C	4D	3D	4D	3E	4D	3F
Ip44	4D	40	4D	41	4D	42	4D	43
Ip45	4D	44	4D	45	4D	46	4D	47
Ip46	4D	48	4D	49	4D	4A	4D	4B
Ip47	4D	4C	4D	4D	4D	4E	4D	4F
Ip48	4D	50	4D	51	4D	52	4D	53

	FX1Snd		FX2Snd		FX3Snd		FX4Snd	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Grp1	4D	54	4D	55	4D	56	4D	57
Grp2	4D	58	4D	59	4D	5A	4D	5B
Grp3	4D	5C	4D	5D	4D	5E	4D	5F
Grp4	4D	60	4D	61	4D	62	4D	63
Grp5	4D	64	4D	65	4D	66	4D	67
Grp6	4D	68	4D	69	4D	6A	4D	6B
Grp7	4D	6C	4D	6D	4D	6E	4D	6F
Grp8	4D	70	4D	71	4D	72	4D	73
Grp9	4D	74	4D	75	4D	76	4D	77
Grp10	4D	78	4D	79	4D	7A	4D	7B
Grp11	4D	7C	4D	7D	4D	7E	4D	7F
Grp12	4E	00	4E	01	4E	02	4E	03

	FX1Snd		FX2Snd		FX3Snd		FX4Snd	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
FX1Rtn	4E	04	4E	05	4E	06	4E	07
FX2Rtn	4E	08	4E	09	4E	0A	4E	0B
FX3Rtn	4E	0C	4E	0D	4E	0E	4E	0F
FX4Rtn	4E	10	4E	11	4E	12	4E	13
FX5Rtn	4E	14	4E	15	4E	16	4E	17
FX6Rtn	4E	18	4E	19	4E	1A	4E	1B
FX7Rtn	4E	1C	4E	1D	4E	1E	4E	1F
FX8Rtn	4E	20	4E	21	4E	22	4E	23

Level Parameter Numbers – Master Sends (MB/LB)

	Mtx1		Mtx2		Mtx3	
	MSB	LSB	MSB	LSB	MSB	LSB
LR	4E	24	4E	25	4E	26
Aux1	4E	27	4E	28	4E	29
Aux2	4E	2A	4E	2B	4E	2C
Aux3	4E	2D	4E	2E	4E	2F
Aux4	4E	30	4E	31	4E	32
Aux5	4E	33	4E	34	4E	35
Aux6	4E	36	4E	37	4E	38
Aux7	4E	39	4E	3A	4E	3B
Aux8	4E	3C	4E	3D	4E	3E
Aux9	4E	3F	4E	40	4E	41
Aux10	4E	42	4E	43	4E	44
Aux11	4E	45	4E	46	4E	47
Aux12	4E	48	4E	49	4E	4A

	Mtx1		Mtx2		Mtx3	
	MSB	LSB	MSB	LSB	MSB	LSB
Grp1	4E	4B	4E	4C	4E	4D
Grp2	4E	4E	4E	4F	4E	50
Grp3	4E	51	4E	52	4E	53
Grp4	4E	54	4E	55	4E	56
Grp5	4E	57	4E	58	4E	59
Grp6	4E	5A	4E	5B	4E	5C
Grp7	4E	5D	4E	5E	4E	5F
Grp8	4E	60	4E	61	4E	62
Grp9	4E	63	4E	64	4E	65
Grp10	4E	66	4E	67	4E	68
Grp11	4E	69	4E	6A	4E	6B
Grp12	4E	6C	4E	6D	4E	6E

	Output	
	MSB	LSB
LR	4F	00
Aux1	4F	01
Aux2	4F	02
Aux3	4F	03
Aux4	4F	04
Aux5	4F	05
Aux6	4F	06
Aux7	4F	07
Aux8	4F	08
Aux9	4F	09
Aux10	4F	0A
Aux11	4F	0B
Aux12	4F	0C

	Output	
	MSB	LSB
FX1Snd	4F	0D
FX2Snd	4F	0E
FX3Snd	4F	0F
FX4Snd	4F	10
Mtx1	4F	11
Mtx2	4F	12
Mtx3	4F	13

	Control	
	MSB	LSB
DCA1	4F	20
DCA2	4F	21
DCA3	4F	22
DCA4	4F	23
DCA5	4F	24
DCA6	4F	25
DCA7	4F	26
DCA8	4F	27

Panning/Balance Parameter Numbers – Inputs to LR (+Groups) and Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Ip1	50	00	50	44	50	45	50	46	50	47	50	48	50	49	50	4A	50	4B	50	4C	50	4D	50	4E	50	4F
Ip2	50	01	50	50	50	51	50	52	50	53	50	54	50	55	50	56	50	57	50	58	50	59	50	5A	50	5B
Ip3	50	02	50	5C	50	5D	50	5E	50	5F	50	60	50	61	50	62	50	63	50	64	50	65	50	66	50	67
Ip4	50	03	50	68	50	69	50	6A	50	6B	50	6C	50	6D	50	6E	50	6F	50	70	50	71	50	72	50	73
Ip5	50	04	50	74	50	75	50	76	50	77	50	78	50	79	50	7A	50	7B	50	7C	50	7D	50	7E	50	7F
Ip6	50	05	51	00	51	01	51	02	51	03	51	04	51	05	51	06	51	07	51	08	51	09	51	0A	51	0B
Ip7	50	06	51	0C	51	0D	51	0E	51	0F	51	10	51	11	51	12	51	13	51	14	51	15	51	16	51	17
Ip8	50	07	51	18	51	19	51	1A	51	1B	51	1C	51	1D	51	1E	51	1F	51	20	51	21	51	22	51	23
Ip9	50	08	51	24	51	25	51	26	51	27	51	28	51	29	51	2A	51	2B	51	2C	51	2D	51	2E	51	2F
Ip10	50	09	51	30	51	31	51	32	51	33	51	34	51	35	51	36	51	37	51	38	51	39	51	3A	51	3B
Ip11	50	0A	51	3C	51	3D	51	3E	51	3F	51	40	51	41	51	42	51	43	51	44	51	45	51	46	51	47
Ip12	50	0B	51	48	51	49	51	4A	51	4B	51	4C	51	4D	51	4E	51	4F	51	50	51	51	51	52	51	53
Ip13	50	0C	51	54	51	55	51	56	51	57	51	58	51	59	51	5A	51	5B	51	5C	51	5D	51	5E	51	5F
Ip14	50	0D	51	60	51	61	51	62	51	63	51	64	51	65	51	66	51	67	51	68	51	69	51	6A	51	6B
Ip15	50	0E	51	6C	51	6D	51	6E	51	6F	51	70	51	71	51	72	51	73	51	74	51	75	51	76	51	77
Ip16	50	0F	51	78	51	79	51	7A	51	7B	51	7C	51	7D	51	7E	51	7F	52	00	52	01	52	02	52	03
Ip17	50	10	52	04	52	05	52	06	52	07	52	08	52	09	52	0A	52	0B	52	0C	52	0D	52	0E	52	0F
Ip18	50	11	52	10	52	11	52	12	52	13	52	14	52	15	52	16	52	17	52	18	52	19	52	1A	52	1B
Ip19	50	12	52	1C	52	1D	52	1E	52	1F	52	20	52	21	52	22	52	23	52	24	52	25	52	26	52	27
Ip20	50	13	52	28	52	29	52	2A	52	2B	52	2C	52	2D	52	2E	52	2F	52	30	52	31	52	32	52	33
Ip21	50	14	52	34	52	35	52	36	52	37	52	38	52	39	52	3A	52	3B	52	3C	52	3D	52	3E	52	3F
Ip22	50	15	52	40	52	41	52	42	52	43	52	44	52	45	52	46	52	47	52	48	52	49	52	4A	52	4B
Ip23	50	16	52	4C	52	4D	52	4E	52	4F	52	50	52	51	52	52	52	53	52	54	52	55	52	56	52	57
Ip24	50	17	52	58	52	59	52	5A	52	5B	52	5C	52	5D	52	5E	52	5F	52	60	52	61	52	62	52	63
Ip25	50	18	52	64	52	65	52	66	52	67	52	68	52	69	52	6A	52	6B	52	6C	52	6D	52	6E	52	6F
Ip26	50	19	52	70	52	71	52	72	52	73	52	74	52	75	52	76	52	77	52	78	52	79	52	7A	52	7B
Ip27	50	1A	52	7C	52	7D	52	7E	52	7F	53	00	53	01	53	02	53	03	53	04	53	05	53	06	53	07
Ip28	50	1B	53	08	53	09	53	0A	53	0B	53	0C	53	0D	53	0E	53	0F	53	10	53	11	53	12	53	13
Ip29	50	1C	53	14	53	15	53	16	53	17	53	18	53	19	53	1A	53	1B	53	1C	53	1D	53	1E	53	1F
Ip30	50	1D	53	20	53	21	53	22	53	23	53	24	53	25	53	26	53	27	53	28	53	29	53	2A	53	2B
Ip31	50	1E	53	2C	53	2D	53	2E	53	2F	53	30	53	31	53	32	53	33	53	34	53	35	53	36	53	37
Ip32	50	1F	53	38	53	39	53	3A	53	3B	53	3C	53	3D	53	3E	53	3F	53	40	53	41	53	42	53	43
Ip33	50	20	53	44	53	45	53	46	53	47	53	48	53	49	53	4A	53	4B	53	4C	53	4D	53	4E	53	4F
Ip34	50	21	53	50	53	51	53	52	53	53	53	54	53	55	53	56	53	57	53	58	53	59	53	5A	53	5B
Ip35	50	22	53	5C	53	5D	53	5E	53	5F	53	60	53	61	53	62	53	63	53	64	53	65	53	66	53	67
Ip36	50	23	53	68	53	69	53	6A	53	6B	53	6C	53	6D	53	6E	53	6F	53	70	53	71	53	72	53	73
Ip37	50	24	53	74	53	75	53	76	53	77	53	78	53	79	53	7A	53	7B	53	7C	53	7D	53	7E	53	7F
Ip38	50	25	54	00	54	01	54	02	54	03	54	04	54	05	54	06	54	07	54	08	54	09	54	0A	54	0B
Ip39	50	26	54	0C	54	0D	54	0E	54	0F	54	10	54	11	54	12	54	13	54	14	54	15	54	16	54	17
Ip40	50	27	54	18	54	19	54	1A	54	1B	54	1C	54	1D	54	1E	54	1F	54	20	54	21	54	22	54	23
Ip41	50	28	54	24	54	25	54	26	54	27	54	28	54	29	54	2A	54	2B	54	2C	54	2D	54	2E	54	2F
Ip42	50	29	54	30	54	31	54	32	54	33	54	34	54	35	54	36	54	37	54	38	54	39	54	3A	54	3B
Ip43	50	2A	54	3C	54	3D	54	3E	54	3F	54	40	54	41	54	42	54	43	54	44	54	45	54	46	54	47
Ip44	50	2B	54	48	54	49	54	4A	54	4B	54	4C	54	4D	54	4E	54	4F	54	50	54	51	54	52	54	53
Ip45	50	2C	54	54	54	55	54	56	54	57	54	58	54	59	54	5A	54	5B	54	5C	54	5D	54	5E	54	5F
Ip46	50	2D	54	60	54	61	54	62	54	63	54	64	54	65	54	66	54	67	54	68	54	69	54	6A	54	6B
Ip47	50	2E	54	6C	54	6D	54	6E	54	6F	54	70	54	71	54	72	54	73	54	74	54	75	54	76	54	77
Ip48	50	2F	54	78	54	79	54	7A	54	7B	54	7C	54	7D	54	7E	54	7F	55	00	55	01	55	02	55	03

Balance Parameter Numbers – Groups to LR/Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Grp1	50	30	55	04	55	05	55	06	55	07	55	08	55	09	55	0A	55	0B	55	0C	55	0D	55	0E	–	–
Grp2	50	31	55	10	55	11	55	12	55	13	55	14	55	15	55	16	55	17	55	18	55	19	–	–	–	–
Grp3	50	32	55	1C	55	1D	55	1E	55	1F	55	20	55	21	55	22	55	23	55	24	–	–	–	–	–	–
Grp4	50	33	55	28	55	29	55	2A	55	2B	55	2C	55	2D	55	2E	55	2F	–	–	–	–	–	–	–	–
Grp5	50	34	55	34	55	35	55	36	55	37	55	38	55	39	55	3A	–	–	–	–	–	–	–	–	–	–
Grp6	50	35	55	40	55	41	55	42	55	43	55	44	55	45	–	–	–	–	–	–	–	–	–	–	–	–
Grp7	50	36	55	4C	55	4D	55	4E	55	4F	55	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp8	50	37	55	58	55	59	55	5A	55	5B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp9	50	38	55	64	55	65	55	66	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp10	50	39	55	70	55	71	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp11	50	3A	55	7C	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp12	50	3B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Balance Parameter Numbers – FX Returns to LR/Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
FX1Rtn	50	3C	56	14	56	15	56	16	56	17	56	18	56	19	56	1A	56	1B	56	1C	56	1D	56	1E	56	1F
FX2Rtn	50	3D	56	20	56	21	56	22	56	23	56	24	56	25	56	26	56	27	56	28	56	29	56	2A	56	2B
FX3Rtn	50	3E	56	2C	56	2D	56	2E	56	2F	56	30	56	31	56	32	56	33	56	34	56	35	56	36	56	37
FX4Rtn	50	3F	56	38	56	39	56	3A	56	3B	56	3C	56	3D	56	3E	56	3F	56	40	56	41	56	42	56	43
FX5Rtn	50	40	56	44	56	45	56	46	56	47	56	48	56	49	56	4A	56	4B	56	4C	56	4D	56	4E	56	4F
FX6Rtn	50	41	56	50	56	51	56	52	56	53	56	54	56	55	56	56	56	57	56	58	56	59	56	5A	56	5B
FX7Rtn	50	42	56	5C	56	5D	56	5E	56	5F	56	60	56	61	56	62	56	63	56	64	56	65	56	66	56	67
FX8Rtn	50	43	56	68	56	69	56	6A	56	6B	56	6C	56	6D	56	6E	56	6F	56	70	56	71	56	72	56	73

Balance Parameter Numbers – FX Returns to Groups (MB/LB)

	Grp1		Grp2		Grp3		Grp4		Grp5		Grp6		Grp7		Grp8		Grp9		Grp10		Grp11		Grp12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
FX1Rtn	5B	34	5B	35	5B	36	5B	37	5B	38	5B	39	5B	3A	5B	3B	5B	3C	5B	3D	5B	3E	5B	3F
FX2Rtn	5B	40	5B	41	5B	42	5B	43	5B	44	5B	45	5B	46	5B	47	5B	48	5B	49	5B	4A	5B	4B
FX3Rtn	5B	4C	5B	4D	5B	4E	5B	4F	5B	50	5B	51	5B	52	5B	53	5B	54	5B	55	5B	56	5B	57
FX4Rtn	5B	58	5B	59	5B	5A	5B	5B	5B	5C	5B	5D	5B	5E	5B	5F	5B	60	5B	61	5B	62	5B	63
FX5Rtn	5B	64	5B	65	5B	66	5B	67	5B	68	5B	69	5B	6A	5B	6B	5B	6C	5B	6D	5B	6E	5B	6F
FX6Rtn	5B	70	5B	71	5B	72	5B	73	5B	74	5B	75	5B	76	5B	77	5B	78	5B	79	5B	7A	5B	7B
FX7Rtn	5B	7C	5B	7D	5B	7E	5B	7F	5C	00	5C	01	5C	02	5C	03	5C	04	5C	05	5C	06	5C	07
FX8Rtn	5C	08	5C	09	5C	0A	5C	0B	5C	0C	5C	0D	5C	0E	5C	0F	5C	10	5C	11	5C	12	5C	13

Balance Parameter Numbers – Master Sends (MB/LB)

	Mtx1		Mtx2		Mtx3	
	MSB	LSB	MSB	LSB	MSB	LSB
LR	5E	24	5E	25	5E	26
Aux1	5E	27	5E	28	5E	29
Aux2	5E	2A	5E	2B	5E	2C
Aux3	5E	2D	5E	2E	5E	2F
Aux4	5E	30	5E	31	5E	32
Aux5	5E	33	5E	34	5E	35
Aux6	5E	36	5E	37	5E	38
Aux7	5E	39	5E	3A	5E	3B
Aux8	5E	3C	5E	3D	5E	3E
Aux9	5E	3F	5E	40	5E	41
Aux10	5E	42	5E	43	5E	44
Aux11	5E	45	5E	46	5E	47
Aux12	5E	48	5E	49	5E	4A

	Mtx1		Mtx2		Mtx3	
	MSB	LSB	MSB	LSB	MSB	LSB
Grp1	5E	4B	5E	4C	5E	4D
Grp2	5E	4E	5E	4F	5E	50
Grp3	5E	51	5E	52	5E	53
Grp4	5E	54	5E	55	5E	56
Grp5	5E	57	5E	58	5E	59
Grp6	5E	5A	5E	5B	5E	5C
Grp7	5E	5D	5E	5E	5E	5F
Grp8	5E	60	5E	61	5E	62
Grp9	5E	63	5E	64	5E	65
Grp10	5E	66	5E	67	5E	68
Grp11	5E	69	5E	6A	5E	6B
Grp12	5E	6C	5E	6D	5E	6E

	Output	
	MSB	LSB
LR	5F	00
Aux1	5F	01
Aux2	5F	02
Aux3	5F	03
Aux4	5F	04
Aux5	5F	05
Aux6	5F	06
Aux7	5F	07
Aux8	5F	08
Aux9	5F	09
Aux10	5F	0A
Aux11	5F	0B
Aux12	5F	0C

	Output	
	MSB	LSB
FX1Snd	5F	0D
FX2Snd	5F	0E
FX3Snd	5F	0F
FX4Snd	5F	10
Mtx1	5F	11
Mtx2	5F	12
Mtx3	5F	13

Assignment Parameter Numbers – Inputs to LR/Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Ip1	60	00	60	44	60	45	60	46	60	47	60	48	60	49	60	4A	60	4B	60	4C	60	4D	60	4E	60	4F
Ip2	60	01	60	50	60	51	60	52	60	53	60	54	60	55	60	56	60	57	60	58	60	59	60	5A	60	5B
Ip3	60	02	60	5C	60	5D	60	5E	60	5F	60	60	60	61	60	62	60	63	60	64	60	65	60	66	60	67
Ip4	60	03	60	68	60	69	60	6A	60	6B	60	6C	60	6D	60	6E	60	6F	60	70	60	71	60	72	60	73
Ip5	60	04	60	74	60	75	60	76	60	77	60	78	60	79	60	7A	60	7B	60	7C	60	7D	60	7E	60	7F
Ip6	60	05	61	00	61	01	61	02	61	03	61	04	61	05	61	06	61	07	61	08	61	09	61	0A	61	0B
Ip7	60	06	61	0C	61	0D	61	0E	61	0F	61	10	61	11	61	12	61	13	61	14	61	15	61	16	61	17
Ip8	60	07	61	18	61	19	61	1A	61	1B	61	1C	61	1D	61	1E	61	1F	61	20	61	21	61	22	61	23
Ip9	60	08	61	24	61	25	61	26	61	27	61	28	61	29	61	2A	61	2B	61	2C	61	2D	61	2E	61	2F
Ip10	60	09	61	30	61	31	61	32	61	33	61	34	61	35	61	36	61	37	61	38	61	39	61	3A	61	3B
Ip11	60	0A	61	3C	61	3D	61	3E	61	3F	61	40	61	41	61	42	61	43	61	44	61	45	61	46	61	47
Ip12	60	0B	61	48	61	49	61	4A	61	4B	61	4C	61	4D	61	4E	61	4F	61	50	61	51	61	52	61	53
Ip13	60	0C	61	54	61	55	61	56	61	57	61	58	61	59	61	5A	61	5B	61	5C	61	5D	61	5E	61	5F
Ip14	60	0D	61	60	61	61	61	62	61	63	61	64	61	65	61	66	61	67	61	68	61	69	61	6A	61	6B
Ip15	60	0E	61	6C	61	6D	61	6E	61	6F	61	70	61	71	61	72	61	73	61	74	61	75	61	76	61	77
Ip16	60	0F	61	78	61	79	61	7A	61	7B	61	7C	61	7D	61	7E	61	7F	62	00	62	01	62	02	62	03
Ip17	60	10	62	04	62	05	62	06	62	07	62	08	62	09	62	0A	62	0B	62	0C	62	0D	62	0E	62	0F
Ip18	60	11	62	10	62	11	62	12	62	13	62	14	62	15	62	16	62	17	62	18	62	19	62	1A	62	1B
Ip19	60	12	62	1C	62	1D	62	1E	62	1F	62	20	62	21	62	22	62	23	62	24	62	25	62	26	62	27
Ip20	60	13	62	28	62	29	62	2A	62	2B	62	2C	62	2D	62	2E	62	2F	62	30	62	31	62	32	62	33
Ip21	60	14	62	34	62	35	62	36	62	37	62	38	62	39	62	3A	62	3B	62	3C	62	3D	62	3E	62	3F
Ip22	60	15	62	40	62	41	62	42	62	43	62	44	62	45	62	46	62	47	62	48	62	49	62	4A	62	4B
Ip23	60	16	62	4C	62	4D	62	4E	62	4F	62	50	62	51	62	52	62	53	62	54	62	55	62	56	62	57
Ip24	60	17	62	58	62	59	62	5A	62	5B	62	5C	62	5D	62	5E	62	5F	62	60	62	61	62	62	62	63
Ip25	60	18	62	64	62	65	62	66	62	67	62	68	62	69	62	6A	62	6B	62	6C	62	6D	62	6E	62	6F
Ip26	60	19	62	70	62	71	62	72	62	73	62	74	62	75	62	76	62	77	62	78	62	79	62	7A	62	7B
Ip27	60	1A	62	7C	62	7D	62	7E	62	7F	63	00	63	01	63	02	63	03	63	04	63	05	63	06	63	07
Ip28	60	1B	63	08	63	09	63	0A	63	0B	63	0C	63	0D	63	0E	63	0F	63	10	63	11	63	12	63	13
Ip29	60	1C	63	14	63	15	63	16	63	17	63	18	63	19	63	1A	63	1B	63	1C	63	1D	63	1E	63	1F
Ip30	60	1D	63	20	63	21	63	22	63	23	63	24	63	25	63	26	63	27	63	28	63	29	63	2A	63	2B
Ip31	60	1E	63	2C	63	2D	63	2E	63	2F	63	30	63	31	63	32	63	33	63	34	63	35	63	36	63	37
Ip32	60	1F	63	38	63	39	63	3A	63	3B	63	3C	63	3D	63	3E	63	3F	63	40	63	41	63	42	63	43
Ip33	60	20	63	44	63	45	63	46	63	47	63	48	63	49	63	4A	63	4B	63	4C	63	4D	63	4E	63	4F
Ip34	60	21	63	50	63	51	63	52	63	53	63	54	63	55	63	56	63	57	63	58	63	59	63	5A	63	5B
Ip35	60	22	63	5C	63	5D	63	5E	63	5F	63	60	63	61	63	62	63	63	63	64	63	65	63	66	63	67
Ip36	60	23	63	68	63	69	63	6A	63	6B	63	6C	63	6D	63	6E	63	6F	63	70	63	71	63	72	63	73
Ip37	60	24	63	74	63	75	63	76	63	77	63	78	63	79	63	7A	63	7B	63	7C	63	7D	63	7E	63	7F
Ip38	60	25	64	00	64	01	64	02	64	03	64	04	64	05	64	06	64	07	64	08	64	09	64	0A	64	0B
Ip39	60	26	64	0C	64	0D	64	0E	64	0F	64	10	64	11	64	12	64	13	64	14	64	15	64	16	64	17
Ip40	60	27	64	18	64	19	64	1A	64	1B	64	1C	64	1D	64	1E	64	1F	64	20	64	21	64	22	64	23
Ip41	60	28	64	24	64	25	64	26	64	27	64	28	64	29	64	2A	64	2B	64	2C	64	2D	64	2E	64	2F
Ip42	60	29	64	30	64	31	64	32	64	33	64	34	64	35	64	36	64	37	64	38	64	39	64	3A	64	3B
Ip43	60	2A	64	3C	64	3D	64	3E	64	3F	64	40	64	41	64	42	64	43	64	44	64	45	64	46	64	47
Ip44	60	2B	64	48	64	49	64	4A	64	4B	64	4C	64	4D	64	4E	64	4F	64	50	64	51	64	52	64	53
Ip45	60	2C	64	54	64	55	64	56	64	57	64	58	64	59	64	5A	64	5B	64	5C	64	5D	64	5E	64	5F
Ip46	60	2D	64	60	64	61	64	62	64	63	64	64	64	65	64	66	64	67	64	68	64	69	64	6A	64	6B
Ip47	60	2E	64	6C	64	6D	64	6E	64	6F	64	70	64	71	64	72	64	73	64	74	64	75	64	76	64	77
Ip48	60	2F	64	78	64	79	64	7A	64	7B	64	7C	64	7D	64	7E	64	7F	65	00	65	01	65	02	65	03

Assignment Parameter Numbers – Inputs to Groups (MB/LB)

	Grp1		Grp2		Grp3		Grp4		Grp5		Grp6		Grp7		Grp8		Grp9		Grp10		Grp11		Grp12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Ip1	66	74	66	75	66	76	66	77	66	78	66	79	66	7A	66	7B	66	7C	66	7D	66	7E	66	7F
Ip2	67	00	67	01	67	02	67	03	67	04	67	05	67	06	67	07	67	08	67	09	67	0A	67	0B
Ip3	67	0C	67	0D	67	0E	67	0F	67	10	67	11	67	12	67	13	67	14	67	15	67	16	67	17
Ip4	67	18	67	19	67	1A	67	1B	67	1C	67	1D	67	1E	67	1F	67	20	67	21	67	22	67	23
Ip5	67	24	67	25	67	26	67	27	67	28	67	29	67	2A	67	2B	67	2C	67	2D	67	2E	67	2F
Ip6	67	30	67	31	67	32	67	33	67	34	67	35	67	36	67	37	67	38	67	39	67	3A	67	3B
Ip7	67	3C	67	3D	67	3E	67	3F	67	40	67	41	67	42	67	43	67	44	67	45	67	46	67	47
Ip8	67	48	67	49	67	4A	67	4B	67	4C	67	4D	67	4E	67	4F	67	50	67	51	67	52	67	53
Ip9	67	54	67	55	67	56	67	57	67	58	67	59	67	5A	67	5B	67	5C	67	5D	67	5E	67	5F
Ip10	67	60	67	61	67	62	67	63	67	64	67	65	67	66	67	67	67	68	67	69	67	6A	67	6B
Ip11	67	6C	67	6D	67	6E	67	6F	67	70	67	71	67	72	67	73	67	74	67	75	67	76	67	77
Ip12	67	78	67	79	67	7A	67	7B	67	7C	67	7D	67	7E	67	7F	68	00	68	01	68	02	68	03
Ip13	68	04	68	05	68	06	68	07	68	08	68	09	68	0A	68	0B	68	0C	68	0D	68	0E	68	0F
Ip14	68	10	68	11	68	12	68	13	68	14	68	15	68	16	68	17	68	18	68	19	68	1A	68	1B
Ip15	68	1C	68	1D	68	1E	68	1F	68	20	68	21	68	22	68	23	68	24	68	25	68	26	68	27
Ip16	68	28	68	29	68	2A	68	2B	68	2C	68	2D	68	2E	68	2F	68	30	68	31	68	32	68	33
Ip17	68	34	68	35	68	36	68	37	68	38	68	39	68	3A	68	3B	68	3C	68	3D	68	3E	68	3F
Ip18	68	40	68	41	68	42	68	43	68	44	68	45	68	46	68	47	68	48	68	49	68	4A	68	4B
Ip19	68	4C	68	4D	68	4E	68	4F	68	50	68	51	68	52	68	53	68	54	68	55	68	56	68	57
Ip20	68	58	68	59	68	5A	68	5B	68	5C	68	5D	68	5E	68	5F	68	60	68	61	68	62	68	63
Ip21	68	64	68	65	68	66	68	67	68	68	68	69	68	6A	68	6B	68	6C	68	6D	68	6E	68	6F
Ip22	68	70	68	71	68	72	68	73	68	74	68	75	68	76	68	77	68	78	68	79	68	7A	68	7B
Ip23	68	7C	68	7D	68	7E	68	7F	69	00	69	01	69	02	69	03	69	04	69	05	69	06	69	07
Ip24	69	08	69	09	69	0A	69	0B	69	0C	69	0D	69	0E	69	0F	69	10	69	11	69	12	69	13
Ip25	69	14	69	15	69	16	69	17	69	18	69	19	69	1A	69	1B	69	1C	69	1D	69	1E	69	1F
Ip26	69	20	69	21	69	22	69	23	69	24	69	25	69	26	69	27	69	28	69	29	69	2A	69	2B
Ip27	69	2C	69	2D	69	2E	69	2F	69	30	69	31	69	32	69	33	69	34	69	35	69	36	69	37
Ip28	69	38	69	39	69	3A	69	3B	69	3C	69	3D	69	3E	69	3F	69	40	69	41	69	42	69	43
Ip29	69	44	69	45	69	46	69	47	69	48	69	49	69	4A	69	4B	69	4C	69	4D	69	4E	69	4F
Ip30	69	50	69	51	69	52	69	53	69	54	69	55	69	56	69	57	69	58	69	59	69	5A	69	5B
Ip31	69	5C	69	5D	69	5E	69	5F	69	60	69	61	69	62	69	63	69	64	69	65	69	66	69	67
Ip32	69	68	69	69	69	6A	69	6B	69	6C	69	6D	69	6E	69	6F	69	70	69	71	69	72	69	73
Ip33	69	74	69	75	69	76	69	77	69	78	69	79	69	7A	69	7B	69	7C	69	7D	69	7E	69	7F
Ip34	6A	00	6A	01	6A	02	6A	03	6A	04	6A	05	6A	06	6A	07	6A	08	6A	09	6A	0A	6A	0B
Ip35	6A	0C	6A	0D	6A	0E	6A	0F	6A	10	6A	11	6A	12	6A	13	6A	14	6A	15	6A	16	6A	17
Ip36	6A	18	6A	19	6A	1A	6A	1B	6A	1C	6A	1D	6A	1E	6A	1F	6A	20	6A	21	6A	22	6A	23
Ip37	6A	24	6A	25	6A	26	6A	27	6A	28	6A	29	6A	2A	6A	2B	6A	2C	6A	2D	6A	2E	6A	2F
Ip38	6A	30	6A	31	6A	32	6A	33	6A	34	6A	35	6A	36	6A	37	6A	38	6A	39	6A	3A	6A	3B
Ip39	6A	3C	6A	3D	6A	3E	6A	3F	6A	40	6A	41	6A	42	6A	43	6A	44	6A	45	6A	46	6A	47
Ip40	6A	48	6A	49	6A	4A	6A	4B	6A	4C	6A	4D	6A	4E	6A	4F	6A	50	6A	51	6A	52	6A	53
Ip41	6A	54	6A	55	6A	56	6A	57	6A	58	6A	59	6A	5A	6A	5B	6A	5C	6A	5D	6A	5E	6A	5F
Ip42	6A	60	6A	61	6A	62	6A	63	6A	64	6A	65	6A	66	6A	67	6A	68	6A	69	6A	6A	6A	6B
Ip43	6A	6C	6A	6D	6A	6E	6A	6F	6A	70	6A	71	6A	72	6A	73	6A	74	6A	75	6A	76	6A	77
Ip44	6A	78	6A	79	6A	7A	6A	7B	6A	7C	6A	7D	6A	7E	6A	7F	6B	00	6B	01	6B	02	6B	03
Ip45	6B	04	6B	05	6B	06	6B	07	6B	08	6B	09	6B	0A	6B	0B	6B	0C	6B	0D	6B	0E	6B	0F
Ip46	6B	10	6B	11	6B	12	6B	13	6B	14	6B	15	6B	16	6B	17	6B	18	6B	19	6B	1A	6B	1B
Ip47	6B	1C	6B	1D	6B	1E	6B	1F	6B	20	6B	21	6B	22	6B	23	6B	24	6B	25	6B	26	6B	27
Ip48	6B	28	6B	29	6B	2A	6B	2B	6B	2C	6B	2D	6B	2E	6B	2F	6B	30	6B	31	6B	32	6B	33

Assignment Parameter Numbers – Groups to LR/Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Grp1	60	30	65	04	65	05	65	06	65	07	65	08	65	09	65	0A	65	0B	65	0C	65	0D	65	0E	–	–
Grp2	60	31	65	10	65	11	65	12	65	13	65	14	65	15	65	16	65	17	65	18	65	19	–	–	–	–
Grp3	60	32	65	1C	65	1D	65	1E	65	1F	65	20	65	21	65	22	65	23	65	24	–	–	–	–	–	–
Grp4	60	33	65	28	65	29	65	2A	65	2B	65	2C	65	2D	65	2E	65	2F	–	–	–	–	–	–	–	–
Grp5	60	34	65	34	65	35	65	36	65	37	65	38	65	39	65	3A	–	–	–	–	–	–	–	–	–	–
Grp6	60	35	65	40	65	41	65	42	65	43	65	44	65	45	–	–	–	–	–	–	–	–	–	–	–	–
Grp7	60	36	65	4C	65	4D	65	4E	65	4F	65	50	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp8	60	37	65	58	65	59	65	5A	65	5B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp9	60	38	65	64	65	65	65	66	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp10	60	39	65	70	65	71	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp11	60	3A	65	7C	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Grp12	60	3B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

Assignment Parameter Numbers – FX Returns to LR/Aux (MB/LB)

	LR		Aux1		Aux2		Aux3		Aux4		Aux5		Aux6		Aux7		Aux8		Aux9		Aux10		Aux11		Aux12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
FX1Rtn	60	3C	66	14	66	15	66	16	66	17	66	18	66	19	66	1A	66	1B	66	1C	66	1D	66	1E	66	1F
FX2Rtn	60	3D	66	20	66	21	66	22	66	23	66	24	66	25	66	26	66	27	66	28	66	29	66	2A	66	2B
FX3Rtn	60	3E	66	2C	66	2D	66	2E	66	2F	66	30	66	31	66	32	66	33	66	34	66	35	66	36	66	37
FX4Rtn	60	3F	66	38	66	39	66	3A	66	3B	66	3C	66	3D	66	3E	66	3F	66	40	66	41	66	42	66	43
FX5Rtn	60	40	66	44	66	45	66	46	66	47	66	48	66	49	66	4A	66	4B	66	4C	66	4D	66	4E	66	4F
FX6Rtn	60	41	66	50	66	51	66	52	66	53	66	54	66	55	66	56	66	57	66	58	66	59	66	5A	66	5B
FX7Rtn	60	42	66	5C	66	5D	66	5E	66	5F	66	60	66	61	66	62	66	63	66	64	66	65	66	66	66	67
FX8Rtn	60	43	66	68	66	69	66	6A	66	6B	66	6C	66	6D	66	6E	66	6F	66	70	66	71	66	72	66	73

Assignment Parameter Numbers – FX Returns to Groups (MB/LB)

	Grp1		Grp2		Grp3		Grp4		Grp5		Grp6		Grp7		Grp8		Grp9		Grp10		Grp11		Grp12	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
FX1Rtn	6B	34	6B	35	6B	36	6B	37	6B	38	6B	39	6B	3A	6B	3B	6B	3C	6B	3D	6B	3E	6B	3F
FX2Rtn	6B	40	6B	41	6B	42	6B	43	6B	44	6B	45	6B	46	6B	47	6B	48	6B	49	6B	4A	6B	4B
FX3Rtn	6B	4C	6B	4D	6B	4E	6B	4F	6B	50	6B	51	6B	52	6B	53	6B	54	6B	55	6B	56	6B	57
FX4Rtn	6B	58	6B	59	6B	5A	6B	5B	6B	5C	6B	5D	6B	5E	6B	5F	6B	60	6B	61	6B	62	6B	63
FX5Rtn	6B	64	6B	65	6B	66	6B	67	6B	68	6B	69	6B	6A	6B	6B	6B	6C	6B	6D	6B	6E	6B	6F
FX6Rtn	6B	70	6B	71	6B	72	6B	73	6B	74	6B	75	6B	76	6B	77	6B	78	6B	79	6B	7A	6B	7B
FX7Rtn	6B	7C	6B	7D	6B	7E	6B	7F	6C	00	6C	01	6C	02	6C	03	6C	04	6C	05	6C	06	6C	07
FX8Rtn	6C	08	6C	09	6C	0A	6C	0B	6C	0C	6C	0D	6C	0E	6C	0F	6C	10	6C	11	6C	12	6C	13

Assignment Parameter Numbers – FX Sends (MB/LB)

	FX1Snd		FX2Snd		FX3Snd		FX4Snd	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Ip1	6C	14	6C	15	6C	16	6C	17
Ip2	6C	18	6C	19	6C	1A	6C	1B
Ip3	6C	1C	6C	1D	6C	1E	6C	1F
Ip4	6C	20	6C	21	6C	22	6C	23
Ip5	6C	24	6C	25	6C	26	6C	27
Ip6	6C	28	6C	29	6C	2A	6C	2B
Ip7	6C	2C	6C	2D	6C	2E	6C	2F
Ip8	6C	30	6C	31	6C	32	6C	33
Ip9	6C	34	6C	35	6C	36	6C	37
Ip10	6C	38	6C	39	6C	3A	6C	3B
Ip11	6C	3C	6C	3D	6C	3E	6C	3F
Ip12	6C	40	6C	41	6C	42	6C	43
Ip13	6C	44	6C	45	6C	46	6C	47
Ip14	6C	48	6C	49	6C	4A	6C	4B
Ip15	6C	4C	6C	4D	6C	4E	6C	4F
Ip16	6C	50	6C	51	6C	52	6C	53
Ip17	6C	54	6C	55	6C	56	6C	57
Ip18	6C	58	6C	59	6C	5A	6C	5B
Ip19	6C	5C	6C	5D	6C	5E	6C	5F
Ip20	6C	60	6C	61	6C	62	6C	63
Ip21	6C	64	6C	65	6C	66	6C	67
Ip22	6C	68	6C	69	6C	6A	6C	6B
Ip23	6C	6C	6C	6D	6C	6E	6C	6F
Ip24	6C	70	6C	71	6C	72	6C	73

	FX1Snd		FX2Snd		FX3Snd		FX4Snd	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Ip25	6C	74	6C	75	6C	76	6C	77
Ip26	6C	78	6C	79	6C	7A	6C	7B
Ip27	6C	7C	6C	7D	6C	7E	6C	7F
Ip28	6D	00	6D	01	6D	02	6D	03
Ip29	6D	04	6D	05	6D	06	6D	07
Ip30	6D	08	6D	09	6D	0A	6D	0B
Ip31	6D	0C	6D	0D	6D	0E	6D	0F
Ip32	6D	10	6D	11	6D	12	6D	13
Ip33	6D	14	6D	15	6D	16	6D	17
Ip34	6D	18	6D	19	6D	1A	6D	1B
Ip35	6D	1C	6D	1D	6D	1E	6D	1F
Ip36	6D	20	6D	21	6D	22	6D	23
Ip37	6D	24	6D	25	6D	26	6D	27
Ip38	6D	28	6D	29	6D	2A	6D	2B
Ip39	6D	2C	6D	2D	6D	2E	6D	2F
Ip40	6D	30	6D	31	6D	32	6D	33
Ip41	6D	34	6D	35	6D	36	6D	37
Ip42	6D	38	6D	39	6D	3A	6D	3B
Ip43	6D	3C	6D	3D	6D	3E	6D	3F
Ip44	6D	40	6D	41	6D	42	6D	43
Ip45	6D	44	6D	45	6D	46	6D	47
Ip46	6D	48	6D	49	6D	4A	6D	4B
Ip47	6D	4C	6D	4D	6D	4E	6D	4F
Ip48	6D	50	6D	51	6D	52	6D	53

	FX1Snd		FX2Snd		FX3Snd		FX4Snd	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
Grp1	6D	54	6D	55	6D	56	6D	57
Grp2	6D	58	6D	59	6D	5A	6D	5B
Grp3	6D	5C	6D	5D	6D	5E	6D	5F
Grp4	6D	60	6D	61	6D	62	6D	63
Grp5	6D	64	6D	65	6D	66	6D	67
Grp6	6D	68	6D	69	6D	6A	6D	6B
Grp7	6D	6C	6D	6D	6D	6E	6D	6F
Grp8	6D	70	6D	71	6D	72	6D	73
Grp9	6D	74	6D	75	6D	76	6D	77
Grp10	6D	78	6D	79	6D	7A	6D	7B
Grp11	6D	7C	6D	7D	6D	7E	6D	7F
Grp12	6E	00	6E	01	6E	02	6E	03

	FX1Snd		FX2Snd		FX3Snd		FX4Snd	
	MSB	LSB	MSB	LSB	MSB	LSB	MSB	LSB
FX1Rtn	6E	04	6E	05	6E	06	6E	07
FX2Rtn	6E	08	6E	09	6E	0A	6E	0B
FX3Rtn	6E	0C	6E	0D	6E	0E	6E	0F
FX4Rtn	6E	10	6E	11	6E	12	6E	13
FX5Rtn	6E	14	6E	15	6E	16	6E	17
FX6Rtn	6E	18	6E	19	6E	1A	6E	1B
FX7Rtn	6E	1C	6E	1D	6E	1E	6E	1F
FX8Rtn	6E	20	6E	21	6E	22	6E	23

Assignment Parameter Numbers – Matrix Sends (MB/LB)

	Mtx1		Mtx2		Mtx3	
	MSB	LSB	MSB	LSB	MSB	LSB
LR	6E	24	6E	25	6E	26
Aux1	6E	27	6E	28	6E	29
Aux2	6E	2A	6E	2B	6E	2C
Aux3	6E	2D	6E	2E	6E	2F
Aux4	6E	30	6E	31	6E	32
Aux5	6E	33	6E	34	6E	35
Aux6	6E	36	6E	37	6E	38
Aux7	6E	39	6E	3A	6E	3B
Aux8	6E	3C	6E	3D	6E	3E
Aux9	6E	3F	6E	40	6E	41
Aux10	6E	42	6E	43	6E	44
Aux11	6E	45	6E	46	6E	47
Aux12	6E	48	6E	49	6E	4A

	Mtx1		Mtx2		Mtx3	
	MSB	LSB	MSB	LSB	MSB	LSB
Grp1	6E	4B	6E	4C	6E	4D
Grp2	6E	4E	6E	4F	6E	50
Grp3	6E	51	6E	52	6E	53
Grp4	6E	54	6E	55	6E	56
Grp5	6E	57	6E	58	6E	59
Grp6	6E	5A	6E	5B	6E	5C
Grp7	6E	5D	6E	5E	6E	5F
Grp8	6E	60	6E	61	6E	62
Grp9	6E	63	6E	64	6E	65
Grp10	6E	66	6E	67	6E	68
Grp11	6E	69	6E	6A	6E	6B
Grp12	6E	6C	6E	6D	6E	6E