

**Digital Stereo Mixer M-864D**  
**External Control Protocol – TCP/IP**  
Ver.2.0.0 Dec.2 /2013

■ **Summary**

The External Control protocol described in this document is designed for use of controlling the M-864D from a personal computer or remote controller.

This spec sheet applies to the M-864D firmware of version 2.0.0 or later.

Settings that can be controlled are as follows:

- Channel Fader Gain
- Channel ON/OFF
- Line(Stereo) Select
- Input Matrix Assignment
- Input Matrix Crosspoint Gain
- Output Matrix Assignment
- Preset Memory Load
- Preset Memory Store
- LOCAL/UNLOCAL Status Change
- Level Meter Status Notification Start/Stop
- Auto Status Notification Start/Stop

If necessary, the M-864D's activation can be checked or setting values read by using the following commands:

- Status request (reading of the M-864D's setting value)

Status Information

- M-864D connection establishment status (output from the M-864D at the time of connection establishment)
- Level Meter Status (output from the M-864D at the time of level meter status changed)
- ZM Remote Controller Connection Status (output from the M-864D at the time of ZM remote controller connection status changed)
- Contact Input/Output Make/Break Status (output from the M-864D at the time of Contact I/O make/break status changed)

[Note]

When connecting the remote controller to the M-864D by way of this protocol, set the M-864D's Using port as follows:

(Refer; External Control Port Settings of the M-864D software instructions manual.)

**Using TCP Port**

- Ext. Port No.: (Set according to the remote controller to be connected.)  
Default Port No:3000

[Note] Meter Port No. is automatically set to Ext. Port No. plus 1;

■ **TCP/IP Connection**

No.	Parameter	Description (rules)
1	Connection Path	1 path
2	Data Length	Variable-length, The maximum length is 1024 bytes
3	Code Classification	Binary
4	Delivery Confirm	No handshakes at application layer
5	Resend Control	None
6	Priority Control	None

M-864D is a TCP server.

TCP Port is always connected.

For the purpose of connection keeping, M-864D performs the following behavior.

Transmitting some kind of data at least once in the last 10 seconds.

When there is the status that for send, M-864D transmits the contents. When there is not it, M-864D transmits 0xFF only as for 1 byte.

When M-864DP received nothing from a remote controller more than 1 minute, M-864D disconnect the TCP/IP connection.

■ **Command Construction**

- |         |                 |        |        |       |        |
|---------|-----------------|--------|--------|-------|--------|
| Command | Data length (N) | Data 1 | Data 2 | ..... | Data N |
|---------|-----------------|--------|--------|-------|--------|
- Where 

Command
---------

 is in the range 80H to FFH. And where 

Data length
-------------

 and 

Data
------

 are in the range 00H to 7FH.
- The second byte data indicates the number of byte data that follow the second byte data.
- If received data contains more byte data than the indicated number, those exceeding the number are abandoned.
- When a next command is received, the previous data is abandoned if shorter than the indicated number.

■ **Control Command and Setting Value**

● **Channel Fader Gain (Position)**

Set the input and output channel EXT VOL fader gains by position.

For the relationship of position to gain (dB), refer to the Position vs. Gain Table for Fader.

The M-864D transmits changed value data after receiving this command.

**91H, 03H, <Channel Attribute>, <Channel Number>, <Position>**

<Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

02H: Mono Out channel

03H: Rec Out channel

<Channel Number>

When Channel Attribute=00H: 00H - 07H (Mono In channel 1 – 8)

When Channel Attribute=01H: 00H - 01H (Stereo In channel 1 – 2)

When Channel Attribute=02H: 00H - 03H (Mono Out channel 1 – 4)

When Channel Attribute=03H: 00H - 01H (Rec Out channel L,R)

<Position>

00H - 3FH (-INF - +10dB, see the Position vs. Gain Table)

Example of setting Mono In channel 1 EXT VOL fader gain to 0 dB:

91H, 03H, 00H, 00H, 35H

● **Channel Fader Gain (Step)**

Set the input and output channel EXT VOL fader gain positions by the number of steps.

Positions can be varied from the current status by the designated number of steps.

One position varies per step.

The M-864D informs position values changed by step Up or Down.

**91H, 03H, <Channel Attribute>, <Channel Number>, <Step>**

<Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

02H: Mono Out channel

03H: Rec Out channel

<Channel Number>

When Channel Attribute=00H: 00H - 07H (Mono In channel 1 – 8)

When Channel Attribute=01H: 00H - 01H (Stereo In channel 1 – 2)

When Channel Attribute=02H: 00H - 03H (Mono Out channel 1 – 4)

When Channel Attribute=03H: 00H - 01H (Rec Out channel L,R)

<Step>

UP: 41H - 5FH (1 step up - 31-step up) ; Example showing 1step Up: 41H

Down: 61H - 7FH (1 step down – 31–step down) ; Example showing 1step Down: 61H)

Example showing 3-step Up of Mono In channel 1 EXT VOL fader gain

91H, 03H, 00H, 00H, 43H

● **Channel ON/OFF**

Set the input and output channels to ON or OFF.

The M-864D transmits changed value data after receiving this command.

**92H, 03H, <Channel Attribute>, <Channel Number>, <ON/OFF>**

<Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

02H: Mono Out channel

03H: Rec Out channel

<Channel Number>

When Channel Attribute=00H: 00H - 07H (Mono In channel 1 – 8)

When Channel Attribute=01H: 00H - 01H (Stereo In channel 1 – 2)

When Channel Attribute=02H: 00H - 03H (Mono Out channel 1 – 4)

When Channel Attribute=03H: 00H - 01H (Rec Out channel L,R)

<ON/OFF>

00H: Channel OFF

01H: Channel ON

Example of setting Mono In channel 1 to ON:

92H, 03H, 00H, 00H, 01H

● **Line (Stereo) Select**

Set the line (stereo) select status for the Stereo In channel.

The M-864D transmits changed value data after receiving this command.

**88H, 03H, <Channel Number>, <Line Number>, <ON/OFF>**

<Channel Number >

00H-01H: Stereo In numbers 1 – 2

<Line Number>

00H-02H: Line numbers A – C

<ON/OFF>

00H: OFF

01H: ON

Example of setting Stereo In 1's Line C to ON

88H, 03H, 00H, 02H, 01H

● **Input Matrix Assignment**

Set the input matrix assignment (matrix crosspoint) to ON or OFF.

The M-864D transmits changed value data after receiving this command.

**94H, 04H, <Source Channel Attribute>, <Source Channel Number>, <Bus Channel Number>, <ON/OFF>**

<Source Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

<Source Channel Number>

When Source Channel Attribute=00H: 00H - 07H (Mono In channel 1 - 8)

When Source Channel Attribute=01H: 00H - 01H (Stereo In channel 1 - 2)

<Bus Channel Number>

00H - 03H (Bus channel 1 - 4)

<ON/OFF>

00H: <Source channel> to <Bus channel> assign OFF

01H: <Source channel> to <Bus channel> assign ON

Example of setting the bus assignment from Mono In channel 1 to bus channel 1 to ON:

94H, 04H, 00H, 00H, 00H, 01H

● **Input Matrix Crosspoint Gain**

Set the crosspoint gains by position.

The M-864D transmits changed value data after receiving this command.

**95H, 04H, <Source Channel Attribute>, <Source Channel Number>, <Bus Channel Number>, <Value>**

<Source Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

<Source Channel Number>

When Source Channel Attribute=00H: 00H - 07H (Mono In channel 1 - 8)

When Source Channel Attribute=01H: 00H - 01H (Stereo In channel 1 - 2)

<Bus Channel Number>

00H - 03H (Bus channel 1 - 4)

<Value>

00~46H : For the relationship of position to gain (dB), refer to Value vs. Gain Table for crosspoint gain.

60~6FH : Position Down (1~16 Step Down)

70~7FH : Position Up (1~16 Step Up)

Example of setting the crosspoint gain from Mono In channel 1 to Bus channel 1 to 0dB:

95H, 04H, 00H, 00H, 00H, 46H

Example showing 3-step Up of Mono In channel 1 to Bus channel 1 crosspoint gain

95H, 04H, 00H, 00H, 00H, 72H

● **Output Matrix Assignment**

Set the Output (Rec Out) matrix assignment (output matrix crosspoint) to ON or OFF.

The M-864D transmits changed value data after receiving this command.

**96H, 04H, <Bus Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>, <ON/OFF>**

<Bus Channel Number>

00H - 03H (Bus channel 1 - 4)

< Destination Channel Attribute>

03H: Rec Out channel

< Destination Channel Number>

When Destination Channel Attribute=03H: 00H - 01H (Rec Out channel L,R)

<ON/OFF>

00H: < Bus channel> to <Destination channel> assign OFF

01H: < Bus channel> to <Destination channel> assign ON

Example of setting the output assignment from Bus channel 1 to Rec Out channel L to ON:

96H, 04H, 00H, 03H, 00H, 01H

● **Preset Memory Load**

Load desired preset memories.

The M-864D transmits changed preset memory number after receiving this command.

**F1H, 02H, 00H, <Preset Number>**

<Preset Number>

00H - 0FH: Preset Memory Numbers 1 - 16

Example of loading Preset Memory 1:

F1H, 02H, 00H, 00H

● **Preset Memory Store**

Store desired preset memory. (UTC TimeStamp)

The M-864D transmits stored preset memory number after receiving this command.

**F3H, 08H, 00H, <Preset Number>, <Year>, <Month>, <Day>, <hour>, <Minute>, <Second>**

<Preset Number>

00H - 0FH: Preset Memory Numbers 1 - 16

<Year>

00H - 63H: Year 2000 - 2099

<Month>

01H – 0CH: Month 1 - 12

<Day>

01H – 1FH: Day 1 - 31

<Hour>

00H – 17H: Hour 0 - 23

<Minute>

00H – 3BH: Minute 0 - 59

<Second>

00H – 3BH: Second 0 - 59

Example of Storing Preset Memory 1:

F3H, 08H, 00H, 00H, 0CH, 0CH, 15H, 0FH, 00H, 00H

- **LOCAL/UNLOCAL Status Change**

Set the LOCAL/UNLOCAL status.

The M-864D transmits changed LOCAL/UNLOCAL status after receiving this command.

**F4H, 02H, 00H, <Local/Unlocal>**

<Local/Unlocal>

00H: Unlocal

01H: Local

Example of setting UNLOCAL State:

F4H, 02H, 00H, 00H

- **Level Meter Status Notification Start/Stop**

Set the Level Meter Status Notification ON or OFF.

**F2H, 02H, 00H, <Notify Interval>**

<Notify Interval>

00H: OFF (Status Notification Stop)

01H – 08H: Interval 0, 100ms, 200ms, 500ms, 1s, 2s, 5s, 10s

- **Auto Status Notification Start/Stop**

Set the Auto Status Notification ON or OFF.

**F2H, 02H, 01H, <ON/OFF>**

<ON/OFF>

00H: OFF (Auto Status Notification Stop)

01H: ON (Auto Status Notification Start)

■ **Status Request Command**

● **Status Request(Channel fader gain position)**

This command requests the M-864D to send its current channel fader gain position setting data.

The M-864D informs the current gain position.

**F0H, 03H, 11H, <Channel Attribute>, <Channel Number>**

<Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

02H: Mono Out channel

03H: Rec Out channel

<Channel Number>

When Channel Attribute=00H: 00H - 07H (Mono In channel 1 – 8)

When Channel Attribute=01H: 00H - 01H (Stereo In channel 1 – 2)

When Channel Attribute=02H: 00H - 03H (Mono Out channel 1 – 4)

When Channel Attribute=03H: 00H - 01H (Rec Out channel L,R)

Example of requesting Mono In channel 1's EXT VOL fader gain position value data:

F0H, 03H, 11H, 00H, 00H

● **Status Request (Channel ON/OFF)**

This command requests the M-864D to send its current channel ON/OFF setting status data.

The M-864D informs the current ON/OFF setting status.

**F0H, 03H, 12H, <Channel Attribute>, <Channel Number>**

<Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

02H: Mono Out channel

03H: Rec Out channel

<Channel Number>

When Channel Attribute=00H: 00H - 07H (Mono In channel 1 – 8)

When Channel Attribute=01H: 00H - 01H (Stereo In channel 1 – 2)

When Channel Attribute=02H: 00H - 03H (Mono Out channel 1 – 4)

When Channel Attribute=03H: 00H - 01H (Rec Out channel L,R)

Example of requesting Mono In channel 1's ON/OFF setting status data:

F0H, 03H, 12H, 00H, 00H

● **Status request (Line Select)**

This command requests to send the current line select ON/OFF setting status data on the M-864D side.

The M-864D transmits the current line select ON/OFF setting status data.



**F0H, 03H, 08H, <Channel Number>, <Line Number>**

<Channel Number>

00H - 01H: Stereo In numbers 1 - 2

<Line number>

00H - 02H: Line numbers A - C

Example of requesting the ON/OFF setting status data for Input C of Stereo In 1

F0H, 03H, 08H, 00H, 02H

- **Status Request (Input Matrix Assignment)**

This command requests the M-864D to send its current input matrix assignment setting data.

The M-864D informs the current input matrix assignment setting status.

**F0H, 04H, 14H, <Source Channel Attribute>, <Source Channel Number>, <Bus Channel Number>**

Example of requesting Mono In channel 1 to Bus channel 1 bus assignment setting data:

F0H, 04H, 14H, 00H, 00H, 00H

- **Status Request (Input Matrix Crosspoint Gain)**

This command requests the M-864D to send its current input matrix crosspoint gain setting data.

The M-864D informs the current crosspoint gain setting status.

**F0H, 04H, 15H, <Source Channel Attribute>, <Source Channel Number>, <Bus Channel Number>**

Example of requesting Mono In channel 1 to Bus channel 1 crosspoint gain setting data:

F0H, 04H, 15H, 00H, 00H, 00H

- **Status Request (Output Matrix Assignment)**

This command requests the M-864D to send its current output (Rec Out) assignment setting data.

The M-864D informs the current output matrix assignment setting status.

**F0H, 04H, 16H, <Bus Channel Number>, < Destination Channel Attribute>, < Destination Channel Number>**

Example of requesting Bus channel 1 to Rec Out channel L output assignment setting data:

F0H, 04H, 16H, 00H, 03H, 00H

- **Status Request (Current Preset Number)**

This command requests to send the M-864D's currently loaded preset number data.

The M-864D transmits the current preset number data.

**F0H, 02H, 71H, 00H**

- **Status request (LOCAL/UNLOCAL Status)**

This command requests to send the M-864D's current Local/Unlocal status data.

The M-864D transmits the current Local/Unlocal status data.

**F0H, 02H, 18H, 00H**

- **Status request (Level Meter Status)**

This command requests to send the M-864D's current level meter status data.

The M-864D transmits the current level meter status data.

**F0H, 03H, 17H, <Channel Attribute>, <Channel Number>**

<Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

02H: Mono Out channel

<Channel Number>

When Channel Attribute=00H: 00H - 07H (Mono In channel 1 – 8)

When Channel Attribute=01H: 00H - 01H (Stereo In channel 1 – 2)

When Channel Attribute=02H: 00H - 03H (Mono Out channel 1 – 4)

Example of requesting Mono In channel 1's level meter status data:

F0H, 03H, 17H, 00H, 00H

- **Status request (ZM Remote Controller Connection Status)**

This command requests to send the M-864D's current ZM remote controller connection status data.

The M-864D transmits the current ZM remote controller connection status data.

**F0H, 02H, 41H, <Address Number>**

<Address Number>

00H – 0FH: ZM Remote Controller's Address Number 0 - F

Example of requesting Address F's ZM remote controller connection status data:

F0H, 02H, 41H, 0FH

- **Status request (Contact I/O Make/Break Status)**

This command requests to send the M-864D's current contact input/output make/break status data.

The M-864D transmits the current contact I/O's status data.

**F0H, 03H, 42H, <Contact I/O>, <Contact Number>**

<Contact I/O>

00H: Contact Input

01H: Contact Output

<Contact Number>

00H – 07H: Contact Number 1 - 8

Example of requesting contact input No.8's status data:

F0H, 03H, 42H, 00H, 07H

■ **Status Information**

● **M-864D connection establishment status**

Status data is transmitted from the M-864D when the TCP connection is established.

**DFH, 01H, 01H**

● **Level Meter Status Format**

The M-864D transmits the current status data when level meter status changed in Level Meter Status Notification started.

**E6H, 04H, 00H, <Channel Attribute>, <Channel Number>, <Level>**

<Channel Attribute>

00H: Mono In channel

01H: Stereo In channel

02H: Mono Out channel

<Channel Number>

When Channel Attribute=00H: 00H - 07H (Mono In channel 1 – 8)

When Channel Attribute=01H: 00H - 03H (Stereo In channel 1\_L – 2\_R)

When Channel Attribute=02H: 00H - 03H (Mono Out channel 1 – 4)

<Level>

00H – 48H: (-48dBu - +24dBu(PEAK), See: “Level Meter Table”)

Example of the Level Meter status data of Mono In 1 changes to 0dB

E6H, 04H, 00H, 00H, 00H, 30H

● **ZM Remote Controller Connection Status Format**

The M-864D transmits the current status data when the ZM Remote Controller Connection Status changed in Auto Status Notification started.

**E6H, 04H, 01H, <Address Number>, <Controller Type>, <Connection/Disconnection>**

<Address Number>

00H – 0FH: ZM Address Number 0 - F

<Controller Type>

00H: None

01H: ZM-9011

02H: ZM-9012

03H: ZM-9013

04H: ZM-9014

<Connection/Disconnection>

00H: Disconnection

01H: Connection

Example of the connection status data of Address 0's ZM-9011 changes to disconnect

E6H, 04H, 01H, 00H, 00H, 00H

● **Contact Input/Output Make/Break status**

The M-864D transmits the current status data when contact terminal status changed in Auto Status Notification started.

**E6H, 04H, 02H, <Contact I/O>, <Terminal Number>, <Make/Break>**

<Contact I/O>

00H: Contact Input

01H: Contact Output

<Terminal Number>

00H - 07H : Terminal Number 1 - 8

<Make/Break>

00H: Break

01H: Make

Example of the contact status data of contact output terminal No.8 changes to break

E6H, 04H, 02H, 01H, 02H, 00H

**■ Command List**

Function	Command Code
Channel fader gain (position)	91H, 03H, <Channel Attribute>, <Channel Number>, <Position>
Channel fader gain (step)	91H, 03H, <Channel Attribute>, <Channel Number>, <Step>
Channel ON/OFF	92H, 03H, <Channel Attribute>, <Channel Number>, <ON/OFF>
Line(Stereo) Select	88H, 03H, <Channel Number>, <Line Number>, <ON/OFF>
Input Matrix Assignment	94H, 04H, <Source Channel Attribute>, <Source Channel Number>, <Bus Channel Number>, <ON/OFF>
Input Crosspoint Gain	95H, 04H, <Source Channel Attribute>, <Source Channel Number>, <Bus Channel Number>, <Value>
Output Matrix Assignment	96H, 04H, <Bus Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>, <ON/OFF>
Preset Memory Load	F1H, 02H, 00H, <Preset Number>
Preset Memory Store	F3H, 08H, 00H, <Preset Number>, <Year>, <Month>, <Day>, <Hour>, <Minute>, <Second>
LOCAL/UNLOCAL Status Change	F4H, 02H, 00H, <LOCAL/UNLOCAL>
Level Meter Status Notification Start/Stop	F2H, 02H, 00H, <ON/OFF>
Auto Status Notification Start/Stop	F2H, 02H, 01H, <ON/OFF>
Status (channel fader gain)	F0H, 03H, 11H, <Channel Attribute>, <Channel Number>
Status (channel ON/OFF)	F0H, 03H, 12H, <Channel Attribute>, <Channel Number>
Status (Line Select)	F0H, 03H, 08H, <Channel Number>, <Line Number>
Status (Input Matrix Assignment)	F0H, 04H, 14H, <Source Channel Attribute>, <Source Channel Number>, <Bus Channel Number>
Status (Input Matrix Crosspoint Gain)	F0H, 04H, 15H, <Source Channel Attribute>, <Source Channel Number>, <Bus Channel Number>
Status (Output Matrix Assignment)	F0H, 04H, 16H, <Bus Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>
Status (Preset)	F0H, 02H, 71H, 00H
Status (Level Meter Status)	F0H, 03H, 17H, <Channel Attribute>, <Channel Number>
Status (ZM RC. Connection Status)	F0H, 02H, 01H, <Address Number>
M-864D Connection establishment status	DFH, 01H, 01H
Level Meter Status Format	E6H, 04H, 00H, <Channel Attribute>, <Channel Number>, <Level>
ZM RC. Connection Status Format	E6H, 04H, 01H, <Address Number>, <Controller Type>, <Connection/Disconnection>

**■ Communication Examples**

<b>Command</b>	<b>Controller</b>	<b>M-864D Response</b>
Load Preset 1	F1H,02H,00H,00H	F1H,02H,00H,00H
Mono In ch1 Fader gain=0dB	91H,03H,00H,00H,35H	91H,03H,00H,00H,35H
Mono Out ch1 Fader gain=0dB	91H,03H,01H,00H,35H	91H,03H,01H,00H,35H
Mono In ch1 Fader gain=-INFdB	91H,03H,00H,00H,00H	91H,03H,00H,00H,00H
Mono In ch1 Fader gain 3step up	91H,03H,00H,00H,43H	91H,03H,00H,00H,2DH
Mono In ch1 Fader gain 3step down	91H,03H,00H,00H,63H	91H,03H,00H,00H,2AH
Mono In ch1 ON	92H,03H,00H,00H,01H	92H,03H,00H,00H,01H
Mono In ch1 OFF	92H,03H,00H,00H,00H	92H,03H,00H,00H,00H
Stereo In 1 LineC ON (Mix Mode)	88H,03H,00H,02H,01H	88H,03H,00H,02H,01H
Stereo In 1 LineB ON (Select Mode)	88H,03H,00H,01H,01H	88H,03H,00H,01H,01H
Matrix: Mono In ch1 to Bus ch1 ON	94H,04H,00H,00H,00H,01H	94H,04H,00H,00H,00H,01H
Matrix: Mono In ch1 to Bus ch1 0dB	95H,04H,00H,00H,00H,46H	95H,04H,00H,00H,00H,46H
Matrix: Mono In ch1 to Bus ch1 1step up	95H,04H,00H,00H,00H,70H	95H,04H,00H,00H,00H,01H
Matrix: Bus ch1 to Rec Out chL ON	96H,04H,00H,03H,00H,01H	96H,04H,00H,03H,00H,01H
UNLOCAL Status Change	F4H,02H,00H,00H	F4H,02H,00H,00H
Request Mono In ch1 Fader gain setting	F0H,03H,11H,00H,00H	91H,03H,00H,00H,35H
Request Mono In ch1 Channel On/Off	F0H,03H,12H,00H,00H	92H,03H,00H,00H,01H
Request Stereo In 1 LineC Select	F0H,03H,08H,00H,02H	88H,03H,00H,02H,00H
Request Preset Number	F0H,02H,71H,00H	F1H,02H,00H,01H
Request input matrix assign setting of Mono In ch1 to Bus ch1	F0H,04H,14H,00H,00H,00H	94H,04H,00H,00H,00H,01H
Request input matrix crosspoint gain setting of Mono In ch1 to Bus ch1	F0H,04H,15H,00H,00H,00H	95H,04H,00H,00H,00H,46H

■ Position vs Gain Table for Fader

Position	Gain(dB)	Position	Gain(dB)	Position	Gain(dB)	Position	Gain(dB)				
00H	0	-∞	10H	16	-37.0	20H	32	-21.0	30H	48	-5.0
01H	1	-69.0	11H	17	-36.0	21H	33	-20.0	31H	49	-4.0
02H	2	-66.0	12H	18	-35.0	22H	34	-19.0	32H	50	-3.0
03H	3	-63.0	13H	19	-34.0	23H	35	-18.0	33H	51	-2.0
04H	4	-60.0	14H	20	-33.0	24H	36	-17.0	34H	52	-1.0
05H	5	-58.0	15H	21	-32.0	25H	37	-16.0	35H	53	0.0
06H	6	-56.0	16H	22	-31.0	26H	38	-15.0	36H	54	1.0
07H	7	-54.0	17H	23	-30.0	27H	39	-14.0	37H	55	2.0
08H	8	-52.0	18H	24	-29.0	28H	40	-13.0	38H	56	3.0
09H	9	-50.0	19H	25	-28.0	29H	41	-12.0	39H	57	4.0
0AH	10	-48.0	1AH	26	-27.0	2AH	42	-11.0	3AH	58	5.0
0BH	11	-46.0	1BH	27	-26.0	2BH	43	-10.0	3BH	59	6.0
0CH	12	-44.0	1CH	28	-25.0	2CH	44	-9.0	3CH	60	7.0
0DH	13	-42.0	1DH	29	-24.0	2DH	45	-8.0	3DH	61	8.0
0EH	14	-40.0	1EH	30	-23.0	2EH	46	-7.0	3EH	62	9.0
0FH	15	-38.0	1FH	31	-22.0	2FH	47	-6.0	3FH	63	10.0

■ Value vs Gain Table for Crosspoint gain

Value	Gain(dB)	Value	Gain(dB)	Value	Gain(dB)	Value	Gain(dB)				
00H	0	-INF	10H	16	-54	20H	32	-38	30H	48	-22
01H	1	-69	11H	17	-53	21H	33	-37	31H	49	-21
02H	2	-68	12H	18	-52	22H	34	-36	32H	50	-20
03H	3	-67	13H	19	-51	23H	35	-35	33H	51	-19
04H	4	-66	14H	20	-50	24H	36	-34	34H	52	-18
05H	5	-65	15H	21	-49	25H	37	-33	35H	53	-17
06H	6	-64	16H	22	-48	26H	38	-32	36H	54	-16
07H	7	-63	17H	23	-47	27H	39	-31	37H	55	-15
08H	8	-62	18H	24	-46	28H	40	-30	38H	56	-14
09H	9	-61	19H	25	-45	29H	41	-29	39H	57	-13
0AH	10	-60	1AH	26	-44	2AH	42	-28	3AH	58	-12
0BH	11	-59	1BH	27	-43	2BH	43	-27	3BH	59	-11
0CH	12	-58	1CH	28	-42	2CH	44	-26	3CH	60	-10
0DH	13	-57	1DH	29	-41	2DH	45	-25	3DH	61	-9
0EH	14	-56	1EH	30	-40	2EH	46	-24	3EH	62	-8
0FH	15	-55	1FH	31	-39	2FH	47	-23	3FH	63	-7
Value	Gain(dB)	Value	Gain(dB)	Value	Step Down	Value	Step Up				
40H	64	-6	50H	80	reserved	60H	96	1step	70H	112	1step
41H	65	-5	51H	81	reserved	61H	97	2step	71H	113	2step
42H	66	-4	52H	82	reserved	62H	98	3step	72H	114	3step
43H	67	-3	53H	83	reserved	63H	99	4step	73H	115	4step
44H	68	-2	54H	84	reserved	64H	100	5step	74H	116	5step
45H	69	-1	55H	85	reserved	65H	101	6step	75H	117	6step
46H	70	0	56H	86	reserved	66H	102	7step	76H	118	7step
47H	71	reserved	57H	87	reserved	67H	103	8step	77H	119	8step
48H	72	reserved	58H	88	reserved	68H	104	9step	78H	120	9step
49H	73	reserved	59H	89	reserved	69H	105	10step	79H	121	10step
4AH	74	reserved	5AH	90	reserved	6AH	106	11step	7AH	122	11step
4BH	75	reserved	5BH	91	reserved	6BH	107	12step	7BH	123	12step
4CH	76	reserved	5CH	92	reserved	6CH	108	13step	7CH	124	13step
4DH	77	reserved	5DH	93	reserved	6DH	109	14step	7DH	125	14step
4EH	78	reserved	5EH	94	reserved	6EH	110	15step	7EH	126	15step
4FH	79	reserved	5FH	95	reserved	6FH	111	16step	7FH	127	16step

■ Level Meter Table

Value		Level(dBu)	Value		Level(dBu)	Value		Level(dBu)	Value		Level(dBu)
00H	0	-48	10H	16	-32	20H	32	-16	30H	48	0
01H	1	-47	11H	17	-31	21H	33	-15	31H	49	1
02H	2	-46	12H	18	-30	22H	34	-14	32H	50	2
03H	3	-45	13H	19	-29	23H	35	-13	33H	51	3
04H	4	-44	14H	20	-28	24H	36	-12	34H	52	4
05H	5	-43	15H	21	-27	25H	37	-11	35H	53	5
06H	6	-42	16H	22	-26	26H	38	-10	36H	54	6
07H	7	-41	17H	23	-25	27H	39	-9	37H	55	7
08H	8	-40	18H	24	-24	28H	40	-8	38H	56	8
09H	9	-39	19H	25	-23	29H	41	-7	39H	57	9
0AH	10	-38	1AH	26	-22	2AH	42	-6	3AH	58	10
0BH	11	-37	1BH	27	-21	2BH	43	-5	3BH	59	11
0CH	12	-36	1CH	28	-20	2CH	44	-4	3CH	60	12
0DH	13	-35	1DH	29	-19	2DH	45	-3	3DH	61	13
0EH	14	-34	1EH	30	-18	2EH	46	-2	3EH	62	14
0FH	15	-33	1FH	31	-17	2FH	47	-1	3FH	63	15
Value		Level(dBu)									
40H	64	16									
41H	65	17									
42H	66	18									
43H	67	19									
44H	68	20									
45H	69	21									
46H	70	22									
47H	71	23									
48H	72	24									



Revision history

Version	Amendment day	The contents of establishment / change
1.0.0	March 22/2013	First edition establishment
2.0.0	Dec.2/2013	Changed version number to firmware version