9000M2 Series Mixer/Amplifiers
RS-232C Protocol Manual

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1. SUMMARY

The RS-232C protocol described in this document is designed to be used to control the 9000M2 Series Amplifier from a PC and/or remote controller. This specification applies to the 9000M2 Series firmware version 1.00 or later.
There are both descriptions of mixer mode and matrix mode in this manual, but only mixer mode available with 9000M2 series.

Settings that can be controlled are as follows:

- Channel Fader Gain
- Crosspoint Gain
- Preset Memory Recall
- Channel ON/OFF
- Power ON/OFF
- Tone Control
- EQ Settings(ON/OFF, Band number selection, Gain setting, Q setting, Center frequency setting)
- Loudness Compensation Settings
- Filter Settings(High Pass Filter/Low Pass Filter)
- Filter Settings
- Input Sensitivity Setting
- Phantom Power ON/OFF Setting
- Paging Event Preset Recall

Following values can be read from the 9000M2 Series Amplifier.
- Channel name

When connecting the PC and/or remote controller to the 9000M2 Series Amplifier using this protocol, set the 9000M2 Series Amplifier's RS-232C port as follows:

Bit rate: 9,600/19,200/38,400/57,600 bps (Select the band rate depending on the remote controller to be connected.) (See; Operating instructions of the 9000M2 Series Amplifiers.)

COMMANDLIST, COMMUNICATION EXAMPLES and PARAMETER TABLES are available at the end of each section of this document.

2. SERIAL PORT SETTING

• 9,600/19,200/38,400/57,600 bps, 8 bits, non-parity, stop bit: 1, non flow control
• Connector: D-sub 9 pins, straight cable
• Signal line: No.2=TX, No.3=RX, No.5=Ground

3. COMMAND CONFIGURATION

• Command | Data length (N) | Data 1 | Data 2 ..... Data N
• Command is in the range of 80H to FFH. Data length are in the Data range of 00H to 7FH.
• Data length (N) refers to the length of the subsequent data of Data 1 to Data N.
• If received data contains more byte data than the Data length, these exceeding data are abandoned.
• If a next command received contains byte data shorter than the Data length, the previous command is abandoned.

4. TRANSMISSION DATA AFTER COMMAND RECEPTION

When normal data is received, the same data as the reception data is to be transmitted.
Example: 91H, 03H, 00H, 00H, 00H (Reception data)
⟶ 91H, 03H, 00H, 00H, 00H (Transmission data)

When channel data is received and the data is outside of the range, the data is to be inverted and transmitted.
Example: 91H, 03H, 00H, 08H, 00H (Reception data)
⟶ 91H, 03H, 00H, 77H, 00H (Transmission data)

When abnormal data is received, the data is to be inverted and transmitted.
Example: 91H, 03H, 00H, 00H, 6AH (Reception data)
⟶ 91H, 03H, 00H, 00H, 15H (Transmission data)

When data other than channel data is received and the data is outside of the range, no data is transmitted.
Example: 91H, 03H, 05H, 00H, 6AH (Reception data)
⟶ No response

See section 9. COMMUNICATION EXAMPLES for other transmission data when normal data is received.

5. CONTROL COMMAND AND SETTING VALUE

5.1. Channel Fader Gain

5.1.1. Channel Fader Gain - Position setting

Set the input and output channel fader gains to a fixed value position.

Note: Command cannot be received during power off.

9000M2 Series Amplifier responds with the same data as that received.

91H, 03H, <Channel Attribute>, <Channel Number>, <Value>

<Channel Attribute>
00H: Input channel
01H: Output channel

<Channel Number>
00H - 07H (Input channel 1 - 8)
00H - 07H (Output channel 1 - 8)

<Value>
Position setting

00 – 7EH (-∞ to +10 dB)

See Channel Fader Gain - Position V/S Gain Table on the next page.

Example: Setting the fader gain of channel 1 to 0 dB
91H, 03H, 00H, 00H, 6AH

CHANNEL FADER GAIN - POSITION V/S GAIN TABLE

Position		Gain	Position		Gain	Position		Gain	Position		Gain
HEX	DEC	(dB)	HEX	DEC	(dB)	HEX	DEC	(dB)	HEX	DEC	(dB)
00H	0	-∞	22H	34	-36.0	44H	68	-19.0	66H	102	-2.0
01H	1	-70.0	23H	35	-35.5	45H	69	-18.5	67H	103	-1.5
02H	2	-68.0	24H	36	-35.0	46H	70	-18.0	68H	104	-1.0
03H	3	-66.0	25H	37	-34.5	47H	71	-17.5	69H	105	-0.5
04H	4	-64.0	26H	38	-34.0	48H	72	-17.0	6AH	106	0.0
05H	5	-62.0	27H	39	-33.5	49H	73	-16.5	6BH	107	+0.5
06H	6	-60.0	28H	40	-33.0	4AH	74	-16.0	6CH	108	+1.0
07H	7	-59.0	29H	41	-32.5	4BH	75	-15.5	6DH	109	+1.5
08H	8	-58.0	2AH	42	-32.0	4CH	76	-15.0	6EH	110	+2.0
09H	9	-57.0	2BH	43	-31.5	4DH	77	-14.5	6FH	111	+2.5
0AH	10	-56.0	2CH	44	-31.0	4EH	78	-14.0	70H	112	+3.0
0BH	11	-55.0	2DH	45	-30.5	4FH	79	-13.5	71H	113	+3.5
0CH	12	-54.0	2EH	46	-30.0	50H	80	-13.0	72H	114	+4.0
0DH	13	-53.0	2FH	47	-29.5	51H	81	-12.5	73H	115	+4.5
0EH	14	-52.0	30H	48	-29.0	52H	82	-12.0	74H	116	+5.0
0FH	15	-51.0	31H	49	-28.5	53H	83	-11.5	75H	117	+5.5
10H	16	-50.0	32H	50	-28.0	54H	84	-11.0	76H	118	+6.0
11H	17	-49.0	33H	51	-27.5	55H	85	-10.5	77H	119	+6.5
12H	18	-48.0	34H	52	-27.0	56H	86	-10.0	78H	120	+7.0
13H	19	-47.0	35H	53	-26.5	57H	87	-9.5	79H	121	+7.5
14H	20	-46.0	36H	54	-26.0	58H	88	-9.0	7AH	122	+8.0
15H	21	-45.0	37H	55	-25.5	59H	89	-8.5	7BH	123	+8.5
16H	22	-44.0	38H	56	-25.0	5AH	90	-8.0	7CH	124	+9.0
17H	23	-43.0	39H	57	-24.5	5BH	91	-7.5	7DH	125	+9.5
18H	24	-42.0	3AH	58	-24.0	5CH	92	-7.0	7EH	126	+10.0
19H	25	-41.0	3BH	59	-23.5	5DH	93	-6.5			
1AH	26	-40.0	3CH	60	-23.0	5EH	94	-6.0			
1BH	27	-39.5	3DH	61	-22.5	5FH	95	-5.5			
1CH	28	-39.0	3EH	62	-22.0	60H	96	-5.0			
1DH	29	-38.5	3FH	63	-21.5	61H	97	-4.5			
1EH	30	-38.0	40H	64	-21.0	62H	98	-4.0			
1FH	31	-37.5	41H	65	-20.5	63H	99	-3.5			
20H	32	-37.0	42H	66	-20.0	64H	100	-3.0			
21H	33	-36.5	43H	67	-19.5	65H	101	-2.5			

5.1.2. Channel Fader Gain(Paging Output Volume) - Position setting

Set the Paging output volume channel fader gains to a fixed value position.

Note: Command cannot be received during power off.

9000M2 Series Amplifier responds with the same data as that received.

96H, 03H, <Channel Attribute>, <Channel Number>, <Value>

<Channel Attribute>
01H: Output channel

<Channel Number>
00H - 07H (Paging Output channel 1 - 8)

<Value>
Position setting

00 – 7EH (-∞ to +10 dB)

See CHANNEL FADER GAIN(Paging Output Volume) - POSITION V/S GAIN TABLE on the next page.

Example: Setting the fader gain of channel 1 to 0 dB
96H, 03H, 01H, 00H, 6AH

CHANNEL FADER GAIN(Paging Output Volume) - POSITION V/S GAIN TABLE

Position		Gain	Position		Gain	Position		Gain	Position		Gain
HEX	DEC	(dB)	HEX	DEC	(dB)	HEX	DEC	(dB)	HEX	DEC	(dB)
00H	0	-∞	22H	34	-36.0	44H	68	-19.0	66H	102	-2.0
01H	1	-70.0	23H	35	-35.5	45H	69	-18.5	67H	103	-1.5
02H	2	-68.0	24H	36	-35.0	46H	70	-18.0	68H	104	-1.0
03H	3	-66.0	25H	37	-34.5	47H	71	-17.5	69H	105	-0.5
04H	4	-64.0	26H	38	-34.0	48H	72	-17.0	6AH	106	0.0
05H	5	-62.0	27H	39	-33.5	49H	73	-16.5	6BH	107	+0.5
06H	6	-60.0	28H	40	-33.0	4AH	74	-16.0	6CH	108	+1.0
07H	7	-59.0	29H	41	-32.5	4BH	75	-15.5	6DH	109	+1.5
08H	8	-58.0	2AH	42	-32.0	4CH	76	-15.0	6EH	110	+2.0
09H	9	-57.0	2BH	43	-31.5	4DH	77	-14.5	6FH	111	+2.5
0AH	10	-56.0	2CH	44	-31.0	4EH	78	-14.0	70H	112	+3.0
0BH	11	-55.0	2DH	45	-30.5	4FH	79	-13.5	71H	113	+3.5
0CH	12	-54.0	2EH	46	-30.0	50H	80	-13.0	72H	114	+4.0
0DH	13	-53.0	2FH	47	-29.5	51H	81	-12.5	73H	115	+4.5
0EH	14	-52.0	30H	48	-29.0	52H	82	-12.0	74H	116	+5.0
0FH	15	-51.0	31H	49	-28.5	53H	83	-11.5	75H	117	+5.5
10H	16	-50.0	32H	50	-28.0	54H	84	-11.0	76H	118	+6.0
11H	17	-49.0	33H	51	-27.5	55H	85	-10.5	77H	119	+6.5
12H	18	-48.0	34H	52	-27.0	56H	86	-10.0	78H	120	+7.0
13H	19	-47.0	35H	53	-26.5	57H	87	-9.5	79H	121	+7.5
14H	20	-46.0	36H	54	-26.0	58H	88	-9.0	7AH	122	+8.0
15H	21	-45.0	37H	55	-25.5	59H	89	-8.5	7BH	123	+8.5
16H	22	-44.0	38H	56	-25.0	5AH	90	-8.0	7CH	124	+9.0
17H	23	-43.0	39H	57	-24.5	5BH	91	-7.5	7DH	125	+9.5
18H	24	-42.0	3AH	58	-24.0	5CH	92	-7.0	7EH	126	+10.0
19H	25	-41.0	3BH	59	-23.5	5DH	93	-6.5			
1AH	26	-40.0	3CH	60	-23.0	5EH	94	-6.0			
1BH	27	-39.5	3DH	61	-22.5	5FH	95	-5.5			
1CH	28	-39.0	3EH	62	-22.0	60H	96	-5.0			
1DH	29	-38.5	3FH	63	-21.5	61H	97	-4.5			
1EH	30	-38.0	40H	64	-21.0	62H	98	-4.0			
1FH	31	-37.5	41H	65	-20.5	63H	99	-3.5			
20H	32	-37.0	42H	66	-20.0	64H	100	-3.0			
21H	33	-36.5	43H	67	-19.5	65H	101	-2.5			

5.1.3. Channel Fader Gain - Step Up/ Step Down

Set the input and output channel 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.

9000M2 series Amplifier informs position values changed by commands.
Position values are shown in POSITION V/S GAIN TABLE.
Values are 1dB step under -40dB, and 2dB step under -60dB.

The 9000M2 series Amplifier informs position values changed by Step Up or Down.
93H, 03H, <Channel Attribute>, <Channel Number>, <Step>

<Channel Attribute>
00H: Input channel
01H: Output channel

<Channel Number>
00H - 07H (Input channel 1 – 8)
00H - 07H (Output channel 1 – 8)

<Step>
UP: 41H – 5FH (1 – 31 step up); Example showing 0.5dB Step Up: 41H
Down: 61H - 7FH (1 – 31 step down); Example showing 0.5dB Step Down: 61H

Example showing 0.5dB up of Input Channel 1 fader gain
93H, 03H, 00H, 00H, 41H

Example of 9000M2 series Amplifier response of +1dB Input Channel 1 fader gain after 0.5dB up.

93H, 03H, 00H, 00H, 6CH

See Channel Fader Gain – Step Up / Step Down Table on the next page.

CHANNEL FADER GAIN – STEP UP / STEP DOWN TABLE

Step Up		Gain (dB)	Step Down		Gain (dB)
HEX	DEC		HEX	DEC	
41H	65	+0.5 step	61H	97	-0.5 step
42H	66	+1.0 step	62H	98	-1.0 step
43H	67	+1.5 step	63H	99	-1.5 step
44H	68	+2.0 step	64H	100	-2.0 step
45H	69	+2.5 step	65H	101	-2.5 step
46H	70	+3.0 step	66H	102	-3.0 step
47H	71	+3.5 step	67H	103	-3.5 step
48H	72	+4.0 step	68H	104	-4.0 step
49H	73	+4.5 step	69H	105	-4.5 step
4AH	74	+5.0 step	6AH	106	-5.0 step
4BH	75	+5.5 step	6BH	107	-5.5 step
4CH	76	+6.0 step	6CH	108	-6.0 step
4DH	77	+6.5 step	6DH	109	-6.5 step
4EH	78	+7.0 step	6EH	110	-7.0 step
4FH	79	+7.5 step	6FH	111	-7.5 step
50H	80	+8.0 step	70H	112	-8.0 step
51H	81	+8.5 step	71H	113	-8.5 step
52H	82	+9.0 step	72H	114	-9.0 step
53H	83	+9.5 step	73H	115	-9.5 step
54H	84	+10.0 step	74H	116	-10.0 step
55H	85	+10.5 step	75H	117	-10.5 step
56H	86	+11.0 step	76H	118	-11.0 step
57H	87	+11.5 step	77H	119	-11.5 step
58H	88	+12.0 step	78H	120	-12.0 step
59H	89	+12.5 step	79H	121	-12.5 step
5AH	90	+13.0 step	7AH	122	-13.0 step
5BH	91	+13.5 step	7BH	123	-13.5 step
5CH	92	+14.0 step	7CH	124	-14.0 step
5DH	93	+14.5 step	7DH	125	-14.5 step
5EH	94	+15.0 step	7EH	126	-15.0 step
5FH	95	+15.5 step	7FH	127	-15.5 step

5.2. Crosspoint Gain

Set the crosspoint switch gain. 9000M2 Series Amplifier responds with the same data as that received.

Note: Command cannot be received during power off.

95H, 05H, <Source Channel Attribute>, <Source Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>, <Value>

<Source Channel Attribute> 00H: Input channel

<Source Channel Number> 00H - 07H (Input channel 1 - 8)

<Destination Channel Attribute> 01H: Output channel

<Destination Channel Number> 00H – 07H (Output channel 1 - 8)

<Value>

00 - 51H: Gain Position (-∞ to +10.0 dB)
60 - 6FH: Position Down (1 – 16dB Step Down)
70 - 7FH: Position Up (1 – 16dB Step Up)

Example 1: Setting the crosspoint gain from Input Channel 1 to Output Channel 1 to a fixed value of 0 dB
95H, 05H, 00H, 00H, 01H, 00H, 47H

Example 2: Increasing the crosspoint gain from Input Channel 1 to Output Channel 1 by +3.0 dB steps
95H, 05H, 00H, 00H, 01H, 00H, 72H

See Crosspoint Gain Table on the next page.

CROSSPOINT GAIN TABLE

value		Gain	Value		Gain (dB)	Value		Gain (dB)	Value		Step Down
HEX	DEC	(dB)	HEX	DEC		HEX	DEC		HEX	DEC	
00H	0	-∞	22H	34	-37.0	44H	68	-3.0	65H	101	-6.0 step
01H	1	-70.0	23H	35	-36.0	45H	69	-2.0	66H	102	-7.0 step
02H	2	-69.0	24H	36	-35.0	46H	70	-1.0	67H	103	-8.0 step
03H	3	-68.0	25H	37	-34.0	47H	71	0.0	68H	104	-9.0 step
04H	4	-67.0	26H	38	-33.0	48H	72	1.0	69H	105	-10.0 step
05H	5	-66.0	27H	39	-32.0	49H	73	2.0	6AH	106	-11.0 step
06H	6	-65.0	28H	40	-31.0	4AH	74	3.0	6BH	107	-12.0 step
07H	7	-64.0	29H	41	-30.0	4BH	75	4.0	6CH	108	-13.0 step
08H	8	-63.0	2AH	42	-29.0	4CH	76	5.0	6DH	109	-14.0 step
09H	9	-62.0	2BH	43	-28.0	4DH	77	6.0	6EH	110	-15.0 step
0AH	10	-61.0	2CH	44	-27.0	4EH	78	7.0	6FH	111	-16.0 step
0BH	11	-60.0	2DH	45	-26.0	4FH	79	8.0	Value		Step Up
0CH	12	-59.0	2EH	46	-25.0	50H	80	9.0	70H	112	+1.0 step
0DH	13	-58.0	2FH	47	-24.0	51H	81	10.0	71H	113	+2.0 step
0EH	14	-57.0	30H	48	-23.0	52H	82	reserved	72H	114	+3.0 step
0FH	15	-56.0	31H	49	-22.0	53H	83	reserved	73H	115	+4.0 step
10H	16	-55.0	32H	50	-21.0	54H	84	reserved	74H	116	+5.0 step
11H	17	-54.0	33H	51	-20.0	55H	85	reserved	75H	117	+6.0 step
12H	18	-53.0	34H	52	-19.0	56H	86	reserved	76H	118	+7.0 step
13H	19	-52.0	35H	53	-18.0	57H	87	reserved	77H	119	+8.0 step
14H	20	-51.0	36H	54	-17.0	58H	88	reserved	78H	120	+9.0 step
15H	21	-50.0	37H	55	-16.0	59H	89	reserved	79H	121	+10.0 step
16H	22	-49.0	38H	56	-15.0	5AH	90	reserved	7AH	122	+11.0 step
17H	23	-48.0	39H	57	-14.0	5BH	91	reserved	7BH	123	+12.0 step
18H	24	-47.0	3AH	58	-13.0	5CH	92	reserved	7CH	124	+13.0 step
19H	25	-46.0	3BH	59	-12.0	5DH	93	reserved	7DH	125	+14.0 step
1AH	26	-45.0	3CH	60	-11.0	5EH	94	reserved	7EH	126	+15.0 step
1BH	27	-44.0	3DH	61	-10.0	5FH	95	reserved	7FH	127	+16.0 step
1CH	28	-43.0	3EH	62	-9.0	Value		Step Down			
1DH	29	-42.0	3FH	63	-8.0	60H	96	-1.0 step			
1EH	30	-41.0	40H	64	-7.0	61H	97	-2.0 step			
1FH	31	-40.0	41H	65	-6.0	62H	98	-3.0 step			
20H	32	-39.0	42H	66	-5.0	63H	99	-4.0 step			
21H	33	-38.0	43H	67	-4.0	64H	100	-5.0 step			

5.3. Preset Memory Recall

Recalls any desired preset memories. 9000M2 Series Amplifier responds with the same data as that received.

Note:
Settings to be stored in preset memories are referred to as “SCENE” in mixer mode and “EVENT” in matrix mode.
Preset Memory Recall command cannot be received during power off.

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

<Preset Number> 00H - 1FH: Preset Number 1 - 32

Note: During single channel operation or BGM/PAGE operation in matrix mode
00H - 07H: Preset Number 1 - 8

Example 1: Recalling Preset Memory 1
F1H, 02H, 00H, 00H

Example 2: Recalling Preset Memory 2
F1H, 02H, 00H, 01H

Following command is used to terminate "EVENT" in Matrix Mode. (not available 9000M2 series)

F1H, 02H, 01H, (Event #)

9000M2 series Amplifier ignores this command .

The ROUTE event using the input channel with priority 8 (BGM event) and the BASE event cannot be terminated by this command.
To terminate the BGM event or the BASE event, it is necessary to setup the BGM END event to the unit and activate it.

5.4. Channel ON/OFF

This performs ON/OFF setting of the Input or Output channel. 9000M2 Series Amplifier responds with the same data as that received.

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

<Channel Attribute>
- 00H: Input channel
- 01H: Output channel

<Channel Number>
00H - 07H (Input channel 1 - 8)
00H - 07H (Output channel 1 - 8)

<ON/OFF>
- 00H: Channel OFF
- 01H: Channel ON

Example 1: Setting the Input Channel 1 to ON
92H, 03H, 00H, 00H, 01H

Example 2: Setting the Input Channel 1 to OFF
92H, 03H, 00H, 00H, 00H

5.5. Power ON/OFF

This command performs ON/OFF setting of the power switch of the 9000M2 Series Amplifier. 9000M2 Series Amplifier responds with the same data as that received.

F4H, 01H, <ON/OFF>

<ON/OFF>
- 00H: Power OFF
- 01H: Power ON

Example 1: Setting the power switch to OFF.
F4H, 01H, 00H

Example 2: Setting the power switch to ON.
F4H, 01H, 01H

5.6. Tone Control

Performs Bass and Treble gain settings of the input/output channels. 9000M2 Series Amplifier responds with the same data as that received.

Note: Command cannot be received during power off.

AAH, 04H, <Channel Attribute>, <Channel Number>, <Bass/Treble>, <Value>

<Channel Attribute>
00H: Input channel
01H: Output channel

<Channel Number>
00H - 07H (Input channel 1 - 8)
00H - 07H (Output channel 1 - 8)

<Bass/Treble>
00H: Bass Gain
01H: Treble Gain

<Value>
00 - 18H: Gain Position (-12 to +12dB)
21 - 2CH: Position Down (1 –12dB Step Down)
2D - 38H: Position Up (1 – 12dB Step Up)

Example 1: Setting the Input Channel 1 Bass Gain fixed value to 0 dB.
AAH, 04H, 00H, 00H, 00H, 0CH

Example 2: Increasing Input Channel 1 Bass Gain by +3.0 dB step increments.
AAH, 04H, 00H, 00H, 00H, 2FH

See Tone Control Gain Position Table on the next page.

TONE CONTROL GAIN POSITION TABLE

Value		Gain (dB)	Value		Gain (dB)
HEX	DEC		HEX	DEC	
00H	0	-12.0	0DH	13	+1.0
01H	1	-11.0	0EH	14	+2.0
02H	2	-10.0	0FH	15	+3.0
03H	3	-9.0	10H	16	+4.0
04H	4	-8.0	11H	17	+5.0
05H	5	-7.0	12H	18	+6.0
06H	6	-6.0	13H	19	+7.0
07H	7	-5.0	14H	20	+8.0
08H	8	-4.0	15H	21	+9.0
09H	9	-3.0	16H	22	+10.0
0AH	10	-2.0	17H	23	+11.0
0BH	11	-1.0	18H	24	+12.0
0CH	12	0			
Value		Step Down	Value		Step Up
HEX	DEC		HEX	DEC	
21H	33	-1.0 step	2DH	45	+1.0 step
22H	34	-2.0 step	2EH	46	+2.0 step
23H	35	-3.0 step	2FH	47	+3.0 step
24H	36	-4.0 step	30H	48	+4.0 step
25H	37	-5.0 step	31H	49	+5.0 step
26H	38	-6.0 step	32H	50	+6.0 step
27H	39	-7.0 step	33H	51	+7.0 step
28H	40	-8.0 step	34H	52	+8.0 step
29H	41	-9.0 step	35H	53	+9.0 step
2AH	42	-10.0 step	36H	54	+10.0 step
2BH	43	-11.0 step	37H	55	+11.0 step
2CH	44	-12.0 step	38H	56	+12.0 step

Note: 19H – 20H are deemed to be reserved.

5.7. EQ Settings

Perform EQ settings (ON/OFF, Band number, Gain, Q and Center frequency) of the input/output channels. 9000M2 Series Amplifier responds with the same data as that received. Band number, Gain, Q, and Center frequency cannot be received when EQ is set to OFF. They can be valid only when EQ is set to ON.

Note: Command cannot be received during power off.

A1H, 07H, <Channel Attribute>, <Channel Number>, <OFF/ON>, <Band Number>, <Gain Value>, <Q Value>, <Freq Value>

<Channel Attribute>
00H: Input channel
01H: Output channel

<Channel Number>
00H - 07H (Input channel 1 - 8)
00H - 07H (Output channel 1 - 8)

<OFF/ON>
00H: EQ OFF
01H: EQ ON

<Filter Number>
00H - 09H: Filter 01 - 10

<Gain Value>

EQ-GAIN TABLE

Value		Gain (dB)	Value		Gain (dB)
HEX	DEC		HEX	DEC	
00H	0	-12	0DH	13	+1
01H	1	-11	0EH	14	+2
02H	2	-10	0FH	15	+3
03H	3	-9	10H	16	+4
04H	4	-8	11H	17	+5
05H	5	-7	12H	18	+6
06H	6	-6	13H	19	+7
07H	7	-5	14H	20	+8
08H	8	-4	15H	21	+9
09H	9	-3	16H	22	+10
0AH	10	-2	17H	23	+11
0BH	11	-1	18H	24	+12
0CH	12	0			

Note: If testing using Hyperterminal HEX value 0DH may incorrectly translate and will not work. But when used in other applications using the HEX 0DH will work.

<Q Value>

EQ-Q TABLE

Value		Q
HEX	DEC	
00H	0	0.3
01H	1	0.5
02H	2	0.7
03H	3	1
04H	4	1.5
05H	5	2
06H	6	3
07H	7	5

<Freq Value>

EQ-FREQUENCY TABLE

Value		Freq (Hz)	Value		Freq (Hz)
HEX	DEC		HEX	DEC	
00H	0	20	11H	13	1k
01H	1	25	12H	14	1.25k
02H	2	31.5	13H	15	1.6k
03H	3	40	14H	16	2k
04H	4	50	15H	17	2.5k
05H	5	63	16H	18	3.15k
06H	6	80	17H	19	4k
07H	7	100	18H	20	5k
08H	8	125	19H	21	6.3k
09H	9	160	1AH	22	8k
0AH	10	200	1BH	23	10k
0BH	11	250	1CH	24	12.5k
0CH	12	315	1DH	25	16k
0DH	13	400	1EH	26	20k
0EH	14	500			
0FH	15	630			
10H	16	800			

Example: Setting the Input Channel 1's EQ to ON, Band No. to 1, Gain value to +2 dB, Q value to 0.7 and Center frequency to 40 Hz.
A1H, 07H, 00H, 00H, 01H, 00H, 0EH, 02H, 03H

5.8. Loudness Compensation Settings

Perform loudness compensation settings of the Input / Output channels. 9000M2 Series Amplifier responds with the same data as that received.

Note: Command cannot be received during power off.

ABH, 03H, <Channel Attribute>, <Channel Number>, <OFF/ON>

<Channel Attribute>
- 00H: Input channel
- 01H: Output channel

<Channel Number>
- 00H - 07H (Input channel 1 - 8)
- 00H - 07H (Output channel 1 - 8)

<OFF/ON>
- 00H: Loudness OFF
- 01H: Loudness ON

Example: Setting the loudness compensation of Output Channel 2 to ON
ABH, 03H, 01H, 01H, 01H

5.9. Filter Settings

Perform Filter (HPF/LPF) settings of Input / Output channels. 9000M2 Series Amplifier responds with the same data as the receipt.

Note: Command cannot be received during power off.

A2H, 04H, <Channel Attribute>, <Channel Number>, <HPF/LPF>, < Frequency Value>

<Channel Attribute>
- 00H: Input channel
- 01H: Output channel

<Channel Number>
- 00H - 07H (Input channel 1 - 8)
- 00H - 07H (Output channel 1 - 8)

<HPF/LPF>
- 00H: High Pass Filter
- 01H: Low Pass Filter

<Frequency Value>

HIGH PASS FILTER TABLE – 00H

Value		Freq	Value		Freq
HEX	DEC	(Hz)	HEX	DEC	(Hz)
00H	0	OFF	11H	13	800
01H	1	20	12H	14	1k
02H	2	25	13H	15	1.25k
03H	3	31.5	14H	16	1.6k
04H	4	40	15H	17	2k
05H	5	50	16H	18	2.5k
06H	6	63	17H	19	3.15k
07H	7	80	18H	20	4k
08H	8	100	19H	21	5k
09H	9	125	1AH	22	6.3k
0AH	10	160	1BH	23	8k
0BH	11	200	1CH	24	10k
0CH	12	250	1DH	25	12.5k
0DH	13	315	1EH	26	16k
0EH	14	400	1FH	27	20k
0FH	15	500			
10H	16	630			

LOW PASS FILTER TABLE – 01H

Value		Freq	Value		Freq
HEX	DEC		HEX	DEC	
00H	0	20	11H	13	1k
01H	1	25	12H	14	1.25k
02H	2	31.5	13H	15	1.6k
03H	3	40	14H	16	2k
04H	4	50	15H	17	2.5k
05H	5	63	16H	18	3.15k
06H	6	80	17H	19	4k
07H	7	100	18H	20	5k
08H	8	125	19H	21	6.3k
09H	9	160	1AH	22	8k
0AH	10	200	1BH	23	10k
0BH	11	250	1CH	24	12.5k
0CH	12	315	1DH	25	16k
0DH	13	400	1EH	26	20k
0EH	14	500	1FH	27	OFF
0FH	15	630			
10H	16	800			

Example: Setting the Input Channel 3's High Pass Filter to 31.5 Hz.
A2H, 04H, 00H, 02H, 00H, 03H

5.10. Input Sensitivity Setting

Performs input sensitivity setting of Input channel. 9000M2 Series Amplifier responds with the same data as that received. Input sensitivity setting is enabled only for the channel on which the D-001T or AN-001T is used.

Note: Command cannot be received during power off.

ACH, 02H, <Channel Number>, <Value>

<Channel Number>
00H - 07H (Input channel 1 - 8)

<Value >

INPUT SENSITIVITY TABLE

Value		Sense	Value		Sense
HEX	DEC	(dB)	HEX	DEC	(dB)
00H	0	-10	05H	5	-42
01H	1	-18	06H	6	-48
02H	2	-24	07H	7	-54
03H	3	-30	08H	8	-60
04H	4	-36			

Example: Setting the input sensitivity of Input Channel 5 to –24 dB.
ACH, 02H, 04H, 02H

5.11. Phantom Power ON/OFF Setting

Sets the phantom power of Input channel to ON or OFF. 9000M2 Series Amplifier responds with the same data as that received.

Note: Command cannot be received during power off.

87H, 02H, <Channel Number>, <OFF/ON>

<Channel Number>
00H - 07H (Input channel 1 - 8)

<OFF/ON>
00H: PHANTOM OFF
01H: PHANTOM ON

Example: Setting the phantom power of Input Channel 1 to ON.
87H, 02H, 00H, 01H

5.12. Paging Event Preset Recall

Activates or terminates paging event.

Note: Command cannot be received during power off.

F2H,02H, <Paging Event No>, <Control>

< Paging Event No >
    00H – 1FH (Paging Event 1 - 32)

<Control>
    00H: Stop
    01H: Start

Example: Activating paging event 1.
F2H, 02H, 00H, 01H

6. Channel Name Request

Reads input and output channels' names. The 9000M2 Series Amplifier responds with the channel name to this command.

F0H, 03H, 40H, <Channel Attribute>, <Channel Number>

<Channel Attribute>
- 00H: Input channel
- 01H: Output channel

<Channel Number>
- 00H - 07H (Input channel 1 - 8)
- 00H - 07H (Output channel 1 - 8)

Example: Acquiring the Input Channel 1's name.
F0H, 03H, 40H, 00H, 00H
Response data are provided below.
C0H, 09H, <Channel Attribute>, <Channel Number>,
<ASCII Data (1byte)>, <ASCII Data (2byte)>, <ASCII Data (3byte)>,
<ASCII Data (4byte)>, <ASCII Data (5byte)>, <ASCII Data (6byte)>,
<ASCII Date (7byte)>

Example: Responding with the Input Channel 1's name "INPUT1."
C0H, 09H, 00H, 00H, 49H, 4EH, 50H, 55H, 54H, 31H, 00H

Table below shows ASCII codes used for Names.

Numeric	0	1	2	3	4	5	6	7	8	9
	30H	31H	32H	33H	34H	35H	36H	37H	38H	39H
Alphabetic	A	B	C	D	E	F	G	H	I	J
	41H	42H	43H	44H	45H	46H	47H	48H	49H	4AH
	K	L	M	N	O	P	Q	R	S	T
	4BH	4CH	4DH	4EH	4FH	50H	51H	52H	53H	54H
	U	V	W	X	Y	Z				
	55H	56H	57H	58H	59H	5AH				
Symbol	"	$	&	>	(	)	*	+	-	/
	22H	24H	26H	27H	28H	29H	2AH	2BH	2DH	2FH
	<	=	>	?	[	¥	]	_		
	3CH	3DH	3EH	3FH	5BH	5CH	5DH	5FH		

7. Speaker Preset Setting

Recalls speaker EQ preset values for specific TOA model speakers. 9000M2Series Amplifier responds with the same data as that received.

Note: Command cannot be received during power off.

ADH, 02H, <Output Channel Number>, <Value>

<Output Channel Number>
00H - 07H (Output channel 1 - 8)

<Value >

SPEAKER PRESET TABLE

Value		Sense (dB)	Value		Sense (dB)
HEX	DEC		HEX	DEC	
00H	0	ALL FLAT	10H	16	F-1522
01H	1	F-122	11H	17	FB-2322
02H	2	F-122 LOWCUT	12H	18	FB-2352
03H	3	H-1	13H	19	FB-2852
04H	4	H-1 LOWCUT	14H	20	SR-H2S
05H	5	H-2	15H	21	SR-H2L
06H	6	H-2 LOWCUT	16H	22	SR-H3S
07H	7	H-3	17H	23	SR-H3L
08H	8	H-3 LOWCUT	18H	24	HS-120
09H	9	HB-1	19H	25	HS-150
0AH	10	FB-100	1AH	26	HS-1200
0BH	11	SW FOR F-122	1BH	27	HS-1500
0CH	12	SR-S4	1CH	28	F-1000 LOWCUT
0DH	13	HX-5	1DH	29	F-1300 LOWCUT
0EH	14	HX-5_LOWCUT	1EH	30	F-2000 LOWCUT
0FH	15	FB-120			

8. ANC ADJUST

8.1. ANC Adjust Setting

Adjusts reference level of sensing ambient noise variation.

AEH, 02H,<Channel Number><Adjust Value>

<Channel Number>
    00H - 07H (AN channel 1 - 8)
<Adjust Value>
    Value
    00 – 14H (-10dB to 10dB)
See Adjust Value Table on the next page

Example: Setting reference level of channel 1 to –9dB.
        AEH, 02H, 00H, 01H
        Response data are provided below.
        C1H, 01H, <OK/NG>
        00H:OK
        01H:NG

ANC Adjust Value Table

Value		Value (dB)
HEX	DEC	
00H	0	-10dB
01H	1	-9dB
02H	2	-8dB
03H	3	-7dB
04H	4	-6dB
05H	5	-5dB
06H	6	-4dB
07H	7	-3dB
08H	8	-2dB
09H	9	-1dB
0AH	10	0dB
0BH	11	1dB
0CH	12	2dB
0DH	13	3dB
0EH	14	4dB
0FH	15	5dB
10H	16	6dB
11H	17	7dB
12H	18	8dB
13H	19	9dB
14H	10	10dB

8.2. ANC Get Reference

Reads current reference level of ANC.

F3H, 01H,<Channel Number>

<Channel Number>
00H - 07H (AN channel 1 - 8)

See Reference Level Table on the next page

Example: Acquiring reference level of channel 1.
F3H, 01H, 00H
Response data are provided below.
C2H, 01H, <Ref Level>
00H:OK
01H:NG

Reference Level Value Table

value		Gain	Value		Gain	Value		Gain
HEX	DEC	(dB)	HEX	DEC	(dB)	HEX	DEC	(dB)
00h	0	-50	20h	32	-18	40h	64	+14
01h	1	-49	21h	33	-17	41h	65	+15
02h	2	-48	22h	34	-16	42h	66	+16
03h	3	-47	23h	35	-15	43h	67	+17
04h	4	-46	24h	36	-14	44h	68	+18
05h	5	-45	25h	37	-13	45h	69	+19
06h	6	-44	26h	38	-12	46h	70	+20
07h	7	-43	27h	39	-11	47h	71	+21
08h	8	-42	28h	40	-10	48h	72	+22
09h	9	-41	29h	41	-9	49h	73	+23
0Ah	10	-40	2Ah	42	-8	4Ah	74	+24
0Bh	11	-39	2Bh	43	-7	4Bh	75	+25
0Ch	12	-38	2Ch	44	-6	4Ch	76	+26
0Dh	13	-37	2Dh	45	-5	4Dh	77	+27
0Eh	14	-36	2Eh	46	-4	4Eh	78	+28
0Fh	15	-35	2Fh	47	-3	4Fh	79	+29
10h	16	-34	30h	48	-2	50h	80	+30
11h	17	-33	31h	49	-1	51h	81	+31
12h	18	-32	32h	50	0	52h	82	+32
13h	19	-31	33h	51	+1	53h	83	+33
14h	20	-30	34h	52	+2	54h	84	+34
15h	21	-29	35h	53	+3	55h	85	+35
16h	22	-28	36h	54	+4	56h	86	+36
17h	23	-27	37h	55	+5	57h	87	+37
18h	24	-26	38h	56	+6	58h	88	+38
19h	25	-25	39h	57	+7	59h	89	+39
1Ah	26	-24	3Ah	58	+8	5Ah	90	+40
1Bh	27	-23	3Bh	59	+9	5Bh	91	+41
1Ch	28	-22	3Ch	60	+10	5Ch	92	+42
1Dh	29	-21	3Dh	61	+11			
1Eh	30	-20	3Eh	62	+12			
1Fh	31	-19	3Fh	63	+13			

9. COMMAND LIST

Function	Command Code
Channel fader gain	91H, 03H, <Channel Attribute>, <Channel Number>, <Value> (position) 96H, 03H, <Channel Attribute>, <Channel Number>, <Value> (position) 93H, 03H, <Channel Attribute>, <Channel Number>, <Value> (step)
Crosspoint gain	95H, 05H, <Source Channel Attribute>, <Source Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>, <Value>
Preset memory recall	F1H, 02H, 00H, <Preset Number>
Terminate "EVENT"	F1H, 02H, 01H, <EVENT Number>
Channel ON/OFF	92H, 03H, <Channel Attribute>, <Channel Number>, <OFF/ON>
Power ON/OFF	F4H, 01H, <ON/OFF>
Tone control (BASS/TREBLE)	AAH, 04H, <Channel Attribute>, <Channel Number>, <Bass/Treble>, <Value>
EQ settings - ON/OFF setting - Band No, setting - Gain setting - Q setting - Center frequency setting	A1H, 07H, <Channel Attribute>, <Channel Number>, <OFF/ON>,<Band Number>, <Gain Value>, <Q Value>, <Freq Value>
Loudness compensation	ABH, 03H, <Channel Attribute>, <Channel Number>, <OFF/ON>
Filter setting - HPF setting - LPF setting	A2H, 04H, <Channel Attribute>, <Channel Number>, <HPF/LPF>, <Value>
Input sensitivity setting	ACH, 02H, <Channel Number>, <Value>: (Input channel only)
Phantom power setting	87H, 02H, <Channel Number>, <OFF/ON>: (Input channel only)
Paging Event Preset Recall	F2H,02H, <Paging Event No>, <Control>
Channel name request	F0H, 03H, 40H, <Channel Attribute>, <Channel Number> [Response code] C0H, 09H, <Channel Attribute>, <Channel Number>, <ASCII Data(1byte)>, <ASCII Data(2byte)>, <ASCII Data(3byte)>, <ASCII Data(4byte)>, <ASCII Data(5byte)>, <ASCII Data(6byte)>, <ASCII Data(7byte)>

ANC Adjust Setting	AEH, 02H,<Channel Number><Adjust Value>
ANC Reference	F3H, 01H, ,<Channel Number>

10. COMMUNICATION EXAMPLES

Command	Controller	9000M2 Response
Channel fader gain		
Input ch1 Fader gain=0dB	91H, 03H, 00H, 00H, 6AH	91H, 03H, 00H, 00H, 6AH
Input ch1 Fader gain 1 step up	93H, 03H, 00H, 00H, 41H	93H, 03H, 00H, 00H, 6CH (Amplifier response of +1dB Input Channel 1 fader gain after command.)
Output ch1 Fader gain=-∞dB	91H, 03H, 01H, 00H, 00H	91H, 03H, 01H, 00H, 00H
Paing Output ch1 Fader gain=0dB	96H,03H,01H,01H,6AH	96H,03H,01H,01H,6AH
Crosspoint gain		
Input ch1->Output ch1 0dB	95H, 05H, 00H, 00H, 01H, 00H, 47H	95H, 05H, 00H, 00H, 01H, 00H, 47H
Input ch3->Output ch5 -20dB	95H, 05H, 00H, 02H, 01H, 04H, 33H	95H, 05H, 00H, 02H, 01H, 04H, 33H
Input ch4->Output ch1 1 step up	95H, 05H, 00H, 03H, 01H, 00H, 70H	95H, 05H, 00H, 03H, 01H, 00H, 70H
Preset memory recall		
Event1 Start (Matrix)	F1H, 02H, 00H, 00H	F1H, 02H, 00H, 00H
Scene5 Load (Mixer)	F1H, 02H, 00H, 04H	F1H, 02H, 00H, 04H
Terminate "EVENT" (Matrix)		
Terminate Event1 (Matrix)	F1H, 02H, 01H, 00H	F1H, 02H, 01H, 00H
Channel ON/OFF		
Input ch1 OFF	92H, 03H, 00H, 00H, 00H	92H, 03H, 00H, 00H, 00H
Output ch2 ON	92H, 03H, 01H, 01H, 01H	92H, 03H, 01H, 01H, 01H
Power ON/OFF		
Power OFF	F4H, 01H, 00H	F4H, 01H, 00H
Power ON	F4H, 01H, 01H	F4H, 01H, 01H
Tone control (Bass/Treble)		
Input ch1 Bass gain -5dB	AAH, 04H, 00H, 00H, 00H, 07H	AAH, 04H, 00H, 00H, 00H, 07H
Output ch3 Treble gain 0dB	AAH, 04H, 01H, 02H, 01H, 0CH	AAH, 04H, 01H, 02H, 01H, 0CH
Input ch2 Treble gain 2 step up	AAH, 04H, 00H, 01H, 01H, 2EH	AAH, 04H, 00H, 01H, 01H, 2EH
Output ch1 Bass gain 1 step down	AAH, 04H, 01H, 00H, 00H, 21H	AAH, 04H, 01H, 00H, 00H, 21H
EQ setting		
Input ch1 EQ ON, Band01, Gain +1dB, Q 0.5, Freq 40Hz	A1H, 07H, 00H, 00H, 01H, 00H, 0DH, 01H, 03H	A1H, 07H, 00H, 00H, 01H, 00H, 0DH, 01H, 03H
Output ch3 EQ ON, Band05, Gain 0dB, Q 3, Freq 200Hz	A1H, 07H, 01H, 02H, 01H, 04H, 0CH, 06H, 0AH	A1H, 07H, 01H, 02H, 01H, 04H, 0CH, 06H, 0AH
Loudness compensation settings		
Input ch4 Loudness ON	ABH, 03H, 00H, 03H, 01H	ABH, 03H, 00H, 03H, 01H
Filter settings		

Input ch2 Hpf 31.5Hz	A2H, 04H, 00H, 01H, 00H, 03H	A2H, 04H, 00H, 01H, 00H, 03H
Output ch1 Lpf 6.3kHz	A2H, 04H, 01H, 00H, 01H, 02H	A2H, 04H, 01H, 00H, 01H, 02H
Command	Controller	9000M2 Response
Input sensitivity setting		
Input ch1 Insense -24dB	ACH, 02H, 00H, 02H	ACH, 02H, 00H, 02H
Speaker preset setting		
Output ch2 SpPreset F-122	ADH, 02H, 01H, 01H	ADH, 02H, 01H, 01H
Phantom power setting		
Input ch3 Phantom ON	87H, 02H, 02H, 01H	87H, 02H, 02H, 01H
Paging Event Preset Recall		
Paging No1 Activates	F2H,02H,00H,01	F2H,02H,00H,01
Channel name recall		
Input ch1 Name “INPUT1”	F0H, 03H, 40H, 00H, 00H	C0H, 09H, 00H, 00H, 49H, 4EH, 50H, 55H, 54H, 31H, 00H
ANC ADJUST		
Reference Level Of Ch1 to –9dB	AEH,02H,00H,01H	C1H,01H,00H
ANC Get Reference		
Acquiring reference level of Ch1	F3H,01H,00h	C2H,01H,32H(0dB)