

## **D-901 Digital Mixer**

### **RS-232C Protocol**

Ver.2.00 Apr.22/2004

#### ■ **Summary**

The RS-232C protocol described in this document is designed for use of controlling the D-901 Mixer from a personal computer or remote controller.

This spec sheet applies to the D-901 firmware of version 2.00 or later.

Settings that can be controlled are as follows:

- Channel fader gain
- Channel ON/OFF
- Input HPF ON/OFF
- Line(Stereo) Select
- Bus assignment
- Crosspoint Gain
- Preset memory recall

If necessary, the D-901's activation can be checked or setting values read by using the following commands:

- D-901 activation status (output from the D-901 at the time of activation)
- Gate status (transmitted from the D-901 when the gate status changes)
- Status request (reading of the D-901's setting value)

When connecting the remote controller to the D-901 Mixer by way of this protocol, set the D-901's RS-232C port as follows:

- Mode: Remote
- Bit rate: 9,600/19,200/38,400/115,200 (Select according to the remote controller to be connected.)

(Refer; RS-232C Port Settings of the D-901 instruction manual.)

#### ■ **Serial Port Settings**

- 9,600/19,200/38,400/115,200 bps, 8 bits, non-parity, stop bit: 1, no flow control
- Connector: D-sub 9 pins, straight cable
- Signal line: No. 2=TX; No. 3=RX; No. 5=Ground

#### ■ **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 fader gains by position.

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

The D-901 transmits changed value data after receiving this command.

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

<Channel Attribute>

00H: Input channel

01H: Output channel

<Channel Number>

When Channel Attribute=00H: 00H - 0BH, 7FH (Input channel 1 – 12, All input channels)

When Channel Attribute=01H: 00H - 07H, 7FH (Output channel 1 – 8, All output channels)

<Position>

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

Example of setting Input Channel 1 fader gain to 0 dB:

91H, 03H, 00H, 00H, 2AH

### ● Channel Fader Gain (Step)

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.

The D-901 informs position values changed by step Up or Down.

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

<Channel Attribute>

00H: Input channel

01H: Output channel

<Channel Number>

When Channel Attribute=00H: 00H - 0BH, 7FH (Input channel 1 – 12, All input channels)

When Channel Attribute=01H: 00H - 07H, 7FH (Output channel 1 – 8, All output channels)

<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 Input Channel 1 fader gain

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

● **Channel ON/OFF**

Set both the input and output channels to ON or OFF.

The D-901 transmits changed value data after receiving this command.

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

<Channel Attribute>

00H: Input channel

01H: Output channel

<Channel Number>

When Channel Attribute=00H: 00H - 0BH, 7FH (Input channel 1 – 12, All input channels)

When Channel Attribute=01H: 00H - 07H, 7FH (Output channel 1 – 8, All output channels)

<ON/OFF>

00H: Channel OFF

01H: Channel ON

Example of setting Input Channel 1 to ON:

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

● **Input high-pass filter ON/OFF**

Set the input channel's high-pass filter to ON or OFF.

The D-901 transmits changed value data after receiving this command.

**A0H, 03h, 00h, <Channel Number>, <ON/OFF>**

<Channel Number>

00H – 0BH (Input channels 1 – 12)

<ON/OFF>

00H: HPF OFF

01H: HPF ON

Example of setting Input Channel 1's High-pass Filter 1 to ON:

A0H, 03H, 00H, 00H, 01H

● **Line (stereo) select**

Set the line (stereo) select status for the D-936R.

The D-901 transmits changed value data after receiving this command.

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

<Slot Attribute>

00H-05H: Input Slot Numbers 1 – 6

Slot 1 = Input ch 1/ch 2

Slot 6 = Input ch 11/ch 12

<Line Number>

00H-03H: Line Numbers 1 – 4

<ON/OFF>

00H: OFF

01H: ON

Example of setting Input Slot 1's Line 3 to ON

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

### ● Bus assignment

Set the bus assignment to ON or OFF.

The D-901 transmits changed value data after receiving this command.

**94H, 05H, <Source Channel Attribute>, <Source Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>, <ON/OFF>**

<Source Channel Attribute>

00H: Input channel

02H: Mic bus channel

<Source Channel Number>

When Source Channel Attribute=00H: 00H - 0BH (Input channel 1 - 12)

When Source Channel Attribute=02H: 00H (Mic Bus channel)

<Destination Channel Attribute>

01H: Output channel

02H: Mic bus channel

<Destination Channel Number>

When Destination Channel Attribute=01H: 00H - 07H (Output channel 1 - 8)

When Destination Channel Attribute=02H: 00H (Mic Bus channel)

<ON/OFF>

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

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

Example of setting the bus assignment from Input Channel 1 to Output Channel 1 to ON:

94H, 05H, 00H, 00H, 01H, 00H, 01H

### ● Crosspoint gain

Set the crosspoint gains by position.

The D-901 transmits changed value data after receiving this command.

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

<Source Channel Attribute>

00H: Input channel

02H: Mic bus channel

<Source Channel Number>

When Source Channel Attribute=00H: 00H - 0BH (Input channel 1 - 12)

When Source Channel Attribute=02H: 00H (Mic Bus channel)

<Destination Channel Attribute>

01H: Output channel

02H: Mic bus channel

<Destination Channel Number>

When Destination Channel Attribute=01H: 00H - 07H (Output channel 1 - 8)

When Destination Channel Attribute=02H: 00H (Mic Bus channel)

<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 Input Channel 1 to Output Channel 1 to 0dB:

95H, 05H, 00H, 00H, 01H, 00H, 46H

Example showing 3-step Up of Input Channel 1 to Output Channel 1 crosspoint gain

95H, 05H, 00H, 00H, 01H, 00H, 72H

### ● Preset Memory Recall

Recall desired preset memories.

The D-901 transmits changed preset memory number after receiving this command.

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

<Preset Memory Number>

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

Example of recalling Preset Memory 1:

F1H, 02H, 00H, 00H

- **D-901 Action Status**

Status data is transmitted from the D-901 when the power is switched on.

**DFH, 01H, 01H**

- **Gate status**

When the gate status changes, the D-901 transmits the changed status data.

**E6H, 03H, 00H, <Channel Number>, <OPEN/CLOSE>**

<Channel Number>

00H-0BH: Numbers 1 – 12

<OPEN/CLOSE>

00H: OPEN

01H: CLOSE

Example of the change of Input 1's gate status to CLOSE

E6H, 03H, 00H, 00H, 01H

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

This command requests the D-901 to send its current channel fader gain position setting data.

The D-901 informs the current gain position.

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

<Channel Attribute>

00H: Input channel

01H: Output channel

<Channel Number>

When Channel Attribute=00H: 00H - 0BH, 7FH (Input channel 1 – 12, All input channels)

When Channel Attribute=01H: 00H - 07H, 7FH (Output channel 1 – 8, All output channels)

Example of requesting Input Channel 1's fader gain position value data: F0H, 03H, 11H, 00H, 00H

- **Status Request (Channel ON/OFF)**

This command requests the D-901 to send its current channel ON/OFF setting status data.

The D-901 informs the current ON/OFF setting status.

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

<Channel Attribute>

00H: Input channel

01H: Output channel

<Channel Number>

When Channel Attribute=00H: 00H - 0BH, 7FH (Input channel 1- 12, All input channels)

When Channel Attribute=01H: 00H - 07H, 7FH (Output channel 1 – 8, All output channels)

Example of requesting Input Channel 1's ON/OFF setting status data: F0H, 03H, 12H, 00H, 00H

- **Status request (HPF ON/OFF)**

This command requests to send the current ON/OFF setting status data of the input high-pass filter on the D-901 side.

The D-901 transmits the current input high-pass filter ON/OFF setting status data.

**F0H, 03H, 20H, 00H, <Channel Number>**

<Channel Number>

00H-0BH, 7FH (Input channels 1 – 12, all input channels)

Example of requesting input Channel 1's high-pass filter ON/OFF setting status data

F0H, 03H, A0H, 00H, 00H

- **Status request (Line Select)**

This command requests to send the current line select ON/OFF setting status data on the D-901 side.

The D-901 transmits the current line select ON/OFF setting status data.

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

<Slot Number>

00H-05H: Input slot numbers 1 – 6

Slot 1 = Input ch 1/ch 2

Slot 6 = Input ch 11. ch 12

<Line number>

00H – 03H: Line numbers 1 – 4, 7FH (All line numbers for each slot)

Example of requesting the ON/OFF setting status data for Input 4 of the module in Slot 6

F0H, 03H, 08H, 05H, 03H

Example of requesting to send ON/OFF setting status data of all line numbers for Slot 2.

F0H, 03H, 08H, 01H, 7FH

- **Status request (gate status)**

This command requests to send the current gate OPEN/CLOSE status data on the D-901 side.

The D-901 transmits the current gate OPEN/CLOSE status data.

**F0H, 03H, 66H, <Channel Attribute>, <Channel Number>**

<Channel Attribute>

00H: Input channel

<Channel Number>

00H-0BH, 7FH (Input channels 1 – 12, all input channels)

Example of requesting the gate OPEN/CLOSE status data for Input Channel 1

F0H, 03H, 66H, 0H, 00H

- **Status Request (Bus assignment)**

This command requests the D-901 to send its current bus assignment setting data.

The D-901 informs the current bus assignment setting status.

**F0H, 05H, 14H, <Source Channel Attribute>, <Source Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>**

Example of requesting Input Channel 1 to Output Channel 1 bus assignment setting data:

F0H, 05H, 14H, 00H, 00H, 00H, 00H

Example of requesting all bus assignment setting data:

F0H, 05H, 14H, 7FH, 7FH, 7FH, 7FH

- **Status Request (Crosspoint gain)**

This command requests the D-901 to send its current crosspoint gain setting data.

The D-901 informs the current crosspoint gain setting status.

**F0H, 05H, 15H, <Source Channel Attribute>, <Source Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>**

Example of requesting Input Channel 1 to Output Channel 1 crosspoint gain setting data:

F0H, 05H, 15H, 00H, 00H, 00H, 00H

Example of requesting all crosspoint gain setting data:

F0H, 05H, 15H, 7FH, 7FH, 7FH, 7FH

- **Status Request (Current preset numbers)**

This command requests to send the D-901's currently recalled preset number data.

The D-901 transmits the current preset number data.

**F0H, 02H, 71H, 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>
Input HPF ON/OFF	A0H, 03H, 00H, <Channel Number>, <ON/OFF>
Line(Stereo) Select	88H, 03H, <Slot Number>, <Line Number>, <ON/OFF>
Bus assignment	94H, 05H, <Source Channel Attribute>, <Source Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>, <ON/OFF>
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>
D-901Activation status	DFH, 01H, 01H
Gate Status	E6H, 03H, 00H, <Channel Number>, <OPEN/CLOSE>
Status (channel fader gain)	F0H, 03H, 11H, <Channel Attribute>, <Channel Number>
Status (HPF)	F0H, 03H, 20H, 00H, <Channel Number>
Status (channel ON/OFF)	F0H, 03H, 12H, <Channel Attribute>, <Channel Number>
Status (Line Select)	F0H, 03H, 08H, <Slot Number>, <Line Number>
Status (Gate Status)	F0H, 03H, 66H, 00H, <Channel Number>
Status (bus assignment)	F0H, 05H, 14H, <Source Channel Attribute>, <Source Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>
Status (Crosspoint gain)	F0H, 05H, 15H, <Source Channel Attribute>, <Source Channel Number>, <Destination Channel Attribute>, <Destination Channel Number>
Status (Preset)	F0H, 02H, 71H, 00H

**Communication Examples**

Command	Controller	D-901Response
Load preset 1	F1H,02H,00H,00H	F1H,02H,00H,00H
Input ch1 Fader gain=0dB	91H,03H,00H,00H,2AH	91H,03H,00H,00H,2AH
Output ch1 Fader gain=0dB	91H,03H,01H,00H,2AH	91H,03H,01H,00H,2AH
Input ch1 Fader gain=-INFdB	91H,03H,00H,00H,00H	91H,03H,00H,00H,00H
Input ch1 Fader gain 3step up	91H,03H,00H,00H,43H	91H,03H,00H,00H,2DH
Input ch1 Fader gain 3step down	91H,03H,00H,00H,63H	91H,03H,00H,00H,2AH
All input channel Fader gain = 0dB	91H,03H,00H,7FH,2AH	91H,03H,00H,00H,2AH 91H,03H,00H,01H,2AH : 91H,03H,00H,0BH,2AH
Input ch1 ON	92H,03H,00H,00H,01H	92H,03H,00H,00H,01H
Input ch1 OFF	92H,03H,00H,00H,00H	92H,03H,00H,00H,00H
All input channel ON	92H,03H,00H,7FH,01H	92H,03H,00H,00H,01H 92H,03H,00H,01H,01H : 92H,03H,00H,0BH,01H
Select Slot1 Line3 ON (Mix Mode)	88H,03H,00H,02H,01H	88H,03H,00H,02H,01H
Select Slot5 Line2 ON (Select Mode)	88H,03H,04H,01H,01H	88H,03H,04H,00H,00H 88H,03H,04H,01H,01H
Input ch1 HPF ON	A0H,03H,00H,00H,01H	A0H,03H,00H,00H,01H
Bus: Input ch1 to Output ch1 ON	94H,05H,00H,00H,01H,00H,01H	94H,05H,00H,00H,01H,00H,01H
Bus: Input ch1 to Output ch1 0dB	95H,05H,00H,00H,01H,00H,46H	95H,05H,00H,00H,01H,00H,46H
Bus: Input ch1 to Output ch1 1step up	95H,05H,00H,00H,01H,00H,70H	95H,05H,00H,00H,01H,00H,01H
Request Input ch1 Fader gain setting	F0H,03H,11H,00H,00H	91H,03H,00H,00H,2AH
Request Input ch1 Channel On/Off	F0H,03H,12H,00H,00H	92H,03H,00H,00H,01H
Request Input ch1 HPF On/Off	F0H,03H,20H,00H,00H	A0H,03H,00H,00H,01H
Request Slot1 Line3 Select	F0H,03H,08H,00H,02H	88H,03H,00H,02H,01H
Request Slot5 All Line Select	F0H,03H,08H,04H,7FH	88H,03H,04H,00H,00H 88H,03H,04H,01H,01H 88H,03H,04H,02H,00H 88H,03H,04H,03H,00H
Request Input ch1 Gate Status	F0H,03H,66H,00H,00H	E6H,03H,00H,00H,01H
Request Input all Gate Status	F0H,03H,66H,00H,7FH	E6H,03H,00H,00H,01H E6H,03H,00H,01H,01H :

		E6H,03H,00H,0BH,01H
Request Preset Number	F0H,02H,71H,00H	F1H,02H,00H,01H
Request bus assign setting of Input ch1 to Output ch1	F0H,05H,14H,00H,00H,01H,00H	94H,05H,00H,00H,01H,00H,01H
Request All bus assign settings	F0H,05H,14H,7FH,7FH,7FH,7FH	94H,05H,00H,00H,01H,00H,01H 94H,05H,00H,00H,01H,01H,01H : 94H,05H,00H,00H,01H,07H,01H 94H,05H,00H,01H,01H,00H,01H : 94H,05H,00H,00H,02H,00H,01H 94H,05H,02H,00H,01H,00H,01H : 94H,05H,02H,00H,01H,07H,01H
Request crosspoint gain setting of Input ch1 to Output ch1	F0H,05H,15H,00H,00H,01H,00H	95H,05H,00H,00H,01H,00H,46H
Request All crosspoint gain settings	F0H,05H,15H,7FH,7FH,7FH,7FH	95H,05H,00H,00H,01H,00H,46H 95H,05H,00H,00H,01H,01H,46H : 95H,05H,00H,00H,01H,07H,46H 95H,05H,00H,01H,01H,00H,46H : 95H,05H,00H,00H,02H,00H,46H 95H,05H,02H,00H,01H,00H,46H : 95H,05H,02H,00H,01H,07H,46H

**Position vs Gain Table for Fader**

Position		Gain(dB)	Position		Gain(dB)	Position		Gain(dB)	Position		Gain(dB)
00H	0	-INF	10H	16	-19.0	20H	32	- 4.5	30H	48	2.5
01H	1	-60.0	11H	17	-18.0	21H	33	- 4.0	31H	49	3.0
02H	2	-54.0	12H	18	-17.0	22H	34	- 3.5	32H	50	3.5
03H	3	-48.0	13H	19	-16.0	23H	35	- 3.0	33H	51	4.0
04H	4	-42.0	14H	20	-15.0	24H	36	- 2.5	34H	52	4.5
05H	5	-36.0	15H	21	-14.0	25H	37	- 2.0	35H	53	5.0
06H	6	-33.0	16H	22	-13.0	26H	38	- 1.5	36H	54	5.5
07H	7	-30.0	17H	23	-12.0	27H	39	- 1.0	37H	55	6.0
08H	8	-27.0	18H	24	-11.0	28H	40	- 0.5	38H	56	6.5
09H	9	-26.0	19H	25	-10.0	29H	41	0.0	39H	57	7.0
0AH	10	-25.0	1AH	26	- 9.0	2AH	42	0.0	3AH	58	7.5
0BH	11	-24.0	1BH	27	- 8.0	2BH	43	0.0	3BH	59	8.0
0CH	12	-23.0	1CH	28	- 7.0	2CH	44	0.5	3CH	60	8.5
0DH	13	-22.0	1DH	29	- 6.0	2DH	45	1.0	3DH	61	9.0
0EH	14	-21.0	1EH	30	- 5.5	2EH	46	1.5	3EH	62	9.5
0FH	15	-20.0	1FH	31	- 5.0	2FH	47	2.0	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			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

## Revision history

Version	Amendment day	The contents of establishment / change
1.00	Jan.18/2003	First edition establishment
1.10	Oct.15/2003	•HPF(ON/OFF) addition •LINE SELECT addition •GATE STATUS(OPEN/CLOSE) addition •REQUEST PRESET NUMBER addition
2.00	Apr.22/2004	•Crosspoint gain addition