

DIGITAL STEREO REVERB

Model RV-70

MIDI Implementation

1. RECOGNIZED RECEIVE DATA

CHANNEL VOICE MESSAGE

Program Change

Status	Second
CnH	ppH

n = MIDI Channel 0H - FH (ch.1 - ch.16)
 pp = Program Number 00H - 7FH (prog.1 - prog.128)

The program number of internal memory, that corresponds to the received program number, can be called.

SYSTEM EXCLUSIVE MESSAGE

Status	data	Status
F0H	iiH, ddH,, eeH	F7H

Status	
F0H	System Exclusive

iiH = Manufacturer ID (Roland = 41H)
 dd,, eeH = data : 00H - 7FH (0 - 127)
 F7H EOX (End of Exclusive)

For more details, please refer to "3.EXCLUSIVE COMMUNICATIONS" and "Roland Exclusive Messages".

2. TRANSMITTED DATA

SYSTEM EXCLUSIVE MESSAGE

Status	data	Status
F0H	iiH, ddH,, eeH	F7H

Status	
F0H	System Exclusive

iiH = Manufacturer ID (Roland = 41H)
 dd,, eeH = data : 00H - 7FH (0 - 127)
 F7H EOX (End of Exclusive)

For more details, please refer to "3.EXCLUSIVE COMMUNICATIONS" and "Roland Exclusive Messages".

3. EXCLUSIVE COMMUNICATION

Via Exclusive Messages, RV-70 can send or receive parameter setting data in conjunction with external MIDI devices.

Exclusive communications of RV-70 are always conducted under the following One way communication format (shown as the Roland Exclusive Format, type IV).

For more details, please refer to "Roland Exclusive Messages" in this Manual.

For the Model ID, RV-70 accepts 69H.

Device ID is 00H - 0FH.

Request Data1RQ1 (11H)

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
Dev	Device ID (Dev : 00H - 0FH)
69H	Model ID (RV-70)
11H	Command ID (RQ1)
aaH	Address MSB
bbH	Address
ccH	Address LSB
ssH	Size MSB
ttH	Size
uuH	Size LSB
sum	Checksum
F7H	EOX (End of System Exclusive)

* RV-70 dose not transmit this message.

Data Set1DT1 (12H)

Byte	Description
F0H	Exclusive status
41H	Manufacturer ID (Roland)
Dev	Device ID (Dev : 00H - 0FH)
69H	Model ID (RV-70)
12H	Command ID (DT1)
aaH	Address MSB
bbH	Address
ccH	Address LSB
ddH	Data
:	:
eeH	Data
sum	Checksum
F7H	EOX (End of System Exclusive)

4. ADDRESS MAPPING OF PARAMETERS

The address and size are displayd under 7-bit hexadecimal notation.

Address	MSB	LSB
Binary	0aaa aaaa	0bbb bbbb
7-bit Hexadecimal	AA	BB

Address	MSB	LSB
Binary	0sss ssss	0ttt tttt
7-bit Hexadecimal	SS	TT

Parameter base address

The actual address of each parameter is the start address of the block plus the offset address.

There are two type of the RV-70 exclsive message. One is an individual parameter communication, the other is a bulk dump communication.

In bulk dump communication, RV-70 needs EOB(End Of Bulk Mark) end of communication. In individual parameter communication, One system exclusive message "F0 F7" can only have one parameter.

You cannot use any address having "#" for the top address in a system exclusive message.

Address Block Map

Address	Block	Sub Block	Note
00 00 00H	SYSTEM PARAMETERS		Bulk Refer to Table-1
00 04 00H	PROGRAMS PARAMETERS	Program No. 1 Parameters	Bulk Refer to Table-2.1.1 Refer to Table-2.2
		Program No. 2 Parameters	
		...	
		Program No. 199 Parameters	
04 00 00H		End Of Bulk Mark	Refer to Table-2.3
10 00 00H	SYSTEM PARAMETERS		Individual Refer to Table-1
10 04 00H	PROGRAMS PARAMETERS	Program No. 1 Parameters	Individual Refer to Table-2.1.2 Refer to Table-2.2
		Program No. 2 Parameters	
		...	
		Program No. 199 Parameters	
20 00 00H	Temporary Parameters		Individual Refer to Table-2.2
20 02 00H	TEMPORARY BUFFER		Individual Refer to Table-3
20 03 00H	TEMPORARY ALGORITHM Change		Individual Refer to Table-4
20 04 00H	INFORMATION		Individual Refer to Table-5
20 10 00H	Exclusive Program Change		Individual Refer to Table-6

Table-1 SYSTEM PARAMETERS

Offset	Data	Size(H)	Description
00 00 00H	0000_000mB		MIDI MODE m 0:OMNI OFF 1:OMNI ON
00 00 01H	0000_000cB		Rx. MCR-8 Control c 0:OFF 1:ON
00 01 00H	0000_ppppB	00 00 02	Program Change Map No.1 LSB (1 - 199)
00 01 01H#	0000_ppppB		Program Change Map No.1 MSB
00 01 02H	0000_ppppB	00 00 02	Program Change Map No.2 LSB (1 - 199)
00 01 03H#	0000_ppppB		Program Change Map No.2 MSB
00 01 04H	0000_ppppB	00 00 02	Program Change Map No.3 LSB (1 - 199)
00 01 05H#	0000_ppppB		Program Change Map No.3 MSB
00 01 06H	0000_ppppB	00 00 02	Program Change Map No.4 LSB (1 - 199)
00 01 07H#	0000_ppppB		Program Change Map No.4 MSB
	:		:
	:		:
00 02 7AH	0000_ppppB	00 00 02	Program Change Map No.126 LSB (1 - 199)
00 02 7BH#	0000_ppppB		Program Change Map No.126 MSB
00 02 7CH	0000_ppppB	00 00 02	Program Change Map No.127 LSB (1 - 199)
00 02 7DH#	0000_ppppB		Program Change Map No.127 MSB
00 02 7EH	0000_ppppB	00 00 02	Program Change Map No.128 LSB (1 - 199)
00 02 7FH#	0000_ppppB		Program Change Map No.128 MSB

Table-2.1.1 PROGRAM PARAMETERS (Bulk Area)

Address	Data	Description
00 04 00H	0000_aaaaB	Program No.1 Parameters Refer to Table-2.2
00 06 00H	0000_aaaaB	Program No.2 Parameters :
	:	:
	:	:
03 0C 00H	0000_aaaaB	Program No.197 Parameters :
03 0E 00H	0000_aaaaB	Program No.198 Parameters :
03 10 00H	0000_aaaaB	Program No.199 Parameters Refer to Table-2.2

Table-2.1.2 PROGRAM PARAMETERS (Individual Area)

Address	Data	Description
10 04 00H	0000_aaaaB	Program No.1 Parameters Refer to Table-2.2
10 06 00H	0000_aaaaB	Program No.2 Parameters :
	:	:
	:	:
13 0C 00H	0000_aaaaB	Program No.197 Parameters :
13 0E 00H	0000_aaaaB	Program No.198 Parameters :
13 10 00H	0000_aaaaB	Program No.199 Parameters Refer to Table-2.2

Table-2.2 Program Parameters

Offset	Data	Size(H)	Description
00 00 00H	0000_ttttB	00 00 01	Algorithm Number t:00H-0AH(0 - 10)
00 00 01H#	0000_0000B		Reserved
00 00 02H	0000_nnnnB	00 00 06	1st. Parameter Number LSB
00 00 03H#	0000_nnnnB		1st. Parameter Number MSB
00 00 04H#	0000_vvvvB		1st. Parameter Value LSB
00 00 05H#	0000_vvvvB		1st. Parameter Value :
00 00 06H#	0000_vvvvB		1st. Parameter Value :
00 00 07H#	0000_vvvvB		1st. Parameter Value MSB
00 00 08H	0000_nnnnB	00 00 06	2nd. Parameter Number LSB
00 00 09H#	0000_nnnnB		2nd. Parameter Number MSB
00 00 0AH#	0000_vvvvB		2nd. Parameter Value LSB
00 00 0BH#	0000_vvvvB		2nd. Parameter Value :
00 00 0CH#	0000_vvvvB		2nd. Parameter Value :
00 00 0DH#	0000_vvvvB		2nd. Parameter Value MSB
	:		:
00 00 7AH	0000_nnnnB	00 00 06	21th Parameter Number LSB
00 00 7BH#	0000_nnnnB		21th Parameter Number MSB
00 00 7CH#	0000_vvvvB		21th Parameter Value LSB
00 00 7DH#	0000_vvvvB		21th Parameter Value :
00 00 7EH#	0000_vvvvB		21th Parameter Value :
00 00 7FH#	0000_vvvvB		21th Parameter Value MSB
00 01 00H	0000_nnnnB	00 00 06	22th Parameter Number LSB
00 01 01H#	0000_nnnnB		22th Parameter Number MSB
00 01 02H#	0000_vvvvB		22th Parameter Value LSB
00 01 03H#	0000_vvvvB		22th Parameter Value :
00 01 04H#	0000_vvvvB		22th Parameter Value :
00 01 05H#	0000_vvvvB		22th Parameter Value MSB
	:		:
00 01 48H	0000_nnnnB	00 00 06	34th Parameter Number LSB
00 01 49H#	0000_nnnnB		34th Parameter Number MSB

00 01 4A#	0000_vvvvB	34th Parameter Value	LSB
00 01 4B#	0000_vvvvB	34th Parameter Value	:
00 01 4C#	0000_vvvvB	34th Parameter Value	:
00 01 4D#	0000_vvvvB	34th Parameter Value	MSB
00 01 4E#	0000_nnnnB	00 00 06 35th Parameter Number	LSB
00 01 4F#	0000_nnnnB	35th Parameter Number	MSB
00 01 50#	0000_vvvvB	35th Parameter Value	LSB
00 01 51#	0000_vvvvB	35th Parameter Value	:
00 01 52#	0000_vvvvB	35th Parameter Value	:
00 01 53#	0000_vvvvB	35th Parameter Value	MSB

Table-2.2.1 Algorithm Number

Algorithm Name	Number
ROOM1	0 /* Reverb ROOM1 */
ROOM2	1 /* Reverb ROOM2 */
ROOM3	2 /* Reverb ROOM3 */
HALL1	3 /* Reverb HALL1 */
HALL2	4 /* Reverb HALL2 */
GARAGE	5 /* Reverb GARAGE */
Non Linear	6 /* Non Linear */
ROOM SERIES	7 /* REV+DELAY ROOM SERIES */
HALL SERIES	8 /* REV+DELAY HALL SERIES */
ROOM PARALLEL	9 /* REV+DELAY ROOM PARALLEL */
HALL PARALLEL	10 /* REV+DELAY HALL PARALLEL */

Table-2.2.2 Parameter Number List

Name	Number	Information
RSize	0	Room Size
PrDly	1	Pre Delay
HiCFq	2	High Cut Filter Frequency
RevTm	3	Reverb Time
HiDFq	4	HF Damp <Frequency>
HiDmp	5	HF Damp <Gain>
LoDFq	6	LF Damp <Frequency>
LoDmp	7	LF Damp <Gain>
Dnsty	8	Early Density
ERLvl	9	Early Reflection Level
RIDns	10	Release Density
OutLv	11	Output Level
LowFq	12	Low EQ Frequency
LowGn	13	Low EQ Gain
Low_0	14	Low EQ 0 (PEAK/SHELV)
MidFq	15	Mid EQ Frequency
MidGn	16	Mid EQ Gain
Mid_0	17	Mid EQ 0
HigFq	18	High EQ Frequency
HigGn	19	High EQ Gain
Hig_0	20	High EQ 0 (PEAK/SHELV)
NLTyp	21	NLR MODE
EnvT1	22	NLR Envelope Time 1
EnvT2	23	NLR Envelope Time 2
EnvT3	24	NLR Envelope Time 3
EnvT4	25	NLR Envelope Time 4
EnvL1	26	NLR Envelope Level 1
EnvL2	27	NLR Envelope Level 2
EnvL3	28	NLR Envelope Level 3
NLRTm/DyTim	29	NLR & Delay Time Scale
NLFil	30	Non-Linear Filter
DyTmL	31	Delay Time Left
DyLvL	32	Delay Level Left
DyTmR	33	Delay Time Right
DyLvR	34	Delay Level Right
DyTmC	35	Delay Time Center
DyLvC	36	Delay Level Center
DyFLV	37	NLR & Delay Feedback Level
NLRF1	38	Non-Linear Filter 1
NLRO1	39	Non-Linear 0 1
NLRF2	40	Non-Linear Filter 2
NLRO2	41	Non-Linear 0 2
NLRF3	42	Non-Linear Filter 3
NLRO3	43	Non-Linear 0 3
NLRF4	44	Non-Linear Filter 4
NLRO4	45	Non-Linear 0 4
NLRF5	46	Non-Linear Filter 5
NLRO5	47	Non-Linear 0 5
RvLvl	48	Reverb Level

Table-2.2.3 Parameter Number (algo_number 0)

Location	Parameter	Number	Description
1	RSize	0	56 (5.6m) - 326 (32.6m)
2	PrDly	1	0 (0msec) - 400 (400msec)
3	HiCFq	2	170 (170Hz) - 20000 (20.0kHz)
4	RevTm	3	6 (0.06sec) - 3200 (32.0sec)
5	HiDFq	4	4000 (4.0kHz) - 20000 (20.0kHz)
6	HiDmp	5	-36 (-36dB) - 0 (0dB)
7	LoDFq	6	50 (50Hz) - 4000 (4.00kHz)
8	LoDmp	7	-36 (-36dB) - 0 (0dB)
9	Dnsty	8	0 - 99
10	ERLvl	9	0 - 99
11	RIDns	10	0 - 99
12	OutLv	11	0 - 100
13	LowFq	12	200 (200Hz) - 2000 (2.00kHz)
14	LowGn	13	-12 (-12dB) - +12 (+12dB)
15	Low_0	14	2 (SHELV), 3 (0.3) - 100 (10.0)
16	MidFq	15	200 (200Hz) - 8000 (8.00kHz)
17	MidGn	16	-12 (-12dB) - +12 (+12dB)
18	Mid_0	17	3 (0.3) - 100 (10.0)
19	HigFq	18	1500 (1.50kHz) - 20000 (20.0kHz)
20	HigGn	19	-12 (-12dB) - +12 (+12dB)
21	Hig_0	20	2 (SHELV), 3 (0.3) - 100 (10.0)

2. ROOM 2 (algo_number 1) HALL 1 (algo_number 3)

Location	Parameter	Number	Description
1	RSize	0	1 - 10
2	PrDly	1	0 (0msec) - 400 (400msec)
3	HiCFq	2	170 (170Hz) - 20000 (20.0kHz)
4	RevTm	3	6 (0.06sec) - 3200 (32.0sec)
5	HiDFq	4	4000 (4.0kHz) - 20000 (20.0kHz)
6	HiDmp	5	-36 (-36dB) - 0 (0dB)
7	LoDFq	6	50 (50Hz) - 4000 (4.00kHz)
8	LoDmp	7	-36 (-36dB) - 0 (0dB)
9	Dnsty	8	0 - 99
10	ERLvl	9	0 - 99
11	RIDns	10	0
12	OutLv	11	0 - 100
13	LowFq	12	200 (200Hz) - 2000 (2.00kHz)
14	LowGn	13	-12 (-12dB) - +12 (+12dB)
15	Low_0	14	2 (SHELV), 3 (0.3) - 100 (10.0)
16	MidFq	15	200 (200Hz) - 8000 (8.00kHz)
17	MidGn	16	-12 (-12dB) - +12 (+12dB)
18	Mid_0	17	3 (0.3) - 100 (10.0)
19	HigFq	18	1500 (1.50kHz) - 20000 (20.0kHz)
20	HigGn	19	-12 (-12dB) - +12 (+12dB)
21	Hig_0	20	2 (SHELV), 3 (0.3) - 100 (10.0)

3. ROOM 3 (algo_number 2) HALL 2 (algo_number 4) GARAGE (algo_number 5)

Location	Parameter	Number	Description
1	RSize	0	1 - 8
2	PrDly	1	0 (0msec) - 400 (400msec)
3	HiCFq	2	170 (170Hz) - 20000 (20.0kHz)
4	RevTm	3	6 (0.06sec) - 3200 (32.0sec)
5	HiDFq	4	4000 (4.0kHz) - 20000 (20.0kHz)
6	HiDmp	5	-36 (-36dB) - 0 (0dB)
7	LoDFq	6	50 (50Hz) - 4000 (4.00kHz)
8	LoDmp	7	-36 (-36dB) - 0 (0dB)
9	Dnsty	8	0 - 99
10	ERLvl	9	0 - 99
11	RIDns	10	0 - 99
12	OutLv	11	0 - 100
13	LowFq	12	200 (200Hz) - 2000 (2.00kHz)
14	LowGn	13	-12 (-12dB) - +12 (+12dB)
15	Low_0	14	2 (SHELV), 3 (0.3) - 100 (10.0)
16	MidFq	15	200 (200Hz) - 8000 (8.00kHz)
17	MidGn	16	-12 (-12dB) - +12 (+12dB)
18	Mid_0	17	3 (0.3) - 100 (10.0)
19	HigFq	18	1500 (1.50kHz) - 20000 (20.0kHz)
20	HigGn	19	-12 (-12dB) - +12 (+12dB)
21	Hig_0	20	2 (SHELV), 3 (0.3) - 100 (10.0)

4. Non Linear (algo_number 6)

Location	Parameter	Number	Description
1	PrDly	1	0(0msec) - 400(400msec)
2	HiCFq	2	170(170Hz) - 20000(20.0kHz)
3	Dnsty	8	0 - 99
4	OutLv	11	0 - 100
5	NLTyp	21	0 - 2 0: >>> 1:<<< 2:<<<
6	EnvT1	22	0(0msec) - 1000(1000msec)
7	EnvT2	23	0(0msec) - 1000(1000msec)
8	EnvT3	24	0(0msec) - 1000(1000msec)
9	EnvT4	25	0(0msec) - 1000(1000msec)
10	EnvL1	26	0 - 100
11	EnvL2	27	0 - 100
12	EnvL3	28	0 - 100
13	TmRto	29	10 - 100[%]
14	NRBal	30	0 - 100
15	LowFq	2	200(200Hz) - 2000(2.00kHz)
16	LowGn	13	-12(-12dB) - +12(+12dB)
17	Low_0	14	2(SHELV), 3(0.3) - 100(10.0)
18	MidFq	15	200(200Hz) - 8000(8.00kHz)
19	MidGn	16	-12(-12dB) - +12(+12dB)
20	Mid_0	17	3(0.3) - 100(10.0)
21	HigFq	18	1500(1.50kHz) - 20000(20.0kHz)
22	HigGn	19	-12(-12dB) - +12(+12dB)
23	Hig_0	20	2(SHELV), 3(0.3) - 100(10.0)
24	DyFLv	37	0 - 99
25	NLRF1	38	24 - 120
26	NLR01	39	1 - 10
27	NLRF2	40	24 - 120
28	NLR02	41	1 - 10
29	NLRF3	42	24 - 120
30	NLR03	43	1 - 10
31	NLRF4	44	24 - 120
32	NLR04	45	1 - 10
33	NLRF5	46	24 - 120
34	NLR05	47	1 - 10

5. REV+DELAY SIREAL ROOM (algo_number 7) REV+DELAY SIREAL HALL (algo_number 8) REV+DELAY Parallel ROOM (algo_number 9) REV+DELAY Parallel HALL (algo_number 10)

Location	Parameter	Number	Description
1	RSize	0	1 - 10
2	PrDly	1	0(0msec) - 200(200msec)
3	HiCFq	2	170(170Hz) - 20000(20.0kHz)
4	RevTm	3	6(0.06sec) - 3200(32.0sec)
5	HiDFq	4	4000(4.0kHz) - 20000(20.0kHz)
6	HiDmp	5	-36(-36dB) - 0(0dB)
7	LoDFq	6	50(50Hz) - 4000(4.00kHz)
8	LoDmp	7	-36(-36dB) - 0(0dB)
9	Dnsty	8	0 - 99
10	ERLvl	9	0 - 99
11	OutLv	11	0 - 100
12	TmRto	29	10 - 100[%]
13	DyTrL	31	0(0msec) - 500(500msec)
14	DyLvL	32	0 - 99
15	DyTrR	33	0(0msec) - 500(500msec)
16	DyLvR	34	0 - 99
17	DyTrC	35	0(0msec) - 500(500msec)
18	DyLvC	36	0 - 99
19	DyFLv	37	0 - 99
20	LowFq	12	200(200Hz) - 2000(2.00kHz)
21	LowGn	13	-12(-12dB) - +12(+12dB)
22	Low_0	14	2(SHELV), 3(0.3) - 100(10.0)
23	MidFq	15	200(200Hz) - 8000(8.00kHz)
24	MidGn	16	-12(-12dB) - +12(+12dB)
25	Mid_0	17	3(0.3) - 100(10.0)
26	HigFq	18	1500(1.50kHz) - 20000(20.0kHz)
27	HigGn	19	-12(-12dB) - +12(+12dB)
28	Hig_0	20	2(SHELV), 3(0.3) - 100(10.0)
29	Rvlvl	48	0 - 100

Table-2.3 End Of Bulk Mark

Address	Data	Description
04 00 00H	0000_0000B	End Of Bulk Mark

Table-3 TEMPORARY BUFFER (Write Only)

Address	Data	Description
20 02 00H	0000_nnnnB	Parameter Number n:00H-30H(0 - 48) LSB
20 02 01H#	0000_nnnnB	Parameter Number MSB
20 02 02H#	0000_vvvvB	Parameter Value LSB
20 02 03H#	0000_vvvvB	Parameter Value :
20 02 04H#	0000_vvvvB	Parameter Value :
20 02 05H#	0000_vvvvB	Parameter Value MSB

v:0000H-FFFFH(-32768 - 32767)use nibblized data

Table-4 TEMPORARY Algorithm Change (Write Only)

Address	Data	Description
20 03 00H	0000_ttttB	Algorithm Number t:00H-0AH(0 - 10)

Table-5 INFORMATION (READ ONLY)

Address	Data	Size(H)	Description
20 04 00H	0aaa_aaaaB	00 00 08	Software Version Number (ASCII) 20H-7FH(32-127)
20 04 01H	0aaa_aaaaB		Software Version Number (ASCII) 20H-7FH(32-127)
	:		:
20 04 07H	0aaa_aaaaB		Software Version Number (ASCII) 20H-7FH(32-127)

Table-6 Exclusive Program Change (Write Only)

Address	Data	Description
20 10 00H	0000_nnnnB	Program number n:00H-C6H(1 - 199) LSB
20 10 01H#	0000_nnnnB	MSB

Example of exclusive message and checksum calculation

Example 1

Setting the gain of low band EQ for the effect sound being output to -12dB (set to temporary buffer) To set the gain, transmit the parameter number and parameter value at the same time.

The low band EQ gain parameter number is as shown below : refer to Table 2.2.2. Parameter Number list.

LowGn 13 Low Band EQ Gain

Convert the decimal number 13 into hexadecimal number :

0Dh
--
| LSB
MSB

Express two's complement of -12 in 16-bit value (refer to conversion table) :

FFF4h
--
| LSB
MSB

Set items (1) through (6) listed below to Roland exclusive format. Referring to Table 3, set 8 bits of the number and the value in that order, LSB first.

F0 41 00 69 12 20 02 00 0D 00 04 0F 0F 0F ??? F7

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)

- (1) Exclusive Status
- (2) ID (Roland)
- (3) Device ID (= Rx, MIDI Channel)
- (4) MODEL ID (RV-70)
- (5) Common ID DT1
- (6) address
- (7) data (nibbled)
- (8) data (nibbled)
- (9) checksum
- (10) End of Exclusive

Calculate checksum (9).

Address (6) + Data (7) + Data (8) =

20H + 02H + 00H + 0Dh + 00H + 04H + 0FH + 0FH + 0FH = 60H (sum)
32 + 2 + 0 + 13 + 0 + 4 + 15 + 15 + 15 = 96

96 (sum) / 128 = 0 (quotient) ... 96 (remainder)
checksum = 128 - 96 (remainder) = 32 = 20H

Example 2

Using exclusive message, change the program number to 134.

Hexadecimal number equivalent of decimal number 134 :

```

86h
--
| LSB
MSB
    
```

Set items (1) through (6) listed below to Roland exclusive format. Referring to Table 3, set 8 bits of the program number, LSB first.

```

F0 41 00 69 12 20 10 00 06 08 ??? F7
-----
(1) (2) (3) (4) (5) (6) (7) (8) (9)
    
```

Calculate checksum (8).

Address (6) + Data (7) =

20H + 10H + 00H + 06H + 08H = 2CH (sum)
 32 + 16 + 0 + 6 + 8 = 44

44 (sum) / 128 = 0 (quotient) ... 44 (remainder)
 checksum = 128 - 44 (remainder) = 84 = 54H

Transmitted message : F0 41 69 00 12 20 10 00 06 08 54 F7

Example 3

Change parameter "EqHFq" of the main program No. 15 to 18800Hz. Below takes algorithm No. 6 "Non Linear" as an example.

* Transferring this data changes the value stored in the RV-70 memory but does not affect the tone color of the sound being output. This change becomes valid only when the program is changed to 15 by a program change operation or by a key operation.

Determine the address

As can be seen from the parameter address map, the base address of the program 15 is 10 20 00. The location of EqHFq for Non Linear : Refer to Table 2.2. Add the offset address of the parameter at location 21 to the base address.

```

10 20 00 + 00 00 7A = 10 20 7A
-----
Base address + Offset address
    
```

Set the parameter number of EqHFq to 20.

Hexadecimal number equivalent of decimal number 20 :

```

14 h
--
| LSB
MSB
    
```

Obtain the value.

Convert decimal number 18800 into hexadecimal number :

```

4970h
--
| LSB
MSB
    
```

Referring to Table 3, set 8 bits of the number and the value in that order, LSB first.

```

F0 41 00 69 12 20 10 7A 04 01 00 07 09 04 ??? F7
-----
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)
    
```

Calculate the checksum (9).

Address (6) + Data (7) + Data (8) =

20H + 10H + 7AH + 04H + 01H + 00H + 07H + 09H + 04H = C3H (sum)
 32 + 16 + 122 + 4 + 1 + 0 + 7 + 9 + 4 = 195

195 (sum) / 128 = 1 (quotient) ... 67 (remainder)
 checksum = 128 - 67 (remainder) = 61 = 3DH

Transmitted data : F0 41 69 00 12 20 10 7A 04 01 00 07 09 04 3D F7

Reference

Decimal number vs hexadecimal number

Two's complement in 16-bit value

10-bit	16-bit	10-bit	16-bit	10-bit	16-bit
0	0000h	-13	FFF3h	-25	FFE7h
-1	FFFh	-14	FFF2h	-26	FFE6h
-2	FFFh	-15	FFF1h	-27	FFE5h
-3	FFFDh	-16	FFE0h	-28	FFE4h
-4	FFFCh	-17	FFEfh	-29	FFE3h
-5	FFFh	-18	FFEEh	-30	FFE2h
-6	FFFh	-19	FFEDh	-31	FFE1h
-7	FFF9h	-20	FFEC	-32	FFE0h
-8	FFF8h	-21	FFEBh	-33	FFDFh
-9	FFF7h	-22	FFEAh	-34	FFDEh
-10	FFF6h	-23	FFE9h	-35	FFDh
-11	FFF5h	-24	FFE8h	-36	FFDCh < Hi, LowDmp Gain minimum
-12	FFF4h < EQ Gain minimum				

Communication between RV-70 and MCR-8

Control change from MCR-8 is used to alter internal parameter settings. And it is not defined by MIDI specifications.

MCR-8 Receive switch of RV-70 must be turned on when you use a MCR-8 to operate the RV-70.

The setting of a MCR-8 is MODE 4.

1. Parameter arrangement of MCR-8.

The effective parameter may change from Algorithm number even when receive same control change signal.

e.g. When change C1_2 Volume of MCR-8 and send it to RV-70,

if Algorithm setting is 7 (NLR), EnvT1 will be edited.

if Algorithm setting is 1-6 (REV) or 8-11 (REV + DELAY), Densty will be edited.

* With Algorithm 1-6 (REVERB), there is no delay-time and feedback that is in Algorithm 8-11 (REVERB + DELAY).

● ALGORITHM 1-6 (REV) 8-11 (REV+DELAY)

	1	2	3	4	5	6	7	8	: MASTER
C1:	RSize	Dnsty	HiDFq	LoDFq	RIDns	DyTmL	DyTmR	DyTmC	: HiCFq
S1:	ALG_1	ALG_2	ALG_3	ALG_4	ALG_5	ALG_6	ALG_7	ALG_8	
S2:	ALG_9	ALG10	ALG11						
C2:	RevTm	PrDly	HiDmp	LoDmp	ERLvl	DyLvL	DyLvR	DyLvC	: OutLv

	9	10	11	12	13	14	15	16	: MASTER
C1:	LowFq	Low_0	MidFq	Mid_0	HigFq	Hig_0	DyFLv	DyTim	: HiCFq
S1:	SHELV				SHELV				
S2:	PEAK				PEAK				
C2:	LowGn	none	MidGn	none	EQHGn	none	none	RevLv	: OutLv

● ALGORITHM 7 (NLR)

	1	2	3	4	5	6	7	8	: MASTER
C1:	Dnsty	EnvT1	EnvT2	EnvT3	EnvT4	NLBal	NLTyp		: HiCFq
S1:	ALG_1	ALG_2	ALG_3	ALG_4	ALG_5	ALG_6	ALG_7	ALG_8	
S2:	ALG_9	ALG10	ALG11						
C2:	PrDly	EnvL1	EnvL2	EnvL3	none	none	none	none	: OutLv

	9	10	11	12	13	14	15	16	: MASTER
C1:	LowFq	Low_0	MidFq	Mid_0	HigFq	Hig_0	DyFLv	NLTim	: HiCFq
S1:	SHELV				SHELV				
S2:	PEAK				PEAK				
C2:	LowGn	none	MidGn	none	HigGn	none	none	none	: OutLv

FILTER (Push F1)

	1/9	2/10	3/11	4/12	5/13	6/14	7/15	8/16	: MASTER
C1:	NLRF1	NLRF2	NLRF3	NLRF4	NLRF5	none	none	none	: none
S1:									
S2:									
C2:	NLR01	NLR02	NLR03	NLR04	HigGn	none	none	none	: none

2. The relation between "MIDI OUTPUT DATA" controlled from MCR-8 and RV-70 parameter.

=MCR-8= = MIDI OUTPUT DATA = = RV-70 SW & Parameter =
 SELECT Status
 | | Second
 | SW/Slider | | Third
 | | | |
 v v v v v (Value) Description

[ALGORITHM CHANGE]

Release / Depressed
 A S1_1 : Bn 00 vv (00 / 7FH) : ALGORITHM Change 1 ROOM1
 A S1_2 : Bn 01 vv (00 / 7FH) : ALGORITHM Change 2 ROOM2
 A S1_3 : Bn 02 vv (00 / 7FH) : ALGORITHM Change 3 ROOM3
 A S1_4 : Bn 03 vv (00 / 7FH) : ALGORITHM Change 4 HALL1
 A S1_5 : Bn 04 vv (00 / 7FH) : ALGORITHM Change 5 HALL1
 A S1_6 : Bn 05 vv (00 / 7FH) : ALGORITHM Change 6 GARAGE
 A S1_7 : Bn 06 vv (00 / 7FH) : ALGORITHM Change 7 NLR
 A S1_8 : Bn 07 vv (00 / 7FH) : ALGORITHM Change 8 REV+DLY ROOM SERIAL
 A S2_1 : Bn 28 vv (00 / 7FH) : ALGORITHM Change 9 REV+DLY HALL SERIAL
 A S2_2 : Bn 29 vv (00 / 7FH) : ALGORITHM Change 10 REV+DLY ROOM PARALLEL
 A S2_3 : Bn 2A vv (00 / 7FH) : ALGORITHM Change 11 REV+DLY HALL PARALLEL

[RV-70 PANEL CONTROL]

F1 : Bn 0A vv (00 / 7FH) : NLR BPF EDIT_MODE (押している間のみ)
 ■ : Bn 15 vv (00 / 7FH) : WRITE MODE EXIT
 ● : Bn 17 vv (00 / 7FH) : WRITE KEY
 DEC : Bn 18 vv (00 / 7FH) : DOWN KEY
 INC : Bn 19 vv (00 / 7FH) : UP KEY
 VALUE : Bn 60 vv (00 - 7FH) : PROGRAM NUMBER INC/DEC
 01H-3FH INC
 40H-7FH DEC
 S3 : Bn 1E vv (00 / 7FH) : PROGRAM SET

[OUTPUT CONTROL]

MASTER
 B C1 : Bn 50 vv (00 - 7FH) : HiCut
 B C2 : Bn 51 vv (00 - 7FH) : OutLv

[PARAMETRIC EQ SHELLVING/PEAKING]

B S1_1 : Bn 20 vv (00 / 7FH) : Low_0 SHELLVING
 B S1_5 : Bn 24 vv (00 / 7FH) : Hig_0 SHELLVING
 B S2_1 : Bn 58 vv (00 / 7FH) : Low_0 PEAKING
 B S2_5 : Bn 5C vv (00 / 7FH) : Hig_0 PEAKING

MODE
 [REVERB]
 [REVERB+DELAY] [NLR] [NLR FILTER (F1 ON)]

[EFFECT PARAMETER CONTROL]

A C1_1 : Bn 48 vv (00 - 7FH) : RSize Dnsty [NLR] NLRF1 [NLR (F1 On)]
 A C1_2 : Bn 49 vv (00 - 7FH) : Dnsty EnvT1 [NLR] NLRF2 [NLR (F1 On)]
 A C1_3 : Bn 4A vv (00 - 7FH) : HiDFq EnvT2 [NLR] NLRF3 [NLR (F1 On)]
 A C1_4 : Bn 4B vv (00 - 7FH) : LoDFq EnvT3 [NLR] NLRF4 [NLR (F1 On)]
 A C1_5 : Bn 4C vv (00 - 7FH) : RiDns EnvT4 [NLR] NLRF5 [NLR (F1 On)]
 A C1_6 : Bn 4D vv (00 - 7FH) : DyTmL NLBal [NLR]
 A C1_7 : Bn 4E vv (00 - 7FH) : DyTmR NLTyp [NLR]
 A C1_8 : Bn 4F vv (00 - 7FH) : DyTmC none [NLR]
 A C2_1 : Bn 40 vv (00 - 7FH) : RevTm PrDly [NLR] NLRQ1 [NLR (F1 On)]
 A C2_2 : Bn 41 vv (00 - 7FH) : PrDly EnvL1 [NLR] NLRQ2 [NLR (F1 On)]
 A C2_3 : Bn 42 vv (00 - 7FH) : HiDmp EnvL2 [NLR] NLRQ3 [NLR (F1 On)]
 A C2_4 : Bn 43 vv (00 - 7FH) : LoDmp EnvL3 [NLR] NLRQ4 [NLR (F1 On)]
 A C2_5 : Bn 44 vv (00 - 7FH) : ERLvI none [NLR] NLRQ5 [NLR (F1 On)]
 A C2_6 : Bn 45 vv (00 - 7FH) : DyLvL none [NLR]
 A C2_7 : Bn 46 vv (00 - 7FH) : DyLvR none [NLR]
 A C2_8 : Bn 47 vv (00 - 7FH) : DyLvR none [NLR]
 B C1_1 : Bn 38 vv (00 - 7FH) : LowFq LowFq
 B C1_2 : Bn 39 vv (00 - 7FH) : Low_0 Low_0
 B C1_3 : Bn 3A vv (00 - 7FH) : MidFq MidFq
 B C1_4 : Bn 3B vv (00 - 7FH) : Mid_0 Mid_0
 B C1_5 : Bn 3C vv (00 - 7FH) : HigFq HigFq
 B C1_6 : Bn 3D vv (00 - 7FH) : Hig_0 Hig_0
 B C1_7 : Bn 3E vv (00 - 7FH) : DyFLv DyFLv [NLR]
 B C1_8 : Bn 3F vv (00 - 7FH) : TmRto TmRto [NLR]
 B C2_1 : Bn 30 vv (00 - 7FH) : LowGn LowGn
 B C2_2 : Bn 31 vv (00 - 7FH) : none none
 B C2_3 : Bn 32 vv (00 - 7FH) : MidGn MidGn
 B C2_4 : Bn 33 vv (00 - 7FH) : none none
 B C2_5 : Bn 34 vv (00 - 7FH) : HigGn HigGn
 B C2_6 : Bn 35 vv (00 - 7FH) : none none
 B C2_7 : Bn 36 vv (00 - 7FH) : none none
 B C2_8 : Bn 37 vv (00 - 7FH) : RevLv none [NLR]

3. The Control Change number that RV-70 recognizes.

Control Change Table

= MIDI = = RV-70 Parameter = = Value =
 Status
 | Second
 | | Third
 | | |
 v v v (Value)
 Bn 20 vv (7FH) : Low_0 SHELLVING /* Shellving */
 Bn 24 vv (7FH) : Hig_0 SHELLVING /* Shellving */
 Bn 30 vv (00 - 7FH) : LowGn /* (-12) - 0 - +12 [dB] */
 Bn 32 vv (00 - 7FH) : MidGn /* (-12) - 0 - +12 [dB] */
 Bn 34 vv (00 - 7FH) : EHGn /* (-12) - 0 - +12 [dB] */
 Bn 37 vv (00 - 7FH) : RevLv /* 0 - 100 */
 Bn 38 vv (00 - 7FH) : LowFq /* 60 - 2000 [Hz] */
 Bn 39 vv (00 - 7FH) : Low_0 /* 0.3 - 10.0 */
 Bn 3A vv (00 - 7FH) : MidFq /* 200 - 8000 [Hz] */
 Bn 3B vv (00 - 7FH) : Mid_0 /* 0.3 - 10.0 */
 Bn 3C vv (00 - 7FH) : HigFq /* 1500 - 20000 [Hz] */
 Bn 3D vv (00 - 7FH) : Hig_0 /* 0.3 - 10.0 */
 Bn 3E vv (00 - 7FH) : DyFLv /* 0 - 99 */
 Bn 3E vv (00 - 7FH) : DyFLv [NLR] /* 0 - 99 */
 Bn 3F vv (00 - 7FH) : TmRto /* 10 - 100 [%] */
 Bn 3F vv (00 - 7FH) : TmRto [NLR] /* 10 - 100 [%] */
 Bn 40 vv (00 - 7FH) : RevTm /* 0.06 - 32.0 [sec] */
 Bn 40 vv (00 - 7FH) : PrDly [NLR] /* 0 - 400 [msec] */
 Bn 40 vv (00 - 7FH) : NLRQ1 [NLR (F1 On)] /* TYPE 1 - TYPE 10 */
 Bn 41 vv (00 - 7FH) : PrDly /* 0 - 400 [msec] */
 : ALGORITHM 8,9 /* 0 - 200 [msec] */
 : ALGORITHM 10,11 /* 0 - 200 [msec] */
 Bn 41 vv (00 - 7FH) : EnvL1 [NLR] /* 0 - 100 */
 Bn 41 vv (00 - 7FH) : NLRQ2 [NLR (F1 On)] /* TYPE 1 - TYPE 10 */
 Bn 42 vv (00 - 7FH) : HiDmp /* 0 - (-36) [dB] */
 Bn 42 vv (00 - 7FH) : EnvL2 [NLR] /* 0 - 100 */
 Bn 42 vv (00 - 7FH) : NLRQ3 [NLR (F1 On)] /* TYPE 1 - TYPE 10 */
 Bn 43 vv (00 - 7FH) : LoDmp /* 0 - (-36) [dB] */
 Bn 43 vv (00 - 7FH) : EnvL3 [NLR] /* 0 - 100 */
 Bn 43 vv (00 - 7FH) : NLRQ4 [NLR (F1 On)] /* TYPE 1 - TYPE 10 */
 Bn 44 vv (00 - 7FH) : ERLvI /* 0 - 99 */
 Bn 44 vv (00 - 7FH) : NLRQ5 [NLR (F1 On)] /* TYPE 1 - TYPE 10 */
 Bn 45 vv (00 - 7FH) : DyLvL /* 0 - 99 */
 Bn 46 vv (00 - 7FH) : DyLvC /* 0 - 99 */
 Bn 47 vv (00 - 7FH) : DyLvR /* 0 - 99 */
 Bn 48 vv (00 - 7FH) : RSize /* Size 5.6 - 32.6 [m] */
 : ALGORITHM 1 /* Size 1 - 10 */
 : ALGORITHM 2,3 /* Size 1 - 10 */
 : ALGORITHM 8,9 /* Size 1 - 10 */
 : ALGORITHM 10,11 /* Size 1 - 10 */
 : ALGORITHM 4,5 /* Size 1 - 8 */
 Bn 48 vv (00 - 7FH) : Dnsty [NLR] /* 0 - 99 */
 Bn 48 vv (00 - 7FH) : NLRF1 [NLR (F1 On)] /* C_0 - C_8 */
 /* C_0 : 16.351598 [Hz] */
 /* C_8 : 4186.009045 [Hz] */
 Bn 49 vv (00 - 7FH) : Dnsty /* 0 - 99 */
 Bn 49 vv (00 - 7FH) : EnvT1 [NLR] /* 0 - 1000 [msec] */
 Bn 49 vv (00 - 7FH) : NLRF2 [NLR (F1 On)] /* Same as NLRF1 */
 Bn 4A vv (00 - 7FH) : HiDFq /* 4000 - 20000 [Hz] */
 Bn 4A vv (00 - 7FH) : EnvT2 [NLR] /* 0 - 1000 [msec] */
 Bn 4A vv (00 - 7FH) : NLRF3 [NLR (F1 On)] /* Same as NLRF1 */
 Bn 4B vv (00 - 7FH) : LoDFq /* 50 - 4000 [Hz] */
 Bn 4B vv (00 - 7FH) : EnvT3 [NLR] /* 0 - 1000 [msec] */
 Bn 4B vv (00 - 7FH) : NLRF4 [NLR (F1 On)] /* Same as NLRF1 */
 Bn 4C vv (00 - 7FH) : RiDns /* 0 - 99 */
 Bn 4C vv (00 - 7FH) : EnvT4 [NLR] /* 0 - 1000 [msec] */
 Bn 4C vv (00 - 7FH) : NLRF5 [NLR (F1 On)] /* Same as NLRF1 */
 Bn 4D vv (00 - 7FH) : DyTmL /* 0 - 500 [msec] */
 Bn 4D vv (00 - 7FH) : NLBal [NLR] /* 0 - 99 */
 Bn 4E vv (00 - 7FH) : DyTmR /* 0 - 500 [msec] */
 Bn 4E vv (00 - 7FH) : NLTyp [NLR] /* 00H - 28H = << Right to Left */
 /* 29H - 51H = <<< Center */
 /* 52H - 7FH = >>> Left to Right */
 Bn 4F vv (00 - 7FH) : DyTmC /* 0 - 500 [msec] */
 Bn 50 vv (00 - 7FH) : HiCut /* 170 - 20000 [Hz] */
 Bn 51 vv (00 - 7FH) : OutLv /* 0 - 100 */
 Bn 58 vv (7FH) : Low_0 PEAKING /* Peaking value = 1.0 */
 Bn 5C vv (7FH) : Hig_0 PEAKING /* Peaking value = 1.0 */

ROLAND EXCLUSIVE MESSAGES

1. Data Format for Exclusive Messages

Roland's MIDI implementation uses the following data format for all Exclusive messages (type IV):

Byte	Description
F0H	Exclusive Status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
CMD	Command ID
[BODY]	Main data
F7H	End of exclusive

•MIDI status: F0H, F7H

An Exclusive message must be flanked by a pair of status codes, starting with a Manufacturer ID immediately after F0H (MIDI version 1.0).

•Manufacturer ID: 41H

The Manufacturer ID identifies the manufacturer of a MIDI instrument that sends an Exclusive message. Value 41H represents Roland's Manufacturer ID.

•Device ID: DEV

The Device ID contains a unique value that identifies individual devices in the implementation of several MIDI instruments. It is usually set to 00H–0FH, a value smaller by one than that of a basic channel, but value 00H–1FH may be used for a device with several basic channels.

•Model ID: MDL

The Model ID contains a value that identifies one model from another. Different models, however, may share an identical Model ID if they handle similar data.

The Model ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Model IDs, each representing a unique model:

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

•Command ID: CMD

The Command ID indicates the function of an Exclusive message. The Command ID format may contain 00H in one or more places to provide an extended data field. The following are examples of valid Command IDs, each representing a unique function:

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

•Main data: BODY

This field contains a message to be exchanged across an interface. The exact data size and content will vary with the Model ID and Command ID.

2. Address-mapped Data Transfer

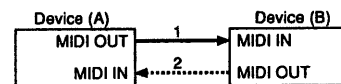
Address mapping is a technique for transferring messages conforming to the data format given in Section 1. It assigns a series of memory-resident records—waveform and tone data, switch status, and parameters, for example, to specific locations in a machine-dependent address space, thereby allowing access to data residing at the address a message specifies.

Address-mapped data transfer is therefore independent of models and data categories. This technique allows use of two different transfer procedures: one-way transfer and handshake transfer.

•One-way transfer procedure (See Section 3 for details.)

This procedure is suited to the transfer of a small amount of data. It sends out an Exclusive message completely independent of the receiving device's status.

Connection Diagram

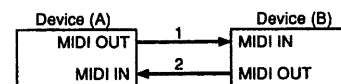


Connection at point 2 is essential for "Request data" procedures. (See Section 3.)

•Handshake-transfer procedure (This device does not use this procedure)

This procedure initiates a predetermined transfer sequence (handshaking) across the interface before data transfer takes place. Handshaking ensures that reliability and transfer speed are high enough to handle a large amount of data.

Connection Diagram



Connection at points 1 and 2 is essential.

Notes on the above procedures

- * There are separate Command IDs for different transfer procedures.
- * Devices A and B cannot exchange data unless they use the same transfer procedure, share identical Device ID and Model ID, and are ready for communication.

3. One-way Transfer Procedure

This procedure sends out data until it has all been sent and is used when the messages are so short that answerbacks need not be checked. For longer messages, however, the receiving device must acquire each message in time with the transfer sequence, which inserts 20 milliseconds intervals.

Types of Messages

Message	Command ID
Request data 1	RQ1 (11H)
Data set 1	DT1 (12H)

•Request data 1: RQ1 (11H)

This message is sent out when there is a need to acquire data from a device at the other end of the interface. It contains data for the address and size that specify designation and length, respectively, of data required.

On receiving an RQ1 message, the remote device checks its memory for the data address and size that satisfy the request.

If it finds them and is ready for communication, the device will transmit a "Data set 1 (DT1)" message, which contains the requested data. Otherwise, the device won't send out anything.

Byte	Description
F0H	Exclusive Status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
11H	Command ID
aaH	Address MSB
	LSB
ssH	Size MSB
	LSB
sum	Check sum
F7H	End of exclusive

- * The size of the requested data does not indicate the number of bytes that will make up a DT1 message, but represents the address fields where the requested data resides.
- * Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
- * The same number of bytes comprises address and size data, which, however, vary with the Model ID.
- * The error-checking process uses a checksum that provides a bit pattern where the last 7 bits are zero when values for an address, size, and that checksum are summed.

•Data set 1: DT1 (12H)

This message corresponds to the actual data transfer process.

Because every byte in the data is assigned a unique address, a DT1 message can convey the starting address of one or more bits of data as well as a series of data formatted in an address-dependent order.

The MIDI standards inhibit non real-time messages from interrupting an Exclusive one. This fact is inconvenient for devices that support a "soft-thru" function. To maintain compatibility with such devices, Roland has limited the DT1 to 256 bytes so that an excessively long message is sent out in separate 'segments'.

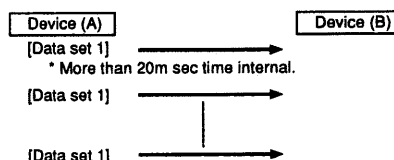
Byte	Description
F0H	Exclusive Status
41H	Manufacturer ID (Roland)
DEV	Device ID
MDL	Model ID
12H	Command ID
aaH	Address MSB
	LSB
ddH	Data MSB
	LSB
sum	Check sum
F7H	End of exclusive

- * A DT1 message is capable of providing only the valid data among those specified by an RQ1 message.
- * Some models are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields before it is exchanged across the interface.
- * The number of bytes comprising address data varies from one Model ID to another.
- * The error-checking process uses a checksum that provides a bit pattern where the last 7 bits are zero when values for an address, data, and that checksum are summed.

•Example of Message Transactions

•Device A sending data to Device B

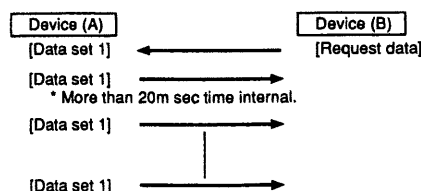
Transfer of a DT1 message is all that takes place.



•Device B requesting data from Device A

Device B sends an RQ1 message to Device A.

Checking the message, Device A sends a DT1 message back to Device B.



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