Roland

D-50

MIDI Implementation

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	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
CMD	Command ID
[BODY]	Maindata
F7H	End of exclusive

MIDI status : F0H, F7H

An exclusive message must be flanked by a pair of status codes, starting with a Manufactures-ID immediately after F0H (MIDI version1.0).

Manufactures-ID : 41H

The Manufactures-ID identifies the manufacturer of a MIDI instrument that triggeres an exclusive message. Value 41H represents Roland's Manufactures-ID.

Device-ID : DEV

The Device-ID contains a unique value that identifies the individual device in the multiple implementation of 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 multiple basic channels.

Model-ID : MDL

The Model-ID contains a value that uniquely 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 contents will vary with the Model-ID and Command-ID.

2 Address-mapped Data Transfer

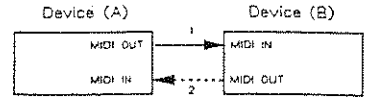
Address mapping is a technique for transferring messages conforming to the data format given in Section 1. It assigns a series of memory-resident records--waveform and tone data, switch status, and parameters, for example--to specific locations in a machine-dependent address space, thereby allowing access 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 Section3 for details.)

This procedure is suited for the transfer of a small amount of data. It sends out an exclusive message completely independent of a receiving device status.

Connection Diagram

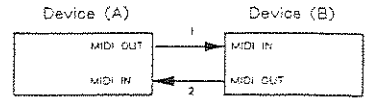


Connectionat point2 is essential for "Request data" procedures. (See Section3.)

Handshake-transfer procedure (See Section4 for details.)

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



Connectionat points1 and 2 is essential.

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

3 One-way Transfer Procedure

This procedure sends out data all the way until it stops when the messages are so short that answerbacks need not be checked.
For long messages, however, the receiving device must acquire each message in time with the transfer sequence, which inserts intervals of at least 20milliseconds in between.

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 will send out nothing.

Byte	Description
F0H	Exclusive status
41H	Manufactures 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 and data 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 lower seven 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 (es) of one or more data as well as a series of data formatted in an address- dependent order.

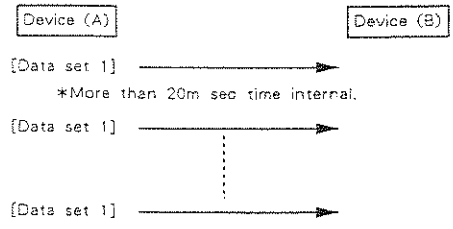
Although the MIDI standards inhibit non-real time messages from interrupting an exclusive one, some devices support a "soft- through" mechanism for such interrupts. To maintaincompatibility with such devices, Roland has limited the DT1 to 256bytes so that an excessively long message is sent out in separate segments.

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

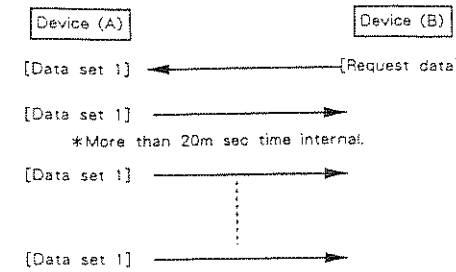
*A DT1 message is capable of providing only the valid data among those specified by an RQ1 message.
*Some models and data are subject to limitations in data format used for a single transaction. Requested data, for example, may have a limit in length or must be divided into predetermined address fields 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 lower seven bits are zero when values for an address, size, 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.



4 Handshake- Transfer Procedure

Handshaking is an interactive process where two devices exchange error checking signals before a message transaction takes place, thereby increasing data reliability. Unlike one-way transfer that inserts a pause between message transactions, handshake transfer allows much speedier transactions becausedata transfer starts once the receiving device returns a ready signal.

When it comes to handling large amounts of data--sampler waveforms and synthesizer tones over the entire range, for example--across a MIDI interface, handshaking transfer is moreefficient than one-way transfer.

Types of Messages

Message	Command ID
Want to send data	WSD (40H)
Request data	RQD (41H)
Data set	DAT (42H)
Acknowledge	ACK (43H)
End of data	EOD (45H)
Communication error	ERR (4EH)
Rejection	RJC (4FH)

Want to send data : WSD (40H)

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

On receiving a WSD message, the remote device checks its memory for the specified data address and size which will satisfy the request. If it finds them and is ready for communication, the device will return an "Acknowledge (ACK)" message.
Otherwise, it will return a "Rejection (RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
40H	Command ID
aaH	Address MSB
	LSB
ssH	Size MSB
	LSB
sum	Check sum
F7H	End of exclusive

*The size of the data to be sent does not indicate the number of bytes that make up a "Data set (DAT)" message, but represents the address fields where the data should reside.
*Some models and data 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 lower seven bits are zero when values for an address, size, and that checksum are summed.

Request data : RQD (41H)

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 RQD message, the remote device checks its memory for the data address and size which satisfy the request. If it finds them and is ready for communication, the device will transmit a "Data set (DAT)" message, which contains the requested data. Otherwise, it will return a "Rejection (RJC)" message.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
41H	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 make up a "Data set (DAT)" message, but represents the address fields where the requested data resides.
*Some models and data 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 lower seven bits are zero when values for an address, size, and that checksum are summed.

Data set : DAT (42H)

This message corresponds to the actual data transfer process. Because every byte in the data is assigned a unique address, the message can convey the starting address (es) of one or more data as well as a series of data formatted in an address-dependent order.

Although the MIDI standards inhibit non-real time messages from interrupting an exclusive one, some devices support a "soft-through" mechanism for such interrupts. To maintaincompatibility with such devices, Roland has limited the DAT to 256bytes so that an excessively long message is sent out in separate segments.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
42H	Command ID
aaH	Address MSB
⋮	⋮
	LSB
ddH	Data
⋮	⋮
sum	Check sum
F7H	End of exclusive

*A DAT message is capable of providing only the valid data among those specified by an RQD or WSD message.
*Some models and data 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 lower seven bits are zero when values for an address, size, and that checksum are summed.

Acknowledge : ACK (43H)

This message is sent out when no error was detected on reception of a WSD, DAT, "End of data (EOD)", or some other message and a requested setup or action is complete. Unless it receives an ACK message, the device at the other end will not proceed to the next operation.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
43H	Command ID
F7H	End of exclusive

End of data : EOD (45H)

This message is sent out to inform a remote device of the end of a message. Communication, however, will not come to an end unless the remote device returns an ACK message even though an EOD message was transmitted.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
45H	Command ID
F7H	End of exclusive

Communications error : ERR (4EH)

This message warns the remote device of a communications fault encountered during message transmission due, for example, to a checksum error. An ERR message may be replaced with a "Rejection (RJC)" one, which terminates the current message transaction in midstream.

When it receives an ERR message, the sending device may either attempt to send out the last message a second time or terminate communication by sending out an RJC message.

Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
4EH	Command ID
F7H	End of exclusive

Rejection : RJC (4FH)

This message is sent out when there is a need to terminate communication by overriding the current message. An RJC message will be triggered when :

a WSD or RQD message has specified an illegal data address or size, or the device is not ready for communication.

an illegal number of addresses or data has been detected.

data transfer has been terminated by an operator.

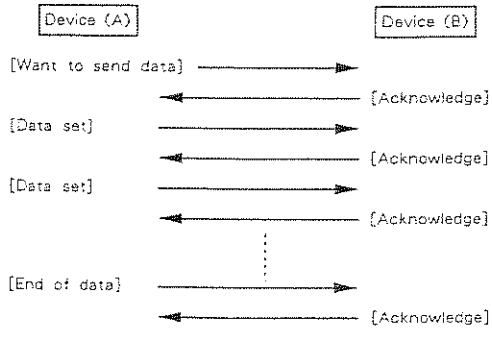
a communications error has occurred.

An ERR message may be sent out by a device on either side of the interface. Communication must be terminated immediately when either side triggers an ERR message.

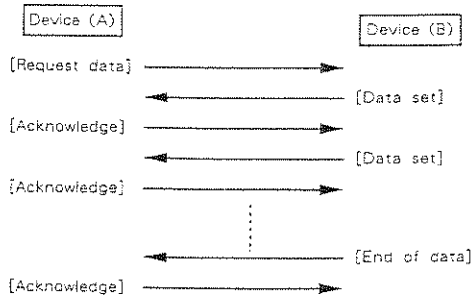
Byte	Description
F0H	Exclusive status
41H	Manufactures ID (Roland)
DEV	Device ID
MDL	Model ID
4FH	Command ID
F7H	End of exclusive

Example of Message Transactions

● Data transfer from device (A) to device (B).

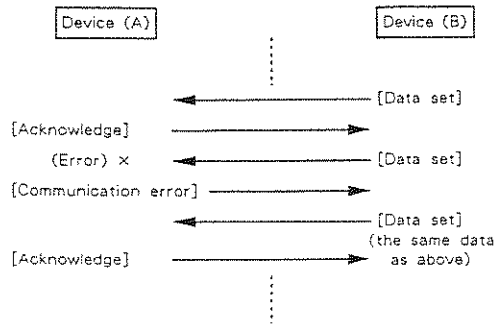


● Device (A) requests and receives data from device (B).

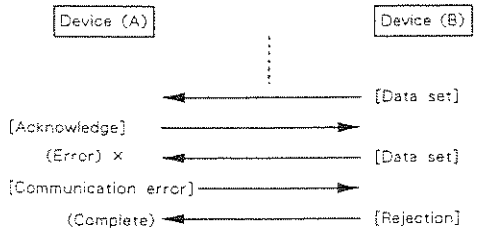


● Error occurs while device (A) is receiving data from device (B).

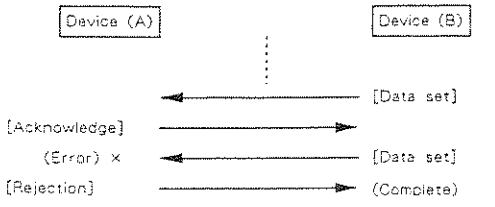
1) Data transfer from device (A) to device (B).



2) Device (B) rejects the data re-transmitted, and completes data transfer.



3) Device (A) immediately completes data transfer.



MODEL D-50

MIDI Implementation Chart

Version : 2.00

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default	1-16	1-16	Memorized
	Changed	1-16	1-16	
Mode	Default	Mode 3	Mode 1, 3, 4	Memorized
	Messages	POLY, OMNI OFF	MONO,POLY,OMNI ON/OFF	
	Altered	*********	Mode 2 → Mode 1	
Note Number		24-108	0-127	
	True Voice	*********	12-108	
Velocity	Note ON	○	○ v=1-127	
	Note OFF	× 9n v=0	×	
After Touch	Key's	×	×	
	Ch's	*	*	
Pitch Bender		*	* 0-12 semi	9 bit resolution
Control Change	1	*	*	Modulation
	5	*	*	Portamento Time
	7	*	*	Volume
	0-31	○	○ (0, 2-4, 8-31)	Ext Control
	6, 38	×	**	Data Entry (MSB, LSB)
	64	*	*	Hold 1
	65	*	*	Portamento SW
	64-95	○	○ (66-95)	Pedal Switch
	100, 101	×	** (0, 1)	RPC (LSB, MSB)
Prog Change		* 0-127	* 0-127	
	True #	*********	0-127	
System Exclusive		*	*	
System common	Song Pos	×	×	
	Song sel	×	×	
	Tune	×	×	
System Real Time	Clock	×	×	
	Commands	×	×	
Aux Message	Local ON/OFF	×	○	Memorized
	All Notes OFF	○ (123)	○ (123-127)	
	Active Sense	×	○	
	Reset	×	×	
Notes		* Can be set to ○ or × manually, and memorized. ** RPC=Registered parameter control number. RPC#0 : Pitch bend sensitivity RPC#1 : Master fine tuning Parameter values are given by Data Entry.		

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

○ : Yes
× : No

*Recognized if key mode in patch function is 'Sep' or 'Sep−S'.

Function...		Transmitted	Recognized	Remarks
Basic Channel	Default		1−16	Memorized
	Changed		1−16	
Mode	Default		Mode 3, 4 (M=1)	Memorized
	Messages		×	
	Altered	*********		
Note Number			0−127	
	True Voice	*********	12−108	
Velocity	Note ON		○ v=1−127	
	Note OFF		×	
After Touch	Key's		×	
	Ch's		*	
Pitch Bender			* 0−12 semi	9 bit resolution
Control Change	1		*	Modulation
	5		*	Portamento Time
	7		×	Volume
	0−31		○ (0, 2−4, 8−31)	Ext Control
	6, 38		**	Data Entry (MSB, LSB)
	64		*	Hold 1
	65		*	Portamento SW
	64−95		○ (66−95)	Pedal Switch
	100, 101		** (0)	RPC (LSB, MSB)
Prog Change			×	
	True #	*********		
System Exclusive			×	
System common	Song Pos		×	
	Song sel		×	
	Tune		×	
System Real Time	Clock		×	
	Commands		×	
Aux Message	Local ON/OFF		○	Memorized
	All Notes OFF		○ (123)	
	Active Sense		○	
	Reset		×	
Notes		* Can be set to ○ or × manually, and memorized. ** RPC=Registered parameter control number. RPC#0 : Pitch bend sensitivity Parameter values are given by Data Entry.		

Mode 1 : OMNI ON, POLY
Mode 2 : OMNI ON, MONO
Mode 3 : OMNI OFF, POLY
Mode 4 : OMNI OFF, MONO

○ : Yes
× : No

1. TRANSMITTED DATA

Status	Second	Third	Description
1001 nnnn	0kkk kkkk	0000 0000	Note OFF *1-1 kkkkkkk =12 - 108
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk =24 - 108 vvvvvvv = 1 - 127
1011 nnnn	0000 0001	0vvv vvvv	Modulation depth *1-2 vvvvvvv =0 - 127
1011 nnnn	0000 0111	0vvv vvvv	Main Volume *1-2 vvvvvvv =0 - 127
1011 nnnn	000c cccc	0vvv vvvv	External control ccccc = 0 - 31 *1-3 vvvvvvv =0-127
1011 nnnn	0100 0000	0000 0000	Hold 1 OFF *1-2, *1-4
1011 nnnn	0100 0000	0111 1111	Hold 1 ON *1-2
1011 nnnn	0100 0001	0000 0000	Portamento OFF *1-2
1011 nnnn	0100 0001	0111 1111	Portamento ON *1-2
1011 nnnn	0sss ssss	0000 0000	Pedal Switch OFF sssssss = 64 - 95 *1-5
1011 nnnn	0sss ssss	0111 1111	Pedal Switch ON sssssss = 64 - 95 *1-5
1100 nnnn	0ppp pppp		Program Change *1-2, *1-6 ppppppp = 0 - 127
1101 nnnn	0vvv vvvv		Channel After Touch *1-2, *1-7 vvvvvvv = 0 - 127
1110 nnnn	0vvv vvvv	0vvv vvvv	Pitch Bend Change *1-2
1011 nnnn	0111 1011	0000 0000	All NOTES OFF *1-1
1011 nnnn	0111 1100	0000 0000	OMNI OFF *1-8
1011 nnnn	0111 1111	0000 0000	POLY ON *1-8
1111 0000	... ...	1111 0111	System exclusive *1-9

Notes :

*1-1 Even if the transmit channel is changed while the keyboard is being played, data is transmitted on the previous transmit channel.

*1-2 Transmitted if the corresponding function switch is ON.

*1-3 'ccccc' can be selected by ExtCont in MIDI function.

*1-4 Even when the transmit channel is changed while Hold Pedal is being ON, data is transmitted on the previous transmit channel.

Transmitted even when Hold Function switch is turned to OFF while the Hold Pedal is being ON.

*1-5 'sssssss' can be selected by PedalSW in MIDI function.

*1-6 Transmitted when TxPC in patch function is changed, 'ppppppp' can be selected by TxPC in patch function.

0 - 63 : Internal Memory Group
64 - 127 : Card Memory Group

*1-7 The maximum value is determined by the value of Aftertouch Volume.

*1-8 Transmitted at power-up.

When the transmit channel is changed, data is transmitted on the new channel.

*1-9 See section 5 (TRANSMITTED EXCLUSIVE MESSAGES IN NORMAL MODE), section 7 (TRANSMITTED EXCLUSIVE MESSAGES IN DATA TRANSFER MODE).

2. RECOGNIZED RECEIVE DATA (MAIN CHANNEL)

Status	Second	Third	Description
1000 nnnn	0kkk kkkk	0vvv vvvv	Note OFF,velocity ignored *2-1
1001 nnnn	0kkk kkkk	0000 0000	Note OFF *2-1 kkkkkkk = 12 - 108
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk = 12 - 108 *2-1 vvvvvvv = 1 - 127
1011 nnnn	0000 0001	0vvv vvvv	Modulation Depth *2-2 vvvvvvv = 0 - 127
1011 nnnn	0000 0101	0vvv vvvv	Portamento Time *2-2 vvvvvvv = 0 - 127
1011 nnnn	0000 0110	0vvv vvvv	Data Entry MSB *2-3
1011 nnnn	0000 0111	0vvv vvvv	Main Volume *2-2,*2-4 vvvvvvv = 0 - 127
1011 nnnn	000c cccc	0vvv vvvv	External Control *2-5 ccccc = 0, 2 - 4, 6 - 31 vvvvvvv = 0 - 127
1011 nnnn	0010 0110	0vvv vvvv	Data Entry LSB *2-3
1011 nnnn	0100 0000	0vvv vvvv	Hold 1 OFF *2-2 vvvvvvv = 0 - 63
1011 nnnn	0100 0000	0vvv vvvv	Hold 1 ON *2-2 vvvvvvv = 64 - 127
1011 nnnn	0100 0001	0vvv vvvv	Portamento OFF *2-2 vvvvvvv = 0 - 63
1011 nnnn	0100 0001	0vvv vvvv	Portamento ON *2-2 vvvvvvv = 64 - 127
1011 nnnn	0sss ssss	0vvv vvvv	Pedal Switch OFF *2-6 sssssss = 66 - 95 vvvvvvv = 0 - 63
1011 nnnn	0sss ssss	0vvv vvvv	Pedal Switch ON *2-6 sssssss = 66 - 95 vvvvvvv = 64 - 127
1011 nnnn	0110 0100	0vvv vvvv	RPC LSB *2-3
1011 nnnn	0110 0101	0vvv vvvv	RPC MSB *2-3
1100 nnnn	0ppp pppp		Program Change *2-2, *2-7 ppppppp = 0 - 127
1101 nnnn	0vvv vvvv		Channel After Touch *2-2, *2-8 vvvvvvv = 0 - 127
1110 nnnn	0vvv vvvv	0vvv vvvv	Pitch Bend Change *2-2
1011 nnnn	0111 1010	0000 0000	Local OFF *2-9
1011 nnnn	0111 1010	0111 1111	Local ON *2-9
1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF *2-10
1011 nnnn	0111 1100	0000 0000	OMNI OFF *2-10
1011 nnnn	0111 1101	0000 0000	OMNI ON *2-10
1011 nnnn	0111 1110	000m mmmm	MONO ON *2-10,*2-11
1011 nnnn	0111 1111	0000 0000	POLY ON *2-10,*2-11
1111 0000	... ...	1111 0111	System exclusive *2-12
1111 1110			Active Sensing

Notes :

*2-1 Note numbers outside the range 12 - 108 are transposed to the nearest octave inside this range.

*2-2 Recognized if the corresponding function switch is ON.

*2-3 RPC and value (Data Entry) are recognized as follows.

RPC#	value MSB	value LSB	Description
0	0vvv vvvv	0xxx xxxx	BEND RANGE (0-12 semitone, 1 semitone step) xxxxxxx is ignored.
1	0vvv vvvv	0vvv vvvv	MASTER TUNE (-50 - +50 cent)

*2-4 The volume of the sound can be controlled by main volume message within level which adjusted by the panel volume knob.

*2-5 'ccccc' can be selected by ExtCont in MIDI function.

Recognized as folows depending on how the ExtCont mode of Tune/Func is set.

ExtCont mode	Function
'BAL'	Tone Balance
'AFTER'	Channel pressure
'MOD'	Moduration Depth
'OFF'	------

*2-6 'ssssss' can be selected by PedalSW in MIDI function.

Recognized as folows depending on how the PedalSW mode of Tune/Func is set.

PedalSW mode	Function
'P-SFT'	Patch Shift
'PORTA'	Portamento ON/OFF
'CHASE'	Chase ON/OFF
'OFF'	------

However, Patch Shift function is available only in Play mode. Also, Chase ON /OFF is recognized only when the key mode is Whole or Dual.

*2-7 Recognized only in play mode.
0 - 63 : Internal Memory Group
64 - 127 : Card Memory Group

*2-8 Ignored if ExtCont in Tune/Func function is 'AFTER'.

*2-9 Ignored if key mode in patch function is 'Sep' or 'Sep-S'.

*2-10 Mode Messages (123 - 127) are also recognized as ALL NOTES OFF.

MONO channel range 'mmmmm' is recognized as follows.

mmmmm	True MONO channel range
0	8
1 - 8	1 - 8
9 - 16	8
17 - 127	ignore

In MONO mode, channel of recognized each message is as follows.

	Control in MIDI function	
Message	' B.CH '	' G.CH '
Note on/off	individual	individual
Control change	basic	global
Mode message	basic	basic
Program change	basic	global
Channel After Touch	basic	global
Pitch bend change	individual	individual
Exclusive	basic	basic

*Global channel is equal to "basic channel - 1".
And if basic channel is 1, global channel is 16.

*2-11 Ignored if Control in MIDI function is 'MdeOFF'.

*2-12 See section 6 (RECOGNIZED EXCLUSIVE MESSAGES IN NOMAL MODE), section 8 (RECOGNIZED EXCLUSIVE MESSAGES IN DATA TRANSFER MODE).

3. RECOGNIZED RECEIVE DATA (SEPARATE CHANNEL)

*Recognized if key mode in patch function is 'Sep' or 'Sep-S'.

Status	Second	Third	Description
1000 nnnn	0kkk kkkk	0vvv vvvv	Note OFF,velocity ignored *3-1
1001 nnnn	0kkk kkkk	0000 0000	Note OFF *3-1 kkkkkkk=12 - 108
1001 nnnn	0kkk kkkk	0vvv vvvv	Note ON kkkkkkk=12-108 *3-1 vvvvvvv=1 - 127
1011 nnnn	0000 0001	0vvv vvvv	Modulation depth *3-2 vvvvvvv = 0 - 127
1011 nnnn	0000 0101	0vvv vvvv	Portamento Time *3-2 vvvvvvv = 0 - 127
1011 nnnn	0000 0110	0vvv vvvv	Data Entry MSB *3-3
1011 nnnn	000c cccc	0vvv vvvv	External Control *3-4 ccccc = 0, 2 - 4, 8 - 31 vvvvvvv = 0 - 127
1011 nnnn	0100 0000	0vvv vvvv	Hold 1 OFF *3-2 vvvvvvv = 0 - 63
1011 nnnn	0100 0000	0vvv vvvv	Hold 1 ON *3-2 vvvvvvv = 64 - 127
1011 nnnn	0100 0001	0vvv vvvv	Portamento OFF *3-2 vvvvvvv = 0 - 63
1011 nnnn	0100 0001	0vvv vvvv	Portamento ON *3-2 vvvvvvv = 64 - 127
1011 nnnn	0sss ssss	0vvv vvvv	Pedal Switch OFF *3-5 sssssss = 66 - 95 vvvvvvv = 0 - 63
1011 nnnn	0sss ssss	0vvv vvvv	Pedal Switch ON *3-5 sssssss = 60 - 95 vvvvvvv = 64 - 127
1011 nnnn	0110 0100	0vvv vvvv	RPC LSB *3-3
1011 nnnn	0110 0101	0vvv vvvv	RPC MSB *3-3
1101 nnnn	0vvv vvvv		Channel After Touch *3-2, *3-6 vvvvvvv = 0 - 127
1110 nnnn	0vvv vvvv	0vvv vvvv	Pitch Bend Change *3-2
1011 nnnn	0111 1010	0000 0000	Local OFF
1011 nnnn	0111 1010	0111 1111	Local ON
1011 nnnn	0111 1011	0000 0000	ALL NOTES OFF
1111 1110			Active Sensing

Notes :
*3-1 Note numbers outside the range 12 - 108 are transposed to the nearest octave inside this range.

*3-2 Received if the corresponding function switch is ON.

*3-3 RPC and value (Data Entry) are recognized as follows.

RPC#	value MSB	value LSB	Description
0	0vvv vvvv	0xxx xxxx	BEND RANGE (0-12 semitone, 1 semitone step) xxxxxxx is ignored.

*3-4 'ccccc' can be selected by ExtCont in MIDI function.

Recognized as follows depending on the ExtCont mode of Tune/Func.

ExtCont Mode	Function
'BAL'	------
'AFTER'	Channel pressure
'MOD'	Moduration Depth
'OFF'	------

*3-5 'ssssss' can be selected by PedalSW in MIDI function.

Recognized as follows depending on the PedalSW mode of Tune/Func.

PedalSW Mode	Function
'P-SFT'	------
'PORTA'	Portamento ON/OFF
'CHASE'	------
'OFF'	------

*3-6 Ignored if ExtCont in Tune/Func function is 'AFTER'.

4. EXCLUSIVE COMMUNICATION

4.1 Message structure

All exclusive communications are based on following structure (Roland Exclusive Format Type IV).

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0aaa aaaa	Command-ID #
[f	0bbb bbbb	Address MSB] [ ] depend on Command-ID
[g	0ccc cccc	Address]
[h	0ddd dddd	Address LSB]
[i	0eee eeee	Data]
[	:	]
j	0fff ffff	Checksum
k	1111 0111	End of System Exclusive

Summed value of the all bytes between Command-ID and EOX (f-j) must be 00H (7 bits). It doesn't include Command-ID and EOX.

4.2 Address mapping

Address				
Temporary area				
[00 - 00 - 00]	Upper	Partial-1	temp.area	*4-1, *4-4
[00 - 00 - 40]	Upper	Partial-2	temp.area	*4-1, *4-4
[00 - 01 - 00]	Upper	Common	temp.area	*4-1, *4-5
[00 - 01 - 40]	Lower	Partial-1	temp.area	*4-1, *4-4
[00 - 02 - 00]	Lower	Partial-2	temp.area	*4-1, *4-4
[00 - 02 - 40]	Lower	Common	temp.area	*4-1, *4-5
[00 - 03 - 00]	Patch		temp.area	*4-1, *4-6
Memory area				
[02 - 00 - 00]	Patch	Memory	1-1	*4-2, *4-3

[02 - 03 - 40]	Patch Memory	1-2	*4-2, *4-3
:	:		
	Patch Memory	8-8	*4-2, *4-3
[03 - 60 - 00]	Reverb Data	17	*4-2, *4-7
[03 - 62 - 78]	Reverb Data	18	*4-2, *4-7
:	:		
[04 - 0C - 08]	Reverb Data	32	*4-2, *4-7

* [hh-mm-ll] 'hh','mm' and 'll' are showed by hex decimal.
0hhhhhhh 0mmmmmmm 0lllllll (binary), MS bit must be 0 .

Notes :

*4-1 Transmitted and recognized in NORMAL MODE.

*4-2 Transmitted and recognized in DATA TRANSFER MODE.

*4-3 Each patch memory consists of the following.

Offset	Description	
[00 - 00 - 00]	Upper Partial-1	*4-4
[00 - 00 - 40]	Upper Partial-2	*4-4
[00 - 01 - 00]	Upper Common	*4-5
[00 - 01 - 40]	Lower Partial-1	*4-4
[00 - 02 - 00]	Lower Partial-2	*4-4
[00 - 02 - 40]	Lower Common	*4-5
[00 - 03 - 00]	Patch	*4-6

*4-4 Each partial block consists of the following.

Offset	Function		Value			
0	WG	Pitch Coarse	0	-	72	(C1,C#1 - C7)
1	WG	Pitch Fine	0	-	100	(-50 - +50)
2	WG	Pitch Keyfollow	0	-	16	(-1,-1/2,-1/4,0,1/8, 1/4,3/8,1/2,5/8,3/4, 7/8,1,5/4,3/2,2,s1, s2)
3	WG	Mod LFO Mode	0	-	3	(OFF,(+),(-),A&L)
4	WG	Mod P-ENV Mode	0	-	2	(OFF,(+),(-)
5	WG	Mod Bend Mode	0	-	2	(OFF,Keyfollow,Normal)
6	WG	Wave Form	0	-	1	(Square,Sawtooth)
7	WG	PCM Wave No.	0	-	99	(1 - 100)
8	WG	Pulse Width	0	-	100	
9	WG	PW Velocity Range	0	-	14	(-7 - +7)
10	WG	PW LFO Select	0	-	5	(+1,-1,+2,-2,+3,-3)
11	WG	PW LFO Depth	0	-	100	
12	WG	PW After touch Range	0	-	14	(-7 - +7)
13	TVF	Cutoff Frequency	0	-	100	
14	TVF	Resonance	0	-	30	
15	TVF	Keyfollow	0	-	14	(-1,-1/2,-1/4,0,1/8, 1/4,3/8,1/2,5/8,3/4, 7/8,1,5/4,3/2,2)
16	TVF	Bias Point/Dir	0	-	127	(<A1-<C7,>A1->C7)
17	TVF	Bias Level	0	-	14	(-7 - +7)
18	TVF ENV	Depth	0	-	100	
19	TVF ENV	Velocity Range	0	-	100	
20	TVF ENV	Depth Keyfollow	0	-	4	
21	TVF ENV	Time Keyfollow	0	-	4	
22	TVF ENV	Time 1	0	-	100	
23	TVF ENV	Time 2	0	-	100	
24	TVF ENV	Time 3	0	-	100	
25	TVF ENV	Time 4	0	-	100	
26	TVF ENV	Time 5	0	-	100	
27	TVF ENV	Level 1	0	-	100	
28	TVF ENV	Level 2	0	-	100	
29	TVF ENV	Level 3	0	-	100	
30	TVF ENV	Sustain Level	0	-	100	
31	TVF ENV	End Level	0	-	1	(0,100)
32	TVF Mod	LFOSelect	0	-	5	(+1,-1,+2,-2,+3,-3)
33	TVF Mod	LFO Depth	0	-	100	
34	TVF Mod	After touch Range	0	-	14	(-7 - +7)
35	TVA	Level	0	-	100	
36	TVA	Velocity Range	0	-	100	(-50 - +50)
37	TVA	Bias Point	0	-	127	(<A1-<C7,>A1->C7)
38	TVA	Bias Level	0	-	12	(-12 - 0)
39	TVA ENV	Time 1	0	-	100	
40	TVA ENV	Time 2	0	-	100	
41	TVA ENV	Time 3	0	-	100	
42	TVA ENV	Time 4	0	-	100	
43	TVA ENV	Time 5	0	-	100	
44	TVA ENV	Level 1	0	-	100	
45	TVA ENV	Level 2	0	-	100	
46	TVA ENV	Level 3	0	-	100	
47	TVA ENV	Sustain Level	0	-	100	
48	TVA ENV	End Level	0	-	1	(0,100)
49	TVA ENV	Velocity Follow	0	-	4	
50	TVA ENV	Time Keyfollow	0	-	4	
51	TVA Mod	LFO Select	0	-	5	(+1,-1,+2,-2,+3,-3)
52	TVA Mod	LFO Depth	0	-	100	
53	TVA Mod	After touch Range	0	-	14	(-7 - +7)
54	Extension	(for future)	0	-	127	
55	Extension		0	-	127	
56	Extension		0	-	127	
57	Extension		0	-	127	
58	Extension		0	-	127	
59	Extension		0	-	127	
60	Extension		0	-	127	
61	Extension		0	-	127	
62	Extension		0	-	127	
63	Extension		0	-	127	

*4-5 Each common block consists of the following.

Offset	Function		Value			
0	Tone Name 1		0	-	63	(' ','A'-'Z','a'-'z', '1'-'9','0','-')
1	Tone Name 2		0	-	63	...
2	Tone Name 3		0	-	63	...
3	Tone Name 4		0	-	63	...
4	Tone Name 5		0	-	63	...
5	Tone Name 6		0	-	63	...
6	Tone Name 7		0	-	63	...
7	Tone Name 8		0	-	63	...
8	Tone Name 9		0	-	63	...
9	Tone Name 10		0	-	63	...
10	Structure No.		0	-	6	(1 - 7)
11	P-ENV	Velocity Range	0	-	2	
12	P-ENV	Time Keyfollow	0	-	4	
13	P-ENV	Time 1	0	-	50	
14	P-ENV	Time 2	0	-	50	
15	P-ENV	Time 3	0	-	50	
16	P-ENV	Time 4	0	-	50	
17	P-ENV	Level 0	0	-	100	(-50 - +50)
18	P-ENV	Level 1	0	-	100	(-50 - +50)
19	P-ENV	Level 2	0	-	100	(-50 - +50)
20	P-ENV	Sustain Level	0	-	100	(-50 - +50)
21	P-ENV	End Level	0	-	100	(-50 - +50)
22	P-Mod	LFO Depth	0	-	100	
23	P-Mod	Lever	0	-	100	
24	P-Mod	After touch	0	-	100	
25	LFO-1	Wave Form	0	-	3	(TRI,SAW,SQU,RND)
26	LFO-1	Rate	0	-	100	
27	LFO-1	Delay Time	0	-	100	
28	LFO-1	Sync	0	-	2	(OFF,ON,KEY)
29	LFO-2	Wave Form	0	-	3	(TRI,SAW,SQU,RND)
30	LFO-2	Rate	0	-	100	
31	LFO-2	Delay Time	0	-	100	
32	LFO-2	Sync	0	-	1	(OFF,ON)
33	LFO-3	Wave Form	0	-	3	(TRI,SAW,SQU,RND)
34	LFO-3	Rate	0	-	100	
35	LFO-3	Delay Time	0	-	100	
36	LFO-3	Sync	0	-	1	(OFF,ON)
37	Low EQ	Frequency	0	-	15	(63, 75, 88,105,125, 150,175,210,250,300, 350,420,500,600,700, 840)
38	Low EQ	Gain	0	-	24	(-12 - +12)
39	Low EQ	Frequency	0	-	21	(250,300,350,420,500, 600,700,840,1.0,1.2, 1.4,1.7,2.0,2.4,2.8, 3.4,4.0,4.8,5.7,6.7, 8.0,9.5)
40	High EQ	Q	0	-	8	(0.3,0.5,0.7,1.0,1.4, 2.0,3.0,4.2,6.0)
41	High EQ	Gain	0	-	24	(-12 - +12)
42	Chorus	Type	0	-	7	(1 - 8)
43	Chorus	Rate	0	-	100	
44	Chorus	Depth	0	-	100	
45	Chorus	Balance	0	-	100	
46	Partial	Mute	0	-	3	(00,01,10,11)
47	Partial	Balance	0	-	100	
48	Extension	(for future)	0	-	127	
49	Extension		0	-	127	
50	Extension		0	-	127	
51	Extension		0	-	127	
52	Extension		0	-	127	
53	Extension		0	-	127	
54	Extension		0	-	127	
55	Extension		0	-	127	
56	Extension		0	-	127	
57	Extension		0	-	127	
58	Extension		0	-	127	
59	Extension		0	-	127	
60	Extension		0	-	127	
61	Extension		0	-	127	
62	Extension		0	-	127	
63	Extension		0	-	127	

*4-6 Each patch block consists of the following.

Offset	Function	Value			
0	Patch Name 1	0	–	63	(' ','A'–'Z','a'–'z', '1'–'9','0','–')
1	Patch Name 2	0	–	63	...
2	Patch Name 3	0	–	63	...
3	Patch Name 4	0	–	63	...
4	Patch Name 5	0	–	63	...
5	Patch Name 6	0	–	63	...
6	Patch Name 7	0	–	63	...
7	Patch Name 8	0	–	63	...
8	Patch Name 9	0	–	63	...
9	Patch Name 10	0	–	63	...
10	Patch Name 11	0	–	63	...
11	Patch Name 12	0	–	63	...
12	Patch Name 13	0	–	63	...
13	Patch Name 14	0	–	63	...
14	Patch Name 15	0	–	63	...
15	Patch Name 16	0	–	63	...
16	Patch Name 17	0	–	63	...
17	Patch Name 18	0	–	63	...
18	Key Mode	0	–	8	(Whole,Dual,Split, Separate,Whole–S, Dual–S,Split–US, Split–LS,Separate–S)
19	Split Point	0	–	60	(C2,C#2 – C7)
20	Portamento Mode	0	–	2	(U,L,UL)
21	Hold Mode	0	–	2	(U,L,UL)
22	Upper Tone Key Shift	0	–	48	(–24 – +24)
23	Lower Tone Key Shift	0	–	48	(–24 – +24)
24	Upper Tone Fine Tune	0	–	100	(–50 – +50)
25	Lower Tone Fine Tune	0	–	100	(–50 – +50)
26	Bender Range	0	–	12	
27	After touch Bend Range	0	–	24	(–12 – +12)
28	Portamento Time	0	–	100	
29	Output Mode	0	–	3	(1 – 4)
30	Reverb Type	0	–	31	(1 – 32)
31	Reverb Balance	0	–	100	
32	Total Volume	0	–	100	
33	Tone Balance	0	–	100	
34	Chase Mode	0	–	2	(UL,ULL,ULU)
35	Chase Level	0	–	100	
36	Chase Time	0	–	100	
37	MIDI Transmit Channel	0	–	16	(Basic CH, 1 – 16)
38	MIDI Separate Rcv Channel	0	–	16	(OFF,1 – 16)
39	MIDI Transmit Prog. Change	0	–	100	(OFF, 1–100)
40	Extension (for future)	0	–	100	(OFF, 1–100)
41	Extension	0	–	100	(OFF, 1–100)
42	Extension	0	–	100	(OFF, 1–100)
43	Extension	0	–	100	(OFF, 1–100)
44	Extension	0	–	100	(OFF, 1–100)
45	Extension	0	–	100	(OFF, 1–100)
46	Extension	0	–	100	(OFF, 1–100)
47	Extension	0	–	100	(OFF, 1–100)
48	Extension	0	–	100	(OFF, 1–100)
49	Extension	0	–	100	(OFF, 1–100)
50	Extension	0	–	100	(OFF, 1–100)
51	Extension	0	–	100	(OFF, 1–100)
52	Extension	0	–	127	(OFF, 1–100)
53	Extension	0	–	100	(OFF, 1–100)
54	Extension	0	–	100	(OFF, 1–100)
55	Extension	0	–	100	(OFF, 1–100)
56	Extension	0	–	100	(OFF, 1–100)
57	Extension	0	–	100	(OFF, 1–100)
58	Extension	0	–	100	(OFF, 1–100)
59	Extension	0	–	100	(OFF, 1–100)
60	Extension	0	–	100	(OFF, 1–100)
61	Extension	0	–	100	(OFF, 1–100)
62	Extension	0	–	100	(OFF, 1–100)
63	Extension	0	–	100	(OFF, 1–100)

*4-7 Each reverb block (17 – 32) consists of the following.

0	0000 aaaa	Reverb data 1
	0000 aaaa	
2	0000 aaaa	Reverb data 2
	0000 aaaa	
	:	
	:	
374	0000 aaaa	Reverb data 188
	0000 aaaa	

All the 188 data (376 byte) are related each other, therefore receiving or sending a part of data does not achieve anything.

5. TRANSMITTED EXCLUSIVE MESSAGES IN NORMAL MODE

5.1 Data set (One way) DT1 12H

When Request Data (RQ–1) is recognized, the data within the range set with RQ –1 messages will be transmitted on the channel set with MIDI CH in MIDI Func, regardlss of the transmit channel set with TxCH in Patch Func.

When any of Ptch Group, Bank or Number is changed by operating the panel of the unit and if Exclu in MIDI Func is set to P–Dump, all data in Temp. area will be transmitted on the channel set with TxCH in Patch Func.

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model–ID # (D–50)	
e	0001 0010	Command–ID # (DT1)	
f	0aaa aaaa	Address MSB	*5–1
g	0bbb bbbb	Address	
h	0ccc cccc	Address LSB	
i	0ddd dddd	Data	*5–1
	:		
j	0eee eeee	Checksum	
k	1111 0111	End of System Exclusive	

Notes :

*5–1 Transmitted several times in smaller portion than the total number 256 in data byte of each message accroding to the address size assinged with Request Data (RQ1).

6. RECOGNIZED EXCLUSIVE MESSAGES IN NOMAL MODE

6.1 Request Data (One way) RQ1 11H

Recognized if Exclu in the MIDI function is ON or P–Dump.

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device–ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model–ID # (D–50)	
e	0001 0001	Command–ID # (RQ1)	
f	0aaa aaaa	Address MSB	*6–1
g	0bbb bbbb	Address	
h	0ccc cccc	Address LSB	
i	0ddd dddd	Size MSB	*6–1
j	0eee eeee	Size	
k	0fff ffff	Size LSB	
l	0ggg gggg	Checksum	
m	1111 0111	End of System Exclusive	

6.2 Data set (One way) DT1 12H

Recognized if Exclu in the MIDI function is ON or P–Dump.

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model–ID # (D–50)	
e	0001 0010	Command–ID # (DT1)	
f	0aaa aaaa	Address MSB	*6–1
g	0bbb bbbb	Address	
h	0ccc cccc	Address LSB	
i	0ddd dddd	Data	*6–2
	:		
j	0eee eeee	Checksum	
k	1111 0111	End of System Exclusive	

Notes :

*6–1 Any address size can be assinged within the range of Temp.area.

*6–2 Number of the data bytes should not exceed 256. (except sum)

7. TRANSMITTED EXCLUSIVE MESSAGES IN DATA TRANSFER MODE

No matter what tranmit channel is selected with 'TxCH in Patch Func, the messages are transmitted on the channel set with MIDI CH in MIDI Func.

7.1 One way transfer

7.1.1 Data set — DT1 12H

Transmitted when 'ENTER' button is pressed in 'Bulk Dump.O' mode.

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model-ID # (D-50)	
e	0001 0010	Command-ID # (DT1)	
f	0aaa aaaa	Address MSB	*7-1
g	0bbb bbbb	Address	
h	0ccc cccc	Address LSB	
i	0ddd dddd	Data	*7-2
	:		
j	0eee eeee	Checksum	
k	1111 0111	End of System Exclusive	

7.2 Handshaking communication

7.2.1 Want to send data — WSD 40H

Transmitted when 'ENTER' button is pressed in 'Bulk Dump' mode.

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model-ID # (D-50)	
e	0100 0000	Command-ID # (WSD)	
f	0000 0010	Address MSB	*7-1
g	0000 0000	Address	
h	0000 0000	Address LSB	
i	0000 0010	Size MSB	*7-3
j	0000 1111	Size	
k	0000 0000	Size LSB	
l	0110 1101	Checksum	
m	1111 0111	End of System Exclusive	

7.2.2 Request data — RQD 41H

Transmitted when 'ENTER' button is pressed in 'Bulk Load' mode.

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model-ID # (D-50)	
e	0100 0001	Command-ID # (RQD)	
f	0000 0010	Address MSB	*7-1
g	0000 0000	Address	
h	0000 0000	Address LSB	
i	0000 0010	Size MSB	*7-3
j	0000 1111	Size	
k	0000 0000	Size LSB	
l	0110 1101	Checksum	
m	1111 0111	End of System Exclusive	

7.2.3 Data set — DAT 42H

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model-ID # (D-50)	
e	0100 0010	Command-ID # (DAT)	
f	0aaa aaaa	Address MSB	*7-1
g	0bbb bbbb	Address	
h	0ccc cccc	Address LSB	
i	0ddd dddd	Data	*7-2
	:		
j	0eee eeee	Checksum	
k	1111 0111	End of System Exclusive	

7.2.4 Acknowledge — ACK 43H

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 0011	Command-ID # (ACK)
f	1111 0111	End of System Exclusive

7.2.5 End of data — EOD 45H

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 0101	Command-ID # (EOD)
f	1111 0111	End of System Exclusive

7.2.6 Rejection — RJC 4FH

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 1111	Command-ID # (RJC)
f	1111 0111	End of System Exclusive

Notes :

*7-1 Address of first Data set command (DT1, DAT), Want to send data (WSD) or Request data (RQD) is [02-00-00] top of memory area.

*7-2 Number of data in data set (DT1, DAT) is not exceed 256.

*7-3 Number of memory data (including reverb 17 - 32).

8. RECOGNIZED EXCLUSIVE MESSAGES IN DATA TRANSFER MODE

8.1 One way transfer

8.1.1 Data set — DT1 12H

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model-ID # (D-50)	
e	0001 0010	Command-ID # (DT1)	
f	0aaa aaaa	Address MSB	*8-1
g	0bbb bbbb	Address	
h	0ccc cccc	Address LSB	
i	0ddd dddd	Data	*8-2
	:		
j	0eee eeee	Checksum	
k	1111 0111	End of System Exclusive	

8.2 Handshaking communication

8.2.1 Want to send data — WSD 40H

Byte		Description	
a	1111 0000	Exclusive status	
b	0100 0001	Roland ID #	
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #	
d	0001 0100	Model-ID # (D-50)	
e	0100 0000	Command-ID # (WSD)	
f	0aaa aaaa	Address MSB	*8-1
g	0bbb bbbb	Address	
h	0ccc cccc	Address LSB	
i	0ddd dddd	Size MSB	*8-3
j	0eee eeee	Size	
k	0fff ffff	Size LSB	
l	0ggg gggg	Checksum	
m	1111 0111	End of System Exclusive	

8.2.2 Request data RQD 41H

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 0001	Command-ID # (RQD)
f	0000 0010	Address MSB *8-1
g	0000 0000	Address
h	0000 0000	Address LSB
i	0ddd dddd	Size MSB *8-3
j	0eee eeee	Size
k	0fff ffff	Size LSB
l	0ggg gggg	Checksum
m	1111 0111	End of System Exclusive

8.2.3 Data set DAT 42H

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 0010	Command-ID # (DAT)
f	0aaa aaaa	Address MSB *8-1
g	0bbb bbbb	Address
h	0ccc cccc	Address LSB
i	0ddd dddd	Data *8-2
	:	
j	0eee eeee	Checksum
k	1111 0111	End of System Exclusive

8.2.4 Acknowledge ACK 43H

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 0011	Command-ID # (ACK)
f	1111 0111	End of System Exclusive

8.2.5 End of data EOD 45H

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 0101	Command-ID # (EOD)
f	1111 0111	End of System Exclusive

8.2.6 Communication error ERR 4EH

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 1110	Command-ID # (ERR)
f	1111 0111	End of System Exclusive

8.2.7 Rejection RJC 4FH

Byte		Description
a	1111 0000	Exclusive status
b	0100 0001	Roland ID #
c	0000 nnnn	Device-ID # = MIDI basic channel where nnnn + 1 = channel #
d	0001 0100	Model-ID # (D-50)
e	0100 1111	Command-ID # (RJC)
f	1111 0111	End of System Exclusive

Notes :

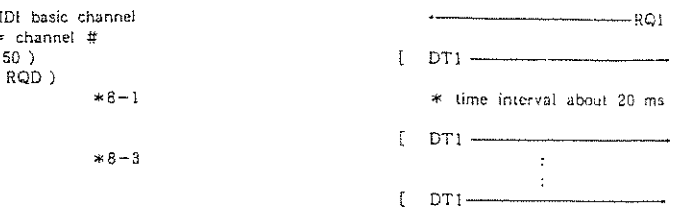
*8-1 If the assinged address exceeds Memory area, it is ignores.

*8-2 Number of data in data set (DT1, DAT) should not exceed 256.

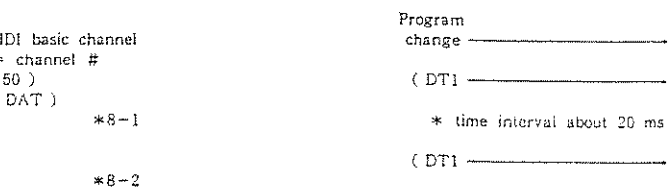
*8-3 The size that exceeds Memory area should not be assinged.

9. SEQUENCE OF COMMUNICATION

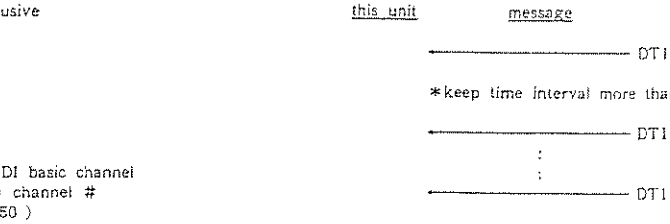
9.1 When one way request data (RQI) is received



9.2 When any of Patch Group, Bank or Number is changed by operating the panel of the unit and if Exclu in MIDI Func is set to P-Dump, all data in Temp. area will be transmitted.



9.3 When one way data set (DT1) is received

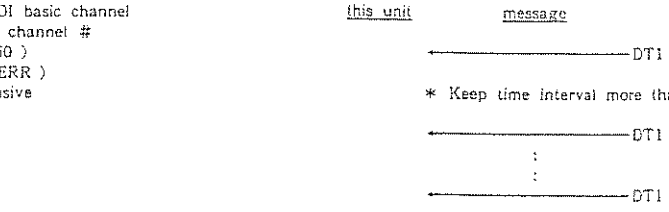


9.4 In the 'Bulk Dump' mode

Data in all memory areas, including Reverbs 17 to 32, is transmitted from the beginning.

9.5 In the 'Bulk Load' mode

Data in all memory areas, including Reverbs 17 to 32, is transmitted from the beginning.



Notes :

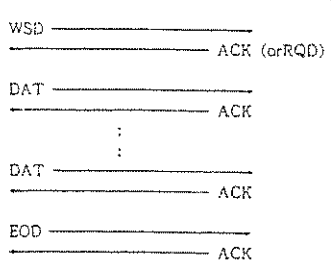
*It sends RJC and stops the sequence when it receives ERR or detects some error.

*It sends RJC when the sequence is discontinued manually.

*It stops the sequence immediately when it receives RJC.

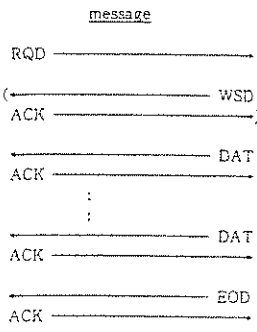
9.6 In the 'Bulk Dump' mode

When Request data (RQD) is recongnized, data area defined by RQD is transferred. If not recognized, data in all memory areas, in cluding Reverbs 17 to 32 is transferred.



9.7 In the 'Bulk Load' mode

When"Want to send"data (WSD) is recognized, data area defined by WSD is transferred. If not recognixed, data in all memory areas, in cluding Reverys 17 to 32 is transferred.



Notes :

*t sends RJCand stops the sequence when it receives ERR or detects some error.

*It sends RJC when the sequence is discontinued manually.

*It stops the sequence immediately when it receives RJC.

10 HOW TO USE EXCLUSIVE MESSAGES

10.1 DataSet (DT1)

To set Pitch Coarse and Pitch Fine in Upper Partial−1, transmit the following messages to the D−50.

byte		Description
a	F0h	Exclusive status
b	41h	Roland ID#
c	00h	Device−ID# (MIDI basic channel=1)
d	14h	Model−ID# (D−50)
e	12h	Command−ID# (DT1)
f	00h	Address MSB (Pitch Coarse of Upper Partial−1)
g	00h	Address
h	00h	Address LSB
i	24h	Data (Pitch Coarse=C4)
j	32h	Data (Pitch Fine=0 (senter))
k	2Ah	Check sum
l	F7h	End of System Exclusive

When parameter's addresses are consecutive like the above example, one messages can set data for up to 256 parameters.

10.2 Request Data (RQ1)

To request the D−50 to transmit all parameters data in Temp. area, sent the following messages.

byte		Description
a	F0h	Exclusive status
b	41h	Roland ID#
c	00h	Device−ID# (MIDI basic channel=1)
d	14h	Model−ID# (D−50)
e	11h	Command−ID# (RQ1)
f	00h	Addres sMSB (top of temp. area)
g	00h	Address
h	00h	Address LSB
i	00h	Size MSB (size=448)
j	03h	Size
k	40h	SizeLSB
l	3Dh	Checksum
m	F7h	EndofSystemExclusive

When the data size exceeds 256 is received, D-50 devicea, the data into two and transmit them.

10.3 Want to send data (WSD)

To send only Patch memory 1−1 data, send the following want to send data (WSD) messages.

byte		Description
a	F0h	Exclusive status
b	41h	Roland ID#
c	00h	Device−ID# (MIDI basic channel=1)
d	14h	Model−ID# (D−50)
e	40h	Command−ID# (WSD)
f	02h	Address MSB (patch memory1−1)
g	00h	Address
h	00h	Address LSB
i	00h	SizeMSB (size=448)
j	03h	Size
k	40h	SizeLSB
l	3Bh	Check sum
m	F7h	End of System Exclusive

After the above messages are recongnized, the address size check of the later Data set (DAT) messages is performaed according to the address size set with these messagges.

10.6 Request data (RQD)

To send only Patch memory 1−1 data, send the following Request data (RQD) messages

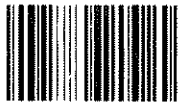
byte		Description
a	F0h	Exclusive status
b	41h	Roland ID#
c	00h	Device−ID# (MIDI basic channel=1)
d	14h	Model−ID# (D−50)
e	41h	Command−ID# (RQD)
f	02h	Address MSB (patchmemory1−1)
g	00h	Address
h	00h	Address LSB
i	00h	SizeMSB (size=448byte)
j	03h	Size
k	40h	SizeLSB
l	3Bh	Check sum
m	F7h	End of System Exclusive

When the above messages are recognized, the defined data area is transmitted with Dta set (DAT) messages, then End of data (EOD) is transmitted.

Roland®

10481

UPC 10481



Roland

'87-7-F3-5S