1. RECOGNIZED RECEIVE DATA

■ Channel Voice Messages
● Note off

Status	2nd byte	3rd byte
8nH	kkH	vvH
9nH	kkH	00H

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
kk=note number: 00H - 7FH (0 - 127)
vv=note off velocity: 00H - 7FH (0 - 127)

* The velocity values of Note Off messages are ignored.

● Note on

Status	2nd byte	3rd byte
9nH	kkH	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
kk=note number: 00H - 7FH (0 - 127)
vv=note on velocity: 01H - 7FH (1 - 127)

* Note numbers outside the range of 15-113 are transposed to the nearest octave within this range.
* Transpose function does not affect the recognized note numbers.

● Control Change

* The value specified by a Control Change message will not be reset even by a Program Change, etc.

○ Data Entry (Controller number 6,38)

Status	2nd byte	3rd byte
BnH	06H	mmH
BnH	26H	llH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
mm,ll= the value of the parameter specified by RPN

○ Volume (Controller number 7)

Status	2nd byte	3rd byte
BnH	07H	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Volume: 00H - 7FH (0 - 127)

* Volume messages are used to adjust the volume balance of each Part.
* Received volume messages affect received note event levels (Rx ch/Part), and cannot affect internal keyboard notes.

○ Expression (Controller number 11)

Status	2nd byte	3rd byte
BnH	0BH	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Expression: 00H - 7FH (0 - 127)

* Received expression messages affect received note event levels (Rx ch/Part) only for Strings or Pipe Organ.
* Recognized when dual tone selected.
* These message can affect only MIDI notes.

○ Hold 1 (Controller number 64)

Status	2nd byte	3rd byte
BnH	40H	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H - 7FH (0 - 127)

* Hold-1 (damper) is not a switch (ON/OFF) but a continuously valiable controller.
* These message can affect only MIDI notes.

○ Sostenuto (Controller number 66)

Status	2nd byte	3rd byte
BnH	42H	vvH

* These message can affect only MIDI notes.

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H - 7FH (0 - 127) 0-63=OFF, 64-127=ON

* Sostenuto is an ON/OFF switch.
* These message can affect only MIDI notes.

○ Soft (Controller number 67)

Status	2nd byte	3rd byte
BnH	43H	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H - 7FH (0 - 127)

* Soft is not a switch (ON/OFF) but a continuously valiable controller.
* These message can affect only MIDI notes.

○ Effect 1 (Reverb Send Level) (Controller number 91)

Status	2nd byte	3rd byte
BnH	5BH	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H - 7FH (0 - 127) 0-63=OFF, 64-127=ON

* Reverb setting via MIDI are treated as a temporary message. They are not stored.
* Reverb message shall be recieved as a basic channel.
* Received reverb messages through basic channel affect all parts and internal keyboard notes.

○ Effect 3 (Chorus Send Level) (Controller number 93)

Status	2nd byte	3rd byte
BnH	5DH	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H - 7FH (0 - 127) 0-63=OFF, 64-127=ON

* Received chorus messages through channel 1-16 affect each part individually.
* When Chorus is received as a basic channel, this channel part and the piano shall be affected.
* Received chorus messages through basic channel affect part on the corresponding channel and internal keyboard notes.

○ RPN MSB/LSB (Controller number 100,101)

Status	2nd byte	3rd byte
BnH	65H	mmH
BnH	64H	llH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
mm=upper byte of parameter number specified by RPN
ll=lower byte of parameter number specified by RPN

* Recognized when MIDI transmit mode 2 is selected.
* The value specified by RPN will not be reset even by messages such as Program Change or Reset All Controller.

** RPN **
The RPN (Registered Parameter Number) messages are expanded control changes, and each function of an RPN is described by the MIDI Standard.
To use these messages, you must first use RPN MSB and RPN LSB messages to specify the parameter to be controlled, and then use Data Entry messages to specify the value of the specified parameter. Once an RPN parameter has been specified, all Data Entry messages received on that channel will modify the value of that parameter.
To prevent accidents, it is recommended that you set RPN Null (RPN Number = 7FH/7Fh) when you have finished setting the value of the desired parameter.

On the HP-330/530/245, RPN can be used to modify the following parameters.

RPN MSB LSB	Data entry MSB LSB	Explanation
00H 01H	mmH llH	Master Fine Tuning mm,ll: 00 00H - 40 00H - 7F 7FH (-100 - 0 - +100 cents) Initial value = 40 00H (±0 cent)
7FH 7FH	— —	RPN null Set condition where RPN is unspecified. Settings already made will not change. mm,ll: ignored

● Program Change

Status | 2nd byte
CnH | ppH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
pp=Program number: 00H - 01H, 03H - 2CH (prog.1 - 2, prog.4 - 45)

Received program change message are assigned as follows.

program number	tone
1	Piano 1
2	Piano 2
4	Harpsichord
5	Vibraphone
6	Electric Piano 1
7	Electric Piano 2
8	Pipe Organ
9	Strings
10	Piano 1 + Piano 2
11	Piano 1 + Harpsichord
12	Piano 1 + Vibraphone
13	Piano 1 + Electric Piano 1
14	Piano 1 + Electric Piano 2
15	Piano 1 + Pipe Organ
16	Piano 1 + Strings
17	Piano 2 + Harpsichord
18	Piano 2 + Vibraphone
19	Piano 2 + Electric Piano 1
20	Piano 2 + Electric Piano 2
21	Piano 2 + Pipe Organ
22	Piano 2 + Strings
23	Harpsichord + Vibraphone
24	Harpsichord + Electric Piano 1
25	Harpsichord + Electric Piano 2
26	Harpsichord + Pipe Organ
27	Harpsichord + Strings
28	Vibraphone + Electric Piano 1
29	Vibraphone + Electric Piano 2
30	Vibraphone + Pipe Organ
31	Vibraphone + Strings
32	Electric Piano 1 + Electric Piano 2
33	Electric Piano 1 + Pipe Organ
34	Electric Piano 1 + Strings
35	Electric Piano 2 + Pipe Organ
36	Electric Piano 2 + Strings
37	Pipe Organ + Strings
38	Acoustic Bass / Piano 1
39	Acoustic Bass / Piano 2
40	Strings / Harpsichord
41	Acoustic Bass / Vibraphone
42	Acoustic Bass / Electric Piano 1
43	Acoustic Bass / Electric Piano 2
44	Pipe Organ / Harpsichord
45	Strings / Piano 1

* After a Program Change message is received, the sound will change beginning with the next Note-on. Voices already sounding when the Program Change message was received will not be affected.
* Program Number 3 will be ignored.
* Received program change messages through channel 1-16 affect each part individually.
* When the program change is received as a basic channel, the tone of this channel part and the tone selected by the panel shall be changed to the designated tone.
* Received program change messages through basic channel affect part on the corresponding channel and internal keyboard notes.

■ Channel Mode Messages
● Reset All Controllers (Controller number 121)

Status | 2nd byte | 3rd byte
BnH | 79H | 00H

n=MIDI channel number: 0H - FH (ch.1 - ch.16)

* When this message is received, the following controllers will be set to their reset values.

Controller	Reset value
Expression	127 (max)
Hold 1	0 (off)
Portamento	0 (off)
Sostenuto	0 (off)
Soft	0 (off)

● Local Control

Status | 2nd byte | 3rd byte
BnH | 7BH | 00H
BnH | 7AH | vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Value: 00H, 7FH (0, 127) 0=OFF 127=ON

● All Notes Off (Controller number 123)

Status | 2nd byte | 3rd byte
BnH | 7BH | 00H

n=MIDI channel number: 0H - FH (ch.1 - ch.16)

* When All Notes Off is received, all notes on the corresponding channel will be turned off. However if Hold 1 or Sostenuto is ON, the sound will be continued until these are turned off.

● OMNI OFF (Controller number 124)

Status | 2nd byte | 3rd byte
BnH | 7CH | 00H

n=MIDI channel number: 0H - FH (ch.1 - ch.16)

* The same processing will be carried out as when All Notes Off is received. *1

● OMNI ON (Controller number 125)

Status | 2nd byte | 3rd byte
BnH | 7DH | 00H

n=MIDI channel number: 0H - FH (ch.1 - ch.16)

* The same processing will be carried out as when All Notes Off is received. *1

● MONO (Controller number 126)

Status | 2nd byte | 3rd byte
BnH | 7EH | mmH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
mm=mono number: 00H - 10H (0 - 16)

* The same processing will be carried out as when All Notes Off is received. *1

● POLY (Controller number 127)

Status | 2nd byte | 3rd byte
BnH | 7FH | 00H

n=MIDI channel number: 0H - FH (ch.1 - ch.16)

* The same processing will be carried out as when All Notes Off is received. *1

Note:
*1 The Mode doesn't change (OMNI OFF, POLY remains).

■ System Realtime Message
● Active Sensing
<u>Status</u>
FEH

* When Active Sensing is received, the unit will begin monitoring the intervals of all further messages. While monitoring, if the interval between messages exceeds 380 ms, the same processing will be carried out as when All Notes Off and Reset All Controllers are received, and message interval monitoring will be halted.

■ System Exclusive Message

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	ii, ddH, ...,eeH	F7H

F0H:	System Exclusive Message status
ii = ID number:	an ID number (manufacturer ID) to indicate the manufacturer whose Exclusive message this is. Roland's manufacturer ID is 41H. ID numbers 7EH and 7FH are extensions of the MIDI standard; Universal Non-realtime Messages (7EH) and Universal Realtime Messages (7FH).
dd,...,ee = data:	00H - 7FH (0 - 127)
F7H:	EOX (End Of Exclusive)

The System Exclusive Messages received by the HP-330/530/245 are; Data Set (DT1), and Universal Non-realtime System Exclusive messages (Identity request),

● Universal Non-realtime System Exclusive Messages
○ Identity Request

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	7EH,dev,06H,01H	F7H

<u>Byte</u>	<u>Explanation</u>
F0H	Exclusive status
7EH	ID number (universal non-realtime message)
dev	Device ID (dev:UNIT#-1)
06H,01H	Identity request
F7H	EOX (End Of Exclusive)

* When Identity Request is received, Identity Reply message will be transmitted.
* Even if the Device ID is 7FH(Broadcast), Identity Reply message will be transmitted.

● Data transmission
HP-330/530/245 can transmit and receive the various parameters using System Exclusive messages.
The exclusive message of HP-330/530/245 data has a model ID of 1AH, and device ID is defined by MIDI UNIT NUMBER. UNIT NUMBER is always the same as the current basic channel.

○ Data set 1 DT1
This is the message that actually performs data transmission, and is used when you wish to transmit the data.

<u>Status</u>	<u>Data byte</u>	<u>Status</u>
F0H	41H, dev, 1AH, 12H, aaH, bbH, ccH, ... ddH, sum	F7H

<u>Byte</u>	<u>Explanation</u>	
F0H	Exclusive status	
41H	ID number (Roland)	
dev	Device ID (dev: UNIT#-1)	
1AH	Model ID (HP-330/530/245)	
12H	Command ID (DT1)	
aaH	Address MSB:	upper byte of the starting address of the transmitted data
bbH	Address LSB:	lower byte of the starting address of the transmitted data
ccH	Data:	the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.
:	:	
ddH	Data	
sum	Checksum	
F7H	EOX (End Of Exclusive)	

* Data larger than 128 bytes must be divided into packets of 128 bytes or less. If "Data Set 1" is transmitted successively, there must be an interval of at least 20 ms between packets.
* Regarding the address please refer to section 3 (Parameter Address Map).
* Regarding the checksum please refer to section 4 (Supplementary material).

Section 2. Transmit data

■ Channel Voice Messages
● Note off

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
8nH	kkH	40H

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
kk=note number: 00H - 7FH (0 - 127)

● Note on

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
9nH	kkH	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
kk=note number: 00H - 7FH (0 - 127)
vv=note on velocity: 01H - 7FH (1 - 127)

* Note number's range can be changed with Key Transpose: up a maximum 5, or down a minimum of 6 semitones. The table below shows the degrees of transposition.

transpose	transmitted note number
-6	15-102
-5	16-103
-4	17-104
-3	18-105
-2	19-106
-1	20-107
0	21-108
+1	22-109
+2	23-110
+3	24-111
+4	25-112
+5	26-113

● Control Change
○ Data Entry (Controller number 6,38)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	06H	mmH
BnH	26H	llH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
mm,ll= the value of the parameter specified by RPN

○ Expression (Controller number 11)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	0BH	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Expression: 00H - 7FH (0 - 127)

* Continuous value is transmitted.
* Transmitted when pedal function 2 or 4 is selected.

○ Hold 1 (Controller number 64)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	40H	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H - 7FH (0 - 127)

* Continuous value is transmitted.

○ Sostenuto (Controller number 66)

<u>Status</u>	<u>2nd byte</u>	<u>3rd byte</u>
BnH	42H	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H, 7FH (0, 127) 0=OFF 127=ON

* ON or OFF is transmitted.

○ **Soft (Controller number 67)**

Status	2nd byte	3rd byte
BnH	43H	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H - 7FH (0 - 127)

* Continuous value is transmitted.

○ **Effect 1 (Reverb Send Level) (Controller number 91)**

Status	2nd byte	3rd byte
BnH	5BH	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H, 7FH (0, 127) 0=OFF 127=ON

* Transmitted when MIDI transmit mode 2 is selected.

○ **Effect 3 (Chorus Send Level) (Controller number 93)**

Status	2nd byte	3rd byte
BnH	5DH	vvH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
vv=Control value: 00H, 7FH (0, 127) 0=OFF 127=ON

* Transmitted when MIDI transmit mode 2 is selected.

○ **RPN MSB/LSB (Controller number 100,101)**

Status	2nd byte	3rd byte
BnH	65H	mmH
BnH	64H	llH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
mm=upper byte of parameter number specified by RPN
ll=lower byte of parameter number specified by RPN

* Transmitted when MIDI transmit mode 2 is selected.

*** RPN **
HP-330/530/245 can transmit Master fine tuning (RPN #1) and RPN null. After sending the master fine tune, immediately the RPN Null shall be sent.

RPN MSB LSB	Data entry MSB LSB	Explanation
00H 01H	mmH llH	Master Fine Tuning
		mm,ll: 00 00H - 40 00H - 7F 7FH (-100 - 0 - +100 cents)
7FH 7FH	— —	RPN null

● **Program Change**

Status	2nd byte
CnH	ppH

n=MIDI channel number: 0H - FH (ch.1 - ch.16)
pp=Program number: 00H - 7FH (prog.1 - prog.128)

* When this piano is set to MIDI transmit mode 2, pressing a Tone button will select a tone as usual. At this time, the Program Change message assigned to that button is sent.

■ **System Realtime Message**

● **Active sensing**

Status
FEH

* This will be transmitted constantly at intervals of approximately 240ms.

■ **System exclusive messages**

HP-330/530/245 can transmit and receive the various parameters using System Exclusive messages.
The exclusive message of HP-330/530/245 data has a model ID of 1AH, and device ID is defined by MIDI UNIT NUMBER. UNIT NUMBER is always the same as the current basic channel.

The System Exclusive Messages transmitted by the HP-330/530/245 are; Data Set (DT1), and Universal Non-realtime System Exclusive messages (Identity Reply).

● **Universal Non-realtime System Exclusive Messages**
○ **Identity Reply**

Status	Data byte	Status
F0H	7EH,dev,06H,02H,41H,1AH,00H,00H,02H,ssH,01H,00H,00H	F7H

Byte	Explanation
F0H	Exclusive status
7EH	ID number (universal non-realtime message)
dev	Device ID (dev:UNIT#-1)
06H,02H	Identity reply
41H	Manufacture's ID(Roland)
1AH,00H	Device family code
00H,02H	Device family number code
	ssH,01H,00H,00H Software revision level
	ss : 00(HP-330/245) 01: (HP-530)
F7H	EOX (End Of Exclusive)

* When Identity Request is received, Identity Reply message will be transmitted.

● **Data transmission**
○ **Data set 1 DT1**

Status	Data byte	Status
F0H	41H, dev, 1AH, 12H, aaH, bbH, ccH, ... ddH, sum	F7H

Byte	Explanation	
F0H	Exclusive status	
41H	ID number (Roland)	
dev	Device ID (dev: UNIT#-1)	
1AH	Model ID (HP-330/530/245)	
12H	Command ID (DT1)	
aaH	Address MSB:	upper byte of the starting address of the transmitted data
bbH	Address LSB:	lower byte of the starting address of the transmitted data
ccH	Data:	the actual data to be transmitted. Multiple bytes of data are transmitted starting from the address.
:	:	
ddH	Data	
sum	Checksum	
F7H	EOX (End Of Exclusive)	

* Regarding the address please refer to section 3 (Parameter Address Map).
* Regarding the checksum please refer to section 4 (Supplementary material).

Section 3. Parameter Address Map (Model ID=1AH)

Parameter Address is divided into 2 bytes. Each byte is 7 bits.

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

■ Parameter base address

* Addresses marked at "#" cannot be used as starting addresses.

```
+-------+------------------------------------------------------+
| Start |                                                      |
|address|                    Description                       |
+-------+------------------------------------------------------+
| 00 05 | 0ttt kkkk   Temperament Select              *3.1     |
|       |             ttt (0H - 6H), kkkk (0H - BH)            |
| 01 01 | 0aaa aaaa   Chorus Depth                     *3.2     |
|       |               00H - 0FH : Depth 1                    |
|       |               10H - 1FH : Depth 2                    |
|       |               20H - 2FH : Depth 3                    |
|       |               30H - 3FH : Depth 4                    |
|       |               40H - 4FH : Depth 5                    |
|       |               50H - 5FH : Depth 6                    |
|       |               60H - 7FH : Depth 7                    |
| 01 03 | 0aaa aaaa   Reverb Intensity                 *3.3     |
|       |               00H - 0FH : Depth 1                    |
|       |               10H - 1FH : Depth 2                    |
|       |               20H - 2FH : Depth 3                    |
|       |               30H - 3FH : Depth 4                    |
|       |               40H - 4FH : Depth 5                    |
|       |               50H - 5FH : Depth 6                    |
|       |               60H - 7FH : Depth 7                    |
| 01 06 | 0aaa aaaa   Resonance Intensity              *3.4     |
|       |               00H - 0FH : Intensity 1 (OFF)         |
|       |               10H - 1FH : Intensity 2               |
|       |               20H - 2FH : Intensity 3               |
|       |               30H - 3FH : Intensity 4               |
|       |               40H - 4FH : Intensity 5               |
|       |               50H - 5FH : Intensity 6               |
|       |               60H - 7FH : Intensity 7               |
| 01 0A | 0000 00aa   Stretch Tune                     *3.5     |
|       |               00H - 01H                              |
| 01 0B | 0aaa aaaa   Dual Balance                     *3.6     |
|       |               00H - 27H : Balance 9-1               |
|       |               28H - 2FH : Balance 8-2               |
|       |               30H - 37H : Balance 7-3               |
|       |               38H - 3FH : Balance 6-4               |
|       |               40H - 47H : Balance 5-5               |
|       |               48H - 4FH : Balance 4-6               |
|       |               50H - 57H : Balance 3-7               |
|       |               58H - 5FH : Balance 2-8               |
|       |               60H - 7FH : Balance 1-9               |
|  01 10| 0000 aaaa   Rx Switch Ch.1   (Part 1)        *3.7     |
|#01 11 |    :            :    Ch.2   (Part 2)                 |
|#01 12 |    :            :    Ch.3   (Part 3)                 |
|#01 13 |    :            :    Ch.4   (Part 4)                 |
|#01 14 |    :            :    Ch.5   (Part 5)                 |
|#01 15 |    :            :    Ch.6   (Part 6)                 |
|#01 16 |    :            :    Ch.7   (Part 7)                 |
|#01 17 |    :            :    Ch.8   (Part 8)                 |
|#01 18 |    :            :    Ch.9   (Part 9)                 |
|#01 19 |    :            :    Ch.10  (Part 10)                |
|#01 1A |    :            :    Ch.11  (Part 11)                |
|#01 1B |    :            :    Ch.12  (Part 12)                |
|#01 1C |    :            :    Ch.13  (Part 13)                |
|#01 1D |    :            :    Ch.14  (Part 14)                |
|#01 1E |    :            :    Ch.15  (Part 15)                |
|#01 1F |    :            :    Ch.16  (Part 16)                |
|       |             00H       : OFF                          |
|       |             01H-07H   : ON                           |
+-------+------------------------------------------------------+
```

Note:
Press the [Chorus] button while the [Transpose] button is held down, and select MIDI transmit mode 2 using [+/-] button. In this mode, the following exclusive messages can be sent.

*3.1 Temperament Select

Upon pressing the [Transpose] button down, press the[Piano 2] button down. The display shall show the temperament type value. The following exclusive messages as shown below can be transmitted by pressing the [+/-] button down.

tt	0H - 6H :	temperament select
kkkk	0H - BH :	key signature

Temperament change value are assigned as follows:

* When EQUAL temperament tuning is selected, the key signature change is ignored.

```
             |C  |C# |D  |D# |E  |F  |F# |G  |G# |A  |A# |B  |
             +---+---+---+---+---+---+---+---+---+---+---+---+
Equal        |00 |01 |02 |03 |04 |05 |06 |07 |08 |09 |0A |0B |
             +---+---+---+---+---+---+---+---+---+---+---+---+
JUST (major) |10 |11 |12 |13 |14 |15 |16 |17 |18 |19 |1A |1B |
             +---+---+---+---+---+---+---+---+---+---+---+---+
JUST (minor) |20 |21 |22 |23 |24 |25 |26 |27 |28 |29 |2A |2B |
             +---+---+---+---+---+---+---+---+---+---+---+---+
MEAN TONE    |30 |31 |32 |33 |34 |35 |36 |37 |38 |39 |3A |3B |
             +---+---+---+---+---+---+---+---+---+---+---+---+
WERCKMEISTER |40 |41 |42 |43 |44 |45 |46 |47 |48 |49 |4A |4B |
             +---+---+---+---+---+---+---+---+---+---+---+---+
KIRNBERGER   |50 |51 |52 |53 |54 |55 |56 |57 |58 |59 |5A |5B |
             +---+---+---+---+---+---+---+---+---+---+---+---+
PYTHAGOREAN  |60 |61 |62 |63 |64 |65 |66 |67 |68 |69 |6A |6B |
             +---+---+---+---+---+---+---+---+---+---+---+---+
```

(numbers are hexa_decimal)

*3.2 Chorus Depth

The following exclusive messages can be transmitted by pressing the [+/-] down upon pressing the [Chorus] button down.

00H : Depth 1
10H : Depth 2
20H : Depth 3
30H : Depth 4
40H : Depth 5
50H : Depth 6
60H : Depth 7

*3.3 Reverb Intensity

The following exclusive messages can be transmitted by pressing the [+/-] down upon pressing the [Reverb] button down.

00H : Intensity 1
10H : Intensity 2
20H : Intensity 3
30H : Intensity 4
40H : Intensity 5
50H : Intensity 6
60H : Intensity 7

*3.4 Resonance Intensity

The following exclusive messages can be transmitted by pressing the [+/-] down upon pressing the [Reverb] and [Chorus] buttons down.

00H : Intensity 1 (OFF)
10H : Intensity 2
20H : Intensity 3
30H : Intensity 4
40H : Intensity 5
50H : Intensity 6
60H : Intensity 7

*3.5 Strech Tuning

Upon pressing the [Transpose] button down, press the[Harpsichprd] button down. The display shall show the stretch tuning type. The following exclusive messages as shown below can be transmitted by pressing the [+/-] button down.

00H : Stretch 1
01H : Stretch 2

*3.6 Dual Balance

Upon pressing the [Transpose] button down, press the [Electric Piano 1] button down.The display shall show the dual balance value. The following exclusive messages as shown below can be transmitted by pressing the [+/-] button down.

20H : Balance 9-1
28H : Balance 8-2
30H : Balance 7-3
38H : Balance 6-4
40H : Balance 5-5
48H : Balance 4-6
50H : Balance 3-7
58H : Balance 2-8
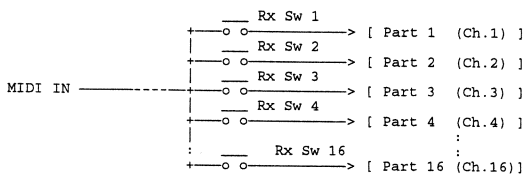60H : Balance 1-9

*3.7 Rx Switch

According to receiving the exclusive message of the MIDI Rx switch, each part 1-16 turns on or off the reception of the MIDI information.

* It is only possible to receive the exclusive message of Rx Switch. You can not transmit it.
* Regarding the Rx Switch please refer to section 4 (Supplementary material).

Section 4. Supplementary material

● Channel and Part

HP-330/530/245 has 16 parts: each channel is 1-16. These channel numbers are fixed. Each part channel can receive program changes individually.

```
                    ___  Rx Sw 1
              +----o o------------> [ Part 1   (Ch.1)  ]
              |     ___  Rx Sw 2
              +----o o------------> [ Part 2   (Ch.2)  ]
              |     ___  Rx Sw 3
MIDI IN ------------+----o o------------> [ Part 3   (Ch.3)  ]
              |     ___  Rx Sw 4
              +----o o------------> [ Part 4   (Ch.4)  ]
              |                        :
              :     ___   Rx Sw 16     :
              +----o o------------> [ Part 16  (Ch.16)]
```

Each part of "HP-330/530/245" awaits the MIDI Rx switch that turns on or off the reception of the MIDI amessage. When the MIDI channel is set by the panel; if the setting value is between 1 and 16, the one channel responding Rx switch shall be on, while the others shall be off. If the setting value is "ALL", the Rx switch for all parts shall be on. Also, by sending the exclusive message from an external MIDI device, it is possible to turn on or off the MIDI Rx switches of the piano part by part.

* When MIDI Rx switches of several parts are on, the display of the MIDI receive channel shall show "ALL".
* When power is turned on, as for part 2-16, the MIDI Rx switch is off.

● Basic Channel

When the MIDI receive channel is set a one of the 1-16 values, the basic channel is determined by the setting of the MIDI transmit channel. When the MIDI receive channel is set at "ALL", the basic channel is determined by the setting of the MIDI transmit channel. When the MIDI Rx switches of more than two parts are on, then the basic channel is determined by the MIDI transmit channel.

MIDI Receive Channel	Basic Channel
1	1
2	2
3	3
4	4
:	:
:	:
16	16
ALL	MIDI Transmit Channel(1-16)

● Example of Roland System Exclusive messages and Checksum

Roland System Exclusive messages (RQ1 and DT1) have a Checksum at the end of the data (just before EOX) to be able to check for communication errors. The Checksum is determined by values of address and data (or size) included in the message.

✧ How to calculate Checksums ("H" indicates Hexadecimal.)

The error checking process employs a sum-check error detection. It provides binary bit figures whose lower 7 bits are zero when values for an address, data (or size) and the Checksum are summed.

One practical equation to determine Checksum is;
If the address is "ad bb ccH" and the data (or the size) is "dd ee ffH"
    ad + bb + cc + dd + ee + ff = sum
    sum ÷ 128 = quotient ... remainder
    128 - remainder = checksum

<Example> Set "Reverb Intensity" to "Depth 4"

According to the Parameter Address Map, the Address of Reverb Intensity is 01 03H, and the Value corresponding to Depth 4 is 30H. So, the message should be :

```
F0   41   00   1A   12   01 03      30        ??         F7
--   --   --   --   --   ------      --        --         --
(1)  (2)  (3)  (4)  (5)  address    data    checksum     (6)
```

(1) Exclusive Status   (2) ID (Roland)
(3) Device ID (UNIT#-1)   (4) Model ID (HP-330/530/245)
(5) Command ID (DT1)   (6) End of Exclusive

* UNIT# is always the same as the current basic channel. In this example, the MIDI receive channel is 1.

The Checksum is :
01H + 03H + 30H = 1 + 3 + 48 = 52 (sum)
52 (sum) ÷ 128 = 0 (quotient) ... 52 (remainder)
checksum = 128 - 52 (remainder) = 76 = 4CH

Therefore, the message to send is : F0 41 00 1A 12 01 03 30 4C F7

☲Roland®

10972

☲Roland®