DENON PROFESSIONAL

rhoxx networking

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DN-500MX/DN-500MXA

Serial Command Protocol Guide

Ver. 2.2

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inMusic Brands, Inc.

Contents

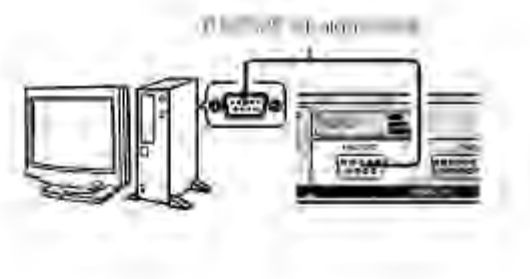
1. General

The Serial Remote control function is used by connecting the host machine such as PC to the device (our product). The host can control the device by sending the Control command, and the host can sense the current device status by sending the Status Request command. Two types of the connectivity, RS-232C and IP (Ethernet) is selectable. In addition, in this document, the controlled equipment is called the “Device” (our product) and the controlling equipment is called the “Host (PC etc.)”.

1-1. RS-232C Control

The host can control the device by connecting the RS-232C straight cable to the D-sub 9 pins connector on the device surface as shown in the following diagram.

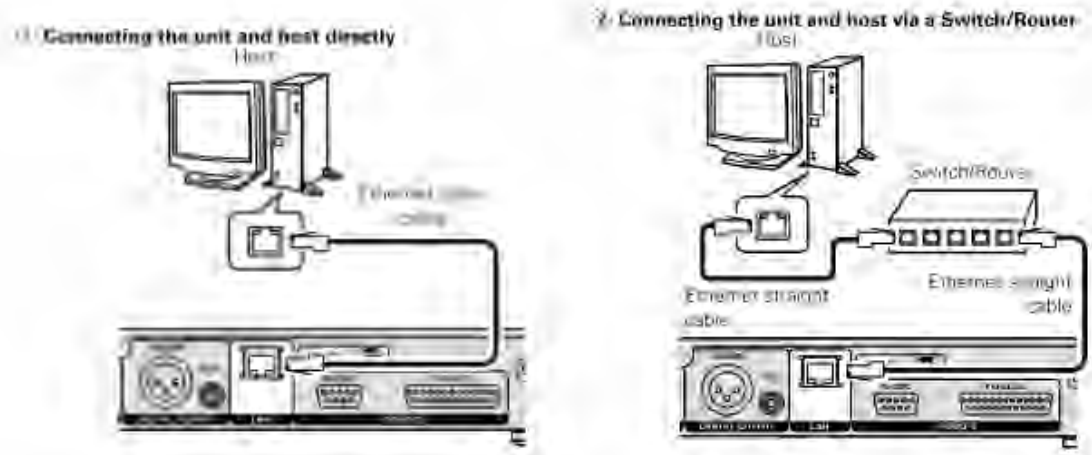
Figure 1-1 RS-232C Connection



1-2. IP Control (Ethernet)

The host can control the device by connecting the Ethernet cable to the RJ-45 connector on the device surface as shown in the following diagram. (10BASE-T / 100BASE-TX)

Figure 1-2 IP Control Connection



【Three main features】

1. A device is controlled by a host.
2. A device sends status of the device to host by receiving the status request command from the host
3. Automatic ally a device sends status notification to the host to notify of the device status change

2. Specification

2-1. RS-232C Control

- Transmission type : Asynchronous / Full duplex
- Connector type : 9 pin D-sub female connector (Straight cable)
- Transfer rate : 9,600 / 38,400 bps Selectable (via “Serial Bit Rate” in the “System Setting” menu)
- Clock accuracy : < +/- 2.0%
- Data length : 8 bits
- Parity : None
- Start bit : 1 bit
- Stop bit : 1 bit
- Flow Control : None
- Maximum data length : 600 Bytes (Start character to End character is included.)

Figure2-1 Pin arrangement

Pin Number	Signal Name
1	GND
6	NC
2	TxD
7	RTS*
3	RxD
8	NC
4	NC
9	NC
5	S. GND

*5V/500mA power supply can be used for RTS.

2-2. IP Control (Ethernet)

- Transmission type : Full duplex
- Transfer speed : 10 Mbps / 100 Mbps
- TCP port No. : 0 -65535
- Maximum data length : 600 Bytes (Start character to End character is included.)

3. Communication Protocol

3-1. Packet Structure

A packet must be started with the Start Character '@' and terminated with the End Character '\r' (0x0D).

Figure 3-1Packet Structure

There are three kinds of packet, "COMMAND", "REQUEST", and "ANSWER /NOTIFICATION/ERROR".

3-2. ACK (Acknowledge) and NACK (Not Acknowledge)

The device sends ACK or NACK to a host according to the following table.

3-2-1. ACK [Acknowledgement]:

It is an affirmative reply sent to a host from a device. When data transfer completes properly, a device notify of that to a host.

3-2-2. NACK [Negative Acknowledgement]:

It is a negative reply sent to a host from a device. When data transfer does not complete properly, a device notify of that to a host.

Table 3-1 ACK and NACK

Name	Value (HEX)	Transmission Requirement
ACK	0x06	The device acknowledged that the command was received normally from the host.
NACK	0x15	· The device received the End Character '\r'(0x0D) before receiving the Start Character '@(0x40)'. · The device does not receive ID'0(0x30)' just after Start Character'@(0x40)' · The device receives an unknown character just after Start Character '@ (0x40)' and ID'0 (0x30)' · The device receives an unknown command just after Start Character '@ (0x40)' and ID'0 (0x30)'. · Parameter is out of range. · The size of data is abnormal. · 5msec passed before the device receives the next code necessary to complete the command.

3-3. Communication Rules

3-3-1. Initiative of Communication

In the communication between a host and a device, the host must have the initiative. However, the Status Information notification automatically from the device is an exception.

When the device receives a command from the host, the device returns the following.

- When receiving the command which doesn't require a status information — ACK
- When receiving the command which requires a status information — ACK + Status information (ANSWER)
- For the communication failure or an unknown commands etc.(Refer to Table 3-2): — NACK

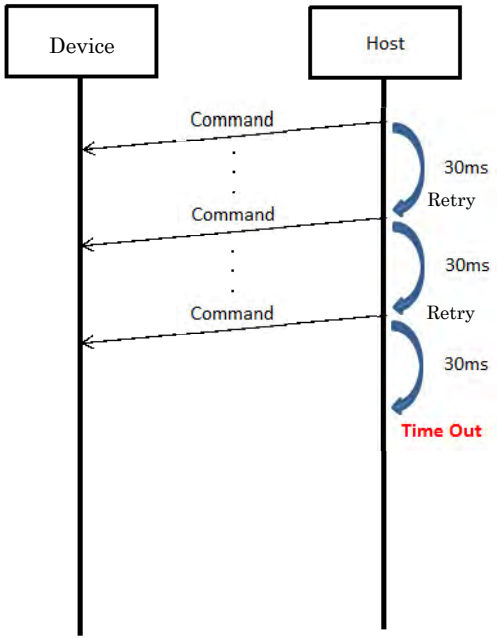
3-3-2. Communication Sequence

The host must not send any new command after the previous command before the host receives ACK or NACK, or the timeout (see "3-3-3 Timeout") has expired.

3-3-3. Timeout

After a host sends a message to a device, the host waits for a reply from the device for 30ms. When the host does not receive a reply over 30ms from the device, the host sends the same message to the device. However, when the host does not receive a reply from the device after sending the same message 3 times (that means Tim Out), the host sends End character '\r' (0x0D) to the device. After that, the host should execute the recovery process such as retry.

Figure 3-3 Time Out



3-3-4. ACK

Refer to " 3-2-1 ACK [Acknowledgement)".

3-3-5. NACK

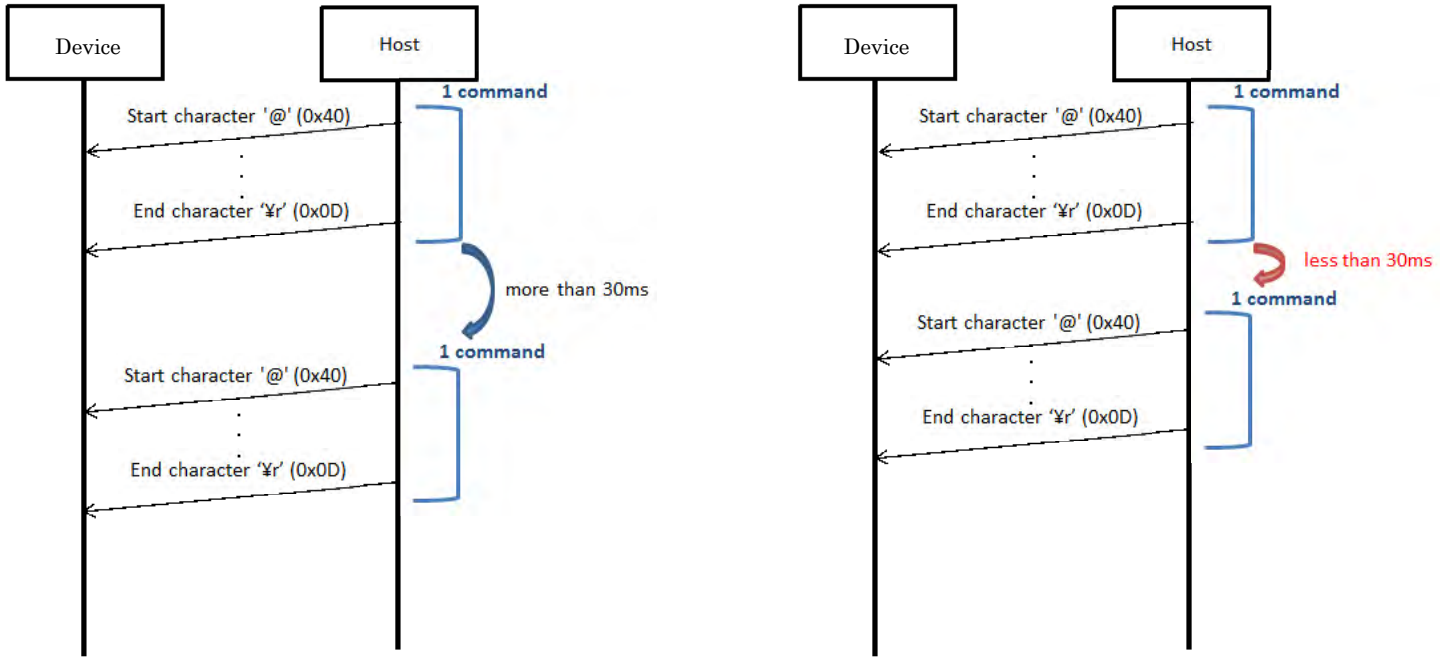
The device returns a NACK immediately after detecting a failure in the communication with the host (see ("3-2-2 NACK [Negative Acknowledgement)"). If the host receives a NACK, it must stop sending the current remaining command immediately and execute the recovery process such as retry.

3-3-6. Command Interval time

・Interval time between Characters from a host must be less than 5ms. The device sends NACK when 5msec passed before the device receives the next character code.

・Interval time between Commands is more than 30ms.

Figure 3-4 Interval time between each command



In case of less than 30ms as interval time between commands,

1) Executing the subsequent command is not guaranteed.

2) When there are buffer spaces of a device for a command, the device will execute the command.

3) When there is no buffer space of a device for a command, the device does not execute the command, and will send Busy (@0BDERBUSY) to the host instead.

3-4. Basic Control Flow

3-4-1. Login

When the operator password is defined, device ignore all commands besides login command until login is succeed.

System, Schedule and Amp setting commands are available only during the login as administrator. (Status Request command is always available.)

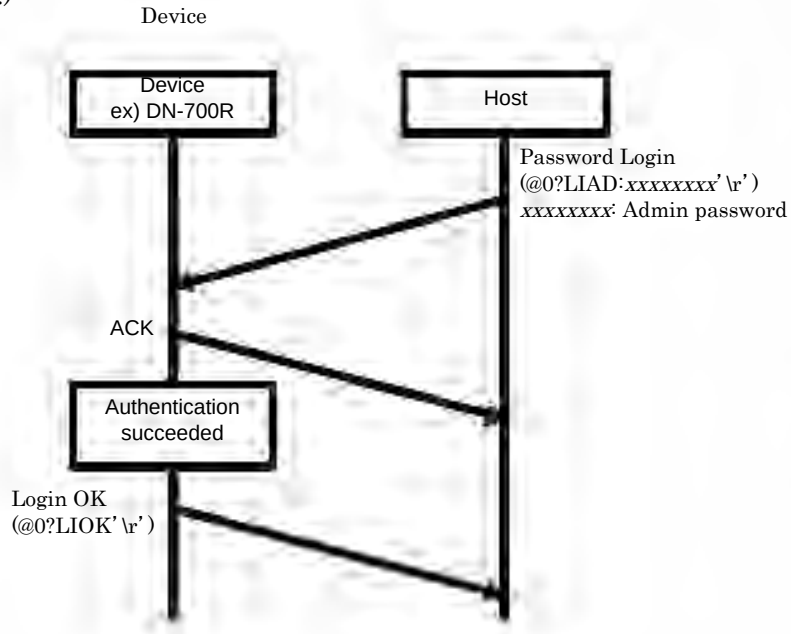


Figure 3-2 Login Flow (The case of success)

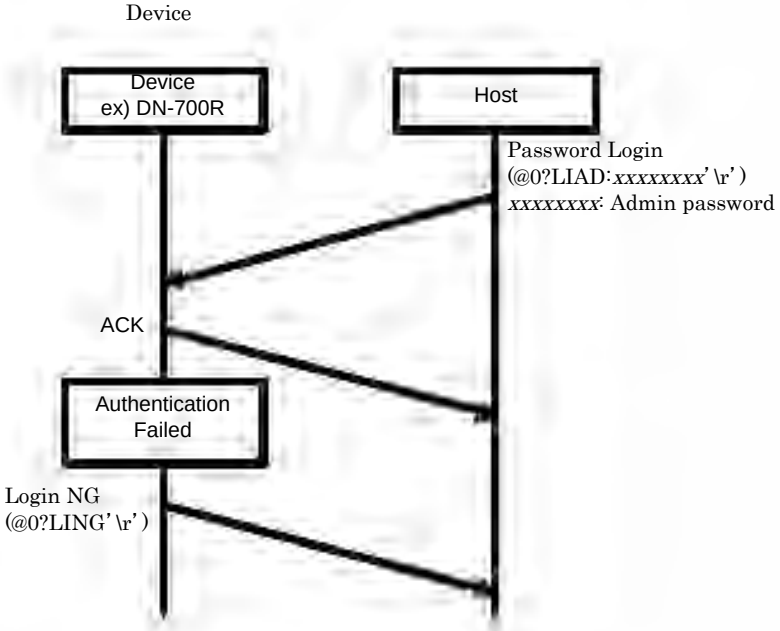


Figure 3-3 Login Flow (The case of fail)

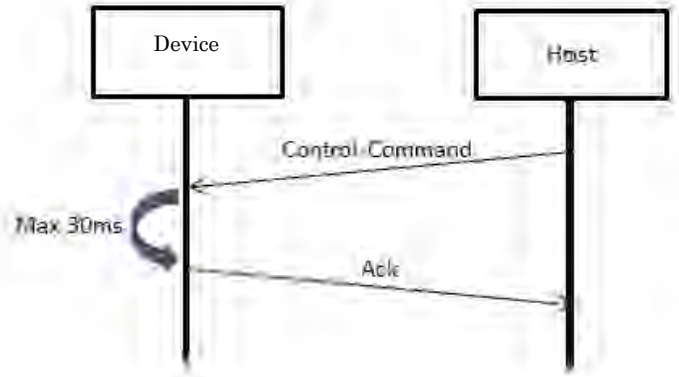
***Note-1:** Only one user can be connected simultaneously.

3-4-2. Device Control Flow

The device sends the host an ACK (Acknowledgement) and executes that command when the device receives a Control command from the host.

The list of the Control command is shown in "Control Command List".

Figure 3-5 Device Control Flow

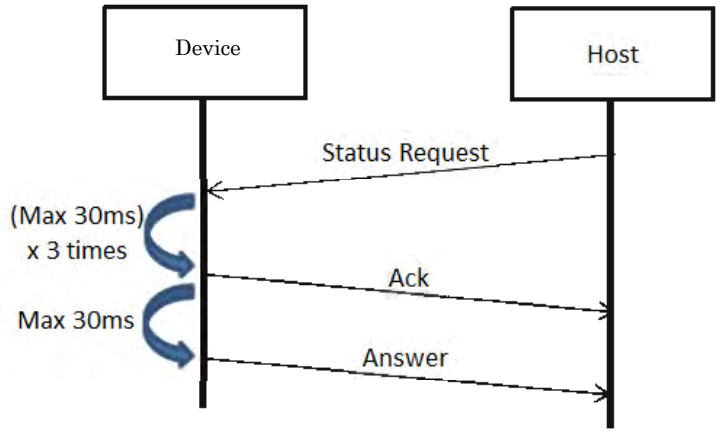


If the device receives an unknown command or an End Character '\r' (0x0D) without a Start Character '@', it causes transmission failure and the device returns a NACK (Not Acknowledgement). Refer to "3-2-2 NACK [Negative Acknowledgement)" about NACK transmission condition. When the device shows menu screen (except Idle screen) on the device, the device sends an ACK to a host, however the Control Command is not executed

3-4-3. Status Request Flow

The device returns an ACK and the ANSWER requested by the host when the device receives the Status Request from the host. The list of the Status Request and the corresponding answer is shown in "Status Request List".

Figure 3-6 Status Request Flow



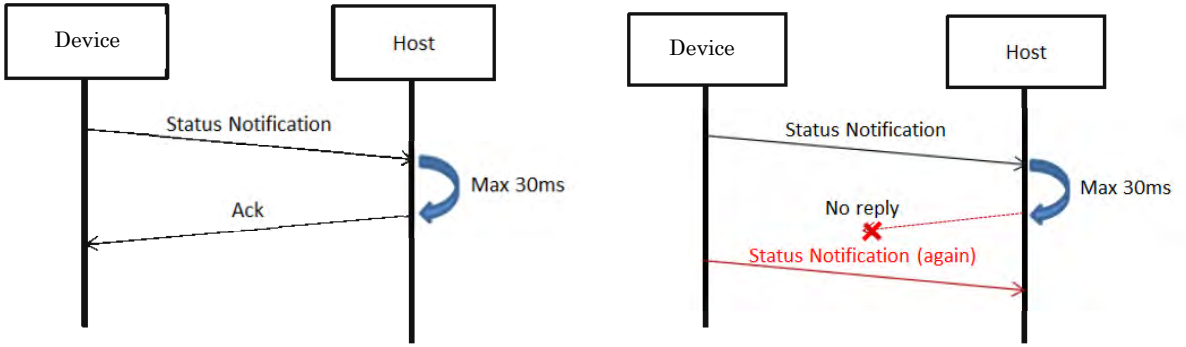
When a device receives Status Request from a host, the device sends an ACK to the host. After that, the device gets the current status, and then sends it to the host.

If the device receives an unknown command or an End Character '\r' (0x0D) without a Start Character '@', it causes transmission failure and the device returns a NACK (Not Acknowledgement). Refer to "3-2-2 NACK [Negative Acknowledgement)" about NACK transmission condition.

3-4-4. Status Notification Flow

A device notifies of Status Information listed in "Status Information List" whenever the status of the device is changed, such as the transport status, the current track, the storage media status, and other status.

Figure 3-7 Status Notification Flow



A device sends Status Notification to a host. The host replies ACK to the device. The device waits for the ACK for Max 30ms. When the device does not receive the ACK from the host, the device sends the same Status Notification to the host again. After that, the device does not send the same Status Notification even if it does not receive an ACK from the host.

The Status Information is same as the answer for the Status Request listed in "Status Request List".

4. Command Table

Italic characters of command mean parameter. (Ex: Frame "@0fr*XX*¥r"" -> Parameter: *XX*)

4-1. Control Command/ Status Request Command List

4-1-1. MIC/LINE Control Command

#	Title			Control Command			
				Prefix	param1	Command	param2
1	Name			@0PXML	*x*:Ch '1':Mic/Line 1 '2':Mic/Line 2 '3':Mic/Line 3 '4':Mic/Line 4 '5':Mic/Line 5 '6':Mic/Line 6	NM	*yyyyyy*: name(Variable length)
2	EQ	SHL	Frequency			EQSLF	*yyyy*: Frequency (Variable length) ex(100Hz = '100', 10kHz = '10000')
			Gain			EQSLG	*yyy*: Gain(Variable length) ex(−10.0dB = '−10.0', +5.0dB = '+5.0') *After the decimal point can be omitted.
		PEQ	Frequency			EQPEF	*yyyy*: Frequency(Variable length) ex(100Hz = '100', 10kHz = '10000')
			Gain			EQPEG	*yyy*: Gain(Variable length) ex(−10.0dB = '−10.0', +5.0dB = '+5.0') *After the decimal point can be omitted.
			Q			EQPEQ	*yy*: Q Value(Variable length) ex(0.7 = '0.7', 63.0 = '63') *After the decimal point can be omitted.
		SHH	Frequency			EQSHF	*yyyy*: Frequency(Variable length) ex(100Hz = '100', 10kHz = '10000')
			Gain			EQSHG	*yyy*: Gain(Variable length)

					ex(−10.0dB = ‘−10.0’, +5.0dB = ‘+5’) *After the decimal point can be omitted.
3	Input Volume			IL	*yzzzz* *y*: Output No. *zzzz*: Lvel
4	MIC/LINE			ML	*yy*:Mic or Line ‘Mc’: Mic ‘Ln’ : Line
5	Hi Pass Filter			HP	*yy*: On/Off ‘00’: On ‘01’ : Off
6	Phantom			PT	*yy*: On/Off ‘00’: On ‘01’ : Off

Note: No.4,5,6 items are available during login as administrator only.

4-1-2. MIC/LINE Status Request Command

#	Title			Status Request Command				Response
				Prefix	param1	Command	Parameter	
1	Name			@0?PXML	*x*:Ch ‘1’:Mic/Line 1 ‘2’:Mic/Line 2 ‘3’:Mic/Line 3 ‘4’:Mic/Line 4	NM	N/A	Same as ″Control Command″
2	EQ	SHL	Frequency			EQSLF	N/A	Same as ″Control Command″
			Gain			EQSLG	N/A	Same as ″Control Command″
		PEQ	Frequency			EQPEF	N/A	Same as ″Control Command″
			Gain			EQPEG	N/A	Same as ″Control Command″

		SHH	Q	'5':Mic/Line 5 '6':Mic/Line 6	EQPEQ	N/A	Same as "Control Command"
			Frequency		EQSHF	N/A	Same as "Control Command"
			Gain		EQSHG	N/A	Same as "Control Command"
3	Input Volume				IL	*y*: Output No.	Same as "Control Command"
4	MIC/LINE				ML	N/A	Same as "Control Command"
5	Hi Pass Filter				HP	N/A	Same as "Control Command"
6	Phantom				PT	N/A	Same as "Control Command"
7	Sig./Peak				SP	N/A	xxxxxx: LED Status (1-6) '0': Off 'G': Green 'A': Amber 'R': Red

4-1-3. SOURCE Control Command

#	Title			Control Command			
				Prefix	param1	Command	param2
1	Name			@0PXSR	*x*:Ch '1':Source1 '2': Source2 '3': Source3 '4': Source4 'A':AUX	NM	*yyyyyy*: name(Variable length)
2	EQ	SHL	Frequency			EQSLF	*yyyy*: Frequency(Variable length) ex(100Hz = '100', 10kHz = '10000')
			Gain			EQSLG	*yyy*: Gain(Variable length) ex(-10.0dB = '-10.0', +5.0dB = '+5') *After the decimal point can be omitted.
		PEQ	Frequency			EQPEF	*yyyy*: Frequency(Variable length) ex(100Hz = '100', 10kHz = '10000')
			Gain			EQPEG	*yyy*: Gain(Variable length) ex(-10.0dB = '-10.0', +5.0dB = '+5') *After the decimal point can be omitted.
			Q			EQPEQ	*yy*: Q Value(Variable length) ex(0.7 = '0.7', 63.0 = '63') *After the decimal point can be omitted.
		SHH	Frequency			EQSHF	*yyyy*: Frequency(Variable length) ex(100Hz = '100', 10kHz = '10000')
			Gain			EQSHG	*yyy*: Gain(Variable length) ex(-10.0dB = '-10.0', +5.0dB = '+5') *After the decimal point can be omitted.
3	Gain					GN	*yyy*: Gain(Variable length) ex(-10.0dB = '-10.0', +5.0dB = '+5')

					*After the decimal point can be omitted.
4	AUX AGC	Compensation Level		AGCL	*y*:Level '1' – '5'
		Response Time		AGRT	*yyy*: Time '100' – '500': 100msec –500msec
		Noise Gate		AGNG	*yy*: On/Off '00': On '01': Off

Note: No.3,4 items are available during login as administrator only.

4-1-4. SOURCE Status Request Command

#	Title			Status Request Command			Response
				Prefix	param1	Command	
1	Name			@0?PXSR	x:Ch '1':Source1 '2': Source2 '3': Source3 '4': Source4 'A':AUX	NM	Same as "Control Command"
2	EQ	SHL	Frequency			EQSLF	Same as "Control Command"
			Gain			EQSLG	Same as "Control Command"
		PEQ	Frequency			EQPEF	Same as "Control Command"
			Gain			EQPEG	Same as "Control Command"
			Q			EQPEQ	Same as "Control Command"
		SHH	Frequency			EQSHF	Same as "Control Command"
			Gain			EQSHG	Same as "Control Command"
3	Gain					GN	Same as "Control Command"
4	AUX AGC	Compensation Level				AGCL	Same as "Control Command"
		Response Time				AGRT	Same as "Control Command"
		Noise Gate				AGNG	Same as "Control Command"
5	Sig./Peak					SP	xxxxx: LED Status (1-5,Aux) '0': Off 'G': Green 'A': Amber 'R': Red

4-1-5. Output Control Command

#	Title			Control Command			
				Prefix	param1	Command	param2
1	Name			@0PXOT	*x*:Ch '1' : Zone1 '2' : Zone2 '3' : Zone3 '4' : Zone4 '5' : Zone5 '6' : Zone6 '7' : Zone7 '8' : Zone8	NM	*yyyyyy*: name
2	Source					SS	*x*: Source '1' :Source1 '2' : Source2 '3' : Source3 '4' : Source4 'A' :AUX
3	Source Level					SL	*yyy*: Level
4	Source Mute					SM	*yy*: On/Off '00' : On '01' : Off
5	Mic Level					ML	*yyy*: Level
6	PEQ	High	Frequency			EQHIF	*yyyy*: Frequency(Variable length) ex(100Hz = '100', 10kHz = '10000')
			Gain			EQHIG	*yyy*: Gain(Variable length) ex(-10.0dB = '-10.0', +5.0dB = '+5') *After the decimal point can be omitted.
			Q			EQHIQ	*yy*: Q Value(Variable length) ex(0.7 = '0.7', 63.0 = '63') *After the decimal point can be omitted.
		Mid High	Frequency			EQMHF	*yyyy*: Frequency(Variable length)

				ex(100Hz = ‘100’, 10kHz = ‘10000’)
		Gain	EQMHG	*yyy*: Gain(Variable length) ex(-10.0dB = ‘-10.0’, +5.0dB = ‘+5’) *After the decimal point can be omitted.
		Q	EQMHQ	*yy*: Q Value(Variable length) ex(0.7 = ‘0.7’, 63.0 = ‘63’) *After the decimal point can be omitted.
	Mid	Frequency	EQMDF	*yyyy*: Frequency(Variable length) ex(100Hz = ‘100’, 10kHz = ‘10000’)
		Gain	EQMDG	*yyy*: Gain(Variable length) ex(-10.0dB = ‘-10.0’, +5.0dB = ‘+5’) *After the decimal point can be omitted.
		Q	EQMDQ	*yy*: Q Value(Variable length) ex(0.7 = ‘0.7’, 63.0 = ‘63’) *After the decimal point can be omitted.
	Mid Low	Frequency	EQMLF	*yyyy*: Frequency(Variable length) ex(100Hz = ‘100’, 10kHz = ‘10000’)
		Gain	EQMLG	*yyy*: Gain(Variable length) ex(-10.0dB = ‘-10.0’, +5.0dB = ‘+5’) *After the decimal point can be omitted.
		Q	EQMLQ	*yy*: Q Value(Variable length) ex(0.7 = ‘0.7’, 63.0 = ‘63’) *After the decimal point can be omitted.
	Low	Frequency	EQLOF	*yyyy*: Frequency(Variable length)

					ex(100Hz = ‘100’, 10kHz = ‘10000’)
			Gain	EQLOG	*yyy*: Gain(Variable length) ex(−10.0dB = ‘−10.0’, +5.0dB = ‘+5’) *After the decimal point can be omitted.
			Q	EQLOQ	*yy*: Q Value(Variable length) ex(0.7 = ‘0.7’, 63.0 = ‘63’) *After the decimal point can be omitted.
7	Master Level			LV	*yyy*: Gain(Variable length) ex(−10.0dB = ‘−10.0’, +5.0dB = ‘+5’) *After the decimal point can be omitted.
8	Mono / Stereo			CH	*yy*: Mono/Stereo ‘MN’: Mono ‘ST’ : Stereo
9	2nd Priority	Volume		2PVL	*yyy*: volume(Variable length) ex(−10.0dB = ‘−10.0’, −6.0dB = ‘−6’) *After the decimal point can be omitted.
		Source		2PSR	*x*: Source ‘0’: None ‘1’:Mic/Line1 ‘2’:Mic/Line 2 ‘3’:Mic/Line 3 ‘4’:Mic/Line 4 ‘5’:Mic/Line 5 ‘6’:Mic/Line 6

		Threshold			2PTH	*yyy*: Threshold Level
		Attack Time			2PAT	*yyy*: Time '000' – '300' : 0msec –300msec
		Hold time			2PHT	*yyyy*: Time '0001' – '1960' : 1msec –1960msec
		Release			2PRL	*yyyy*: Time '0003' – '4270' : 3msec –4270msec
		Attenuation Level			2PAL	*yyy*: Level
10	1st Priority	Volume			1PVL	*yyy*: Volume(Variable length) ex(–10.0dB = '–10.0', –5.0dB = '–6') *After the decimal point can be omitted.
		Source			1PSR	*x*: Source '0' : None '1' :Mic/Line1 '2' :Mic/Line 2 '3' :Mic/Line 3 '4' :Mic/Line 4 '5' :Mic/Line 5 '6' :Mic/Line 6
		Threshold			1PTH	*yyy*: Threshold Level
		Attack Time			1PAT	*yyy*: Time '000' – '300' : 0msec –300msec
		Hold time			1PHT	*yyyy*: Time

					‘0001’ – ‘1960’ : 1msec –1960msec
		Release		1PRL	*yyyy*: Time ‘0003’ – ‘4270’ : 3msec –4270msec
		Attenuation Level		1PAL	*yyy*: Level
11	Delay			DL	*yyyy*: Time ‘0000’ – ‘1000’ : 0msec –1000msec
12	Dynamics	On/Off		DN	*yy*: On/Off ‘00’ : On ‘01’ : Off
		Threshold		DNTH	*yyy*: Threshold Level
		Ratio		∞*:1* DNRT	*yyy*: Ratio ‘010’ – ‘200’ : 1.0 : 1 – 20.0 : 1 ‘INF’ : ∞:1
		Attack Time		DNAT	*yyy*: Time ‘000’ – ‘300’ : 0msec –300msec
		Release		DNAL	*yyyy*: Time ‘0003’ – ‘4270’ : 3msec –4270msec
		Gain		DNGN	*yy*: Gain
		KNEWW		DNNE	*y*: Type ‘H’ : Hard, ‘1’ – ‘5’

Note: No.8 to 12 items are available during login as administrator only.

4-1-6. Output Status Request Command

#	Title			Status Request Command			Response
				Prefix	param1	Command	
1	Name			@0?PXOT	x:Ch '1' : Zone1 '2' : Zone2 '3' : Zone3 '4' : Zone4 '5' : Zone5 '6' : Zone6 '7' : Zone7 '8' : Zone8	NM	Same as "Control Command"
2	Source					SS	Same as "Control Command"
3	Source Level					SL	Same as "Control Command"
4	Source Mute					SM	Same as "Control Command"
5	Mic Level					ML	Same as "Control Command"
6	PEQ	High	Frequency			EQHIF	Same as "Control Command"
			Gain			EQHIG	Same as "Control Command"
			Q			EQHIQ	Same as "Control Command"
		Mid High	Frequency			EQMHF	Same as "Control Command"
			Gain			EQMHG	Same as "Control Command"
			Q			EQMHQ	Same as "Control Command"
		Mid	Frequency			EQMDF	Same as "Control Command"
			Gain			EQMDG	Same as "Control Command"
			Q			EQMDQ	Same as "Control Command"
		Mid Low	Frequency			EQMLF	Same as "Control Command"
			Gain			EQMLG	Same as "Control Command"
			Q			EQMLQ	Same as "Control Command"
		Low	Frequency			EQLOF	Same as "Control Command"
			Gain			EQLOG	Same as "Control Command"
			Q			EQLOQ	Same as "Control Command"

7	Master Level			LV	Same as "Control Command"
8	Mono / Stereo			CH	Same as "Control Command"
9	2nd Priority	Source		2PSR	Same as "Control Command"
		Threshold		2PTH	Same as "Control Command"
		Attack Time		2PAT	Same as "Control Command"
		Hold time		2PHT	Same as "Control Command"
		Release		2PRL	Same as "Control Command"
		Attenuation Level		2PAL	Same as "Control Command"
10	1st Priority	Source		1PSR	Same as "Control Command"
		Threshold		1PTH	Same as "Control Command"
		Attack Time		1PAT	Same as "Control Command"
		Hold time		1PHT	Same as "Control Command"
		Release		1PRL	Same as "Control Command"
		Attenuation Level		1PAL	Same as "Control Command"
11	Delay			DL	Same as "Control Command"
12	Dynamics	On/Off		DN	Same as "Control Command"
		Threshold		DNTH	Same as "Control Command"
		Ratio		DNRT	Same as "Control Command"
		Attack Time		DNAT	Same as "Control Command"
		Release		DNAL	Same as "Control Command"
		Gain		DNGN	Same as "Control Command"
		KNEWW		DNNE	Same as "Control Command"
13	Sig./Peak			SP	xxxxxxxx: LED Status (1-8) '0' : Off

					‘G’ : Green ‘A’ : Amber ‘R’ : Red

4-1-7. System Control Command

#	Title		Control Command		
			Prefix	Command	param2
1	Mute		@0PXST	NM	*xx*: MUSIC/ALL 'MU' : Music 'AL' : All
2	Ethernet	IP Address	@0	IP	*xxxxxxxxxxxx*: IP Address Ex) When IP Address is 192.168.000.002, parameter=' 192168000002' Case of Auto =' AUTO00000000'
		Sub Net Mask		SM	*xxxxxxxxxxxx*: Subnet mask Ex) When Subnet mask is 255.255.255.000, parameter=' 255255255000'
		Gateway		GW	*xxxxxxxxxxxx*: Gateway IP Ex) When Gateway is 192.168.000.005, parameter=' 192168000005'
		IP Control Port		Ip	*XXXXX*: Port No. '00001' – ' 65535'
3	Baudrate	RS-232C	@0PXST	B2	*zzzzz* '09600' . 9600bps '38400' : 38400bps
		RS-422		B4	*zzzzzz* '038400' : 38400bps '115200' .115200bps

4	Time			TM	*YYMMDDhhmmss* *YY:* Year *MM:* Month *DD* Date *hh:* Hour *mm:* Minute *ss:* Seconds
5	Daylight Saving	On/Off	@0	dS	*yy*: On/Off ‘00’: On ‘01’: Off
		Start		ds	*MMDDhhmm* *MM:* Month *DD* Date *hh:* Hour *mm:* Minute
		End		de	*MMDDhhmm* *MM:* Month *DD* Date *hh:* Hour *mm:* Minute
		Offset		do	*hhmm* *hh:* Hour *mm:* Minute
6	Admin Password			PD	*xxxxxxxx*
7	Operator Password			Op	*xxxxxxxx*

Note: All items are available during login as administrator only.

4-1-8. System Status Request Command

#	Title		Status Request Command		Response
			Prefix	Command	
1	Mute		@0?PXST	NM	Same as "Control Command"
2	Ethernet	IP Address	@0?	IP	Same as "Control Command"
		Sub Net Mask		SM	Same as "Control Command"
		Gateway		GW	Same as "Control Command"
		IP Control Port		Ip	Same as "Control Command"
		Mac Address		MA	@0MA*xxxxxxxx* *xxxxxxxx*: Mac Address
3	RS-232C Baudrate		@0?PXST	BR	Same as "Control Command"
4	Time			TM	Same as "Control Command"
5	Daylight Saving	On/Off	@0?	dS	Same as "Control Command"
		Start		ds	Same as "Control Command"
		End		de	Same as "Control Command"
		Offset		do	Same as "Control Command"
6	Firmware Version			VN	@0VN*xxxxxxxxmmmmmmmm* *xxxxxxxx*: Version No(8 digits) *mmmmmmmm*: model name
7	Login (Admin)			LIAD:*xxxxxx* *xxxxxxx*: Admin Password	@0LIOKAD: Login accepted as admin.. @0LING: Login failed.
8	Login (Operator)			LIOP: *xxxxxx* *xxxxxxx*: Admin Password	@0LIOKOP: Login accepted as operator. @0LING: Login failed.
9	Logout			LO	@0LOOK: Logout complete.

			@0LONG: Logout failed.

4-1-9. Schedule Control Command

#	Title	Control Command			
		Prefix	parameter 1	Command	parameter 2
1	On/Off	@0PXSd	*xx*: Schedule No. '01' – '30'	EN	*yy*: On/Off '00': On '01': Off
2	Day of week			DW	*xxxxxxxhhmmcccccc* *xxxxxxx*: Week (x is 'SMTWTFS' or '_') Ex) '_M_W_F_' means Monday, Wednesday and Friday are scheduled. *hhmm*: Start Time *hh*: '00' – '23', '**': Every hour *mm*: '00' – '59' *cccccc*: Reserved command *1
3	Date Time			DT	*YYMMDDHHMMhhmmcccccc* *YYMMDD*: Date *YY*: '13' – '35' in 2000, '**': Every year *MM*: '01' – '12', '**': Every month *DD*: '01' – '31' *hhmm*: Start Time *hh*: '00' – '23', *mm*: '00' – '59' *cccccc*: Reserved command *1
4	Delete			DL	*xx*: Schedule No.

					'01' – '30'
5	All Delete			AD	

Note *1 please refer to 5-2 Command parameter.

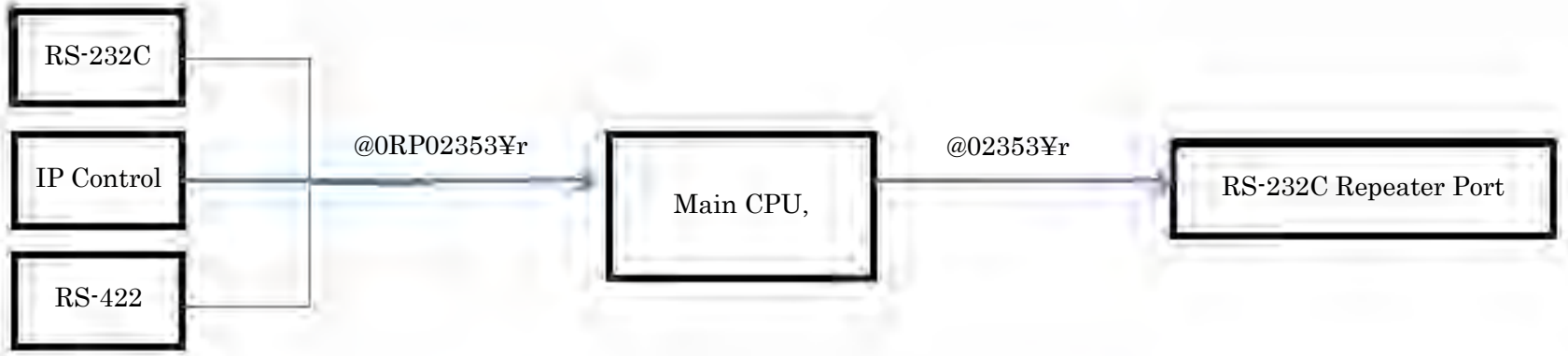
4-1-10. Schedule Status Request Command

#	Title	Status Request Command		Response
		Command	parameter	
1	Schedule	@0PXSd	*xx*: Schedule No. '01' – '30'	Same as "Control Command" Please refer to Day of week or Date Time.

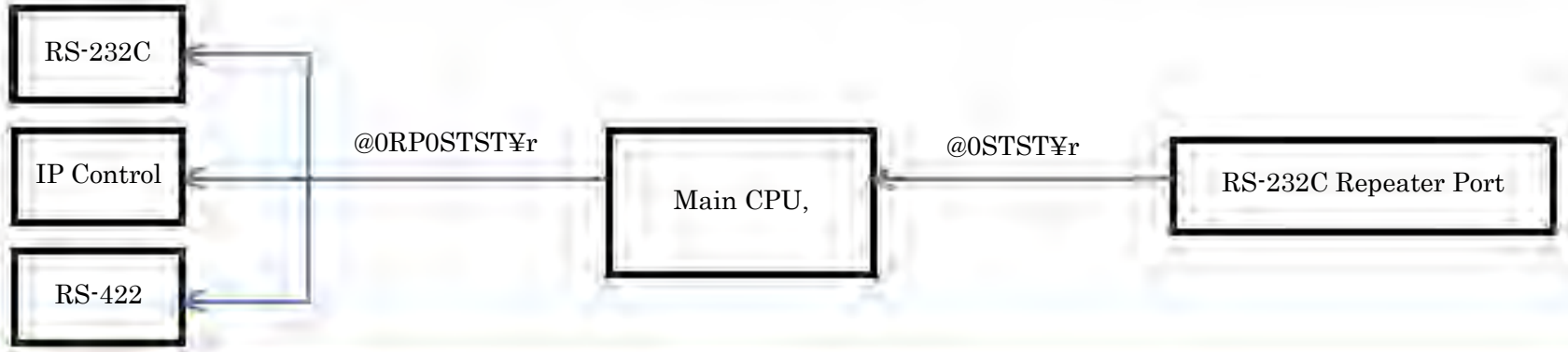
4-1-11. Repeater Control

When the main CPU receives the “Repeater command” via RS-232, IP Control or RS-422, the parameter is send via RS-232C Repeater Port with converting to the command.
On the other hand, when the main CPU received any command via RS-232C Repeater Port, the received command is send via RS-232C, IP Control and RS-422 with converting to Repeater command.

Receive



Transfer



#	Title	Control Command		
		Prefix	Command	parameter
1	Repeater	@0	RP	*ccccccc*: Command *1

Note *1 please refer to 5-2 Command parameter.

4-1-12. Amp. Control Command(Only DM03)

#	Title	Control Command		
		Prefix	Command	param2
1	Hi Impedance Mode	@0AP	HI	*xx*:Ch '12' : 1-2ch '34' : 3-4ch *yyy*: Mode '070' : 70V mode '100' : 100V mode 'OFF' : Off
2	Hi Pass Filter		HP	*xx*:Ch '12' : 1-2ch '34' : 3-4ch *yy*: On/Off '00' : On '01' : Off
3	BTL		BT	*xx*:Ch '12' : 1-2ch '34' : 3-4ch *yy*: On/Off '00' : On '01' : Off
4	Impedance Mode		IP	*xx*:Ch '12' : 1-2ch

			‘34’ : 3–4ch *y*: Impedance ‘4’ : 4Ohm ‘8’ : 8Ohm

Note: All items are available during login as administrator only.

4-1-13. Amp. Status Request Command(Only DM03)

#	Title	Status Request Command		Response
		Prefix	Command	
1	Hi Impedance Mode	@?0AP	HI	*xx*: Ch '12' : 1-2ch '34' : 3-4ch Same as "Control Command"
2	Hi Pass Filter		HP	*x*: Ch '1' - '4' : 1-4ch Same as "Control Command"
3	BTL		BT	*xx*: Ch '12' : 1-2ch '34' : 3-4ch Same as "Control Command"
4	Impedance Mode		IP	*xx*: Ch '12' : 1-2ch '34' : 3-4ch Same as "Control Command"
5	Protection		PT	xxxxxxxx: Protection On/Off '0' : Off '1' : On

4-1-14. Firmware Update

#	Title	Status Request Command		Response
		Prefix	Parameter	
1	Update Start Request	@?0UT	*xxxxx*: size	@0UTOK: Update standby. @0UTNG: Update standby fail.

Note: After the unit sends the "@0UTOK", the unit transfers to update mode. During the update mode, any received data is stored as update binary data until receiving specified size.

4-2. Status Information

When any setting is changed by Web Remote or front panel operation, the changed setting information is sent via RS-232C and IP Control. The information command are same as response commands.

4-3. Error message

The following error message commands are sent from the device when an error occurs in the device.

#	Title	Command	Parameter	Description
1	Error message	@0BDERBUSY	-	There is no space of buffer for a command.

5. Appendix

5-1. Acceptable Character

The acceptable character set is ISO/IEC 8859-1.

5-1-1. Acceptable Character Type1

• Acceptable characters are shown in

• Table 5-1. (The characters that are colored in gray are not acceptable.)

• Table 5-1-1 Acceptable Character

	X0	X1	X2	X3	X4	X5	X6	X7	X8	X9	XA	XB	XC	XD	XE	XF
0X																
1X																
2X	*SP*	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3X	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4X	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5X	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6X	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7X	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	*DEL*
8X																
9X																
AX	*NBSP*	¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	
BX	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
CX	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
DX	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
EX	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
FX	ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

5-2. Command parameter

Type 1 : For schedule command

If you would like to program the blow commands as parameter, the parameter is as follows.

Commands

- @0MXOT1SS1¥r
- @0MXOT2SS1¥r
- @0MXOT3SS1¥r

Parameter

- 0MXOT1SS1:0MXOT2SS1:0MXOT3SS1

*exclusive '@' and '¥r', separator is ':'

** If ':' is included to command, put ignore code" ' " in front of ':'. (ex. @0abcd:efg -> 0abcd':efg)

Type 2 : For Repeater command

If you would like to send the blow commands via RS-232C Repeater port, parameter is as follows.

Commands

- @02353¥r

Parameter

- 02353

*exclusive '@' and '¥r', separator is ':'

** If ':' is included to command, put ignore code" ' " in front of ':'. (ex. @0abcd:efg -> 0abcd':efg)