marantz PROFESSIONAL

PMD-500D

Serial Command Protocol Guide

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inMusic Brands, Inc.

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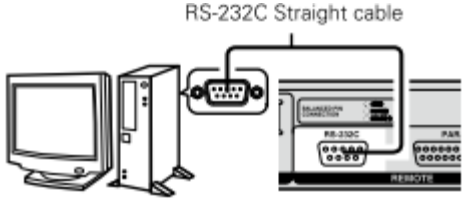
1. General

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. 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



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/ 115, 200 bps Selectable (via “Serial Bit Rate” in the “System Setting” menu). **Set the BAUD rate to 9,600 for all the serial command to work properly.**
- 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.

3. Communication Protocol

3-1. Packet Structure

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

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

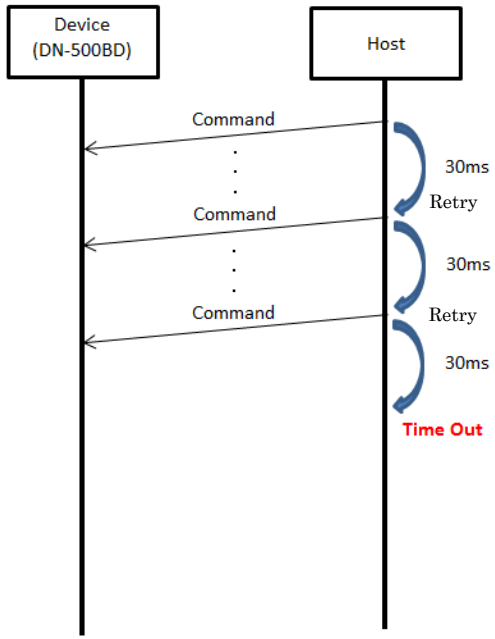
3-3-2. Communication Sequence

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(IP Control)/300ms(RS-232C). When the host does not receive a reply over 30ms(IP Control)/300ms(RS-232C) 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

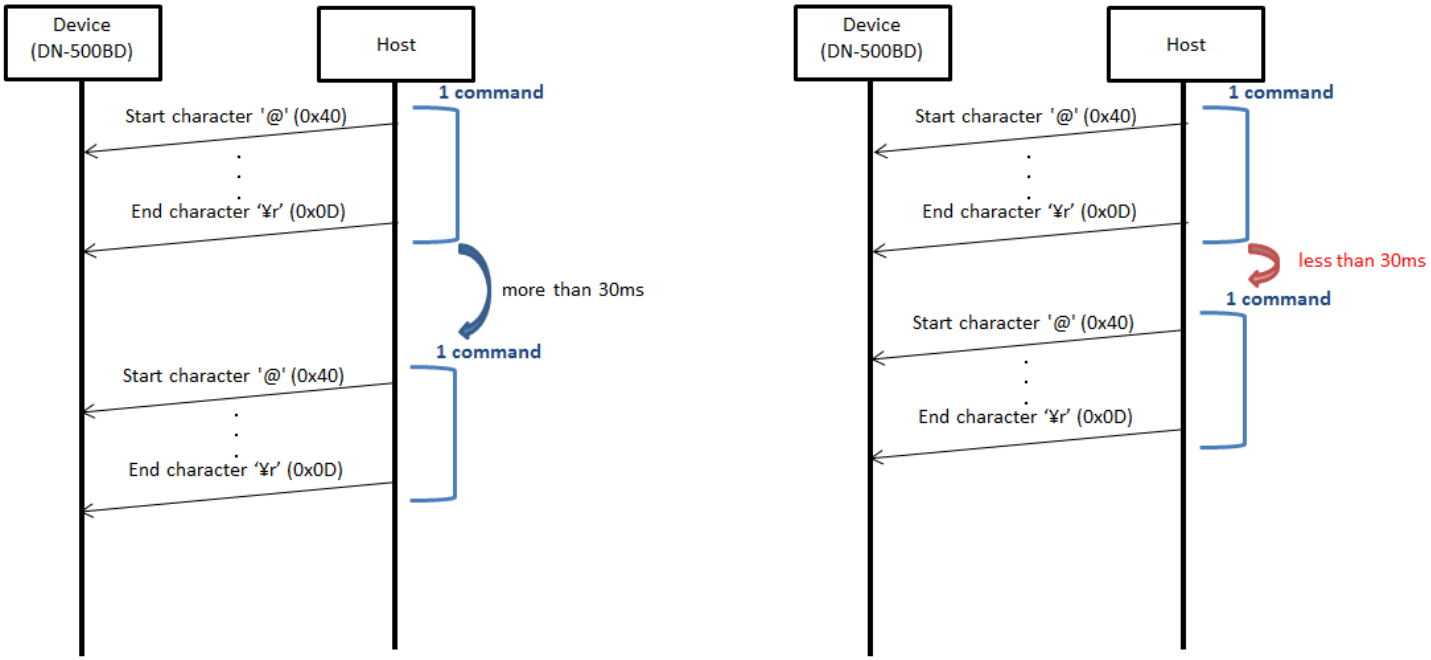
The device returns a NACK immediately after detecting a failure in the communication with the host (see (”3-2-2 NACK [Negative Acknowledgement)”). If the host receives a NACK, it must stop sending the current remaining command immediately and execute the recovery process such as retry.

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.

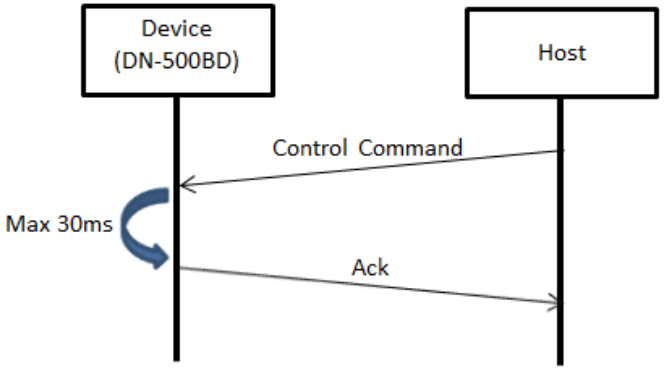
3) When there is no buffer space of a device for a command, the device does not execute the command, and will send Busy (@0BDERBUSY) to the host instead.

3-4. Basic Control Flow

3-4-1. 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

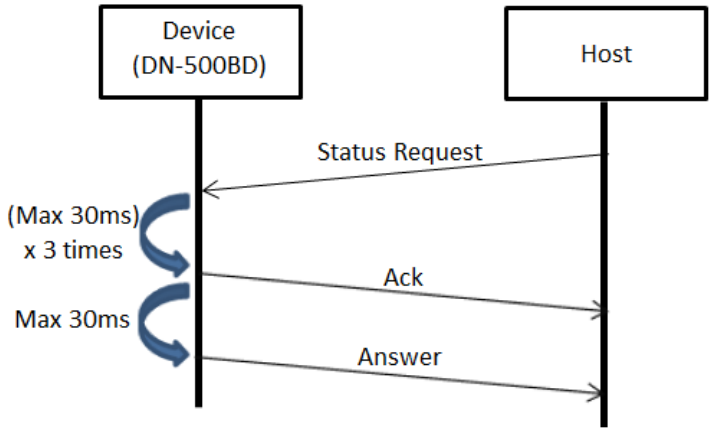


If the device receives an unknown command or an End Character '\r' (0x0D) without a Start Character '@', it causes transmission failure and the device returns a NACK (Not Acknowledgement). Refer to "3-2-2 NACK [Negative Acknowledgement)" about NACK transmission condition.

3-4-2. 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



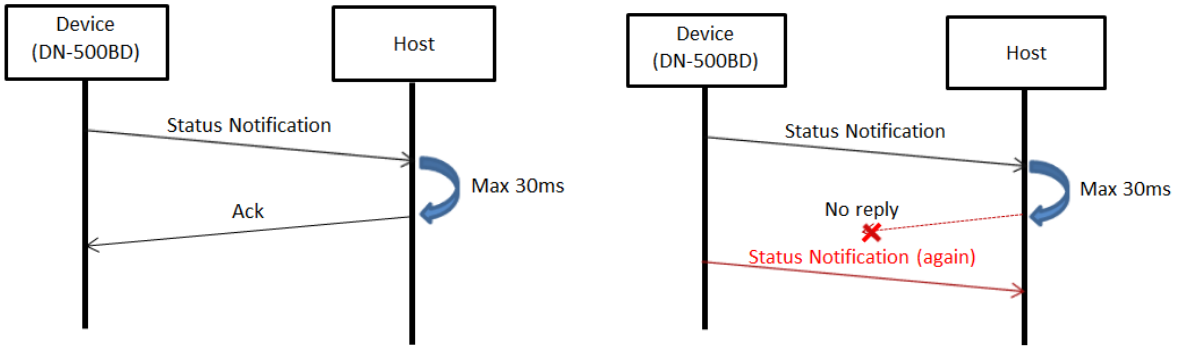
When a device receives Status Request from a host, the device sends an ACK to the host. After that, the device gets the current status, and then sends it to the host.

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.

3-4-3. 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*)

*Note- "Track" means "Chapter" during the DVD or BD playback. "Group" means "Title" (DVD or BD playcak) and "Folder" (USB and other Playback).

4-1. Control Command/ Status Request Command List

4-1-1. Key Control

#	Function	Command/Response	Status	Description
1.	Power On	@0PW00		Power On
2.	Power Off	@0PW01	-	Power Off
3.	Stop	@02354	-	Stop
4.	Play	@02353	-	Play
5.	Play Pause	@02348	-	Playback is Paused
6.	Track/Chapter Jump Next	@02332	-	Track skip forward
7.	Track/Chapter Jump Prev	@02333	-	Track skip reverse
8.	Lock Panel's Key	@023KL	-	Key lock front panel
9.	Unlock Panel's Key	@023KU	-	Key lock front panel buttons.
10.	IR Lock	@0PCIRLK*XX*	@0?PCIRLK	Toggles "IR Remote Lock" setting. *XX*: IR Lock On/Off '00': IR Lock on. '01': IR Lock off.
11.	Set A for A-B Repeat (On the fly)	@0PCRPAF	-	Sets A point for A-B repeat

12.	Set B and Start Repeat for A-B Repeat (On the fly)	@0PCRPBF	-	Sets B point, and starts A-B repeat.
13.	Exit A-B Repeat	@0PCEXRP	-	Exits A-B repeat
14.	Program Mode	@0PCPMP*00*	@0?PCPMP	Toggles On/Off
15.	Time Mode Code	@0PCTMD*XX*	@0?PCTMD	*XXXX: Time Mode Code* 'TL': Total Elapsed, 'TR': Total Remain, 'EL': Elapsed, 'RM': Remain,
16.	Hide OSD	@0DVHOSD*XX*	@0?DVHOSD	Complete hiding of the icon displayed on the screen. *XX*: On/Off '00': OSD on. '01': OSD off.
17.	Setup Menu	@0PCSU	-	Shows Setup menu.
18.	Top Menu (Disc Menu)	@0DVTP	-	Playback title menu in the disc.
19.	Return	@0PCRTN	-	Return to the previous setup menu screen in the BD/DVD disc.
20.	Angle	@0DVANGL+	@0?DVANGL*X*	Command: Forward the angle in the DVD disc. Status: Return the angle No. *X*: Angle No.
21.	Cursor	@0PCCUSR*X*	-	*X*: Moves highlight area of initial setting screen. '1':Left, '2':Right, '3':Up, '4':Down

22.	Enter	@0PCENTR	-	Decides selected item in the setup menu screen, etc. in the BD/DVD disc.
23.	Disc Tray	@0PCDTRY*XX*	-	Controls Disc Tray. *XX*: Disc Tray Open/Close 'OP': Open 'CL': Close
24.	Video Resolution (Specified resolution)	@0DVVR*X*	@0?DVVR	Changes the resolution of HDMI *X*: Resolution '1': Auto, '2': 480/576i, '3': 480/576P, '4': 720P '5': 1080i, '6': 1080P
25.	Display/Info	@0DVDSIF	-	Shows information on screen display.
26.	Ten Key	@0PCTKEY*X*	-	Inputs 0-9 *X*: Number '1': 1, '2': 2, '3': 3, '4': 4, '5': 5, '6': 6, '7': 7, '8': 8, '9': 9, '0': 0
27.	MUTE	@0mt*XX*	@0?mt	*XX*: On/Off '00': Mute on. '01': Mute off.

4-1-2. Menu Setting

No	Item	Command	Status Request	Response	Description
1.	DVD/CD Auto Play	@0PCAP00	@0?PCAP	@0PCAP00	On
		@0PCAP01		@0PCAP01	Off
2.	Power On Repeat	@0PCSR00		@0?PCSR	On/Off Toggle
3.	Auto Resume	@0PCAR00	@0?PCAR	@0PCAR00	On
		@0PCAR01		@0PCAR01	Off
4.	BD/DVD Ratings	@0DVPCRT*XXXXYYY*	@0?DVPCRT	@0DVPCRT*YYY*	*XXXX*: current Password *YYY* (Variable): Rating 'OFF', 'KIDSAFE', 'G', 'PG', 'PG13', 'R', 'NC-17', 'ADULT'
5.	Change Password	@0DVPCCP*XXXXYYYY*	-	-	XXXX: current Password YYYY: new Password
6.	OSD Language	@0DVLGOS*XXX*	@0?DVLGOS	@0DVLGOS*XXX*	*XXX*: Language 'OFF': Off
7.	Disc Menu Language	@0DVLGDM*XXX*	@0?DVLGDM	@0DVLGDM*XXX*	
8.	Audio Language	@0DVLGAD*XXX*	@0?DVLGAD	@0DVLGAD*XXX*	
9.	Subtitle Language	@0DVLGST*XXX*	@0?DVLGST	@0DVLGST*XXX*	
10.	Brightness	@0DVPABN*XXX*	@0?DVPABN	@0DVPABN*XXX*	*XXX*: Level ex) '-16' : -16 '+00' : 0 '+16' : +16
11.	Contrast	@0DVPACT*XXX*	@0?DVPACT	@0DVPACT*XXX*	*XXX*: Level ex) '-16' : -16

					'+0' : 0 '+16' : +16
12.	Hue	@0DVPAHU*XX*	@0?DVPAHU	@0DVPAHU*XX*	*XX*: Level ex) '-9' : -9 '00' : 0 '+9' : +9
13.	Saturation	@0DVPASR*XX*	@0?DVPASR	@0DVPASR*XX*	*XX*: Level ex) '-9' : -9 '00' : 0 '+9' : +9
14.	TV Aspect Ratio	@0DVAr9W	@0?DVAr	@0DVAr9W	16:9 Wide
		@0DVAr9A		@0DVAr9A	16:9 Wide/Auto
		@0DVAr3P		@0DVAr3P	4:3 pan&scan
		@0DVAr3L		@0DVAr3L	4:3 letterbox
15.	TV System	@0DVFMNT	@0?DVFM	@0DVFMNT	NTSC
		@0DVFMPL		@0DVFMPL	PAL
		@0DVFMMS		@0DVFMMS	Multi-system
16.	1080p 24 Conversion	@0DV1K2400	@0?DV1K24	@0DV1K2400	On
		@0DV1K2401		@0DV1K2401	Off
17.	HDMI Deep Color	@0DVDC48	@0?DVDC	@0DVDC48	48 Bits
		@0DVDC36		@0DVDC36	36 Bits
		@0DVDC30		@0DVDC30	30 Bits
		@0DVDCOF		@0DVDCOF	Off

18.	Display Options	@0Ss00	@0?Ss	@0Ss00	Screen Saver ON
		@0Ss01		@0Ss01	Screen Saver OFF
19.	HDMI Audio -> Digital Out	@0DVHASO	@0?DVHA	@0DVHASO	Spdif Off
		@0DVHABS		@0DVHABS	Bitstream
		@0DVHAPC		@0DVHAPC	Pcm
20.	Coaxial/Optical Output -> PCM Out	@0DVDO48	@0?DVDO	@0DVDO48	48k
		@0DVDO96		@0DVDO96	96k
21.	Dynamic Range Control	@0DVDRAT	@0?DVDR	@0DVDRAT	Auto
		@0DVDR00		@0DVDR00	On
		@0DVDR01		@0DVDR01	Off
22.	Output Volume	@0DVOV*XXX*	@0?DVOV	@0DVOV*XXX*	*XXX*: Level 'inf' : Infinity ex) '-50': -50dB '+10': +10dB '+00': 0dB NOTE: Min: -50, Max: +10
		@0DVOVFX		@0DVOVFX	Fixed
23.	Maximum Volume	@0DVMV*XXX*	@0?DVMV	@0DVMV*XXX*	*XXX*: Level '-10' : -10dB '-06': -6dB '+06': +6dB '+10': +10dB
24.	Firmware Upgrade	@0DVFUUS	-	-	Via USB
		@0DVFUDS		-	Via Disc

25.	Remote Control Code	@0DVRCC1	@0?DVRC	@0DVRCC1	Code1
		@0DVRCC2		@0DVRCC2	Code2
		@0DVRCC3		@0DVRCC3	Code3
26.	Reset Factory Defaults	@0DVFD	-	-	-

4-1-3. Current Status Information

#	Request	Command	Answer	Command	Description	Notification
1.	Power Status	@0?PW	On	@0PW00		
			Off	@0PW01		
2.	Media Status	@0?CD	No Disc	@0CDNC	There is not media	No
			Disc In	@0CDCI	There is media.	
			Disc Loading	@0CDLD	Disc is loading.	
			Tray Opening	@0CDTO	Disc tray is opening or open	
			Tray Close	@0CDTC	Disc tray is closing or closed	
			Tray Error	@0CDTE	Disc tray error	
3.	Status	@0?ST	Play	@0STPL	See “Key Control”	
			Pause	@0STPP	See “Key Control”	
			Slow Play	@0STDVS*X*	Show scanning in process. X: Direction ‘R’ : Reverse, ‘F’: Forward	
			Fast Play	@0STDVF*X*	Show scanning in process. X: Direction ‘R’ : Reverse, ‘F’: Forward	
			FS Play	@0STDVFS	FS Play	
			Setup	@0STDVSU	Setup mode.	
			Track Menu	@0STDVTR	Track Menu (Root Menu) playback in process.	
			Home	@0STDVHM	Home menu mode.	

4.	Total Track Number(4digit)	@0?Tt	Total Track Number	@0Tt*XXXX*	*XXXX*: Total Track '0000' to '9999' 'UNKN': Unknown	No
5.	Track Number	@0?Tr	Track Number	@0Tr*XXXX*	*XXXX*: Track No '0000' to '9999' 'UNKN': Unknown	No
6.	Total Group Number	@0?PCTG	Total Group Number	@0?PCTG*XXXX*	*XXXX*: Total Group '0000' to '9999' 'UNKN': Unknown	No
7.	Group Number	@0?PCGp	Group Number	@0?PCGp*XXXX*	*XXXX*: Group No. '0000' to '9999' 'UNKN': Unknown	No
8.	Elapse Time	@0?ET	Elapse Time	@0ET*hhhmmss*	*hhhmmss*: Time	No
9.	Remain Time	@0?RM	Remain Time	@0RM*hhhmmss*	*hhhmmss*: Time	No
10.	Media Type	@0?PCTYP	Media Type	@0PCTYP*XXXX*	*XXXX*: Disc Type 'DVV': DVD_VIDEO, 'DVA': DVD_AUDIO, 'CDA': CDDA, 'CDR': CD-ROM, 'UKN': UNKNOWN, 'SAC': SACD, 'DVR': DVD_VR, 'BDM': BDMV, 'BDA':BDAV,	No

					‘AVH’:AVCHD, ‘DLN’: DLNA, ‘EXT’: External Memory	
11.	Audio Format Code	@0?PCAFMT	Audio Format	@0PCAFMT*XXX*	*XXX*: Audio Format Code ‘DBD’: DOLBY DIGITAL, ‘DTS’: DTS, ‘MPG’: MPEG, ‘LPC’: LPCM, ‘PPC’: PPCM, ‘UKN’: UNKNOWN, ‘DSD’: DSD, ‘DD+’: DD+, ‘DTH’: DTS-HD, ‘DLH’: DOLBY True HD, ‘MP3’: MP3, ‘AAC’: AAC, ‘WMA’: WMA, ‘UKN’: Unknown	*No*
12.	Subtitle Code	@0?DVSTC	Subtitle Code	@0DVSTC*XXX*	*XXX*: Subtitle Code ISO 639-2 Code ‘UKN’ Unknown	*No*
13.	Model Information	@0?VN	Model Information	@0VN*XXXXXXXXMMMMMMMM*	Version No. & Model Name *XXXXXXXX*: Version No. (8digit)	No

					MMMMMMMM: Model Name (64 bytes max, *Note-1)	

(Note-1: Please refer to 5 Appendix)

4-2. 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. Folder name/File name

5-2-1. Absolute Folder or File name

Folder name or File name must be specified in full-path from the root folder. (Root folder is expressed in 0x2F ('/') of the top, and the separator is 0x2F ('/').)

Ex) Folder name: /NewFolder, File name: /NewFolder/NewFile.wav

5-2-2. Folder or File name without folder path

Folder name or File name is specified without folder path.