

[1] Version 1.18

Specification
For
Serial Interface DCM-5000 / 5001

Nippon Columbia Co., Ltd.

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1 Serial communication interface

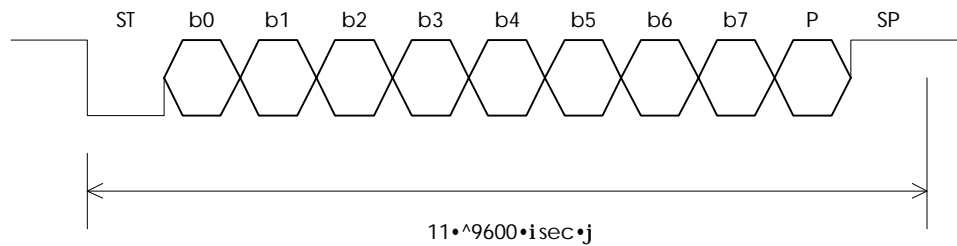
.1 Physical interface

Arrangement of connector signals

Terminal #	RS-232C		RS-422A	
	Signal	I/O	Signal	I/O
1	NC		NC	
2	TxD	0	TxD return	0
3	RxD	I	RxD	I
4	NC		NC	
5	S. GROUND		NC	
6	NC		S. GROUND	
7	NC		TxD	0
8	NC		RxD return	I
9	NC		NC	

.2 Transfer format of serial data

- Interface As per RS-232C or RS-422A
- Communication system Half-duplex communication
- Data transfer mode Start stop synchronization
- Transfer rate 9,600bps
- Start bit (ST) 1 bit
- Data bit (b0-b7) 8 bits
- Parity (P) Even number
- Stop bit (SP) 1 bit
- Transfer data ASCII code
- Control characters STX 02h
- ETX 03h
- ETB 17h
- NAK 15h
- ACK 06h



.3 Command format and answer format

This unit shall be based on commands each of which consists of a data row (some commands are without a PC) composed of command codes (CC) and parameter codes (PC). The transmitting station shall be designed to send block check characters (BCC) following ETX, with the data row enclosed in STX (text start 02h) and ETX (text termination 03h). The receiving station shall regard receipt of BCC as the completion of command reception when it has received STX.

Here are the formats.

Commands	<STX> <CC> <PC0> <PC1> <PC2> <> <PCn> <ETX> <BCCH><BCCL>
STX Start of Text	02h
CC Command Code	Command code
PC Parameter Code	Defined for each command (contents and number of parameters)
ETX End of Text	03h
BCC Block Check Character	$CC + PC0 + PC1 + PC2 + \dots + PCn + ETX = Xyh$ (Each of X and Y is 4 bits long) X, Y=0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F BCCH (high-level byte) = X as converted to an ASCII code BCCL (low-level byte) = Y as converted to an ASCII code
Answers	<STX> <CC> <AC> <PC0> <PC1> <PC2> <> <PCn> <ETX><BCCH><BCCL>
STX Start of Text	02h
RC Reply Code	Reply code(=Command code)
AC Answer Code	Answer code
PC Parameter Code	Defined for each command (contents and number of parameters)
ETX End of Text	03h
BCC Block Check Character	$CC + PC0 + PC1 + PC2 + \dots + PCn + ETX = Xyh$ (Each of X and Y is 4 bits long) X, Y=0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F BCCH (high-level byte) = X as converted to an ASCII code BCCL (low-level byte) = Y as converted to an ASCII code

.4 Protocol for data transmission and reception

This unit is based on half-duplex communication. The unit shall therefore transmit commands and receive answers according to the following procedure.

.1 Basic procedure

The host shall select commands for this unit and transmit them to this unit.

Having issued a command, the host shall receive an answer from this unit, then issue the next command.

The host shall analyze the RC, AC, and PC as answers given and decide whether the command has been normally executed.

The host shall give an answer to a command that gives operational instructions, then issue a status request command, and decide whether this unit has finished operating with regard to the command that gives operational instructions.

The time from the start of command transmission to the end of command transmission should be max 40 msec.

The time from the completion of command transmission to the start of answer-back is 40 msec (max).

This unit cannot receive any commands for about 15 seconds after the power switch is turned on.

.2 Communication errors

Having received a command, which results in a communication error (overrun, framing, or parity error), this unit shall give NAK (15h). (MAX 80ms from the start of command transmission)

If the host has received NAK from this unit, it shall retransmit the command that it has transmitted immediately beforehand.

Having received an answer, which results in a communication error (overrun, framing, or parity error), the host shall respond with NAK.

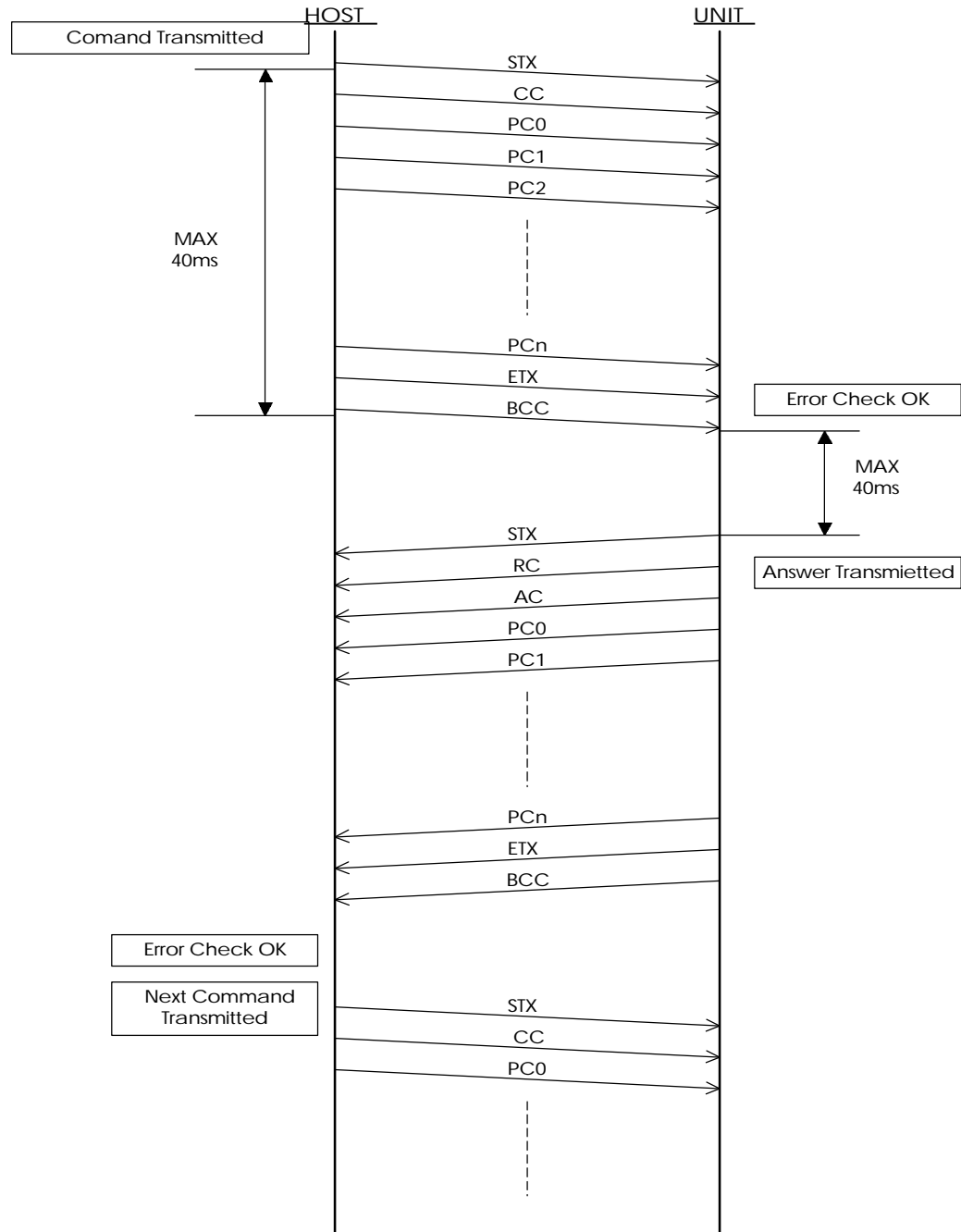
If it has received NAK from the host, this unit shall retransmit the answer it has transmitted immediately beforehand. (MAX 40ms)

When there is no answer from the unit within 80 ms, the host shall retransmit the command.

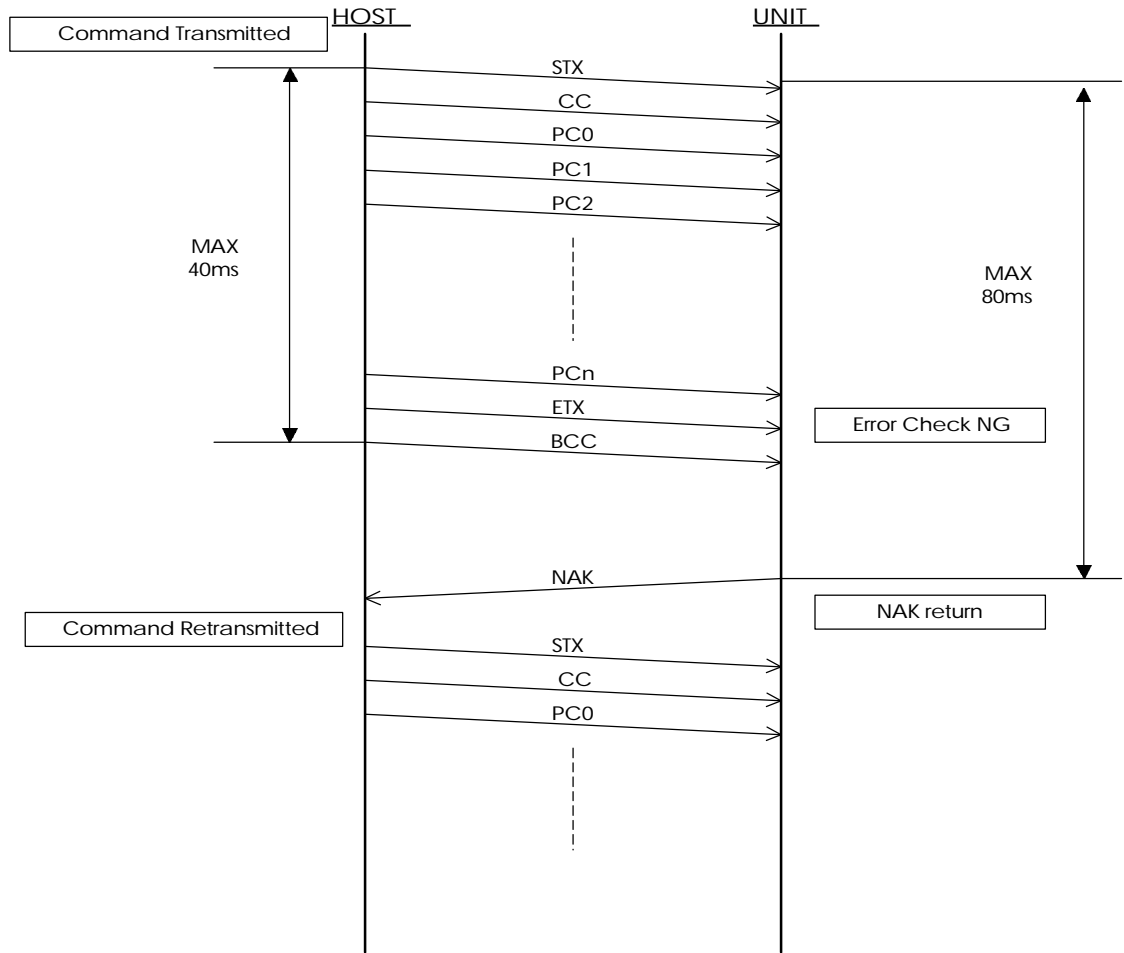
.5 Command / Answer sequence

Shown below are the command sequence and the answer sequence of this unit.

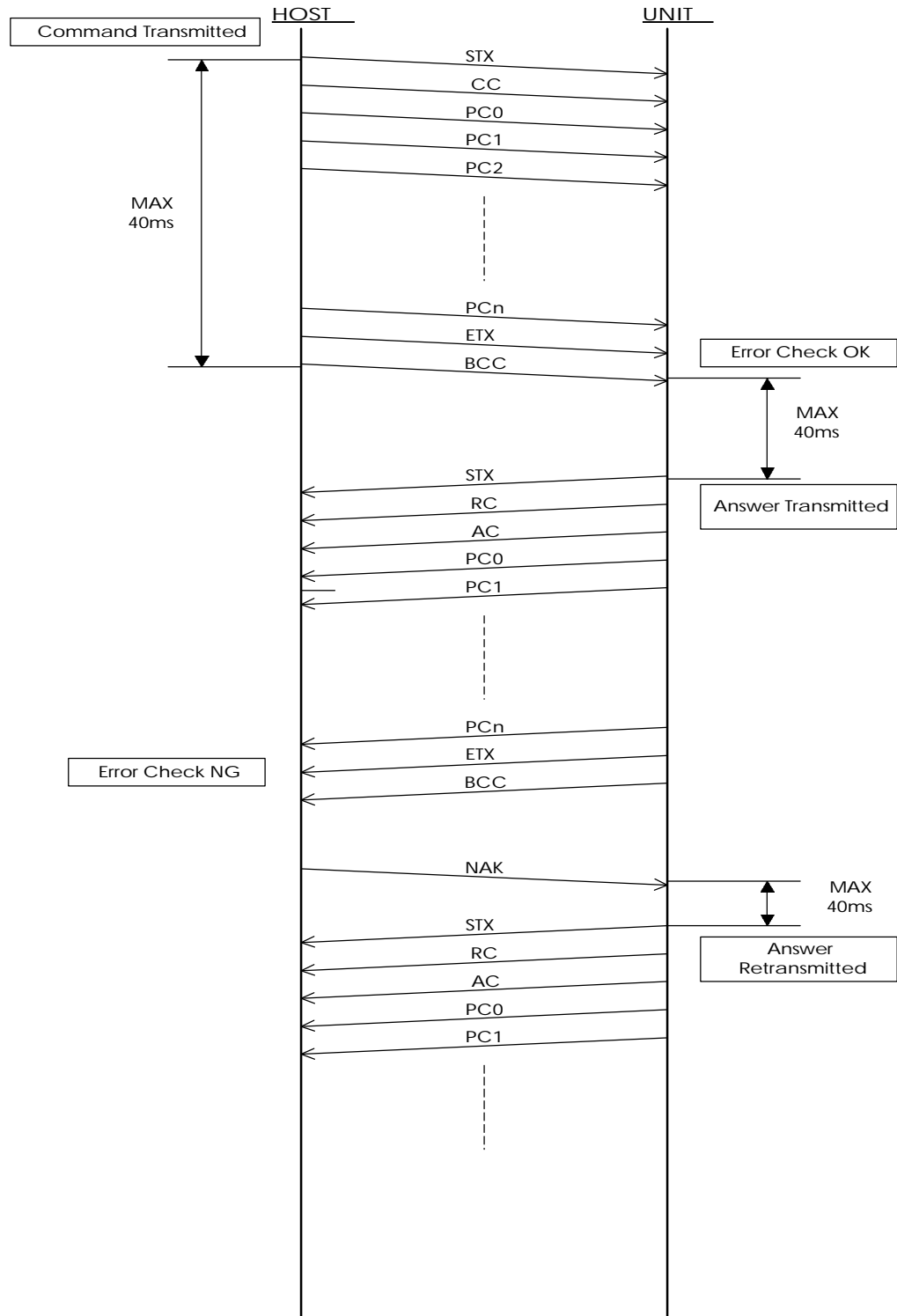
When a command is normally received (unit) and an answer is normally received (host) with an answer parameter



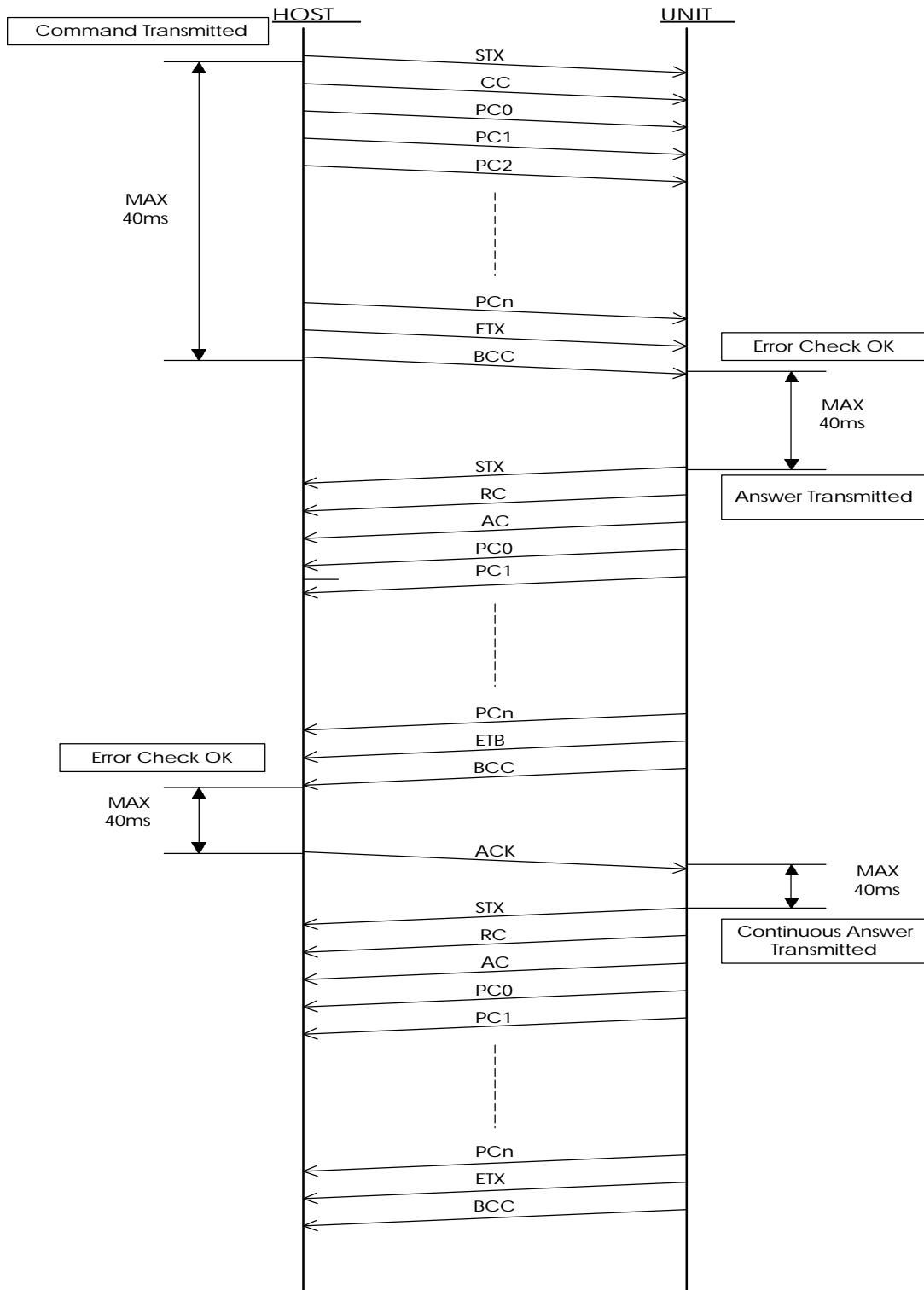
When a command is abnormally received (with or without an answer parameter)



When a command with an answer parameter is normally received (unit) and an answer is abnormally received (host)



When a command with an answer parameter is normally received (unit) and an answer is normally received with ETB (host)



.6**List of command codes**

Here is a list of command code types.

- 2Xh POWER control command
- 3Xh Command related to the acquisition of player information (such as status and name)
- 4Xh Command related to the setting and revision of information addressed to the player (such as mode and name)
- 5Xh Operation instruction command to the player

No.	Command	CodeASCII	Operation
1	Power ON	20h[SP]	Power-on request from the standby state
2	Power OFF	21h!	Power-off request
3	Request System Status	30h0	Acquires system status (such as the entire player and transfer unit).
4	Request TOC Data	31h1	Acquires TOC data.
5	Request Track Data	32h2	Acquires time data for a specified track.
6	Request CD-TEXT Name	34h4	Acquires the names of CD-TEXT discs.
7	Request CPU Version	35h5	Acquires the CPU version.
8	Request Setting Disc	36h6	Acquires the disc number loaded on the rack.
9	Request Error Status	37h7	Acquires the error code when an error is occurred.
10	Zone Control	40h@	Changes the zone mode.
11	Cross Fade	41hA	Sets the cross fade.
12	Play	50hP	Starts playback.
13	Stop	51hQ	Stops playback.
14	Pause ON	52hR	Requests a pause.
15	Pause OFF	53hS	Requests an unpauses.
16	Disc Skip	54hT	Changes discs.
17	Track Skip	55hU	Moves to another track.
18	Scan Play	56hV	Scan
19	A-Time Search	57hW	Absolute time search
20	Cross Fade Play	58h (X)	
21	Cross Fade Disc Reserve	59H (Y)	

.7 List of answer codes

No.	Status	CodeASCII	Description
1	Command OK	20hSP	Accepts the command.
2	Invalid	30h0	Invalid command.
3	Format Error	31h1	Inappropriate command format.
4	Order Disc None	33h3	The disc you specified does not exist.
5	Order Track None	34h4	The track you specified does not exist.
6	Order Time None	35h5	The time you specified does not exist.
7	Play Error	36h6	An error occurred during playback.
8	Disc Carry Error	37h7	Disc takeout from the rack failed.
9	Communication Error	3Ah:	Communication error between the parent and child unit.

.8 List of status codes

Here is a list of answer code types.
 3XhStatus of the entire system
 4XhStatus of a specific zone

No.	Status	CodeASCII	Description
1	Stand-by	30h0	Stand-by
2	System Initialize	31h1	Under initialization (including disc search).
3	Disc Check	32h2	Disc presence check in process.
4	Disc Check Complete	33h3	Disc presence check complete.
5	Door Opening	34h4	Door open.
6	Disc Nothing	34h5	All units have no disc
7	No Disc	41hA	Disc not present.
8	Stop	42hB	Stop
9	Disc Changing	43hC	Disc being transferred.
10	TOC Reading	44hD	TOC reading in process.
11	TOC Read OK	45hE	TOC read complete. *2 *3
12	Play	46hF	Playback in process.
13	Pause	47hG	Pause in process.
14	Scan Play	48hH	Scanning in process.
15	Search	49hI	Search in process.
16	Load CD-TEXT Disc	4AhJ	CD-TEXT disc loaded (TOC read complete). *1 *3
17	On Read In Area	4BhK	The pickup entered the read-in area.
18	On Read Out Area	4ChL	The pickup entered the read-out area.
19	During Cross Fade	4Dh (M)	Cross fade in process

*1 : The status at the finish of reading the TOC ,there is a difference between CD-TEXT Discs and the other discs. the Request CD-TEXT Name command shall be issued after the status is “ Load CD-TEXT Disc ” (‘ J ’). For the order of the Request CD-TEXT Name and the Request TOC Data commands, it is recommended to issue the Request TOC Data first.

*2 : The Request TOC Data and Request Track Data command shall be issued after the status is “ TOC Read OK ” (‘ E ’). The unit is at stopping

*3 : The TOC Read OK and Load CD-TEXT Disc statuses proceed to the next statuses by sending Request System Status and Request TOC Data commands. For the CD-TEXT Disc, they also proceed to the next statuses by sending the Request CD-NEXT Name command.

.9 Command specification

■ When this unit is set to be compatible with all commands and fails to accept a command (due to a communication error, for example), it returns NAK (15h) as an answer.

.1 Power ON

This requests a power-on from the standby state.

On receiving this command, this unit gives a power-on instruction to all players connected by a daisy chain.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code SP							
2	ETX 03h							
3	BCCH high-level							
4	BCCL low-level							

Button mask

The CD DOOR OPEN key on the front panel and POWER ON,STAND-BY key on the remote control unit are valid.

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code SP							
2	Answer code							
316	Master player type "DENON DCM-5000" or "DENON DCM-5001" (ASCII CODE)							
17	ETX 03h							
18	BCCH high-level							
19	BCCL low-level							

Special condition

Other



.2 Power OFF

This requests a transfer from power-on to a standby state.

On receiving this command, the unit instructs all players connected by a daisy chain to enter a standby state.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code !							
2	ETX 03h							
3	BCCH high-level							
4	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code !							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special condition

- On receiving this command, the master player (a player with an ID of 0) instructs all players connected to it to enter a standby state.
- This command is valid only when the System Status is Disc Sense Complete ('3') or Disc Nothing ('5').

Other

.3 Request System Status

This requests a system status, along with the disc number being transferred or the one installed in the drive.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code 0							
2	ETX 03h							
3	BCCH high-level							
4	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code 0							
2	Answer code							
3	System status code							
4	Zone mode (single zone/dual zone2)							
5	Zone 1 status							
6	Zone 2 status							
7	Disc number in zone 1 (100 digits)							
8	Disc number in zone 1 (10 digits)							
9	Disc number in zone 1 (1 digit)							
10	Disc number in zone 2 (100 digits)							
11	Disc number in zone 2 (10 digits)							
12	Disc number in zone 2 (1 digit)							
13	Track number of zone 1 (10 digits)							
14	Track number of zone 1 (1 digit)							
15	Track number of zone 2 (10 digits)							
16	Track number of zone 2 (1 digit)							
17	Elapsed time of zone 1 (minutes, 10 digits)							
18	Elapsed time of zone 1 (minutes, 1 digit)							
19	Elapsed time of zone 1 (second, 10 digits)							
20	Elapsed time of zone 1 (second, 1 digit)							
21	Elapsed time of zone 1 (frame, 10 digits)							
22	Elapsed time of zone 1 (frame, 1 digit)							
23	Elapsed time of zone 2 (minutes, 10 digits)							
24	Elapsed time of zone 2 (minutes, 1 digit)							
25	Elapsed time of zone 2 (second, 10 digits)							
26	Elapsed time of zone 2 (second, 1 digit)							
27	Elapsed time of zone 2 (frame, 10 digits)							
28	Elapsed time of zone 2 (frame, 1 digit)							
29	ETX 03h							
30	BCCH high-level							
31	BCCL low-level							

—Special conditions

- If the status parameters of zones 1 and 2 of a specific answer are J (the CD-TEXT disc is loaded), the unit shall issue the Request CD-TEXT Name command and acquire new name information.
 - While this unit runs in the single zone mode, the status of the currently active disc is parametrized as zone 1 status, and the status of the disc on standby as zone 2 status.
 - If there is no disc on the driver “Disc NO. Parameter” is “0”.
 - Track NO. Parameters are ‘0’ when there is no disc on the driver ,or the case of not finishing to read the TOC , or at the Stop mode.
 - A -time parameters are “0” except for play mode, pause mode, or during scanning.
 - At the standby condition, the unit accepts Request System Status, Power On, **Request CPU Version**, and Request Error Status commands. In the case of other commands , it returns command format error “1” as the Answer code.
 - TOC Read OK and Load CD-TEXT Disc zone statuses proceed to the next statuses after sending the Request System Status command.
 - During cross-fading, the fade-in status is set in the Zone 1 fields and the fade-out status is set in the Zone 2 fields. The fade-out zone status (Zone 2) is 4DH (“M”). The Disk No, Track No, and Time Elapsed fields are all zeros.
- Other

.4 Request Setting Disc

This acquires the disc number installed in the disc rack.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code 6							
2	ETX 03h							
3	BCCH high-level							
4	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code 6							
2	Answer code							
3	First disc number (100 digits)							
4	First disc number (10 digits)							
5	First disc number (1 digit)							
6	Second disc number (100 digits)							

	(n-1) th disc number (1 digit)							
	n th disc number (100 digits)							
	n th disc number (10 digits)							
	n th disc number (1 digits)							
	ETX 03h or ETB 17h							
	BCCH high-level							
	BCCL low-level							

N: MAX 100

Special conditions

- This command shall only be issued after checking the Disc Sense Complete status(3) with a status code to the Request System Status command (' 0 ').
- After detecting the discs, If there is no disc in the unit, it will be sent the Disc Nothing Status (' 5 ') instead of the Disc Sense Complete Status (3). In this case it's not necessary to send this command
- The maximum value of N is 100.
- Because its length of parameters for the answers is flexible depending on the numbers of discs in the unit, it can be sent the answer by dividing into a couple of numbers with adding ETB (17h) to the end of each data and 03h to the final data.

Other

.5 Play

The unit begins to play back the disc in a selected zone and reserves the next track. It plays only 1 track, and after playing the track, it pauses automatically.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code P							
2	Disc number (100 digits)							
3	Disc number (10 digits)							
4	Disc number (1 digit)							
5	Track number (10 digits)							
6	Track number (1 digit)							
7	Next disc number (100 digits)							
8	Next disc number (10 digits)							
9	Next disc number (1 digit)							
10	Next track number (10 digits)							
11	Next track number (1 digit)							
12	ETX 03h							
13	BCCH high-level							
14	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code P							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special conditions

- If the host doesn't reserve the next disc or track, the Next Disc NO and Next Track NO(Byte711) should be "0".
- accepting play command which specifies the same track as current track. It ignores the command. If the next disc or track of this command is different from the current one, it renews the next disc or the next track.
- This command is valid only when the system status is Disc Sense Complete (3).
- When the current track becomes paused during continuous playing, the unit proceeds to a reserved track by issuing the PLAY command again. Only PLAY and STOP commands are available in the automatic pause status.
- In the multi-zone mode, a disc used in a zone (specified as a current disc) cannot be specified as a current disc in the other zone. It can be specified as a next disc in the other zone. However, to start reproduction of the next disc, it is required that the disc by the current zone has been completed and returned to the rack.
- When a non-existing track is specified before TOC reading is completed, the maximum track is reproduced in case the track is outside the maximum track or the minimum track is reproduced in case the track is before the maximum track.
- **When the current and next disc numbers are the same, and only when the next track number is one track larger than the current track number, the player starts playback of the next track upon completion of the current track, without entering auto-pause mode.**

Other



Example of a PLAY command for playing Disc 2 Track 2.

02 50 30 30 32 30 32 30 30 30 30 03 33 37

.6 Stop

This stops playing back the disc in a selected zone.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code Q							
2	ETX 03h							
3	BCCH high-level							
4	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code Q							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special conditions



Other



.7 Pause ON

This pauses the disc in a selected zone.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code R							
2	ETX 03h							
3	BCCH high-level							
4	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code R							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special conditions

- This command is valid only when the zone status is Play (F).
- When this command is submitted just before the automatic pause status is set in the execution of a Play, Cross Fade Play, or Cross Fade Disc Reverse command, the disk stops at the top of the next tack (current track number + 1). When the pause status is canceled by the Pause OFF command, the reproduction starts from the track.

Other

.8 Pause OFF

This unpauses the disc in a selected zone.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code S							
2	ETX 03h							
3	BCCH high-level							
4	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code S							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special conditions

- This command is valid only when the zone status is Pause (G).
- This command is not available in the automatic pause status by the Play, Cross Fade Play, or Cross Fade Disc Reverse command.

Other

.9 Disc Skip

This selects a disc in a selected zone.

If the unit receives this command while in playback or a pause, the unit completes disc selection and becomes ready to play back, then continues to run according to its immediately previous state the unit plays only 1 track.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code T							
2	Skip code Forward Reverse Direct D							
3	Disc number (100 digits)							
4	Disc number (10 digits)							
5	Disc number (1 digit)							
6	ETX 03h							
7	BCCH high-level							
8	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code T							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special conditions

- Disc number parameters (Byte 3-5) are effective only when the skip code is D .
- It is canceled the disc or the track specified under PLAY command. It should send the command after this command to reserve the next disc or the track.
- This command is valid only when the zone status is Play (F) or PAUSE (G).
- The unit can skip to a maximum disc with Forward (+) and to a minimum disc with Reverse (-) and when it goes to more than those discs, the Order Disc None (3) answer code is issued.
- This command is ignored when a disc specified by a skip code "+" or "-" of this command is used in the other zone in the multi-zone mode.

Other

.10 Track Skip

This selects a track for the disc in a selected zone.

If the unit receives this command while in the playback or in a pause, the unit completes the search, then keeps running according to its immediately previous state.

The unit plays only 1 track. When a track is not specified with the Track Skip command, the unit goes to the head track of the specified disc.

When Forward (+) or Reverse (-) is selected, the unit searches the track number one after or before the current track number.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code U							
2	Skip code Forward Reverse Direct D							
3	Track number (10 digits)							
4	Track number (1 digits)							
5	ETX 03h							
6	BCCH high-level							
7	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code U							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special conditions

- Track number parameters (Byte 3-4) are effectively only when the skip code is D .
- The current track, next disc, and next track specified with the PLAY command are canceled. It should send the command after this command to reserve the next disc or the track.
- This command is valid only when the zone status is Play (F) or PAUSE (G).
- The unit can skip to a maximum disc with Forward (+) and to a minimum disc with Reverse (-) and when it goes to more than those discs, the Order Disc None (4) answer code is issued.

Other

.11 Scan Play

This scans and plays the disc in a selected zone.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code V							
2	Skip code Forward Reverse							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code V							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special conditions

- SCAN PLAY can be canceled with the PLAY command by setting 2 to 11 bytes of the PLAY command to '0'.
- This command is valid only when the zone status is Play (F) or PAUSE (G).
- When Read-in or Read-out is set by this command, the disc pauses at the top of the minimum track (in the Read-in status) or pauses about two seconds before the read-out start time (in the Read-out status).
- When the current and next disc numbers which were specified by the Play Command are the same, the next disc and the next track that were specified by the Play Command are canceled with this command.

Other

.12 A-Time (Absolute Time) Search

This conducts an absolute time search on the disc in a selected zone.

If the unit receives this command while in the playback or pause mode, the unit completes the search, then keeps running according to its immediately previous state. If the unit receives this command at the stop mode, it enters the play mode from a track specified with A-Time. The unit becomes the pause mode at the end of a track specified with A-Time.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code W							
2	Absolute time specification (minutes10 digits)							
3	Absolute time specification minutes1 digit							
4	Absolute time specification seconds10 digits							
5	Absolute time specification seconds1 digit							
6	Absolute time specification frames10 digits							
7	Absolute time specification frames1 digit							
8	ETX 03h							
9	BCCH high-level							
10	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code W							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special conditions

- The current track, next disc, and next track specified with the PLAY command are canceled. It should send the command after this command to reserve the next disc or the track.
- This command is valid only when the zone status is Stop (B), Play (F) or PAUSE (G).

Other

.13 Cross Fade

This specifies the cross fade playback mode. The cross fade time range is 0-10 seconds (0 seconds sets the cross fade off).

The cross-fade reproduction is controlled by the Cross Fade Play command or the Cross Fade Disc Reserve command.

Only Stop, Request System Status, Power Off, Request CPU Version, and Request Error Status commands are acceptable during cross-fade reproduction.

When the door is opened in the Cross Fade mode, the Cross Fade mode is turned off and the Single Zone mode is set.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code A							
2	Cross fade time specification 09A00FFA10 sec							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code A							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special condition

■ The unit plays back in cross fade only when in the single zone mode.

■ This command is valid only when the system status is **Disc Sense (2)**, **Door Opening (4)**, or **Disc Nothing (5) after the system status is open** or Disc Sense Complete (3) when the zone status is No Disc (A) or Stop (B).

Other

.14 Cross Fade Play

This command starts reproduction in the Cross Fade Play mode.
 This command is valid only in the Cross Fade mode. This command can be used only when the Cross Fade mode is set and reproduction is required. Use the Cross Fade Disc Reserve command to reserve the next disc after the Cross Fade reproduction starts.

bytebit	7	6	5	4	3	2	1	0
0	STX02h							
1	Command code ('X')							
2	Disc number (100 digits)							
3	Disc number (10 digits)							
4	Disc number (1 digits)							
5	Track number (10 digits)							
6	Track number (10digits)							
7	Next disc number (100 digits)							
8	Next disc number (10 digits)							
9	Next disc number (1 digits)							
10	Next track number (10 digits)							
11	Next track number (1 digits)							
12	ETX03h							
13	BCCH (high-level)							
14	BCCL (low-level)							

(1)

Answers returned								
bytebit	7	6	5	4	3	2	1	0
0	STX02h							
1	Reply code ('X')							
2	Answer code							
3	ETX03h							
4	BCCH (high-level)							
5	BCCL (low-level)							

(2) Special condition

- Specify a disk number and a track number that are present and available as the parameters. The disc number (byte 2 to byte 4) must not be equal to the next disc number (byte 2 to byte 9).
- This command is enabled only when the system status is Disc Sense Complete (3) and when the zone status is No Disc (A) or Stop (B).
- In case the Cross Fade Disc Reserve command cannot be submitted as the command submission conditions are not satisfied (in the Auto Pause status), this command can start cross fade reproduction.

(3) Other

.15 Cross Fade Disc Reserve

This command reserves the next tune when the Cross Fade mode starts.
 This command is available only when the Cross Fade mode is set and reproduction starts by the Cross Fade Play command. In this case, Cross Fade reproduction can be started only by submitting this command.

bytebit	7	6	5	4	3	2	1	0
0	STX02h							
1	Command code ('Y')							
2	Disc number (100 digits)							
3	Disc number (10 digits)							
4	Disc number (1 digits)							
5	Track number (10 digits)							
6	Track number (10digits)							
7	Next disc number (100 digits)							
8	Next disc number (10 digits)							
9	Next disc number (1 digits)							
10	Next track number (10 digits)							
11	Next track number (1 digits)							
12	ETX03h							
13	BCCH (high-level)							
14	BCCL (low-level)							

(1)

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX02h							
1	Reply code ('Y')							
2	Answer code							
3	ETX03h							
4	BCCH (high-level)							
5	BCCL (low-level)							

(1)

Special condition

- Specify a disk number and a track number that are present and available as the parameters. The disc number (byte 2 to byte 4) must not be equal to the next disc number (byte 7 to byte 9).
- Conditions of submitting this command
- In case the Cross Fade Play command is submitted before this command (Starting the Cross Fade reproduction)
 - The zone status of Zone 1 should be "Play (F)."
 - The remaining play time of Zone 1 should be 25 seconds or more.
 - The next disc number and the track number (byte 7 to byte 11) of the Cross Fade Play command should be equal to the disc number and the track number (byte 2 to byte 6) of this command.
- In case the Cross Fade Disc Reserve command is submitted before this command
 - The play time of Zone 1 should be 1 second or more.
 - The remaining play time of Zone 1 should be 25 seconds or more.
 - The next disc number and the track number (byte 7 to byte 11) of the Cross Fade Play command should be equal to the disc number and the track number (byte 2 to byte 6) of this command.
 - After this command was issued, if it takes a time to read the TOC and others, there is a case that the player enters the auto-pause mode without performing the cross-fade function. In this case, the playback starts when the Cross-fade Play Command was issued from the PC.

(3) Other

This selects the current zone and changes zone modes.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code @							
2	Zone select code of zone mode selection (*1)							
3	Zone select code of current zone selection (*1)							
4	ETX 03h							
5	BCCH high-level							
6	BCCL low-level							

(*1) Zone select code

Code	Function
31h1	Current zone selection (zone 1)
32h2	Current zone selection (zone 2)
41hA	Zone mode selection (single zone)
42hB	Zone mode selection (dual zone)

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code @							
2	Answer code							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

Special condition

- When in the single zone mode, you cannot select a current zone (Zone select code31h / 32h).
- The change of the zone mode selection is valid only when the system status is Disc Noting (5) or when the zone status is No Disc (A) or Stop (B) with the system status of Disc Sense Complete (3).
- The change of the current mode selection is valid only when the system status is Disc Sense Complete (3) or Disc Noting (5).

Other

.17 Request TOC Data

This requests TOC data from the disc in a specified zone.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code 1							
2	Zone specification (*1)							
3	ETX 03h							
4	BCCH high-level							
5	BCCL low-level							

(*1) Zone specification

Code	Function	
	Single zone	Dual zone
31h1	Current zone	Zone 1
32h2	Next zone	Zone 2

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code 1							
2	Answer code							
3	Top track number (10 digits)							
4	Top track number (1 digits)							
5	Final track number (10 digits)							
6	Final track number (1 digit)							
7	Absolute starting time for read-out area (minutes10 digits)							
8	Absolute starting time for read-out area (minutes1 digit)							
9	Absolute starting time for read-out area (second10 digits)							
10	Absolute starting time for read-out area (second1 digit)							
11	Starting time for read-out area (frame10 digits)							
12	Starting time for read-out area (frame1 digit)							
13	Absolute starting time for top track (minutes10 digits)							
14	Absolute starting time for top track (minutes1 digit)							
15	Absolute starting time for top track (second10 digits)							
16	Absolute starting time for top track (second1 digit)							
17	Absolute starting time for top track (frame10 digits)							
18	Absolute starting time for top track (frame1 digit)							
19	ETX 03h							
20	BCCH high-level							
21	BCCL low-level							

Special condition

■ This command is valid only when the zone status is TOC Read (E) or Load CD-TEXT Disc (J), or when the previous zone status is proceeded to other status by the Request System Status command or other commands see item 3 of "1.8 List of Status Codes".

■ The TOC Read OK and Load CD-TEXT Disc statuses proceed to the next statuses by sending this command.

Other

.18 Request Track Data

This requests track data from the disc.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code 2							
2	Zone specification (*1)							
3	Track number specification (10 digits)							
4	Track number specification (1 digit)							
5	ETX03h							
6	BCCH high-level							
7	BCCL low-level							

(*1) Zone specification

Code	Function	
	Single zone	Dual zone
31h1	Current zone	Zone 1
32h2	Next zone	Zone 2

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code 2							
2	Answer code							
3	Specified track number (10 digits)							
4	Specified track number (1 digits)							
5	Absolute starting time (minutes10 digits)							
6	Absolute starting time (minutes1 digit)							
7	Absolute starting time (second10 digits)							
8	Absolute starting time (second1 digit)							
9	Absolute starting time (frame10 digits)							
10	Absolute starting time (frame1 digit)							
11	ETX 03h							
12	BCCH high-level							
13	BCCL low-level							

Special conditions

■ If this command is issued when no disc is mounted on the drive in a selected zone or when TOC read is incomplete, all tracks and time parameters(byte 310) of the answer will be 0 (30h).

■ This command is valid only when the zone status is TOC Read (E) or Load CD-TEXT Disc (J), or when the previous zone status is proceeded to other status by the Request System Status command or other commands see item 3 of "1.8 List of Status Codes".

Other

.19 Request CD-TEXT Name

This requests the various titles of a specified CD-TEXT disc.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code 4							
2	Disc number (100 digits)							
3	Disc number (10 digits)							
4	Disc number (1 digit)							
5	Name category code 1 *1							
6	Name category code2 *1							
7	ETX 03h							
8	BCCH high-level							
9	BCCH low-level							

*1 Name category code

Name category	Name category code 1	Name category code 2
Disc	' D '	' I '
Artist	' A '	' R '
Track	Track number 10 digits (ASCII)	Track number 1 digits (ASCII)

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code 4							
2	Answer code							
3	Name character 1 (ASCII)							

n2	Name character nASCII
n3	ETX 03h
n4	BCCH high-level
n5	BCCH low-level

Special condition

■ The answer parameter for this command shall be of a variable length (as per the data length of the CD-TEXT). However, the maximum value of the 'n' in the table (maximum number of characters) shall be 100. The number of track titles shall be max. 16.

■ This command is valid only when the zone status is Load CD-TEXT Disc (J), or when the previous zone status is proceeded to other status by the Request System Status command or other commands see item 3 of "1.8 List of Status Codes". However, a specified disc must be in the CD drive.

■ For the order of the Request CD-TEXT Name and the Request TOC Data commands, it is recommended to issue the Request TOC Data first.

■

Other

.20 Request CPU Version

This acquires the version number of the CPU.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code 5							
2	ETX 03h							
3	BCCH high-level							
4	BCCH low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Reply code 5							
2	Answer code							
3	Version number of system CPU (1,000 digits) (ASCII)							
4	Version number of system CPU (100 digits) (ASCII)							
5	Version number of system CPU (10 digits) (ASCII)							
6	Version number of system CPU (1 digit) (ASCII)							
7	Version number of drive CPU (1,000 digits) (ASCII)							
8	Version number of drive CPU (100 digits) (ASCII)							
9	Version number of drive CPU (10 digits) (ASCII)							
10	Version number of drive CPU (1 digit) (ASCII)							
11	ETX 03h							
12	BCCH high-level							
13	BCCH low-level							

Special condition

■ This command is valid only when the system status is other than System In Initialize (1).
 ■

Other

.21 Request Error status

This command acquires the Error status. When an error occurs, all units become the STOP mode.

bytebit	7	6	5	4	3	2	1	0
0	STX 02h							
1	Command code 7							
2	ETX 03h							
3	BCCH high-level							
4	BCCH low-level							

Answers returned

bytebit	7	6	5	4	3	2	1	0
0	STX02h							
1	Reply code '7'							
2	Answer code							
3	Error-occurred player ID ('0' to '5')							
4	1st error code (1000 digits) (ASCII)							
5	1st error code (100 digits) (ASCII)							
6	1st error code (10 digits) (ASCII)							
7	1st error code (1 digit) (ASCII)							
8	2nd error code (100 digits) (ASCII)							
9	2nd error code (10 digits) (ASCII)							
10	2nd error code (1 digit) (ASCII)							
11	ETX 03h							
12	BCCH high-level							
13	BCCH low-level							

Special condition

- When no error occurs, bytes 3 to 10 becomes '0'.

Other

- For error codes, see item 3.
- After an error occurs, only the OPEN key on the DCM-5000/5001 is available. Do not open and remove the CD rack by force. Follow the instructions in "Error Code List (3)."
- To restart the DCM-5000/5001 after removing the error cause, turn off power of all units, then turn on power switches of the units in the preset power-on sequence.

2 Constraints

.1 Setting a PC remote mode

DIP switches at the back of the unit can be set to enter the unit either in the PC remote mode or in the standalone mode. The control of this unit by serial remote mode shall be set to the PC remote mode.

.2 Daisy chain

.1 ID setting

Each child unit shall be set to an appropriate ID by DIP switches (4bit) at the back. There shall be no two or more identical IDs. Up to five child units can be connected to the unit. The DCM-5000 shall always be the parent.

SW Number				DCM- 5000	DCM- 5001		
SW1	SW2	SW3	SW4				
1	1	1	1	Stand alone mode	reserved (stand alone mode)		
1	1	1	0				
1	1	0	1				
1	1	0	0				
1	0	1	1				
1	0	1	0				
1	0	0	1				
1	0	0	0				
0	1	1	1			PC remote mode MASTER	reserved
0	1	1	0				SLAVE5 (ID=5)
0	1	0	1	SLAVE4 (ID=4)			
0	1	0	0	SLAVE3 (ID=3)			
0	0	1	1	SLAVE2 (ID=2)			
0	0	1	0	SLAVE1 (ID=1)			
0	0	0	1	(PC remote mode MASTER (ID=0))			
0	0	0	0				

.2 Daisy chain configuration

The daisy chain may consist of either one of the following two. For the connection sequence of child units, it is essential that the child unit with the ID number of "1" is connected to the master unit first and the ID numbers of following child units are continued.

.3 Power-On and Power-Off

Methods of turning on and off power to units connected in a daisy-chain manner (by the POWER button switches)

- (1) Make sure that the CD door is completely closed.
- (2) First turn on the POWER switch of the slave unit, then turn on the POWER switch of the master unit.
- (3) If any of the master and slave units is powered off, the system does not work. In such a case, turn off power to all units and turn on the POWER switches in the above power-on order.

3. List Of Error Codes

x: Drive mechanism number y: DIR number z: 0 to 9

No	Error code		Error description
	1st	2nd	
1	0x20	000	No disk in the CD drive
2	0x21	000	Unadjustable tracking offset
3	0x22	000	Unadjustable focus offset
4	0x23	000	Unadjustable rough focus gain
5	0x24	000	Disabled focusing (or failure of spindle retraction)
6	0x25	000	No tracking
7	0x26	000	Unadjustable rough tracking gain
8	0x27	000	Focusing failed in reproduction
9	0x28	000	Focusing failed in searching
10	0x29	000	Focusing failed in automatic adjustment
11	0x2A	000	Focusing failed in TOC reading
12	0x2C	000	Focusing failed in pausing
13	0x2D	000	Focusing failed in manual searching
14	0x2E	000	Cannot read a sub-code for 0.5 second.
15	0x2F	000	Cannot read a sub-code for 1 second.
16	0x30	000	Cannot read a sub-code in TOC reading.
17	0x32	000	Cannot read a sub-code in pausing.
18	0x33	000	Cannot read a sub-code in manual searching.
19	0x34	000	Cannot read within a preset time period in TOC reading.
20	0x35	000	Cannot turn on the INNER TRACK switch.
21	0040	000	Cannot detect the door switch in opening.
22	0041	000	Cannot detect the door switch in operation.
23	0y80	000	DIR unlock
24	0y81	000	FS (44.1 KHz) error
25	0x39	000	Cannot read CD TEXT within a preset time period. (Timeout)
26	4825	zzz	Address sensor lower bit error
27	4826	zzz	Address sensor higher bit error
28	4827	zzz	Address matching sensor lower bit error
29	4828	zzz	Address matching sensor higher bit error
30	4829	zzz	Selector sensor (LIMS0) error
31	4830	zzz	Selector sensor (LIMS1) error
32	4831	zzz	Lifter/loader sensor (LIMS0) error
33	4832	zzz	Lifter/loader sensor (LIMS1) error
34	4833	zzz	Loader-down reconfirmation sensor (LIMS2) error
35	4834	zzz	Disk chuck (LIMS0) error
36	4835	zzz	Disk chuck (LIMS1) error
37	4836	zzz	Front limit sensor error
38	4837	zzz	Rear limit sensor error
39	4838	zzz	Rear clamper sensor error
40	4839	zzz	Front clamper sensor error
41	4840	zzz	Drive position sensor (1) error
42	4841	zzz	Drive position sensor (2) error
43	4842	zzz	Disk rack error
44	3000	zzz	Cannot take out a disk although "Disk Present" is indicated by the disk sensor.
45	1000	000	Communication error after a slave unit connection is recognized

(1) Error codes 0*2*000 to 0*34000 and 0*39000
The disc may be inserted in reverse in the CD rack (with the label side reversed) or the disk may have contaminants or scratches on its surface.

(2) Error codes 4827*** and 4828***
The CD rack may be inserted incompletely.