

# 6. SERVICE MODE

## 6.1 OSD

### ■ Indication items for the OSDs for debugging

Remote Control Unit Command	Screen	Indication Items for the OSDs	Remarks	
[ESC]+[DISP]	1st screen	Service Indication (software information)		
		Product serial No./destination		
		Model No.		
		Released version No.		
		Revision No.		
		Submicrocomputer version data		
		Drive model No.		
		Drive version No.		
		Drive serial No.		
		DVD-Video region No.		
		BD-ROM region No.		
		CPRM ID		
		MAC address		
	2nd screen	OSD Filter		
	Setup value of the OSD FILTER	The data must be displayed on the subpage of the software information screen.		
[ESC]+[SIDE-B]	1st screen	Specifications 1 for error rate measurement (with OK/NG judgment)		
		Results of error rate measurement OK/NG	To see the result, press ESC then SIDE-B.	
[ESC]+[DISP]+[2]	1st screen	Specifications 2 for error rate measurement (for continuous playback)		
		Title/Chapter data		
		Playback duration data		
		LgcSct address data		
		Error rate data (error rate value)		
[ESC]+[DISP]+[3]	1st screen	ATA/ATAPI DEBUG OSD-Command history (ALL)		
		Packet command from the host		
		Error data from the status register		
	2nd screen	ATA/ATAPI DEBUG OSD-Command history (ERROR)		
		Packet command that has been failed		
		Error Code		
	3rd screen	ATA/ATAPI DEBUG OSD-Drive maintenance data		
		Power ON/accumulated power-on duration		
		LD read power-on duration for the BD		
		LD read power-on duration for the DVD		
	4th screen	ATA/ATAPI DEBUG OSD-Judgment of LD degradation		
		Judgment of degradation of the LD for the BD (OK/NG)		
		Judgment of degradation of the LD for the DVD (OK/NG)		
		Judgment of degradation of the LD for the CD (OK/NG)		
			Temperature inside the writer	
	[ESC]+[DISP]+[4]		Results of self-diagnosis	
Version/Revision Nos. of the SKY chip				
HDMI transmitter IC check				
Communication check of the submicrocomputer				
PLL synthesizer check				
DRIVE check				

Remote Control Unit Command	Screen	Indication Items for the OSDs	Remarks																																												
[ESC]+[DISP]+[5]		AV output data <table border="1"> <tr> <td>Video data</td> <td rowspan="13">*These data are to be used merely as a guide, as they were designed to be used for product development.</td> </tr> <tr> <td>Video encoder data</td> </tr> <tr> <td>Component output resolution</td> </tr> <tr> <td>HDMI output resolution</td> </tr> <tr> <td>Frame rate</td> </tr> <tr> <td>Content resolution</td> </tr> <tr> <td>Content aspect ratio</td> </tr> <tr> <td>Data on VBID and WSS</td> </tr> <tr> <td>CGMS-A/Copyright</td> </tr> <tr> <td>APS</td> </tr> <tr> <td>MacroVision</td> </tr> <tr> <td>Aspect</td> </tr> <tr> <td>Audio data</td> <td></td> </tr> <tr> <td>Sampling frequency</td> <td></td> </tr> <tr> <td>Category code (Number of Bits &amp; definition)</td> <td></td> </tr> <tr> <td>Word Length</td> <td></td> </tr> <tr> <td>C/L bit: Indications on number of bits &amp; status (Free/Once/Disable)</td> <td></td> </tr> <tr> <td>Audio muting status</td> <td></td> </tr> <tr> <td>LPCM/BitStream output</td> <td></td> </tr> <tr> <td>Number of output channels</td> <td></td> </tr> <tr> <td>HDMI ACP Type</td> <td></td> </tr> </table>	Video data	*These data are to be used merely as a guide, as they were designed to be used for product development.	Video encoder data	Component output resolution	HDMI output resolution	Frame rate	Content resolution	Content aspect ratio	Data on VBID and WSS	CGMS-A/Copyright	APS	MacroVision	Aspect	Audio data		Sampling frequency		Category code (Number of Bits & definition)		Word Length		C/L bit: Indications on number of bits & status (Free/Once/Disable)		Audio muting status		LPCM/BitStream output		Number of output channels		HDMI ACP Type															
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Remote Control Unit Command	Screen	Indication Items for the OSDs	Remarks																						
[ESC]+[DISP]+[10]		Playback data (BD-ROM) <table border="1" data-bbox="483 352 1063 919"> <tr><td>Title No.</td></tr> <tr><td>Chapter No.</td></tr> <tr><td>Elapsed time within a title</td></tr> <tr><td>Video data</td></tr> <tr><td>  Primary Video Stream</td></tr> <tr><td>  Secondary Video Stream</td></tr> <tr><td>  Resolution</td></tr> <tr><td>  Source video aspect ratio</td></tr> <tr><td>  Frame rate</td></tr> <tr><td>  AACs data</td></tr> <tr><td>    CPI</td></tr> <tr><td>    CCI</td></tr> <tr><td>    APS</td></tr> <tr><td>    ICT</td></tr> <tr><td>    DOT</td></tr> <tr><td>Audio data</td></tr> <tr><td>  Primary Audio Stream</td></tr> <tr><td>  Secondary Audio Stream</td></tr> </table>	Title No.	Chapter No.	Elapsed time within a title	Video data	Primary Video Stream	Secondary Video Stream	Resolution	Source video aspect ratio	Frame rate	AACs data	CPI	CCI	APS	ICT	DOT	Audio data	Primary Audio Stream	Secondary Audio Stream					
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[ESC]+[DISP]+[11]		Playback data (BD-R/RE) <table border="1" data-bbox="483 961 1063 1644"> <tr><td>Title No.</td></tr> <tr><td>Chapter No.</td></tr> <tr><td>Elapsed time within a title</td></tr> <tr><td>Navigation data</td></tr> <tr><td>  Playback stream format</td></tr> <tr><td>    SESF</td></tr> <tr><td>    ISDB</td></tr> <tr><td>Video data</td></tr> <tr><td>  Video stream data</td></tr> <tr><td>  Playlist data (Virtual/Real-PlayList)</td></tr> <tr><td>  Playlist No.</td></tr> <tr><td>  Resolution</td></tr> <tr><td>  Source video aspect ratio</td></tr> <tr><td>  Frame rate</td></tr> <tr><td>  AACs data</td></tr> <tr><td>    CPI</td></tr> <tr><td>    CCI</td></tr> <tr><td>    APS</td></tr> <tr><td>    ICT</td></tr> <tr><td>    DOT</td></tr> <tr><td>Audio data</td></tr> <tr><td>  Audio Stream data</td></tr> </table>	Title No.	Chapter No.	Elapsed time within a title	Navigation data	Playback stream format	SESF	ISDB	Video data	Video stream data	Playlist data (Virtual/Real-PlayList)	Playlist No.	Resolution	Source video aspect ratio	Frame rate	AACs data	CPI	CCI	APS	ICT	DOT	Audio data	Audio Stream data	
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Remote Control Unit Command	Screen	Indication Items for the OSDs	Remarks
[ESC]+[DISP]+[12]	1st screen	Playback data (DVD)	
		Playback status data (PLAY, PAUSE, etc.)	
		Navigation data	
		Title No.	
		Chapter No.	
		Numbers of all chapters in a title	
		Elapsed time within a title	
		Elapsed time within a chapter	
		Number of multi-angles	
		Number of the selected multi-angle	
		Number of audio streams	
		Number of selected audio	
		Number of sub-pictures	
	No. of the selected sub-picture or OFF		
	2nd screen	Video data	
		Frame rate	
		Resolution	
		Aspect ratio	
		Progressive frame data	
		Repeat first field data	
Maximum quantity/current quantity of video stream buffer			
Audio data			
Codec type			
Sampling frequency			
Number of channels			
(With LPCM) Quantization bit rate			
Maximum quantity/current quantity of audio stream buffer			
[ESC]+[DISP]+[13]	1st screen	Playback data (A/V decoder)	
		Primary A/V decoder data for DVD and BD	
		Error data of the video decoder	
	Error data of the audio decoder		
	2nd screen	Secondary A/V decoder data for BD	
		Error data of the video decoder	
Error data of the audio decoder			
[ESC]+[DISP]+[14]		Playback data (CD)	
		Audio data	
		Playback track/all tracks	
		Playback duration of the track	
		Playback duration of the disc	
		Total duration of the track	
Total duration of the disc			

A

B

C

D

E

F

Remote Control Unit Command	Screen	Indication Items for the OSDs	Remarks
[ESC]+[DISP]+[15]	1st screen	Playback data (PC Files)	
		Movie	
		Format (MPEG1/MPEG2-PS/MPEG2-TS/WMV...)	
		Resolution	
		NTSC/PAL	
		Aspect	
	2nd screen	Music	
		Format (MP3,WMA,WAV ...)	
		Fs	
		Bitrate	
		Channel number	
	3rd screen	Photo	
Format (JPEG/GIF/PNG ...)			
Resolution (Pixel)			
Aspect			
Date			
[ESC]+[AMON]+[TEST]		Destination setting screen	
		Input/setting of destination	
[ESC]+[STEREO]		CPRM ID Registration screen	
		ID registration	This screen is displayed when no ID is set.
		CPRM ID Clearing screen	
		Clearing of the registered ID	This screen is displayed when the ID has been set.

\* For details on how to shift screens, see "Service Indication Screens".

## ■ Service Indication Screens

### 1. Overview

On Service Indication screens, data that are retained by the System Controller are displayed with the aid of the remote control unit for service (GGF1067). (Not for use by general users)

The maximum display area for on-screen displays is 64 one-byte characters (widthwise) × 17 lines (lengthwise).

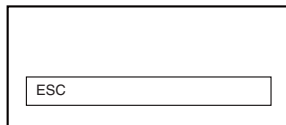
### 2. How to Operate

To display indications for servicing, use the remote control unit for service.

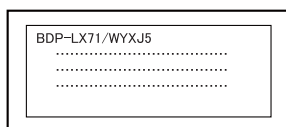
#### • How to enter Service Indication mode

The following key input can be accepted either in Normal Startup mode or Service mode.

(1) Without any GUI displayed, press the ESC key.



(2) Then press the DISP key. The 1st screen (version data, etc.) is displayed.



1st screen (version data, etc.)

(3) To shift to a subsequent screen, press the corresponding key:

[2]: 2nd screen: Error rate measurement 2 (for continuous playback)

[3]: 3rd screen: ATA/ATAPI debugging (drive data)

#### • How to exit Service Indication mode

Press the ESC key.

#### • How to shift between screens

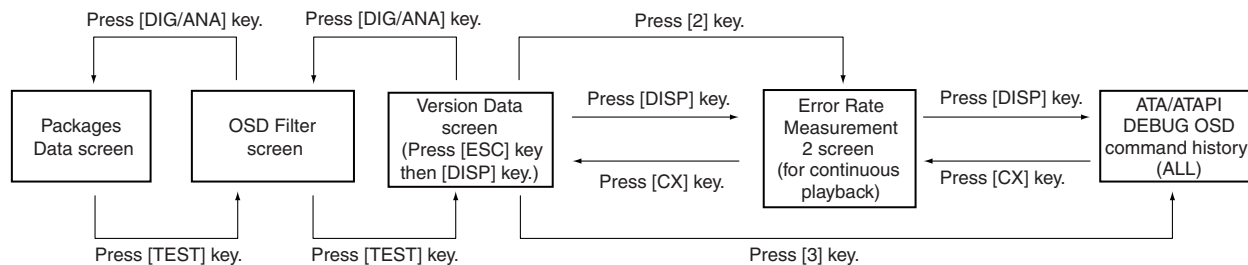
To shift to the next screen, press the DISP key. To shift to the previous screen, press the CX key.

#### • How to shift between subscreens

To shift to the next subscreen, press the DIG/ANA key. To shift to the previous subscreen, press the TEST key.

## 3. Overview of Screen Shifting

An overview of screen shifting in Service Indication mode is given below.



\* To exit any screen, press the ESC key.

\* For details on the Error Rate Measurement 2 screen, see the "Specifications 2 for Error Rate Measurement (for continuous playback)".

\* For details on the OSD Filter screen, see the "OSD Filter Setting".

## 4. Specifications of Version Data screen

### • 1st screen (version data, etc)

00	①	BDP-LX71/WYXJ5	
01	②	MODEL : 0205	
02	③	VERSION : 1.00	
03	④	REVISION : 1.6101.4.166 \$	
04	⑤	DRIVE : PIONEER BD-RW BDR-101AX	OK
05		DRIVE VER : 1.00	OK
06		DRIVE S/N : FLTP900007WL	
07	⑥	SUBCON : 1.00	OK
08	⑦	REGION : 1A	
09	⑧	CPRM ID : 000000001	
10	⑨	MAC ADDRESS : 00-E0-36-00-C7-FF	
11			
12			
13			
14			
15			
16			

① Data on the model: Model name/destination

② MODEL: Model No.

③ VERSION: Release version

④ REVISION: SVN Revision No.

⑤ DRIVE: Data on the built-in drive

Drive name: Judged as OK: The name assigned by the application program coincided with that obtained by the command.  
 Judged as NG: The name assigned by the application program did not coincide with that obtained by the command.

DRIVE VER: Version of the firmware

Judged as OK: The version assigned by the application program coincided with that obtained by the command.  
 Judged as NG: The version assigned by the application program did not coincide with that obtained by the command.

DRIVE S/N: Drive serial No. (For details on the drive serial No. indication, see the "Drive Serial No. Indication".)

⑥ SUBCON: Firmware version of the submicrocomputer (PIC)

Judged as OK : The version assigned by the application program coincided with that obtained by the command.

Judged as NG+ : The version obtained by the command is newer than that assigned by the application program.

Judged as NG- : The version obtained by the command is older than that assigned by the application program.

⑦ REGION: Region codes for DVD-VIDEO and BD-ROM of the player

The above screen example shows that the DVD region code is 1 and the BD region code is A.

If a region has not been set, "VIRGIN ROM" is displayed for the DVD, and "F" is displayed for BD.

⑧ CPRM ID: CPRM key No.

If it has not been set, "?????????" is displayed.

⑨ MAC ADDRESS: MAC ADDRESS value

If it has not been set, "?????????????????" is displayed.

### • 2nd screen (OSD Filter Setting)

Video Setting		1080/24p
OSD FILTER	: No Filter	*

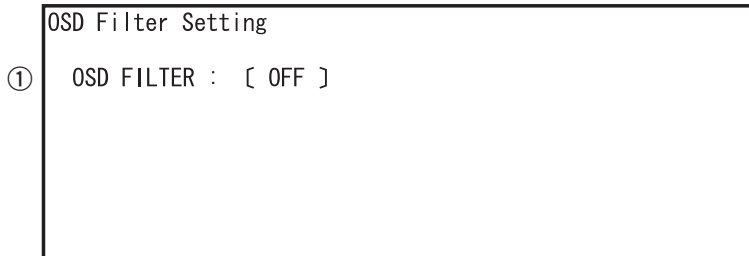
\* For details on the OSD Filter screen, see the "OSD Filter Setting".

## ■ OSD Filter Setting

\* The details of this section are to be determined later after register specifications are determined.

To display the Service Indication screen, press the ESC then DISP keys. Then press the DIG/ANA key once to switch to the OSD Filter Setting screen. The above key inputs can be accepted either in Normal Startup mode or Checker mode.

### • OSD Filter Setting screen



① OSD Filter Setting value    ON  
  OFF

### Key operations of the OSD Filter Setting screen

Key	Operation	Setting value (*: Default)	Remarks
[<x3], [x3>]	For switching the OSD Filter Setting between ON or OFF	OFF/ON ( * )	[<x3]: To set the OSD Brightness Filter to OFF [x3>]: To set the OSD Brightness Filter to ON
[ESC]	For clearing data or exiting the current mode	–	–

\* Use the remote control unit for service for key operation.

\* A setting becomes valid as soon as it is set. The setting value will be stored in nonvolatile memory, as with the setting values of the main unit. Therefore, the changed setting value will be retained upon the next power-on.

\* About factory preset

- If the ESC then CLEAR keys are pressed ("No power off" command) for factory presetting, the setting will be reset to default (ON).
- If the STOP and POWER keys on the main unit are pressed simultaneously for factory presetting, the current setting will be retained.



### A ■ Specifications 1 for Error Rate Measurement (with OK/NG judgment)

To measure the error rate for a certain duration, press the ESC then SIDE-B keys only during playback. The result of judgment (OK/NG) will be displayed on the FL display and as an OSD.

To exit Error Rate Measurement mode, press the ESC key while the error rate is being measured.

After exiting Error Rate Measurement mode, if the ESC then SIDE-B keys are pressed again to reenter Error Rate Measurement mode, measurement of the error rate will start from the beginning.

The error rate is measured for up to 5 sessions, and the displayed result is updated after measurement for each session is performed.

At the end of 5 sessions, the average error rate for the entire measurement range will be displayed. If measurement sessions are interrupted before 5 sessions, the average error rate up to the point of interruption will be calculated and displayed.

B A result will be judged as NG if the measured error rate exceeded the reference value. See "OK/NG judgment" below. (Only when the average error rate is judged as NG, the tray will be opened.)

#### Operation Specifications

The following specifications must be met:

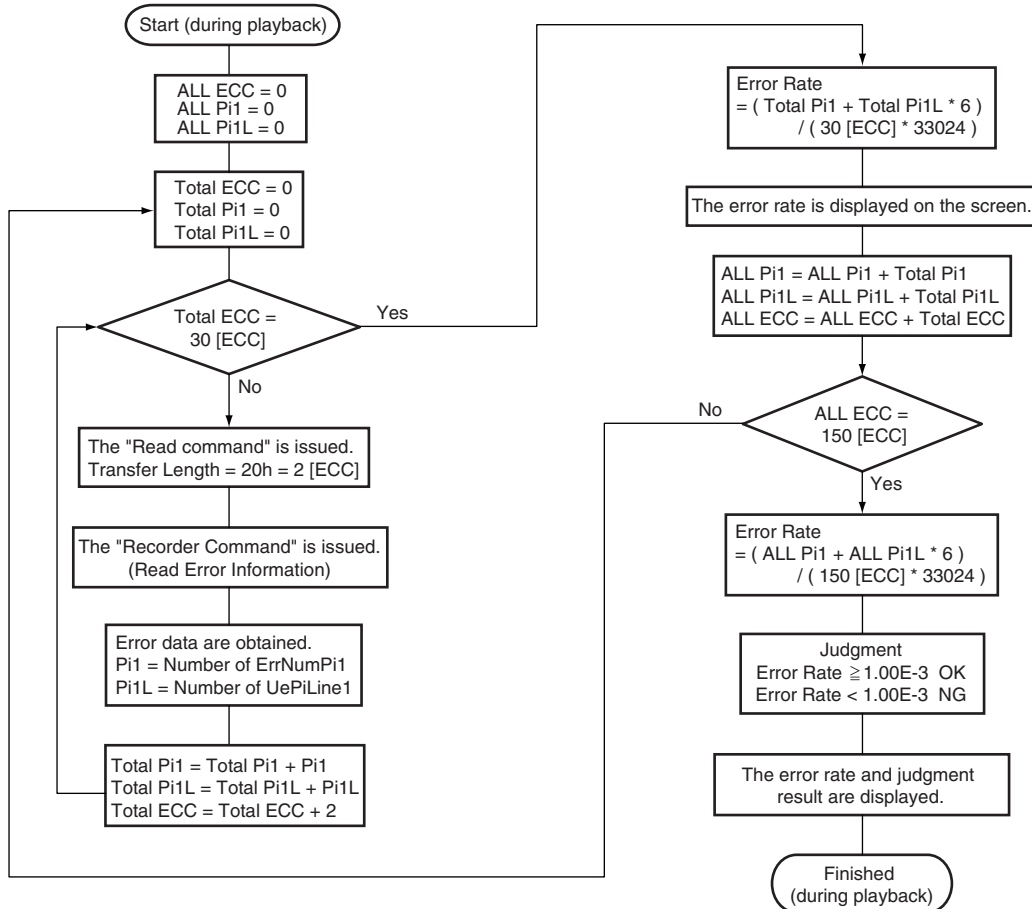
- When calculating an error rate, the denominator groups will be considered as shown below:  
For DVD: 28-32 ECCs (448-512 sectors)  
For BD: 95-105 clusters (3040-3360 sectors)  
Then the measurement result will be displayed.

- For calculation of result judgment, the values of the above denominator groups will be multiplied by 5. The measurement result along with the judgment result will be displayed.

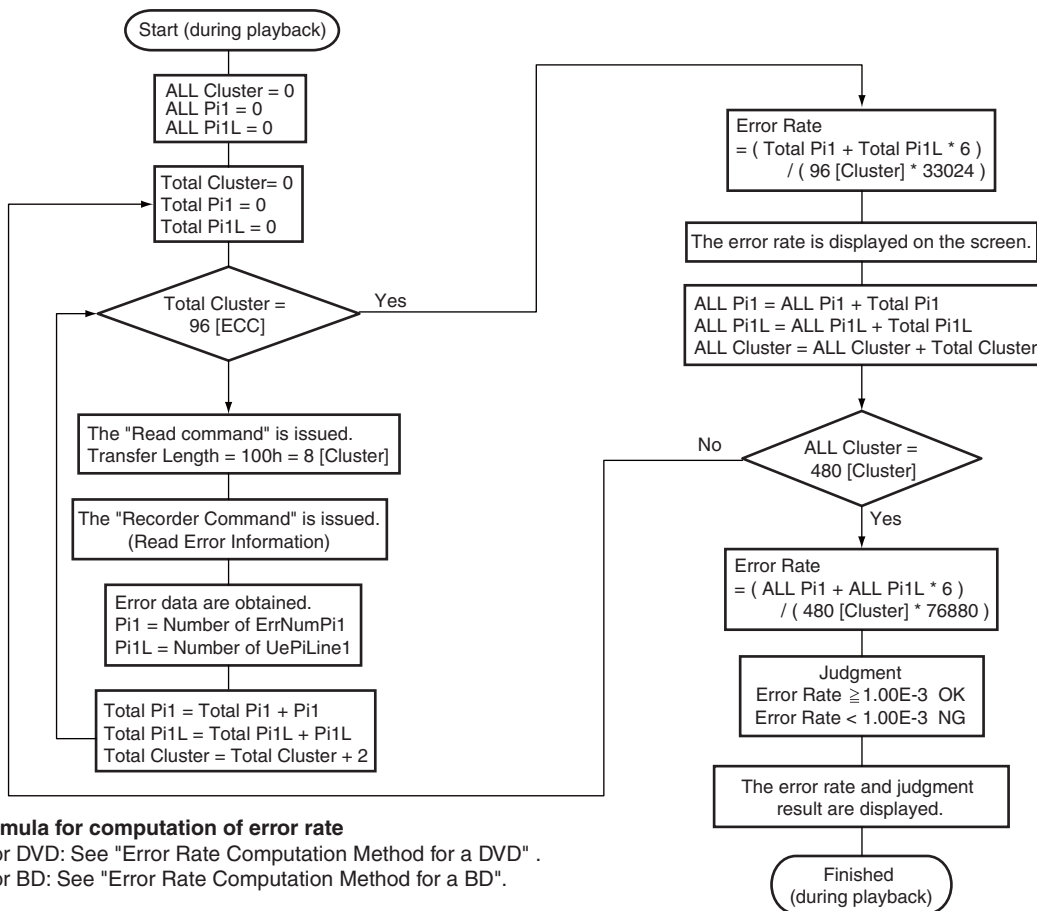
- C
- During error rate measurement, there should not be any video or audio problem (stuttering block noise, jumpiness, etc.) in the playback signal.
  - Data to be measured must be basically continuous.

### Flowchart of DVD Error Rate Measurement (with OK/NG judgment)

Use the following flowchart just as a guide.



**Flowchart of BD Error Rate Measurement (with OK/NG judgment)**



**Formula for computation of error rate**

- For DVD: See "Error Rate Computation Method for a DVD".
- For BD: See "Error Rate Computation Method for a BD".

**Display Formats on the FL display and as an OSD**

Operation	Display format	
	FL	OSD
Only during playback, if keys are pressed, calculation of error rate is started, and the results are displayed on the FL display and as an OSD. The symbol (-) (which indicates that measurement is not finished) flashes.	ER   x   .   xE   -   x   (At lights out) ER   x   .   xE   -   x   -   (At lighting)	ERR RATE : x.xE-x (At lights out) ERR RATE : x.xE-x- (At lighting)
The result of measurement is displayed.		
If error rate measurement is completed before playback finishes, the average error rate, the symbol (*) (which indicates that the measurement is completed) and the judgment result (OK/NG) will be displayed on the FL and as an OSD. (When NG is displayed, if the tray is opened, the indications on the FL display and screen will be retained.)	ER   x   .   xE   -   x   *	ERR RATE : x.xE-* OK (NG: OSD whole screen display with red)
If error rate measurement is not completed before playback finishes, the average error rate, the symbol (-) (which indicates that measurement is not finished) and the judgment result (ERROR) that indicates that the error rate measurement has not been completed will be displayed on the FL display and as an OSD.	ER   x   .   xE   -   x   -	ERR RATE : x.xE-x- ERROR

\* For details on the FL display, see "Specifications of Screen Display & FL Display."

\* The layout for OSD depends on the mounting.

\* "x.xE-X" in the above table indicates an error rate. E.g.: 3.5E-5 = 3.5X10<sup>-5</sup>

**OK/NG judgment**

Disc type	Reference value	Indication
DVD	1.0x10 <sup>-3</sup>	OK/NG
BD	1.0x10 <sup>-3</sup>	OK/NG
CD	No error rate measurement	

## ■ Specifications 2 for Error Rate Measurement (for continuous playback)

### How to Start

To measure the error rate continuously, press the ESC, DISP, then 2 keys, in that order, only during playback. The result will be displayed as an OSD. The above keys can be accepted either in Normal Startup mode or Service mode.

\* For details on key inputs, see also "3. Overview of Screen Shifting" of "Service Indication Screens."

### [ERROR RATE MEASURING]

An error rate is measured during playback, and playback duration, title & chapter, address that is read, and error rate result are displayed as an OSD.

\* For details on commands for the drive, see "Drive Command Specifications."

The measurement method is as follows:

1. Press the ESC, DISP, then 2 keys, in that order, to start measurement.
2. The displayed result is updated after each measurement session is performed.
3. To exit Error Rate Measurement mode, press the ESC key while error rate is being measured.

\* During Stop mode, the on-screen display will remain displayed.

### ■ Operation Specifications

The following specifications must be met:

- When calculating an error rate, the denominator groups will be considered as shown below:

For DVD: 28-32 ECCs (448-512 sectors)

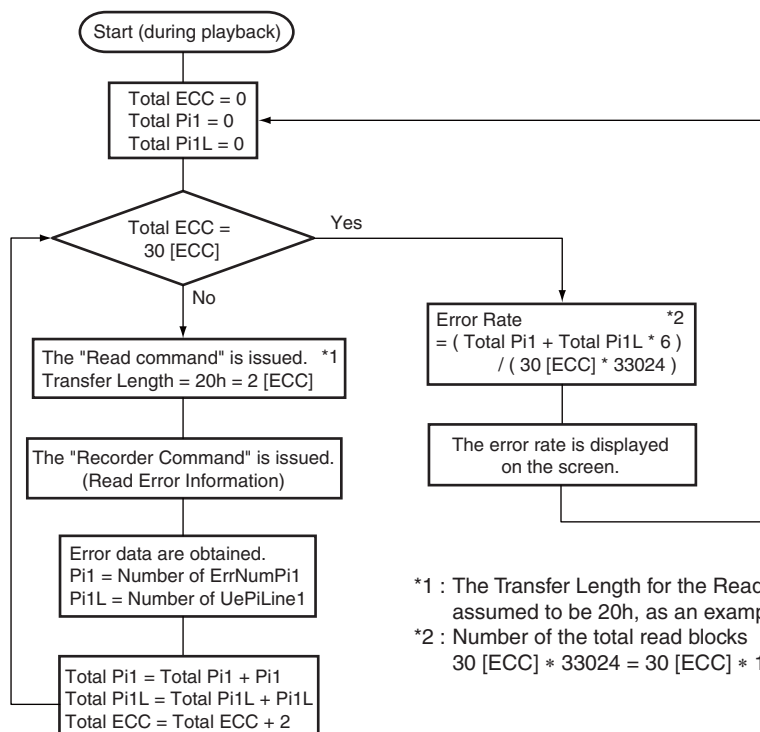
For BD: 95-105 clusters (3040-3360 sectors)

Then the measurement result will be displayed.

- During error rate measurement, there should not be any video or audio problem (stuttering block noise, jumpiness, etc.) in the playback signal.
- Data to be measured must be basically continuous.

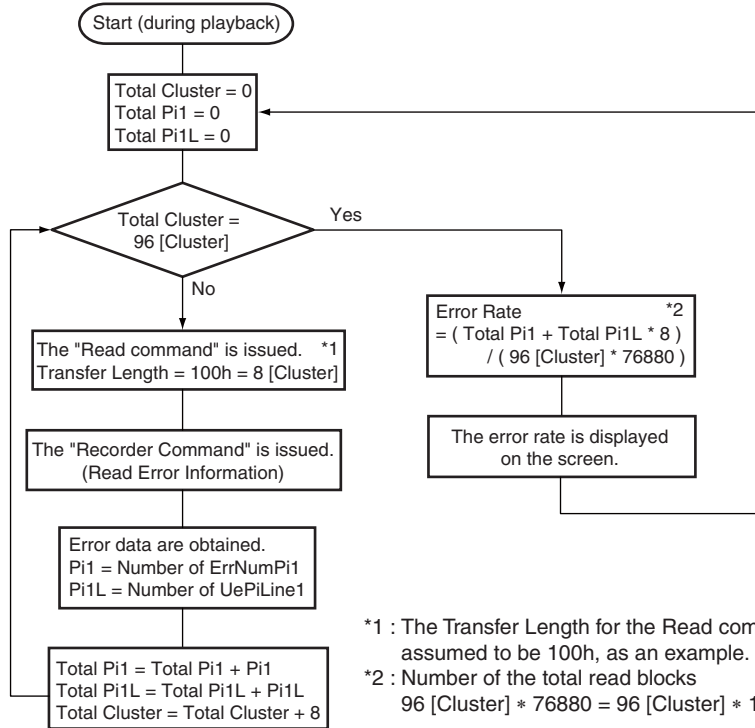
### Flowchart of DVD Error Rate Measurement (continuous playback)

Use the following flowchart just as a guide.



**Flowchart of BD Error Rate Measurement (continuous playback)**

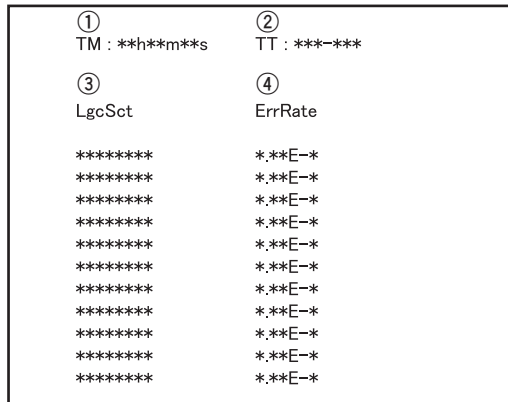
Use the following flowchart just as a guide.



**Formula for computation of error rate**

- For DVD: See "Error Rate Computation Method for a DVD".
- For BD: See "Error Rate Computation Method for a BD".

**Display format of the OSD**



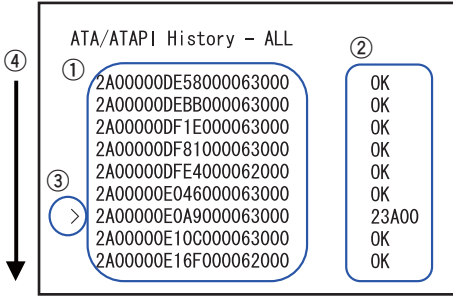
- ① Title & Chapter data: Title No. and Chapter No. of the title being played back  
\*For details on title & chapter display, see "Specifications of Screen Display and FL Display."
- ② Playback duration data: Elapsed time of the title being played back
- ③ LgcSct Address data: A logical sector address (Bytes 3-6 of Request Sense Standard Data [Information]) at the start point of error rate measurement is displayed.
- ④ Error rate data: Measured error rate value

\* Error rate values are displayed endlessly as far as playback is performed.

### A ■ ATA/ATAPI DEBUG OSD

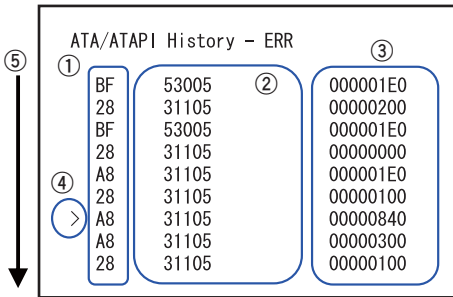
Press the ESC, DISP, then 3 keys, in that order, to display the 1st screen for ATA/ATAPI DEBUG OSD. Then press the DIG/ANA key to switch screens.

#### • 1st screen (ATA/ATAPI DEBUG OSD-Command history [ALL])



- ① Packet commands from the host (10 Bytes from the beginning are displayed.)
- ② Error data for the corresponding packet commands in the Status register  
If the error bit is 0: OK  
If the error bit is 1: Error code (Sense key, ASC, ASCQ)
- ③ This indicates the latest command log.
- ④ The first 9 command logs are listed, in descending order.  
If the number of logs exceeds 9, the subsequent log will overwrite the oldest (uppermost) log, and the same will follow as the logs are added.

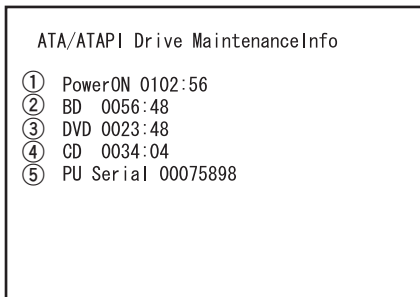
#### • 2nd screen (ATA/ATAPI DEBUG OSD-Command history [ERROR])



- ① The beginning (1 byte) of the packet command that was failed is indicated.
- ② Error code (Sense key, ASC, ASCQ)
- ③ The command-specific information (4 bytes) that was acquired by the Request Sense command is displayed.
- ④ This indicates the latest command log.
- ⑤ The first 9 command logs are listed, in descending order.  
If the number of logs exceeds 9, the subsequent log will overwrite the oldest (uppermost) log, and the same will follow as the logs are added.

The error log for the Test Unit Ready command will not be displayed as a command log.

#### • 3rd screen (ATA/ATAPI DEBUG OSD-Drive maintenance data)



- ① Accumulated power-on duration
- ② LD read power-on duration for the BD
- ③ LD read power-on duration for the DVD.
- ④ LD read power-on duration for the CD.
- ⑤ Serial No. of the PU

The power-on duration and error logs that the writer manages are displayed.

To update the display, press the SEARCH key of the remote control unit for service while this screen is being displayed.

## [How to acquire various data]

### • Commands for acquiring various durations of the drive

Use the LogSense command.

If "PKT:4D 00 70 00 00 00 00 00 20 00 00 00" is issued, the following data are stored in the Read buffer:

#### <How to read the data in the Read buffer>

Accumulated power-on duration of the drive: data [8]-[11] (Most Significant Byte: data [8], Least Significant Byte: data [11])

LD read power-on duration for the DVD : data [12]-[15] (Most Significant Byte: data [12], Least Significant Byte: data [15])

LD read power-on duration for the CD : data [20]-[23] (Most Significant Byte: data [20], Least Significant Byte: data [23])

LD read power-on duration for the BD : data [28]-[31] (Most Significant Byte: data [28], Least Significant Byte: data [31])

The unit for accumulated power-on duration is 2 minutes.

The format for duration indication is "hours:minutes."

### • Commands for acquiring the PU serial No.

Use the "Read Buffer" command.

If "PKT:3c 02 A0 00 \*\* \*\* 00 00 02 00 00" (\*\* \*\*: Read address) is issued, part of the PU serial number can be confirmed at data [0]/data [1] of the Read buffer. (Most Significant Byte: data [1], Least Significant Byte: data [0])

Enter the following address in the read address (\*\* \*\*) to acquire drive serial data:

Most Significant    Least Significant

Read address:        0x104,                0x106

Display the acquired serial No. in decimal notation.

[E.g.]

Acquiring data for 0x104:

PKT:3c 02 A0 00 01 04 00 00 02 00 00 00

data[1] = 0x00 , data[0] = 0x01

Acquiring data for 0x106:

PKT:3c 02 A0 00 01 06 00 00 02 00 00 00

data[1] = 0x28 , data[0] = 0x7A

PU serial No.: 0x0001287A → 00075898

### • 4th screen (ATA/ATAPI DEBUG OSD-Judgment of degradation of LDs)

ATA/ATAPI - LD Degrade	
BD	: 104 % OK
DVD	: 96 % OK
CD	: 101 % OK
TMP	: 41 °C

It is indicated to what extent the LDs (for BD, DVD, and CD) of the drive have degraded. To update the on-screen data, press the SEARCH key on the remote control unit for service while this screen is displayed. For details on the display content and updating conditions, see Table 1 below:

**Table 1: Display content and updating conditions**

Display Item	Display Content	Conditions for updating on-screen data by pressing the SEARCH key
BD	Judgment of degradation of the LD for BD. NG with a rate of 120% or higher	No disc in the disc tray
DVD	Judgment of degradation of the LD for DVD. NG with a rate of 120% or higher	No disc in the disc tray
CD	Judgment of degradation of the LD for CD. NG with a rate of 120% or higher	No disc in the disc tray
TMP	Current temperature inside the writer	No disc in the disc tray

## [How to acquire various data]

### • Command for measuring the LD degradation rate

Use the Write Buffer command.

After entering `btr[0] = 99` and `btr[1] = 50` to the Write Buffer, issue the "PKT:3b 02 e1 00 00 00 00 20 00 00 00" packet command.

### • Command for acquiring the LD degradation rate

Use the Read Buffer command.

When the "PKT:3c 02 e1 00 00 00 00 20 00 00 00" is issued, the following data are stored in the Read Buffer.

#### <How to read the Read Buffer>

CD degradation rate (%) : `data[15]/data[16]` (Most Significant Byte: `data[15]`, Least Significant Byte: `data[16]`)

DVD degradation rate (%) : `data[3]/data[4]` (Most Significant Byte: `data[3]`, Least Significant Byte: `data[4]`)

BD degradation rate (%) : `data[5]/data[6]` (Most Significant Byte: `data[5]`, Least Significant Byte: `data[6]`)

Current temperature : `data[7]/data[8]` (Most Significant Byte: `data[7]`, Least Significant Byte: `data[8]`)

Temperature at the time of CD adjustment : `data[17]/data[18]` (Most Significant Byte: `data[17]`, Least Significant Byte: `data[18]`)

Temperature at the time of DVD adjustment : `data[11]/data[12]` (Most Significant Byte: `data[11]`, Least Significant Byte: `data[12]`)

Temperature at the time of BD adjustment : `data[13]/data[14]` (Most Significant Byte: `data[13]`, Least Significant Byte: `data[14]`)

Temperature (°C) = Acquired temperature value x 0.25

Example: When the acquired temperature value is 64h: Temperature = 64h x 0.25 = 25 (°C)

The value for the LD degradation rate is that before correction. Perform temperature correction.

### • On temperature correction coefficient

CD 6%/10°C, DVD 8%/10°C, BD 10%/10°C

#### <How to correct the temperature>

##### BD

ATA/ATAPI - LD Degrade	
BD : 104 %	OK
DVD : 96 %	OK
CD : 101 %	OK
TMP : 41 °C	

$$\text{Coefficient A} = 1 + \frac{\text{Current temperature} - \text{Temperature at the time of BD adjustment}}{10} \times 0.1$$

Current temperature: To be acquired with the Read Buffer command (`data[7]/data[8]` × 0.25)  
 Temperature at the time of BD adjustment: To be acquired with the Read Buffer command (`data[13]/data[14]` × 0.25)

0.1 : BD temperature correction coefficient

- ① Degradation rate of the LD for BD = Degradation rate of BD/Coefficient A  
 Degradation rate of BD: To be acquired with the Read Buffer command (`data[5]/data[6]`)  
 ② OK/NG indication  
 OK: When the degradation rate of the LD for BD is less than 120%.  
 NG: When the degradation rate of the LD for BD is 120% or higher.

##### DVD

ATA/ATAPI - LD Degrade	
BD : 104 %	OK
DVD : 96 %	OK
CD : 101 %	OK
TMP : 41 °C	

$$\text{Coefficient B} = 1 + \frac{\text{Current temperature} - \text{Temperature at the time of DVD adjustment}}{10} \times 0.08$$

Current temperature: To be acquired with the Read Buffer command (`data[7]/data[8]` × 0.25)  
 Temperature at the time of DVD adjustment: To be acquired with the Read Buffer command (`data[11]/data[12]` × 0.25)

0.08 : DVD temperature correction coefficient

- ③ Degradation rate of the LD for DVD = Degradation rate of DVD/Coefficient B  
 Degradation rate of DVD: To be acquired with the Read Buffer command (`data[3]/data[4]`)  
 ④ OK/NG indication  
 OK: When the degradation rate of the LD for DVD is less than 120%.  
 NG: When the degradation rate of the LD for DVD is 120% or higher.

##### CD

ATA/ATAPI - LD Degrade	
BD : 104 %	OK
DVD : 96 %	OK
CD : 101 %	OK
TMP : 41 °C	

$$\text{Coefficient C} = 1 + \frac{\text{Current temperature} - \text{Temperature at the time of CD adjustment}}{10} \times 0.06$$

Current temperature: To be acquired with the Read Buffer command (`data[7]/data[8]` × 0.25)  
 Temperature at the time of CD adjustment: To be acquired with the Read Buffer command (`data[17]/data[18]` × 0.25)

0.06 : CD temperature correction coefficient

- ⑤ Degradation rate of the LD for CD = Degradation rate of CD/Coefficient C  
 Degradation rate of CD: To be acquired with the Read Buffer command (`data[15]/data[16]`)  
 ⑥ OK/NG indication  
 OK: When the degradation rate of the LD for CD is less than 120%.  
 NG: When the degradation rate of the LD for CD is 120% or higher.  
 ⑦ Current temperature: To be acquired with the Read Buffer command (`data[7]/data[8]`)

## ■ Indications for the Results of Self-Diagnosis

Self-diagnosis is performed upon startup of the product, and the results are displayed as shown below.  
For details on operation and description of the self-diagnosis function, see the specifications of "Self-Diagnosis Function."

### • Specifications of indications for the results of self-diagnosis

Result of Self-Diagnostic	
①	SKY Chip Info : 2.00
②	HDMI Transmitter : OK
③	SUBCON : OK
④	PLL Synthesizer : OK
⑤	DRIVE : PIONEER BD-RW BDV-102X OK

- ① SKY Chip Info: Version and revision Nos. of the SKY Chip
- ② HDMI Transmitter: Result of checking communications with the SII9134CTU
- ③ SUBCON: Result of checking communications with the LC87F5932A
- ④ PLL Synthesizer: Result of checking communications with the CDCE906
- ⑤ DRIVE: Result of checking communications with the BD drive