



VA-1809 Utility Software

Instruction Manual

Ver.1.0



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2007.1

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Introduction

Thank you very much for purchasing the HDMI Protocol Analyzer.

VA-1809 UTILITY SOFT (hereafter referred to as UTILITY) is the program that edits / creates the data for HDMI protocol analyzer (hereafter referred to as VA-1809) and then transmits and receives it. (The figures in this manual are only for VA-1809 connection, and for connections with other VA-1809 series, the figures may be different. Refer to Help for the respective editing programs. The basic operation methods for all VA-1809 connections are the same.)

This document describes only the handling method of UTILITY. For details such as specific setting items or values etc., refer to Help of UTILITY.

After referring to the manual, ensure that it is stored safely for future reference.

SAFETY PRECAUTIONS

WARNING

⦿ About foreign matters

- Do not spill liquids or drop inflammable objects or metal parts into it. Operating the device under these conditions may cause fire, electric shocks and malfunctioning.

CAUTION

⦿ About installation and operation locations

- Install on firm surface.
- While mounting, first turn off the power supply of the computer and then remove the power cord.

⦿ About impacts

- Any impact on the precision instrument may cause malfunctioning. Take special care when moving it.

1

UTILITY

1.1. Outline

UTILITY is the application software for operating VA-1809 on Windows.

EDID and CEC CDF set in VA-1809 are obtained, and new data can be created, saved and read by changing the setting of VA-1809.

In addition, it is possible to monitor signal information received by VA-1890 and CEC line, and to edit CEC data to be transmitted from VA-1809.

All operations can be executed on the PC and the created data can also be stored in file format.

1.2. Features

1.2.1 Windows-compatible software

Data can be edited and executed in Windows.

1.2.2 Highly flexible and easy data management function

Each timing and pattern data are independently set as files.

Data can be easily managed by using List View, Sort function and Naming function etc.

1.3. Software Installation

Here, the installation method of file that is used to operate the UTILITY on Windows is explained. However, this explanation is according to the disc given below.

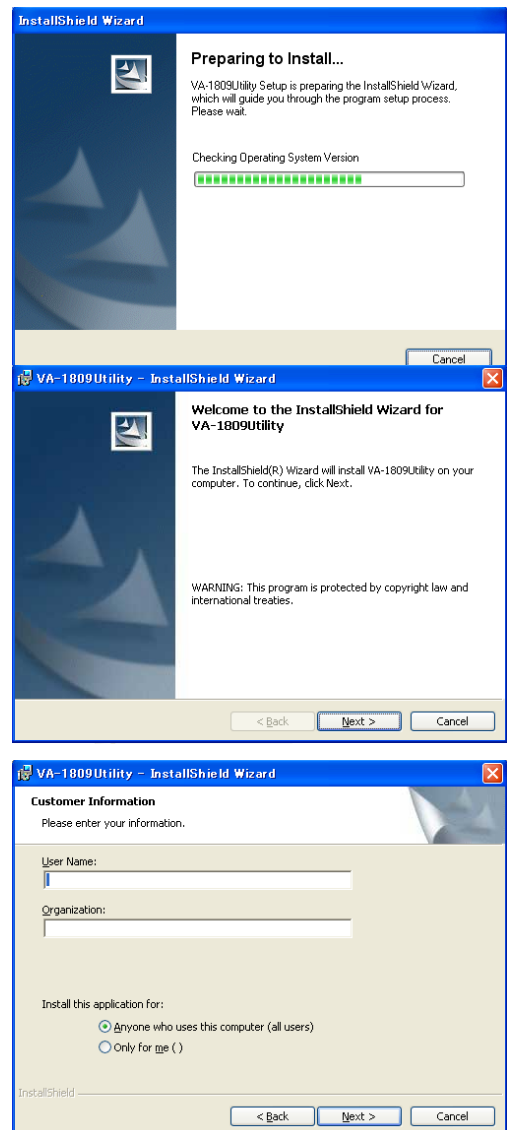
Windows version UTILITY installation disc CD 1

1.3.1. UTILITY Installation

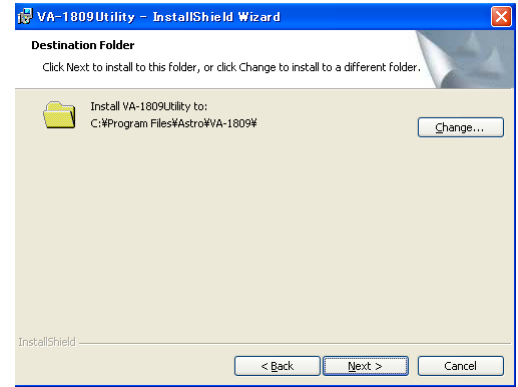
① Set the UTILITY installation disc CD in CD drive and select [Start]-[Setting]-[Control Panel]-[Add and Remove Application]-[Install]. Installer is activated and setup is run.

② First, "Welcome" dialog is displayed. Click the [Next] button to proceed to the next step in the setup, and the [Back] button to return to the previous step. Click the [Cancel] button to stop the setup. Click the [Next] button.

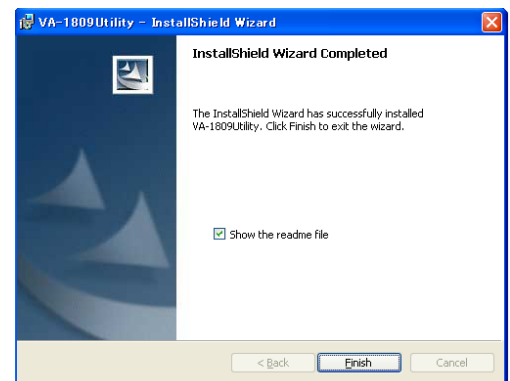
③ User information is registered in "User information" dialog. User who uses the User name, Affiliation and UTILITY can be changed. Click the [Next] button after setting.



④ Destination folder for installation can be changed in the [Select Destination folder] dialog. Press the [Change] button and select the folder. After setting, the File Installation dialog is displayed when the [Next] button is clicked, and installation begins when the [Install] button is pressed.



⑥ Here, the setup is completed. Press the [Finish] button.



⑧ Here, installation is completed. Start by using [Start] - [Program] - [VA-1809 Utility] of Windows.

1.3.2. Uninstallation Method

Select [Start] – [Setting] – [Control Panel] – [Add and Remove Application] of Windows and delete according to the instructions on screen.

To reinstall and upgrade, uninstall by deleting the file and the registry settings.



2

Operation Methods

2.1. Outline

“VA-1809 Utility” is started as a basic operation wherein data is created and edited, transmitted from and received by VA-1809, and the created data is saved.

2.2. UTILITY Start-up

① Select “Start” - “Program” - “VA-1809 UTILITY”.

※ Read the version information and CEC license of VA-1809 at the time of UTILITY start-up. Here, warning message is displayed when versions of UTILITY and VA-1809 are not compatible with each other.

When warning message is displayed, upgrade VA-1809.

※ At the time of UTILITY start-up, if CEC license cannot be obtained due to reasons such as VA-1809 is not powered on, CEC and CEC CDF cannot be set. Start the UTILITY once again after revising the communication settings.

※ Setting items of CEC and CEC CDF in VA-1809 comply with “HDMI Specification Version 1.2a”.

※ GUI display of EDID complies with “CEA Standard CEA-861-C”.

2.3. Closing UTILITY

Click the [Close] button.

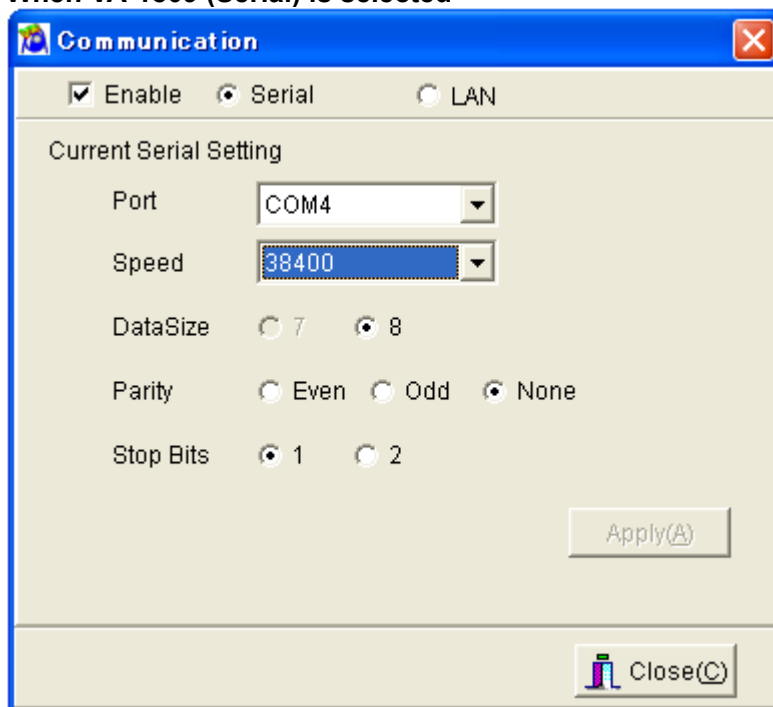
2.4. Environment Settings

2.4.1. Start-up Method

Click [Tool] - [Communication] button of "VA-1809 UTILITY".

2.4.2. Communication Setting Method

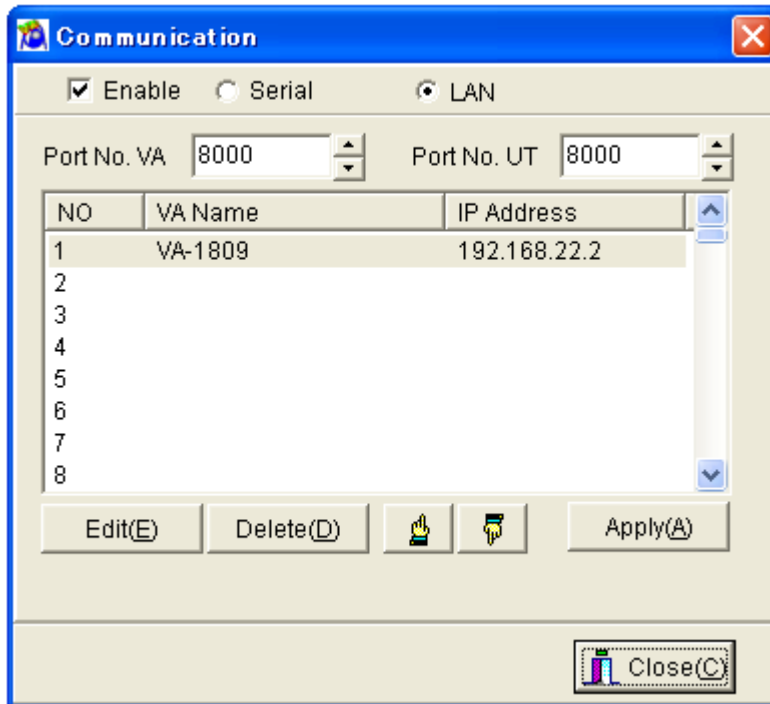
When VA-1809 (Serial) is selected



Selection of communication method

Items	Details
Enable	Enables the communication and also the settings of PCs, VA-1809(Serial), VA-1809(LAN).
VA-1809(Serial)	Select the RS-232C as a communication method.
VA-1809(LAN)	Select the LAN as a communication method.
Port	Select the port number.
Speed	Select the communication speed from 9600/19200/38400/57600/115200.
DataSize	Select the communication data size. (Fixed 8bits)
Parity	Select the Parity from Even/Odd/None.
Stop Bits	Select the Stop Bits from 1/2.
Apply	Enables the communication settings.

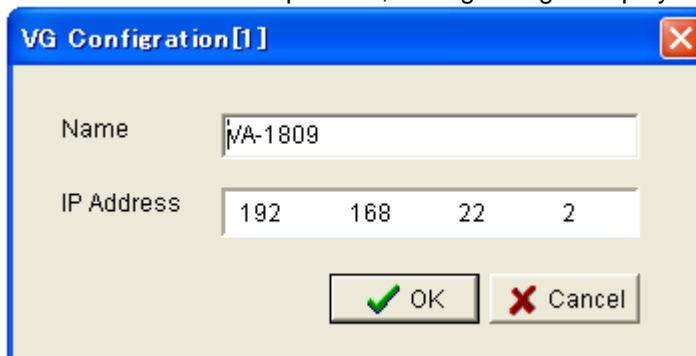
When VA-1809 (LAN) is selected



Items	Details
Port No. VA-1809	Set the port number of VA-1809 side. Default value is set to 8000. (※1)
Port No. UT	Set the port number of Utility side. Default value is set to 8000. (※1)
Edit Button	Displays the IP address setting dialog.
Delete Button	Deletes the settings selected in the list.
Apply	Enables the communication settings.

※1 Use the default value of port number. When the default value cannot be used due to the network to be connected, change the port number.

When the Edit button is pressed, setting dialog is displayed as follows.



Items	Details
Name	Displays name of the communication.
IP Address	Displays the IP address.

2.5. Creating and Editing the EDID data

This is the EDID (Extended Display Identification Data) editor.

In case of many editors having HEX-based editing function, huge amount of SINK equipment-related ID data loaded in VA-1809 is classified into categories or types according to the screen that focuses on GUI-based visibility. Moreover, the settings can also be easily edited because of the selection pattern of the settings.

This reduces the operation time and user's stress.

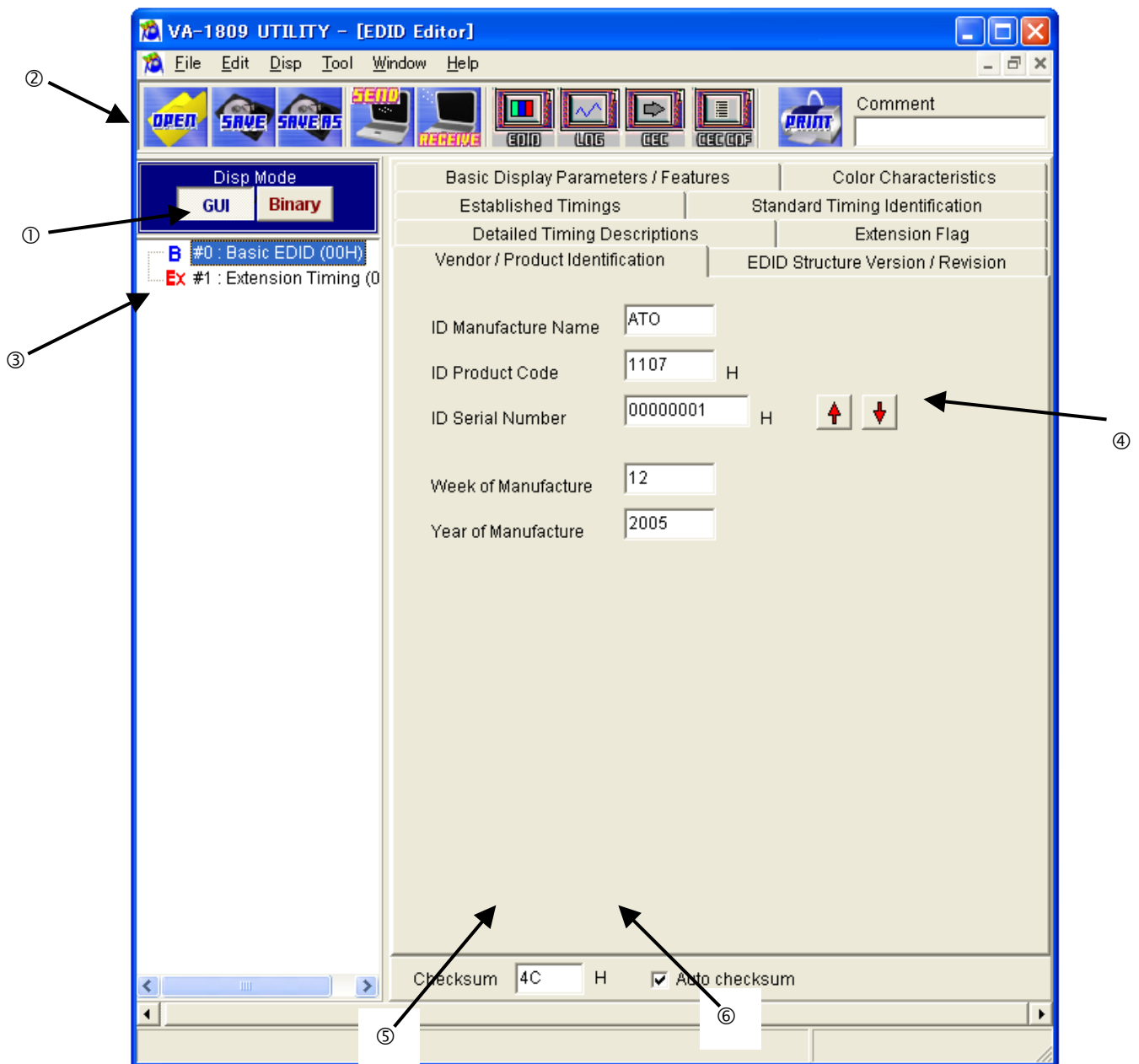
The files on the PC as well as the files in VA-1809 can be directly edited.

Text files for reference can also be generated along with the EDID binary files.

2. 5.1. Start-up Method

Select the [EDID] button.

2. 5.2. Window screen and names



No.	Item names	Details
①	DispMode switching	<p>Toggles between GUI display mode and HEX display mode.</p> <ul style="list-style-type: none"> ▪ GUI Display mode Depending on block type, the data is displayed on the screen that is easily viewable in graphical format. Moreover, it is displayed in the hexadecimal format for the unsupported block type. ▪ HEX Display mode The data is displayed in hexadecimal format of 128 bytes.
②	Tool bar	<ul style="list-style-type: none"> ▪ Open: Opens the EDID data files. ▪ Save: Overwrites EDID data in the file. ▪ Save As: Saves the EDID data in the file. ▪ Send: Sends the EDID data that is being edited to VA-1809. ▪ Receive: Receives the EDID data from VA-1809. ▪ Print: Prints the EDID data. ▪ Comment: The comment can be inserted in EDID data.
③	Block type list	The block type list is displayed and block number/block type (Block code of first byte) is displayed for each block.
④	Data display	Block data selected from block type list on the left is displayed.
⑤	Checksum	<p>Checksum value is displayed.</p> <p>Checksum is the value of the last byte of the block.</p> <p>When Checksum Auto-calculation is selected, it is updated automatically whenever data is updated.</p>
⑥	Checksum auto-calculation	When it is selected, the checksum value is updated automatically whenever data is updated. ※

※ When the device is connected to the output side of VA-1809, the Physical Address is automatically updated. In this case, if check mark is not inserted in AUTO CHECKSUM function of VA-1809, an error may occur in EDID checksum. When the device is connected to the output side, insert check mark in EDID AUTO CHECKSUM of **SETUP** SETUP MENU→**F2** CONFIG SETUP→**F1** PAGE2.

2. 5.3. Menu

■ [File] Menu

Menu command	Function
New	Creates the new data.
Open	Opens the file.
Save	Saves the data in the file.
Save As	Saves the data with a different file name.
Close	Closes the file.
Properties	Displays the file properties.
Print	Prints the displayed data.
Exit EDID Editor	Terminates the program.

■ [Edit] Menu

Menu command	Function
Insert-up Block	Inserts the new block up.
Insert-down Block	Inserts the new block down.
Delete Block	Deletes the block.
Copy Block	Copies the block.
Move Block	Moves the block.
Change Block Type	Changes the block type.

■ [Disp] Menu

Menu command	Function
Binary Byte (1 byte)	Delimiter after each byte in case of HEX display.
binary Short (2 byte)	Delimiter after every 2 bytes in case of HEX display.
Binary Long (4 byte)	Delimiter after every 4 bytes in case of HEX display.

■ [Help] Menu

Menu command	Function
Contents	Displays Help.
Index	Help topic can be searched.
About	Displays the version information.

2. 5.4. Operation Methods

(1) Creating the new EDID data

- ① Click [New] on the [File] menu.

Selection dialog of number of blocks to be created is displayed.

- ② Select the number of created blocks and press the OK button. Specified number of blocks is created. Default value of data is all 0.

× Block numbers can be changed even after new creation.

(2) Opening the file

Saved file is opened and EDID data is read.



- ① Select the [Open] menu on the [File] menu, or the button from Tool buttons.

- ② Select EDI file format or DDC file format.

File structure consists of EDI file having text format and DDC file having binary format.

- ③ Select the file and press the OK button.

- ④ Selected file is opened and EDID data is displayed.

(3) Editing the EDID data

First, the block type is determined and then the data is edited.

- ① Fix the block type. Click the [Change Block Type] on the [Edit] menu after selecting the block to be edited. Select Block Type dialog is displayed. Select the targeted block type and press the OK button.

- ② In case of GUI display mode, switch the display pattern according to the block type.

In case of binary display mode, dump of 128 bytes is displayed.

(5) Saving the file

The displayed data is saved in the file.

Select EDI file format or DDC file format.

File structure consists of EDI file having text format and DDC file having binary format.

- ① The data is overwritten in the selected file when the [Save] menu on the [File] menu is selected, or when the



button is selected from Tool buttons.



- ② File selection dialog is displayed when the [Save As] menu on the [File] menu is selected, or when the button is selected from Tool buttons. Enter the file name and press the OK button. Save the displayed characters in a new file.

(6) Transmission to monitor

EDID data is written to VA-1809.



- ① Transmission dialog is displayed when the  button is selected from Tool buttons.

(7) Reception from monitor

EDID data is read from VA-1809.




- ① Received EDID data is displayed when the  button is selected from Tool buttons.

(9) EDID data printing

The displayed EDID data is printed in binary format.



- ① Select the [Print] menu on the [File] menu, or select the  button from Tool buttons.
- ② Print dialog is displayed. Here, the block number and margin (space) to be printed are set.
- ③ When the OK button is pressed, the displayed EDID data is printed in the binary format.
- ④ Select the Set Printer... button to change the Printer that is set.
- ⑤ Setting dialog of printer is displayed.

2.5.5. Block Operation

■ Insert-up block

Click on the block immediately below the position where it is to be inserted.
Click [Insert-up Block] on the [Edit] menu.

■ Insert-down block

Click on the block immediately above the position where it is to be inserted.
Click [Insert-down Block] on the [Edit] menu.

■ Delete block

Click on the block to be deleted.
Click [Delete Block] on the [Edit] menu.

■ Copy block

Click on the block to be copied.
Click [Copy Block] on the [Edit] menu.

■ Move block

Click on the block to be moved.
Click [Move Block] on the [Edit] menu.

■ Change block type

Click on the block whose type is to be changed.
Click [Change Block Type] on the [Edit] menu.

2.6. LOG

This is the UTILITY software that handles the recorded log data that is triggered from VA-1809.

If the Data Search function or Narrow-down function in this software is used, the time required for confirming the status and detecting the errors in SOURCE and SINK is reduced.

Since conversion is possible in CSV files, it can also be read in Spreadsheet software and Database software. Moreover, it is also convenient to create the Trend Graph or Log.

2.6.1. Start-up Methods

Select the [LOG] button.

2.6.2. Window screen and name

VA-1809 UTILITY - [LOG]

File Log Tool Window Help

OPEN SAVE SAVE AS LOG LOG GO LOG CEC CEC CEC CEC PRINT

Comment

CATEGORY SEARCH STRINGS SEARCH FOCUS ALLDISP

Ver	Count	Time	InputSync	DataMode	AV MUTE	Input Mode	HDCP	Hot F
4.00	1	25329ms(0h0m25s329m; In Sync	In Sync	GUI	UnMute	DVI	Off	Low
	2	58986ms(0h0m58s986m; In Sync	In Sync	GUI	UnMute	DVI	Off	Low
	3	59456ms(0h0m59s456m; In Sync	In Sync	GUI	UnMute	DVI	Off	Low
	4	65218ms(0h1m5s218ms)	In Sync	GUI	UnMute	DVI	Off	Low

① ② ③ ④

No.	Item name	Details
①	Tool bar	<ul style="list-style-type: none"> ▪ Open: Opens the LOG data file. ▪ Save: Overwrites the LOG data in the file. ▪ Save As: Saves LOG data in the file. ▪ LOG START: Starts the LOG acquisition. ▪ LOG STOP: Stops the LOG acquisition.
②	CATEGORY	Sets the category to be FOCUSED.
③	SEARCH STRINGS	Sets the character string to be searched.
④	DISP MODE	<ul style="list-style-type: none"> ▪ SEARCH: Searches the character string set in SEARCH STRINGS from the LOG. ▪ FOCUS: Displays only the items set in CATEGORY. ▪ ALL DISP: Displays all the data.

2.6.3. Menu

■ [File] Menu

Menu command	Function
Open	Opens the LOG.
Save	Saves LOG in the file.
Save As	Saves the LOG file with a different name.
CVS	Changes the LOG file name and saves it in the CVS format.
Print	Prints the LOG data.
Exit EDID Editor	Terminates the program.

■ [LOG] Menu

Menu command	Function
Start Logging Only in PC	Starts the LOG data acquisition. (Only Utility)
Start Logging in PC And VA	Starts the LOG data acquisition. (Card inserted in Utility and VA-1809)
End Logging	Stops the LOG data acquisition.


2.6.4. Operation Method

(1) LOG monitor

Displays the LOG data.

LOG data acquisition is started for Utility, when the [Start Logging Only in PC] menu on the [File] menu is




selected, or when the  button is selected from Tool buttons.


LOG data acquisition is started for the card inserted in Utility and VA-1809, when [Start Logging in PC and VA] menu is selected on [File] menu.


LOG data is acquired for the fixed period when [End Logging] menu is selected on [File] menu, or until



 button is selected from Tool buttons.

③ Character strings set in SEARCH STRINGS are searched when  is clicked.


④ Only the items set in CATEGORY are searched when  is clicked.

⑤ Entire LOG data is displayed when  is clicked.

(2) Opening the file

Saved file is opened and displayed.



① Select the [Open] menu on the [File] menu, or select the  button from Tool buttons.


② Select the file and click the OK button.


③ Selected file is opened and LOG is displayed.

(3) Saving the file

Displayed data is saved in the file.



① Data is overwritten in the selected file when the [Save] menu on the [File] menu is selected, or when the  button is selected from Tool buttons.

② Selection dialog of file is displayed when the [Save As] menu on the [File] menu is selected, or when the  button is selected from Tool buttons. Enter the file name and click the OK button. The displayed LOG is saved in the new file.

③ Selection dialog of file is displayed when the [CVS] menu on the [File] menu is selected. Enter the file name and click the OK button. The displayed LOG is saved in the new file having CVS format.

2.7. CEC Monitoring and Transmission

It is the CEC communicating monitor-tool of HDMI standards.

SINK device can be controlled through VA-1809 by using this command.

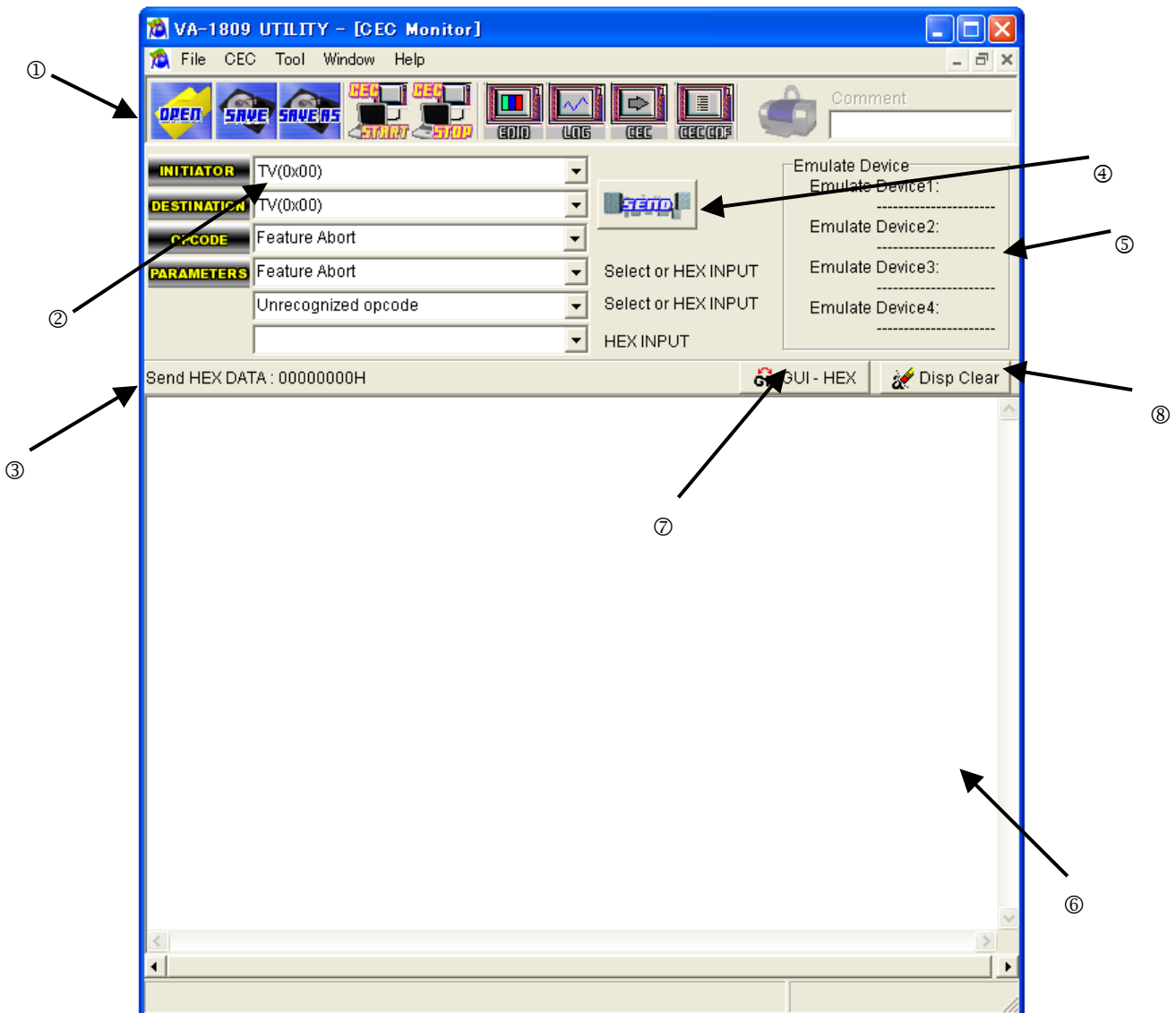
It is expected that the number of compatible devices will gradually go on increasing. It is a convenient tool to load CEC function for developing HDMI products, or to check the communication with CEC-compatible devices.

Command line (Command transmission) is entered or response is displayed.

2.7.1. Start-up method

Click the [CEC] button.

2.7.2. Window screen and name



No.	Item name	Details
①	Toolbar	<ul style="list-style-type: none"> ▪ Open: Opens the CEC SEND data file. ▪ Save: Overwrites CEC SEND data in the file. ▪ Save As: Saves CEC SEND data in the file. ▪ CEC START: Starts the CEC monitor. ▪ CEC STOP: Stops the CEC monitor.
②	CEC SEND DATA	<ul style="list-style-type: none"> ▪ INITIATOR: Sets the INITIATOR of CEC SEND DATA. ※1 ▪ DESTINATION: Sets the DESTINATION of CEC SEND DATA. ▪ OP CODE: Sets the OP CODE of CEC SEND DATA. ▪ PARAMETORS: Sets the PARAMETOR of CEC SEND DATA.
③	SEND HEX DATA	Displays the data set in CEC SEND DATA in the HEX format.
④	SEND	Sends the data set in CEC SEND DATA from VA-1809.
⑤	EMULATE DEVICE	Displays the device that is being emulated by current VA-1809. ※2
⑥	CEC Monitor	Displays the information wherein CEC line is monitored.
⑦	GUI HEX display switching	Toggles between GUI and HEX for the display of CEC monitor.
⑧	DISP CLEAR	Clears the display of CEC monitor.

※1 This device is not emulated by VA-1809.

※2 It is the Emulate Device that is set by Utility. The Utility display and Emulate Device may differ if the settings in VA-1809 are changed.

2.7.3. Menu

■ [File] menu

Menu command	Function
Open	Opens the CEC SEND DATA.
Save	Saves CEC SEND DATA in the file.
Save As	Saves CEC SEND DATA with a different file name.
Exit EDID Editor	Terminates the program.

■ [CEC] menu

Menu command	Function
Start Data Request	Starts monitoring the CEC data.
Stop Data Request	Stops monitoring the CEC data.
Disp Clear	Clears the CEC monitor display.
GUI - HEX	Toggles the CEC monitor display between GUI and HEX.
Send File	Sends the sequence file.
Send File Again	Sends the previously read sequence file again.
Cancel File Sequence	Cancel the sequence file during current execution.
Set Emulate Device	Sets the Emulate Device.
Response Edit	Sets the response.

2.7.4. Operation Methods

(1) Editing the CEC SEND DATA

Click each combo box of [CEC SEND DATA] to select the data.


The items corresponding to OP CODE are displayed in PARAMETERS.

Moreover, HEX or character string can also be entered in OP CODE and PARAMETERS.

(2) Opening the file

Saved CEC SEND DATA file is opened and CEC SEND DATA is read.



① Select the [Open] menu on the [File] menu, or select the  button from Tool buttons.


② Select the file and press the OK button.

③ Selected file is opened and CEC SEND DATA is displayed.


(3) Saving the file

Displayed data is saved in the file.



① The data is overwritten in the selected file when the [Save] menu is selected on the [File] menu, or when  button is selected from Tool buttons.




② File selection dialog is displayed when the [Save As] menu is selected on the [File] menu, or when  button is selected from Tool buttons. Enter the file name and press the OK button. Data is saved in the new file.


(4) CEC monitors


Acquired CEC data is displayed by VA-1809.



CEC data acquisition is started by VA-1809 when  button is selected from Tool buttons.



CEC data is acquired from VA-1809 for a fixed period, until  button is selected from Tool buttons.

③ Display of CEC data switches between HEX and GUI when  button is selected.

④ Display of CEC data is cleared when  button is selected.

(5) Transmission of CEC SEND DATA

CEC SEND DATA is transmitted from VA-1809.



① CEC SEND DATA that is displayed currently is transmitted when button is selected.

② Transmission sequence set in the file can be transmitted when Send File button on CEC menu is selected.

Moreover, previous sending sequence can be sent when Send File Again is selected.

The structure of Send File is as follows.

Command	Details
[CMD]	CEC DATA to be transmitted
[INT]	Transmission and transmission intervals (ms)
;	After comment

- × The intervals set in [INT] are the intervals that execute the transmission commands in VA-1809.
- × Maximum interval is of 9999ms.
- × Some errors may occur while transmitting the command by VA-1809.

(Example)

[CMD] 10 04 ; [CMD] "Recording Device to TV" "Image View ON" are to be sent

[INT] 1000

[CMD] 1F 82 11,00 ; [CMD] "Recording Device to Broadcast Active Source [1.1.0.0]" are to be sent

- × Refer to the ¥data¥CecSendFileJpn.txt for detailed format.
- × Set the file extension as ".csd".

(6) Emulate device settings

Emulating device is set in VA-1809.

Select the [Set Emulate Device] menu on the [CEC] menu.



Maximum 4 devices can be emulated.

Select the device number that is to be set from combo box①.

When check box② is selected, setting of logical address of device number is enabled.

Logical address to be acquired from radio button and check box③ is set.

In case of Direct Set, even if other devices have acquired the specified logical addresses already, the same logical addresses are acquired forcibly.

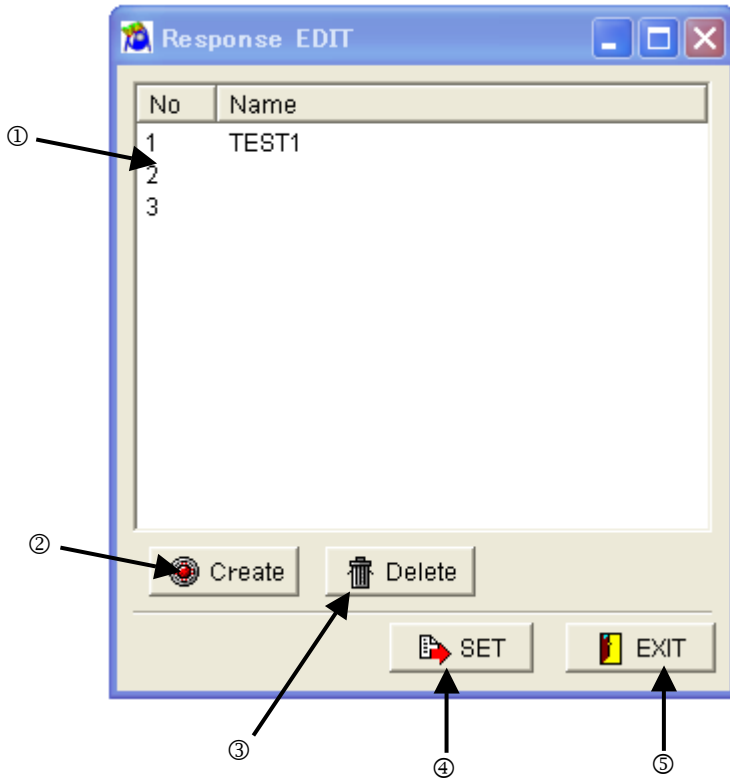
In case of Auto Set, the logical address that can be acquired from device types is acquired.

When the OK button is pressed, the setting is transmitted to VA-1809 and logical address is acquired.

(7) Response settings

When VA-1809 receives the specific command, the settings for returning or not returning the response can be performed.

Select the [Response Edit] menu on the [CEC] menu.



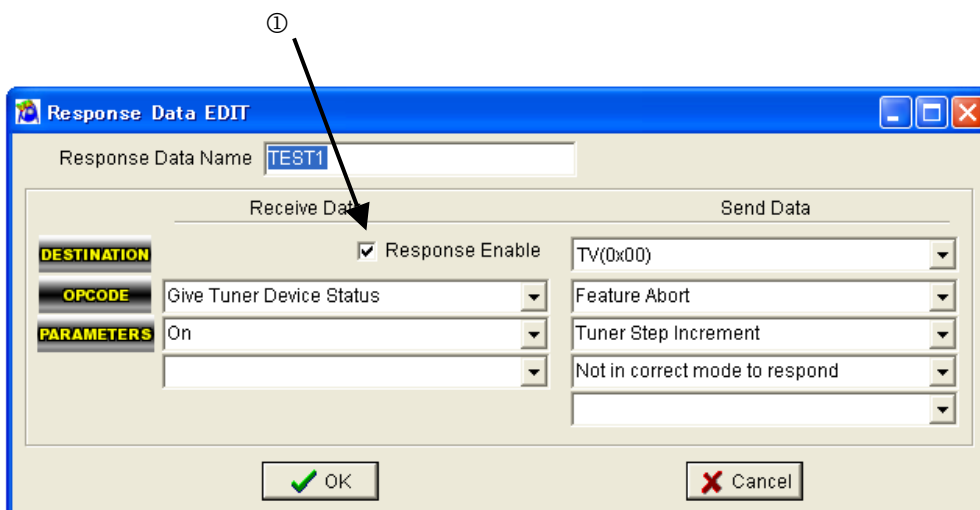
Currently set data is displayed. When each data is double-clicked, the detailed setting form is opened. Maximum 10 settings can be done.

When this is clicked, data settings are created. Maximum 10 data settings can be created.

When this is clicked, the selected settings are cleared.

When this is clicked, the data that is set earlier is set in VA-1809.

When this is clicked, the Response EDIT screen is closed without executing the settings in VA-1809.



When a check mark is entered in check box①, the data set in Send Data is transmitted in response to the Destination, when the data

corresponding to Receive Data is received.

Moreover, when check mark is not inserted, the data corresponding to the Receive Data is not transmitted even though it is received.

2.8. CEC CDF

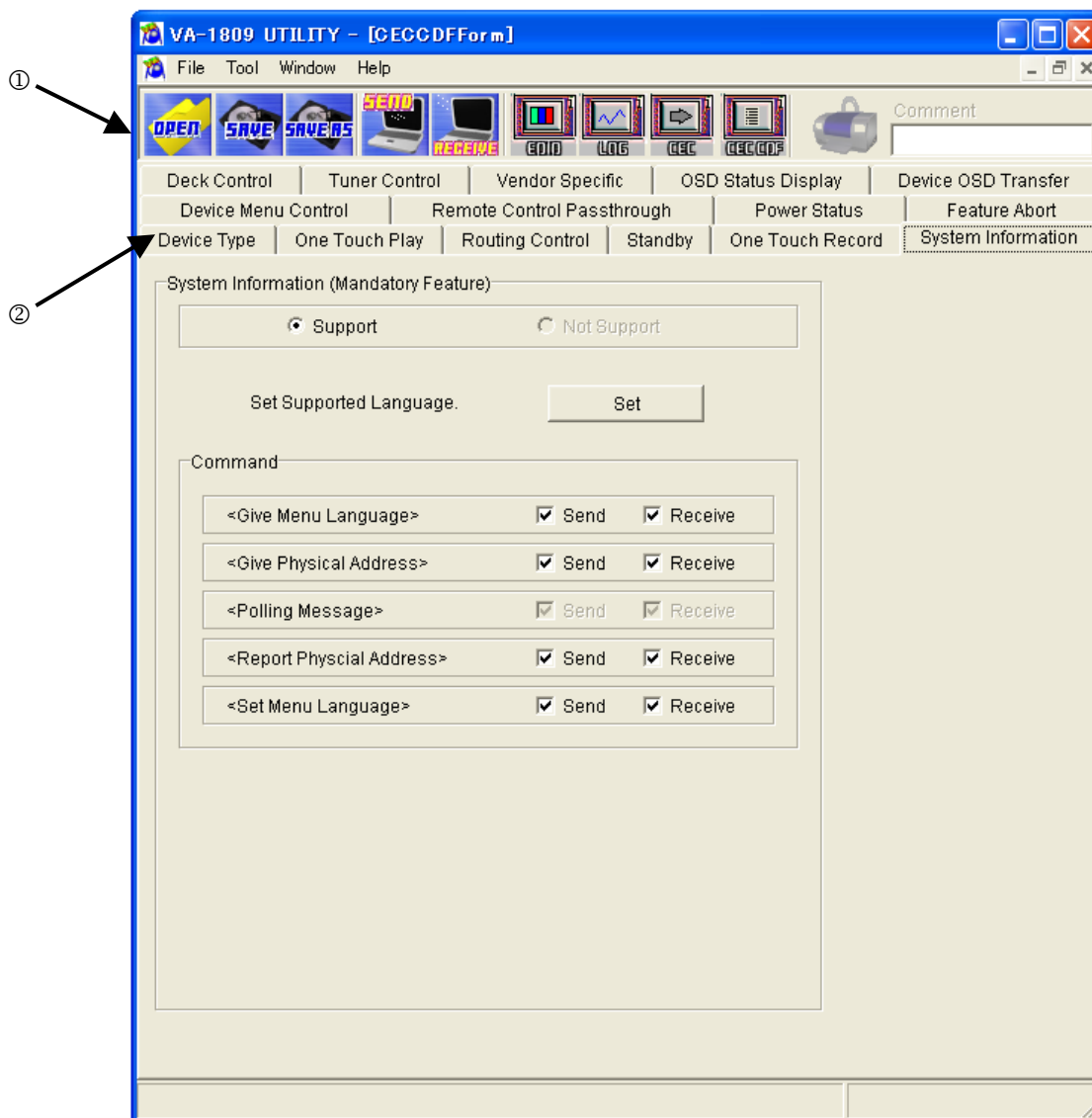
This function sets the CEC Compliance Test Capabilities Declaration Form.

CEC CDF that is set in VA-1809 can be received, and can be sent again to VA-1809 after modifying and correcting the data.

2.8.1. Startup Method

Click the [CEC CDF] button.

2.8.2. Window Screen and Name



No.	Item name	Details
①	Tool bar	<ul style="list-style-type: none"> ▪ Open: Opens CEC SEND data file. ▪ Save: Overwrites CEC SEND data in the file. ▪ Save As: Saves CEC SEND data in the file. ▪ SEND: Sets CEC CDF data in VA-1809. ▪ RECEIVE: Loads the CEC CDF data from VA-1809.
②	Features	The setting items are separated into the tags of each function. Select the function that performs settings.

2.8.3. Setting Items

The items to be set for CEC CDF are as follows.

● Device Type / CEC Features / CECMessages Supported

Items	Option
Device Type	Standard TV / TV with an HDMI Output / Recording Device / STB / DVD / Audio System / CEC Switch
CEC Features	
CEC Message	
One Touch Play	(Mandatory Feature)
Can DUT be brought out of Standby?	Support Yes / No
-> Does DUT (TV) have an internal source?	
-> Does DUT (TV) have a text mode?	
Active Source	Send Support Yes / No Receive Support Yes / No
Image View On	
Text View On	
Routing Control	(Mandatory Feature)
Request Active Source	Send Support Yes / No Receive Support Yes / No
Routing Change	
Routing Information	
Set Stream Path	
Standby	(Mandatory Feature)
Standby	Send Support Yes / No Receive Support Yes / No

CEC Features		Option
	CEC Message	
One Touch Record		Support Yes / No
	-> Does DUT (TV) have an internal source?	Support Yes / No
	Record Off	Send Support Yes / No Receive Support Yes / No
	Record On	
	Record Status	
	Record TV Screen	
System Information		(Mandatory Feature)
	-> Language Supported	
	Give Menu language	Send Support Yes / No Receive Support Yes / No
	Give Physical Address	
	Polling Message	
	Report Physical Address	
	Set Menu Language	
Deck Control		Support Yes / No
	Deck Control	Send Support Yes / No Receive Support Yes / No
	Deck Control [Skip Forward / Wind Forward]	
	Deck Control [Skip Backward / Rewind]	
	Deck Control [Stop]	
	Deck Status	
	Give Deck Status	
	Give Deck Status [Once]	
	Play	
	Play [Play Forward]	
	Play [Play Reverse]	
	Play [Play Still]	
	Play [Scan Forward Min speed]	
	Play [Scan Forward Medium speed]	
	Play [Scan Forward Max speed]	
	Play [Scan Reverse Min speed]	
	Play [Scan Reverse Medium speed]	
	Play [Scan Reverse Max speed]	
	Play [Slow Forward Min speed]	
	Play [Slow Forward Medium speed]	
	Play [Slow Forward Max speed]	
	Play [Slow Reverse Min speed]	
	Play [Slow Reverse Medium speed]	
	Play [Slow Reverse Max speed]	

CEC Features		Option
	CEC Message	
Tuner Control		Support Yes / No
	-> Which [Digital Broadcast System] does DUT support1?	
	-> Which [Digital Broadcast System] does DUT support2?	
	-> Does DUT have typical [ARIB (or ATSC or DVB) data1]?	
	-> Does DUT have typical [ARIB (or ATSC or DVB) data2]?	
	Give Tuner Device Status	
	Select Digital Service	
	Tuner Device Status	Send Support Yes / No
	Tuner Step Decrement	Receive Support Yes / No
	Tuner Step Increment	
Vendor Specific		Support Yes / No
	Device Vendor ID	
	Give Device Vendor ID	
	Vendor Command	Send Support Yes / No
	Vendor Remote Button Down	Receive Support Yes / No
	Vendor Remote Button Up	
	-> Vendor ID used by the DUT	
OSD Status Display		Support Yes / No
	Set OSD String	Send Support Yes / No
		Receive Support Yes / No
Device OSD Transfer		Support Yes / No
	Give OSD Name	Send Support Yes / No
	Set OSD Name	Receive Support Yes / No
	-> Device OSD Name	
Device Menu Control		Support Yes / No
	Menu Request	Send Support Yes / No
	Menu Status	Receive Support Yes / No
Remote Control Passthrough		Support Yes / No
	User Control Pressed	Send Support Yes / No
	User Control Released	Receive Support Yes / No
	-> Supported Operation Ids as Initiator?	
	-> Supported Operation Ids as Follower?	
Power Status		Support Yes / No
	Give Device Power Status	Send Support Yes / No
	Report Device Power Status	Receive Support Yes / No

● UI Command Set

Select	Up	Down	Left
Right	Right-Up	Right-Down	Left-Up
Left-Down	Root Menu	Setup Menu	Contents Menu
Favorite Menu	Exit	Reserved (0x0E)	Reserved (0x0F)
Reserved (0x10)	Reserved (0x11)	Reserved (0x12)	Reserved (0x13)
Reserved (0x14)	Reserved (0x15)	Reserved (0x16)	Reserved (0x17)
Reserved (0x18)	Reserved (0x19)	Reserved (0x1A)	Reserved (0x1B)
Reserved (0x1C)	Reserved (0x1D)	Reserved (0x1E)	Reserved (0x1F)
Numbers 0	Numbers 1	Numbers 2	Numbers 3
Numbers 4	Numbers 5	Numbers 6	Numbers 7
Numbers 8	Numbers 9	Dot	Enter
Clear	Reserved (0x2D)	Reserved (0x2E)	Reserved (0x2F)
Channel Up	Channel Down	Previous Channel	Sound Select
Input Select	Display Information	Help	Page Up
Page Down	Reserved (0x39)	Reserved (0x3A)	Reserved (0x3B)
Reserved (0x3C)	Reserved (0x3D)	Reserved (0x3E)	Reserved (0x3F)
Power	Volume Up	Volume Down	Mute
Play	Stop	Pause	Record
Rewind	Fast forward	Eject	Forward
Backward	Reserved (0x4D)	Reserved (0x4E)	Reserved (0x4F)
Angle	Sub picture	Reserved (0x52)	Reserved (0x53)
Reserved (0x54)	Reserved (0x55)	Reserved (0x56)	Reserved (0x57)
Reserved (0x58)	Reserved (0x59)	Reserved (0x5A)	Reserved (0x5B)
Reserved (0x5C)	Reserved (0x5D)	Reserved (0x5E)	Reserved (0x5F)
Play Function	Pause-Play Function	Record Function	Pause-Record Function
Stop Function	Mute Function	Restore Volume Function	Tune Function
Select Disk Function	Select A/V Input Function	Select Audio Input Function	Reserved (0x6B)
Reserved (0x6C)	Reserved (0x6D)	Reserved (0x6E)	Reserved (0x6F)
Reserved (0x70)	F1 (Blue)	F2 (Red)	F3 (Green)
F4 (Yellow)	F5	Reserved (0x76)	Reserved (0x77)
Reserved (0x78)	Reserved (0x79)	Reserved (0x7A)	Reserved (0x7B)
Reserved (0x7C)			

● LANGUAGE SET

Code	Language	Code	Language
aar	Afar	abk	Abkhazian
ace	Achinese	ach	Acoli
ada	Adangme	ady	Adyghe; Adygei
afa	Afro-Asiatic (Other)	afh	Afrihili
afr	Afrikaans	ain	Ainu
aka	Akan	akk	Akkadian
alb (sqi)	Albanian	ale	Aleut
alg	Algonquian languages	alt	Southern Altai
amh	Amharic	ang	English, Old (ca.450-1100)
anp	Angika	apa	Apache languages
ara	Arabic	arc	Aramaic
arg	Aragonese	arm (hye)	Armenian
arn	Araucanian	arp	Arapaho
art	Artificial (Other)	arw	Arawak
asm	Assamese	ast	Asturian; Bable
ath	Athapascan languages	aus	Australian languages
ava	Avaric	ave	Avestan
awa	Awadhi	aym	Aymara
aze	Azerbaijani		

bad	Banda	bai	Bamileke languages
bak	Bashkir	bal	Baluchi
bam	Bambara	ban	Balinese
baq (eus)	Basque	bas	Basa
bat	Baltic (Other)	bej	Beja
bel	Belarusian	bem	Bemba
ben	Bengali	ber	Berber (Other)
bho	Bhojpuri	bih	Bihari
bik	Bikol	bin	Bini
bis	Bislama	bla	Siksika
bnt	Bantu (Other)	bod (tib)	Tibetan
bos	Bosnian	bra	Braj
bre	Breton	btk	Batak (Indonesia)
bua	Buriat	bug	Buginese
bul	Bulgarian	bur (mya)	Burmese
byn	Blin; Bilin		

Code	Language	Code	Language
cad	Caddo	cai	Central American Indian (Other)
car	Carib	cat	Catalan; Valencian
cau	Caucasian (Other)	ceb	Cebuano
cel	Celtic (Other)	ces (cze)	Czech
cha	Chamorro	chb	Chibcha
che	Chechen	chg	Chagatai
chi (zho)	Chinese	chk	Chuukese
chm	Mari	chn	Chinook jargon
cho	Choctaw	chp	Chipewyan
chr	Cherokee	chu	Church Slavonic; Old Slavonic; Church Slavonic; Old Bulgarian; Old Church Slavonic
chv	Chuvash	chy	Cheyenne
cmc	Chamic languages	cop	Coptic
cor	Cornish	cos	Corsican
cpe	Creoles and pidgins, English based (Other)	cpf	Creoles and pidgins, French-based (Other)
cpp	Creoles and pidgins, Portuguese-based (Other)	cre	Cree
crh	Crimean Tatar; Crimean Turkish	crp	Creoles and pidgins (Other)
csb	Kashubian	cus	Cushitic (Other)
cym (wel)	Welsh	Cze (ces)	Czech
dak	Dakota	dan	Danish
dar	Dargwa	day	Dayak
del	Delaware	den	Slave (Athapascan)
deu (ger)	German	dgr	Dogrib
din	Dinka	div	Divehi; Dhivehi; Maldivian
doi	Dogri	dra	Dravidian (Other)
dsb	Lower Sorbian	dua	Duala
dum	Dutch, Middle (ca.1050-1350)	dut (nld)	Dutch; Flemish
dyu	Dyula	dzo	Dzongkha
efi	Efik	egy	Egyptian (Ancient)
eka	Ekajuk	ell (gre)	Greek, Modern (1453-)
elx	Elamite	eng	English
enm	English, Middle (1100-1500)	epo	Esperanto
est	Estonian	eus (baq)	Basque
ewe	Ewe	ewo	Ewondo

Code	Language	Code	Language
fan	Fang	fao	Faroese
fas (per)	Persian	fat	Fanti
fij	Fijian	fil	Filipino; Pilipino
fin	Finnish	fiu	Finno-Ugrian (Other)
fon	Fon	fra (fre)	French
fre (fra)	French	frm	French, Middle (ca.1400-1600)
fro	French, Old (842-ca.1400)	frr	Northern Frisian
frs	Eastern Frisian	fry	Western Frisian
ful	Fulah	fur	Friulian
gaa	Ga	gay	Gayo
gba	Gbaya	gem	Germanic (Other)
geo(kat)	Georgian	ger (deu)	German
gez	Geez	gil	Gilbertese
gla	Gaelic; Scottish Gaelic	gle	Irish
glg	Galician	glv	Manx
gmh	German, Middle High (ca.1050-1500)	goh	German, Old High (ca.750-1050)
gon	Gondi	gor	Gorontalo
got	Gothic	grb	Grebo
grc	Greek, Ancient (to 1453)	gre (ell)	Greek, Modern (1453-)
grn	Guarani	gsw	Alemanic; Swiss German
guj	Gujarati	gwi	Gwich'in
hai	Haida	hat	Haitian; Haitian Creole
hau	Hausa	haw	Hawaiian
heb	Hebrew	her	Herero
hil	Hiligaynon	him	Himachali
hin	Hindi	hit	Hittite
hmn	Hmong	hmo	Hiri Motu
hrv (scr)	Croatian	hsb	Upper Sorbian
hun	Hungarian	hup	Hupa
hye (arm)	Armenian		
iba	Iban	ibo	Igbo
ice (isl)	Icelandic	ido	Ido
iii	Sichuan Yi	ijo	Ijo
iku	Inuktitut	ile	Interlingue
ilo	Iloko	ina	Interlingua (International Auxiliary Language Association)
inc	Indic (Other)	ind	Indonesian
ine	Indo-European (Other)	inh	Ingush
ipk	Inupiaq	ira	Iranian (Other)
iro	Iroquoian languages	isl (ice)	Icelandic
ita	Italian		

Code	Language	Code	Language
jav	Javanese	jbo	Lojban
jpn	Japanese	jpr	Judeo-Persian
jrb	Judeo-Arabic		
kaa	Kara-Kalpak	kab	Kabyle
kac	Kachin	kal	Kalaallisut; Greenlandic
kam	Kamba	kan	Kannada
kar	Karen	kas	Kashmiri
kat (geo)	Georgian	kau	Kanuri
kaw	Kawi	kaz	Kazakh
kbd	Kabardian	kha	Khasi
khi	Khoisan (Other)	khm	Khmer
kho	Khotanese	kik	Kikuyu; Gikuyu
kin	Kinyarwanda	kir	Kirghiz
kmb	Kimbundu	kok	Konkani
kom	Komi	kon	Kongo
kor	Korean	kos	Kosraean
kpe	Kpelle	krc	Karachay-Balkar
krl	Karelian	kro	Kru
kru	Kurukh	kua	Kuanyama; Kwanyama
kum	Kumyk	kur	Kurdish
kut	Kutenai		
lad	Ladino	lah	Lahnda
lam	Lamba	lao	Lao
lat	Latin	lav	Latvian
lez	Lezghian	lim	Limburgan; Limburger; Limburgish
lin	Lingala	lit	Lithuanian
lol	Mongo	loz	Lozi
ltz	Luxembourgish; Letzeburgesch	lua	Luba-Lulua
lub	Luba-Katanga	lug	Ganda
lui	Luiseno	lun	Lunda
luo	Luo (Kenya and Tanzania)	lus	lushai

Code	Language	Code	Language
mac (mkd)	Macedonian	mad	Madurese
mag	Magahi	mah	Marshallese
mai	Maithili	mak	Makasar
mal	Malayalam	man	Mandingo
mao (mri)	Maori	map	Austronesian (Other)
mar	Marathi	mas	Masai
may (msa)	Malay	mdf	Moksha
mdr	Mandar	men	Mende
mga	Irish, Middle (900-1200)	mic	Mi'kmaq; Micmac
min	Minangkabau	mis	Miscellaneous languages
mkd (mac)	Macedonian	mkh	Mon-Khmer (Other)
mlg	Malagasy	mlt	Maltese
mnc	Manchu	mni	Manipuri
mno	Manobo languages	moh	Mohawk
mol	Moldavian	mon	Mongolian
mos	Mossi	mri (mao)	Maori
msa (may)	Malay	mul	Multiple languages
mun	Munda languages	mus	Creek
mwl	Mirandese	mwr	Marwari
mya (bur)	Burmese	myn	Mayan languages
myv	Erzya		
nah	Nahuatl	nai	North American Indian
nap	Neapolitan	nau	Nauru
nav	Navajo; Navaho	nbl	Ndebele, South; South Ndebele
nde	Ndebele, North; North Ndebele	ndo	Ndonga
nds	Low German; Low Saxon; German, Low; Saxon, Low	nep	Nepali
new	Newari; Nepal Bhasa	nia	Nias
nic	Niger-Kordofanian (Other)	niu	Niuean
nld (dut)	Dutch; Flemish	nno	Norwegian Nynorsk; Nynorsk, Norwegian
nob	Norwegian Bokmal; Bokmal, Norwegian	nog	Nogai
non	Norse, Old	nor	Norwegian
nqo	N'ko	nso	Northern Sotho, Pedi; Sepedi
nub	Nubian languages	nwc	Classical Newari; Old Newari; Classical Nepal Bhasa
nya	Chichewa; Chewa; Nyanja	nym	Nyamwezi
nyn	Nyankole	nyo	Nyoro
nzi	Nzima		
oci	Occitan (post 1500) ; Provençal	oji	Ojibwa
ori	Oriya	orm	Oromo
osa	Osage	oss	Ossetian; Ossetic

Code	Language	Code	Language
ota	Turkish, Ottoman (1500-1928)	oto	Otomian languages
paa	Papuan (Other)	pag	Pangasinan
pal	Pahlavi	pam	Pampanga
pan	Panjabi; Punjabi	pap	Papiamento
pau	Palauan	peo	Persian, Old (ca.600-400 B.C.)
per (fas)	Persian	phi	Philippine (Other)
phn	Phoenician	pli	Pali
pol	Polish	pon	Pohnpeian
por	Portuguese	pra	Prakrit languages
pro	Provençal, Old (to 1500)	pus	Pushto
que	Quechua		
raj	Rajasthani	rap	Rapanui
rar	Rarotongan	roa	Romance (Other)
roh	Raeto-Romance	rom	Romany
ron (rum)	Romanian	rum (ron)	Romanian
run	Rundi	rup	Aromanian; Arumanian; Macedo-Romanian
rus	Russian		
sad	Sandawe	sag	Sango
sah	Yakut	sai	South American Indian (Other)
sal	Salishan languages	sam	Samaritan Aramaic
san	Sanskrit	sas	Sasak
sat	Santali	scc (srp)	Serbian
scn	Sicilian	sco	Scots
scr (hrv)	Croatian	sel	Selkup
sem	Semitic (Other)	sga	Irish, Old (to 900)
sgn	Sign Languages	shn	Shan
sid	Sidamo	sin	Sinhala; Sinhalese
sio	Siouan languages	sit	Sino-Tibetan (Other)
sla	Slavic (Other)	slk (slo)	Slovak
slo (slk)	Slovak	slv	Slovenian
sma	Southern Sami	sme	Northern Sami
smi	Sami languages (Other)	smj	Lule Sami
smn	Inari Sami	smo	Samoan
sms	Skolt Sami	sna	Shona
snd	Sindhi	snk	Soninke
sog	Sogdian	som	Somali
son	Songhai	sot	Sotho, Southern
spa	Spanish; Castilian	sqi (alb)	Albanian
srd	Sardinian	srn	Sranan Togo
srp (scc)	Serbian	srr	Serer
ssa	Nilo-Saharan (Other)	ssw	Swati

Code	Language	Code	Language
suk	Sukuma	sun	Sundanese
sus	Susu	sux	Sumerian
swa	Swahili	swe	Swedish
syr	Syriac		
tah	Tahitian	tai	Tai (Other)
tam	Tamil	tat	Tatar
tel	Telugu	tem	Timne
ter	Tereno	tet	Tetum
tgk	Tajik	tgl	Tagalog
tha	Thai	tib (bod)	Tibetan
tig	Tigre	tir	Tigrinya
tiv	Tiv	tkl	Tokelau
tlh	Klingon; tlhIngan-Hol	tli	Tlingit
tmh	Tamashek	tog	Tonga (Nyasa)
ton	Tonga (Tonga Islands)	tpi	Tok Pisin
tsi	Tsimshian	tsn	Tswana
tso	Tsonga	tuk	Turkmen
tum	Tumbuka	tup	Tupi languages
tur	Turkish	tut	Altaic (Other)
tvl	Tuvalu	twi	Twi
tyv	Tuvinian		
udm	Udmurt	uga	Ugaritic
uig	Uighur; Uyghur	ukr	Ukrainian
umb	Umbundu	und	Undetermined
urd	Urdu	uzb	Uzbek
vai	Vai	ven	Venda
vie	Vietnamese	vol	Volapuk
vot	Votic		
wak	Wakashan languages	wal	Walamo
war	Waray	was	Washo
wel (cym)	Welsh	wen	Sorbian languages
wln	Walloon	wol	Wolof
xal	Kalmyk; Oirat	xho	Xhosa
yao	Yao	yap	Yapese
yid	Yiddish	yor	Yoruba
ypk	Yupik languages		
zap	Zapotec	zen	Zenaga
zha	Zhuang; Chuang	zho (chi)	Chinese
znd	Zande	zul	Zulu
zun	Zuni		

● DIGITAL SERVICE SET

Digital Service 1	Digital Broadcast System1	Digital Broadcast System <hr/> ARIB / ATSC / DVB Service Identification 6Byte DATA
	Service Identification1	
Digital Service 2	Digital Broadcast System2	
	Service Identification2	
Digital Service 3	Digital Broadcast System3	
	Service Identification3	

● DEVICE INFO SET

Vendor ID	3Byte DATA
OSD NAME	ASCII Maximum 8Bytes

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