

HDMI Protocol Analyzer VA-1809A Function and Application



ASTRODESIGN, Inc.

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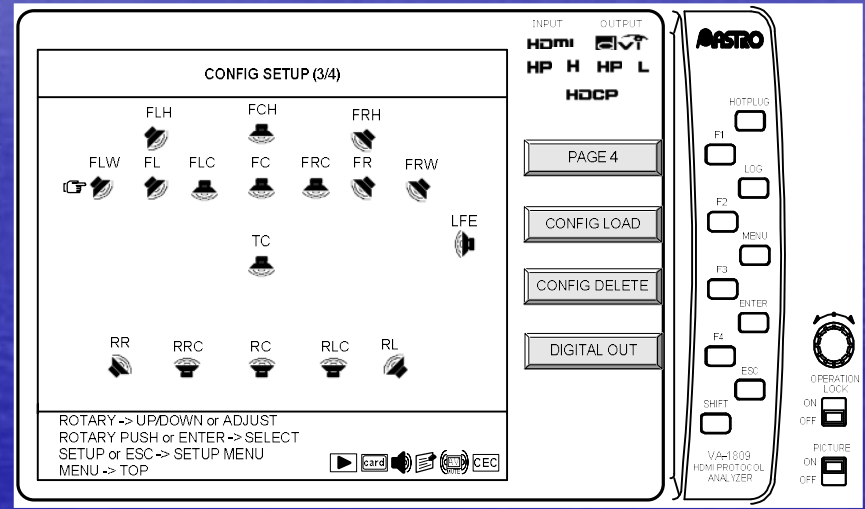
Portable Analyzer with 6.4 inch monitor and Audio output

Video display (6.4 inch TFT LCD/monitor output)



Overlay display of picture and text
Maximum 2000 × 1320 Video Memory
how the image by "Dot By Dot"

Audio output (L/R speaker)



Volume control, mute available
Simulates 5.1 channel audio setting

Portable size (about 5 Kg). Small display which supports HDMI input.

VA-1809A Main Feathers

HDMI Protocol Analysis

Audio Analysis

DDC Line Monitor

HDCP Analysis

**CTS Function
(HDMI, HDCP, CEC)**

Log Function

Virtual Repeater Mode

Lip-Sync Measurement

Generate Config

Colorimetry

Utility Software

CEC Function

I2S Audio Output

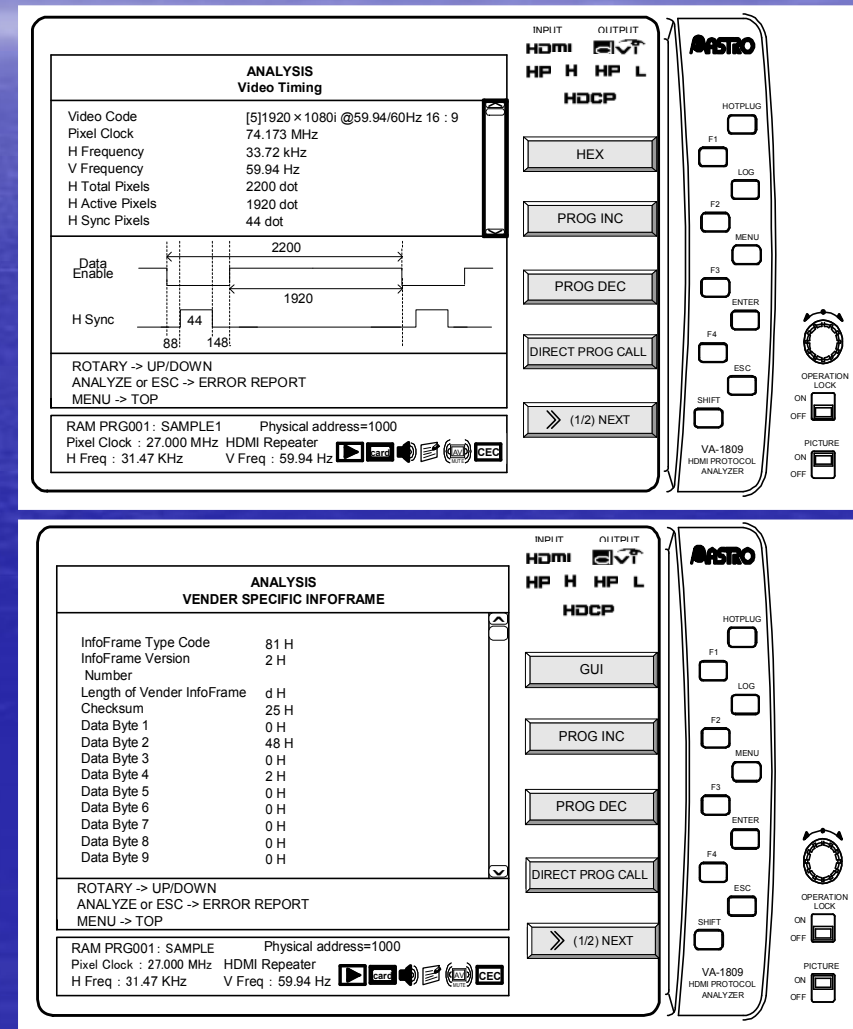


VA-1809A

HDMI Protocol Analysis (Video)

Analysis protocol of input HDMI signal and show the result

- Video timing
- AVI InfoFrame
- SPD InfoFrame
- MPEG InfoFrame
- ISRC1/ISRC2 Packet
- NTSC VBI InfoFrame
- General Control Packet



HDMI Protocol Analysis (Audio)

Analyze the protocol of the input HDMI signal and show the result

- Audio InforFrame
- ACP Packet
- Channel Status Bit
- Audio Timing

Analyze High Bit Rate Audio Header

The screenshot shows the 'ANALYSIS Channel Status Bit' screen. The interface includes a top navigation bar with 'INPUT HDMI HP H HP L' and 'OUTPUT HP H HP L' indicators, and a 'HDCP' status. The main display area contains a table of audio parameters:

Professional or Consumer Audio	Consumer Mode linear PCM samples
Copy / Copyright	no copyright
Emphasis	without pre-emphasis
Channel Status Mode	Mode 00
Category code	Digital / digital conv.&signal (PCM encoder/decoder)
L Bit	1
Source number	Do not take into account
Channel number	Do not take into account
Sampling frequency	48 kHz
Clock accuracy	Level 2,+~1000ppm(default)
Maximum audio sample word length	20bits

Below the table are navigation buttons: 'HEX', 'PROG INC', 'PROG DEC', 'DIRECT PROG CALL', and '>> (1/2) NEXT'. At the bottom, it shows 'RAM PRG001: SAMPLE Physical address=1000', 'Pixel Clock : 27.000 MHz HDMI Repeater', and 'H Freq : 31.47 KHz V Freq : 59.94 Hz'. The right side of the device features a control panel with buttons for 'HOTPLUG', 'F1', 'LOG', 'F2', 'MENU', 'F3', 'ENTER', 'F4', 'ESC', 'SHIFT', 'OPERATION LOCK', and 'PICTURE'.

The screenshot shows the 'ANALYSIS Audio Timing' screen. The interface includes a top navigation bar with 'INPUT HDMI HP H HP L' and 'OUTPUT HP H HP L' indicators, and a 'HDCP' status. The main display area shows a bar chart for audio timing:

Channel	Level
CH1 FR	-90db
CH2 FL	-20db
CH3 FC	-20db
CH4 LFE	-20db
CH5 RR	-20db
CH6 RL	-20db
CH7 FLC	-20db
CH8 FRC	-20db

Navigation buttons are the same as in the previous screen. At the bottom, it shows 'RAM PRG001: SAMPLE Physical address=1000', 'Pixel Clock : 27.000 MHz HDMI Repeater', and 'H Freq : 31.47 KHz V Freq : 59.94 Hz'. The right side of the device features a control panel with buttons for 'HOTPLUG', 'F1', 'LOG', 'F2', 'MENU', 'F3', 'ENTER', 'F4', 'ESC', 'SHIFT', 'OPERATION LOCK', and 'PICTURE'.

HDCP Analysis

Analysis display of input/output HDCP information by real time

The image displays four screenshots of the VA-1809 HDMI Protocol Analyzer interface, showing real-time HDCP analysis results. Each screenshot includes a control panel on the right with buttons for HEX, PROG INC, PROG DEC, DIRECT PROG CALL, and (1/3) NEXT, along with function keys F1-F4, ENTER, ESC, and SHIFT. The main display area shows the following information:

- Top Left:** ANALYSIS HDCP Repeater Sequence Check
- Top Right:** ANALYSIS HDCP Authentication Source -> VA-1809
- Bottom Left:** ANALYSIS HDCP Authentication Part3 Source ->VA-1809
- Bottom Right:** ANALYSIS HDCP Authentication Part3 VA-1809 -> Sink

Top Left Screenshot: HDCP Repeater Sequence Check

Authentication Result	Connected during Authentication
1st DownStream Connect	Connected
1st DDC Line Status	Normal
1st YCbCr Support	Support
1st Repeater or Receiver	Repeater
1st BKSv Check	Normal
1st Link Check	Normal
2nd KSV FIFO Ready	Normal
2nd Depth Check	Normal
2nd Count Check	Normal
2nd Compere V	Normal

Top Right Screenshot: HDCP Authentication Source -> VA-1809

AN	0123456789ABCDEF H
AKSV	0123456789 H
BKSv	0123456789 H
V'	0123456789ABCDEF012345
	6789ABCDEF01234567 H
KSVFIFO	0123456789 H
DeviceCount	2
Depth	2
Ri'	0123H

Bottom Left Screenshot: HDCP Authentication Part3 Source ->VA-1809

Ri'	012E H
Ri'	4F67 H
Ri'	891B H

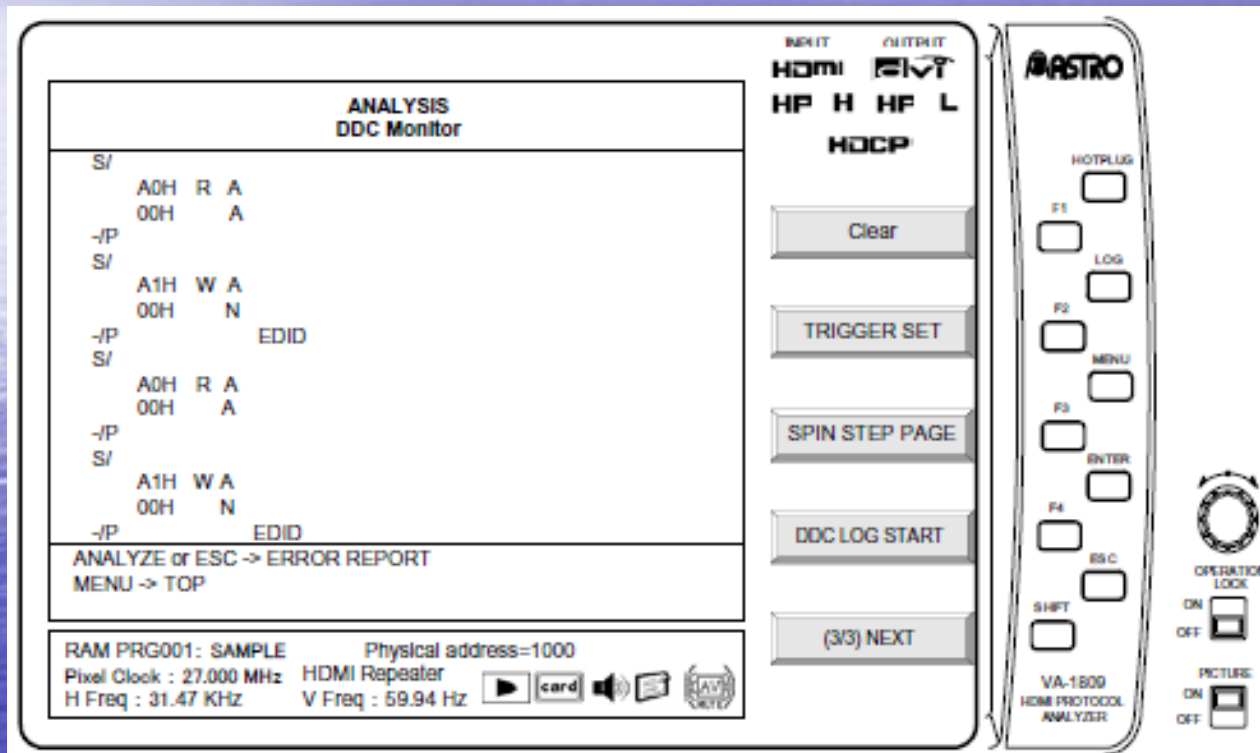
Bottom Right Screenshot: HDCP Authentication Part3 VA-1809 -> Sink

Ri	0123 H	Ri'	0123 H
	4567 H		4567 H
	89AB H		89AB H

RAM PRG001: SAMPLE Physical address=1000
Pixel Clock : 27.000 MHz HDMI Repeater
H Freq : 31.47 KHz V Freq : 59.94 Hz

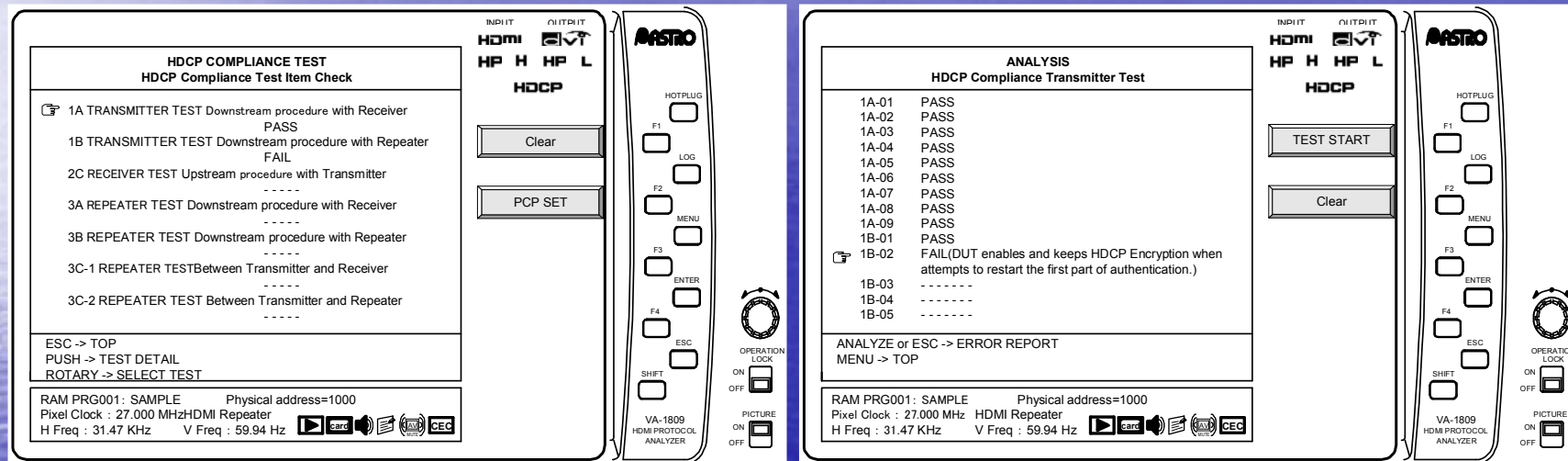
DDC Line Monitoring Function

Monitoring DDC Line. Display the result. Receive/send the data status. Check the source equipment. Send/receive the command in real time



HDMI, HDCP and CEC CTS Function

Run protocol layer test clause for each CTS test item.
Show the result in the real time



- Covers most of the protocol layer test clause of the HDMI CTS
- Covers most of the protocol layer test clause of the HDCP CTS
- Covers all protocol layer test clause of the CEC CTS

Log Function

Analyzing, Recording, Printing the Log data
 Log data available by UTILITY software and HTML
 Set the log trigger and focus on target clause

[RESULT]

1A TRANSMITTER TEST Downstream procedure with Receiver

 1B TRANSMITTER TEST Downstream procedure with Repeater
ERROR
 2C RECEIVER TEST Upstream procedure with Transmitter

 3A REPEATER TEST Downstream procedure with Receiver

 3B REPEATER TEST Downstream procedure with Repeater

 3C-1 REPEATER TEST Between Transmitter and Receiver

 3C-2 REPEATER TEST Between Transmitter and Repeater

[ITEM RESULT]

1A TRANSMITTER TEST Downstream procedure with Receiver
 1A - 01 = ----
 1A - 02 = ----
 1A - 03 = ----
 1A - 04 = ----
 1A - 05 = ----
 1A - 06 = ----
 1A - 07 = ----
 1A - 09 = ----

1B TRANSMITTER TEST Downstream procedure with Repeater
 1B - 01 = PASS
 1B - 02 = PASS
 1B - 03 = Not read Bcaps within 5sec after reading R0'
 1B - 04 = ----
 1B - 05 = ----
 1B - 06 = ----

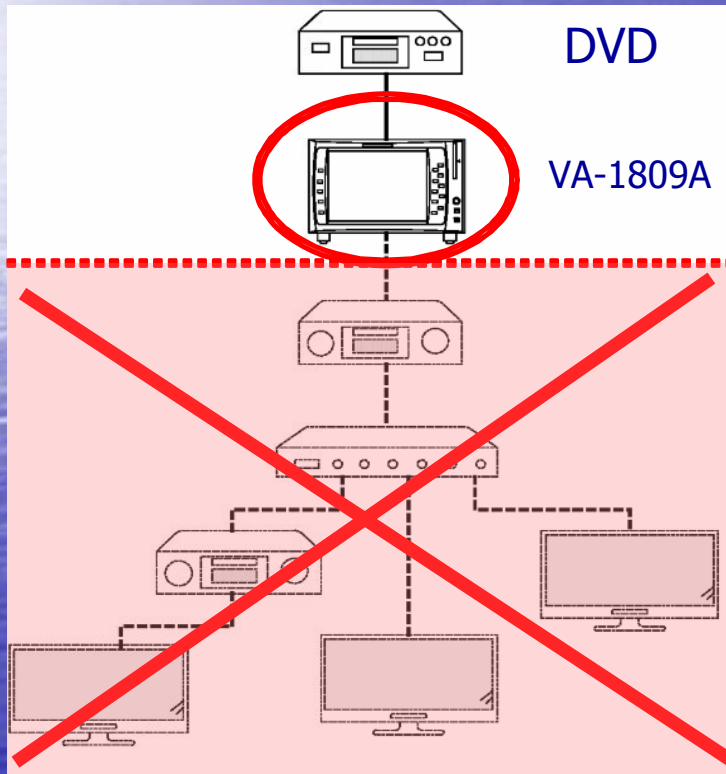
2C RECEIVER TEST Upstream procedure with Transmitter
 2C - 01 = ----
 2C - 02 = ----

The screenshot shows the 'VA-1809 UTILITY - [LOG]' window. It features a menu bar (File, Log, Tool, Window, Help) and a toolbar with icons for OPEN, SAVE, SAVEAS, LOG START, LOG STOP, EDID, CEC, LOG, and PRINT. Below the toolbar is a search section with 'CATEGORY' and 'SEARCH STRINGS' dropdowns, and 'SEARCH', 'FOCUS', and 'ALLDISP' buttons. The main area contains a table with the following data:

Ver	Count	Time	InputSync	DataMode	Input Mode	HDMI Version	HDCP	Hot F
2.02	1	2580ms(0h0m2s580ms)	In Sync	GUI	HDMI	1.0	On	Low
	2	4546ms(0h0m4s546ms)	In Sync	GUI	HDMI	1.0	On	Low
	3	22598ms(0h0m22s598ms)	In Sync	GUI	HDMI	1.0	On	Low

Virtual Repeater Mode

Simulates the connection of devices by using one set of VA-1809A
For HDCP response time testing. Emulates max 12 sets connection



INPUT OUTPUT
HDMI HP H HP L
HDCP

CONFIG SETUP (4/5)

VIRTUAL REPEATER MODE
ON

DEPTH
4

DEVICE COUNT
6

EXECUTION TIME
100ms

PAGE 5

CONFIG LOAD

CONFIG DELETE

KSV LIST

ROTARY -> UP/DOWN or ADJUST
ROTARY PUSH or ENTER -> SELECT
SETUP or ESC -> SETUP MENU
MENU -> TOP

card audio video AVI WITEX

ASTRO

HOTPLUG

F1 LOG

F2 MENU

F3 ENTER

F4 ESC

SHIFT

OPERATION LOCK
ON OFF

PICTURE
ON OFF

VA-1809
HDMI PROTOCOL
ANALYZER

Lip-Sync Measurement

Measure the latency of input video and audio signals

The screenshot displays the 'ANALYSIS LIPSYNC' screen of the VA-1809 HDMI Protocol Analyzer. The interface includes a control panel on the right with buttons for F1-F4, ENTER, ESC, and SHIFT, along with a rotary dial and two toggle switches for 'OPERATION LOCK' and 'PICTURE'. The main display area shows the following data:

ANALYSIS LIPSYNC	
Video Latency Set Value =	10 ms
Audio Latency Set Value =	20 ms
Interlaced Video Latency Set Value =	10 ms
Interlaced Audio Latency Set Value =	30 ms
Difference = Audio is earlier than Video for 10 ms	

Below the table is a timing diagram showing a blue line for 'Video' and a red line for 'Audio'. A 10ms scale bar is provided. The video signal is a square wave, and the audio signal is a sine wave. The audio signal starts 10ms before the video signal.

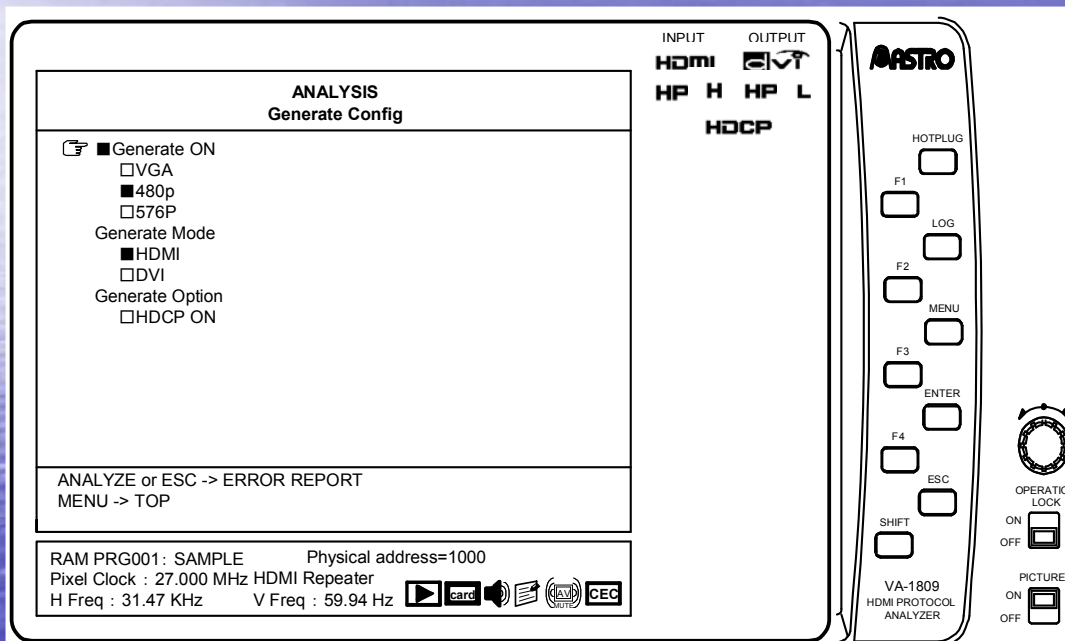
Navigation instructions: ANALYZE or ESC -> ERROR REPORT, MENU -> TOP

System information: RAM PRG001: SAMPLE Physical address=1000, Pixel Clock : 27.000 MHz HDMI Repeater, H Freq : 31.47 KHz V Freq : 59.94 Hz. Icons for card, audio, and CEC are also visible.

Change the VA-1809A's EDID and check source device behavior

Color bar generator

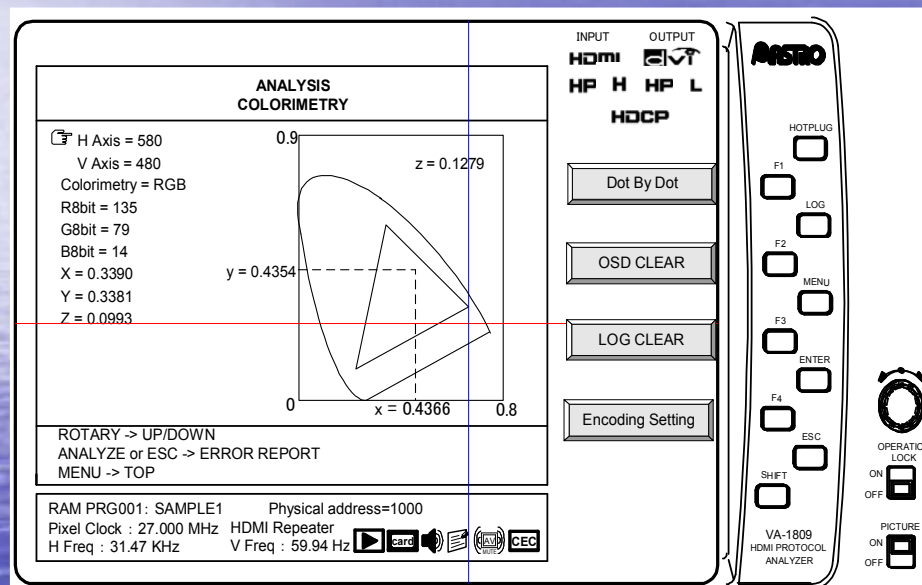
Generate color bar pattern to down stream



480p, 576p or VGA resolution can be selected in the factory.

Colorimetry (xvColor testing)

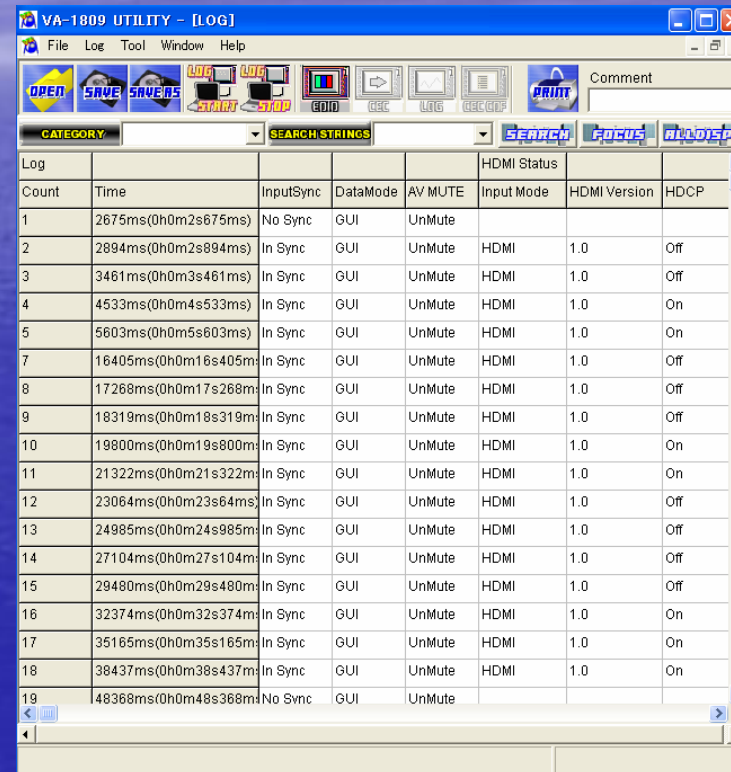
Analyze the color of each pixels



Analyze the color of the source device.
Analyze 8-12bit RGB, YCbCr signal limited and Full range (xvColor).
Set ON/OFF the YCbCr to RGB Encoring Gamma

Utility Software

Communicate and control the VA-1809A by PC via Ethernet and Serial port



Copy and edit the EDID

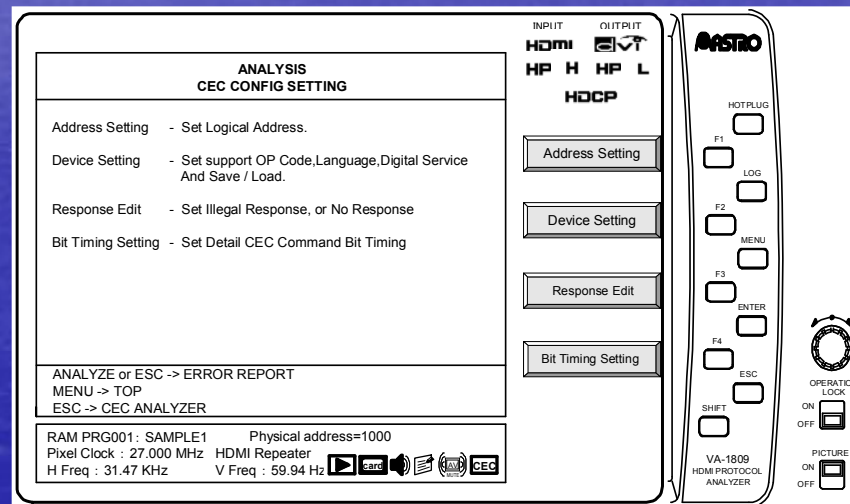
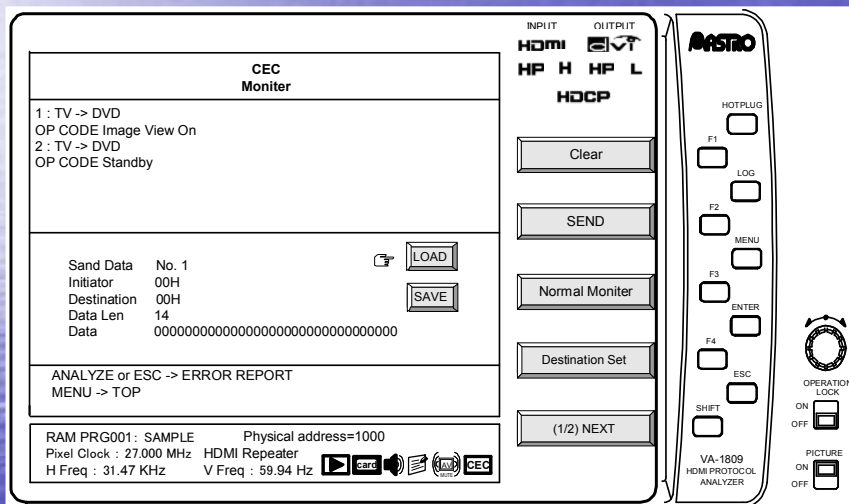
Edit CEC CDF

Monitor the CEC line and Send CEC command

Take a log directly from VA-1809A

CEC Function (Optional)

Monitor the CEC line and send the CEC command



Edit address setting, device setting, respond setting and Bit timing settings
Display the status by GUI and HEX

I2S Audio Output (Optional)

By adding the I2S digital output, it outputs the audio data and trigger



Output 4ch output Audio data via I2S
Set the trigger by outputting the trigger from I2S output

Thank you