

DVM-HDT-KIT (DESK)

4K HDMI® signal analyzer
Support HDMI® 2.0 4K60Hz (YUV420) HDCP2.2/HDCP1.4

Operation Manual
V1.0



CARDINAL **DVM**

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1. Introduction

The DVM-HDT-KIT ANALYZER belongs to the product family of programmable HDMI® UHD (Ultra High Definition) test instruments. It offers the functionality of a signal display and analyzer, laden with features for video and audio testing of HDMI® signals.

The DVM-HDT-KIT ANALYZER accepts a full range of resolutions with a maximum signal of 4K@60fps 4:2:0 as was recently laid down in the HDMI® 2.0 specifications.

Owing to its 10 different EDID settings (4 presets and 10 user editable), the DVM-HDT-KIT ANALYZER can emulate virtually every display.

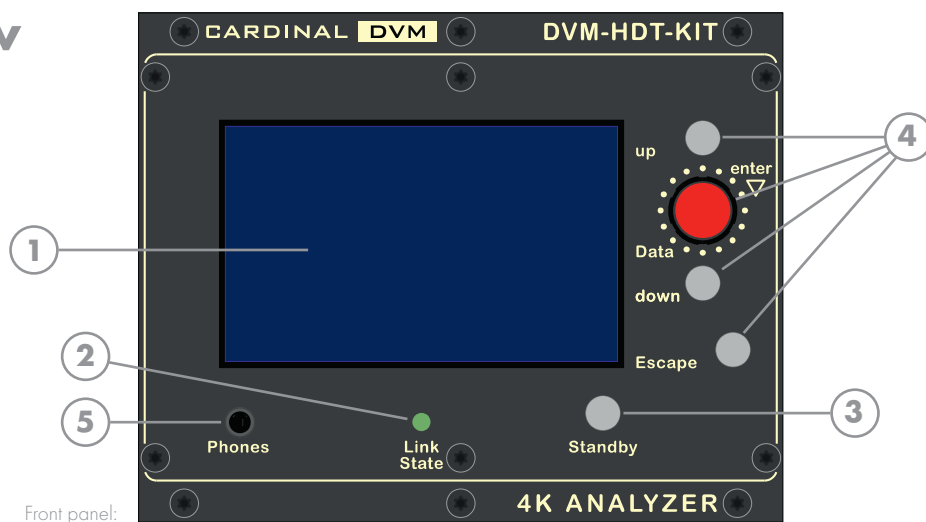
The built-in 3.0" LCD display shows the graphic implementation of the current video and settings menu including video timing information and audio information.

For expanding the device's already contained features and capabilities, we include a PC based control software. The DVM-HDT-KIT ANALYZER can be easily connected to almost any Windows based computer via a USB A-A or USB-RS232 converter cable.

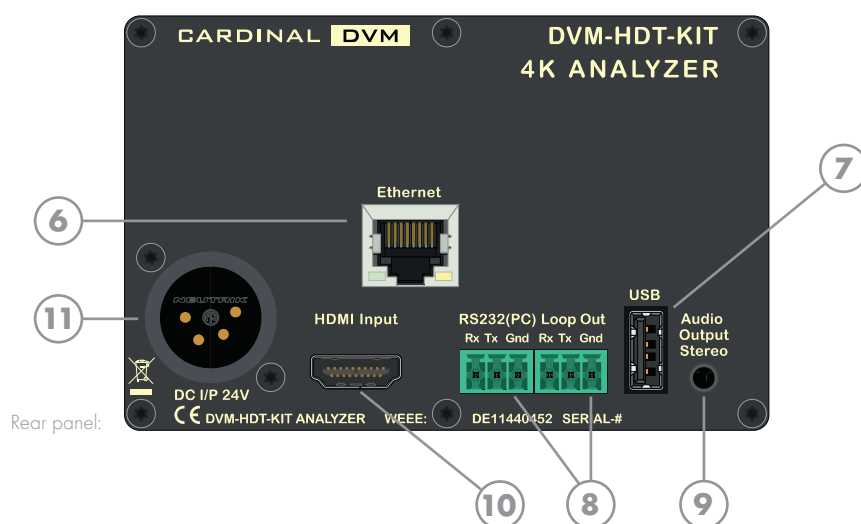
The supplied control software will allow measurements of many video parameters including errors on bit level. The DVM-HDT-KIT ANALYZER can be daisy-chained with other devices and also DVM-HDT-KIT GENERATORS via a 3-pole EUROBLOCK slave out socket.

Owing to this unique feature customers can cost effectively create large HDMI® 2.0, 4K testing systems for automated QC, compliance tests and stress tests during R&D.

2. Product overview



1. 3.0" LCD display: Shows the HDMI® input signal and also displays menu settings.
2. Link Status LED – indicates the HDMI® link status. When the link is broken or no HPD* is present from the sink device, the LED will go off. In case of an EDID error the LED will start flashing. The LED will also flash when the device is turned off and the battery is charging (only desktop version).
3. Standby button to turn on or off the device (press and hold for at least 3s).
4. Up / Down / Esc buttons plus one rotary encoder (which o.k. as Enter button) to operate the device.
5. Headphone jack for analog audio output signal.



6. RJ45 for LAN control
7. USB port, type A
8. Euroblock sockets (3.5mm) for RS232 input and RS232 loop out
9. Analog audio L/R output, MiniJack 1/8" (3.5mm)
10. HDMI® input
11. XLR connector for DC24V input (Pin 1+2: +24V DC, Pin 3+4: 0V)

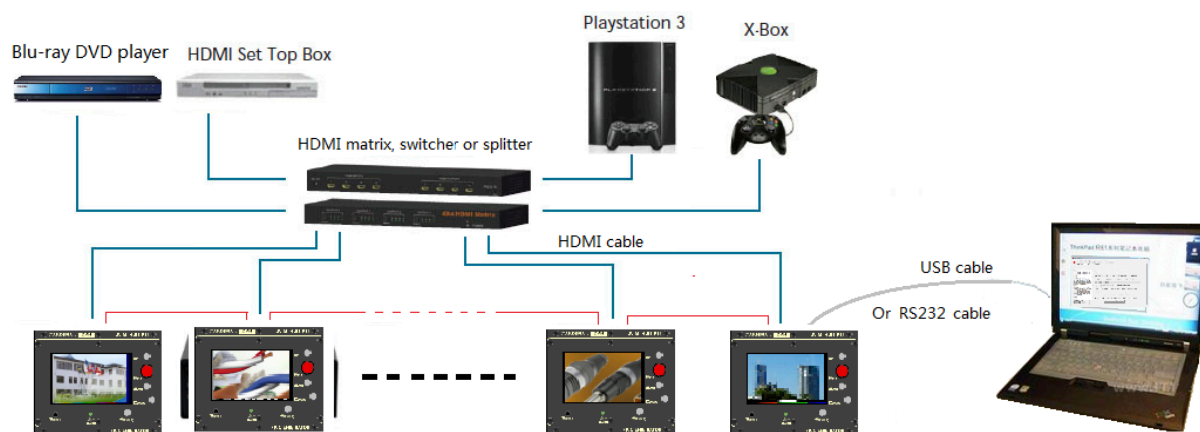
3. Features

- Designed for R&D engineers, AV integrators and installers
- Supports the latest standards such as 4Kx2K 24 Hz / 25 Hz / 30 Hz / 50 Hz / 60 Hz and 3D, 4K 50/60Hz
- Supports HDCP 2.2/1.4
- Supports RGB4:4:4, YUV4:2:2, YUV4:2:0
- Supports Deep Color
- Supports HDMI® & DVI mode
- Supports up to 8 channels of PCM audio and indicates the levels via VU meter
- Headphone socket for analog audio output (analog audio is only available in PCM mode)
- EDID can be managed via PC based control software. Included in the firmware are 4 sets of EDID presets and 10 memory slots for 10 sets of user defined EDID.
- HDMI® receiver module can be powered up and down
(to emulate an HDMI® sink device power on/off sequence).
- Integrated LiION-battery pack in the desktop version for mobile wireless field use. The device works between 5 and 6 hours on battery power.

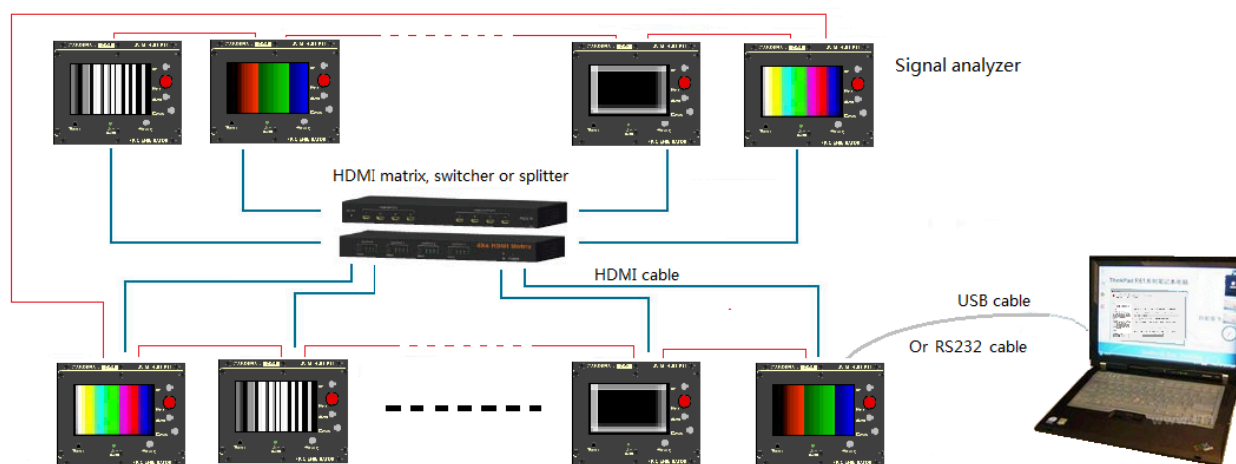
4. Technical specifications

Product	HDMI®2.0 analyzer and display (SA)
HDMI® Version	HDMI®2.0 / DVI
HDCP Version	2.2/1.4
Video bandwidth	Up to 9.0GHz (3.0GHz per channel)
Color depth	24bits, 30bits, 36 bits, 48bits
Color space	RGB444, YUV444, YUV422, YUV420 (only available with HDMI®2.0)
Audio word size	26 bit, 20 bit, 24 bit
Audio sampling rates	32kHz, 44kHz, 48kHz, 88kHz, 96kHz, 176kHz, 192kHz
Vertical frequency	<=120 Hz
Power consumption (max.)	2 W
Housing	metal
Dimensions (mm)	106,5 x 84 x 140 mm (rackmount version), 108 x 65 x 140 mm (desktop version)
Weight (g)	850 g (rackmount version), 970 g (desktop version)

5. Application



The DVM-HDT-KIT ANALYZER is an HDMI® sink emulator and can be used to test any HDMI® sources such as media players, BD players, switches, matrices, splitters, repeaters or literally any HDMI® device for proper functionality.



The above application uses both the DVM-HDT-KIT ANALYZER and our DVM-HDT-KIT GENERATOR. The device pair makes a complex UHD test system. The system is controlled via a single RS232 bus. This is a sophisticated, reasonably priced UHD trouble-shooting and testing system which, in combination with our DVM-HDT-KIT ANALYZER, can perform analyses even down to bit error level) and may be used for time/event based long-term tests which are extremely difficult or almost impossible to do manually. The DVM-HDT-KIT ANALYZER is a sophisticated device with unique functions and great portability which makes it a must-have for any AV professional toolkit.

6. Package content

- Main unit: DVM-HDT-KIT ANALYZER
- 24V 0.5A power supply
- 0.75 m HDMI® line SOMMER CABLE HIMM
- RM3.5 3-pole EUROBLOCK connector (2x)

7. Controls and functions

1. Connect HDMI® cable to HDMI® source device
2. If desired, connect your PC to the RS232 or USB port on the device
3. Connect the included 24V/0.5A power supply to the power socket (the charge time of the integrated battery pack in the desktop version is approx. 1h)

7.1. Local operation via encoder and pushbuttons

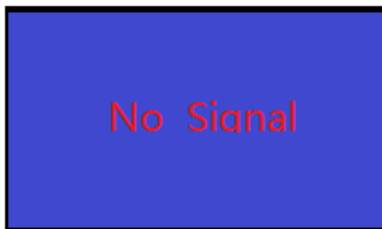
The controls on the right side of the display serve to perform the menu navigation and full local operation of the device.

Use the encoder as a multifunctional input key for the menu navigation – it also doubles as „enter“ key or to call up the menu mode.

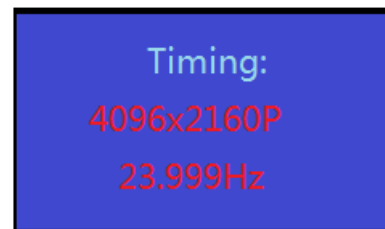
The „Up“ & „Down“ buttons provide the navigation in the menu mode; in the display mode they are used to change the test pattern. To exit the menu mode, press the „escape“ button.

Normal Display:

When no signal is present, only
'No Signal' will be displayed:



As soon as an incoming signal is present, the resolution information will show up for a second before displaying the image:



Now call up the menu mode with a push on the data encoder. With 'Up' oder 'Down' you will go to the next or previous menu page. Select the desired setting by turning the encoder and confirm with a push on the encoder.

Full set of menu pages:

Signal INFO

Timing: 3840x2160P 24.000Hz

ColorSpace: RGB

Video Type: HDMI

HDCP: No HDCP

Color Depth: 24BIT

Sample Rate: 192K

Audio Res: 16Bit

Audio ChNum: 8CH

AudioType: PCM

Signal INFO

Shows all signal information on one screen:

- Resolution & timing
- Color space & depth
- HDCP setup
- Video type (DVI/HDMI®)
- all related audio Information

VU Meter



VU Meter

Shows the audio level of the embedded HDMI® PCM audio channels

Battery Status



Battery Status

(only with the DVM-HDT-KIT-DESK model version).

Indicates the state of charge of the built-in battery pack. During the charging process the word "charging" is also displayed.

Audio Volume



Audio Volume

Shows the volume level of the headphone output.

Input Standby

01	Standby Off
02	Standby On

Input Standby

In this menu item the HDMI® interface of the DVM-HDT-KIT ANALYZER can be set to standby mode.

This is very useful for testing HDMI® installations.

In the "Standby On" setting the interface is disabled, "Standby Off" will enable the interface again.

EDID Setup

01	4K60HZ(Y420)-3D-2CH
02	4K30HZ-3D-2CH
03	1080P-3D-2CH
04	1080P-2CH
05	USER1
06	USER2

EDID Setup

Shows the current EDID set of the device. There are 4 predefined and 10 user editable EDID sets available. The predefined sets are:

1. 2160p@60fps (YUV420) with 3D and 2-channel PCM audio
2. 2160p@30fps with 3D and 2-channel PCM audio
3. 1080p@60fps with 3D and 2-channel PCM audio
4. 1090p@60fps with 2-channel PCM audio

The user definable sets can only be edited with the PC software.

Network Setup

IP Address:

192. 168. 001. 111

Subnet Mask:

255. 255. 255. 000

Gateway:

192. 168. 001. 001

Network Setup

Here you can set the IP address, the subnet mask and the gateway for the internal web server.

Address Setup

Group Address:

000

Device Address:

000

Address setting

The serial communication address is displayed here.

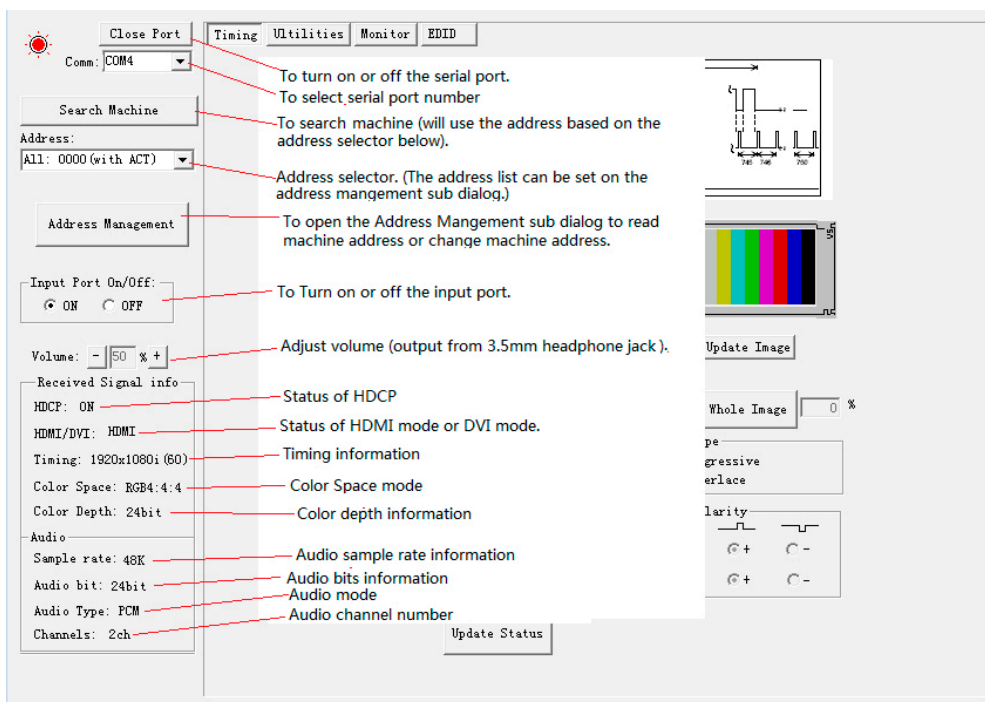
Shown are group and device address; modifications can only be implemented via the PC software.

7.2. Control via RS232 or USB

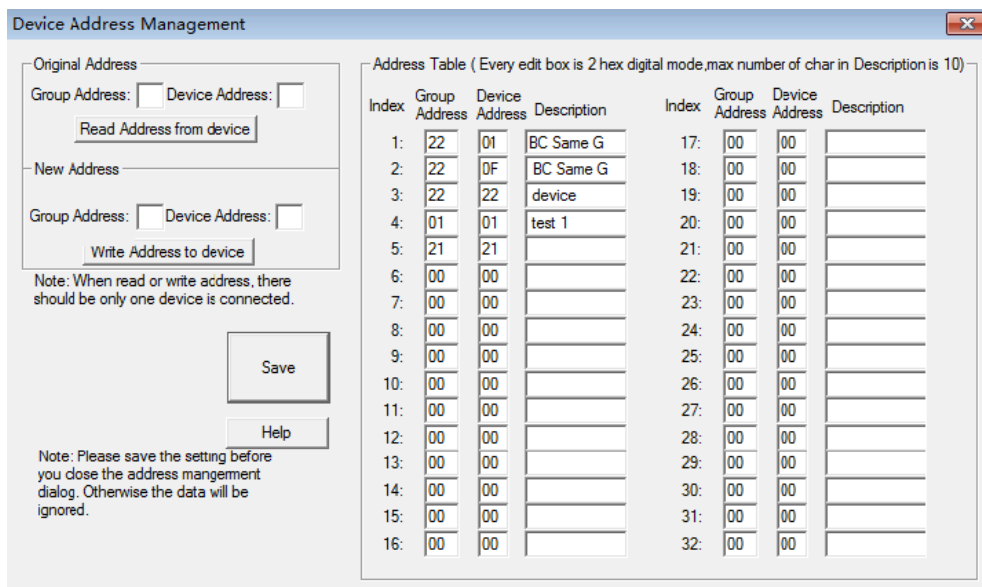
Connect the DVM-HDT-KIT ANALYZER to your computer (via USB or RS232) and run our software DVM-HDT-SG.exe. The following menu pages will show up:

Main menu: On the left side the main menu includes the serial port selection operation for the device communication which includes

- "Open/Close Port" for activating & deactivating the COM-port
- "Comm:" for choosing the right COM port
- "Search Machine"
- "Address:" & "Address Management" functions for controlling networked devices.
- "Input Port On/Off" for standby of the HDMI® interface on the device
- "Volume" for level adjustment of the headphone output
- "Received Signal Info" to show all video and audio parameters of the HDMI® signal stream.



Address management menu



Device Address Management

Original Address
Group Address: Device Address:

New Address
Group Address: Device Address:

Note: When read or write address, there should be only one device is connected.

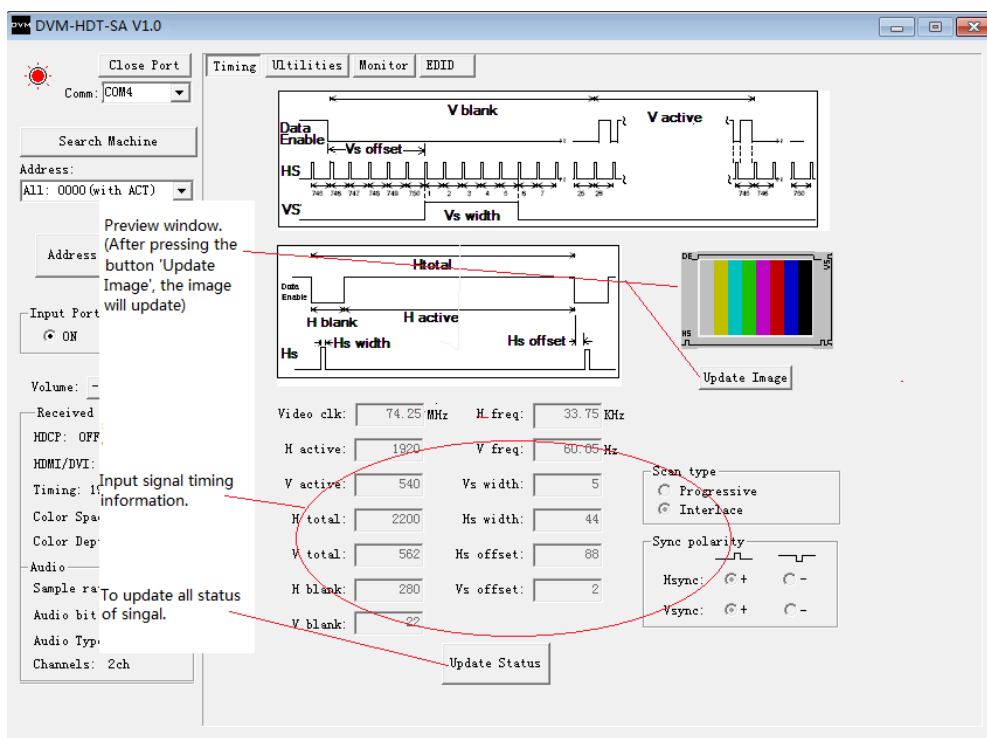
Note: Please save the setting before you close the address management dialog. Otherwise the data will be ignored.

Address Table (Every edit box is 2 hex digital mode, max number of char in Description is 10)

Index	Group Address	Device Address	Description	Index	Group Address	Device Address	Description
1:	22	01	BC Same G	17:	00	00	
2:	22	0F	BC Same G	18:	00	00	
3:	22	22	device	19:	00	00	
4:	01	01	test 1	20:	00	00	
5:	21	21		21:	00	00	
6:	00	00		22:	00	00	
7:	00	00		23:	00	00	
8:	00	00		24:	00	00	
9:	00	00		25:	00	00	
10:	00	00		26:	00	00	
11:	00	00		27:	00	00	
12:	00	00		28:	00	00	
13:	00	00		29:	00	00	
14:	00	00		30:	00	00	
15:	00	00		31:	00	00	
16:	00	00		32:	00	00	

The DVM-HDT-KIT ANALYZER can be used to set up a large test system. All employed DVM-HDT-KIT GENERATORs and DVM-HDT-KIT ANALYZERs can be cascaded via the RS232 (3-pole) Euroblock connector. If more than one DVM-HDT-KIT GENERATOR is connected to a single serial bus, those devices must be assigned different ID addresses. Each address can have a unique identifier with a max. number of 10 characters each. After saving the address table, these can be called up via the address selection in the main menu.

Tab "Timing"



DVM-HDT-SA V1.0

Close Port
Comm: COM4
Search Machine
Address: All: 0000 (with ACT)
Input Port: ON
Volume: -
Received: HDCP: OFF
HDMI/DVI: Timing: 1
Color Spa: Color Dep: Audio: Sample rate: Audio bit of signal: Audio Type: Channels: 2ch

Timing Utilities Monitor EDID

Preview window. (After pressing the button 'Update Image', the image will update)

Input signal timing information.

To update all status

Update Status

Update Image

Video clk: 74.25 MHz H freq: 33.75 KHz
H active: 1920 V active: 540
V active: 540 Vs width: 5
H total: 2200 Hs width: 44
V total: 562 Hs offset: 88
H blank: 280 Vs offset: 2
V blank: 22

Scan type: Progressive Interlace
Sync polarity: Hsync: + - Vsync: + -

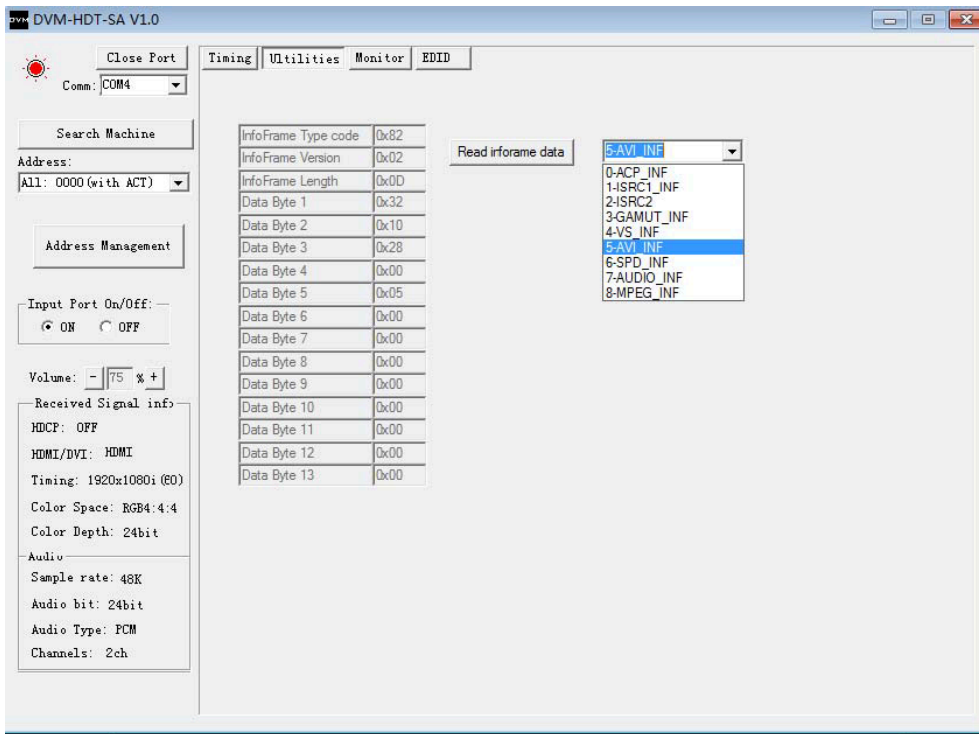
DE HS VS

DE HS VS

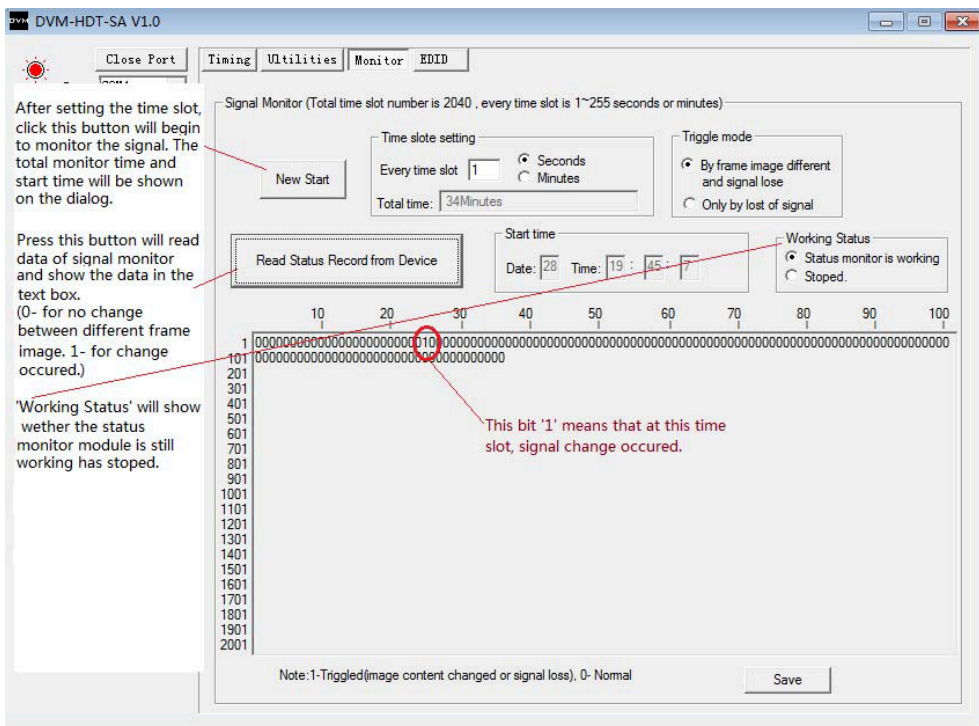
On this tab you can see all clocking & timing information of the current input signal. An image preview is also possible: please use the "Update Image" button for updating the preview (the update will take some seconds). The "Update Status" button is for updating all details.

Tab "Utilities"

This tab can show all HDMI® infoframe information for an in-depth analysis of the HDMI® stream.



Tab "Monitor"

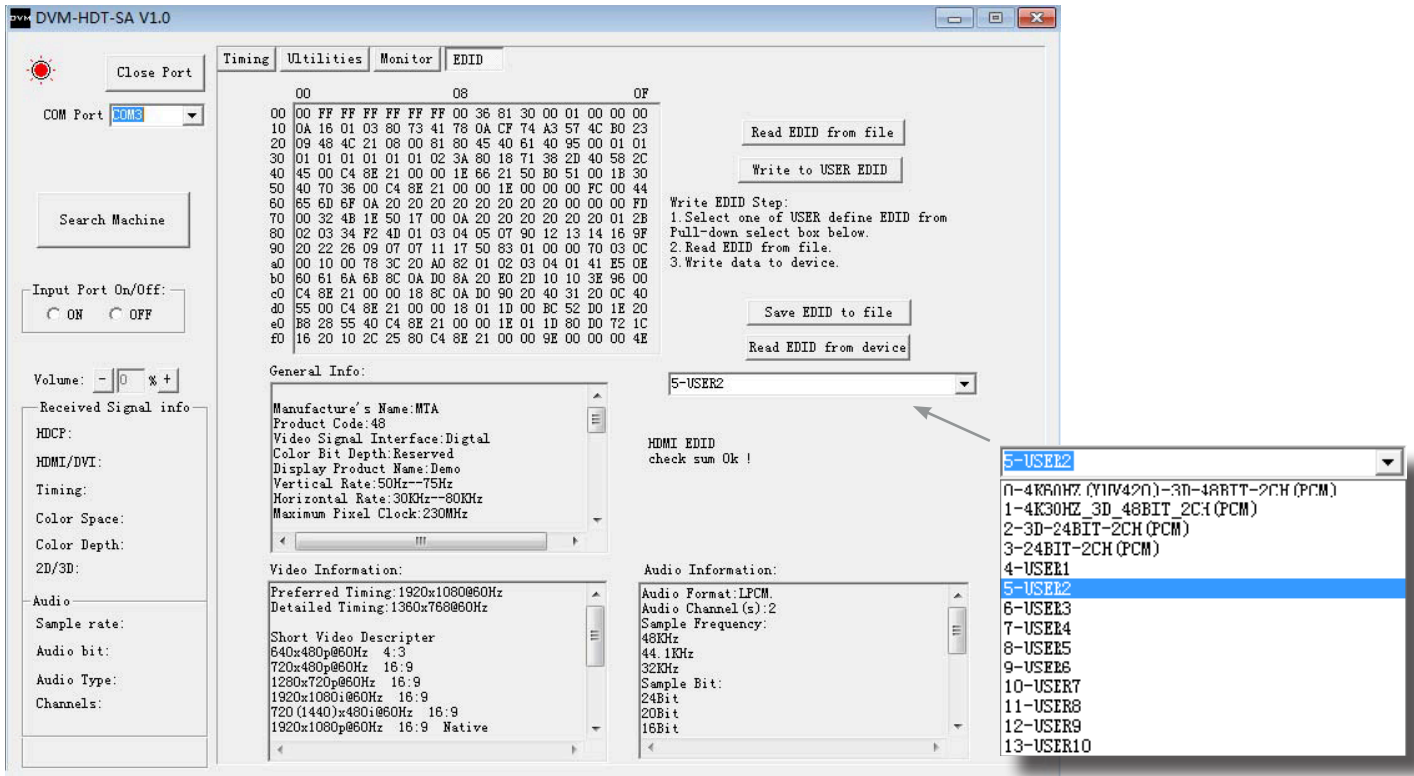


You can use the DVM-HDT-KIT Analyzer for monitoring the stability of the HDMI® input signal. Hereby you can search for signal losses or signal frame deviations. The algorithm compares the current frame image data with the previous frame image data. If there is any difference, '1' will be set. Otherwise it is '0' for no change. Please set a time slot first, the device can report up to 2040 slots. One slot can be from 1 second to 255 minutes. This is a very useful function for service centers, workshops, R&D laboratories, QC departments and manufacturing facilities.

Tab "EDID"

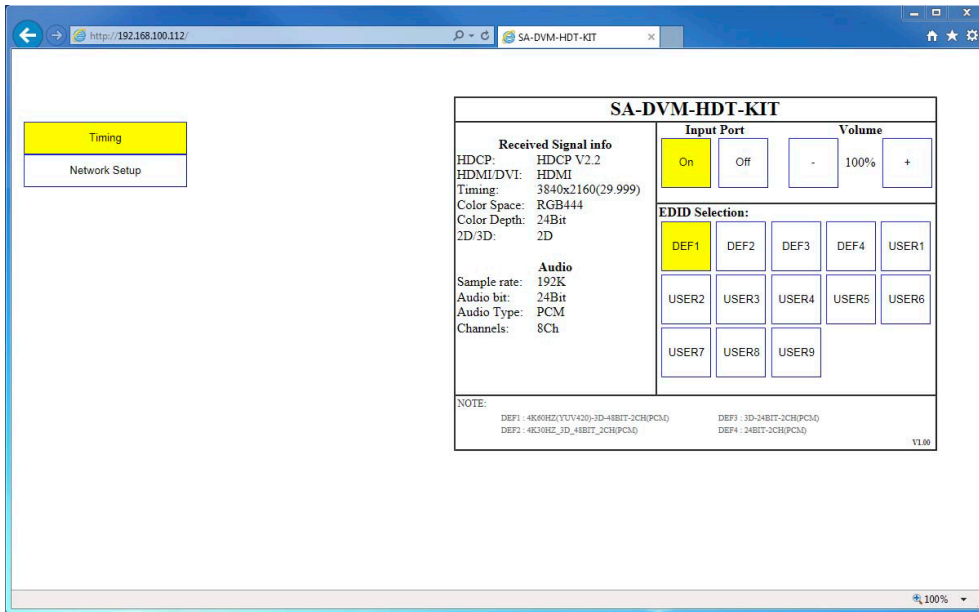
This tab shows all EDID options. You can import EDID sets either from a file or read them from the Analyzer. You can also write user-EDID sets into the device. The DVM-HDT-KIT Analyzer is equipped with 4 fixed sets of EDID informations. You can also define 10 sets of individual user EDID data.

A preview of the currently loaded ID is also available which contains all EDID information both in hexadecimal code and as clear text information.



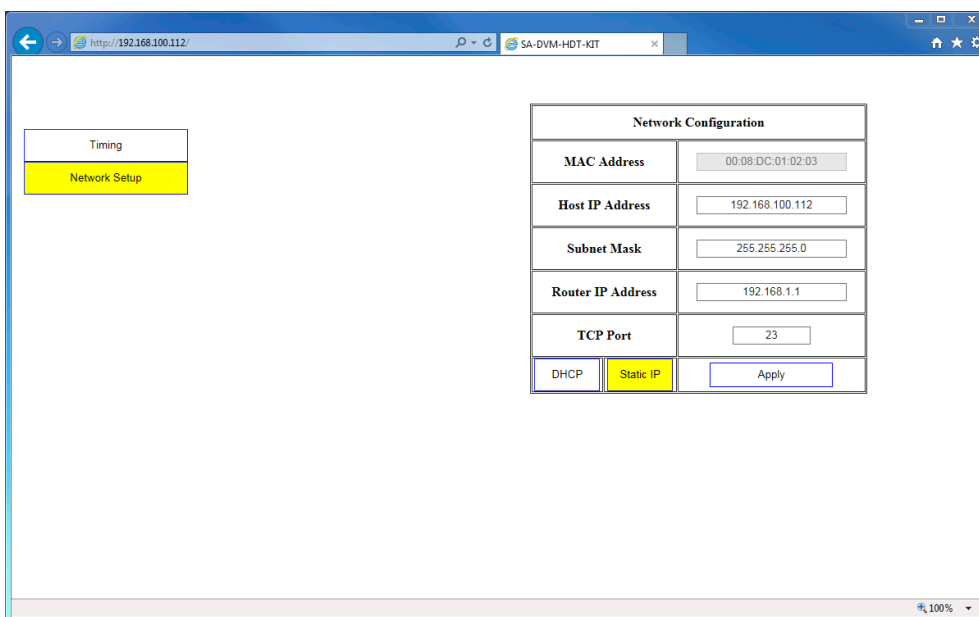
7.3. Controlling via TCP/IP (internal web server)

The integrated web server in the DVM-HDT-KIT ANALYZER provides a super easy, quick access using any standard browser software. Please first check the device IP address in the “Network setup” menu. Enter this address into your browser and the main page will open:



The buttons give direct access to all available EDID sets. You can also adjust the headphone volume and access the input standby function with just one click.

Click on the “Network setup” button to open the network configuration page:



All detailed settings can be found here:

- MAC address (read only)
- IP address / subnet mask / gateway address
- DHCP/static IP setting (only available here!)

8. USB port driver installation guide

Driver installation guide for USB-RS232 emulation

For Windows operating systems an exe file is available. Download this exe file (CDM v2.12.00 WHQL Certified.exe) from the website <http://www.ftdichip.com/Drivers/VCP.htm> and run it to install the driver for the USB RS232 emulation.

Currently Supported VCP Drivers:

Download driver files

Download executable file

Operating System	Release Date	Processor Architecture							Comments
		x86 (32-bit)	x64 (64-bit)	PPC	ARM	MIPSII	MIPSIV	SH4	
Windows*	2014-09-29	2.12.00		-	-	-	-	-	2.12.00 WHQL Certified Available as setup executable Release Notes
Linux	2009-05-14	1.5.0	1.5.0	-	-	-	-	-	All FTDI devices now supported in Ubuntu 11.10, kernel Refer to TN-101 if you need a custom VCP VID/PID
Mac OS X	2012-08-10	2.2.18	2.2.18	2.2.18	-	-	-	-	Refer to TN-105 if you need a custom VCP VID/PID
Windows CE 4.2-5.2**	2012-01-06	1.1.0.20	-	-	1.1.0.20	1.1.0.10	1.1.0.10	1.1.0.10	
Windows CE 6.0/7.0	2012-01-06	1.1.0.20 CE 6.0 CAT CF 7.0 CAT	-	-	1.1.0.20 CE 6.0 CAT CF 7.0 CAT	1.1.0.10	1.1.0.10	1.1.0.10	For use of the CAT files supplied for ARM and x86 builds re

You can also download the driver files only and install them manually.

For other operating systems the driver files must be downloaded and the FTDI USB-UART installed manually.

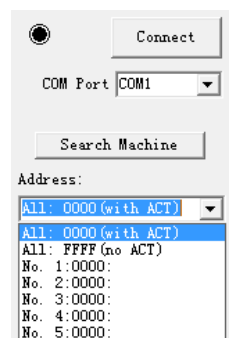
9. Cascading application guide

- A 19" rack mounting frame is optionally available to hold the required number of DVM-HDT-KIT GENERATORS and DVM-HDT-KIT ANALYZERS. The units can be easily mounted into the SOMMER CABLE SYSBOXX frames:



SYG12-02-02

- Connect the DVM-HDT-KIT ANALYZER to the appropriate HDMI input on the sink device.
- Connect the power supply to the DVM-HDT-KIT ANALYZER.
- Assign a different serial address to each DVM-HDT-KIT ANALYZER.
- The RS232 & USB ports can be used to connect the device to a PC for control.
- Set up an address table in the address management menu.
- Please note! During the first setup each device should be addressed independently (please save the settings before closing the dialog window).
- Choose the desired unit by clicking on the respective address in the address select window (pull down menu). Upon address selection the signal status indicated in the menu will be updated automatically.



10. Warranty and Contact information

To the first owner the manufacturer warrants this SA 4K Signal Analyzer/4K Display, under normal use, to be free from defects in workmanship and materials when received in its original packaging.

This warranty is only valid for the first owner, and proof of purchase is required to assert warranty claims.

If there is no proof of purchase provided with a warranty claim, the manufacturer reserves the right to reject the warranty described above. Therefore, labor and parts costs may be charged to the consumer.

This warranty does not apply to the housing or cosmetic appearance of the unit. Abuse, abnormal handling, ESD impact on the HDMI® circuitry, alterations or modifications in design or construction will void this warranty.

A very small number of pixels on the LCD screen – no more than three – is considered normal to fail on the periphery of the active viewing area of the display. The manufacturer reserves the option to refuse service for a display pixel failure if deemed harmless by our technicians to the effective use of the monitor.

Neither the sales staff of the seller nor any other persons shall be authorized to grant any warranties other than those described above, or to extend the duration of any warranties beyond the period of time described above on behalf of the manufacturer. Due to our ongoing effort to improve products and product features, specifications may be changed without prior notice.



DVM-HDT-KIT

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