HDMI 2.0/3G-SDI Signal Analyzer

Installation & Operation Manual

500831

Contents

1. Introduction

HDMI 2.0/3G-SDI Signal Analyzer (500831) is an advanced device for testing the latest HDMI® signal sources with HDMI outputs from such devices as an HDMI® repeater, switcher, splitter, matrix, media players, BD Player etc. It can analyze and display HDMI® signals up to 4K 60Hz 4:4:4, as defined in the HDMI® 2.0 standard. The unit can also be used for SDI signal analysis, including SD/HD/3G-SDI for Broadcast applications.

When used together with the HDMI 2.0/3G-SDI Signal Generator (500830), a useful set of cable tests can be performed to check the HDMI cable quality and the connectivity of signal lines. Such tests may be operated from the HDMI 2.0/3G-SDI Signal Analyzer and the test result will also be displayed on the HDMI 2.0/3G-SDI Signal Analyzer.

Thanks to the product's small size and low power consumption, the unit is powered via an internal battery, which can be charged from the included power supply. The battery supports 5 hours of normal operation between charges. This convenience permits the operator to run tests

in areas where AC power may not be easily accessible, and allows for a device that is highly portable and can be easily included in a video technician's toolbox. The device is also well suited for stationary laboratory environment applications.

The integrated 3" (Inch) TFT LCD panel is very usefully for the purpose of visual viewing of received HDMI® signal contents.

In addition to viewing video signals, the OSD (on Screen Display) feature on the LCD panel will overlay results of the HDMI® source signal video analysis.

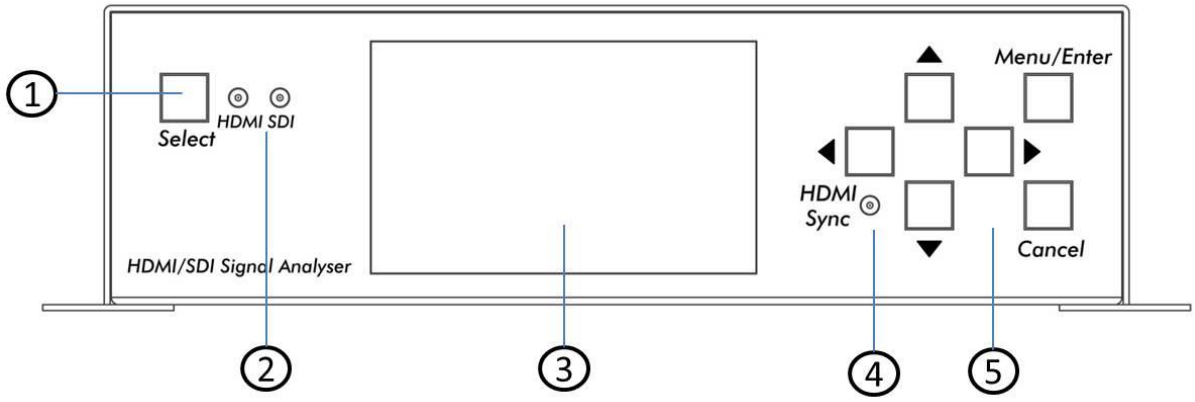
Free Windows based Control Software is available on the MuxLab website for the purposes of expanding the devices features and reach capabilities. The included USB cable will allow the HDMI 2.0/3G-SDI Signal Analyzer to be easily connected to a Windows based computer. The Control Software will allow measurements of many Video parameters, including bit-error.

2. Package Contents

1. Main unit: HDMI 2.0/3G-SDI Signal Analyzer
2. 5V 1A power supply

3. Wall-mounting bracket (x2)
4. 1.2m USB cable (x1)
5. Stick-on rubber feet (x4)

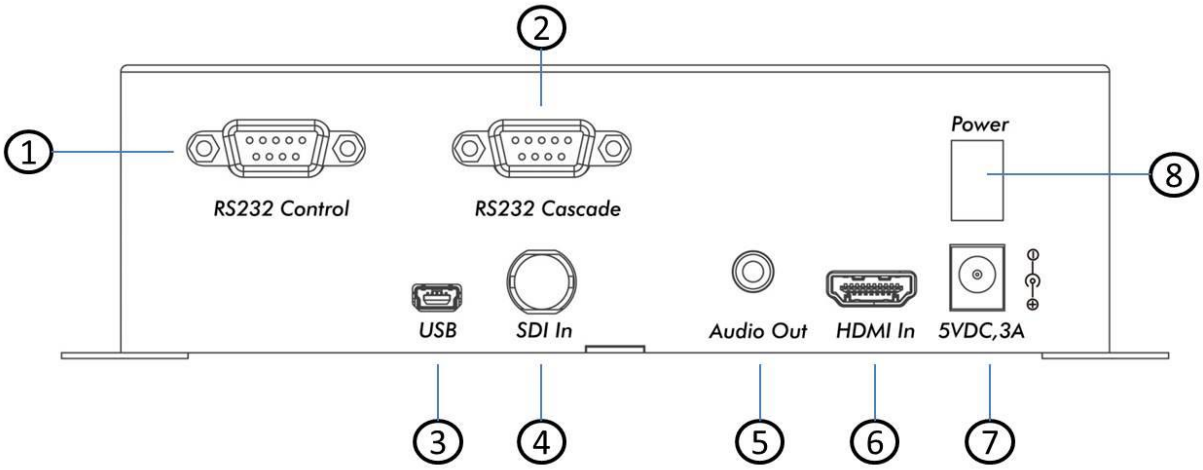
3. Product Panel Overview



3.1 Front panel

1. HDMI/SDI mode select button
2. HDMI or SDI mode LED Indicator
3. 3 inch LCD panel. The display shows actually signals received on the HDMI input port, as well as to control/navigation menus and device settings.
4. HDMI Sync Status LED. Shows the HDMI link status and is lit when the link is active. The LED will be off when the link is lost or the HPD is not present from the sink device. The link will blink if an EDID error exists.
5. Convenient and ergonomic buttons for operating and navigating menus and settings with Up, Down, Left, Right,

Enter (select) and Cancel buttons.



3.2 Rear panel

1. DB9 connector for RS232 control
2. DB9 connector for RS232 cascade, to other tester
3. USB port for control
4. SDI in
5. 3.5mm jack for 2CH analog audio out
6. HDMI in
7. 5V DC socket
8. Power switch

4. Features

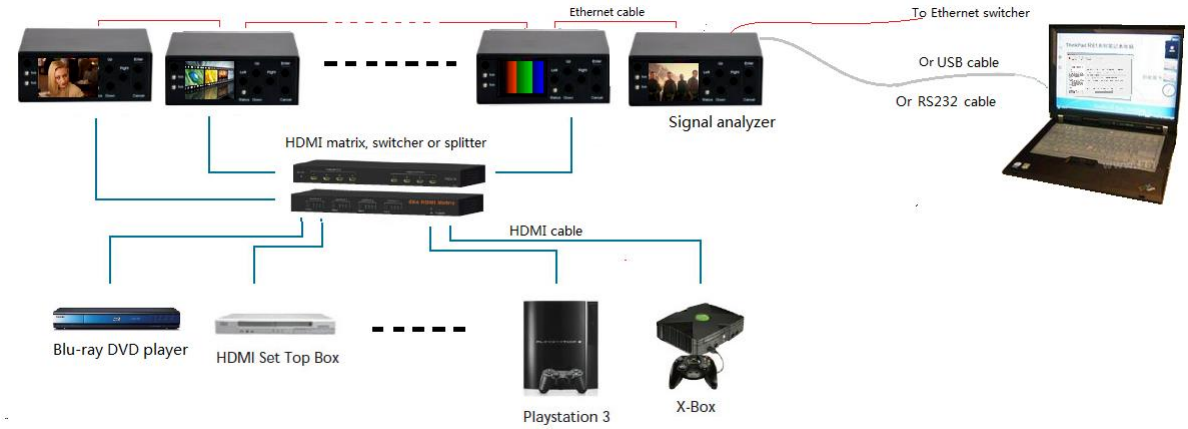
- Powerful and affordable testing solution AV R&D engineers, integrators and installers
- Supports 4Kx2K 24Hz/25Hz/30Hz/50Hz/60Hz and 3D, 4K 50/60Hz YUV420 is only used for HDMI®2.0

- Support RGB4:4:4, YUV4:2:2, YUV4:2:0 and Deep-Color
- Support SD/HD/3G-SDI
- 3 inch high resolution LCD panel for displaying input video and OSD for Menu settings display
- VU meter available on the LCD panel to help users see the volume on each audio channel
- HDMI cable test function can help users diagnose cable problems when the HDMI link is problematic
- Signal characteristics for actual audio present on the 3.5mm Audio-out socket is displayed on the OSD (Note that analog audio is only available in PCM mode)
- EDID can be managed by the Windows based Control Software
- The embedded software (firmware) includes 4 sets of fixed EDID settings and 10 memory slots for 10 sets of user defined EDID settings
- HDMI receiver module can be powered up and powered down in any order – to emulate an HDMI® sink device power On/Off sequence

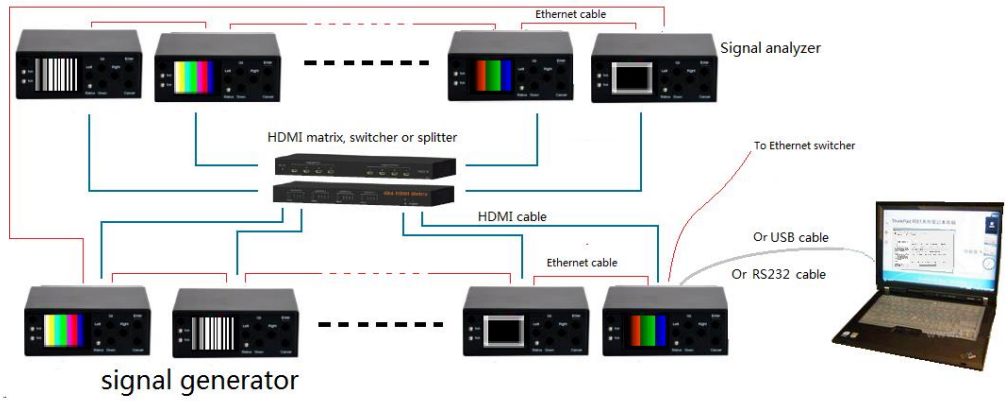
5. Specifications

HDMI Version	HDMI®2.0 / DVI
HDCP Support	Yes
HDCP Version	HDCP2.2/HDCP1.4
HDMI Video Bandwidth	Up to 18.0GHz (6.0GHz per channel)
SDI version	SD-SDI/ HD-SDI/ 3G-SDI
Color Depth	24bits, 30bits, 36 bits, 48bits
Color Space	RGB444, YUV444,YUV422, YUV420 (HDMI2.0 only)
Audio Bits	26bits, 20bits, 24bits
Audio Sample Rate	32K, 44K, 48K, 88K, 96K,176K,192K
Vertical Frequency Range	≤ 120 Hz
Power Consumption (max.)	2 Watts
Housing	Metal
Dimension (mm)	170mm x 109mm x 50mm
Weight (g)	930g

6. Applications



The HDMI 2.0/3G-SDI Signal Analyzer is an SDI receiver or HDMI® sink emulator that can be used to test SDI or HDMI Sources, such as Media Players, BD players, Matrix Switches, Switchers, Splitters, Repeaters, and numerous other HDMI devices for proper functionality.



The HDMI 2.0/3G-SDI Signal Analyzer (500831) also works with the HDMI 2.0/3G-SDI Signal Generator (500830), which is practical when testing devices placed between source and sink equipment, such a matrix switches, switchers and splitters as shown below. This device pairing creates a flexible and powerful UHD test system. The test systems can be controlled via a single RS232 control port, due to the fact that the RS232 signal can cascaded (daisy chained) across multiple testing devices (500830 & 500831 devices).

The combination of the HDMI 2.0/3G-SDI Signal Generator (500830) and HDMI 2.0/3G-SDI Signal Analyzer (500831) provides the user with a sophisticated low cost UHD troubleshooting testing system. The setup can be used to analyze bit error levels, and for long term "Time /Event based sampling" tests that are extremely difficult to do by individual technician alone.

The HDMI 2.0/3G-SDI Signal Analyzer offers sophisticated functionality in a compact size, making it a valuable tool for AV professionals.

7. Operation Control & Functions

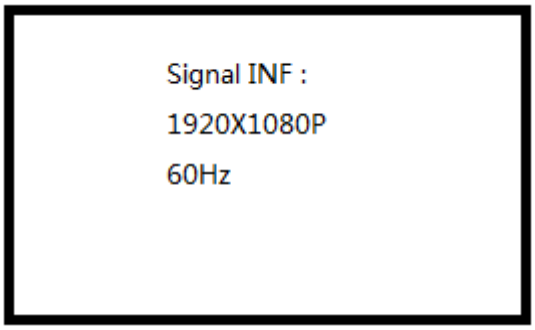
1. Connect an HDMI cable to the HDMI® source device.
2. If needed, connect the PC RS232 to the phoenix socket or use a USB cable to connect to the HDMI 2.0/3G-SDI Signal Analyzer via USB port for controlling the Analyzer.
3. The Signal Analyzer can be run on the internal battery, or can be run via an external power source, such as from the included power supply by connecting the power supply to the Signal Analyzer power socket.

4. The Signal Analyzer may be controlled via the Front Panel by using the ergonomic push buttons.
5. Be sure the HDMI out LED is lit on. If this LED is off but SDI OUT LED is on, then press the button to change the mode to HDMI mode.

For SDI applications, follow the same method to set up the system. But you need to ensure the SDI OUT LED is lit (is on). If this LED is off but HDMI LED is on, then press the button to change the mode to SDI mode.

6. Menu mode:
    - The 'Enter' key can operate as a MENU or Enter (Confirm) function key.
    - Press 'Enter' to activate Menu mode and display the various available menus. Menu mode will turn off automatically after 5 seconds of no input activity.
    - Press 'Cancel' to turn off Menu mode.
    - While in Menu mode the user can scroll through the various available menus.

  - The ‘Left’ or ‘Right’ button is for selecting menu items.
  - The ‘Up’ or ‘Down’ button is used for selecting a parameter and also upon selection, changing its value
  - ‘Cancel’ button is used for exiting the menu.
- When ‘Enter’ is pressed, the first menu (for changing time) will be displayed.
- The Menu will turn off automatically in 5 about seconds.



- Pressing ‘Up’ or ‘Down’ will show additional formation concerning the input Video signal, such as:
  Timing, Color-Space, Color-Depth, HDCP, HDMI/DVI, Audio Sample rate, Audio resolution, External audio, and Audio channel.
- Press the ‘Left’ or ‘Right’ button to bring up further menu items:
  - Volume (Increase/Decrease)

- Input standby (On / Off)
- EDID select (4 fixed EDID and 10 user defined)

- The VU meter function and HDMI cable testing function both need to operate the OSD menu.

HDMI cable testing

TMDS D2+	Ok	DDC	Ok
TMDS D2-	Ok	CEC	Ok
TMDS D1+	Ok	ARC	Ok
TMDS D1-	Ok	HPD	Ok
TMDS D0+	Ok	5V line	Ok
TMDS D0-	Ok		
CLK+	Ok		
CLK-	Ok		

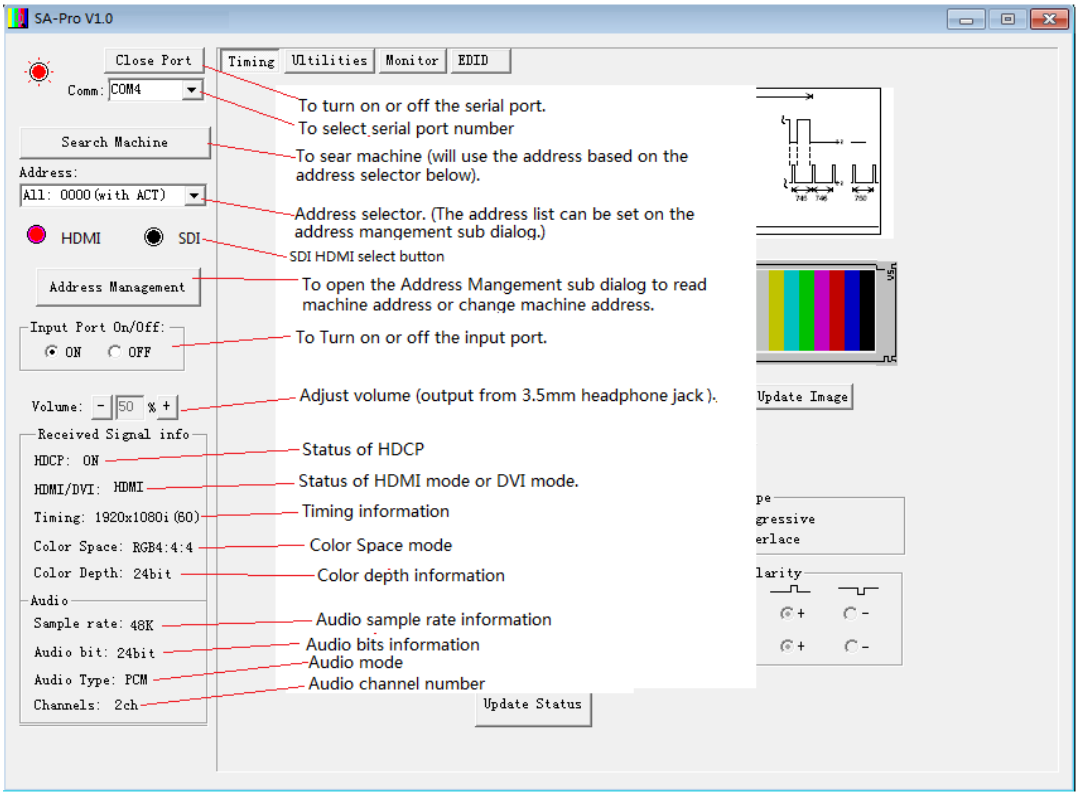
Note: Only connect HDMI cable between The 3G-SDI Signal Generator and the 3G-SDI Signal Analyzer, so that the HDMI cable test function will work properly.

7. Control the Signal Analyzer from a PC via RS232 or USB.

a) Main menu (on left):

The main menu is located on the left portion of the screen, which allows for, serial port selection, which includes a sophisticated "Auto Search Machine" function, "Address Management" function, "Input port On/Off, and information via OSD showing video and audio parameters.

Note: The Search Machine is a very useful function. With a single click of this button, software will search the Signal Analyzer from COM1 to COM30 (com port number must be 1~30) based on the selected address on the "Address select" pull down menu. If just one device is connected to the Control chain, you don't need to set the address, because the default broadcast mode address 0000 will work well in this case.



b) Timing information menu:

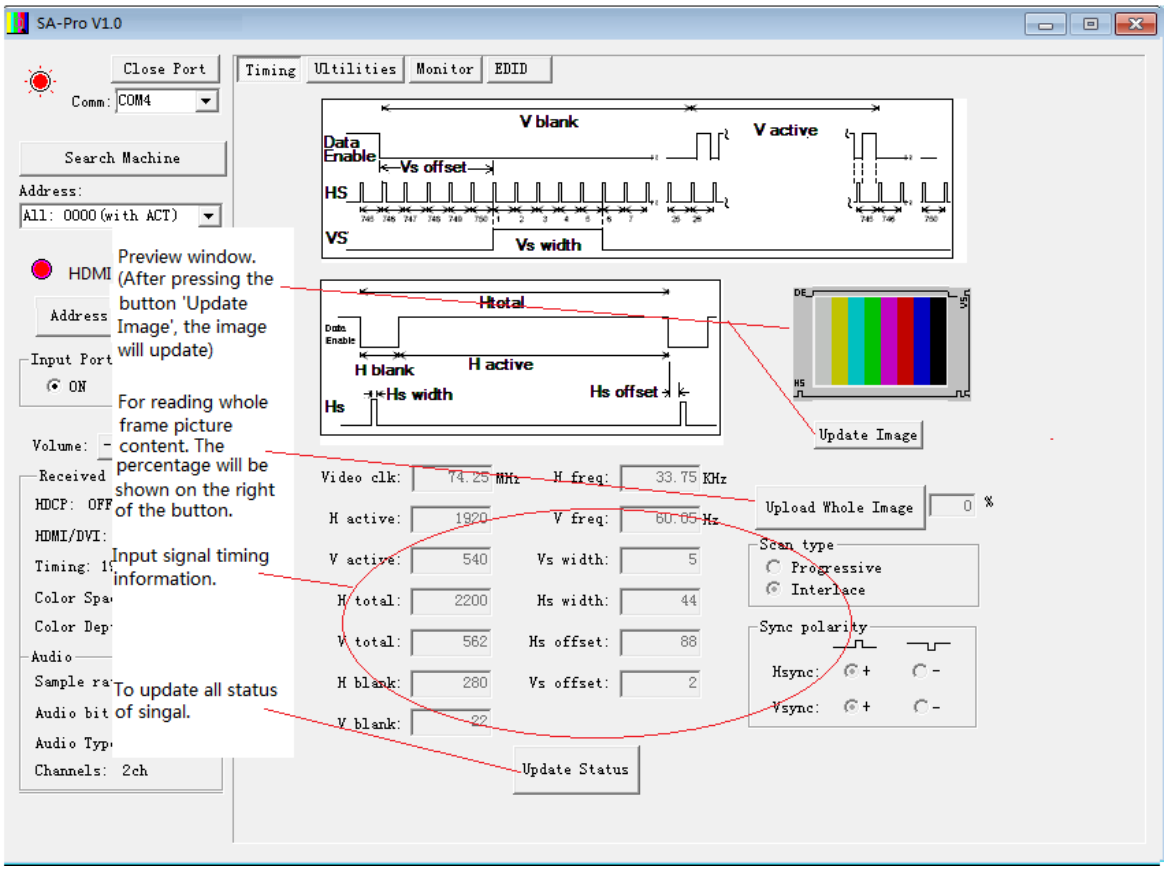
On this menu, detailed information on the Audio/Video input signal will be displayed.

In case you need to preview an image in the Control Software, a small size image to preview can be shown after pressing the button 'Update Image'.

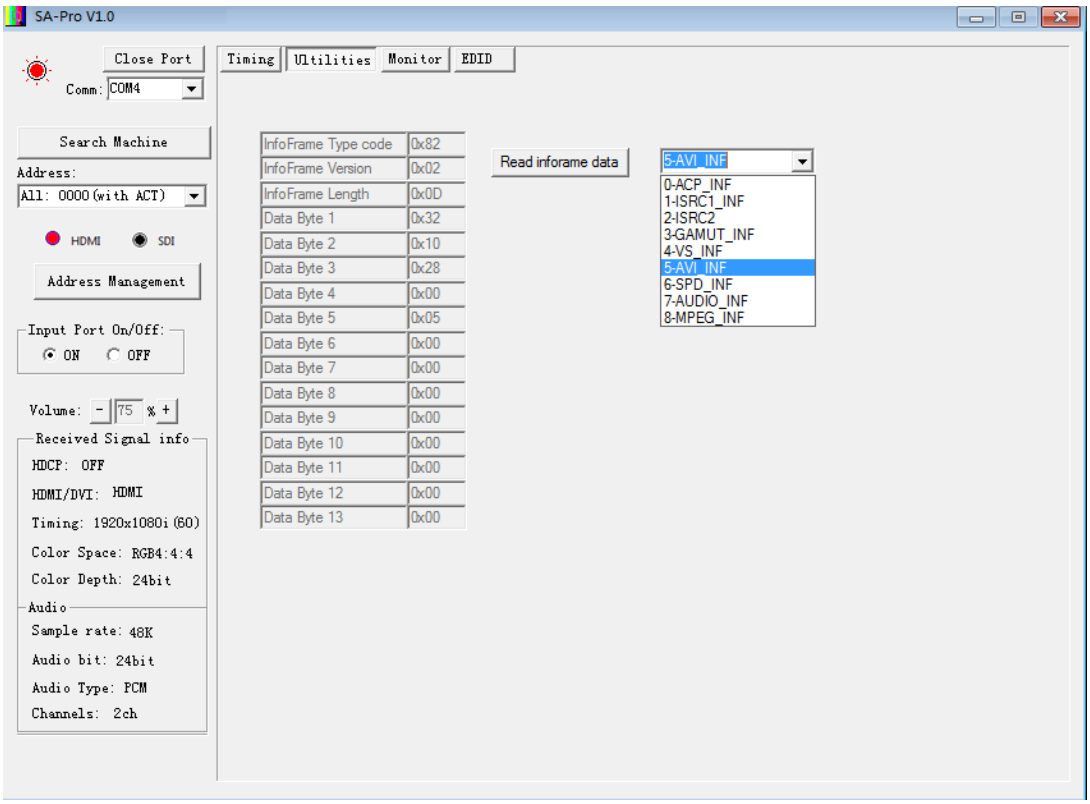
The whole image data can be read from the Signal Analyzer and will be saved as a BMP file. This function is useful for analyzing a signal or just for capturing image content for further analyzes. (**Note:** The image before being captured must be placed

into freeze mode or should be a still frame.) The download speed from the device to the PC is slow due to the low serial port speed.

About 9 minutes is required to download a 1080P image, and 4 minutes for 720P.



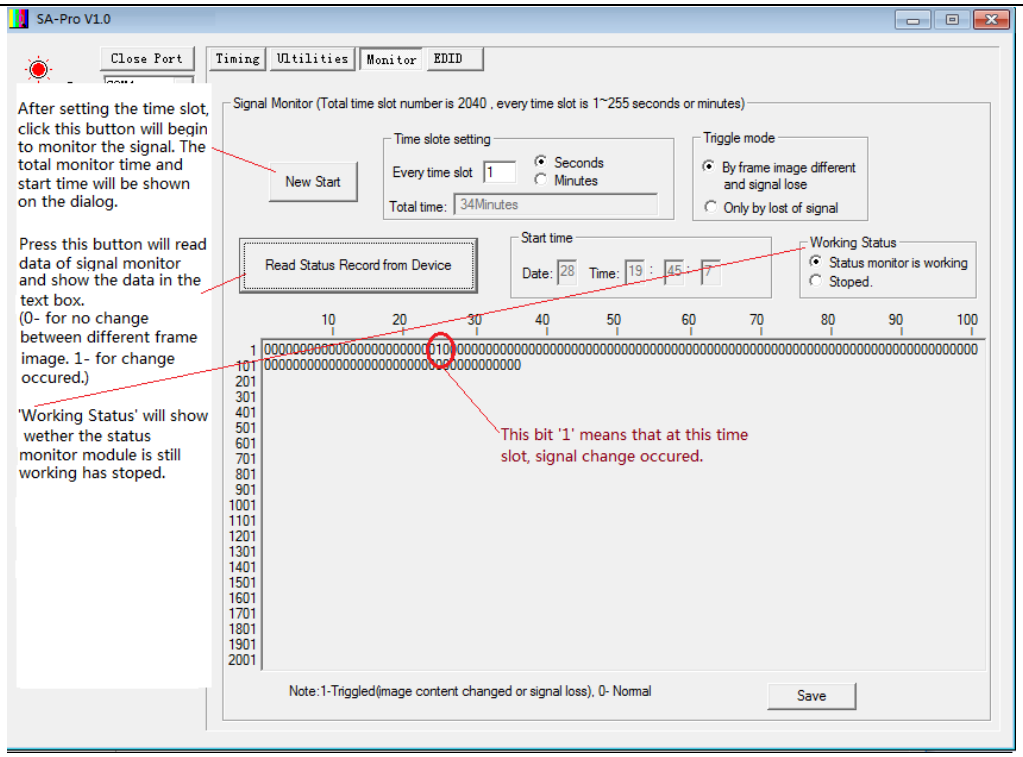
c) The Utilities menu allows the user to read Frame data.



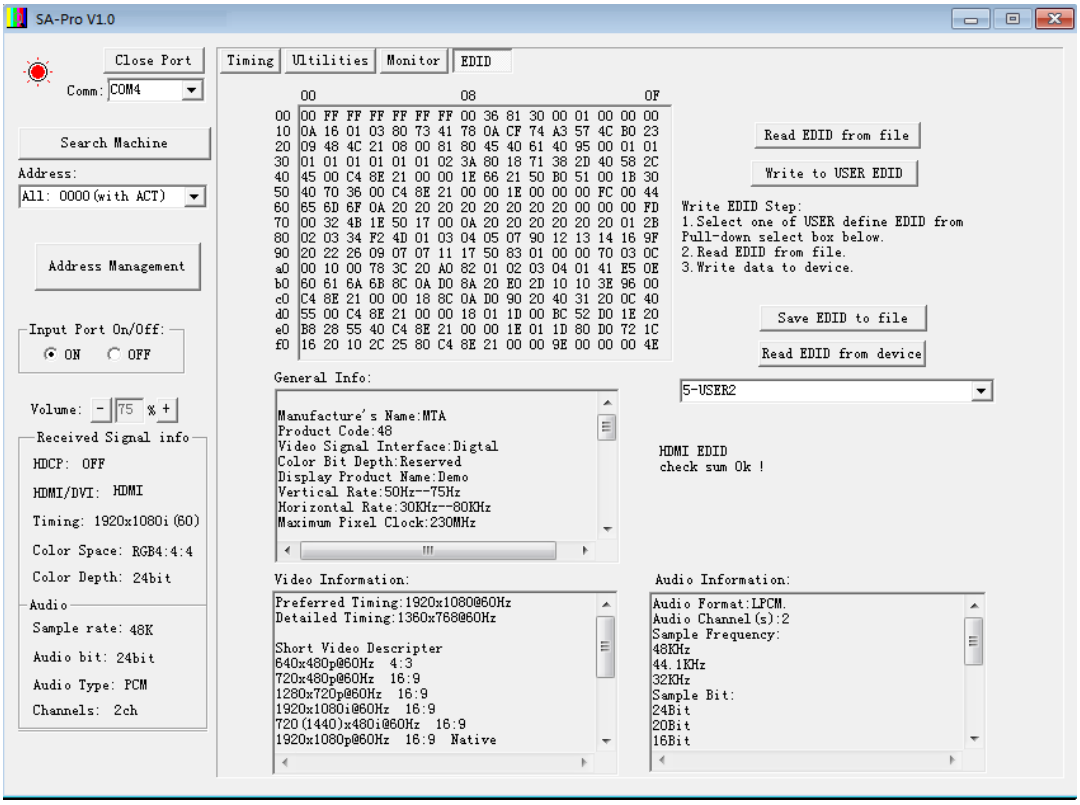
d) Signal status monitor menu.

The HDMI 2.0/3G-SDI Signal Analyzer can be used for the purpose of monitoring input HDMI signal stability. An algorithm will compare the current frame image data with the previous frame image data. If there is any difference, a '1' will be set. Otherwise, it will be a '0' (for no change).

This is a very useful function for Service companies, Workshops, R&D Laboratories, QC Departments and Manufacturing facilities.

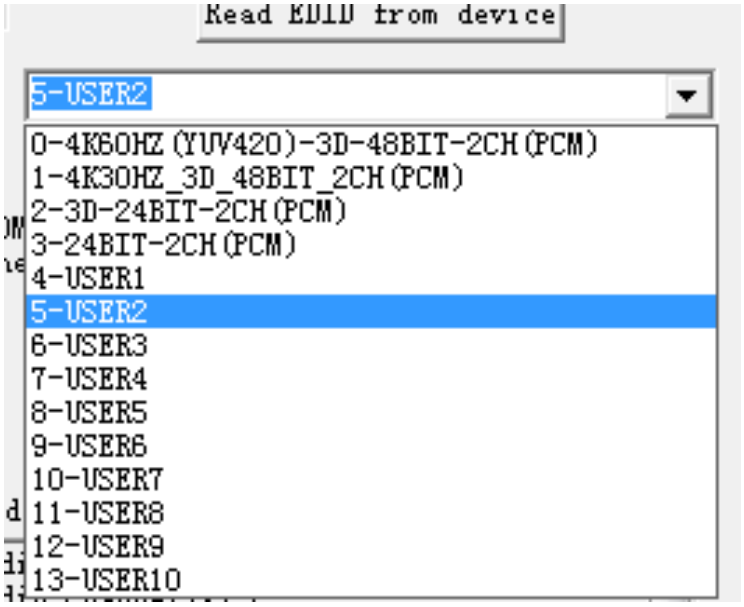


e) EDID menu.

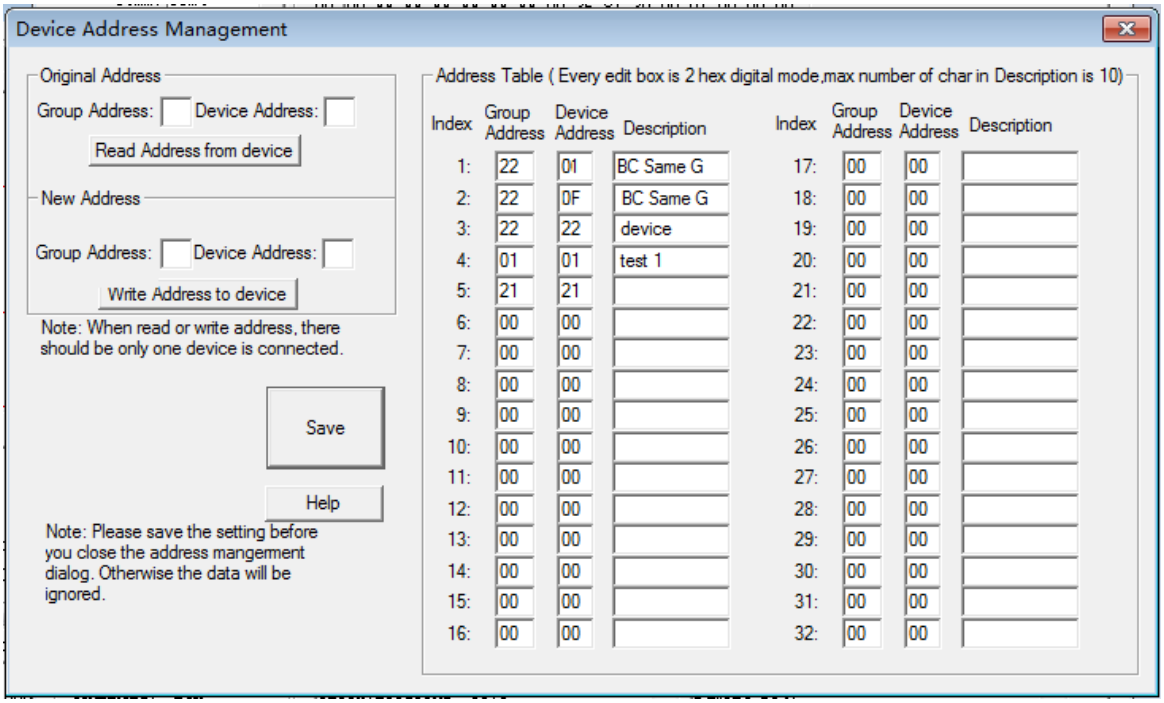


There are 4 registers for fixed EDID data and 10

registers of potential user defined EDID data, see below.



f) Address management menu.



The Signal Analyzer can be used to set up a large test

system. All Signal Generators and Signal Analyzers in a system can be cascaded by using the RS232 (3 pin) Phoenix connector. When more than one Signal Analyzer is connected on a single serial chain (Bus), these devices must have unique (different) identification address.

Each address can have a binding note, which has at most 10 characters. After the address table is saved, they it can be selected via the address selector on the main menu.

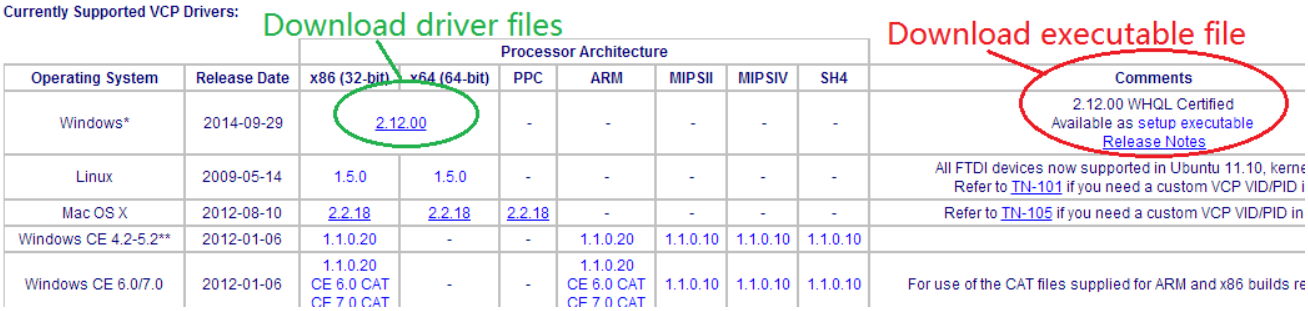
8. USB Port Serial Driver Installation

For a Windows system, there is an executable available.

Download executable file from the website:

http://www.ftdichip.com/Drivers/VCP.htm

Execute the downloaded file ' CDM v2.12.00 WHQL Certified.exe ' to install the driver for FTDI USB-UART.



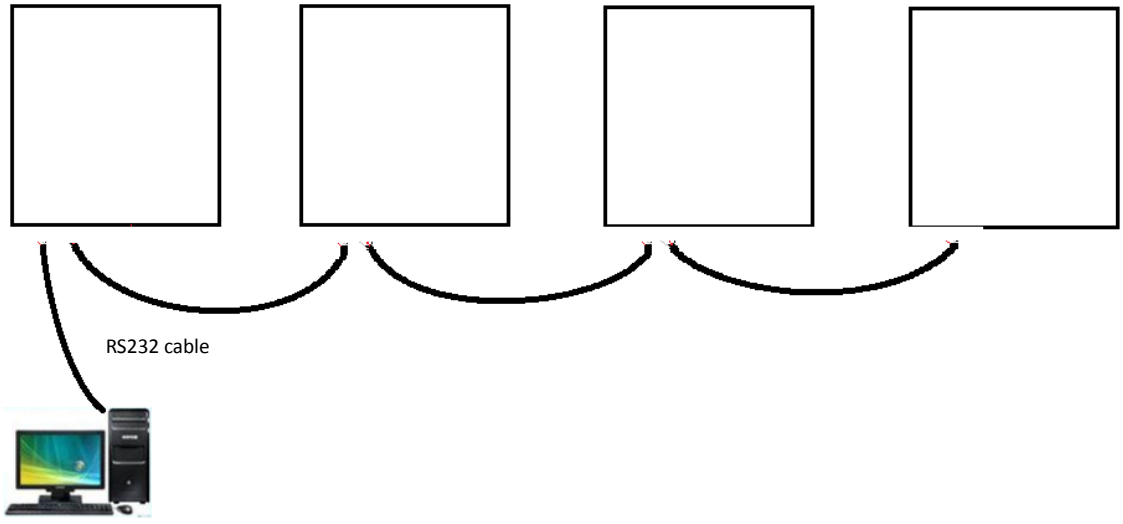
Or download the driver files and install the FTDI USB-UART manually.

For other Operating Systems, you need to download the

driver files and install the FTDI USB-UART manually.

9. Cascading the Control Bus

1. Connect the Signal Analyzer to an appropriate HDMI output port on a source device (such as a Blu-ray player, etc.).
2. Connect the power supply to the unit. The unit can also operate on the internal battery.
3. The RS232 port or the USB port can be used for control.
4. There are two RS232 ports. The first RS232 port is used for control, while the second RS232 port is for cascading and can be used to connect to the next Signal Analyzer down-stream. In this way, many Signal Analyzers can be cascaded and controlled easily.



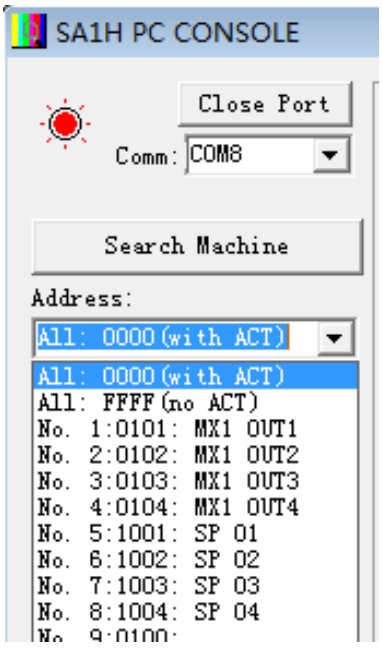
5. Set different Serial address for each Signal Analyzer and Signal Generator (if any).
6. On the first unit connect the RS232 Control port to the

controlling PC and connect the RS232 Cascade port to the next down-stream Signal Analyzer or Signal Generator RS232 Control port, and so on.

7. Use the DB9 to Phoenix cable to connect the first Signal Analyzer to a PC.
8. Setup the address table on the address management Menu.
9. **Please Note!** During first time setup you should program ID address for each device independently.

   [Please save settings before closing dialog!]

10. Choose a device by selecting the address from the Address Select (pull down menu). When the address is selected, the status of the signal shown on the menu will be updated automatically.



10. Warranty

MuxLab warranties that this unit will, under normal use, be free from defects in workmanship and materials, when received in its original container, for a period of two years from the purchase date. This warranty is extended to the original purchaser only, and proof of purchase is necessary to honor the warranty. If there is no proof of purchase provided with a warranty claim, MuxLab reserves the right not to honor the warranty set forth above, and labor and parts may be charged to the consumer. This warranty does not apply to the product exterior or cosmetics. Misuse, abnormal handling, ESD on HDMI circuitry, alterations or modifications in design or construction will void this warranty. It is considered normal for a minimal amount of pixels on a screen, not to exceed three, to fail on the periphery of the display active viewing area. MuxLab reserves the option to refuse service for display pixel failure if deemed unobtrusive to effective use of the monitor by our Service Department. No sales personnel of the seller partner or Distributor or any other person is authorized to make any warranties other than those described above, or to extend the duration of any warranties on behalf of MuxLab, beyond the time period described above. Due to constant effort to improve products and product features, specifications may change without notice.

8495 Dalton Road, Mount Royal, Quebec, Canada
Tel: (514) 905-0588
Fax: (514) 905-0589
Toll Free (North America): (877) 689-5228