Murideo

Fox & Hound Test Kit - Installer Pro Tools

AVPRO-AC-FXHD-KIT

HDMI 2.0 18 Gbps Audio/Video Generator & Analyzer

User's Manual

Version 1.00

Important Safety Information

- Follow all instructions
- Use only a dry cloth to clean
- Use caution not to block side vents on unit
- Indoor use only: To reduce the risk of electric shock, do not use near water or expose to rain or moisture. Keep away from excess moisture
- Do not use near heat sources such as room heaters, hot A/V equipment
- Read all warnings
- Use only accessories provided by Murideo
- Unplug the device during lightning storms or when unused for long periods of time
- Keep away from open flames
- Protect all connected cords including power cords from being pinched, compressed, and stepped on
- Do not open the case. All servicing should be done only by qualified and approved service personnel and will void the warranty.
- Electrical Input Rating: Power over 5V/DC 700mA. Caution: Use only the supplied AC/DC Adapter
- Operating temperature range: e.g. 0 to 40C.
- For charging use the provided 5V/ DC 3A supply only
- To disconnect power sources, remove the AC/DC adapters from the wall outlets.

Attention – High Voltage Protection:

1. In order to protect your FOX & HOUND and complete system under test from possible damages, please don't turn on the FOX & HOUND power switches before generator Output is attached to tested device (repeater, video processor or display) input. Please make sure that system under test is completely powered off before you insert or extract HDMI cable to any of involved devices.

2. Please insert and extract HDMI cables from your FOX & HOUND gently and with high level of care. We highly recommend you use a port-saver if you main use of the kit is testing cables (many insertions and removal of HDMI cable).

3. Reason to be careful - during Hot-Plug between HDMI connector and receptacle (when tested device is On) ESD discharge can occur due to the potential differences (possible ground -loop) between powered equipments. These potential differences can be at an extremely high level.
Our FOX & HOUND HDMI output is protected against ESD discharge up to 7KV on all active HDMI lines, but in the case of a massive discharge this value can be exceeded and will cause serious damage to FOX & HOUND internal circuitry and can make FOX & HOUND HDMI output completely inoperable. We have sophisticated methods to measure directly on the high voltage protection chips to provide evidence of such an unwanted ESD event, but unfortunately, that will automatically void FOX & HOUND warranty. In your own interest please pay full attention and prevent your workplace from occurrence of ESD by trying to create Static-safe working environment.

Table of Contents

Overview

Fox & Hound: HDMI 2.0 Testing & Troubleshooting for A/V Integrators

Thank you for purchasing the Fox & Hound HDMI Testing Kit.

Five top reasons for owning Fox & Hound:

1. To troubleshoot HDMI distributed systems
2. To verify display and projector HDMI ports for maximum signal capability
3. To validate HDCP 2.2 compliance
4. To provide 18 GBPS and HDR source signals for video calibration
5. Peace of Mind

The Fox & Hound is the first low-cost, 2-piece, battery-operated HDMI 2.0 test kit on the market, brought to you by Murideo, and the team that developed the Fresco advanced HDMI analyzing tools (6A and 6G)

The Fox & Hound testing and troubleshooting kit comes with a **Generator** that generates test patterns for video and audio at the HDMI 2.0x level, additionally, the kit includes an **Analyzer** for analyzing the output of any source or repeater under test.

The Fox & Hound enables you to completely test from **Source** to **Sink** (and all **Repeaters** in between) for failures in the HDMI ecosystem. These tests include end-to-end systems throughput testing up to 18 Gbps (All HDMI timing and selected VESA timings). EDID tools, HDCP 2.0 tools, Audio confidence tests, HDR verification, HDMI Cable test and more.

The Fox & Hound is battery operated, comes with a hard case for the F&H and accessories, and is guaranteed to make your life easier when you can reduce reworks and troubleshooting and your overall support costs go down.

Key Features:

- HDMI 2.0 Support. 600 Mcsc - 2160P @60 4:4:4 Maximum Resolution
- HDCP Pass/Fail - HDCP 2.2, 1.4 or None Indicator Light >Some of the 4K UHDs on the market today support HDCP 2.2 - The Fox & Hound will tell you what the TV will and won't support.
- HDMI Cable Test – Know immediately if your HDMI cable or HDBaseT extender is defective with complete BER testing from source to sink (results presented as Pass or Fail).
- Status Light > Instant notification if HPD and 5V is active. On the fly indicator for troubleshooting issues especially when switching, splitting and extending HDMI.
- EDID Read and Save functionality >did you know most 4K TVs still have 2K preferred timings? Know what your TV is telling you.
- Deep Color Testing > 48 Bit per pixel color depth > Todays TVs are still 24 bits per pixel, but the new Blu-Ray may be 30, so lots of headroom is available.
- HDR Confidence Testing – tests for the presence of the HDR signal for both HDR-10 and HLG > gives you the confidence that your distribution system will support High Dynamic Range, which is becoming more common rapidly.
- Portable - Battery Operated > Rechargeable batteries included make field troubleshooting much easier.
- Optimized Ergonomics – 2.5" LCD display and simple menu system makes Fox & Hound very user friendly.
- Includes audio confidence test tones > to make sure audio is active on the HDMI line
- Field upgradable via firmware.

What's in the Box

- 2.0x Generator (Source)
- 2.0x Analyzer (Sink)
- 2 each 5 V DC/AC Power Supply / Charger (110-240 VAC) with set of International plugs (US, UK, AU, EU).
- Rechargeable Battery Pack (installed)
- Hard Case
- 3' Micro USB to USB cable for firmware Updates
- User Manual (recommend you download latest version from F&H Site)

Please read the entire manual before turning on your new Fox & Hound testing system for helpful tips on charging and battery life extension.

Functionality Diagram Generator

From Top to Bottom (Left to Right)

Buttons/Indicators

a. HDCP Indicator – indicates the presence to HDCP
b. Status Indicator – indicates that Hot Plug event has occurred and there is a successful connection between source, sink and repeaters in the system.
c. 4K Button – brings up a selection list of all 4K timings up to 18 Gbps
d. 1080 Button – brings up a selection list of all High Definition (HD) 1080 timings.
e. 720 Button - brings up a selection list of all High Definition (HD) 720 timings.
f. Power Button – use to power the unit on or off.
g. VESA Button - brings up a selection list of all VESA timings (PC).
h. Auto Button – when pressed, reads the EDID from the sink device connected to the generator and outputs the preferred timing from the EDID. Note: Auto screen is only place to see actual battery charge level.
i. SD Button - brings up a selection list of all Standard Definition (SD) timings.

j. HDCP Button – brings up a selection list for HDCP troubleshooting – HDCP Off, HDCP 2.2 and HDCP 1.4
k. Audio Button - brings up a selection list of audio output formats for audio confidence testing.
l. Color Button – brings up a selection list of Color (chroma subsampling) selections. Use this in combination with a timing button to achieve desired bandwidth for system testing.
m. HDR Button – use this to test for HDR-10 or HLG (Hybrid Log Gamma).
n. Back Button – Use this button to return to pattern selection screen.

Note: Rotary Switch in middle of buttons (reference for items o-q).

o. Up/Down Arrows – Use these to scroll through patterns or scroll through sub-menu items.
p. OK Button – Use this to select menu items – change timing, HDCP type, HDR, etc.
q. A & B Buttons – Press and hold either A or B button for 3 seconds to store the current configuration – includes timing, color, HDCP and pattern – handy feature for A/B testing of new and existing infrastructure.

Note: Top Panel of Generator Indicated below (reference for items r-u).

r. HDMI OUT connector – connect to any sink or repeater input via HDMI cable.
s. USB ISP – port used for installing firmware updates if required.

t. DC/5V – DC 5V power port – connect included power supply to this connector – use for charging and can be used for operation
u. Charge Status – when lit changing is in process.

Functionality Diagram Analyzer

From Top to Bottom (left to Right):

a. VOL + Button – Use this button to increase the volume of the internal speaker when an audio signal in being generated by the analyzer or from a source device.
b. EDID Select Button – This button allows selection of 5 default EDIDs and 2 User EDIDs.
c. Re-Sync Button – This button causes a hot-plug event when pressed – use this for troubleshooting distributed systems. It is not necessary to plug/unplug HDMI cable when using this button.
d. Power Button – Use this button to power the unit on and off.
e. VOL - Button – Use this button to decrease the volume of the internal speaker when an audio signal in being generated by the analyzer or from a source device.

f. Active EDID Button – Use this button to view the EDID being used in the system under test now. Oftentimes this button is used in conjunction with the EDID Select Button to verify active EDID.
g. Cable Test Button – Use this button to perform an HDMI cable test after plugging cable under test into generator and analyzer.
h. HDCP Button – Use this button to emulate HDCP functions – Off, HDCP Auto, HDCP 2.x and HDCP 1.x
i. Video Button – Press to see active video material – test pattern when connected to analyzer, content when connected to a source.
j. Info Button – Press to see signal & timing information on device under test. Also see battery charging status and firmware revision number.

Note: Refer to rotary switch below for items k, l and m:

k. Up/Down Buttons – use these buttons for scrolling through menu items under buttons discussed above.
l. OK Button – use this to select menu items.
m. A/B Buttons – Use these by holding either for 3 seconds to capture EDID of sink device (display). This allows you to have 2 user EDIDs available with single button press – handy for troubleshooting EDID issues and for pre-testing distribution end points prior to display installation.

Note: Top Panel of Analyzer reference items n-q below.

n. HDMI Input connector – connect to any source or repeater output via HDMI cable.

o. USB ISP – port used for installing firmware updates if required.
p. DC/5V – DC 5V power port – connect included power supply to this connector – use for charging and can be used for operation
q. Charge Status – when lit changing is in process.

Basic Troubleshooting of Audio/Video Systems
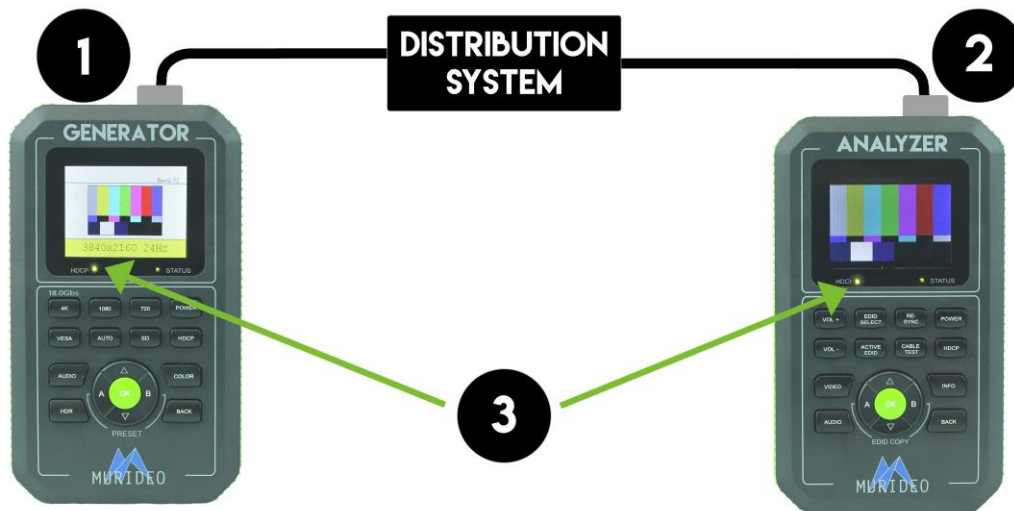
In the system diagram above it's easy to see the basic components of a video distribution system. Obviously, this is a very simple system diagram, use your imagination to replace all the sources, displays, matrices, distribution amplifiers and extenders in the system [where you see the term – DISTRIBUTION SYSTEM above] and the task of troubleshooting these systems can become daunting at times.

Example of functioning system above:

1. Generator – generates test pattern (SMPTE Bars) at desired timing and HDCP version.
2. Analyzer – receives, decodes and displays signal (SMPTE Bars) at desired timing and HDCP version.
3. Indicator Lights – Status HDCP and Status lights are green – SMPTE color bars is displayed

All AV Systems are made of basically 3 main components:

a. Sinks – This is the display or projector – this is an HDMI Receiver device. Substitute the analyzer for sinks during system testing – use the generator to test sinks by injecting a specific timing characteristic expected to pass through distribution system.
b. Sources – This is any device that outputs HDMI – Set top boxes, game consoles, computers and more. This is a HDMI Transmitter device. Substitute the generator during system testing – use the analyzer to test the output of any source for the desired timing characteristic.
c. Repeaters – This is a combination device that can be connected between one or several sources and sink devices – like an AVR (audio video receiver) or matrix switch. Use both generator and analyzer for troubleshooting the devices and for system troubleshooting.

Understanding what happens when these devices are connected in a simple or distributed system is useful in troubleshooting an actual system.

The Fox & Hound is designed for testing HDMI distribution systems and devices in these systems. The tests included are the result of years of testing and troubleshooting with integrators in the field like you – but understanding the basic principles of systematic troubleshooting – from source to display – and everything in between will improve your chances of resolving issues. The chart below is helpful in determining "what" system components should do based on their specification and firmware revision.

Bandwidth Required for Video Signals

Resolution	Frame rate	Chroma Subsampling	Pixel Clock	8-bit color	10-bit color	Remark
720p / 1080i	60 Hz	4:4:4	74.25 MHz	2.23 Gbps	2.78 Gbps	HDBaseT OK
1080p / 2K	60 Hz	4:4:4	148.5 MHz	4.46 Gbps	5.57 Gbps	HDBaseT OK
4K / UHD	30 Hz	4:4:4	297.00 MHz	8.91 Gbps	11.14 Gbps	HDBaseT 8-bit only
4K / UHD	60 Hz	4:2:0	594.00 MHz	8.91 Gbps1	11.14 Gbps	HDBaseT 8-bit only
4K / UHD	60 Hz	4:4:4	594.00 MHz	17.82 Gbps	22.28 Gbps	HDBaseT No - HDMI 8-bit only

3 Main Formats in CE
- 1080P24/30/60
- 2160P24/30 4:2:0
- 2160P60 4:4:4

Chart above shows the 3 most common AV formats – the top two will run in almost any distribution system. The third is new, requires double the bandwidth, and is where systems are

failing, cables are failing – or more proper – systems are not engineered correctly or some of the components of the system are just not up to par in 2017 and uncompressed 4K.

Fox & Hound Test Scenario Examples

Pre-Installation Testing (racking):

1. Use the GENERATOR in place of your source and test for all actual resolutions, HDCP flavor and HDR type that will be used in the system.
2. Connect the ANALYZER at the end of the distribution system (replace your TV) and use for testing the output resolution, HDCP, HDR, etc.
3. Look for any differences; is the signal you are sending unchanged by your distribution system? or has something been downscaled? Compressed? altered? If your bandwidth, timing, or resolution is different from what the GENERATOR is outputting, then you know it was changed by a product in your distribution system.
4. Is everything the same? Then you are done with the first part, if not work backwards from the sink with your analyzer checking the signal after each product to find the where the change originated.

Notes of pre-testing:

Why Pre-Test products?

Nothing is worse than integrating a complete system and then finding out that you are not getting a picture or sound somewhere. Pre-Testing all your products can save you time and hassle of not having to track down one bad piece in a project that has hundreds of connection points. Many integrators will test each product before installation at the job site. Others will have someone test all the products in a lab or warehouse before they get to the site. Let the Fox & Hound save you time and money by pre-testing products.

HDCP Specific Testing when copyrighted 4K UHD material will be distributed

1. Use the GENERATOR in place of your source, choose a test pattern and the highest resolution your distribution system can handle. Then press "HDCP" on the GENERATOR and select 2.2.
2. Place your ANALYZER in place of your sink, press the Info Button to analyze the signal, make sure you are getting HDCP 2.2 by pushing "HDCP" on the ANALYZER – you should see video if HDCP setting on either 1- HDCP 2.2 + 1.X (will auto-select based on content & HDCP path from source to sink – all compliant) or 3 - HDCP 2.2 only.

3. If you get picture on your ANALYZER and the HDCP light is lit up your system is ready to go. If you get no picture, or no HDCP light, work backwards from the sink with your analyzer checking the signal after each repeater product to find the where HDCP was lost

Test a Source Device

How to Test a Source (a source is anything that creates the video signal: Blu-ray, Apple TV, Roku, Media Player, Computer) – see example of connecting directly to a UHD player above.

1. Connect the supplied HDMI cable from the output of the Source to the ANALYZER.
2. Press the INFO or VIDEO buttons to display the video content (VIDEO) or video signal info (INFO).
3. Make sure the signal you expected is being achieved -   Is the signal 4K? Does it have the correct color space? Is the timing correct for this source, Is HDCP present and in the proper form?
4. If everything reads correctly, you know your source is ready. But if not you will need to get into that sources menus and make sure that it is sending an optimized signal. If your source isn't optimized, there is no way for the rest of your system to distribute a truly higher resolution if it is not coming from the source.

Test a Display (sink) Device
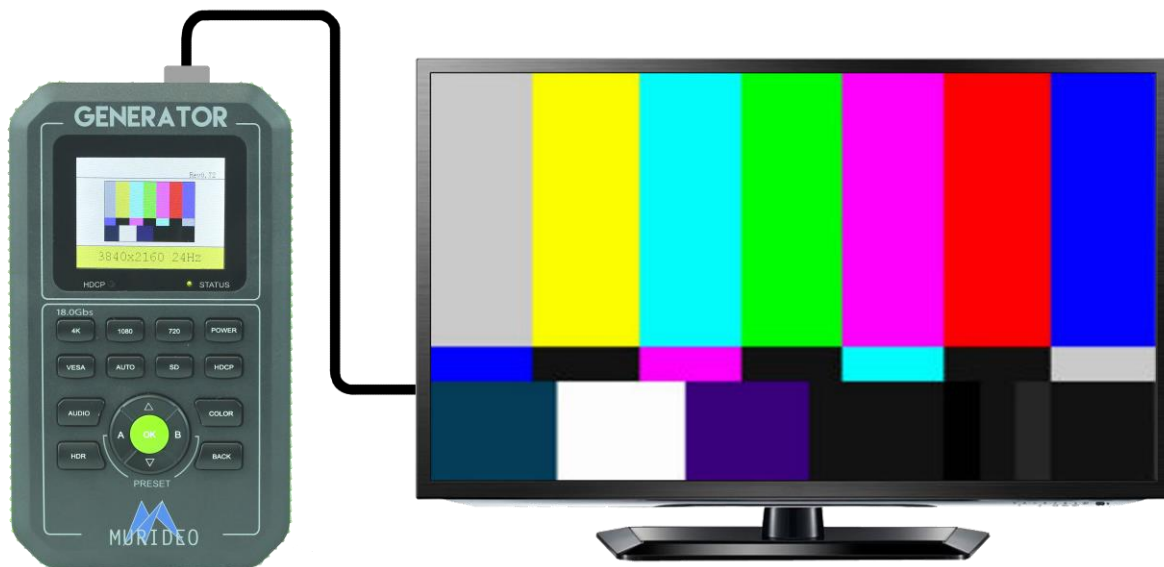
How to Test a Sink *(a sink is anywhere the signal ends up such as a TV, Projector, or Computer Monitor)*

1. Connect supplied HDMI cable from the output of your generator to the input of the display you want to test.
2. Select a familiar test pattern from the GENERATOR using the up down arrows. Then choose the resolution you want to distribute by selecting either "4K", "1080", "720" or "VESA", click "OK" when you are on the one you would like to use. For testing verifying a full 4K system select 3840X2160 60 Hz and Color Space RGB Full Range or similar full HDMI 2.0 resolution.
3. The test pattern should appear on the display, if it does not, start decreasing your resolution until you get a picture on screen. Once you get a picture, this would be the maximum resolution for that display.

Test a Repeater
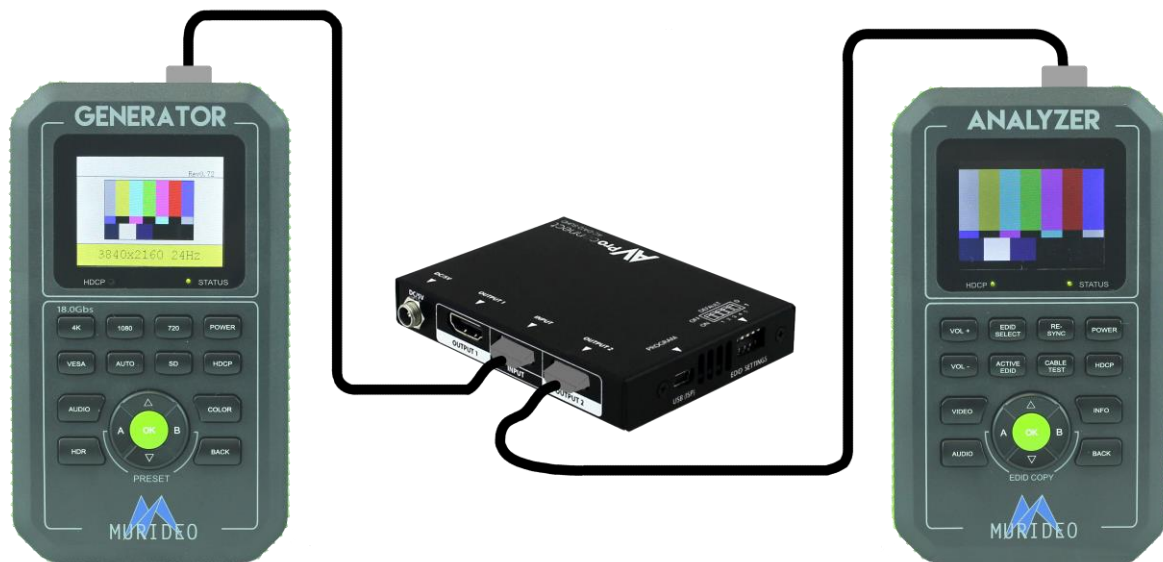
How to Test a Repeater (a repeater is any HDMI device that receives an input signal and retransmits that same signal to a downstream sink or display device; like a matrix, a switch, an AV receiver or distribution amplifier)

1. Plug one end of the first cable into the GENERATOR, and the other into the repeaters input. Use the other cable to connect the repeaters output to your ANALYZER.
2. With the GENERATOR, choose any test pattern, then select the highest resolution, timing and bandwidth required to be passed through the repeater.
3. Select INFO Button on the ANALYZER to read the output signal from the repeater. It should be the exact same signal that the GENERATOR was configured to send. If not, attempt to use internal settings in the repeater to make adjustments to items such as scaling, format conversion, color space, etc. to correct the issue. If you can't optimize the repeater device via internal adjustment or you can't achieve the required signal timing, HDCP version, HDR,

etc., you may need to replace the device with a compliant device or you may need to downclock your entire system to accept this device.

Test a HDMI Extender (over Category Cable)

How to Test an Extender (also known as a balen or HDBaset Tx & Rx)

1. For this you need two trusted HDMI cables and a trusted CAT 5/6/7 cable. Plug one end of the first cable into the GENERATOR, and the other into the Extender Transmitter's input. Use the other HDMI cable to connect to Extender Receiver's output and then into your ANALYZER. Connect the Transmitter and Receiver with the trusted CAT cable.
2. With the GENERATOR, choose any test pattern, then select the highest resolution, timing and bandwidth you want to pass through the extender.
3. Select "OK" on the ANALYZER to read what is being output. It should be the exact same thing that the GENERATOR was inputting. If not then your extenders are changing the signal, and in most times with extenders if there is something wrong you will get NO PICTURE. At this point you will need to swap products or "dumb-down" your entire system to meet the extender set's capabilities.

Call the AVPro Team at –North America 877-886-5112 International +1-605-274-6055

Test an HDMI Cable (replace DISTRIBUTION SYSTEM with an HDMI cable – any HDMI cable 😊
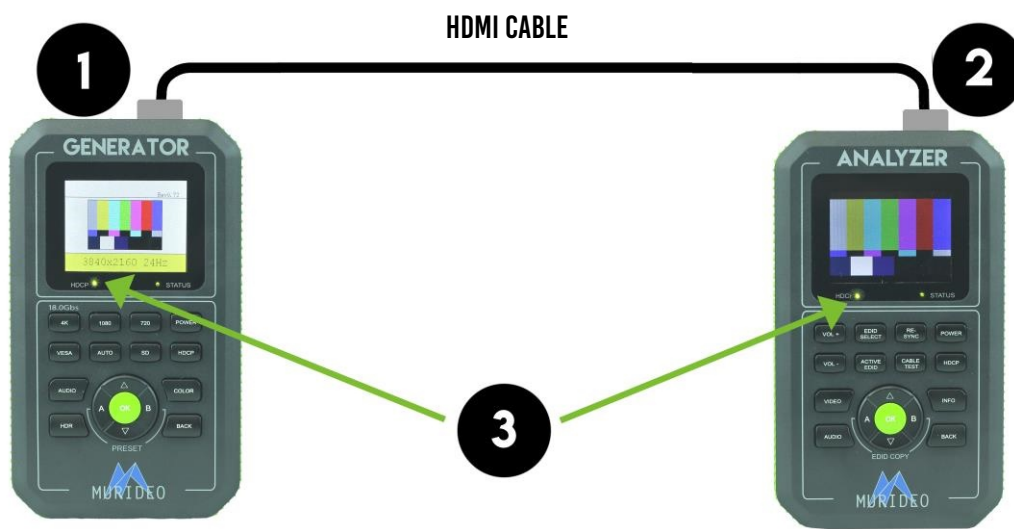
How to Run a Cable Test:

1. To run a cable test with the Fox & Hound the first step is to connect one end of the HDMI cable to the Generator, and the other end to the Analyzer. Double check that they are connected properly.
2. Send any signal and make sure that you can see the video preview on the Analyzer.
3. Now Press the "Cable Test Button" on the Analyzer.
4. WAIT! Don't press any more buttons, if you press any other buttons that will affect the Cable test and you could get incorrect readings.

5. As the readings go through they will show up on the analyzer automatically, you can view them on the main screen.

6. Results are pass or fail – specifically:

- 5V – OK – This indicates 5V is present
- 18G – Pass / Error / No Signal – Pass = pass, Error = sees signal, but cannot pass all data. No Signal and Error are considered defective cables.
- Same as above for all other lower resolutions
- DDC – OK The **Display Data Channel**, or **DDC**, is a collection of protocols for digital communication between a computer display and a graphics adapter that enable the display to communicate its supported display modes to the adapter and that enable the computer host to adjust monitor parameters, such as brightness and contrast.
- HDP – OK - HPD (Hot Plug Detection) allows the source to detect a display plugged in real time and indication should be OK if functioning properly.

Note: Use the cable test to verify that all cables are passing full resolution requirements for your project. Use the chart below to help determine requirements and remember – some cables are better than others and sometimes you may need fiber to get longer runs or extenders – but realize the limitations of each device selected. Fox & Hound can be substituted under Murideo Six Series column below:

Type	Resolution	Frame Rate (FPS)	Color Compression	Deep Color Bit Depth	HDR	Wide Color Gamut (BT2020)	HDMI Version	Data Rate	Murideo SIX Series
HD	1920x1080	24	4:2:0	8 BIT	NO	NO	1.4	2.23 GBPS	YES
HD	1920x1080	60	4:2:0	8 BIT	NO	NO	1.4	4.45 GBPS	YES
HD	1920x1080	60	4:4:4	8 BIT	NO	NO	1.4	4.45 GBPS	YES
UHD	3840x2160	24	4:2:0	8 BIT	NO	NO	1.4	8.91 GBPS	YES
UHD	3840x2160	24	4:4:4	8 BIT	NO	NO	1.4	8.91 GBPS	YES
4K	4096x2160	24	4:4:4	8 BIT	NO	NO	1.4	8.91 GBPS	YES
UHD	3840x2106	60	4:2:0	8 BIT	NO	NO	1.4/2.0	8.91 GBPS	YES
UHD	3840x2160	24	4:2:2	10 BIT	YES	YES	2.0(a/b)	8.91 GBPS	YES
UHD	3840x2160	24	4:4:4	10 BIT	YES	YES	2.0(a/b)	11.14 GBPS	YES
UHD	3840x2160	60	4:2:0	10 BIT	YES	YES	2.0(a/b)	11.14 GBPS	YES
UHD	3840x2160	24	4:4:4	12 BIT	YES	YES	2.0(a/b)	13.37 GBPS	YES
UHD	3840x2160	60	4:2:0	12 BIT	NO	YES	2.0	13.37 GBPS	YES
UHD	3840x2160	60	4:2:2	10 or 12 BIT	NO	YES	2.0	17.82 GBPS	YES
UHD	3840x2160	60	4:4:4	8 BIT	NO	YES	2.0	17.82 GBPS	YES

Common Symptoms you will find in a distributed Audio/Video System:

No Video?

Start at TV with generator – does TV work? Generate a test signal at the next HDMI point (for instance the input to an extender) and every HDMI point until the signal is lost. Once the signal is lost, use analyzer and generator combo to isolate to a cable, TX, RX or other component. Problem could also be firmware – if in doubt call the manufacturer.

No 4K?

Individually check that each product can handle the same types of 4K; 4K 18Gpbs is drastically different than 4K 10.2Gbps. Manage your EDID's on each repeater and sink to make sure you have your system optimized for the 4K signal you are trying to distribute.

Incompatible Video?

Are you getting a signal to the Sink but it's telling you that the signal is incompatible? Test the maximum capability of that Sink and make sure you are not feeding it something it can't handle, if you know if should handle the signal. Strip the EDID from the Sink to make sure the rest of your setup is ready for that same EDID.

Discolored Video?

First check that the Sink's settings are set up show the correct color. Remember you get a live video preview on the ANALYZER so you can visibly see what is being outputted at each spot you test. Normally this symptom is related to a color space mismatch – system looking for YCbCr and source is sending RGB. Use Color Button on generator to substitute alternative color space setting to isolate and solve problem.

Source Problems?

You can check if your source has problems by plugging in the ANALYZER directly to your source you can find out what it is actually outputting compared to what it should be outputting. You will be surprised that they are not always the same, and when you have a problem with your source, nothing can be done with your distribution system to fix it.

Audio Dropouts?

Normally audio dropouts are related to HDCP issues. Make sure HDCP is functioning properly with your Fox & Hound HDCP function. For 4K make sure you select and emulate HDCP 2.2.

Tips for Installers:

- Use Active equipment over Passive wherever possible
- Insure all devices are on the most recent firmware
- Insure all devices are on the same AC circuit if possible
- Keep solid HDMI runs under 25ft (use 24AWG) and go to HDBaseT extenders or fiber optic for runs over 25'.
- Use best cabling possible, the higher bandwidth the better.
- CAT5e or better - use shielded (STP) when you are not sure what is behind the wall.
- Use only solid copper CAT cables - no CCA.
- Don't over complicate the system with too many devices in series. Too many handshakes cause unexpected and unwanted results.
- Try to buy all the HDMI devices and HDMI cables from one vendor as they have been tested with each other assuring system interoperability.
- Cycle power on all devices in the system - this will cause a hot plug event and will cause the source to read the sink EDID again and possibly return the system to normal operation
- Make sure everything in the system is HDCP 2.2 compliant in a UHD distribution system.
- Clock stretching issues are common in some STB with older HDMI chipsets (although they look new). This will cause a no picture situation. You can use EDID minder to fix this, and some connectivity companies' even list a fix for clock stretching as a feature in extenders and matrix switches.
- When using POE extenders - make sure they are IEEE 802.11af - this ensures that you don't damage downstream or upstream components.

Test Pattern Descriptions

Test patterns are used for visually testing a display for things such as sizing – does the entire picture fit on the screen? color – are the colors correct? Setting the 5 front panel controls: Color, Tint, Sharpness, Brightness and Contrast. Test patterns are also required for setting up a video wall, aligning several projectors for blending or for straight video calibration of any display or projector.

Test patterns supplied with the Fox & Hound include the following:

SMPTE Color Bars – for setting color, tint, black and white
White Window 80% - for manual calibration and white balance adjustments
Luma Multiburst – for setting sharpness of other processing on display
Color Bars – for reviewing solid RGBCYM
White Raster 100% - calibration/video walls
Black Raster 0% - calibration
Red, Green, Blue, Cyan, Yellow and Magenta Raster 80% - calibration/video walls
Checker Board 4x4 – for measuring contrast ratio and linearity
Moving Dot – to test for display motion artifacts
Red, Green, Blue and Gray Ramps – to visual inspect white balance and color gamut adjustments
Geometry Pattern – for aligning a projector on screen or for setting aspect ratio on HD/SD displays
16-Bar Gray Scale – for reviewing/adjusting grayscale tracking/white balance
White Pluge – for setting contrast
Black Pluge – for setting brightness
Chroma Multiburst – for reviewing displays light & color reproduction capabilities – toughest test for display – will show scaling and compression artifacts.

Note: The Fox & Hound system does not allow for loading of custom test patterns.

Specifications

Parameter	Specification
HDMI Version	HDMI 2.0
HDCP Version	HDCP 2.2 and 1.4
HDCP ON/OFF	Yes
Maximum Clock Rate	600 Mcsc (594 MHz)
Maximum Throughput per Channel	6.0 Gbits/sec (18 GBP/sec Total)
Resolution Timings	VESA; Video Standard with 60, 59.94, 30, 29.97, 24, 23.98 fps; Video Standard with 50, 25 fps; 4k timings; AUTO and 10 USER Defined
Video Encoding	RGB, YCbCr
Video Sampling Modes	RGB4:4:4, YUV4:4:4, YUV4:2:2, YUV4:2:0 HDMI2.0
Color Bit Depth	8, 10, 12, 16, and AUTO EDID read
Patterns	Over 80 built in including ISF geometery, ISF resolution, ISF Pluge, Colors, Focus, Resolution, Bars, Ramps, Multibust, Black/White and Moving bars
Audio	LPCM
Audio Source	INT 1KHz test tone or EXT L/R IN
Audio Sampling Rate	32k, 44.1k, 48k, 88k, 96k, 176k
Audio Sampling Bit Size	16, 20 24, AUTO
Audio Channels	2
Audio Volume	Yes
Control	RS-232 and USB
Firmware	Field Upgradable
Power	5V DC Li-Ion Internal Battery or Wall Adapter
Battery Charger	Input 100-240VAC - 50/60Hz @.5A Output 5VDC @2A
Case	ABS
Size	5.4H x 4.2W x 1.2D
Weight	< 1 pound
Interface Connectors	
HDMI OUT	HDMI Type A
L/R Audio IN	
RS232	
Control	Micro USB
DC	

List of Supported Resolutions (this can change from time to time via FW updates)

Maximum 4K UHD resolution is: 2160P60 4:4:4 8-bit (almost 18 GBP/sec)

640x480@60	4096x2160@24
800x600@60	3640x2160@60
1024x768@60	3640x2160@59.94
1280x768@60	3640x2160@50
1360x768@60	720P@60 3D FP
1280x960@60	720P@59.9 3D FP
1280x1024@60	1080P@24 3D FP
1400x1050@60	1080P@23.9 3D FP
1600x1200@60	720P@50 3D FP
1920x1200@60	720P@59.9 3D SS
480i@59.94	1080i@59.9 3D SS
480P@59.94	1080P@59.9 3D SS
720P@60	1080P@23.9 3D SS
720P@59.94	720P@50 3D SS
1080i@60	1080i@50 3D SS
1080i@59.94	1080P@50 3D SS
1080P@30	720P@59.9 3D TB
1080P@29.97	1080@59.9 3D TB
1080P@24	1080@23.9 3D TB
1080P@23.976	720P@50 3D TB
1080P@60	1080P@50 3D TB
1080P@59.94	AUTO
576i@50	USER 1
576P@50	USER 2
720P@50	USER 3
1080i@50	USER 4
1080P@25	USED 5
1080P@50	USER 6
4Kx2K@30	USER 7
4Kx2K@29.97	USER 8
4Kx2K@25	USER 9
4Kx2k@24	USER 10
4Kx2K@23.98	

Updating Firmware

Field firmware updates are available via USB port. Firmware updates, when available will be posted on the Murideo.com web site, along with instructions.

FCC Interference and Compliance Statement

This device complies with part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC WARNING

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more ofthe following measures:

•Reorient or relocate the receiving antenna.
•Increase the separation between the equipment and the receiver.
•Connect the equipment into an outlet different from that to which the receiver is connected.
•Consult the dealer or an experienced radio/TV technician for help.

Caution

To comply with the limits for an FCC Class B computing device, always use the shielded signal cord supplied with this unit. The Federal Communications Commission warns that changes or modifications of the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CE mark for Class B ITE (Following European standard EN55022/1998; EN61000-3-2/1995; EN61000-3-3/1995,EN55024/1998, EN60950-1/2001)

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Radio Frequency Interference Statement Warning: This is a Class B product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Warranty and Getting Help

General Warranty Terms

AVPro Global Holdings (DBA MURIDEO) offers a limited warranty for its MURIDEO products. Any product first sold to you is guaranteed to be free from defects in both components and workmanship under regular uses. The warranty period commences on the date the item ships. Attention: Your invoice with the date of purchase, model number and serial number of the product is your proof of the date of purchase. The International Limited Warranty is applicable and shall be honored in every country where MURIDEO or its Authorized Service Providers offer warranty service subject to the terms and conditions provided in this International Limited Warranty Statement.

MURIDEO Products Warranty Period

The warranty terms for MURIDEO products are: Domestic & Asia EU & UK

MURIDEO – Fresco Six-G HDMI 2.0, 4K Test Pattern Generator &1 Year & 2 Year
MURIDEO – Prisma Networked Video Processor 1 Year & 2 Year
MURIDEO – Fox & Hound HDMI Test Kit 1 Year & 2 Year

System Warranty

During the warranty period, the defective hardware of MURIDEO products will be either repaired or replaced, with new or like new products, at the discretion of MURIDEO except in the cases listed in the Limitation of Liability Clause of this document. This International Limited Warranty covers the costs of service parts and labor required to restore your product to fully functional condition. MURIDEO will, at its discretion, repair or replace any defective products or parts thereof covered by this International Limited warranty with refurbished parts of the product that are equivalent to new or like new products in both functionality and performance. A product or part that is repaired or replaced under this International Limited Warranty shall be covered for the remainder of the original warranty period applying to the product or part, or for 90-days, whichever expires last. All exchanged parts and products under this International Limited Warranty will become the property of MURIDEO.

Obtaining the Warranty Service

Warranty service or Returned Merchandise Authorization (RMA) under this International Limited Warranty will be honored only if claims are made within the warranty period. For notifications to MURIDEO or products outside the warranty period, the process will be the same, but charges may apply. Contact details may be obtained on MURIDEO websitehttp://http://avpro.r n

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maportal.com/Customers are requested to perform the following actions before claiming MURIDEO product as defective:

(a) Owner must notify MURIDEO, during the warranty period, in writing of alleged defect, and allow MURIDEO a reasonable opportunity to inspect the allegedly defective product;

(b) No Product may be returned without MURIDEO's consent, The MURIDEO RMA# must accompany all returns, and all returns must be delivered to MURIDEO within the warranty period;

(c) Owner may, then at its own expense, return the allegedly defective Product, freight pre-paid and in the original packaging, accompanied by a brief statement explaining the alleged defect to MURIDEO;

(d) If MURIDEO determines that any returned Product is not defective, or if MURIDEO determines that the defect is not covered by the warranty, MURIDEO will return the Product to the Owner at Owner's expense, freight collect, and Owner agrees to pay MURIDEO's reasonable cost of handling and testing;

(e) Upon determining that a returned product is defective, to receive warranty service Owner will need to present the invoice showing the original purchase transaction. If shipping the product, Owner will need to package it carefully and send it, transportation prepaid by a traceable, insured method, to the MURIDEO Service Center. Package the product using adequate padding material to prevent damage in transit. The original container is ideal for this purpose. Include the RMA #, your name, return shipping address, email address and telephone number where you may be reached during business hours, inside the shipping package with the unit. Any replacement unit will be warranted under these Terms and Conditions for the remainder of the original warranty period or ninety (90) days whichever is longer.

Refer to user manual enclosed within the product package and/or information on http://www.murideo.com/generators.html for important tips on how to operate and troubleshoot the product.

International Warranty

Warranty may be valid when a MURIDEO product is purchased in one country and transferred to another country, without voiding the warranty. Please be advised that service availability and response time may vary from country to country. Warranty is transferrable within the warranty period.

MURIDEO is not responsible for any export and import control issues, handling fees, tariffs, import duties, and all other related fees where owner is responsible for shipping its products. This International Limited warranty does not affect your statutory rights.

Limitation of Liability

MURIDEO reserves the right to refuse warranty service of products under disputable conditions. MURIDEO also holds the rights to declare final decision whether products are within warranty conditions. The following actions and damages will result in voiding the limited warranty:

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• Damage caused by act of nature, such as fire, flood, wind, earthquake, lightning, etc.
• Damage or incompatibility caused by failure to perform a proper installation or to provide an appropriate operational environment for the product, including but not limited to unstable wired/ wireless network connection and phone lines, bad grounding, external electro-magnetic fields, direct sunlight, high humidity and vibration.
• Damage caused by impact with other objects, dropping, falls, spilled liquids, or submersion in liquids.
• Damage caused by unauthorized repair or disassembling of the product.
• Damage caused by any other abuse, misuse, mishandling, or misapplication.
• Damage caused by third party peripherals (including but not limited to visible damages on motherboard or other electronic parts of the product such as burn spots after electric discharge, melting, fusing, splitting, etc.)
• Any unauthorized software or modification of built-in software not approved by MURIDEO.
• The serial number of the product (or serial number stickers of its parts) has been modified, removed, blurred or damaged.
• Defects caused by transportation, handling or customer abuse.

Disclaimer of Warranty
THIS WARRANTY IS EXPRESSED IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, THE IMPLIED WARRANTY OF FITNESS FOR APARTICULAR PURPOSE AND OF ALL OTHER OBLIGATIONS OR LIABILITIES ON MURIDEO'S PART, AND ITNEITHER ASSUMES NOR AUTHORIZES ANY OTHER PARTY TO ASSUME FOR MURIDEO ANY OTHERLIABILITIES. THE FOREGOING CONSTITUTES THE BUYER'S SOLE AND EXCLUSIVE REMEDY FOR THEFURNISHING OF DEFECTIVE OR NONCONFORMING PRODUCTS AND MURIDEO WILL NOT IN ANY EVENT BELIABLE FOR COST OF SUBSTITUTE OR REPLACEMENT, COST OF FACILITIES OR SERVICE, DOWNTIMECOSTS, LOSS OF PROFITS, REVENUES OR GOODWILL, RELIANCE DAMAGES, LOSS OF DATA, LOSS OFUSE IF OR DAMAGE TO ANY ASSOCIATED EQUIPMENT, OR ANY OTHER INDIRECT, INCIDENTAL, SPECIAL,OR CONSEQUENTIAL DAMAGES BY REASON OF THE FACT THAT SUCH PRODUCTS WILL HAVE BEENDETERMINED TO BE DEFECTIVE OR NONCONFORMING. THE RIGHTS AND OBLIGATIONS OF THE PARTIES UNDER THIS AGREEMENT SHALL NOT BE GOVERENED BY THE PROVISIONSOF THE 1980 U.S. CONVENTION ON CONTRACTS FOR THE INTERNATIONAL SALE OF GOODS OR THE UNITED NATIONSCONVENTION ON THE LIMITATION PERIOD IN THE INTERNATIONAL SALE OF GOODS, AS AMENDED (COLLECTIVELY, THE"CONVENTIONS"); RATHER, THE RIGHTS AND OBLIGATIONS OF THE PARTIES SHALL BE GOVERNED BY THE LAWS OF THE STATE of SOUTH DAKOTA, INCLUDING ITS PROVISIONS OF THE UNIFORM COMMERCIAL CODE, AS APPLICABLE. FOR THE
AVOIDANCE OF DOUBT, THE CONVENTIONS ARE HEREBY EXCLUDED.

This Limited Warranty gives you specific legal rights. You may also have other rights that may vary from state to state or from country to country. You are advised to consult applicable state or country laws for full determination of your rights. Some jurisdictions do not allow the exclusion or limitation of special, incidental or consequential damages, or limitations on how longa warranty lasts, so the above exclusion and limitations may not apply to everyone.

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Getting Help

For service and support, contact your local dealer.

To find your dealer or to contact MURIDEO support, go to:
http://www.murideo.com/

or call

+1-605-782-2462 for worldwide technical support

MURIDEO Inc.
3518 N Casco Ave
Sioux Falls, SD 57104

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