

FOX & HOUND

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MURIDEO

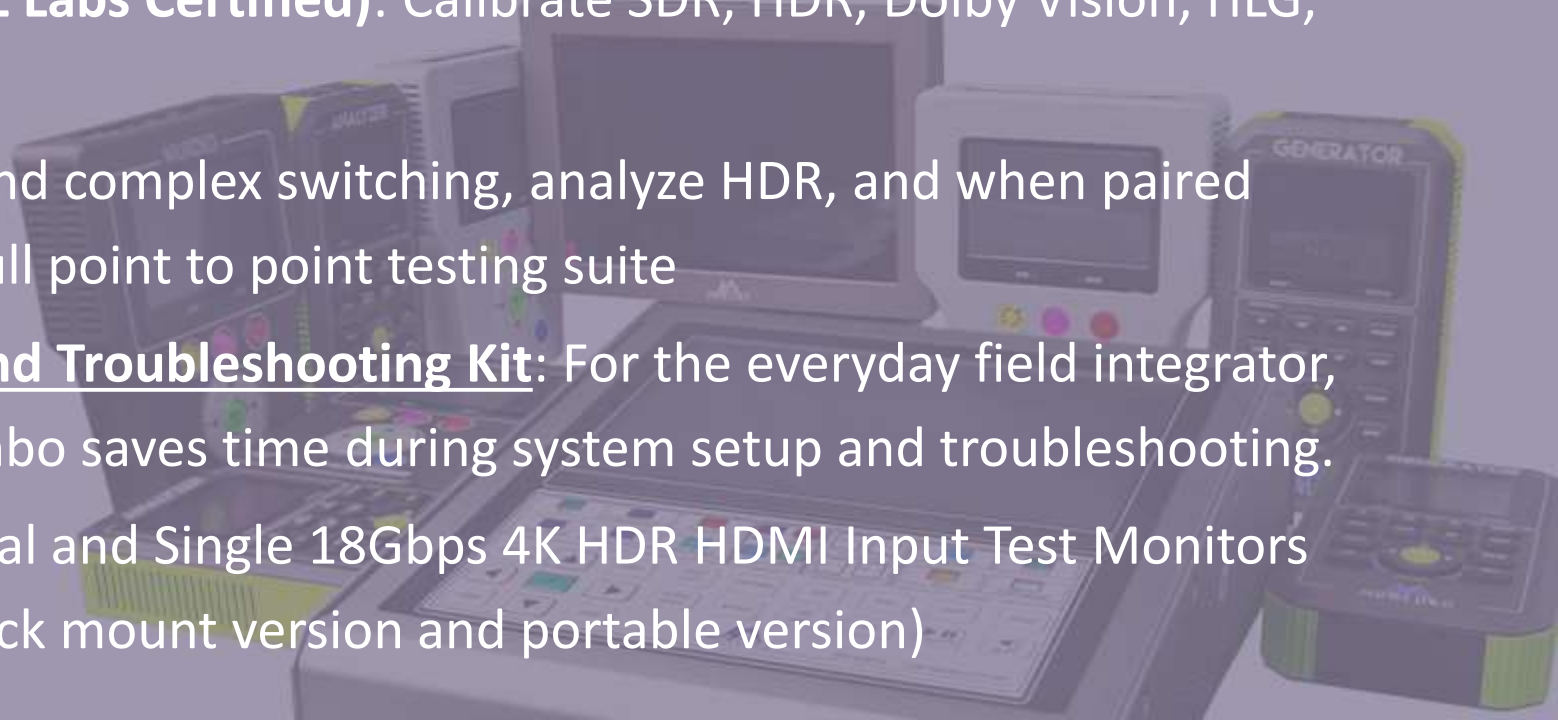
PRODUCT TRAINING

QUICKLY IDENTIFY HDMI ISSUES,
REDUCE TRUCK ROLLS, AND SAVING
TIME WITH THE FOX & HOUND TEST
AND TROUBLESHOOTING KIT



Murideo

- TV manufacturers, connectivity brands, integrators, and calibrators across the globe trust Murideo for their HDMI testing and troubleshooting equipment.
 - **SEVEN-G**: Next generation engineering test tool. Built for TV and connectivity manufacturers.
 - **SIX-G Generator: (ISF & DPL Labs Certified)**: Calibrate SDR, HDR, Dolby Vision, HLG, and more
 - **SIX-A Analyzer**: Test basic and complex switching, analyze HDR, and when paired with the SIX-G becomes a full point to point testing suite
 - **The Fox & Hound Testing and Troubleshooting Kit**: For the everyday field integrator, this generator/analyzer combo saves time during system setup and troubleshooting.
 - **4K HDMI Test Monitors**: Dual and Single 18Gbps 4K HDR HDMI Input Test Monitors with Analyzer Functions (Rack mount version and portable version)



Troubleshooting Facts and Stats

- A survey by CEDIA of integrators and HDMI related issues
 - 66% Most installations involve HDMI components
 - 57% HDMI installations require a great deal more time than installs without HDMI distribution
 - 49% Return visits are more likely when HDMI components are involved
 - 83% Installers have had to take steps to simplify installations that involve HDMI components
 - 82% Installers have had to remove HDMI components to make them work

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Every Integrator needs an HDMI test kit in their toolbox. Why?

- Save Time
- Save Money
- Avoid unnecessary returns
- To avoid additional truck rolls
- Give yourself a leg to stand on when dealing with other manufacturer's equipment
- No more guess work! Definitive answers (no more pluck and chuck)



Every Integrator needs an HDMI test kit in their toolbox. What will you be able to do?

- EDID Tools
- Cable Test
- Display Setup and Testing Patterns
- 4K60 4:4:4/4:2:2/4:2:0 8-16 bit
- HDCP Testing – 1.4, 2.2 and Off
- HDR Testing – HDR-10, HLG
- Portable & Battery Operated

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Fox & Hound HDMI Test and Troubleshooting Kit



TROUBLESHOOTING: Cable Testing

1. Connect one end of the HDMI cable to the Generator, and the other end into the Analyzer. Double check that the connections are secure and snug.
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!



TROUBLESHOOTING: Cable Testing (cont.)

1. After the test you can view the results on the main screen of the analyzer
2. 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.
 - Lower resolutions – see above
 - DDC – OK - The Display Data Channel, or DDC, is a collection of protocols for digital communication between a source and a sink device, specifically EDID and HDCP
 - HPD – OK - HPD (Hot Plug Detection) allows the source to detect a display plugged in real time and indication should be OK if functioning properly



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TROUBLESHOOTING: Pre installation

The first thing to do before installing an Audio/Video distribution system is to check compatibility of all the products to be utilized. Be sure that everything in your system works together.

1. Use the GENERATOR in place of your source, select resolution, color sampling and bit-depth that matches maximum compatibility of the Source.
2. Substitute the ANALYZER for the TV. Press INFO to validate the proper signal is passing through the system.



TROUBLESHOOTING: Pre installation (cont.)

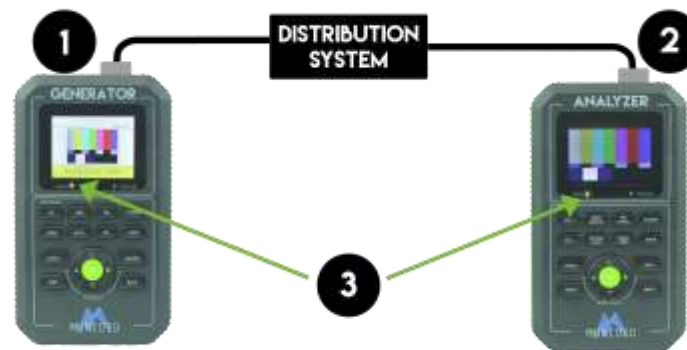
3. Look for any differences. Is the signal you are sending unchanged by your distribution system? Or has something been downscaled? Compressed? Altered? If your bandwidth, timing, or resolution is different from what the GENERATOR is outputting, then you know it was changed by *something* in your distribution system.
4. If the analyzer shows something different, work backwards from the sink using your analyzer. Check the signal after each repeater product to find where the change originated.



TROUBLESHOOTING: HDCP Issues

The second aspect of pre-testing an A/V Distribution system is to check for HDCP compatibility throughout.

1. Use the GENERATOR in place of your Source, choose any test pattern and the highest resolution your distribution system can handle. Then press 'HDCP' on the GENERATOR and select 2.2.
2. Substitute your ANALYZER in place of your TV, select either 'AUTO' or HDCP 2.2 emulation.



TIP: Use A/B on the Generator to store your favorite timings

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TROUBLESHOOTING: HDCP Issues (cont.)

3. If you get the same test pattern on your ANALYZER and the HDCP light is illuminated, your system is HDCP 2.2 compliant and will pass UHD content. If you see static on the analyzer, or no HDCP light, work backwards from the Sink/TV with your Analyzer checking the signal after each repeater product to find the where HDCP was lost.



Note: You can also turn off HDCP completely for testing connectivity.

TIP: Noise on the Analyzer screen indicates HDCP incompatibilities.

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EDID Tools

- Before 2017 EDID was almost a non-issue. These days EDID is more important than ever before. You **MUST** understand and manage EDID for proper 4K and HDR video.
- What is EDID? --- EDID is simply a communication from a sink device (TV, Projector, repeater, matrix etc...) to a source device. Its sole purpose in life is to tell the source what a given sink is capable of – the information includes brand, max resolution, preferred resolution and compatible resolutions, and more. EDID is **ONE WAY** from a display to a source, this means:
 - A source device can only read EDID
 - The sink device communicates it's EDID to the source



EDID Tools

- If you were to verbalize an EDID communication between a TV to a Blu-ray player it would look like this ----

“Hello, I am a (NAME BRAND) TV, and I would prefer you send me 1080P, But I can handle 4K. Even though I can do 4K I cannot do HDR. Additionally, I am not good with PC formats, I was not designed for them.”

The source device then communicates back to the display - *“Hello! I understand! We are on the same team. I promise not to send you something you cannot handle.”*

- What is the “gotcha”? The Source can only read the EDID from the next device in the chain, so if it is not connected directly to the TV it may have an EDID asking for a higher bandwidth or resolution than the display can handle. Additionally, what if you use a canned EDID and it is not good for all the displays?

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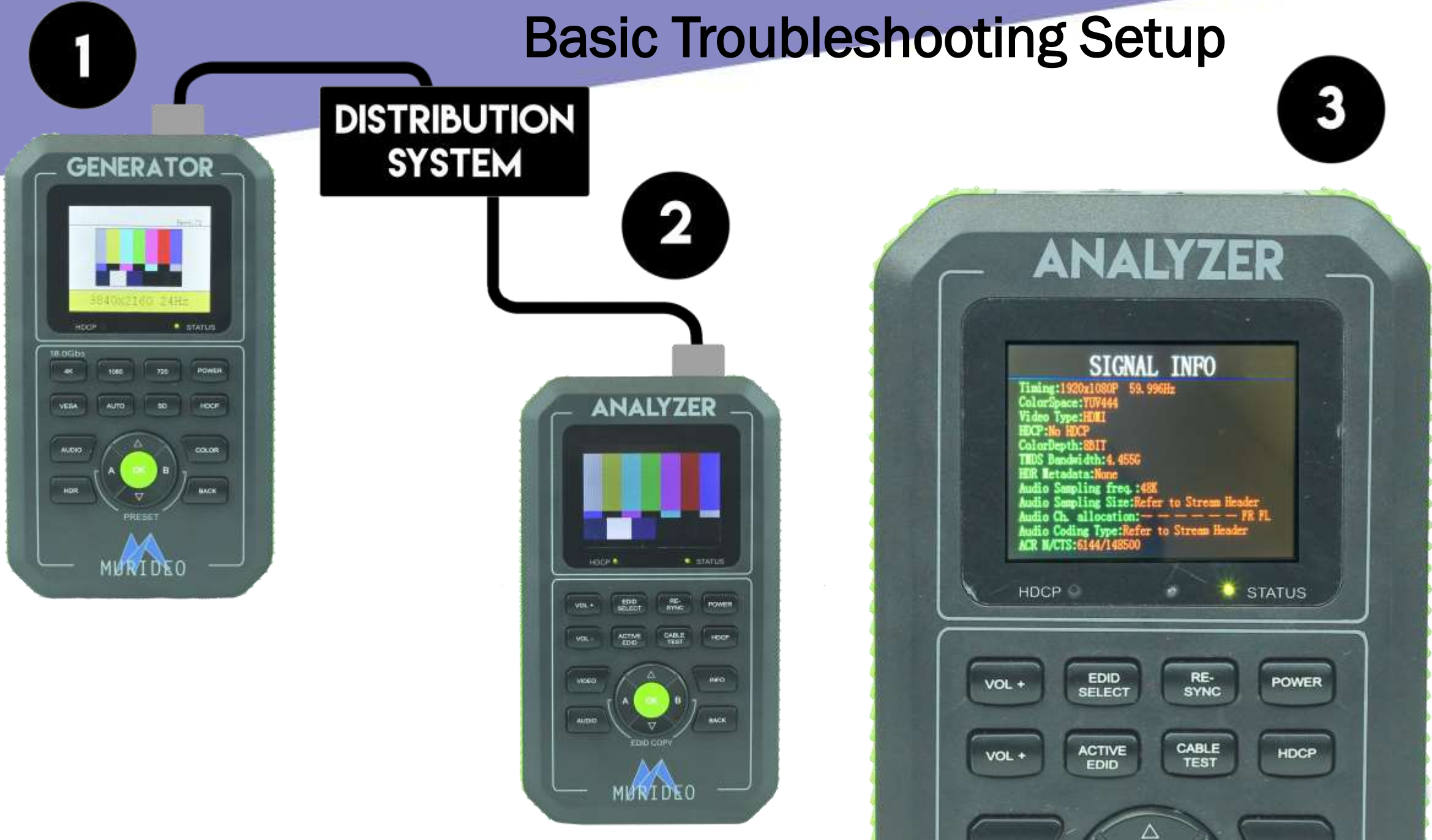


EDID Tools

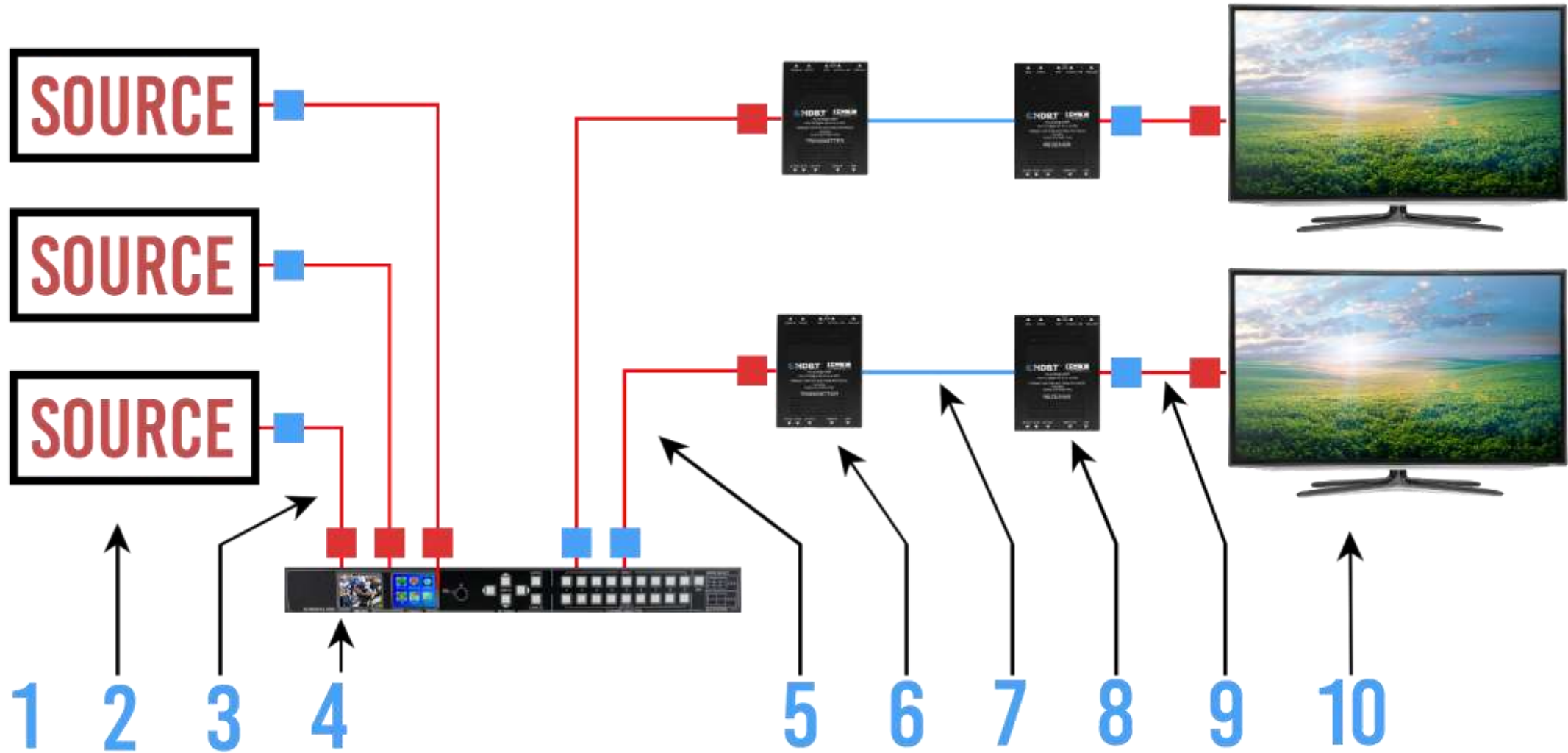
- The most common reason you NEED to pay attention to EDID:
 - Sink devices are known to use use lower bandwidth EDIDs to ensure a picture on the screen
 - Repeaters often “spoof” EDID to force a source to give something it is compatible for and not necessarily what YOU want.
- This is simple to test – Simply place the GENERATOR into AUTO EDID and check what the generator sets itself too
- The analyzer can read and Emulate EDIDs so you can see precisely how a source will react to a given EDID as well!
- PRO TIP: Use AVPro Edge with the most Robust EDID Management. We Practice CCEC
- C = Copy, C= Can, E= Emulate, C= Create



Basic Troubleshooting Setup



TROUBLESHOOTING



TROUBLESHOOTING: Source Devices

1. Connect a trusted HDMI cable (or the cable received with your Fox & Hound Kit) from the output of the Source to the ANALYZER input.
2. Press INFO to see timing data as the Source
Press VIDEO to see line video from the Source



TROUBLESHOOTING: Source Devices (cont.)

3. Read the data and make sure it matches what you want the source to output. Some questions to ask yourself – Is it doing 4K? Does it have the correct color space? Is the bandwidth correct for this content? Is HDR present?
4. If everything reads correctly you know your source is configured properly. If not, you will need to get into the source's menu 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.

TIP: always update FW on all devices in the signal chain before troubleshooting anything!



TROUBLESHOOTING: Sink Devices (Displays, Projectors)

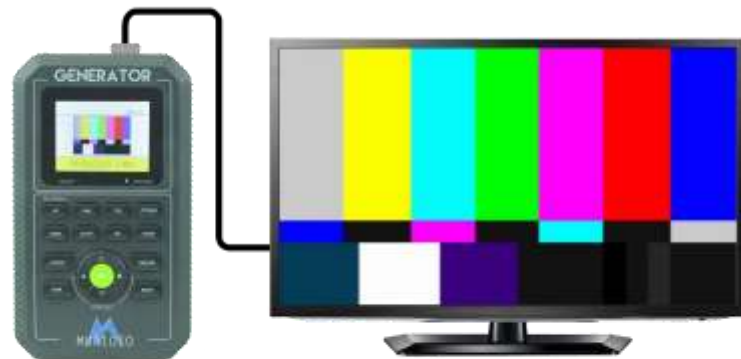
1. Using a trusted HDMI cable (or the cable received with your Fox & Hound Kit), connect from the output of the generator to the input of the sink device.
2. Select any test pattern from the GENERATOR using the up down arrows. Then choose the resolution you want to distribute by selecting either '4K', '1080', '720' or 'VESA', then click 'OK'.

TIP: Press and hold '4K' for 5 seconds to test for maximum bandwidth



TROUBLESHOOTING: Sink Devices (Displays, Projectors) (cont.)

3. Press COLOR on the Generator to set Chroma Sub-Sampling and Bit Depth
 - Note: For a maximized UHD player use 3840x2160, 24fps, 4:2:2, 10 Bit
4. The test pattern should appear on the display. If it does not, start decreasing bandwidth until you get a picture on screen. Once you obtain a picture, this is the maximum resolution available for the display.



TROUBLESHOOTING: Repeaters

1. For this test you need two trusted HDMI cables. Plug one end of the first cable into the GENERATOR, and the other into the repeater's input. Use the other cable to connect the repeater's output into your ANALYZER.
2. With the GENERATOR choose any test pattern, then select the highest resolution, timing, and bandwidth you want to pass through the repeater.



TROUBLESHOOTING: Repeaters (cont.)

3. Select 'OK' on the ANALYZER to read what is being output from the repeater. It should be the exact same thing that the GENERATOR is sending in. If not, use that repeater's internal options to make sure your signal is being optimized. If you can't optimize the repeater to pass the resolution, timing, and bandwidth you want, you will need to swap products or "dumb-down" your entire system to meet its capabilities.



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TROUBLESHOOTING: Extenders

1. For this test you need two trusted HDMI cables and a trusted CAT 5e/6/6a/7 cable.
2. Connect an HDMI cable from the GENERATOR to the input of the Tx. Use the other HDMI cable to connect the Rx output into your ANALYZER. Connect the Tx to the Rx with a trusted CAT cable.
3. With the GENERATOR choose any test pattern, then select the highest resolution, timing, and bandwidth you want to pass through the extender. For most HDBaseT and HD over IP extenders the max bandwidth is 10.2 Gbps.



TROUBLESHOOTING: Extenders (cont.)

3. Select 'INFO' on the ANALYZER to read what is coming in. It should be the exact same thing that the GENERATOR is sending out. If not, the extender kit is changing the signal. In most cases 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.



Note: Toggle HDR on and off to determine the extender capability to pass HDR-10



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TROUBLESHOOTING: HDR

- HDR Testing is very straightforward, and contrary to popular belief the format and bandwidth are the most important. HDR Metadata is only a info-frame carried on the AVI data system. However – We recommend enabling HDR Metadata on the Generator to be 100% sure – This will force the display to activate HDR Mode and show metadata passthrough
- It is recommended to check the following formats to verify HDR Pass through:
 - 4K 60 4:4:4 8BIT – Verify full 18Gbps throughput (Most important) – 18Gbps
 - 4K 60 4:2:2 12BIT – Verify full bandwidth with difficult compressions
 - 4K24 or 30 4:4:4 12BIT – Verify Film HDR Content (Blu-Ray, etc.) 14 Gbps

NOTE: It is highly recommended to check these through the system with the Analyzer to verify it is coming with its full integrity – A lot of repeaters (Matrices, extenders etc.) destroy these formats and leave a terrible image. This will also help you choose the correct infrastructure when selecting HDR connectivity.



TROUBLESHOOTING: HDR (cont.)

- If your system can handle all the above signals you have a robust, stable, high bandwidth signal that will work great.
- 4K 30 4:2:0 10 BIT HDR (9 Gbps) is a MYTH – YES, it is encoded on the disc and used in post-production, but almost no sink device supports it – in lower frame rates 4:4:4 is required for it to work! DO NOT BE TRICKED BY THIS!
- You must also check HDCP 2.2, many source devices will not send HDR if HDCP 2.2 is not present.
- HDR IS YOUR FRIEND! Do not be afraid of this infrastructure – you WILL create repeat business if you can do this properly. Recent advancements in HDMI Cables, HDBaseT, and Fiber Optics all make high bandwidth video a reality. However there is a lot of “funny business” happening in marketing. Ultimately YOU are responsible, so it is in your best interest to test, test, and test again.

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Common Problems in a Distributed A/V System

- No Video?
 - Use the “Troubleshooting A/V Systems” section to run your system through the process and find out where the issue is coming from.
- No 4K?
 - Individually check that each product can handle the same types of 4K; 4K 18Gpbs is drastically different than 4K 10.2Gpbs. Manage EDID on each repeater and sink device 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 the Sink and make sure you are not feeding it something it can’t handle. If you know if the Sink should be able to handle the signal, strip the EDID from it to make sure the rest of your setup is ready for that same EDID.

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Common Problems in a Distributed A/V System

- Discolored Video?
 - First check that the sink's settings are configured to show the correct color. Color space mismatch is the most common issue. Remember to check the live video preview on the ANALYZER so you can visibly see what is being output at each spot you test.
- Source Problems?
 - You can check if the source has problems by plugging the ANALYZER directly into the source. You can find out what is *actually* being output compared to what it *should* output. 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 (except decreasing the capabilities).



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Troubleshooting Tips

- When troubleshooting, test one thing at a time
- Use trustworthy HDMI Cables
- Take notes
- Simplify troubleshooting...eliminate devices in-between the source and display if you can
- Consider fiber going forward
 - HDMI 2.1 48Gbps is here!
- Test cables before installing them
- Run conduit whenever possible
- Plan and prepare!

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Questions?

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THANKS FOR JOINING!

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