

Solutions

User Guide

MS-TestPro

HDBaseT™, HDMI, DCR and AVoIP Test Device



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Notices

- This MSolutions product contains electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection is highly recommended in order to protect and extend the life of your equipment.
- The transmission distances of HDMI over CATx cables are measured using TE CONNECTIVITY 1427071-6 EIA/ TIA-568-B termination (T568B) of cables is recommended for optimal performance. To minimise interference of unshielded twisted pairs in the CAT5e/6 cable, do not run the HDBaseT / CAT5e/6/6a cabling with or in close parallel proximity to mains power cables.
- Do not substitute or use any other power supply other than the enclosed unit, or an MSolutions approved replacement. Do not disassemble either the Tester, Transmitter, Receiver or optional Module units for any reason. Doing so will void the manufacturer’s warranty.
- The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI logo are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.
- MSolutions reserves the right to change the specifications of this unit without prior notice. As a result of this, physical representations or graphical elements contained within this user guide may not be accurate.

Introduction

The MS-TestPro MS-104B is the only HDBaseT tester that is all-inclusive, 100% reliable, portable and affordable, making this an indispensable tool for AV installers and integrators. It provides AV professionals with all the information needed while in the field to enable them to verify the integrity and stability of every system tested down to the last detail. Moreover, the MS-TestPro generates a report including all the parameters necessary to certify link quality and status for signals up to 4K Ultra High Definition. The report can then be e-mailed, or transferred to a computer, tablet or smartphone for use by both installer and end-user.

The device is supplied with HDBaseT Spec 1.0 Transmitter, Receiver, and PoH (Power over HDBaseT) functionality, providing a highly-efficient testing platform for HDBaseT source and sink nodes, powered devices, and CATx cabling intended for use in HDBaseT networks. Optional modules include HDBaseT Spec 2.0, HCT (HDMI Cable Tester), DCR (DC Resistance), and an optional license for AVoIP Network Analysis. Separate user guides for these optional modules are available from the MSolutions website.

Why the MS-TestPro?

The wiring of an HDBaseT system has been completed, and the audio/visual devices have been connected over the HDBaseT link. An image and sound may be present over the link, but how well are these signals being sent and received?

A link test is essential in guaranteeing perfect and ongoing performance. A return visit to site is not ideal for any integrator or end user.

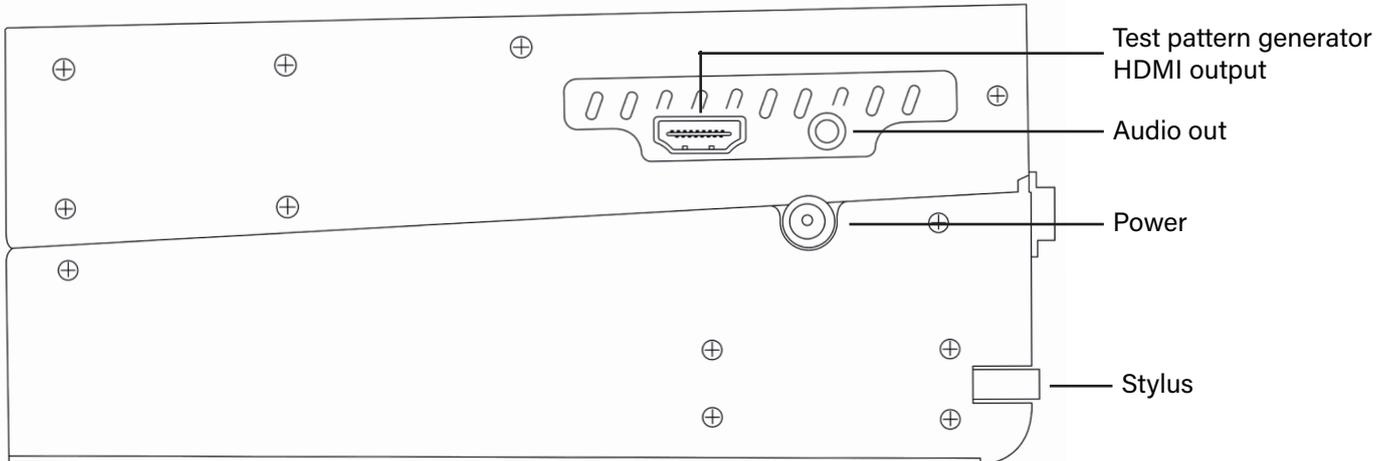
When the test device is connected and error levels are close or exceeding the orange dotted line – even if the link is up and there is a picture on the display – the probability of a future link failure is high. Any EMI (Electro Magnetic Interference) caused by switching on lights or an air conditioning unit, can cause a transmission breakdown and a subsequent drop in the video link.

With the MS-TestPro test device, faulty or inadequate cabling and systems can be identified and remedied before leaving site, saving both time, money and reputation.

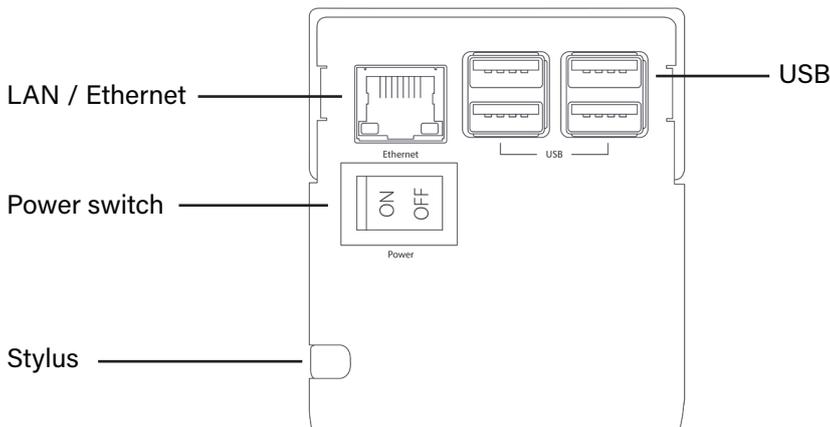
Hardware

MS-TestPro

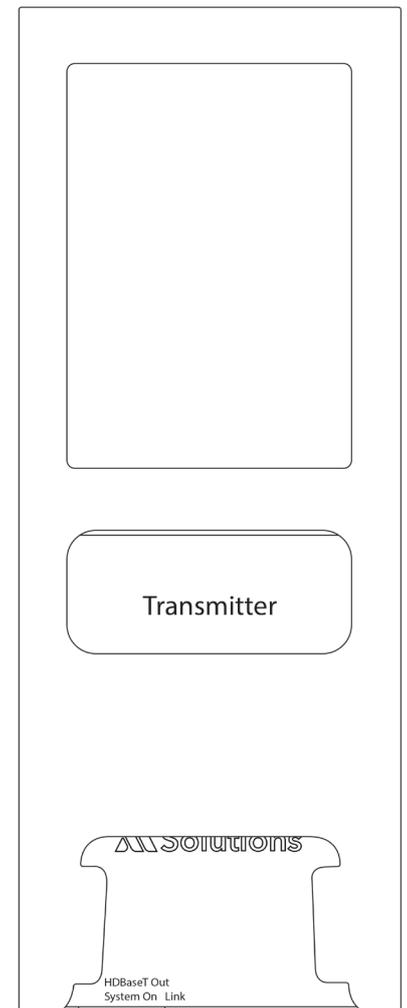
Side elevation



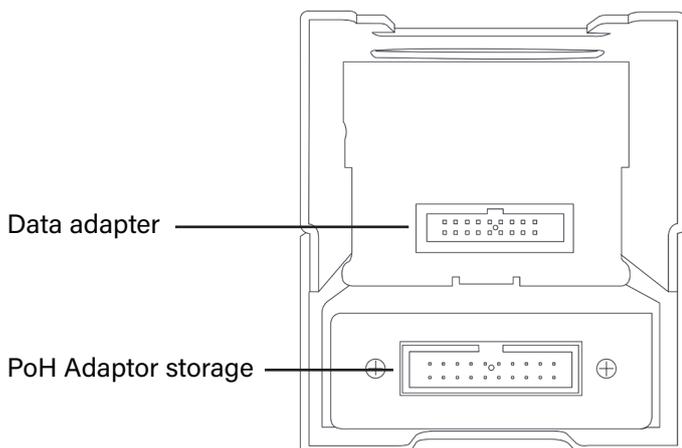
Top elevation



Front elevation



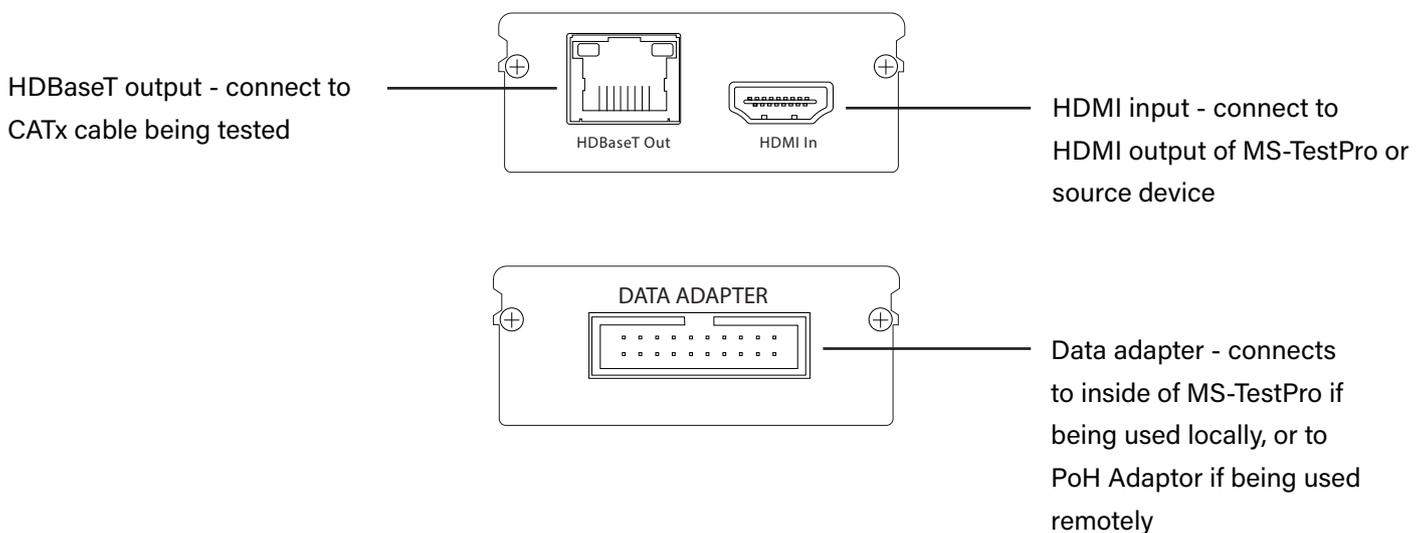
Bottom elevation



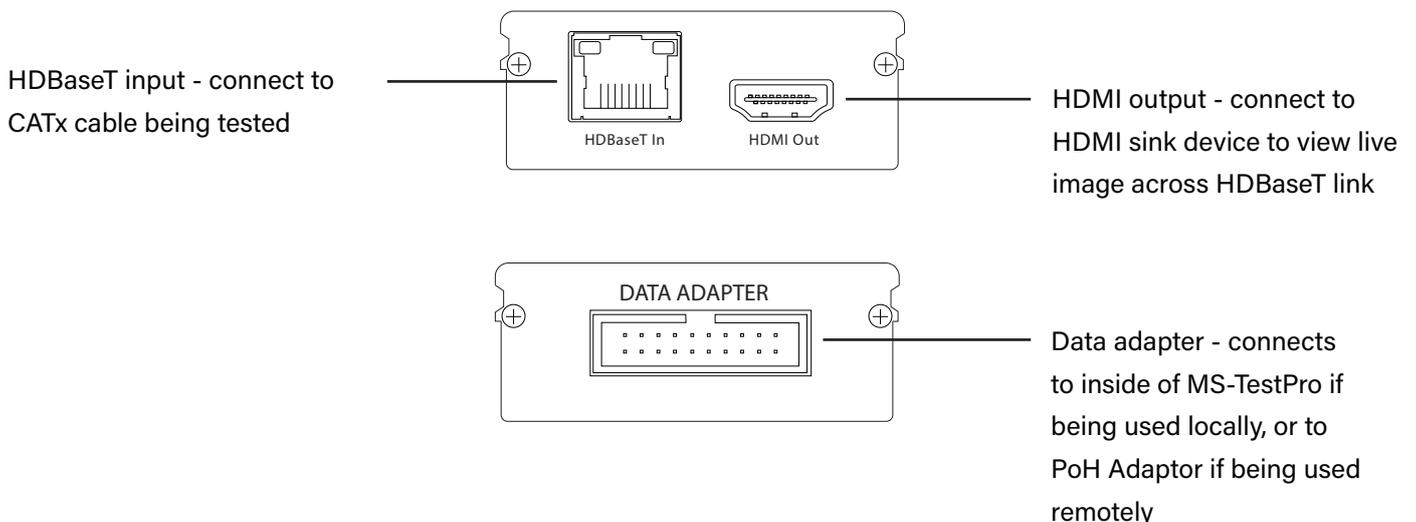
Hardware

The MS-TestPro HDBaseT Test Device is supplied with HDBaseT Spec 1.0-standard TX and RX modules. The HDBaseT Spec 2.0 Modules (TX and RX units) are available as an optional add-on that can be used with the MS-TestPro to test for the additional functionality contained within the HDBaseT Spec 2.0 chipsets.

Spec 1.0 / 2.0 HDBaseT Transmitter Module



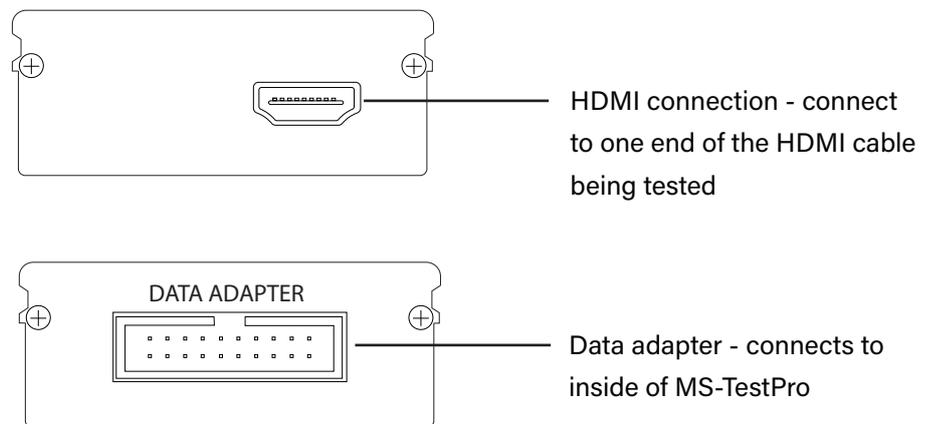
Spec 1.0 / 2.0 HDBaseT Receiver Module



Optional Hardware

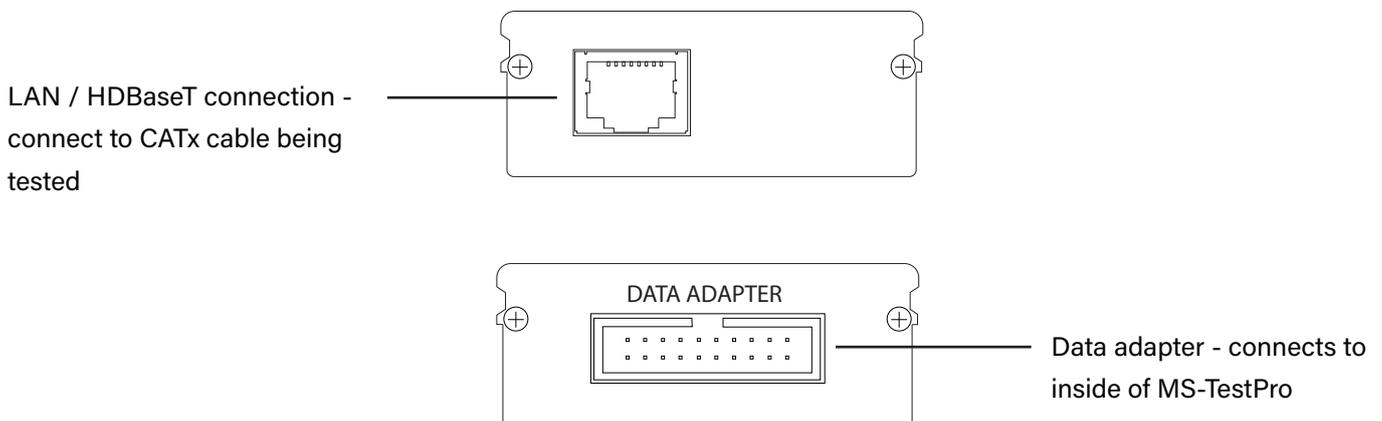
The HDMI Cable Tester (HCT) module allows installers and integrators to test the quality and resolution support of HDMI cables before installation. The module identifies missing and shorted wires in a HDMI cable that will render the cable incapable of 4K streaming.

HCT Module



The DC Resistance feature enables installers and integrators to check DC resistance unbalance easily and reliably on CATx cables – both within and between twisted pairs – ensuring system integrity in even the most advanced, high-powered PoH (Power over HDBaseT) systems.

DCR Module



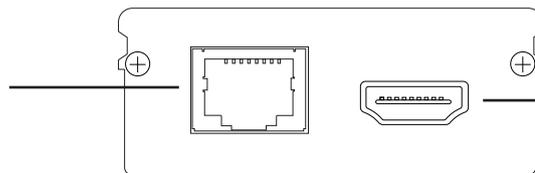
Optional Hardware

The Looper module is a remote-end module with RJ45 and HDMI ports that is used to create the loop at the other end for HCT and DC Resistance testing. A Looper is supplied with any HCT or DCR module purchase.

Looper



LAN / HDBaseT connection - connect to CATx cable being tested as the DCR Module



HDMI connection - connect to opposite end of the HDMI cable being tested as the HCT Module

HDBaseT Support

The MS-TestPro test device integrates a Valens VS100 HDBaseT Class A (Spec 1.0 Module - included) or VS2310 HDBaseT class C (Spec 2.0 Module - sold separately) chipsets, including transmit and receive IC's. The class A chipset supports HDBaseT Specification 1.0, and is compatible with HDBaseT Specification 2.0, allowing it to work with HDBaseT devices of the following classes as outlined in the HDBaseT Specification:

Class	HDBaseT Specification	Media Type	Max Resolution	Max Length	Category
Class A	1.0	Copper	1080p 2160p	100m 70m	Cat5e Cat5e
Class B	1.0	Copper	1080p 2160p	70m 35m	Cat6a Cat5e
Class C	2.0	Copper	1080p 2160p 2160p	100m 90m 100m	Cat5e Cat5e Cat6a
Class D	2.0	Copper	1080p	30m	Cat6a
Class E	2.0	Fibre	2160p	Not support by MS-TestPro	

Cabling for HDBaseT

It is important that the interconnecting CATx cable between HDBaseT products is terminated using the correct RJ45 pin configuration. The link CATx cable should be a 'straight' (pin-to-pin) CAT cable and it is advised that this is wired to the T568B wiring standard as this format is less prone to EMI (Electro-Magnetic Interference) using a recommended of 24 AWG, solid core CATx cable.

When installing CATx cables it is advised that the best possible CAT cable quality possible is used. HDMI distribution products will only work if used with CAT5e standard cable or above. MSolutions recommends using a CAT6 (or higher) cable for installations, especially when running over longer distances, in areas of high EMI, or for 4K signal distribution.

The HDMI cable infrastructure should be compliant to High-Speed standards, especially where 4K is being distributed. It is important to understand that where excessive HDMI cable lengths are used, this brings increased reduction in signal integrity over distance compared to HDBaseT. It is therefore recommended to use short HDMI cables to ensure the integrity of the signal over the link.

The use of HDBaseT Recommended CATx cabling is not a guarantee of performance, only that the cable has been found to be worthy of recommendation by the HDBaseT Alliance. The HDBaseT Alliance cannot guarantee the quality of the installation, or subsequent termination of the cabling by the user.

GUI - Home Page

The home page of the MS-TestPro will be the first screen that appears on first powering on the unit. See below overview of the home page:

USB drive connected: icon shown when a USB drive is connected

Link: will show green when there is an active HDBaseT connection

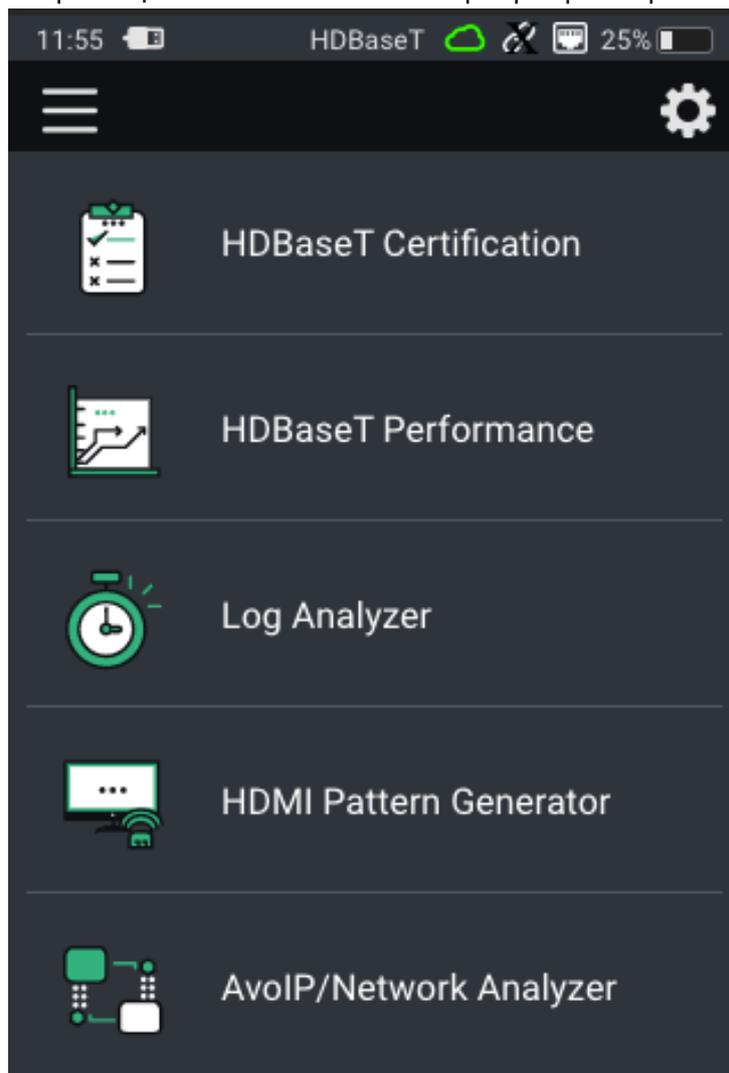
LAN connection: icon will appear green when connected to a LAN

Unit time: set up the date / time from the Settings menu

Cloud connection: Will be green when connected to the cloud

Battery indication: shows charge left in unit

Actions menu: access EDID Analyzer, Files, Power, and Help



Settings menu

HDBaseT Certification menu

HDBaseT Performance menu

Log Analyzer menu

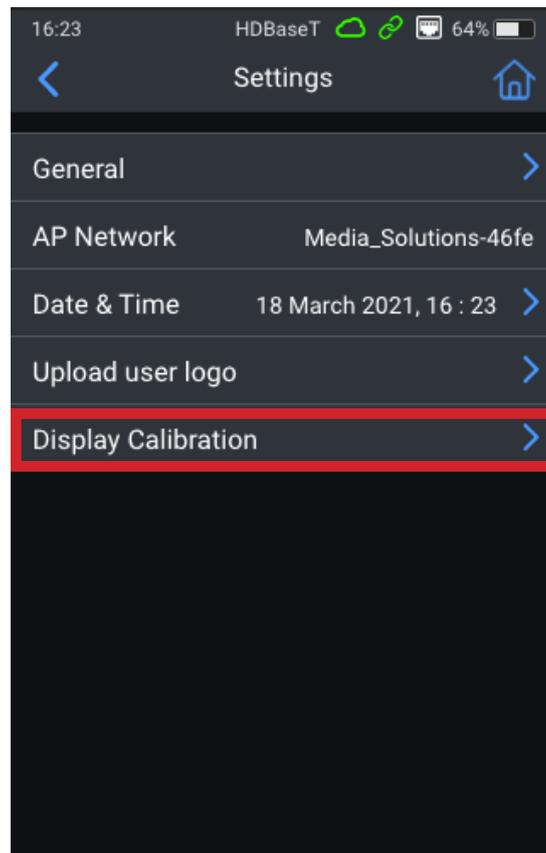
HDMI Pattern Generator menu

AVoIP/Network Analyzer menu

GUI - Display Calibration

Due to the size of the display included on the MS-TestPro there are certain menus and options that require a precise press of the screen when using the supplied stylus. It is recommended to calibrate the display on first use, then periodically depending on use.

To calibrate the display, click on the Settings menu in the top right of the Home Page and select Display Calibration:



Follow the instructions on screen, pressing the tip of the stylus on the red cross-hairs at the given points on the screen. Once a calibration point has been confirmed, it will turn white, and a new cross-hair will appear. A count-down timer will appear in the centre of the screen between presses. Please complete the stylus press within the countdown period.

The MS-TestPro will need to be rebooted for the new calibration to complete. Reboot by using the Power/Reboot sequence in the Actions Menu.

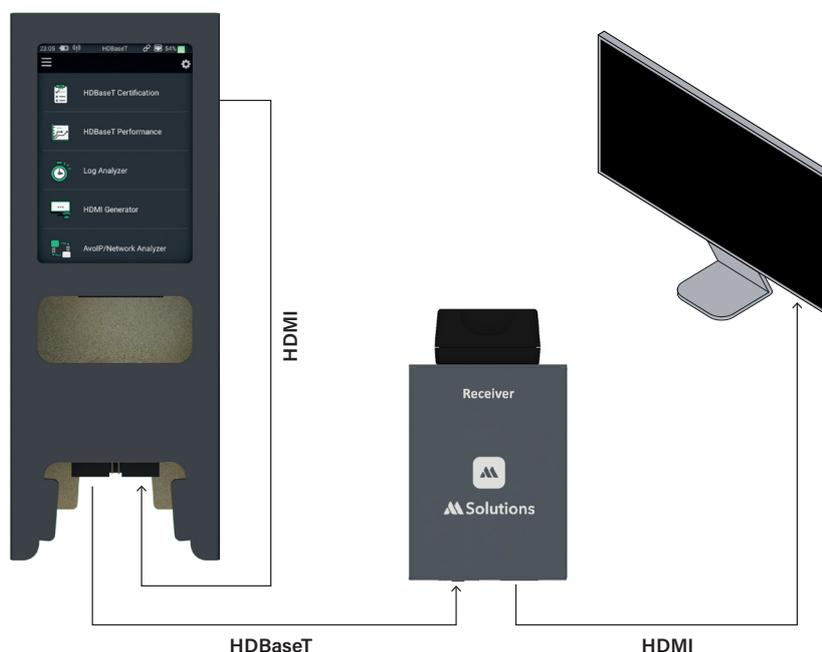
If, during normal use, it is apparent that button presses on the screen are not precise, please re-run the display calibration.

IMPORTANT: It is recommended to always use the supplied stylus. Do not use a finger or other 'blunt' instrument to calibrate the screen. Doing so may result in non-precise actions during use. Likewise, do not use pens, or sharp objects to press on the screen, this may inadvertently damage the screen.

MS-TestPro Test Setup

The Transmitter and Receiver modules of the MS-TestPro device are directly connected to each other using a CATx cable of up to 100 meters (328 feet) in length as per the diagram below. The Transmitter or Receiver module can be inserted into the base of the Tester however, it is important to use the Transmitter unit at the end of the CATx cable where the HDBaseT Matrix or Transmitter equipment is / will be located under normal operation. The test can be carried out at either end of the CATx link.

Important: Always power down the MS-TestPro for cartridge (Transmitter / Receiver / HCT / DCR) replacement.



It is important to use the MS-TestPro with a live HDMI source device, or Test Pattern Generator, to pass a HDMI signal over the link for the MS-TestPro to properly qualify the link. The MS-TestPro can generate a range of HDMI signals (up to 4K 30Hz 4:4:4) using the built-in Test Pattern Generator on the side of the unit. By default, the signal output from the HDMI output of the tester is 4K 30Hz 4:4:4 (10G). By NOT connecting a HDMI signal to the Transmitter unit, the live HDBaseT signal is just a 'base-line' signal which will not push the bandwidth of the connection to that of a 'live' link.

If using a live source device, please limit the resolution output to 4K 30Hz 4:4:4, or, 4K 60Hz 4:2:0.

The HDBaseT Spec 1.0 and 2.0 modules do not require a signal that exceeds 10.2Gbps (4K 30Hz 4:4:4, or, 4K 60Hz 4:2:0) as this is the maximum HDMI data rate HDBaseT can accept under normal conditions. HDBaseT equipment that can accept higher data-rate signals use either compression or conversion prior to the HDBaseT chipsets to limit the ceiling data rate to that of the HDBaseT technology.

MS-TestPro Test Setup

1. Remove Transmitter, Receiver and PoH Adaptor from the main tester body.
2. Insert either the Transmitter or Receiver module (as required) into the MS-TestPro main unit in the lower slot. This will be known as the local module. **Please note:** only the lower slot is used to connect modules to the MS-TestPro main unit. The upper slot is only used for module storage during transport.
3. Use the guide rails to insert the local module into the tester pressing firmly to make a solid connection between the data adaptors on both the local module and the tester body.
4. Connect the CATx cable to the HDBaseT connection on the local module inserted into the tester.
5. Run a short HDMI cable from the HDMI output located on the side of the MS-TestPro to the HDMI input of the local module (assuming the local module is the Transmitter), or from a HDMI source device, or 3rd party Test Pattern Generator to the HDMI input of the Transmitter if the Transmitter is going to be used as the remote module.
6. Attach the PoH Adaptor to the remote (Transmitter or Receiver) module so that this will function as the PoH powered device (PSE). Power over HDBaseT is sent from the local module (PD) inserted into the tester, to the remote module over the CATx cable.
7. Connect the remote module to the HDBaseT port on other end of the CATx link.
8. Connect the Receiver module by HDMI to a display, or HDMI Analyser on the far end of the CATx cable to see a live image being transferred over the HDBaseT link.

HDBaseT Testing Types

Depending on the reason for using the MS-TestPro, there are a few differing types of test that can be undertaken.

1. **HDBaseT Certification:** unlike certification of an IP infrastructure, this test will verify that a run of CATx cable is capable of carrying a HDBaseT signal. This test should be used for new cabling runs, after installation / termination, to guarantee that 3rd party HDBaseT manufacturers equipment can work over the cable infrastructure.
2. **HDBaseT Performance:** this is a "live view" of the HDBaseT signal passing across the CATx link based on the image being supplied to the tester from its own HDMI pattern generator, or a live HDMI source.
3. **Log Analysis:** this is used in instances where intermittent drop-out of signal is experienced over a CATx cable run. This can be left "testing" the cable for up to 24 hours, logging the signal quality at 1 second intervals.

The next few pages of this User Guide will outline the above tests in more detail.

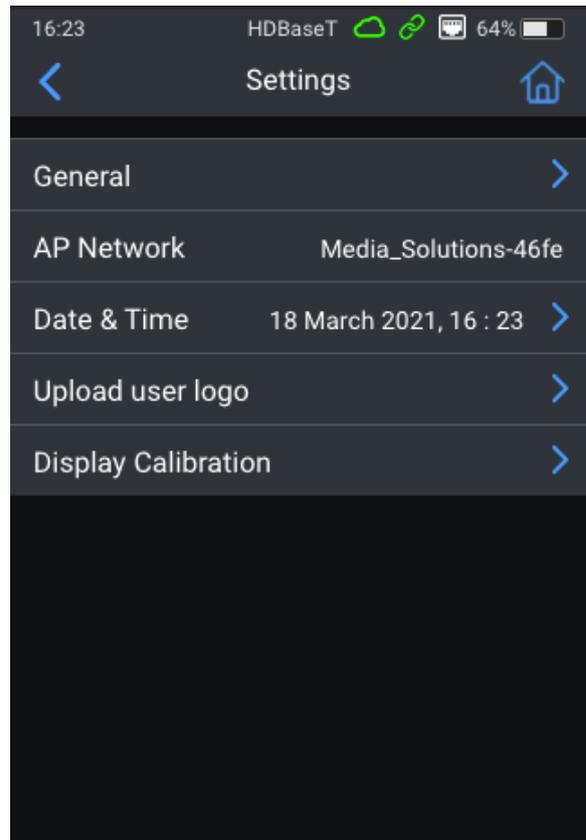
WiFi / LAN Connectivity

The MS-TestPro MS-104B features LAN connectivity allowing for a user to connect the MS-TestPro to the network directly (via hardwired LAN), directly to the unit from a PC (hardwired - DHCP), or using the built in AP to connect a mobile device, tablet or laptop computer where no hard-wired LAN connection is available.

Connecting to the built-in AP:

Use this method where there is no hard-wired connection to a LAN, or the customers network.

- Click on the 'Settings' icon in the top right of the home screen to access the WiFi details
- The access point of the unit is noted in the 'AP Network' field
- Search for this AP in the list of available wireless networks
- Connect to the unit - no password required
- Enter the default IP address of 192.168.11.1 into your browser to communicate with the unit directly



Connecting the unit to a LAN:

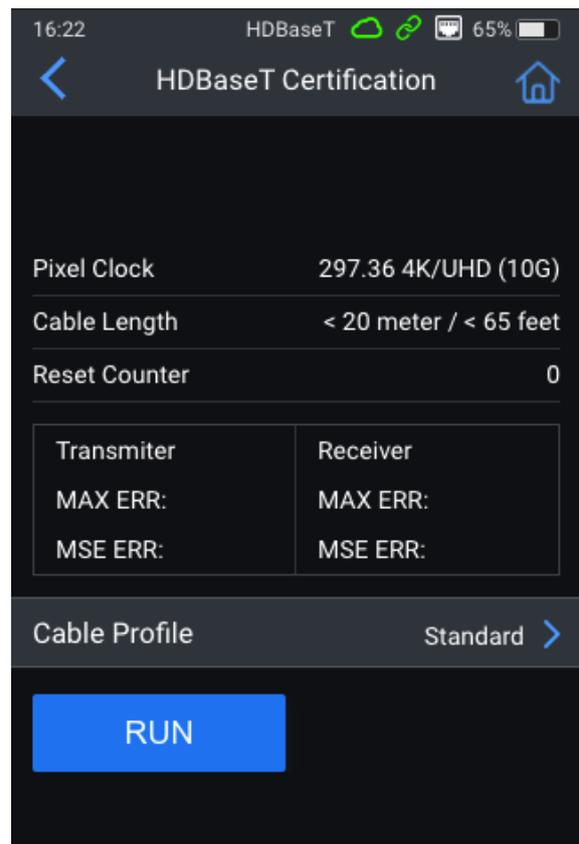
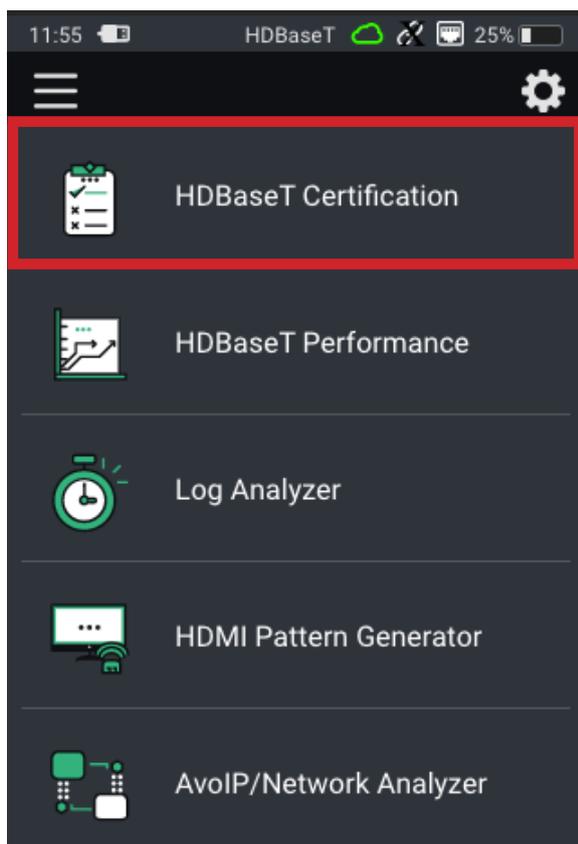
Use this method when there is a hardwired LAN connection. Use the RJ45 connection on the top of the MS-TestPro to connect to the network. The LAN Connection icon will appear at the top of the display (see GUI Home Page for further details).

- Click on the 'Settings' icon
- Click on the 'General' menu at the top of the list (as shown above)
- The IP address of the unit will be displayed under 'Local IP'
- Insert this IP address into the browser of a smart phone, tablet or laptop that is connected to the same LAN as the MS-TestPro

HDBaseT Certification Test

The MSolutions MS-TestPro HDBaseT Certification test has been approved by the HDBaseT Alliance as a recognised test for the defining of a CATx run as being suitable for the transmission of a HDBaseT signal. This test would be used for new CATx cable runs, or for existing runs to determine the suitability for stable HDBaseT transmission.

Select the first menu option on the main Home menu of the MS-TestPro to enter the 'HDBaseT Certification' page.



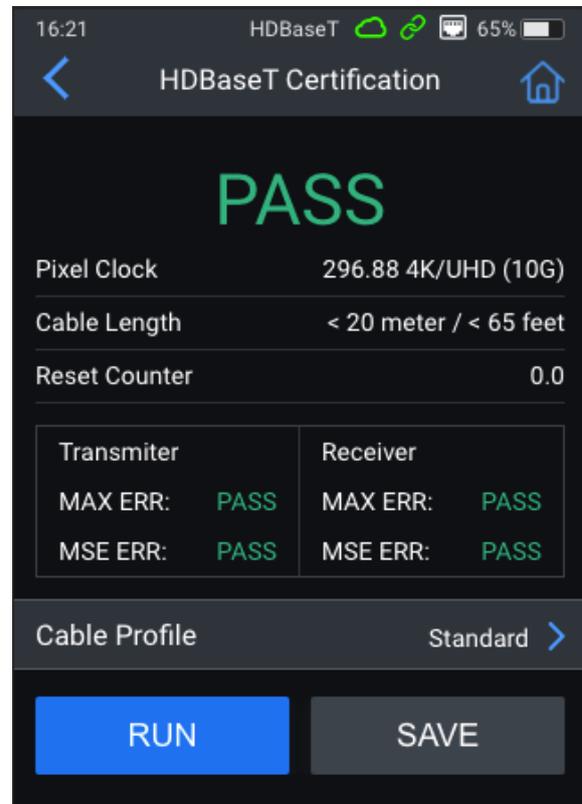
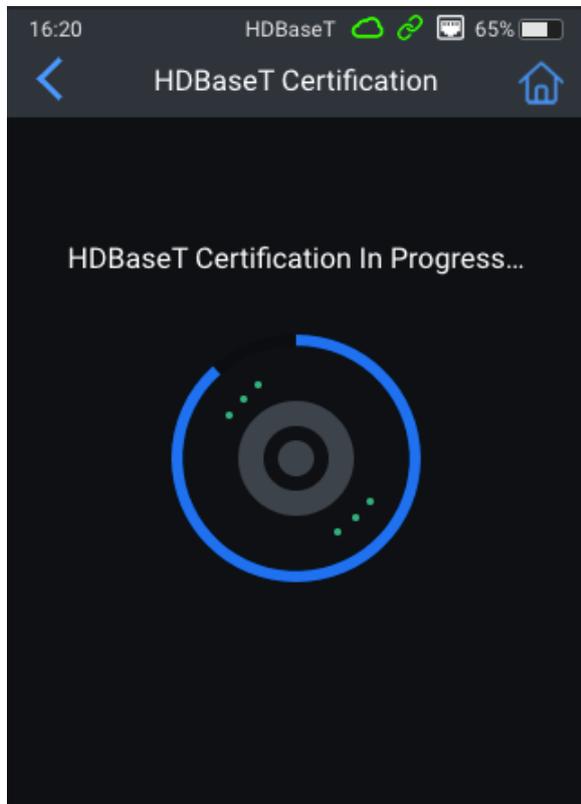
If using a CATx cable that has been included into the pre-defined Cable Profiles of the MS-TestPro, use the Cable Profile selection towards the bottom of the screen to select the cable type being used. Otherwise, leave this as 'Standard'

The MS-TestPro will quantify the HDMI signal being passed by the Pixel Clock notification. **Please note:** the maximum pixel clock that HDBaseT can carry in Specifications 1.0 and 2.0 is 298MPixel.

Press 'RUN' to carry out the HDBaseT Certification test. The test will take approximately 10 seconds where the live HDMI signal (being inserted to the Transmitter module) will be sent over the HDBaseT link for the test.

Please note: if a live HDMI signal is not inserted into the Transmitter module then the tester can only test for basic DDC (Display Data Channel) information being sent and received. This is not considered to be a true HDBaseT link test, as there is no physical video or audio being transmitted.

HDBaseT Certification Test



Once the test has finished, a PASS or FAIL result will be shown on the tester screen. For more information on MAX ERR and MSE ERR values, see next page.

To save the test result into the memory of the MS-TestPro, click 'SAVE'. Enter the details into the 3 open text fields for: Customer, Job Site, Cable Type and Operator before hitting 'Save'. The .pdf test report will be saved into the MS-TestPro internal memory that can then be downloaded onto a USB drive. If the unit is connected to the Cloud, the report will automatically be uploaded to the Cloud at this point.

The report can be downloaded immediately by pressing 'DOWNLOAD' once saved. The tester will revert to the HDBaseT Certifications download page.

See the 'Report Files' section later in this guide for instructions of how to download these test reports.

MAX ERR and MSE ERR

The MSolutions MS-TestPro measures both the quality of the signal being passed over the cable, and the cables ability to pass the signal. These two pieces of performance data are defined by MAX ERR and MSE ERR.

MAX ERR: the per-channel maximum recorded value of the residual error for PAM-8/-16 modulation:

The Max Error measurement is the absolute value of the maximum distance between the input signal on a given channel and the decision threshold in the HDBaseT modulation detection scheme. This measurement behaves as a peak detector, so the value read is always the maximum error witnessed on the channel. This refers directly to the HDBaseT Receiver chips ability to un-modulate the signal and correct errors that are encountered.

MSE ERR: the per-channel mean square of the residual error for PAM-8/-16 modulation:

The Mean Square Error (MSE) value is a fractional negative number of decibels (dB). The higher the absolute value of the MSE, the better the quality of the HDBaseT signal (i.e. -19.8dB is better than -18.3dB). This refers to the quality of the CATx cable with regards to the resistance (based on the quality of the copper vs the overall length of the cable) applied to the signal.

HDBaseT is an Asymmetrical Link meaning that the technology has a higher rate of data transmission from TX to RX, than it has from RX to TX. The MS-TestPro will test for data flow in both directions, allowing for a true reflection of the link quality for all HDBaseT functionality.

HDBaseT Performance Testing



The HDBaseT Performance overview gives the user a live overview of the signal passing through the MS-TestPro for both MAX ERR and MSE ERR on both Transmitter and Receiver modules. The tester can be switched between TX and RX by using the selection switch at the top of the screen as highlighted above.

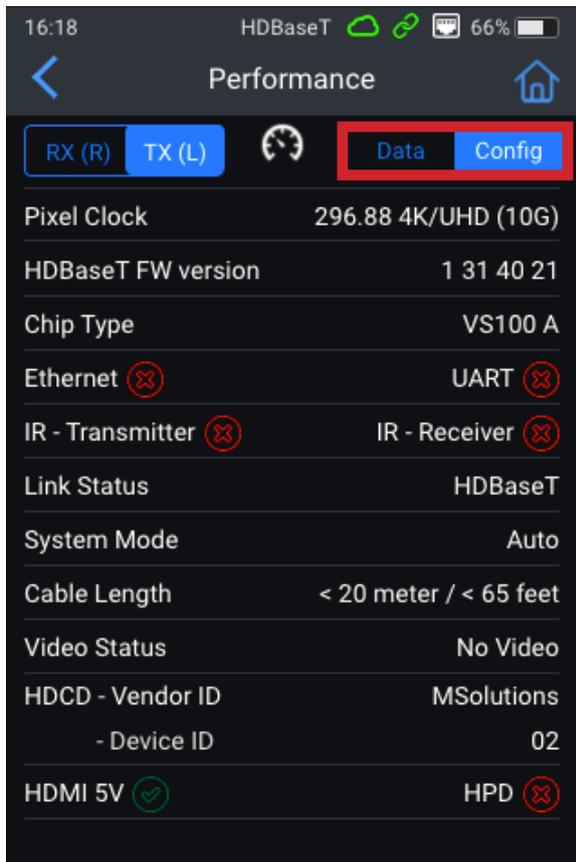
The 4 coloured lines that work their way across the screen from left to right indicate the live signal flow across each of the 4 twisted pairs in a CATx cable over a 30 second period.

- RED - pair A (pins 1 & 2)
- BLUE - pair B (pins 3 & 6)
- ORANGE - pair C (pins 4 & 5)
- GREEN - pair D (pins 7 & 8)

The orange and red dotted lines are performance thresholds (where in view) which indicate that the link is unstable once crossed (orange line), to the link being faulty (red line). The thresholds for TX and RX are constant for the MAX ERR as this is an absolute value where 0 is no errors, and 1 is the threshold of the error correction being exceeded above the capabilities of the technology.

The thresholds for MSE ERR are dependent on Cable Profile, Pixel Clock speed, and Cable Length. The orange and red dotted lines will dynamically adjust based on these variables to give as true reflection of the system under test.

HDBaseT Performance Testing



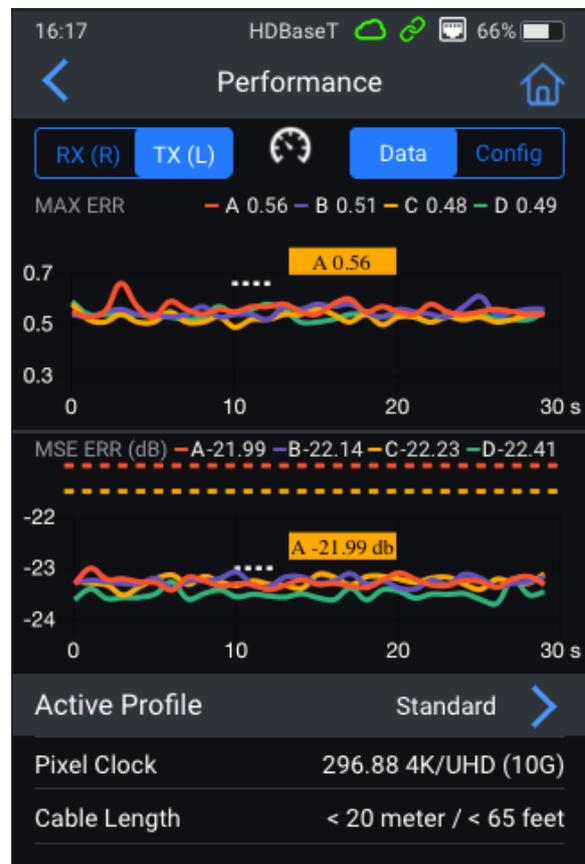
The 'Config' data page shows the capabilities of the HDBaseT chipsets in use on both TX and RX side (using the switch in the top left of the screen).

The MS-TestPro can also be used to send a signal to a HDBaseT receiver, or receive a HDBaseT signal from a HDBaseT Transmitter from a 3rd party manufacturer to assess the capabilities of the device, or to check the quality of the signal being output.

IMPORTANT: the local MS-TestPro module uses 48V PoH (Power over HDBaseT). Connecting a 3rd party manufacturer's TX or RX that does not use PoH to the end of a link is likely to damage the equipment in use. The same for 3rd party equipment sending other non-HDBaseT standard power schemes such as PoC (Power over Cable), or PoW (Power over Wire) is likely to damage the test module.

- Pixel Clock - the clock frequency of the video transmission. The pixel clock values for both TX and RX should be similar
- HDBaseT FW Version & Chip Type - check the current firmware on the Valens chipsets & class of HDBaseT chip
- Supported system features: Ethernet, IR - TX, IR - RX, UART - the interfaces that are extended by the chip over the HDBaseT link such as Ethernet, RS-232 or IR (bi-directional)
- Link Status - HDBaseT or No Link
- System Mode - specifies whether operating mode changes are automatic or manual
- Cable Length - approximate cable length calculation (accuracy level +/-10%)
- Video Status - indicates whether HDCP content is being transmitted:
 - Video On - HDMI transmission without HDCP content
 - HDCP On - HDMI transmission with HDCP content
- HDCD Information - equipment vendor and device ID, as specified in the HDBaseT standard
- HDMI 5V and HPD - Hot Plug Detect - detects presence of 5V and HPD on the signal

HDBaseT Performance Testing



Reading the Performance graphs:

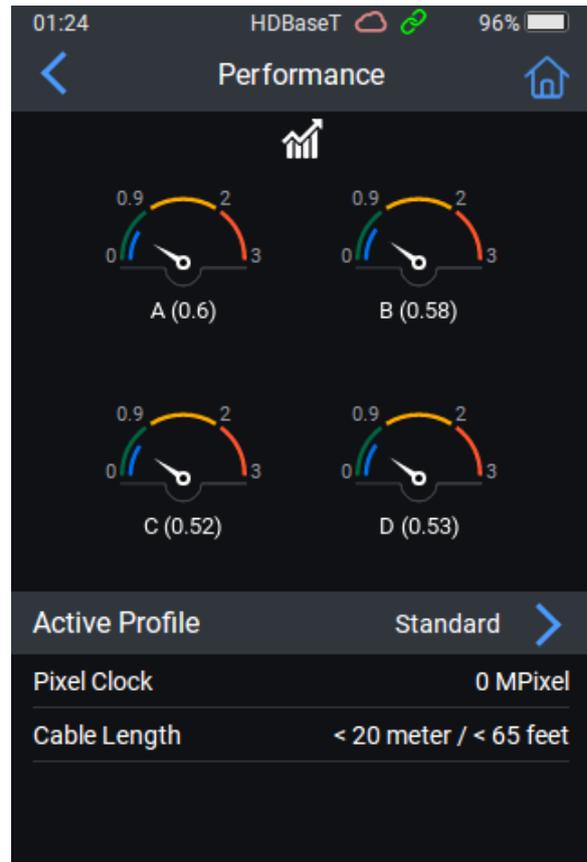
With any data being passed over a CATx cable, the idea is to have adequate headroom in the cable to allow for fluctuations or increases in data.

The performance graphs show the individual twisted pairs data performance. Some points to note as follows when viewing the live output of the performance:

- The 4 twisted pairs should all be similar in their performance across the graph. Should any of the coloured lines be noticeably different (higher, on average) than the rest, this indicates that there could be a fault on these specific pins.
- The coloured lines should have some headroom underneath the orange dotted line for optimal performance.
- The closer the twisted pair lines are to the orange dotted line on the MSE ERR, the more resistance they are encountering. This could be due to the overall length of the cable - in the above example the length of the cable is 92m - this is nearing the limit of HDBaseT's overall extension capabilities. However, if the length is being reported at 25m (as an example), this would therefore be an example of poor quality cable, or, that the cable is being subjected to resistance from in-line connections (i.e. patch panels, wall plates or inline connectors) - removal of these 'joins' will increase the quality of the signal and reduce the MSE ERR.

HDBaseT Performance Testing

Clicking on the dial icon in the middle top of the screen shows a slightly different view of the Performance overview which shows the individual live performance of each twisted pair to view the average MAX ERR of each pair:



To switch back to the line graph, click the icon in the top middle of the screen.

HDBaseT Performance Testing

Reading the Performance Graphs... continued:

- At the point where any of the twisted pair lines cross the orange dotted line, the system would be deemed un-stable and at it would be expected to see intermittent drop out of video and audio. There is no error correction in HDBaseT Spec1.0 - any increases over the orange dotted line could potentially be taken care of by the HDMI chipset within the sink device, but not inside the HDBaseT equipment at this point.
- The error correction in HDBaseT2.0 chipsets can cope with small increases over the orange dotted line, however, if the twisted pair line moves too far over the threshold, the error correction may not be successful and video / audio will be dropped.
- The closer any twisted pair lines move above the orange dotted line towards the red dotted line the higher risk of too many errors will be experienced.
- If any of the twisted pair lines reach or exceed the red dotted line it is expected at this point that the HDBaseT link is likely to fail resulting in no video and audio being passed.
- Active Profiles are only to be used for specific manufacturers CATx cables where their systems are designed to work within specific parameters of cabling performance. Activating a cable Profile within the MS-TestPro adjusts the performance criteria of the test which can have an adverse affect on the actual performance output of the tester.

In summary:

The HDBaseT Performance option within the MS-TestPro allows for a test to be carried out over a longer period of time than the HDBaseT Certification, which only analyses the signal over a 10 second period.

This test is a good graphical indication of the signal performance over the CATx cable which can prove to be invaluable to integrators wanting to have 'x-ray vision' into a HDBaseT signal being transported.

The results from these tests will highlight corrective actions that can be carried out on the CATx cable infrastructure before leaving site. These actions may involve:

- Re-terminating RJ45 plugs, punch-downs, keystones or joins
- Replacing patch cables (if used) - please note, it is not recommended to use patch cables with HDBaseT. Where patch cables are used, it is recommended to use a solid core variant
- Removing patch panels or wall plate connectors
- Running a new CATx cable, or attaching to a new run of cable (if available)
- Reducing the resolution of the source device to take into account errors of higher-bandwidth signals. The HDMI Pattern Generator of the MS-TestPro can be used to qualify different resolutions in this instance - see HDMI Pattern Generator page

Log Analyzer

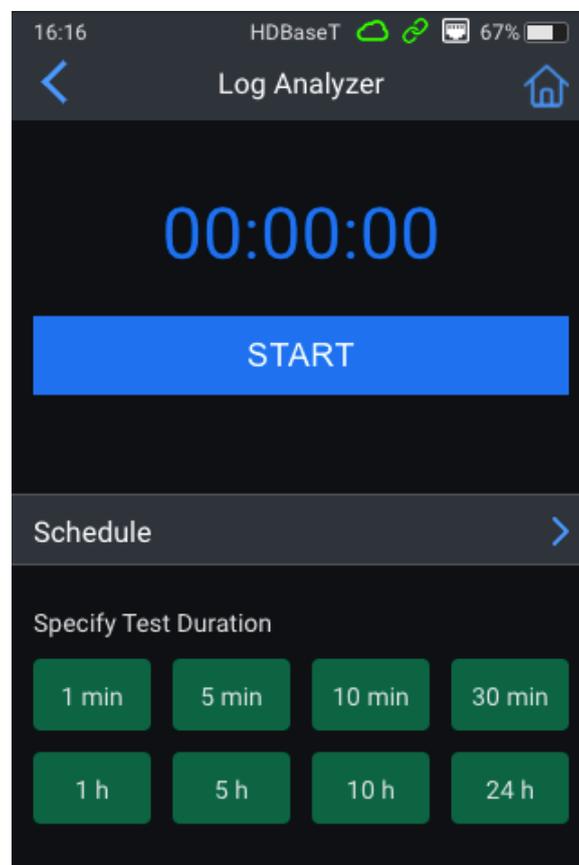
The MS-TestPro can perform an extended HDBaseT Performance test to qualify a CATx link over an extended period of time.

On all too many occasions, end users report intermittent drop outs of video and audio over extended periods of time. Spending time watching a screen for a drop out can be wasteful for an integrator.

The comprehensive Log Analyzer function measures over sixty different parameters of the HDBaseT link. It has been designed to track random failures over a long period of time. The test duration is up to 24 hours, as required, allowing the performance of the cable to be captured over a period of time exceeding the time when the customer has reported intermittent issues with the link.

Log files are generated in pairs – one for the Transmitter module and one for the Receiver module. Up to 5 pairs of log files are stored in the internal memory of the MS-TestPro. When a 6th pair of log files is generated, the oldest log file pair in the system is automatically deleted.

The MS-TestPro has been designed to be installed into the end users system, passing the customers video stream between source and display, and left in situ for the test duration.



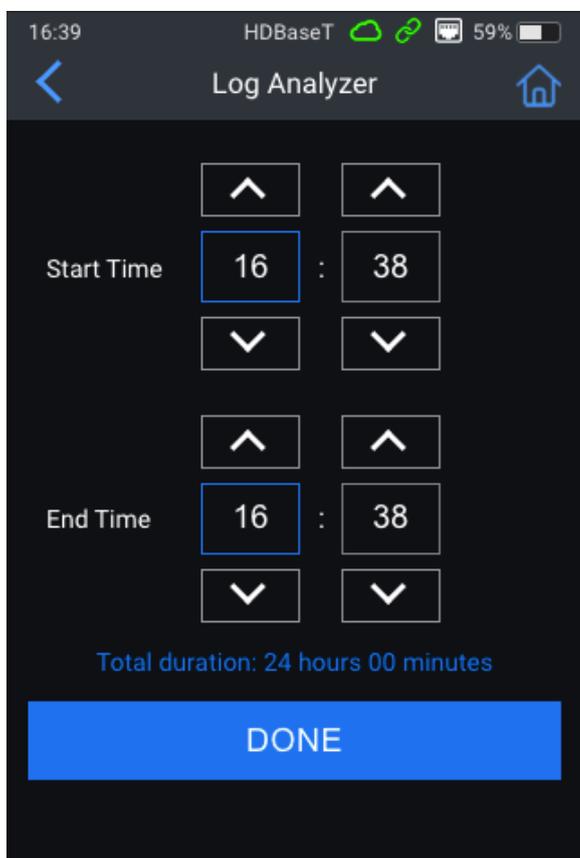
Log Analyzer

Log Generation:

To generate a Log Analysis, click on the 'Log Analyzer' function on the main tester menu:

1. Connect the equipment as per performing a HDBaseT Certification test with a live HDMI signal being input to the Transmitter module, and a display connected to the HDMI output of the Receiver module.
2. Select the 'Test Duration' using the green buttons at the bottom of the screen. The time will be displayed on the count-down timer at the top of the screen in blue.
3. Press 'START'
4. Once started, the test can be stopped by pressing the 'STOP' button.
5. Once stopped, the test can be resumed, however, a separate log file will be created for the resumed time period.

Alternatively, the test can be selected to start at a set time using the 'Schedule' option where a specific start and end time for the test - see example below. The tester will default to the current time as per when the Log Analyzer function was entered into. Select the start and end times as required using the UP and DOWN buttons, pressing 'DONE' when finished. Please note: the maximum log test duration is 24 hours.



The Log Analyzer creates 2x .csv file download documents. One document relates to the testing data for the Transmitter module, the other for the Receiver module.

The Log Analyzer records the quality of the HDBaseT signal over the period of time allocated in 1 second intervals. The testing data is exactly the same as the information recorded during a HDBaseT Certification or whilst viewing the HDBaseT Performance graphs.

The data can be analyzed by an MSolutions professional who will be able to advise on the quality of the signal over the time period of the test.

Please email the .csv files for analysis to:

support@m4sol.com

The team will review these and reply within 2 business days.

HDMI Pattern Generator

To ensure a successful HDBaseT test, a live signal should be passed along the link during testing. The MS-TestPro has a built-in HDMI test pattern generator for times where there are no source devices available for testing.

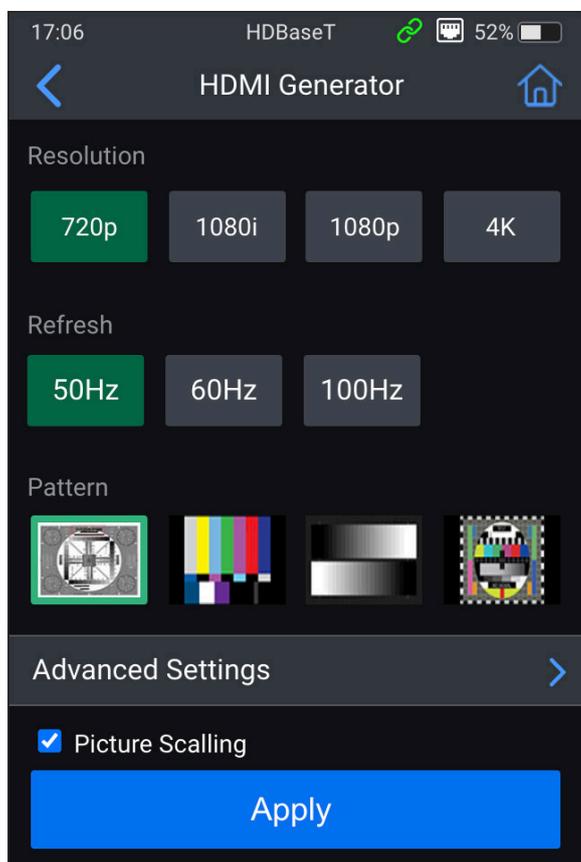
The built-in HDMI test pattern generator is always outputting a live signal from the HDMI output port on the side of the MS-TestPro. The image is a 4K (10Gbps) image with a resolution of 3840x2160 30Hz RGB 4:4:4 8-bit colour with no HDCP.

HDBaseT specifications 1.0 & 2.0 have a ceiling HDMI bandwidth rate equal to that of the HDMI1.4 chipset - 10.2Gbps. Any 3rd party HDBaseT equipment that handles up to 18Gbps HDMI signals will either be:

- utilising a form of compression or conversion to reduce the overall amount of data before it is transferred into the HDBaseT Transmitter chip for modulation, or,
- is a VS3000 HDBaseT Spec 3.0 chipset

The 4K UHD image generated by the Pattern Generator in the MS-TestPro will provide a “ceiling limit” HDMI signal to ensure the HDBaseT test module chipsets are working to their optimum for all HDBaseT Spec 1.0 and 2.0 testing.

There are also times where 4K is not required, therefore the testing should be applicable to the usage of the particular install. The Pattern Generator has the ability to output multiple other HDMI resolutions and frame rates for more appropriate testing.



To select a new resolution:

1. select the resolution from the list at the top of the screen
2. select the refresh rate
3. select an appropriate pattern
4. click 'Apply'

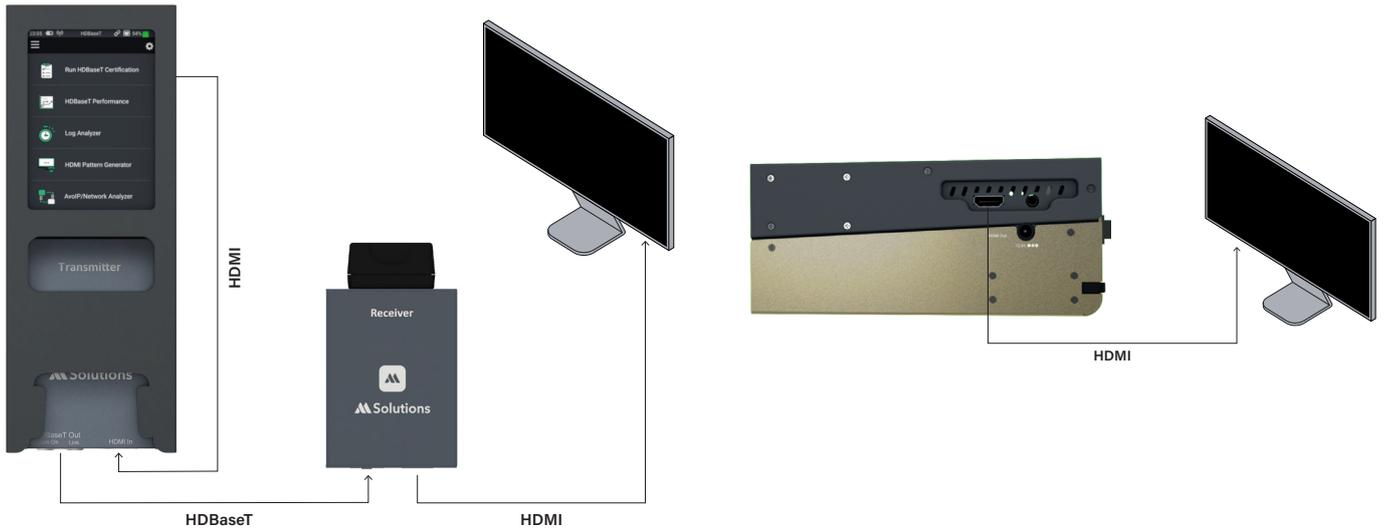
The Advanced Settings page allows for a variety of VESA resolutions to be selected for more niche installations including 4:3 aspect displays. There are also a selection of patterns to choose from including colour bars, grey scale and full screen colour imagery.

The 'Picture Scalling' radio button can be ticked to scale the patterns to fit the screen the signal is being distributed to.

EDID Analyzer

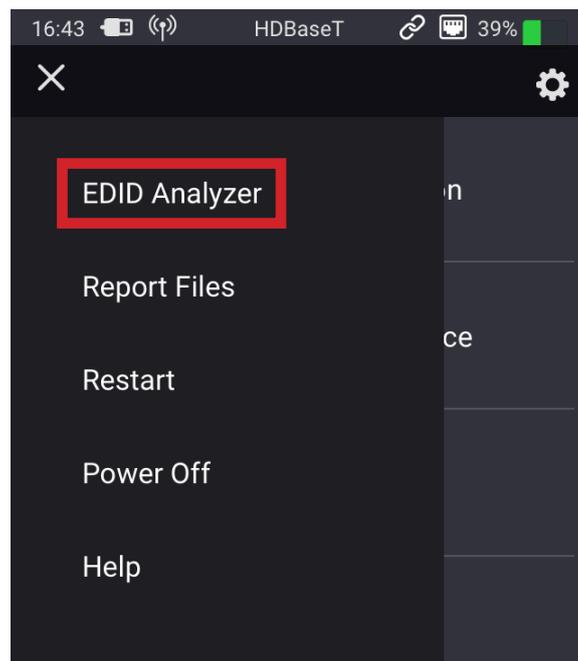
The built in EDID Analyzer allows access to the display capabilities of HDMI sink devices. There are two methods for obtaining the EDID information from a sink device:

1. Connecting the MS-TestPro device to an HDMI sink device via a HDBaseT link
2. Connecting the MS-TestPro device to an HDMI sink device via a HDMI cable directly



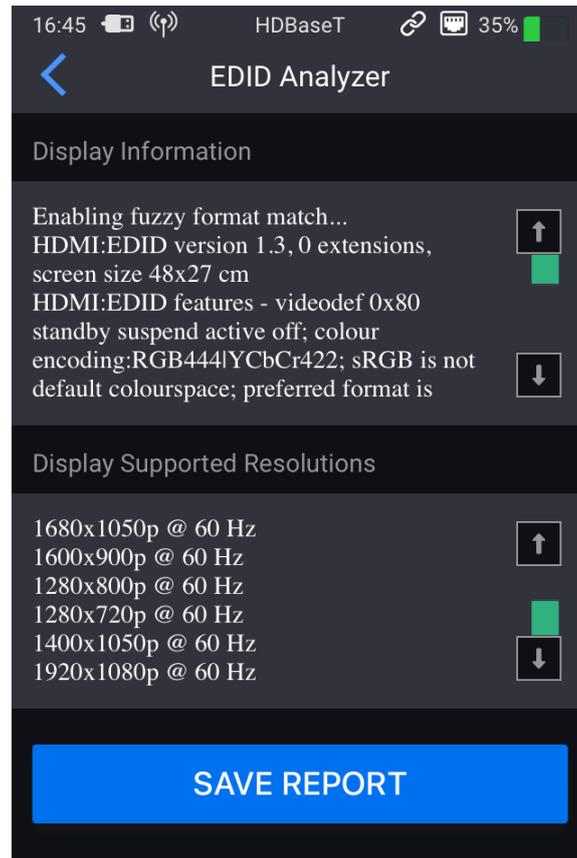
To access the sink EDID capabilities:

1. Connect the MS-TestPro device to the sink either via HDMI, or HDBaseT, as shown in one of the methods as described above.
2. Select the 'EDID Analyzer' from the Tools menu, as shown below:



EDID Analyzer

The EDID Analyzer screen gives access information on the display capabilities of the HDMI sink device. The following screen appears, presenting the sink device display information, and supported display resolutions:

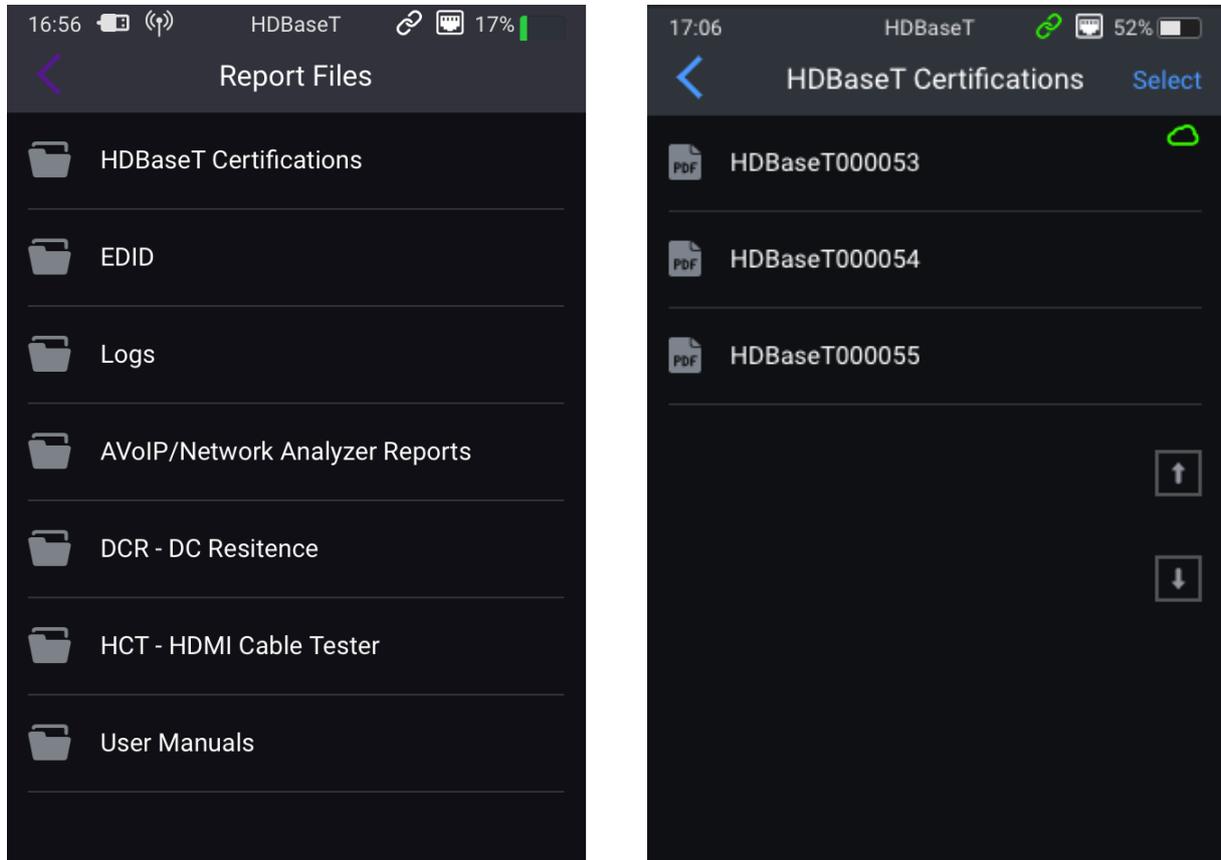


To save the EDID data to the MS-TestPro’s internal memory, click the ‘SAVE REPORT’ button.

To download EDID data, connect a USB memory stick and tap the ‘DOWNLOAD REPORT’ button. Two files will be saved – EDIDXXXX.txt and EDIDXXXX.bin. Select the file required and confirm the download by clicking ‘Download x files.’

Report Files

The Report Files option within the Actions menu is a centralised location for all reports that have been stored into the MS-TestPro internal memory.



All reports from any of the tests that the MS-TestPro can carry out will be saved into this location for download onto a USB stick inserted to one of the 4 slots on the top of the MS-TestPro.

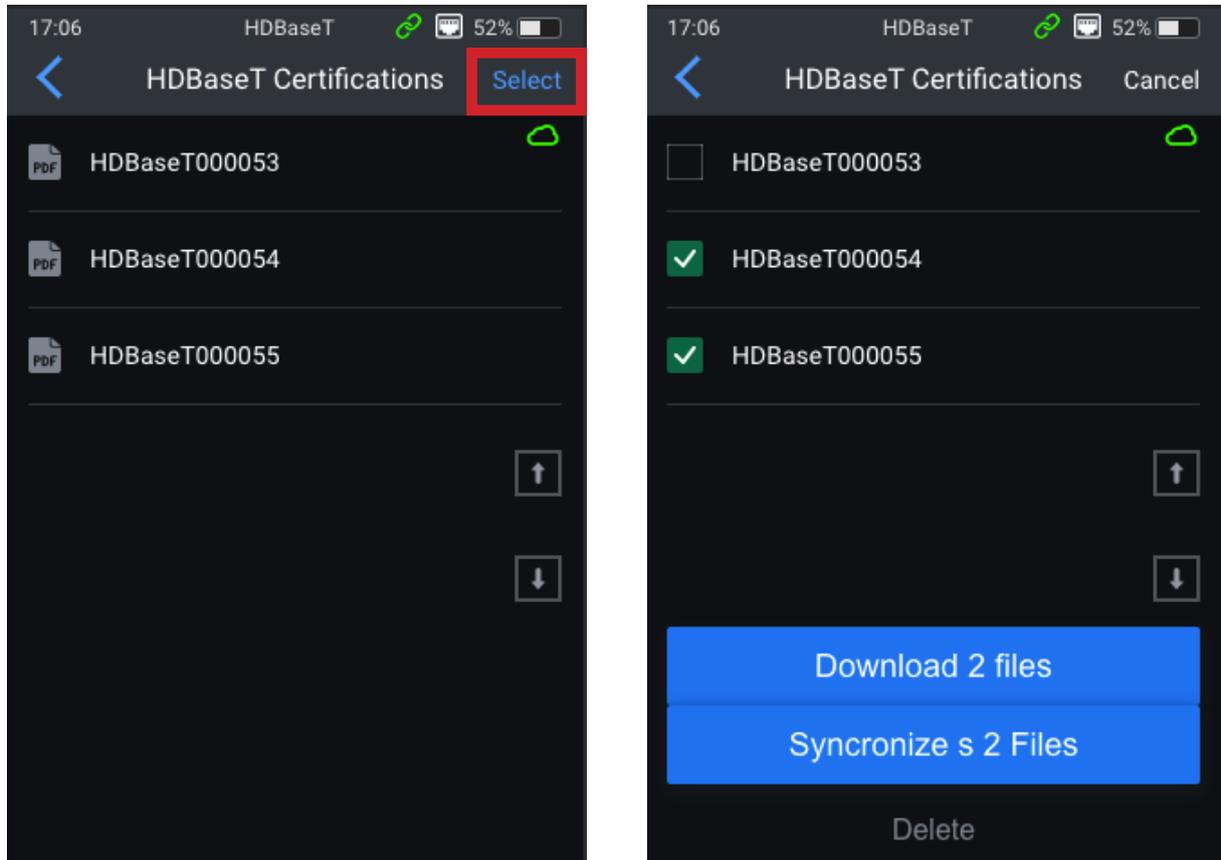
Reports are grouped together for HDBaseT Certifications, EDID, Log Analysis, AVoIP / Network Analyzer, DCR, and HCT. Select the type of report required for download.

Once inside the individual parent folders, the reports are available to select as required. Reports that have a green cloud symbol (as above right example) have had this report uploaded to the Cloud. Reports can be uploaded to the Cloud when the MS-TestPro is next online - see next page.

When using a mobile device, tablet or laptop computer to run tests on the MS-TestPro, reports are downloaded automatically to your device. These will be available in your assigned 'Downloads' folder for saving, printing or filing.

Report Files

When inside the individual parent folder for the type of report that is required for download, click 'Select' in the top right of the screen:



Use the tick boxes to select the reports required. The UP and DOWN arrows on the right of the page can be used to scroll. Once selected:

- Insert a USB stick into one of the USB ports on the top of the MS-TestPro unit and click 'Download x files.' The files will be downloaded in .pdf format.
- Connect the MS-TestPro to the Cloud and click 'Synchronize x Files'
- Click 'Delete' to permanently delete the files from the MS-TestPro internal memory. Please note: there is NO confirmation of deletion on pressing the delete button. Once pressed, the reports will be deleted permanently.

Reports can be deleted once downloaded, freeing up space on the internal memory of the MS-TestPro.

MSolutions Cloud

The most recent firmware revision of the MS-TestPro enables Cloud connectivity of the tester to a centralised location. This system is perfect for companies with multiple MS-TestPro units in the field, giving full view of the units in use, but also a centralised account to filter all reports through to, in real-time.

To enable a Cloud account, please email: support@m4sol.com

Please refer to the MS-TestPro Cloud User Guide document available to download on the MSolutions website.

Device Power & PoH

The MS-TestPro MS-104B includes a li-ion battery cell giving the user maximum portability when in use. The battery cell will allow for up to 4 hours of use between charges, It is recommended that the unit is left to drain the battery down to less than 20% (as indicated in the top right of the screen) before fully charging the unit as this will prolong the battery life. When installing the MS-TestPro to carry out Log Analysis over extended periods of time, please connect the unit to the mains supply using the included power supply unit to avoid the test being interrupted due to power failure.

The local MS-TestPro module supplies a 48V PoH (Power over HDBaseT) to the remote module connected to the end of the CATx lnk. Connecting a 3rd party manufacturers TX or RX that does not use PoH at the end of a link is likely to damage the equipment in use. The same for 3rd party equipment sending other non-HDBaseT standard power schemes such as PoC (Power over Cable), or PoW (Power over Wire) is likely to damage the test module. The warranty of the MS-TestPro does not include damage to either TX, RX or the tester caused by non-HDBaseT standard power schemes.

Firmware / System Upgrade

From time to time, and as new features are released for the MS-TestPro, there may be the requirement to update the firmware on the MS-TestPro unit. Before starting the process, please ensure that there is sufficient battery life on the unit, or it is plugged into the mains supply.

To update to a new firmware revision:

- Download the new firmware file from the MSolutions website, or email us at support@m4sol.com to check the firmware revision on your unit is current
- Save the .mst file onto a USB drive
- Insert the USB stick into one of the USB slots on the top of the MS-TestPro
- Click on the 'Settings' menu at the top of the screen
- Click on the 'General' option at the top fo the menu
- Click on 'Software Update.' The current FW Version is noted directly underneath the Software Update option.



- The window will show the .mst file automatically unless the file is saved within a folder on the USB drive
- Click on the top most .mst file as highlighted adjacent
- Click 'Upgrade'

The firmware update process of the MS-TestPro can take between 8 - 15 minutes to complete depending on how much data the new version holds.

The MS-TestPro will go through a number of steps during the process.

DO NOT UNDER ANY CIRCUMSTANCES power down the unit during the firmware update process. It is not necessary to have the HDBaseT, HCT or DCR modules inserted in the unit during this process.

Once completed, the unit will reboot automatically and will show the main Home Screen once finished.

Specifications

Physical / Mechanical:

- Chassis construction: aluminium
- Ingress protection: IP54
- Unit dimensions (tester) W x D x H:
 - MS-103TD - 67mm x 180mm x 55mm (2.6" x 7" x 2.1")
 - MS-104B - 67mm x 180mm x 79mm (2.6" x 7" x 3.1")
- Unit dimensions (HDBaseT modules) W x D x H:
 - MST100 (transmitter) - 61mm x 88mm x 24mm (2.3" x 3.4" x 0.9")
 - MSR100 (receiver) - 61mm x 88mm x 24mm (2.3" x 3.4" x 0.9")
- Unit weight (tester):
 - MS-103TD - 487g
 - MS-104B - 895g
- Unit weight (HDBaseT modules):
 - MST100 (transmitter) - 90g
 - MSR100 (receiver) - 90g

Electrical:

- Power adaptor: AC to DC, 98V to 250V
- Power input:
 - MS-103TD - 48V 0.5A
 - MS-104B - 12.6V 3A

Environment:

- Operating temperature: 15degC to 40degC (59degF to 104degF)
- Storage temperature: -20degC to 50degC (-4degF to 122degF)
- Relative humidity: 80% max, at temperatures up to 31degC, decreasing linearly to 50% at 40degC
- Standards compliance: CE, RoHS



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