TELEDYNE LECROY
Everywhereyoulook™

M41h 48G Video Analyzer/Generator

for HDMI® 8K Testing

Quick Start Guide

Rev: A19

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1 Scope of this Quick Start Guide

This Quick Start Guide provides basic setup and configuration of the M41h 48G Video Analyzer/Generator for HDMI® testing and the Advanced Test Platform (ATP) Manager GUI application used to manage it.

NEW! The M41h now supports new configurations with Video Analyzer only and Video Generator-only. Therefore please note that some of the functions described in this Quick Start Guide may not apply to your specific M41h Configuration.

1.1 Topics Covered in this Quick Start Guide

The following high level tasks are described in this Quick Start Guide:

- Getting Started Procedures.
- Provisioning the IP address of the M41h.
- Installing the M41h ATP Manager on a PC.
- Establishing an IP session between an M41h and the host PC running the ATP Manager.
- Connecting the HDMI® source or sink devices under test to the M41h.

This ***Quick Start Guide does not include*** descriptive or procedural information for any of the video test functions of the M41h applications themselves. Procedures for the functional applications are covered in the M41h User Guide. The procedures for running compliance tests are covered in the HDMI MOIs available on the quantumdata website or from HDMI, Forum. The User Guide is available from the product page on the Teledyne LeCroy website https://teledynelecroy.com/protocolanalyzer/quantumdata-m41h.aspx.

1.2 Changes to this Quick Start Guide

This QSG has been updated to:

- Added the LED color modes of the front panel power button in a **Note** following the table in Section 4.3.
- Revised Section 5.1 VNC Remote Connection to remove download instructions for TightVNC and to add instruction for changing the VNC Server password (Section 5.1.1).

Note: Please be sure to check the quantumdata website https://teledynelecroy.com/protocolanalyzer/quantumdata-m41h.aspx for updates to this Quick Start Guide & User Guide.

2 About the M41h

The M41h is a compact versatile HDMI® 2.1-capable video generator and video analyzer offering entry level functional testing that can be extended through software licenses to full compliance testers with sophisticated analysis and diagnostic capabilities.

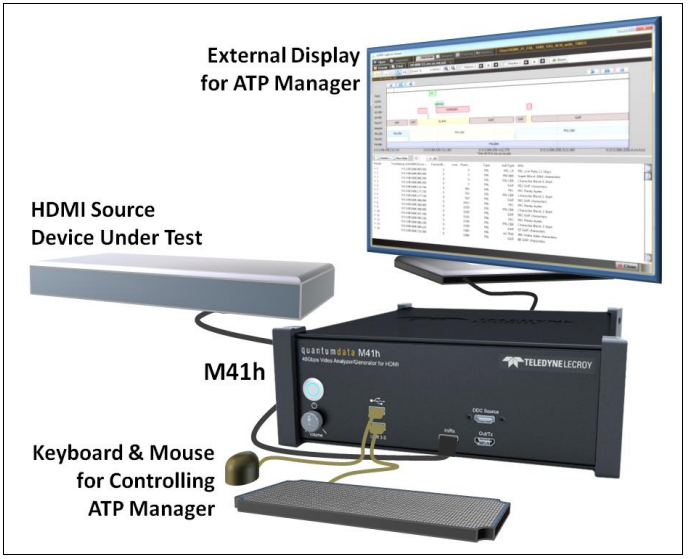
The M41h now supports new configurations with Video Analyzer only and Video Generator-only. Therefore please note that some of the functions described in this Quick Start Guide may not apply to your specific M41h Configuration.

M41h 48G Video Analyzer/Generator

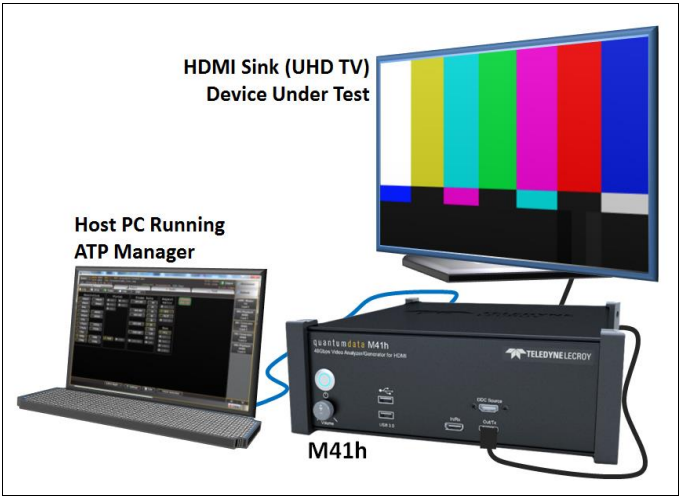
3 About the ATP Manager GUI Application

The M41h is operated through the Advanced Test Platform (ATP) Manager. The ATP Manager is a GUI application that can run either on a **Windows host PC** or on an **external display** connected to the HDMI® or DisplayPort port on the back of the M41h.

When operating from a host PC the ATP Manager application has to be installed on the PC. When operating from an external display, a mouse (provided) is required and a keyboard is optional but recommended. In this case of the external display, the ATP Manager is running on the M41h itself but the ATP Manager GUI is displayed on the external monitor. These operational scenarios are shown below.



ATP Manager Running on External Display (Source Test Example)



ATP Manager Running on Host PC (Sink Test Example)

4 Getting Started

This chapter explains what is involved in getting your M41h up and operating.

4.1 What is in the M41h shipping box?

When a Teledyne LeCroy quantumdata M41h is shipped it will contain the following additional items:

- AC Power Line Cord.
- CE mark declaration.
- Hi-Speed HDMI® Cable.
  Note: It is highly recommended that you use the high quality cable that is provided with the M41h when testing.
- Ethernet Cable.
- Mouse.
- This Quick Start Guide.

4.2 Positioning/Orientation

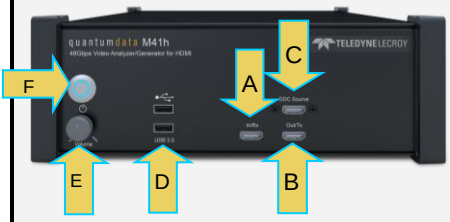
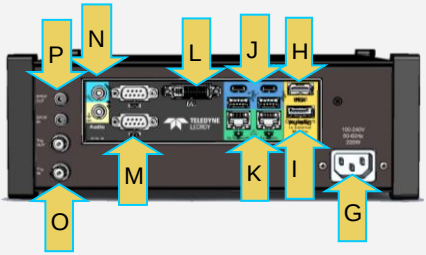
The M41h can be positioned either flat or upright. These two orientations are depicted below:

Flat Positioning

Upright Positioning

4.3 Connectors and Controls

The following table describes the connectors and controls on the M41h front and back panels.

M41h Configurations	Information / Function
Protocol Analyzer in M41h  	**Front panel:** ▪ A – HDMI 2.1 Rx port for analyzing HDMI 2.1 sources. ▪ B – HDMI 2.1 Tx port for testing HDMI 2.1 sinks. ▪ C – HDMI 2.1 Tx port used for reading the EDID over the DDC channel (applies to eARC Tx test). **Do not connect with TRIG IN.** ▪ D – USB ports (2) used for connecting a mouse and keyboard. ▪ E – Volume knob for adjusting the internal speaker level. Used for eARC Rx audio only. ▪ F – Power button, press for on/off. See Note following table. **Back panel:** ▪ G – Power plug (100-240VAC 50/60Hz) ▪ H - HDMI – Admin port for connecting external HDMI UHD display for M41h ATP Manager. ▪ I - DisplayPort – Not Used. ▪ J - USB/USB-C (2 ea.) – For mouse & keyboard. ▪ K - RJ45 (2) - E1 Network for connecting host PC running ATP Mgr. E2 Aux – Not used ▪ L - DVI – Possible future use. ▪ M - RS-232 (2) – Possible future use. ▪ N - Audio (2) – Possible future use. ▪ O - TRIG IN/OUT – IN for triggering a capture. **Do not**

M41h Configurations	Information / Function
	connect with HDMI DDC. ▪ P - RCA SPDIF OUT – OUT: Monitors eARC audio

Note: The front panel power button features the following LED color modes:

- Solid Red: Powered down/standby
- Solid Green: Booted without network connectivity
- Solid Blue: Booted with network connectivity
- Solid Yellow: Instrument power on, hardware not initialized
- Flashing Yellow: Instrument hardware initializing in progress
- Flashing Green: Instrument boot is in process
- Flashing Red: Error

4.4 Getting the M41h Up and Running

Use the following procedures to get your M41h up and running.

1. Remove the M41h from the shipping box and lay it flat or upright on your desktop or benchtop.
2. Connect the M41h power cable (provided) to a suitable outlet (100-240V 50/60Hz). The power receptacle is on the back of the M41h as shown below.

3. Connect an external HDMI monitor to the HDMI connector on the back of the M41h; labeled “External Monitor” at the location

indicated below.

Note: Do not use the DisplayPort Admin port.

The setup is depicted below.

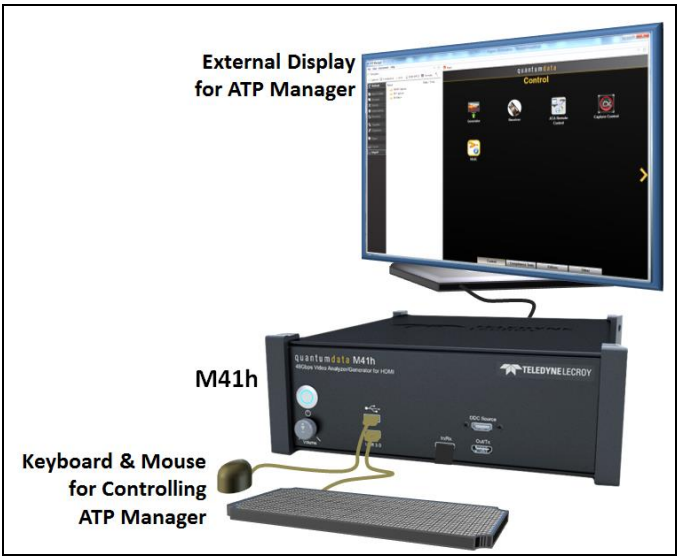
4. Connect a mouse to one of the USB ports on the front or back of the M41h as shown below.
5. Optionally connect a keyboard to one of the other USB ports on the front or the back of the M41h. You can also use the virtual keyboards that present themselves in the ATP Manager.

6. Power up the M41h via the power button on the front of the M41h.

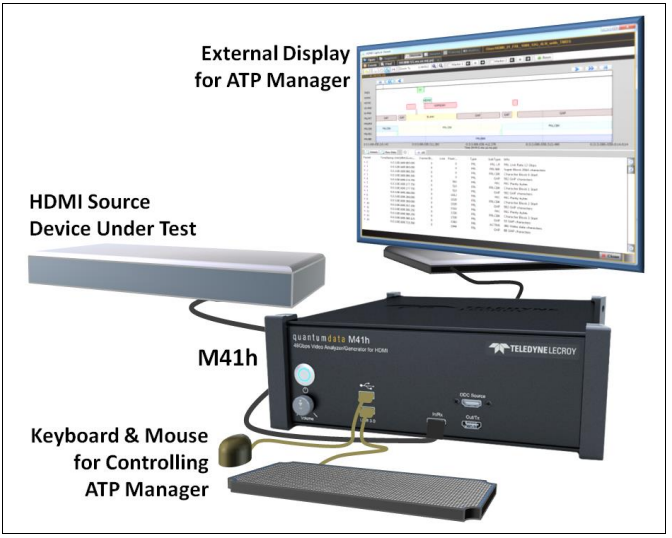
Notes: Regarding Power Button color:

- Solid Red = Powered down/standby
- Solid Green = Booted without network connectivity
- Solid Blue = Booted with network connectivity
- Solid Yellow = The front button is being actively pressed in
- Flashing Yellow = Instrument is powering up
- Flashing Green = Instrument is nearly done powering up (FPGA is ready, firmware still loading)
- Flashing Red = Error

The ATP Manager application will appear on the external display as shown below.



7. Connect your HDMI source or sink device under test to the appropriate In/Rx or Out/Tx port on the front of the M41h. The following example shows an HDMI source device connected.



You can fully operate the M41h through the ATP Manager using this connection scenario with a keyboard, mouse and external monitor. There is an alternative way with the ATP Manager application running on a host Windows PC as described in the following section.

Important Notes Using External Monitor for ATP Manager

Note 1: Selection of external monitor
Due to HDCP 2.3 content protection schemes you will have to use an HDCP 2.3-enabled external monitor to view HDCP 2.3 protected content from a 4K or 8K source in the ATP Manager GUI. We have qualified the following displays:

- Dell UltraSharp 27 inch Monitor Model U2718Q.
- Dell UltraSharp 27 inch 4K Monitor Model U2720Q.
- ASUS 28" 4K UHD Monitor Model VP28U.
- ViewSonic 27" 4K UHD Monitor Model VX2776-4K-MHD.
- Acer bmiipx 27” WQHD IPS Monitor Model KW272U

Note 2: Changing the ATP Manager GUI Display Resolution
You can change the resolution that the ATP Manager GUI is display at on the connected monitor using the Mint Linux utilities. Follow these steps:

Step 1: Click on the lower right corner icon to access **Shutdown** menu. Under GUI Appliation click on the Close button. The ATP Manager GUI will close.

Step 2: Once the ATP Manager is shutdown, click on the Mint icon (green M) on the lower left corner of the monitor to access the Mint Linux Controls.

Step 3: Select the **Settings** primary menu on the left and then on the right select **Display Configuration** secondary menu. The Display Configuration menu appears.

Step 4: Set the resolution to 1080p using the **Resolution** pull-down menu. The resolution should change and persist through a reboot.

4.4.1 Adjusting the M41h Internal Fan Speed

Once the hardware is set up with an external display connected directly, you may optionally adjust the internal fan on the M41h unit from its default Full Speed setting to the Standard Speed.

Full Speed is enabled by default in order to meet the specification of maximum operating ambient temperature of 40°C. Full Speed is necessary for operating at ambient temperature between 30°C and 40°C. If you will be operating the unit at **less than 30°C** (86°F), you may safely change the fan to Standard Speed, which is quieter than the Full Speed setting.

Note: This procedure needs to be done on the M41h instrument itself using a display connected to the M41h with a keyboard connected to the USB-A port of the instrument.

The procedure for adjusting fan speed is as follows:

1. If not already off, power down the unit by pressing the power button once.
2. Once completely shut down (power button light is red), power the unit on by pressing the power button again.
3. While booting up, press the DEL key repeatedly to place into BIOS mode.
4. Once in BIOS mode, use the right arrow to select **Advanced** tab.
5. Use the down arrow to select **NCT6106D HW Monitor** and press Enter.
6. Press Enter again to select **Fan Speed Control Mode**
7. Use up/down arrow keys to select **Standard** and press Enter
8. Press F4 key to prompt the **Save & Exit Setup** dialog box.
9. Press Enter to save configuration and exit.
   The device will automatically reboot normally with the lower fan speed setting.

5 Managing the M41h with VNC

5.1 VNC Remote Connection

This section has discussed controlling the M41h device either directly using an external monitor, or remotely using the ATP Manager application on a remote host PC. However, the M41h 48G HDMI® Video Analyzer/Generator does come with another built-in option for controlling the device remotely.

The instruments come with **a VNC Server** installed enabling the user to access the embedded GUI of the instrument remotely as an alternative to using the ATP Remote Manager. The main advantage of this is to utilize features that are modified or inaccessible while using a remote host ATP Manager.

5.1.1 Changing the VNC Server Password

As an option, the password for the VNC login can be changed. To change the VNC login password, perform the following steps.

Note: If using a local USB keyboard, **Ctrl-Alt-F1** switches to a command prompt window, and **Ctrl-Alt-F7** switches back to the GUI window.

Note: qd is both the Linux account login and password. They are separate from the VNC Server password and will not be changed.

1. Log into the instrument's Linux BASH shell prompt using Telnet, SSH, or your local USB keyboard. Login is *qd* and password is *qd*.

When you first log in, you will be at the instrument scope command prompt.

2. Enter the single letter **q**.
3. Click the **Enter** key to exit to the Linux BASH shell.
4. From the Linux BASH shell prompt, enter the following command line to change the VNC Server password:

```
sudo x11vnc -storepasswd "newpassword"
/etc/x11vnc/vncpwd
```

5. The sudo command will probably prompt you to enter a password. You need to enter the Linux account password (**qd**) to continue.

   Note: "**newpassword**" is the new password that you will set. It must be inside double quotes, but the double quotes will not be part of the actual password that is set. There are no other requirements for password selection.

6. Enter the new password within quotation marks.

5.1.2 Restarting VNC Server on Instrument

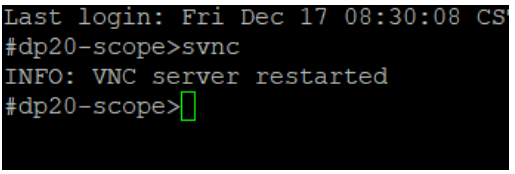
There may be a point when you need to restart the VNC Server on the instrument. There is a simple command to do so that can be executed if the VNC Server is not properly responding.

Procedures for accessing the command line can be found in the Command Reference chapter of the User Guide.

To restart the VNC Server on the M41h instrument, type the following into the command line:

```
svnc
```

This will restart the VINC server and make it accessible via a VNC Viewer once again.



6 Managing the M41h with ATP Manager from a PC

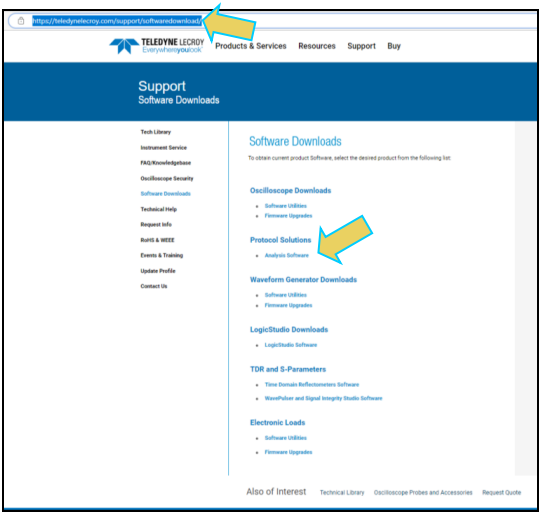
You can operate the M41h from the ATP Manager application installed on a host PC. You will have to first download and install the ATP Manager GUI application on your Windows PC. You will then need to connect your PC to the M41h over an Ethernet IP connection. These procedures are provided below.

Please note: You will have to have completed the procedures in the subsection above **(4.4 Getting the M41h Up and Running)** in order to complete the following steps.

6.1 Install the M41h ATP Manager GUI Application

This procedure describes how to install the ATP Manager application on your host PC.

1. Download the ATP Manager GUI application from the quantumdata downloads page: https://teledynelecroy.com/support/softwaredownload/.



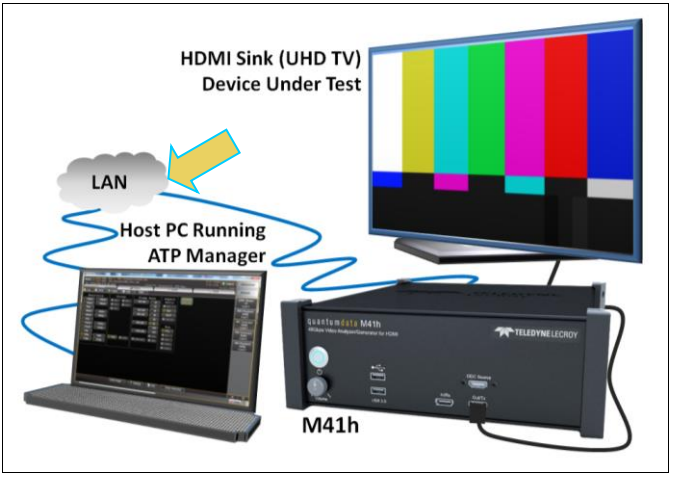
Double click on ATP Manager 5.50 (or whatever the latest release is) and follow the installation prompts to install the ATP Manager on your Windows PC.

2. After installation completes, run the new ATP Manager. It should be available in the Start Menu under All Programs → Quantum Data, and also from an icon on your Desktop.

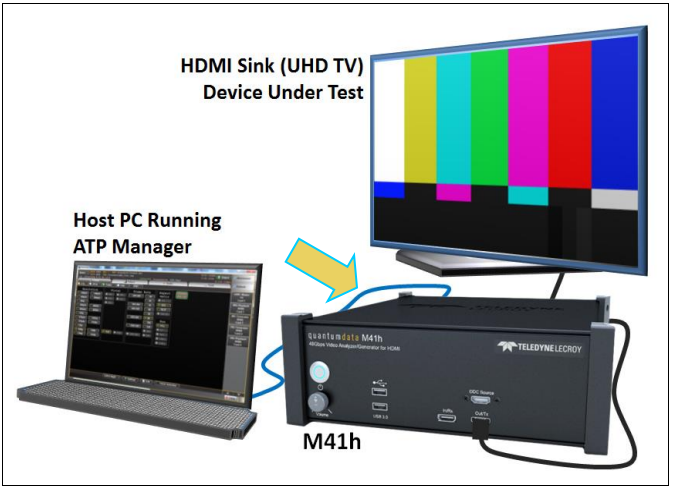
   Note: Verify that the version number in the title bar matches the version on the website.

3. Connect your PC to the M41h using an Ethernet cable. The connection is made to the Rj45 jack on the back of the M41h labeled E1 to Network as shown below.

The Ethernet IP connection from the host PC to the M41h can be accomplished through your corporate network or you can connect directly. Both scenarios are depicted below.



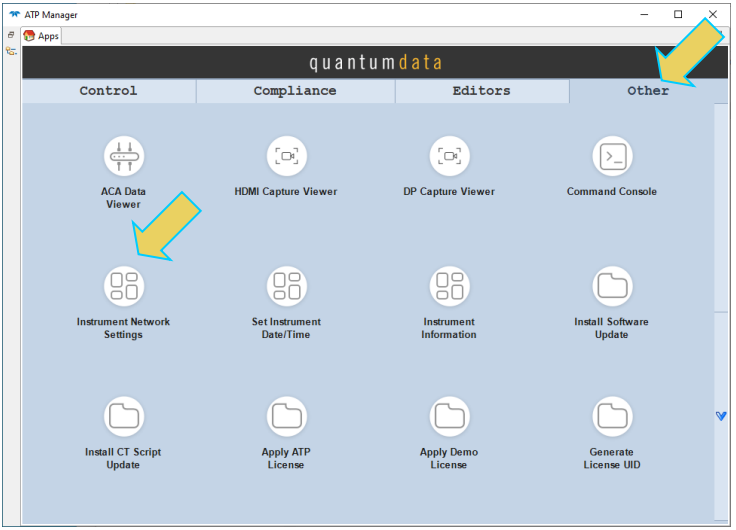
PC Running ATP Manager w/ Ethernet Connection thru Corporate LAN

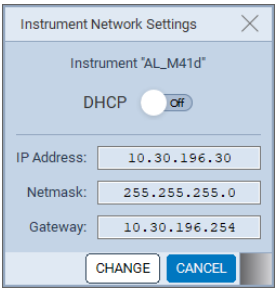


PC Running ATP Manager with Ethernet Direct Connection

4. Set the IP address of the M41h from the **Other** page under the Control window of the ATP Manager GUI. Select the **Instrument Network Settings** icon. A dialog box appears enabling you to set

DHCP or specify an IP address. Sample screen shots of these windows are shown below.

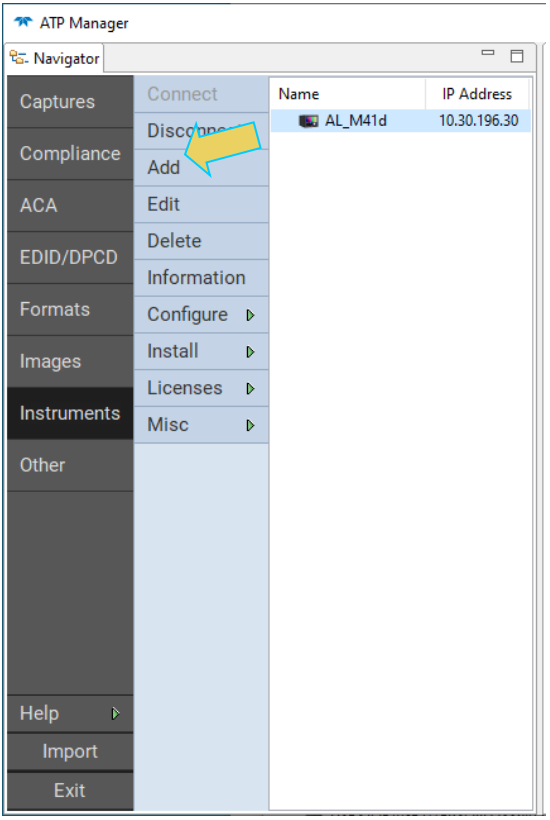




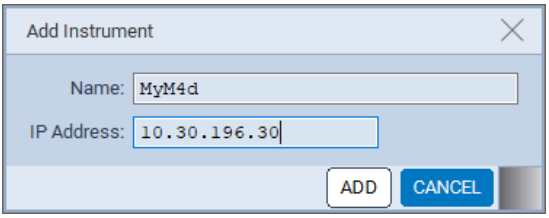
Note: Be sure to use an IP address that is compatible with your corporate LAN or your PC if you are connecting directly.

5. Power cycle the M41h with the power button on the front panel.

6. A dialog box will appear on the ATP Manager. Select Shutdown. Wait 5 seconds and reapply power.
7. Add your M41h to the ATP Manager application using the green + Add icon or the + Add item on the Instrument pull-down menu identified below.

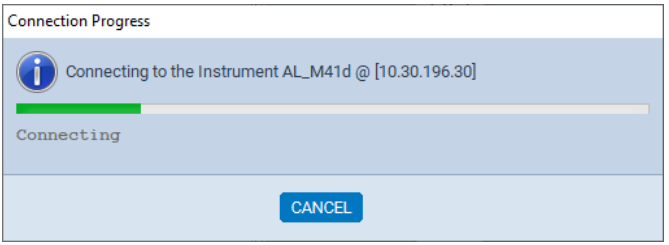


The **Add Instrument** dialog appears enabling you to enter the name and IP information for the M41h that you are trying to connect to (below).



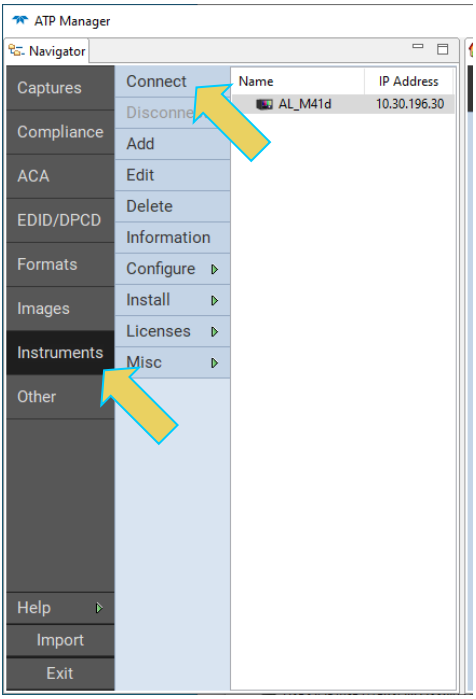
8. Enter the name (any suitable name) and IP address of the M41h that you want to connect to in the **Add Instrument** dialog box (above) and click on the **Add** activation button.

   You will see a series of messages on a dialog boxes describing the progress. One example is shown below:

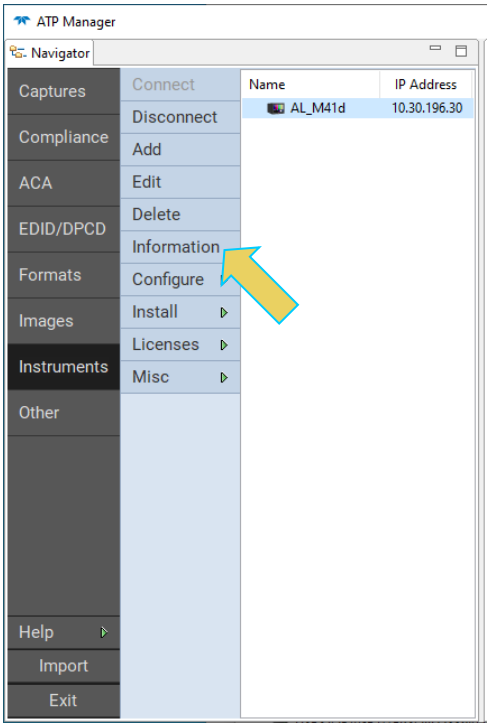


   The M41h with the IP address you entered appears on the list in the **ATP Navigator** panel. The ATP Manager application will automatically connect to the M41h once you add the M41h to the application.

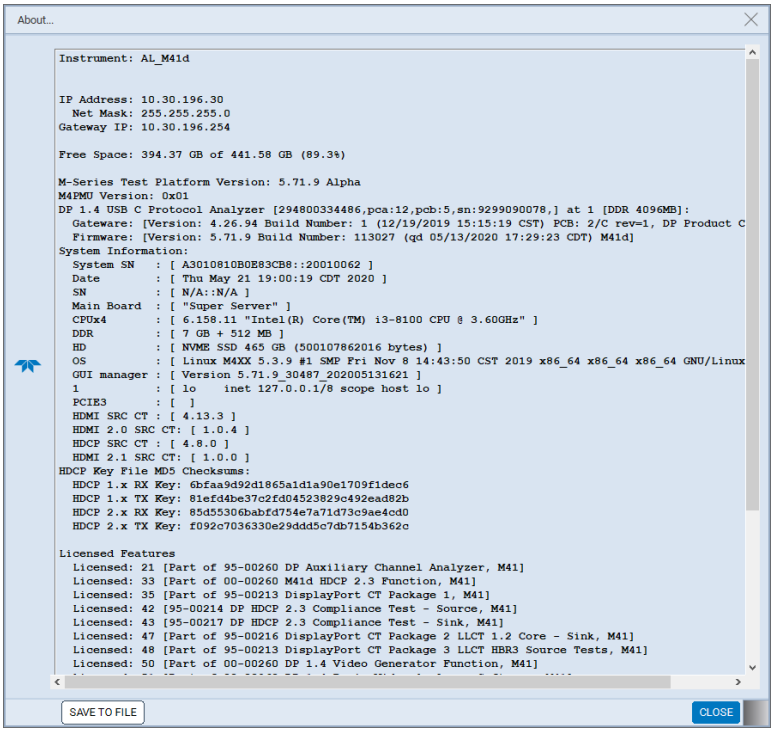
9. If not already connected, connect to the M41h using either the **Connect** icon or the **Connect** item on the right click menu as shown in the screen below. Note that you can also double click on the M41h in the **Instrument** dialog box in order to initiate a connection.



Once the connection is made the information about the connected M41h is available via the right click menu as shown below.



The information is then displayed in a separate window. The information on the **Instrument Information** window tells you the firmware and hardware release and version information as well as what options you have. This information will be helpful if you call quantumdata customer support during an upgrade process.

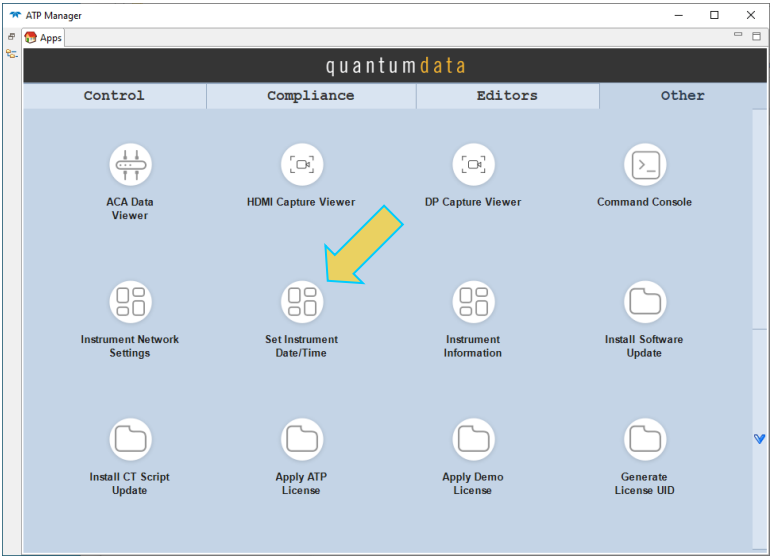


6.2 Setting the Instrument date and time

This procedure describes how to set a M41h's data and time. The procedure assumes that you have connected to an M41h through the external ATP Manager.

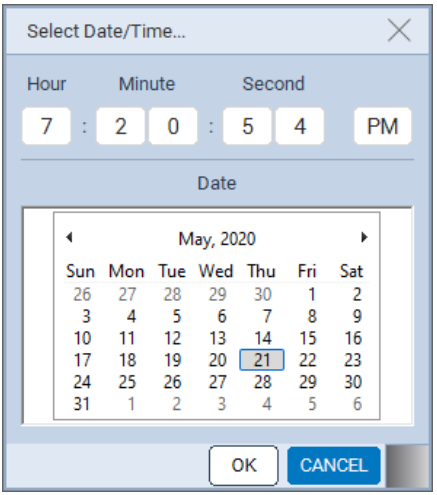
To set the date and time of the M41h:

1. From the **Other** page (Page 4) of the Apps Window select **Set Instrument Date/Time**.



The **Select Date/Time**… dialog box appears as shown below:

2. Set the month and date and time by selecting from the Calendar and time dials.



7 Connecting the Devices Under Test

This section describes how to connect an HDMI® source or sink device to the M41h for testing.

7.1 Connecting an HDMI Source Device Under Test

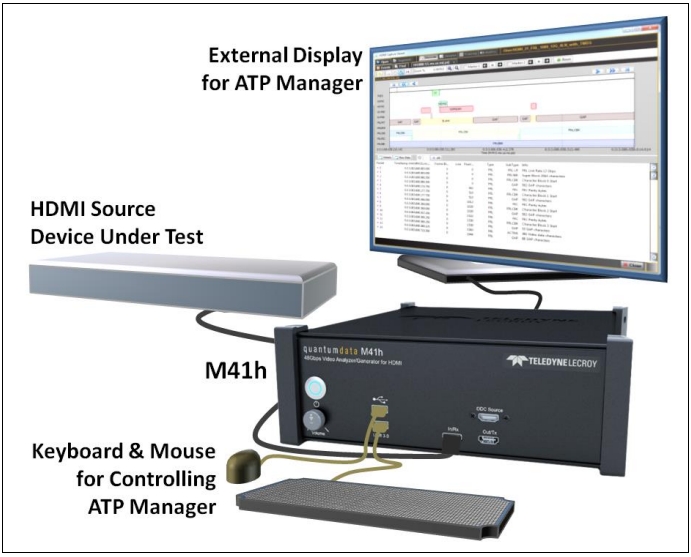
This procedure describes how to connect your HDMI source device to the M41h for testing. This example shows the ATP Manager running on the M41h with the ATP Manager GUI on the external monitor.

To connect your source DUT to the M41h:

1. Connect the HDMI source device under test to the M41h HDMI In/Rx port as shown below.

   Note: It is highly recommended that you use the high quality cable that is provided with the M41h.

   The full test setup is shown below with the connected external monitor displaying the M41h ATP Manager application. The sample screen shows an HDMI capture analysis screen.



7.2 Connecting to an HDMI Sink Device Under Test

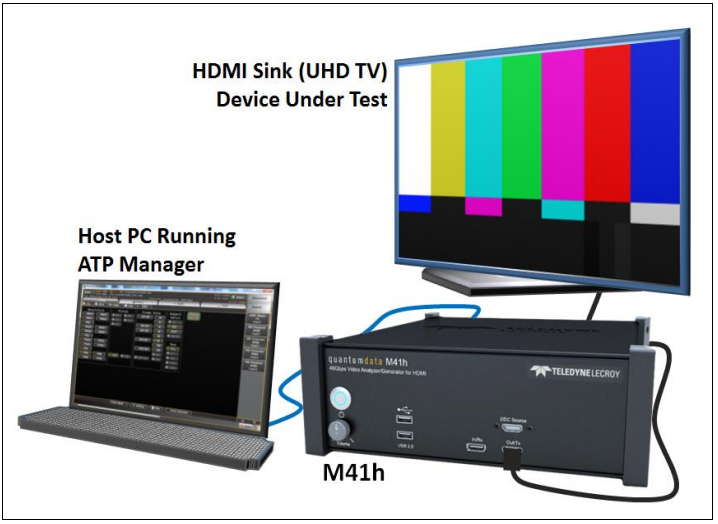
This procedure describes how to connect your HDMI sink device to the M41h for testing. This example show the ATP Manager running on a host PC.

To connect your HDMI sink DUT to the M41h:

1. Connect the HDMI sink device under test to the M41h HDMI Out/Tx port as shown below.

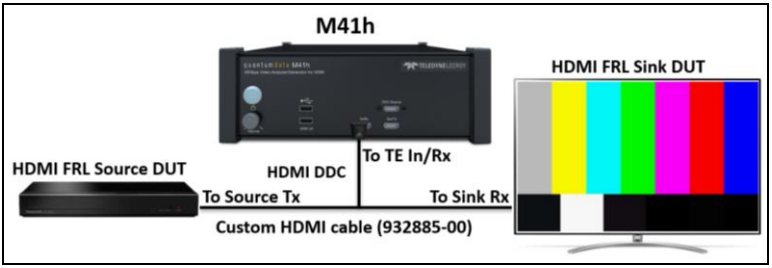
   Note: It is highly recommended that you use the high quality cable that is provided with the M41h.

The full test setup is shown below. This example uses the ATP Manager installed on a host PC.



7.3 Connecting for Passive Monitoring the DDC Channel

This procedure describes how to monitor the DDC channel passively between a source and sink device in either TMDS or FRL mode. The solution uses a custom cable (shown below). This feature is an option feature and requires a license. This example shows the test setup.

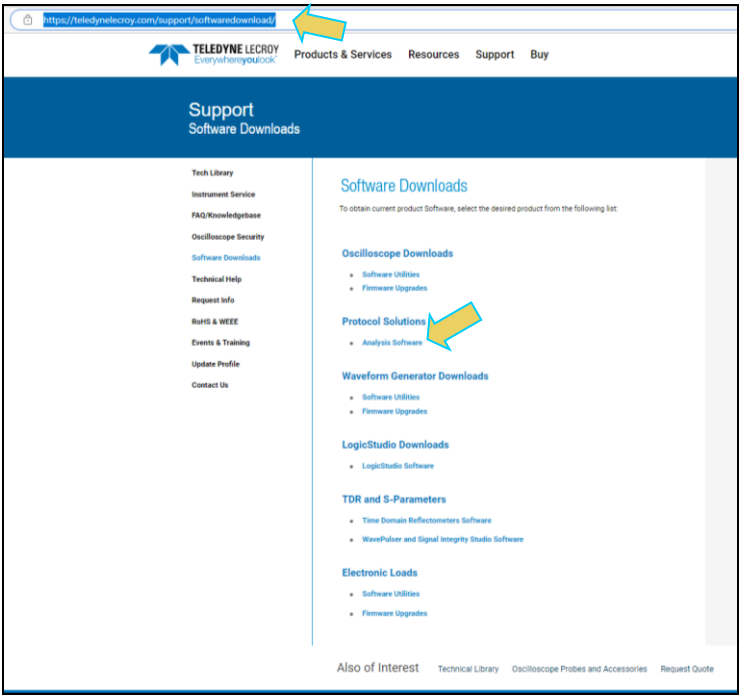


8 Upgrading ATP Manager

This section provides information about upgrading your M41h and M41h ATP Manager. Detailed procedures are not provided in this document. ***Please be sure to refer to the Release Notes for a specific release for detailed upgrade instructions.***

Teledyne LeCroy periodically provides maintenance release of software and firmware. The most recent versions are available on the downloads page of the quantumdata website.

Download the ATP Manager GUI application from the quantumdata downloads page: https://teledynelecroy.com/support/softwaredownload/.



Two software packages are available for upgrading the M41h:

1. The firmware and gateware package for the M41h instrument. This is a Debian software package for installation in the Linux-based instrument. (The file extension is .deb.) This package also includes the embedded ATP Manager that will be installed.

2. ATP Manager (GUI) either for the M41h or if you are using a host PC for Windows. This is the ATP Manager GUI that can be used to control all M41h instrument from a Windows PC.

   Notes:

   1. You must upgrade the windows based ATP manger every time you upgrade the firmware/software on the unit. **Upgrade the ATP Manager first,** and then upgrade the M41h application firmware as indicated in the release notes.

   2. Be sure to check the release notes associated with the download files. Any special installation instructions will be noted in the release notes.

Please be sure to refer to the Release Notes for the specific release for detailed upgrade instructions.