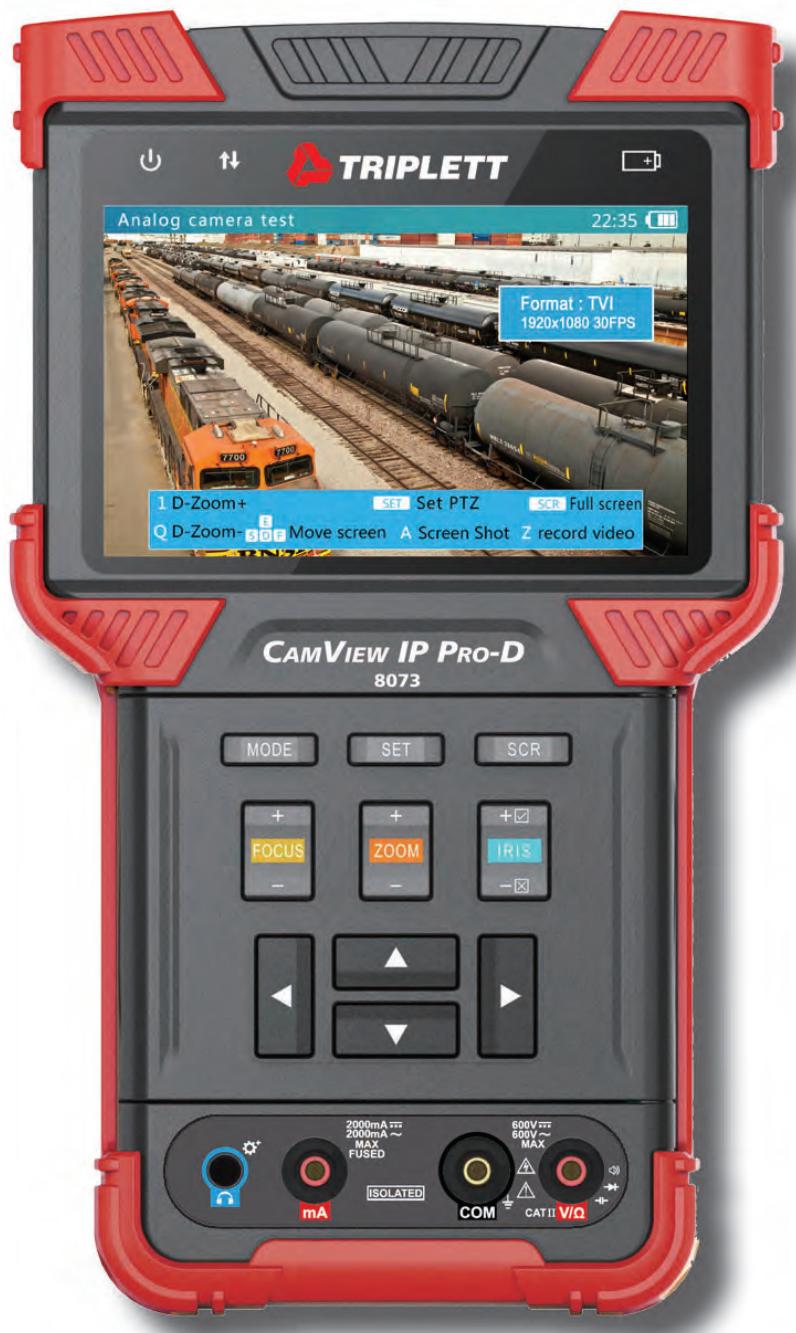


CAMVIEW™ IP PRO SERIES TESTERS



USER MANUAL

Thank you for purchasing the *Triplet CamView™ Pro/Pro-C/Pro+/Pro-D*. Please read the manual carefully before using the product.

To assure safe use of this product, please read the section on Safety carefully, and observe any Cautions or Warnings posted there and throughout this manual.

Please keep this manual for future reference.

SAFETY INFORMATION

- Comply with all local electrical safety and electromagnetic compatibility rules and regulations when using this device.
- Use original accessories with this equipment to avoid possible damage caused from unapproved accessories.
- Accessories supplied are only intended for use with this product. Use with other products or for other purposes is not recommended.
- Do not expose the product to rain, liquids, or excessive moisture as product damage may occur.
- Do not expose or use the product in dusty or highly particulate environments.
- Avoid dropping the product or subjecting it to physical shock or high vibrations.
- Avoid leaving the product unattended while recharging it. Charging time should not exceed 8 hours. If the battery becomes hot, disconnect power immediately.
- Do not use the product in an environment containing flammable gases
- Do not attempt to disassemble the product. There are no user serviceable parts inside and product damage can occur. Contact Triplet customer service if the unit does not function properly.
- Do not use the product in environments with strong electromagnetic fields.
- Do not handle or operate the product with wet hands.
- Do not use strong detergents or solvents for cleaning the product. Wipe off dirt with a soft dry cloth, or a soft cloth slightly moistened with water or mild cleaner.

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1. INTRODUCTION

1.1 General Use

The CamView IP Pro, Pro-C, Pro+, and Pro-D are designed to facilitate the installation and maintenance of surveillance video equipment. They can be used with Standard Definition analog NTSC/PAL camera systems and High Definition ONVIF conformant IP (Ethernet) camera systems. They provide an RS485 port for PTZ control of analog PTZ cameras, and can provide POE for operating IP cameras, or 12VDC (not to exceed 2A) to power analog cameras. They allow you to perform various IP camera tests, Ethernet and network tests, capture video (snapshots and video recording), playback video, generate video test patterns for monitor checking, and perform analog camera testing. They also allow you to check microphone/audio sources and even provide a bright flashlight function. Recorded images and video can be transferred to PCs or other devices via USB port connection.

The CamView IP Pro-C supports H.264 IP cameras and NTSC/PAL and HD-CVI 2.0 analog video cameras. The Pro+ supports H.264 IP cameras, as well as NTSC/PAL and AHD 1.0 and HD-TVI 2.0 analog video cameras. The Pro-D supports H.265 IP cameras, as well as NTSC/PAL, AHD 2.0, CVI 3.0, and TVI 3.0 cameras. The Pro-C, Pro+, and Pro-D all include additional Ethernet cable testing functions, including TDR (Time Domain Reflectometry) for length and fault checking.

These products combine powerful features in a very portable, ergonomic design that will help you perform your video systems installation and maintenance jobs quickly and efficiently.

1.2 Function Summary

1.2.1 ONVIF IP Camera Test

The Tester will guide you through a step-by-step process to test the functionality of IP cameras, whether they are connected to an existing network or directly attached to the Tester. These steps include:

Step 1: Testing Ethernet connections, POE, IP settings, DHCP status/request, or providing DHCP service to a directly connected camera;

Step 2: Discovering camera(s), accessing camera settings, ONVIF report generation, showing a snapshot from the currently selected camera; and

Step 3: Displaying live video from the camera, profile/stream settings, and controlling the camera's PTZ functions (if camera is capable of PTZ).



You can adjust the camera's settings, and record still images or video from the selected camera. You can also check the audio signal from the camera if it is equipped with a microphone. If the camera is directly connected, the Tester will provide POE voltage to power the camera.

1.2.2 Standard Definition Analog Camera Test

The Tester can display the analog video signal input from an attached analog camera or video source with NTSC or PAL format video output. The Tester can provide 12VDC (not to exceed 2A) to power the camera. If the camera has an RS485 port for PTZ control, the Tester can be used to test that functionality. The Tester provides support for more than 30 PTZ command formats.

1.2.3 High Definition Analog Camera Test (CamView IP Pro-C, Pro+, and Pro-D Only)

The Tester will display the analog video signal input from an attached analog camera or video source with AHD 1.0 or TVI 2.0 format video output (CamView Pro+ only); HD-CVI 2.0 (CamView Pro-C only); or AHD 2.0, CVI 3.0, or TVI 3.0 (CamView IP Pro-D only). The Tester can provide 12VDC (not to exceed 2.0 Amps) to power the camera. If the camera has an RS485 port for PTZ control, the Tester can be used to test that functionality. The Tester provides support for more than 30 PTZ command formats.

1.2.4 Analog Video Test Pattern

You can select from several common video test patterns stored in the tester and generate standard definition analog (NTSC or PAL) format video output if you are using the Pro, Pro+, or Pro-C model. These can be used to test cabling, video recorders, and monitors. The selected video test pattern is displayed on the Tester's screen along with the analog video input signal for simple visual comparison.

The Pro-D model will generate an HD test pattern.

1.2.5 POE and DC Output

The Tester will automatically detect if a camera needs to be supplied with POE when an IP camera is directly connected to Network Port 1 (i.e., the blue port). Network Port 2 accepts POE to test the POE output of installed PSE network devices. You may also use the Tester's 12VDC output jack to power analog cameras.

1.2.6 Audio Test

The Tester can be used to check audio signal functionality which is input on the Tester's audio input jack.



1.2.7 Network Test

The Tester may be used to perform several Ethernet network test functions, including:

Network Sniff:

Monitors and displays Ethernet MAC IDs and IP addresses broadcast on the network

Subnet List:

Monitors and displays Ethernet MAC IDs and IP addresses broadcast on the selected subnet according to IP and mask settings

Ping Test:

Performs the standard ping messaging response test on the specified destination IP address

1.2.8 RJ45 Cable Test (CamView IP Pro-C, Pro+, and Pro-D Only)

The Tester may be used to check the condition of the RJ45 cable pairs (normal, open, short) and perform a cable length measurement test using TDR.

1.2.9 Digital Multimeter (CamView IP Pro-D Only)

The CamView IP Pro-D model has a built-in digital multimeter.

1.3 Accessories

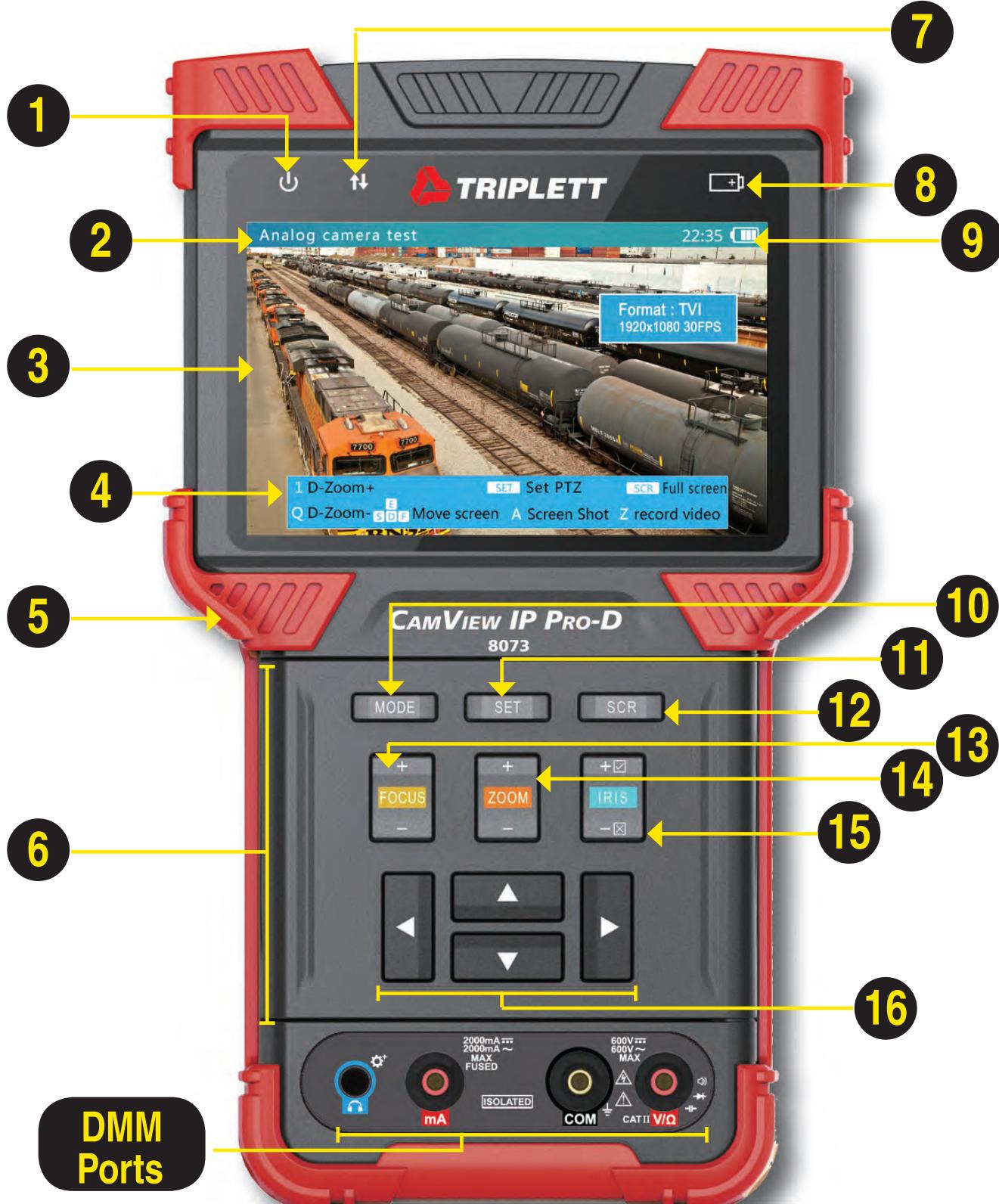
One each of the following items are included in the package:

- IP/Analog Camera Tester
- Lanyard
- Battery
- Battery Cover
- Tool Bag with Shoulder Strap
- POE Power Injector
- Network Cable
- BNC Cable
- RS485 Cable
- 12V Power Output Cable
- Audio Cable
- USB Cable
- Screen Protector Film
- Test Leads (Pro-D model only)



2. DEVICE DIAGRAMS AND FUNCTIONS

2.1 Front of Tester

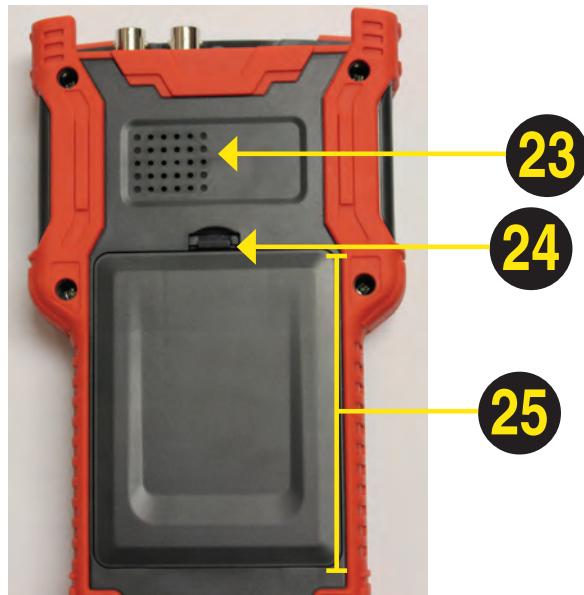


1		Power Indicator — Lights up when powered on.
2		Title Bar — Displays current function mode and system time.
3		Display Area — Displays various user interface menus.
4		On-Screen Instructions — Displays what your options are in the current screen and how to apply them.
5		Bumpers — Rubber protectors to improve handling and protect the tester.
6		QWERTY Keyboard — Flip open this area to access the QWERTY keyboard.
7		Data Transmission Indicator — Red light flashes when data is being transferred.
8		Charge indicator — Red when charging, off when fully charged.
9		Battery Level Icon — Indicates battery Level.
10		Mode Button/Function Select Key — Click to bring up Function Select menu. Click multiple times or use Up/Down and Right Arrow Keys to select function.
11		Setting Button — Brings up Settings Menu for various functions.
12		Screen Button — Switches full screen video display on/off.
13		Focus Control Key — Controls PTZ focus and other functions depending on the individual screen. Use of this button will be indicated by Focus+ / Focus-
14		Zoom Control Key — Controls PTZ and other functions depending on the individual screen. Use of this button will be indicated by Zoom+ / Zoom-
15		Iris Control Key — Controls PTZ Iris and other functions depending on the individual screen. When altering settings, use Iris+ to confirm and Iris- to cancel.
16		Arrow Keys — Use these to navigate menus, alter settings, and pan/tilt cameras.

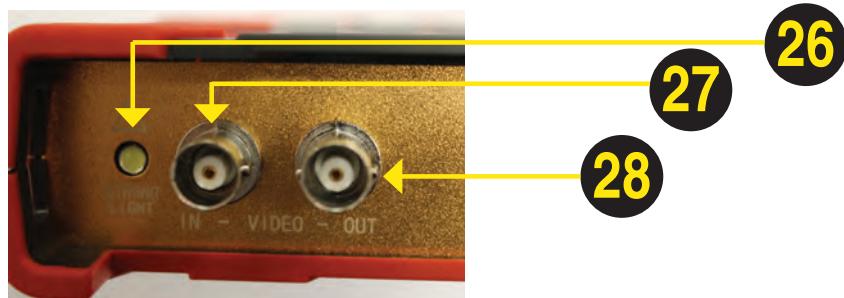
2.2 Front of Tester (Keyboard)



2.3 Back of Tester

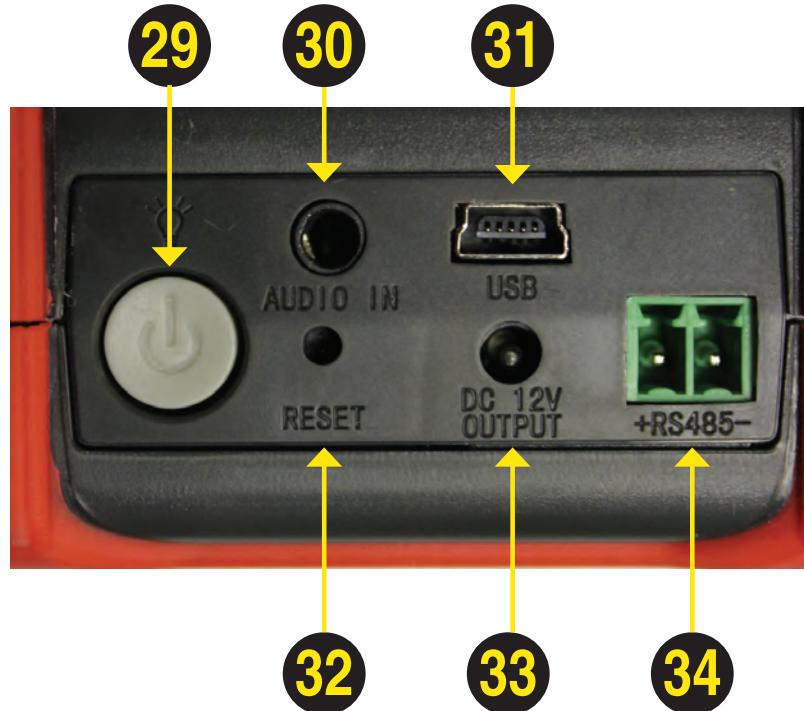


2.4 Top of Tester

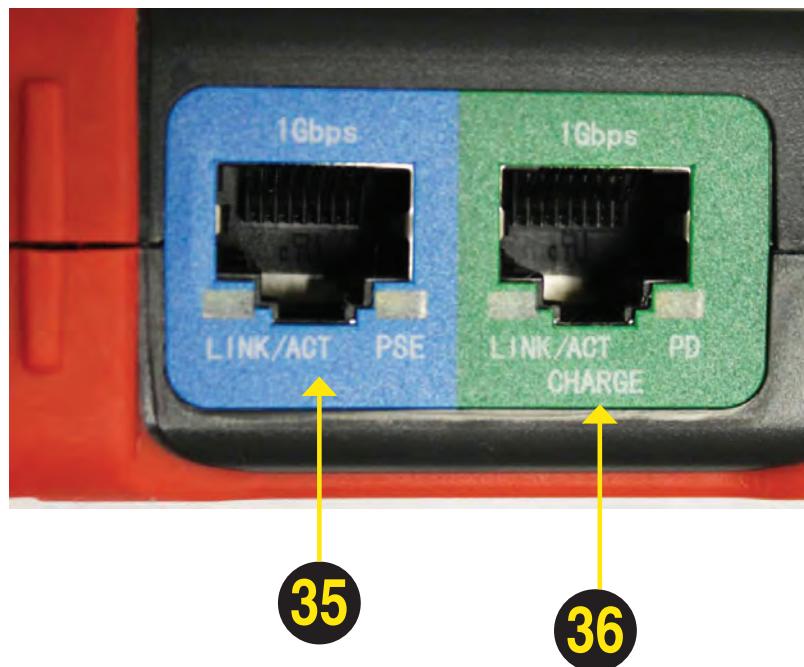


17	TAB Key — Press to switch between input fields on the screen (e.g., username to pwd)
18	CAPS Key — Select to turn Caps Lock on/off
19	SYMBOL Key — Select to switch between letters and symbols on the keyboard
20	ENTER Key — Press to click Return/Enter as you would on a computer keyboard
21	BACKSPACE Key — Press this key to delete / backspace
22	CAPS/SYMBOL Indicators — Green light illuminates when Caps Lock is on; Red light illuminates when Symbol is on. If both lights are off, keyboard will type in lowercase letters.
23	Built-in Speaker
24	Battery Cover Latch — Press toward bottom of tester to open battery cover
25	Battery Cover
26	LED Lights (one on either side of the top of the tester) — These lights turn on using the Flashlight feature (double-press the Power button quickly to turn on or off)
27	Analog Video Input BNC Connector — This is the input from the camera to the tester
28	Analog Video Output BNC Connector — This is the output from the tester to the monitor, if needed

2.5 Right Side of Tester



2.6 Left Side of Tester



29	Power Button <ul style="list-style-type: none">• Press and hold for 2 seconds to turn the tester on / off• Press twice quickly to turn the Flashlight on / off (Flashlight feature may be used while the tester is on)
30	Audio Input Jack — 3.5 mm audio connector for plugging in camera audio to test
31	USB Port — Mini USB Port used to connect computer to the tester to download reports / videos / screen captures
32	Reset Button — Use a paperclip to press and hold the Reset Button to reboot the device if necessary
33	12V DC Output Jack — 12V / 2A 4mm (internal pin diameter 1.65mm). Used to provide power to Analog cameras
34	RS485 Port — Use to test PTZ functions on Analog cameras
35	Network Port 1 (Blue outline) — 1 Gbps RJ45 Port for ethernet OUT <ul style="list-style-type: none">• Provides POE and network link out to camera• LINK/ACT Light — Network Port link and data activity indicator (green)• PSE Light — POE Power Supply Indicator (orange)
36	Network Port 2 (Green outline) — 1 Gbps RJ45 Port for ethernet IN <ul style="list-style-type: none">• Accepts POE• Used for charging the tester• Used as Network Input on an existing network when placing tester in series with the camera or to run network tests (e.g., ping, sniff, etc.)• LINK/ACT Light — Network Port link and data activity indicator (green)• PD Light — POE Power Accept Indicator (orange)

3. BASIC OPERATION

3.1 Installing the Battery

The CamView IP series of testers use a rechargeable lithium-ion polymer battery. To ensure safety when transporting, always disconnect the battery from the tester. The device may leave the factory with one of the following two battery placements:

- The battery is placed inside tester and insulated from the contacts with a thin, plastic sheet. In this case, the user should open the battery cover, take out the battery, remove the plastic sheet, then put the battery back in, and put the battery cover back on.
- The battery is placed outside the tester. In this case, the user should open the battery cover, put the battery securely into the battery compartment, and put the battery cover back on.

Note — The tester will automatically turn on when the battery is properly placed in the device for the first time.

3.2 Charging the Battery

Be sure to fully charge the battery prior to first use. If the battery level is too low, the charge indicator will flash 3 times, and the device won't turn on.

You should use the POE injector and ethernet cable provided by the manufacturer to charge the battery. To charge the unit, connect one end of the ethernet cable to the **Data/Power-out Port** on the POE Injector, then connect the other end of the ethernet cable to the **Network Port 2 (Green outline)** on the tester. Once you have connected the ethernet cable on both ends, plug in the power cord for the POE Injector into a power outlet. **Network Port 2** will light up with an orange light when the internal battery is recharging.

3.3 Frequently Asked Questions About the Battery

- The Tester uses a lithium-ion polymer battery, which does not have a memory effect. Users can recharge the battery whenever they want.
- When recharging, the **Charge Indicator** on the tester will light up red. When the battery is fully charged, the light will turn off.
- Due to calculation deviation or other reason, the battery level can be as low as 90% when the charge light turns off. Users can ensure their battery is fully charged by extending the charge time for up to 60 minutes.



- The battery can also be charged using a POE switch or other POE power sources that meet the 802.3af / 802.3at standard. However, we strongly recommend using the original POE injector provided with your Tester. ***DO NOT USE A NON-STANDARD POE POWER SUPPLY TO CHARGE THE BATTERY—THIS CAN DAMAGE THE TESTER.***

3.4 Lanyard

Users can choose to install the lanyard. The lanyard can help when handling the device, prevent dropping the device, avoid damage to the device, and prevent loss.

To install the lanyard, put one end of the lanyard through the hole at the top of the device, turn back and go through the slip-lock (i.e., the plastic piece similar to a buckle). Tighten the lanyard and confirm that it is locked in position.

3.5 Basic Starting Instruction

3.5.1 Turning the Device On and Off

To turn on the device, press and hold the **Power Button** for more than 2 seconds. The **Power Indicator** will light up green when the device is turned on.

To turn off the device, press and hold the **Power Button** for more than 2 seconds. When the device is turned off, the green **Power Indicator** light will turn off after the device is fully shut down. Users can also setup the idle auto power off feature.

3.5.2 Selecting Function Mode

When the device is on, press the **MODE** button to switch to the Function Select menu. Press **MODE** multiple times or use the **Arrow Keys** to select a function.

Press the **Right Arrow** key to enter the selected function.

3.5.3 Using the Flashlight

Press the **Power Button** twice quickly to turn the Flashlight on/off. You can use the Flashlight feature even if the tester is off.

The Flashlight will automatically turn off every time the device is turned on or off (to avoid draining the battery if the Flashlight is turned on accidentally).

WARNING

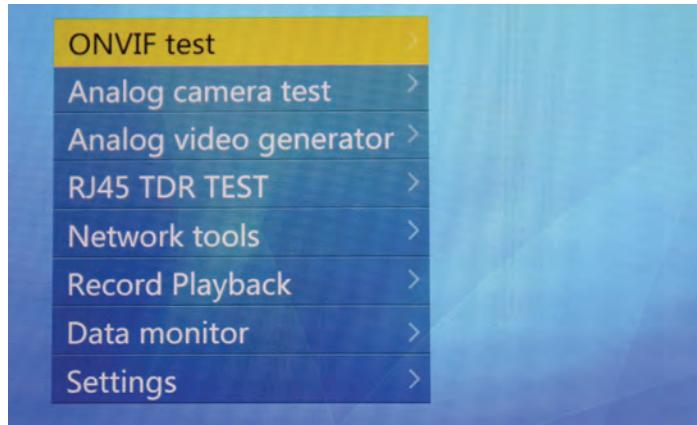
The LEDs are high brightness LEDs. When the LEDs are on, do not look directly at them or point them at someone's eyes as injury may occur.



4. HOW TO USE YOUR CAMVIEW IP PRO, PRO-C, OR PRO+

4.1 Main Menu

When the CamView IP Pro-C/Pro+/Pro-D first boots up, you will see the following Main Screen.
(*NOTE—CamView IP Pro Testers will show fewer options.*)



You can navigate this screen using the Up or Down Arrow Keys. Once you have highlighted the function you want to use, press the Right Arrow Key to go to the Interface Screen for that feature.

4.2 Testing IP Cameras using the ONVIF Test Interface

4.2.1 Overview

The ONVIF test function is designed to act as a three-step installation and trouble-shooting guide for IP Camera testing. It combines Ethernet tests, POE tests, IP settings, camera discovery, camera authorization, video display, PTZ control, camera settings, and more.

4.2.2 How to Connect the IP Camera to the Tester

There are three ways you can connect your IP cameras in order to test them:

OPTION 1

For Power-over-Ethernet (POE) IP cameras, you can directly connect the camera to the Tester using the Tester's Network Port 1 using an ethernet cable. The Tester will first detect the POE device and then supply power. The POE information and packet activity will be displayed on the screen. (You can verify incoming POE from the Switch by plugging that cable into Network Port 2.)

Note—When powering POE devices, the 12V output of the Tester is disabled. When a POE powered device requires more power than max power, the POE power output will terminate. The Tester's PSE meets the 802.3af / 802.3at standard. The maximum power is 25.5W.



OPTION 2

For non-POE IP cameras, the camera can either be powered using its own 12V power adapter or using the Tester's 12V/2A power output. When using the Tester's 12V/2A output, please use the 12V power cable supplied to connect the Tester's **12V Output Port** to the camera's 12V power port. You can then connect the ethernet cable from the IP camera to the Tester's **Network Port 2**. (Do not use Network Port 1 in this case as Network Port 1 may try to supply POE and disable the 12V port at the same time. Be sure to use Network Port 2 in this scenario.)

OPTION 3

You can also connect to IP and Wireless IP cameras through a Network Switch. Simply connect an ethernet cable from the Switch to either the Tester's **Network Port 1** or **Network Port 2**. The network status will show on the Tester's corresponding network port bar and icons after you turn the Tester on. The Tester supports MDI/MDIX connection.



Option 1



Option 2



Option 3

4.2.3 Using the Interface

Once you have connected the IP Camera to the Tester using one of the options listed in the previous section, follow these steps to perform IP Camera testing:

STEP 1: Power Up the Tester

Press the **Power Button** on the side of your Tester to turn it on if it is not already powered on.

STEP 2: Select ONVIF Test

On the Main Menu, highlight “ONVIF Test” (press the **MODE** button to enter the Main Menu if you are not already on it). Once the “ONVIF Test” option is highlighted, press the **Right Arrow Key** to select the test.

STEP 3: Performing the Link Test

The screen should now be showing “1. Link Test” just below the **Title Bar**. (For more details about the Link Test screen, see pages 16 - 17.) Confirm activity on **Network Port 1** (you should see a green light flashing on the ethernet port where the camera/network is connected to the Tester), adjust settings as necessary (e.g., modify the IP, DHCP, or link speed, etc.), then press the **Right Arrow Key** to move to the Discover screen.

STEP 4: Discovering the Camera

When entering the Discover screen, the Tester software will broadcast an ONVIF discover message to discover ONVIF cameras. You may need to wait a few minutes for the Tester to find all of the cameras, particularly if it is a large network. The text above the list will show the number of cameras discovered. If there is more than one camera listed, **Arrow Up/Down** to highlight the camera you want to test.

Some cameras may not respond to the ONVIF discover request, or cannot reply due to different IP subnet settings. In this case, you should return to Step 2 and set the Tester’s local IP to be within the same subnet as the camera (remember, your Tester’s IP cannot be in conflict with other devices on the network). After that is done, enter Step 3 to try discovering the cameras again. If the camera(s) still cannot be discovered, then you can use the Manual Add function.

Manually Adding a Camera:

To manually add a camera, you must know the camera’s exact IP and ONVIF service path.

Once you have that information, press **Zoom-** while on the Discover screen, type the camera’s IP address into the field labelled “URL”, then press the **TAB Key** to add the ONVIF path.

For example, if the camera’s IP address is 10.1.1.100, you would enter that into the “URL” field and then press the **TAB Key**. The Tester should then automatically append the

IP address to include ".../onvif/device_service" at the end of the original 10.1.1.100 address. The final result will look like this: http://10.1.1.100/onvif/device_service.

Press **Iris+** to accept the settings and return to the Discover screen.

You may also notice the Discover screen has a different set of On-Screen Options than what was on the Link Test screen, including Rediscover (which will run by pressing **Focus-**), Manual Add (accessible by pressing **Zoom-**), Refresh Pic (which will snap a new image from the camera by pressing **Iris-**), and so forth. Take a few minutes to review the On-Screen Options as you explore each screen.

STEP 5: Selecting and Accessing the Camera

Once you have highlighted the camera you want to test on the Discover screen, press the **RIGHT ARROW Key** to select that camera.

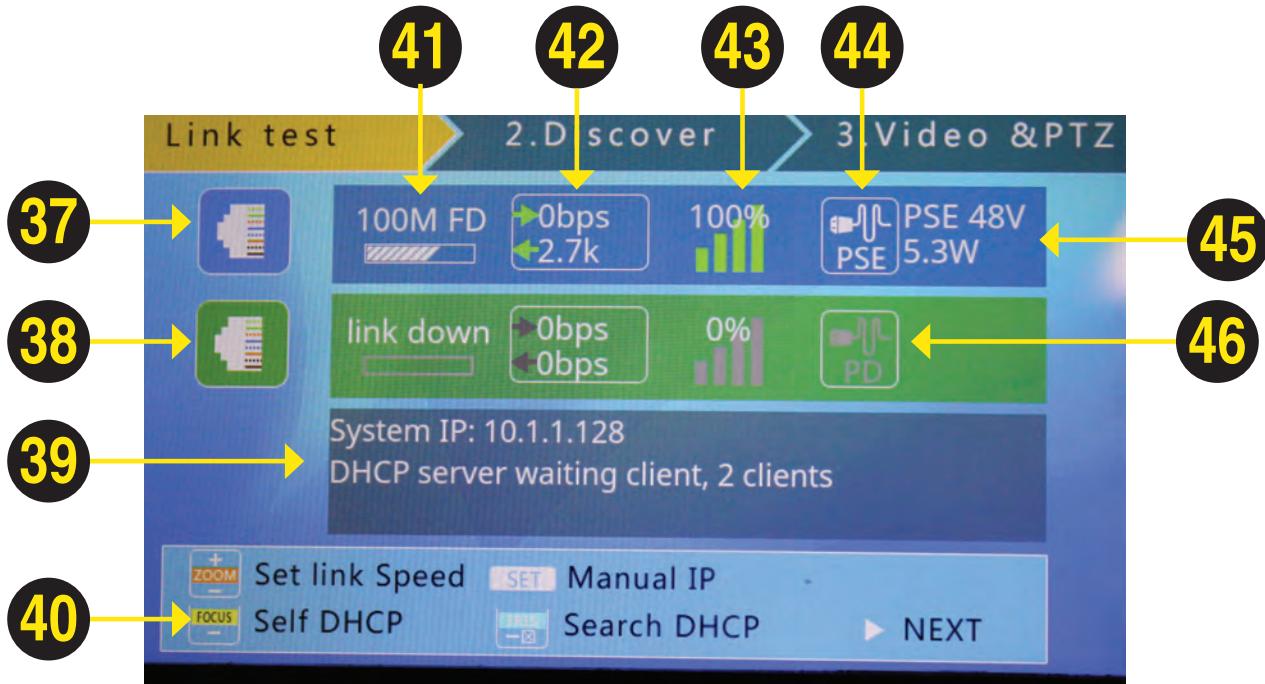
If the camera requires a Username and Password, a notice will display on the right side of the screen saying "Authorization Required". In this case, you will need to press **Iris-** to access the Username/Password screen. You can then open the flip keyboard to fill in the Username and Password (use the **TAB Key** to move between the fields, then press the **RETURN Key** when you are done).

Once you have accessed the camera, a snapshot from the camera will appear on the right side of the Discover screen. Information about the camera's resolution, framerate, and compression method will show above the snapshot (see picture below).



Continued on page 18.





37	Network Port 1 Status Information — Also referred to as the Blue Bar, all of the information for the camera connected to Port 1 (blue RJ45 port on the side of the Tester) will show in this row.
38	Network Port 2 Status Information — Also referred to as the Green Bar, all of the information from the network connected to Port 2 (green RJ45 port on the side of the Tester) will show in this row.
39	IP Test Information — Also referred to as the Gray Bar, this area shows the IP information and status of the Tester and clients.
40	Available Operations for Link Testing — Follow the on-screen instructions to access or modify specific settings, such as: <ul style="list-style-type: none"> • Set Link Speed — Press Zoom+/- to modify link speed • Self DHCP — Press Focus- to enable Self-generating DHCP. Use if no network is set up yet and you are connecting directly to a camera. The Tester will set the local IP to static, start the DHCP server, and wait for a remote DHCP request from the camera. <u>DO NOT USE if connecting through an existing network as this will cause an IP conflict.</u> • Manual IP — Press SET button to enter Manual IP screen • Search DHCP — Press Iris- to have the tester request DHCP from an existing network. The server's assigned address will show in the gray bar.

41	<p>Link Speed of Corresponding Port — The Link Speed displays above the bar icon. shows for each Port. The link speed can also be observed via the icon itself.</p> <ul style="list-style-type: none"> • If the bar icon is gray, there is no network connection. It will also say “Link Down” as shown in the sample image. • If the bar icon is white, the tester is sensing and will display the link speed (10M/100M/1000M) and whether the connection is Full or Half Duplex.
42	<p>Ethernet Data Flow Monitor — shows the current Ethernet traffic flow.</p> <ul style="list-style-type: none"> • \leftarrow is the outgoing data flow in b/s, Kbps, and Mbps. • \rightarrow is the incoming data flow in b/s, Kbps, and Mbps.
43	<p>Packet Loss Monitor — The displayed data shows the success rate. Normally this number is 100%. The color of the bars will differ according to the success rate.</p> <ul style="list-style-type: none"> • Gray Bars — No Link • Green Bars — 100% of packet transfers successfully completed • Yellow Bars — 99%+ of packet transfers successfully completed • Orange Bars — 95% - 99% of packet transfers completed (i.e., up to 1% - 5% packet loss) • Red Bars — Less than 95% of packet transfers completed (i.e., 5% - 99% packet loss)
44	<p>POE Power Supply Status — This icon is for Network Port 1 and indicates the POE power output status.</p>
45	<p>The first line of text is output mode:</p> <ul style="list-style-type: none"> • 12V — The device is outputting 12V and detecting PD at the same time. • PD. CLAS — The classification of the remote POE device. • PSE 48V — The remote POE device is being powered by the Tester. <p>The second line of text shows the output power in Watts. When outputting power, the actual power consumption is decided by the remote device. The tester has a max power limit. When the remote device requires more power than max power, the output will terminate automatically.</p>
46	<p>POE Power Accept Status — This icon applies to network port 2, indicating the POE power acceptance status. The text displays the powering voltage as measured by the Tester. (E.g., PSE 48V — The Tester is being provided with POE at 48V.)</p>

CAMERA SETTINGS:

While you are in the Discover screen, you can press the **SET Key** to enter the Camera's Settings Screen.

The left side of the display shows the Setting's Class, and the right side shows the details of the camera's setting within that class. The classes and details are explained in the table at the bottom of this page.

Use **Zoom +/-** to move up or down to select the Class. To select right side items, use the **Up and Down Arrow Keys**. Use the **Left and Right Arrow Keys** to adjust/change the highlighted settings. Use the flip keyboard if you need to type in numbers, letters, or symbols (e.g., when updating the camera's IP address to a static IP).

When you have finished, press **Iris +** to save your changes. The Tester will apply the new settings to the camera. If the camera accepts the new settings, the "Setup Successful" prompt will be displayed. Otherwise, failure information will be displayed.

NOTE — Some cameras must be rebooted to apply new settings.

Class	Contents
Camera Info	Device information including camera model, serial, brand, and other information. This information cannot be altered.
Scopes	Name, location, model number, type(s) of encoder(s) (e.g., video, audio, PTZ), and the profile of the camera.
eth0	This can be set to Disabled, but is Enabled by default. Includes all the NIC 1 data (e.g., Mac Address, DHCP enabled/disabled, IP address, etc.)
wlan0	This can be set to Enabled, but is Disabled by default. Includes all the NIC 2 data (e.g., Mac Address, DHCP enabled/disabled, IP address, etc.)
Network	Includes Hostname, Gateway, DNS, etc.
System	This screen details which ports are used for the camera, and whether it is discoverable.

You may also export a report about this camera by selecting the **SCR Key**. You can retrieve the report, along with any screenshots or recordings, by plugging the mini USB cable into the tester and then attaching it to your computer. Your computer will view the Tester as an external drive. See Appendix 1 for a sample report.

STEP 6: ONVIF Video Testing

While on the Discover screen, press the **Right Arrow Key** to move to the “3. Video & PTZ” Test Screen (see example below). The Video & PTZ Test Screen will allow you to view a live video feed from your IP camera, control and test PTZ, and enter the camera’s setup settings.

When entering the Video & PTZ Test Screen, the Tester will automatically display the camera’s video stream. The video image will re-size to the reserved area of the screen.

ONVIF PTZ CONTROL:

Pressing the **SCR Key** will switch to full screen video display mode, and all display information will be hidden. The video image will cover most of the screen area. Due to width to height ratio differences, part of the screen could be black with nothing to display. In full screen mode, use the **Focus +/-** and the **Arrow Keys** to control PTZ.

Press the **SET Key** to access and change the stream profile settings (e.g., Baud Rate, Protocol [Pelco D, Samsung, Hikvision, etc.], Address, etc.)

ONVIF VIDEO DIGITAL ZOOM:

On the video display screen, pressing the **1 Key** will digitally zoom in, and pressing the **Q Key** will zoom out. When the image is partly shown, a chart will be displayed on the lower right corner that shows the display ratio. When the image is partly shown, pressing the **E, S, D, and F Keys** will move the viewing window to inspect different portions of the digitally zoomed image.

CAPTURING SCREEN SHOTS AND VIDEO:

To capture a screen shot, press the **A Key**. To capture video, press the **Z Key**.



4.3 Testing Analog Cameras

4.3.1 Overview

You can test standard Analog (NTSC/PAL) cameras with the Pro model, NTSC/PAL & HD-CVI with the Pro-C model, or you can test NTSC/PAL, AHD & HD-TVI cameras if you have the Pro+ model.

4.3.2 How to Connect the Analog Camera to the Tester

Analog cameras are connected using the BNC In connector on the top of the Tester. If the camera is already providing a live-feed to the security personnel and you don't want to remove their feed while you are testing the camera, you can then use the BNC Out to set up the Tester in series.

If the camera has PTZ, plug the PTZ cable into the RS485 Port on the side of the Tester.

Finally, you must ensure the camera has power.



There are two ways you can power your Analog camera. You can either plug the camera's power cable into the 12V DC Output Jack on the side of the Tester (left image), or you can use the camera's existing power source (right image).

NOTES — The Tester's output power is 12V/2A. When the current exceeds the limit, power output will automatically stop. Be cautious when using cameras with high power IR lights.

Also, when Network Port 1 is connected to a POE-powered device, the 12V output is disabled.

4.3.3 Using the Analog Camera Test Interface

Once you have connected the Analog Camera to the Tester and set up the camera's power supply, follow these steps to perform Analog Camera testing:

STEP 1: Power Up the Tester

Press the **Power Button** on the side of your CamView IP Pro, Pro-C, or Pro+ Tester to turn it on if it is not already powered on.

STEP 2: Select Analog Camera Test

On the Main Menu, highlight "Analog Camera Test" using the **Down Arrow Key**. Once the "Analog Camera Test" option is highlighted, press the **Right Arrow Key** to select the test.

Live video will show in the video display area. Due to varying image aspect ratios, the displayed image may not be full screen and some parts of the screen may be black (e.g., on the left and right side).

The signal information will show in the upper right of the screen, and will display the Format (e.g., NTSC, HD-TVI, etc.), and the resolution (e.g., 720x480), framerate (e.g., 30fps), and signal level.

STEP 3: Testing PTZ

While you are on the Analog Camera Test screen, you will notice the On-Screen Instructions give you the following options:

RECORDING SCREEN SHOTS AND SAMPLE VIDEOS:

Press the **A Key** to save a Screen Shot to the Tester's internal flash memory, or press the **Z Key** to record video to the Tester's internal flash memory.

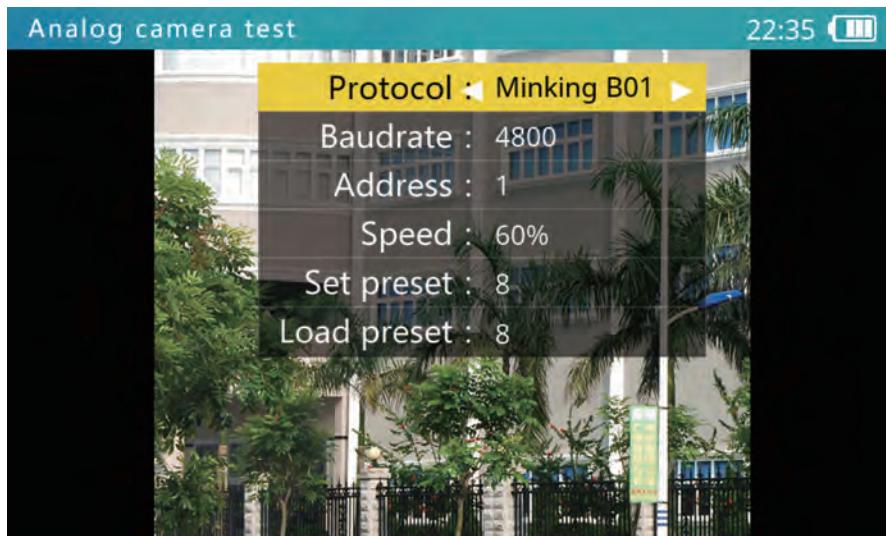
DIGITAL ZOOM:

Opening the flip-keyboard and pressing the **1 or Q Keys** will allow you to digitally zoom in and out.

PAN AND TILT:

Press the **Arrow Keys** or **Focus +/-, Zoom +/-**, and **Iris +/-** to test the Pan, Tilt, Zoom functions on the camera. When the Tester is sending a Pan/Tilt signal to the camera, the **Data Transmission Indicator** on the top left of the Tester's display will light up red. If you see that icon light up but do not see any movement on the camera, you will need to adjust the Tester's settings to match the camera's requirements regarding Protocol (e.g., Pelco D), Baud Rate (e.g., 2400), etc. The camera's factory default settings should be in the camera's user manual.





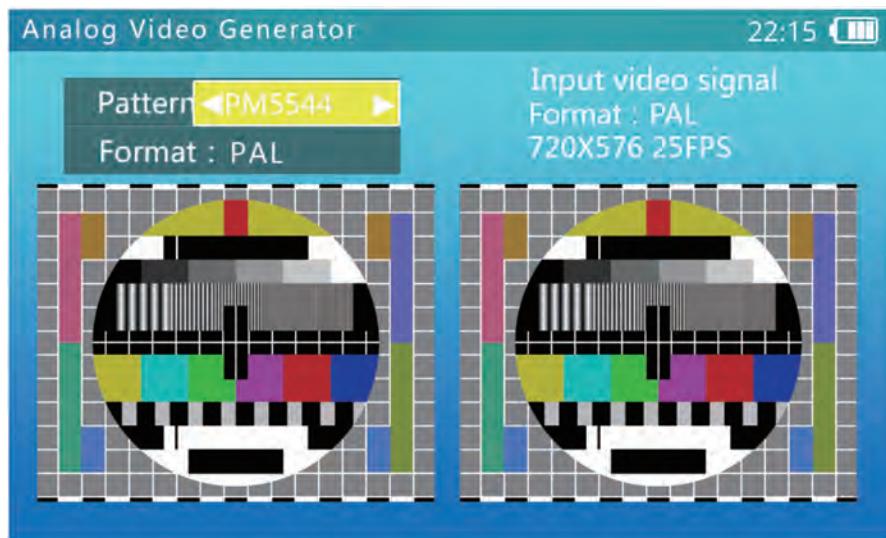
To access and change the Tester's settings to match the camera's settings, press **SET** and then use the **Arrow Keys** to navigate the screen. (See image above.) When adjusting the parameters, press **Iris-** to restore previous values if you don't want to save the setting. Once you have updated all of the settings, press **SET** again to save your changes. The changes will be applied immediately.

Protocol	Select RS485 PTZ protocol. The tester supports many PTZ protocols.
Baud Rate	RS485 communication baud rate.
Address	Address of PTZ to control. Due to different camera manufacturer settings, the address may be offset by +/-1. Address range is dependent on the protocol.
Speed	Expected PTZ speed, 10%-100%.
Set Preset	Adjust this value, and then press Iris+ to save the camera's current position to its internal storage. This function is provided by the camera. Refer to the camera's manual for details.
Go Preset	Adjust this value, and then press Iris+ . The camera will go to the corresponding pre-saved position at maximum speed. This function is provided by the camera. Refer to the camera's manual for details.

4.3.4 Analog Video Generator

On the Main Menu, highlight “Analog Video Generator” (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the “Analog Video Generator” option is highlighted, press the **Right Arrow Key** to select the test.

Live video will show in the right side of the screen if you have the Analog Camera hooked up to the **BNC In** jack on the Tester. On the left side of the screen, you will see Pattern and Format options. (See image below.) You can adjust these options using your **Arrow Keys**. Press **SET** when you are done updating your options to save the changes.



Test Pattern	Supports PM544 and EBU color bars and EIA1956 black and white test screen.
Format	PAL/NTSC.
Output Image	Left side.
Input Image	Right side.
Input Format	Format, resolution, and framerate of input video signal.
Input Level	Input of the video's level as displayed in dB. 0dB is the standard value (1vpp@75 ohms)

4.3.5 Testing Remote Analog Monitors and Optical Transmitters/Receivers

You can transmit generated video to the remote monitor or DVR using the **BNC Out** jack (see image below). This will allow you to test the cable and monitor by comparing the image quality on the Tester to the image quality on the monitor. You can do this with either a live feed from the camera when you are in the Analog Camera Test screen, or when you are viewing a test pattern in the Analog Video Generator screen.



You can also test the Optical Transmitters/Receivers in the circuit by connecting an optical video transmitter to the **BNC Out** on the Tester, then connecting that transmitter to an optical video receiver, and finally connecting the receiver to the **BNC In** on the Tester. (See image below.)



4.4 Ethernet Cable TDR Test

4.4.1 Overview

This feature is only available on the Pro-C, Pro+, and Pro-D models. It is primarily used to test the approximate cable length of an RJ45 cable by using a Time Domain Reflectometry (TDR) analysis method. However, you can also use this feature to test for breaks, Skew, and Attenuation. The accuracy is to within one meter.

NOTES — Test results can be affected by temperature, moisture, cable diameter, and cable dielectric. Test results are only for reference, not for formal measurement.

Continuous measure is to help easily test multiple cables, and it will not increase the accuracy of the test.

When a cable is correctly terminated, there may be a stronger reflection from a cable junction along the cable's length. This may result in a measurement that may be shorter than the actual cable length. We recommend that you disconnect the other end of the cable and measure from that end if this occurs.

4.4.2 Testing Length Using TDR

To measure a cable's length, only one end of the cable should be connected to the Tester, and the other end should be left open.

STEP 1: Power Up the Tester

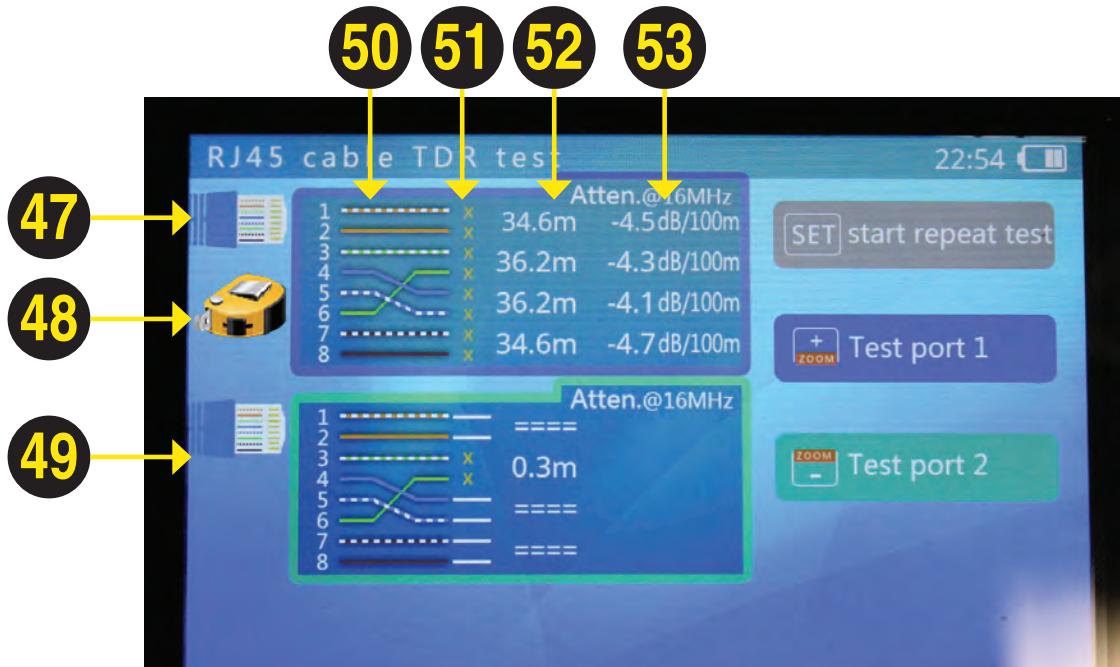
Press the **Power Button** on the side of your CamView IP Pro-C, Pro+, or Pro-D Tester to turn it on if it is not already powered on.

STEP 2: Connect the Ethernet Cable to the Tester

Connect one end of the Ethernet Cable to the Tester's **Network Port 1**.

Continued on page 27.





47	Network Port 1 Icon
48	Tape Measure — Flashes just under the Network Port icon when a cable is being tested.
49	Network Port 2 icon
50	Cable Pairs — Both by number and color pattern.
51	Cable Pair Status — Test results for each pair are displayed here. <ul style="list-style-type: none"> • A solid horizontal line indicates pass-through (good cable; no breaks) • An X indicates the cable is not passing through. In a Length-Only test, this will always show X because the other end of the cable is not connected to the Tester. • A > symbol indicates a short of at least one wire in the pair. • “Test Failed” will display if the wire is in poor condition or for other unknown reasons.
52	Approximate Length of Cable — Length of cable (in meters) to termination or open.
53	Other Test Results — Attenuation, Skew, etc., will appear here.

STEP 3: Access the TDR Test Screen

On the Main Menu, highlight “RJ45 Cable TDR Test” (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the “RJ45 Cable TDR Test” option is highlighted, press the **Right Arrow Key** to select the test. (See page 26 for a complete description of each feature on this screen.)

Once you are on the Cable Test screen, press **SET** to activate/deactivate continuous testing; or press **Zoom+** to test Port 1 once. See example results on below.



4.4.3 Testing for Breaks in Ethernet Cable Using TDR

If you are trying to test the quality of the cable itself instead of just getting the approximate length of the ethernet cable, you can perform a separate test.

STEP 1: Power Up the Tester

Press the **Power Button** on the side of your CamView IP Pro-C, Pro+, or Pro-D Tester to turn it on if it is not already powered on.

STEP 2: Connect the Ethernet Cable to the Tester

Connect one end of the Ethernet Cable to the Tester's **Network Port 1**, and connect the other end of the Ethernet Cable to the Tester's **Network Port 2**.

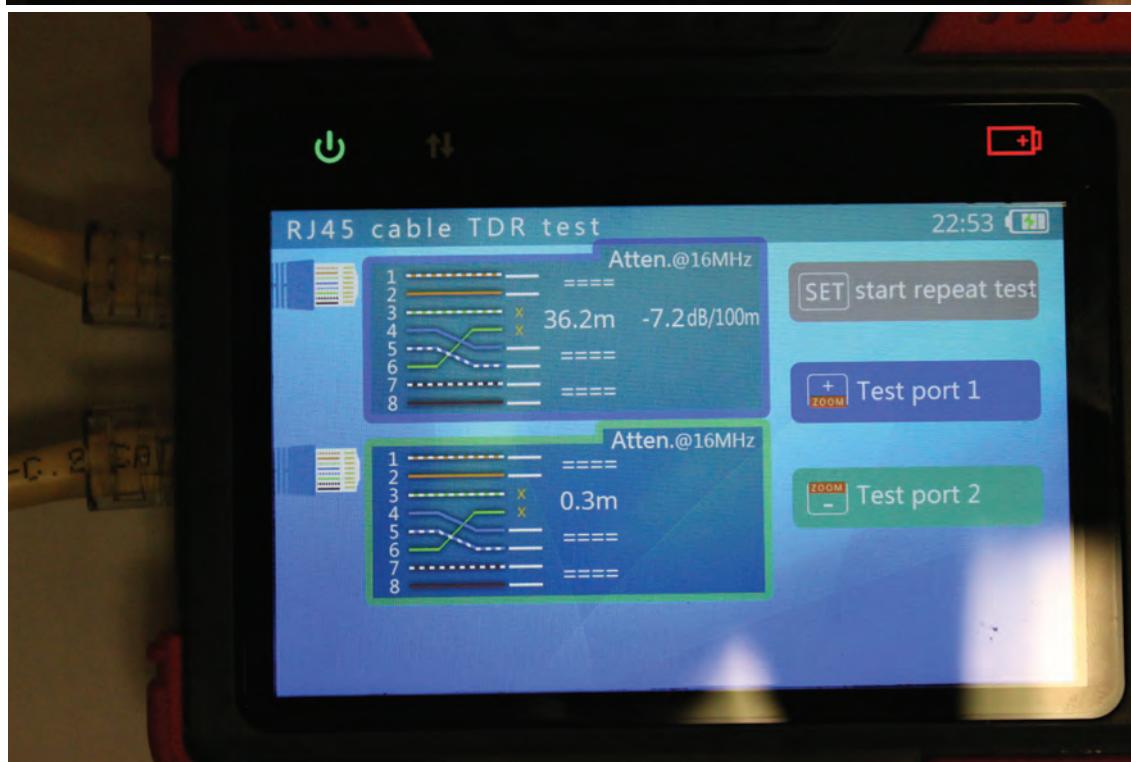
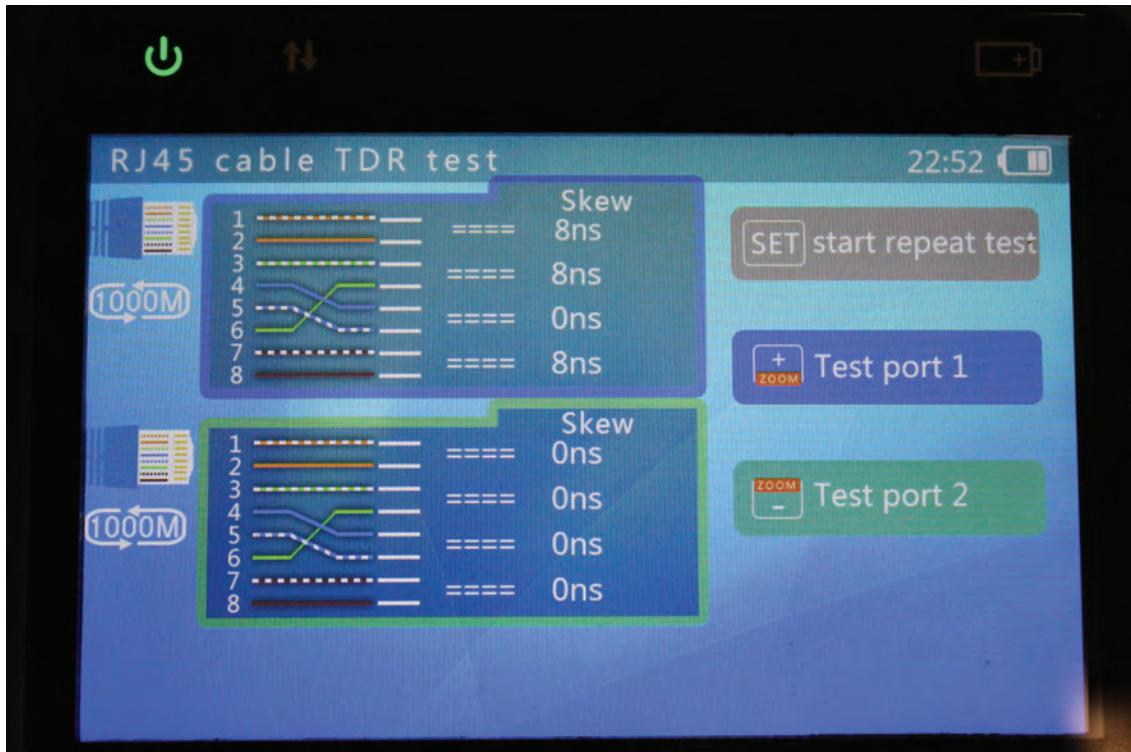
STEP 3: Access the TDR Test Screen

On the Main Menu, highlight “RJ45 Cable TDR Test” (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the “RJ45 Cable TDR Test” option is highlighted, press the **Right Arrow Key** to select the test. (See page 26 for a description of each feature on this screen.)

Once you are on the Test screen, press **Zoom+** to test Port 1 once. When testing is complete on Port 1, press **Zoom-** to test Port 2. The first example on page 28 shows the results from a good

cable. The second example below shows the results from a cable with an open on the green pairs and the length to that open from each end of the cable.

NOTE — Do not use the Repeat Test feature when performing this test as the test results will be compromised.



4.5 Network Analysis Tools

4.5.1 Overview

Network analysis is a combination of several network tools, including Ethernet Sniff, Subnet List, and Ping test.

4.5.2 Network Tools Test Screen and Operation

On the Main Menu, highlight “Network Tools” (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the “Network Tools” option is highlighted, press the **Right Arrow Key** to select the test. (See next page for a diagram of each feature on this screen.)

VERIFY & UPDATE IP, SUBNET, GATEWAY, AND DESTINATION:

The list on the left side of the Network Tools screen will display the Tester’s current IP, Subnet Mask, Gateway, DNS, and Destination settings. To change these settings, select **SET** to access the IP Settings screen, then use the **Arrow Keys** and **Flip Keyboard** to make changes. Select **Iris+** when you are done to confirm the changes and return to the Network Tools screen.

ETHERNET SNIFF:

While you are on the Network Tools screen, press **Focus+** to start the Sniff test. Once Ethernet Sniff is started, the Tester will listen to the network, waiting for broadcast data, detecting MAC and IP addresses. Unlisted new MAC and IP addresses will be added to the list. Press **Focus+** again to end the test.

The format of the list is XX-XX-XX-XX-XX-XX I.I.I.I; where XX is a MAC address in HEX, and I is an IP address displayed in decimal.

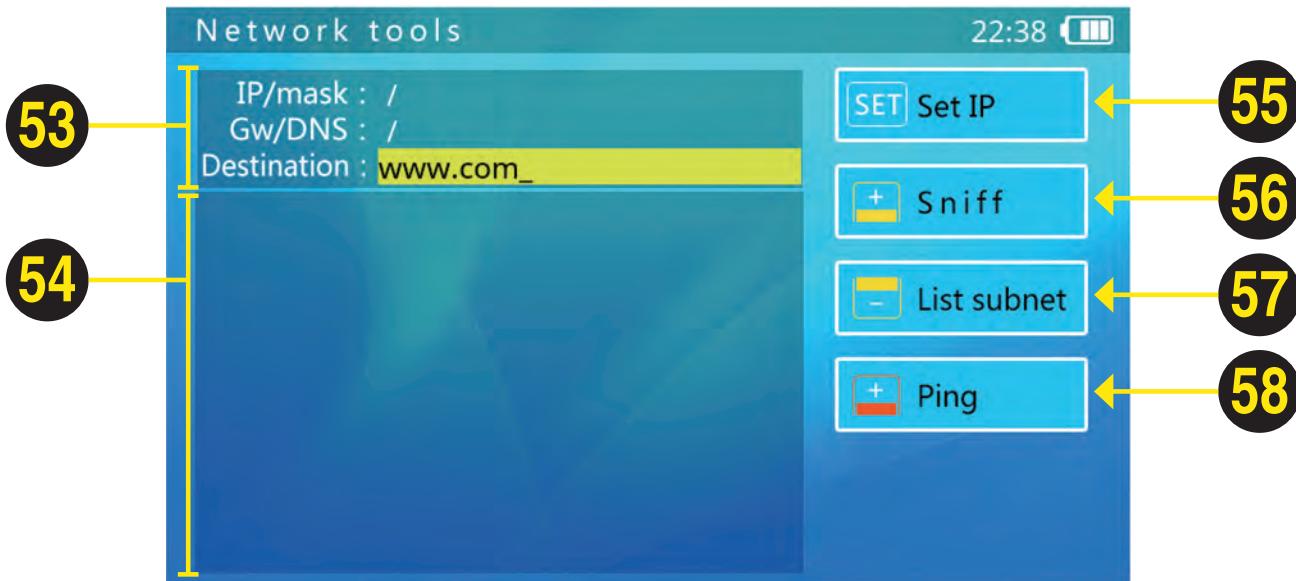
Most network devices broadcast data packets periodically, identifying their presence. The Sniff function will detect this data and discover unknown network devices. The sniff function is detecting broadcasting data packets, so devices of any subnet and any kind can be found.

When connecting to an unknown device with an unknown IP address, first try using the DHCP server to distribute IP to the device. If the device is not requesting an IP address, then use this Sniff function to detect the device.

Detecting a device using the Sniff function may take 3 to 60 seconds, depending on the device broadcasting frequency, and the Tester will not detect a device if it remains silent.

NOTE — The sniff function does not detect uni-cast (point-to-point) packets.





53	Tester's Current Network Settings <ul style="list-style-type: none"> IP/Mask - Tester's IP Address and Subnet Mask. Select SET to change. GW/DNS - Tester's Gateway and DNS. Select SET to change. Destination - Ping destination. When the bar is yellow, use the Flip Keyboard to change the information in this field. Both IP addresses and Domain Names are supported.
54	Information Display area — Results of testing will be listed here.
55	Set IP — Used to access the IP Settings screen to change the Tester's settings between Static IP and DHCP
56	Sniff — Select Focus+ to run the Sniff test. This option will dim when other tests are running
57	List Subnet — Select Focus- to run the List Subnet test. This option will dim when other tests are running.
58	Ping — Select Zoom+ to run the Ping test. Press Zoom+ again to end the test. This option will dim when other tests are running.

LIST SUBNET:

To use the List Subnet function, IP and Mask should be set up, and the Subnet Mask should be 24bits wide (subnet size of 256 devices, or 8 bits). Refer to the instructions on page 29 if you need to update the IP, Subnet Mask, or Gateway.

While you are on the Network Tools screen, press **Focus-** to run the List Subnet function. The Tester will then scan the whole subnet. Devices being scanned must reply, so the discover rate is 100% if the device is operating normally. This List Subnet function will also measure the network latency, and display it in ms (milliseconds).

The List Subnet display format is: XX-XX-XX-XX -XX-XX I.I.I.I N ms. Where XX is the MAC address displayed in HEX, I is the IP address displayed in decimal, and N is the network latency.

Compared to the network sniff function, this function cannot detect devices with different Subnet settings, but the same Subnet detection rate is 100%.

The List Subnet will take 1-10 seconds to finish. Press **Focus-** to exit the List Subnet function.

PING TEST:

To use the Ping Test, IP, Subnet Mask, and Destination must be filled in. If the destination is a domain, then DNS/Gateway are also needed. Refer to the instructions on page 29 if you need to update the IP, Subnet Mask, or DNS/Gateway.

Use the **Flip Keyboard** when the destination section is yellow to edit the Destination.

While you are on the Network Tools screen, press **Zoom+** to run the Ping Test.

The ping test displays result in chart form as shown on page 32. The first column is the latency grade; the second column is the number of responses at that latency grade; the third column is the respond time percentage; and the fourth column is the latency chart.

Press **Zoom+** to exit the Ping Test.



Ping 10.1.1.1 Average: 3ms			
1ms	10	7%	**
3ms	123	91%	*****
10ms	2	1%	*
30ms	0	0%	
0.1s	0	0%	
0.3s	0	0%	
1s	0	0%	
3s	0	0%	
Lost	0	0%	

4.6 Recording, Reviewing, and Accessing Snapshots and Videos

4.6.1 Overview

The Tester can take snapshots of or record input from video, then save the files to internal storage as either .jpg or .avi files. *NOTE — Overlaid test details are not saved on the image.*

4.6.2 Recording Screenshots and Video when Testing an IP Camera

While on the Video & PTZ screen, select the **A Key** to take a screen shot, or the **Z Key** to record video. Press the **Z Key** a second time to stop the recording.

4.6.3 Recording Screenshots and Video when Testing an Analog Camera

While in the Analog Camera Test screen, select the **A Key** to take a screen shot, or the **Z Key** to record video. Press the **Z Key** a second time to stop the recording.

4.6.4 Reviewing the Saved Files

While on the Main Menu, highlight “Record Playback” (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the “Record Playback” option is highlighted, press the **Right Arrow Key** to access the file folders. Follow the On-Screen Instructions to Delete, Play, Pause, and navigate the files.

4.6.5 Accessing the Saved Files from a Computer

While on the Main Menu, highlight and select “Settings”, then select “Start USB Storage”. Plug the USB cable into the side of the Tester and connect the other end to your computer. The Tester’s internal memory card will appear on your computer as an external hard drive.



4.7 Device Settings and Updating the Firmware

4.7.1 Overview

There are many other features in the Tester that you can adjust or view, including the screen's language, Auto Shutoff delay, Serial Number, and so forth. There may also be times when you need to update the firmware or export files to a computer.

4.7.2 Viewing and Changing Settings

On the Main Menu, highlight "Settings" (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the "Settings" option is highlighted, press the **Right Arrow Key** to access the Device Settings screen. (See next page for a screen shot of the Device Settings screen.)

AUTO POWER OFF:

Use the **Left and Right Arrow Keys** to change the setting and press **Iris+** to apply.

KEYPAD TONE:

Use the **Left and Right Arrow Keys** to change the setting and press **Iris+** to apply. The Keypad Tone setting does not affect the Audio Test function.

SCREEN LANGUAGE:

Use the **Left and Right Arrow Keys** to change the setting and press **Iris+** to apply. The tester supports multiple languages, including French and Spanish.

SCREEN BACKLIGHT:

Use the **Left and Right Arrow Keys** to change the setting and press **Iris+** to apply. For outdoor use, a higher brightness will have better contrast, while a lower brightness will consume less battery power.

SYSTEM TIME:

When the field is highlighted, use **Focus+/-** to change the hours in 24-hour time, **Zoom+/-** to change the minutes, and the **Left and Right Arrow Keys** to change the seconds, then press **Iris+** to apply the changes.

SYSTEM DATE:

When the field is highlighted, use **Focus+/-** to change the year, **Zoom+/-** to change the month, and the **Left and Right Arrow Keys** to change the day, then press **Iris+** to apply the changes.





4.7.3 Upgrading Firmware and Identifying Current Firmware Version

IP and Analog camera standards are constantly evolving, therefore it is important that you keep your Tester up-to-date with the most recent firmware. Follow these steps to update the firmware:

STEP 1: Power Up the Tester

Press the **Power Button** on the side of your Tester to turn it on if it is not already powered on.

STEP 2: Connect to the Internet

Plug an ethernet cable into **Network Port 2**, and plug the other end of the ethernet cable into a network that has Internet access. Wait for the light on the **LINK/ACT** on **Network Port 2** to flash before moving on to the next step. (If the network you are plugging into is using DHCP, the Tester will automatically detect the IP Settings. Otherwise, you will need to manually apply the IP settings. Consult your Network Administrator if you need assistance.)

STEP 3: Select the Settings Screen

On the Main Menu, highlight “Settings” using the **Down Arrow Key**. Once the “Settings” option is highlighted, press the **Right Arrow Key** to access the Device Settings screen.

STEP 4: Select the System Upgrade function

While on the Device Settings screen, scroll down to the System Upgrade option using the **Up or Down Arrow Keys**, then press the **Right Arrow Key** to access the Check Upgrade screen. Your current firmware version will show on this screen.

STEP 5: Run the Firmware Upgrade

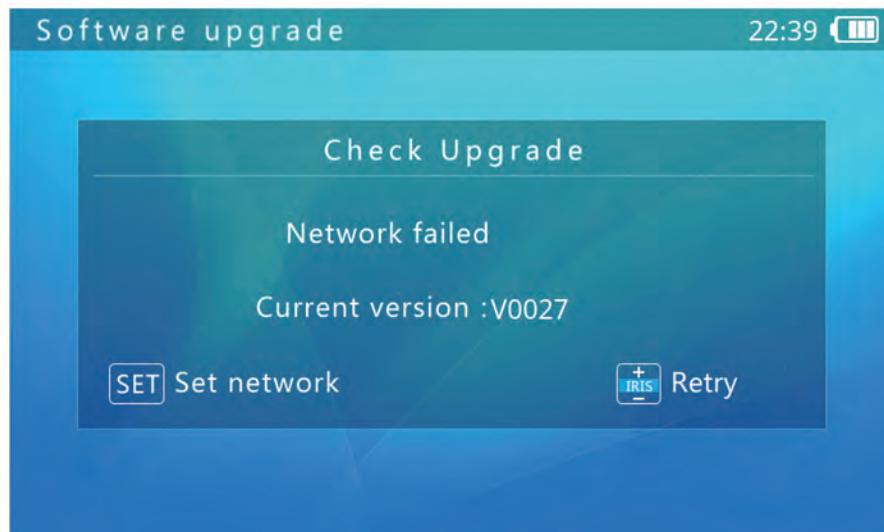
If you have internet access, the Tester will automatically check for new firmware updates when you initially land on the Check Upgrade screen. If, however, you see an error that states “Network Failed” (see screenshot below), first confirm that the network you have plugged into does have internet access and is set to DHCP. If the network does have internet access and the network is supposed to be providing DHCP service to the Tester, you will need to press **SET** to get to the IP Settings screen, and then just toggle over to “Static IP” and then back to “Use DHCP” by pressing the **Right Arrow Key** twice. Once “Use DHCP” is highlighted again, press **Iris+** to apply the settings. The Check Upgrade should run immediately. The Tester will connect to the software upgrade server and try to find a new software version automatically.

When a new version is found, the new version number and current version number will be displayed. Press **Focus+** to enter the download screen. The download process is fully automatic, and an integrity check is automatically executed upon download completion. After this process, the tester will return to the upgrade screen automatically.

An upgrade download may take seconds to dozens of minutes, depending on the network speed. Please use a broadband connection to upgrade. This will save you valuable time.

After the update has successfully downloaded, a “Start Upgrade” prompt will be displayed on the screen. Press **Zoom+** to start the upgrade. The system will reboot automatically then enter the upgrade screen. Press **SET** to start. Follow the on-screen prompts to continue the process.

NOTES — Confirm the battery level is at least 30%. It is a good choice to connect the charger when upgrading to avoid power loss during the upgrade process. Also, do not open battery cover, remove the battery, or press the Reset button while upgrading as doing so may cause system failure, and the device may not be able to boot up again.



4.7.4 Exporting Reports

Any screen shots, video, or ONVIF IP camera reports you have saved on your Tester can be exported to your computer.

STEP 1: Power Up the Tester

Press the **Power Button** on the side of your Tester to turn it on if it is not already powered on.

STEP 2: Connect the Tester to the Computer

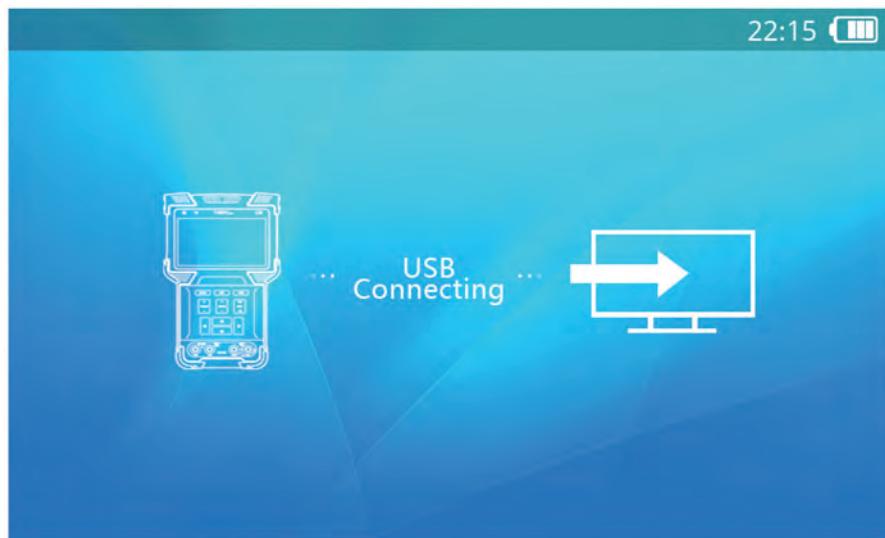
Plug the mini-USB end of the cable into the Tester, and plug the standard USB end of the cable into your computer.

STEP 3: Select the Settings Screen

On the Main Menu, highlight “Settings” (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the “Settings” option is highlighted, press the **Right Arrow Key** to access the Device Settings screen.

STEP 4: Select the Start USB Storage function

While on the Device Settings screen, scroll down to the Start USB function using the **Up or Down Arrow Keys**. Once the option is highlighted, press the **Right Arrow Key**. The Tester’s flash drive should now be accessible as an external drive on your computer, and you should see the image below on the Tester’s screen while the connection is in place.



NOTES — Due to data sharing problems, the USB storage function is off by default. When using USB Storage, do not press **MODE** or the power key as doing so will cause the USB storage device to be unplugged from the host computer, and you may lose data. To disconnect the USB connection from a computer, eject or unmount the disk from the host system before disconnecting the cable.

4.8 Audio Tests

The Tester is equipped with an audio test function. It can be used to test microphones or other audio devices.

Use the supplied 3.5mm audio cable to connect audio device. The black clip is for the ground, the red clip is for the signal connection. Be sure to connect the ground first to avoid loud noises during connection.

If connected successfully and the Tester is powered on, the audio will be heard through the Tester's internal speaker.

4.9 RS485 Data Monitor

The Tester can detect whether the PTZ at the Control Center (i.e., the joystick or software that is used by the Security Staff to pan / tilt / zoom a camera) is reaching the camera by using the Data Monitor feature.

STEP 1: Power Up the Tester

Press the **Power Button** on the side of your Tester to turn it on if it is not already powered on.

STEP 2: Connect the Tester's RS485 Port to the Camera's RS485 Hookup

You can use the Alligator clips with the RS485 plug to do this. Plug the RS485 connector into the Tester, and click the Alligator clips onto the PTZ wires on the camera.

STEP 3: Select the Data Monitor Screen

On the Main Menu, highlight "Data Monitor" (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the "Data Monitor" option is highlighted, press the **Right Arrow Key** to access the Data Monitor screen.

STEP 4: Adjust Tester's Settings

Select the correct Baud Rate by pressing **Zoom+/-**, then move the joystick or software controls in the Control Center. A hexadecimal representation of the commands from the joystick/software controls will appear if the commands are making it to the Tester.



4.10 Digital Multimeter

The CamView IP Pro-D has a built-in Digital Multimeter (DMM). It can measure AC/DC Voltage, AC/DC Current, Resistance, Capacitance, Diode Forward Voltage, and Circuit Continuity.

STEP 1: Power Up the Tester

Press the **Power Button** on the side of your Tester to turn it on if it is not already powered on.

STEP 2: Connect the Probes to the Tester

Remove the probes from the Tester bag and connect them in the appropriate ports on the front of the Tester. The Tester is both **LABELLED** and **COLOR CODED** for your convenience. Be sure to plug the probes into the correct ports for what you intend to test (e.g., if you intend to test Current, the RED probe would be plugged into the second port from the left, and the BLACK probe would be plugged into the third port from the left). An easy way to remember is that Black is always ground/negative and Red is always live/positive. Always plug the Tester end first before you place the test probes against/into whatever you are attempting to test.

WARNING

Failure to properly connect the probes can result in personal injury, fire, or catastrophic damage to the Tester.



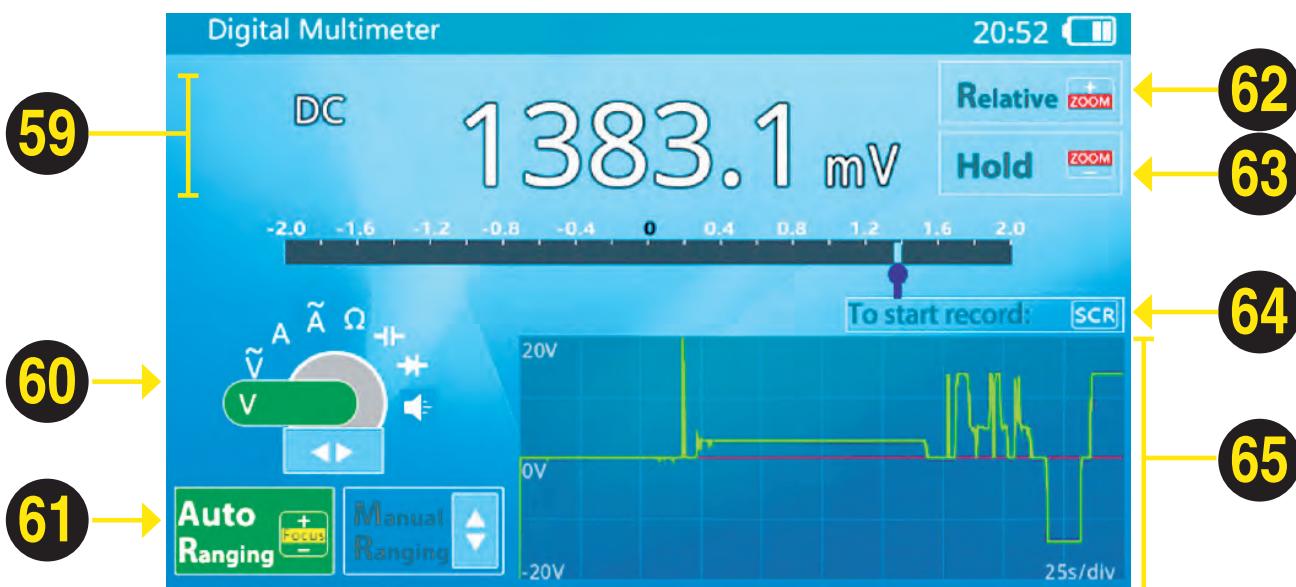
STEP 3: Select the Digital Multimeter Screen

On the Main Menu, highlight “Digital Multimeter” (press the **MODE** button to enter the Main Menu if you are not already on it; press the **Up or Down Arrow Keys** to highlight it). Once the Digital Multimeter option is highlighted, press the **Right Arrow Key** to access the Digital Multimeter screen.

STEP 4: Select the Test Type

While on the Digital Multimeter screen, press the $\leftarrow \rightarrow$ keys to select the test you want to run. You will see the Test Type Selector (see #60 in the diagram on the next page) highlight the test in GREEN as you arrow through the options. The symbols are: DC Voltage (V), AC Voltage (\tilde{V}), DC Current (A), AC Current (\tilde{A}), Resistance (Ω), Capacitance ($\text{--}||\text{--}$), Diode Forward Voltage ($\rightarrow||\text{--}$), or Continuity ($\text{--}|\text{--}$) test.





59	Information and Measurement Display Area — Results and type of testing are shown here, including Vpp, type of measurement, etc. Shows up to 20,000
60	Test Type Selector — Press the \leftarrow \rightarrow keys to select DC Voltage (V), AC Voltage (\tilde{V}), DC Current (A), AC Current (\tilde{A}), Resistance (Ω), Capacitance (C), Diode Forward Voltage (\rightarrow), or Continuity (beep) test.
61	Auto Ranging or Manual Ranging Selector — Press Focus+/- to activate Auto Ranging, or the Up or Down Arrow Keys to activate and set Manual Ranging.
62	Relative — Press Zoom+ to enable and disable Relative function.
63	Hold — Press Zoom- to enable and disable Hold function.
64	History and Record — Press Iris- to switch between Waveform and History. Waveform shows the Waveform itself. History shows the change in current/voltage/etc. over time. You will likely want to use the History setting if you are looking for peaks or drops. Press SCR to start and stop recording.
65	Wave Display Area — Displays either the waveform or history.

WARNING

The Maximum Voltage rating on the test probes is 400V (AC) or 600V (DC). Do not exceed this rating. There is risk of personal injury or equipment damage if it is exceeded. To avoid risk of electrical shock, be sure to use proper safety protocols and avoid direct contact of energized circuits.

STEP 5: Properly Prepare for the Test

Since you are testing circuits, it is necessary to properly prepare for each test. The type of test will determine your preparation. Once you have set up your Tester and are ready to start your test, be aware of the following:

When testing Current:

The probes must be placed in series with the circuit. If the probes are placed in parallel, you will get an incorrect reading.

When testing Resistance, Diode Forward Voltage, or Continuity:

Cut power to the circuit prior to testing.

When testing Capacitance:

Cut power to the circuit before attempting to test and fully discharge the capacitor prior to testing.

STEP 6: Execute Test and Adjust Options

Once you have set up your Tester and properly prepared for the test, you may select Auto or Manual Ranging. The range will show in the upper left of the screen (see #59 on diagram on Page 39). You may also apply Relative and Hold functions during the test.

STEP 7: Record Test Data

To start and stop recording data, press the **SCR** button. You can save a report by pressing **Iris-** .

Changing the Fuse

The DMM is protected with a 2A/250VAC fuse. The Fuse is either a F2AL2 5mm x 20mm or equivalent, and is readily available for purchase online. It is accessible by removing the battery compartment on the back of the Tester. No tools are necessary to access the fuse, however you will need an appropriate tool to remove it.

WARNING

When replacing the fuse, first power off the Tester and unplug the DMM Leads. Use protective eyewear and be careful not to put pressure on the glass part of the fuse; only apply pressure to the metal portion of the fuse. Do not use sharp or jagged objects to pry the fuse out.

NOTES — The Continuity test provides an audible indicator as well as a displaying a measurement on the screen. If you are in a loud environment and want to perform a continuity test, you may use the far left (front blue jack) to plug in standard headphones.

The DMM provides true RMS (Root Mean Square) measurements of AC Voltages. There may be a non-zero displayed value when there is no test circuit connected. This generally has no impact on measurement accuracy of displayed measurements above 200 units.

In the 2V measurement range, there can be 10mV reading displayed even with the test probes shorted. These small offset values can be compensated for by using Relative Measurement mode.



APPENDIX 1: SAMPLE FIRST PAGE OF ONVIF REPORT

NOTE — Data and format are dependent on the specific IP camera.

Report of ONVIF IPC

Basic Information	Device URI	http://10.1.1.101/onvif/device_service	
	Discoverable	YES	
Device Information	Manufacturer	HIKVISION	
	Model	DS-2DE2103-DE3/W	
	Firmware Version	V5.2.7 build 141125	
	Serial Number	DS-2DE2103-DE3/W20150104CCWR497058494	
	Hardware Id	88	
Scopes	Name	HIKVISION%20DS-2DE2103-DE3/W	
	Location	city/hangzhou	
	Hardware	DS-2DE2103-DE3/W	
	Type	video_encoder; audio_encoder; ptz	
	Profile	Streaming; G	
	Others		
Profile #1	Name	mainStream	
	Fixed	YES	
	Snapshot	URI	http://10.1.1.101/onvif-http/snapshot
		Sample	
	Stream URIs	RTP over UDP	rtsp://10.1.1.101:554/Streaming/Channels/1?transportmode=unicast&profile=Profile_1
		RTP over TCP	rtsp://10.1.1.101:554/Streaming/Channels/1?transportmode=unicast&profile=Profile_1
		RTP over RTSP	rtsp://10.1.1.101:554/Streaming/Channels/1?transportmode=unicast&profile=Profile_1
		RTP over HTTP	http://rtsp
		Multicast	rtsp://10.1.1.101:554/Streaming/Channels/1?transportmode=mcast&profile=Profile_1
	PTZ	Supported	YES
		Pan Speed	Range -1.000000 - 1.000000, Default 0.100000
		Tilt Speed	Range -1.000000 - 1.000000, Default 0.100000
		Zoom Speed	Range 0.000000 - 1.000000, Default 1.000000
	Video Encoding	Codec	H264
		Profile	Main High
		Quality	3, Range 0 - 5
		Resolution	1280x720
		Frame Rate	30, Range 1 - 30
		Encoding Interval	1, Range 1 - 1



APPENDIX 2: TECHNICAL SPECIFICATIONS

PORTS	
Network Ports	(2) 10M/100M/1G RJ45 ports (Blue is POE Out; Green is POE In)
I/O Ports	(2) BNC ports (Video IN and Video OUT), (1) RS485, (1) Audio In, (1) USB, (1) Reset Button
IP CAMERA TEST FEATURES	
Protocols	ONVIF 2.4.1 or higher, RTSP, RTP
Ethernet Tests	10M/100M/1G Ethernet link test, loop detect, Ethernet traffic flow monitor, link quality test
IP Configurations	Static IP / DHCP client / DHCP server
IP Camera Tests	Discover camera, real-time video, camera configuration, PTZ control, audio test, full screen preview, and 8x digital zoom; snapshot, record video (recording original data stream), store ONVIF camera reports
AHD, TVI, HD-CVI, & ANALOG CAMERA TEST FEATURES	
SD Signal Format	NTSC / PAL
HD Video Signal Formats	AHD1.0 & TVI 2.0 (Pro+ model only); HD-CVI 2.0 (Pro-C model only); AHD 2.0, TVI 3.0, and CVI 3.0 (Pro-D model only)
Resolutions	D1, 720P, 1080P
Signal Level	1Vpp
Camera Tests	Real-time video, PTZ control, audio test, full-screen preview, and 8x digital zoom; snapshot, record video (H.264 - Pro, Pro-C, and Pro+; H.265 - Pro-D)
PTZ CONTROLS	
Protocol	More than 30 protocols including Dahua, Pelco-D/P, Samsung, Panasonic, Lilin, Yaan etc.
Baud Rate	150, 300, 600, 1200, 2400, 4800, 9600, 19200bps
DETECTION	
TDR Tests	0~150m network cable length measurement (resolution 1m), cable pair status
PTZ Test	Data Monitor to detect RS485 Communication from control room console to camera
POE Tests	PD test (tester accepts POE power, displays voltage)
	PSE test (tester provides POE power, displays power)
Network Analysis	Sniff, list subnet, ping
Analog Video Generator	Generate PAL / NTSC video signals of various test patterns
Record Playback	Support local playback of recorded video and view screenshots

SYSTEM	
Screen	4.0 inch TFT 800*RGB*480(WVGA) resolution, 16.7M color, backlight brightness adjustable
Operation Method	Power key, 12 control keys, QWERTY flip-open keyboard with 45 keys
Auto Power Off	Disable / 5~60 minutes
Keyboard Tone	Enable / Disable
Software	Supports online upgrades
POWER	
Power Input	POE source or POE injector (Green RJ45 port)
POE Injector	Input AC100~230V 50~60Hz, output 48V/15w
Battery	Dedicated battery, user replaceable, 7.4V lithium-ion polymer battery, capacity 22.2Wh
Power Output	POE (802.3af, 802.3at) (Blue RJ45 port), DC12V 2A
Time	Charging time 3~4 hours, max working time 10 hours
OTHER	
Internal Storage	8GB flash
LED Light	(2) 35lm LED lights
Working Temperature	-10°C ~+55°C
Working Humidity	30%~90%
Dimensions	190mm x 113mm x 37mm
Weight	1.6kg



APPENDIX 3: DMM TECHNICAL SPECIFICATIONS

Item	Range	Reading Range	Minimum Resolution	Accuracy
DCV	2V, 20V, 200V, 600V	±19999	0.1mV	±0.1%+8*
ACV True RMS	20V, 200V, 600V	±1999	1V	±1.2%+3
DC Current	20mA, 200mA, 2000mA	±19999	1uA	±0.1%+8*
AC Current True RMS	20mA, 200mA, 2000mA	±1999	1uA	±1.2%+3
Resistance	2KΩ, 20KΩ, 200KΩ 2MΩ, 20MΩ	0~19999	0.1Ω	±0.1%+8**
Capacitance	2nF, 20nF, 200nF, 2uF, 20mF, 200uF, 2mF, 20mF	0~1999	1pF	±4%+5
Diode Forward Voltage	2V	0~1999.9	0.1mV	±0.1%+20
Continuity	2KΩ	0~1999.9	0.1Ω	±0.1%+20

*2VDC, 20mA DC. For the range of 2VDC and 20mA DC, no load reading should be subtracted.

**When measuring small resistors, resistance of the probes should be subtracted.

Item	Parameters	Description
Resistance, Capacitance, Diode Measurement Protection	<400V	Connecting to voltage beyond the range will cause the meter to be damaged permanently.
Fuse	Size: 5mm x 20mm, 2A/250V	
Electrical Insulation	>1.5KV	mA, COM, V/Ω are electronic measurement connectors, which are insulated from all other interfaces.



Item	Parameters	Description
Factory calibration temperature	25 ±5°C	
Temperature Stability	<100ppm/ °C	Except for large current measurement
User Self-calibration Range	±1%	
Data Rate	5 readings per second 2 readings per second 0.1~5 readings per second	DC Voltage, DC Current, Resistance Measurement, Diode testing, Continuity AC Voltage & AC Current Testing Capacitance Testing
Analog Meter Refresh Rate	20 ~ 40fps	Except for Capacitance Testing
Data History Chart X Axis	1s/div, 5s/div, 25s/div	Automatic Adapt
Waveform Display Mode X Axis	10ms/div	
Waveform Refresh Rate	1 per second	No synchronization
AC Measurement Frequency Range	0Hz ~ 1000Hz	Harmonics above 1KHz will induce error
Diode Current Measurement	1mA ±5%	
Breakdown Prompt Threshold	30mV	
Conductivity Test Current	1mA ±5%	
Conductivity Beeper Threshold	30 OHMS	
Conductivity Beeper Response Time	<2mS	
Current Measurement Resistance	20mA Grade: 5Ω ±5% 200mA Grade: 1Ω ±10% 2000mA Grade: 0.1Ω~0.2Ω	
Data Recording Frequency	2 records/second	
Data Record Length	0.5s~9999h	

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Triplet / Jewell Instruments extends the following warranty to the original purchaser of these goods for use. Triplet warrants to the original purchaser for use that the products sold by it will be free from defects in workmanship and material for a period of (1) one year from the date of purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons in any way or purchased from unauthorized distributors so as, in our sole judgment, to injure their stability or reliability, or which have been subject to misuse, abuse, misapplication, negligence, accident or which have had the serial numbers altered, defaced, or removed. Accessories, including batteries and fuses, are not covered by this warranty.

To register a claim under the provisions of this warranty, please contact the distributor from which you purchased the product from for warranty consideration.

ALL WARRANTIES IMPLIED BY LAW ARE HEREBY LIMITED TO A PERIOD OF THREE YEARS FROM DATE OF PURCHASE, AND THE PROVISIONS OF THE WARRANTY ARE EXPRESSLY IN LIEU OF ANY OTHER WARRANTIES EXPRESSED OR IMPLIED.

The purchaser agrees to assume all liability for any damages and bodily injury which may result from the use or misuse of the product by the purchaser, his employees, or others, and the remedies provided for in this warranty are expressly in lieu of any other liability Triplet may have, including incidental or consequential damages.

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