

# SeeUV<sup>®</sup>

## Flexicam HD-UV Video Probe

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InterTest, Inc. • 303 Route 94 • Columbia, NJ 07832



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## Contact Information

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## Cautions and warnings.

### Safety Precautions

This manual covers the QN HD equipment, its functions, and use. It also covers precautions to be taken to ensure safe operation. Please read this manual thoroughly before operating the equipment. By doing so, you will become familiar with the equipment's capabilities and better understand its functions. After reading this manual, save it for future reference.

Follow all warnings and instructions in the manual and marked on the equipment.

### Operational, General Safety Considerations and Precautions

Always observe the guidelines and precautions that follow.

There are no user-serviceable parts inside the controller. Refer all service to the InterTest Customer Service and Support Group.







**IMPORTANT:** To ensure operator safety, read and understand this manual before using the system.

To avoid injury, read and understand the associated documentation of support components prior to operation. Direct any questions about equipment operation to InterTest Customer Service and Support Group at 908-496-8008 or via email to [service@intertest.com](mailto:service@intertest.com).

## Cautionary Symbols and Symbol Terminology

Table A describes the various symbols that may be included in this manual and mounted on the equipment. The severity level of a potential hazard varies. Refer to for hazard level descriptions.

**Table A — Manual and Equipment Safety Symbols**

Symbols	Definitions
	WARNING/CAUTION: Risk of electric shock.
	WARNING/CAUTION: Refer to instruction manual.
	WARNING/CAUTION: Avoid exposure to water and liquids.
	WARNING/CAUTION: Avoid eye and skin exposure to UVA Light.

## Warnings

**Stop operation immediately when any abnormality or defect occurs.** Use during an abnormal condition; such as emitting smoke, burning odors, after damage from dropping, invasion of foreign objects, etc. may cause fire and/or electrical shock. Disconnect the power plug from the electrical outlet at once and contact InterTest Inc.

**Only use the specified power supply.**

**Do not connect or disconnect any cable while the unit is energized.**

**Some surfaces may be warm to the touch. Use caution when handling.**

## Disclaimers

We disclaim any responsibility and shall be held harmless for any damages or losses uncured by the user in any of the following cause:

1. Fire, earthquake or any other Act of God. Acts by third parties; misuse by the user, whether intentional or accidental; use under conditions outside of noted operating range.





2. Malfunction or non-function resulting in indirect, additional or consequential damage including but not limited to loss of expected income and suspension of business activities.
3. Use not in compliance with this manual's instructions.
4. Malfunctions resulting from misconnection.
5. Unauthorized repairs or modifications.
6. Notwithstanding the foregoing, InterTest's liabilities shall not, in any circumstances, exceed the purchase price of the product.

## Warranty

### Warranty Statement

InterTest, Inc. guarantees products manufactured by InterTest, Inc. to be free from defects in materials and workmanship for a period of one (1) year, from the date of original purchase. All other products not manufactured by InterTest, Inc. will carry the OEM's limited warranty, which will be passed to the purchaser through and supported by InterTest, Inc. InterTest, Inc.'s obligation under this limited warranty shall be confined to the repair or exchange of any part, or parts thereof, that prove defective under normal use and service for which the product was intended or designed.

This limited warranty covers products that upon our examination are deemed to be defective.

This limited warranty is in lieu of all other warranties, express or implied, including the warranties of merchantability and fitness for use. We neither assume, nor authorize any other person to assume for us, any other liabilities in connection with the sale of InterTest, Inc. equipment. This warranty does not apply to any equipment that has been subject to accident, negligence, alteration, abuse, unauthorized repair, improper storage, or other misuse.

This limited warranty applies only to the original purchaser and cannot be assigned or transferred to any third party without express written consent from InterTest, Inc.

This limited warranty does not apply to consumable items, expendable items or normal wear and tear, nor does it apply to failure due to radiation, overheating and / or below freezing temperatures.

InterTest, Inc. assumes no responsibility, either expressed or implied, regarding the improper usage of this equipment or interpretation of test data derived from the use of this equipment. InterTest, Inc.'s responsibility and obligations, in all cases, are limited strictly to the repair and/or replacement costs outlined above.



The laws of the State of New Jersey shall govern this warranty.

Note: In the event the equipment cannot be returned to InterTest, Inc. The customer agrees to pay all travel and living expenses incurred to have an InterTest, Inc. representative evaluate, assess or affect a warranty repair in the field.

### Copyrights and Rights of Portrait

There may be a conflict with the Copyright Law and other laws when a customer uses, displays, distributes or exhibits an image picked up by a television camera without permission from the copyright holder. Please also note that transfer of an image or file covered by copyright is restricted to use with the scope permitted by the Copyright Law.

### Registered Trademark Information

InterTest™	is a registered trademark of InterTest, Inc.
iShot™	is a registered trademark of InterTest, Inc.
iShot™ Imaging™	is a trademark of InterTest, Inc.

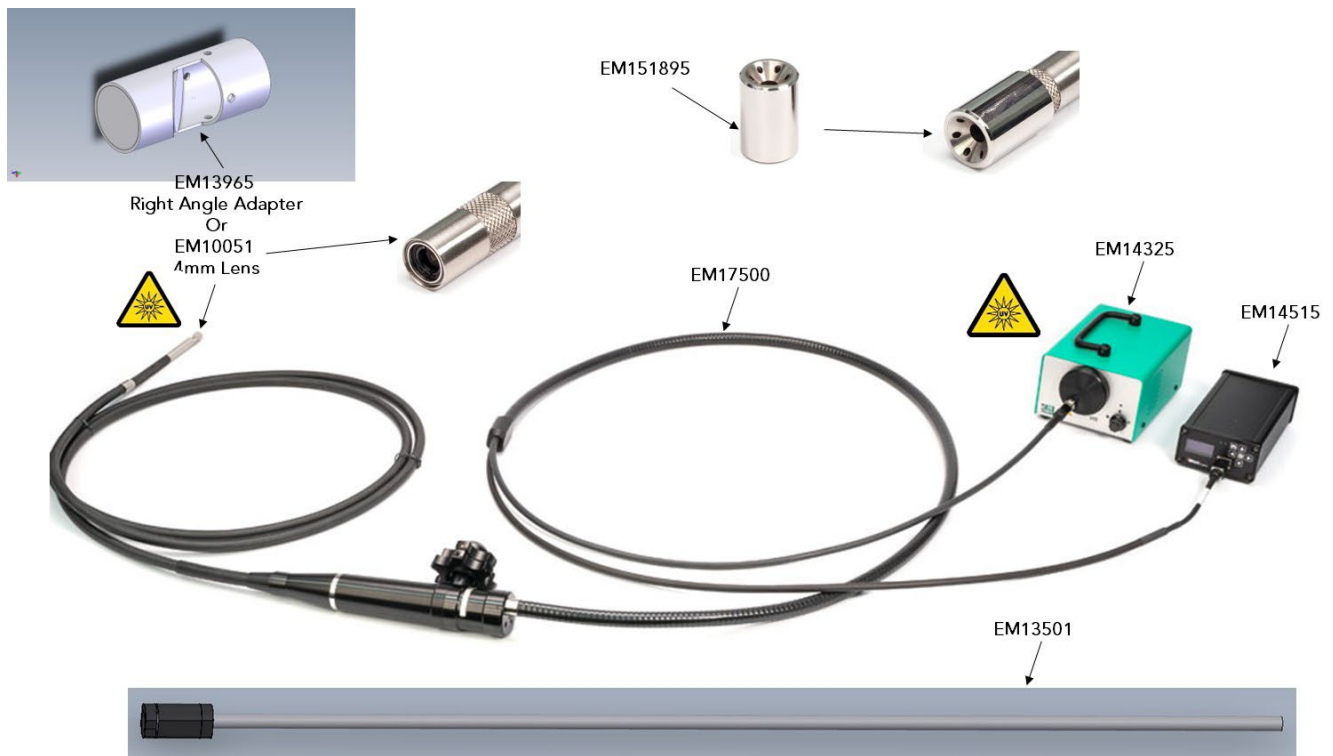


**IMPORTANT:** If you are in possession of a printed or electronic version of this document, be aware that it may not be the current revision. To ensure that you are using the most up-to-date revision of this document, contact the InterTest Customer Service and Support Group or reference the downloads portal under this product on [www.intertest.com](http://www.intertest.com).

## System Components

Part Number	Description
EM17500	UV Flexicam HD 4-Way Articulation 3M
EM14325	iShot UV/White LED Light Source Kit-Mach
EM14515	iShot QNHD Control Unit
EM10051	ELMO 4MM LENS FOR 7MM MICRO CAM
EM13965	FLEXIUV VIDEOPROBE R-ANGLE ADAP
EM151895	FLEXICAM FOCUS TOOL
EM13501	13mm x 48" Guide Tube Rigidizer & Gripper

## System Component Images



**Figure 1 System Components**

## Focus Adjustment



Figure 2 Focus Adjustment / Head Guard



CAUTION: Lens/ Imager Head threads are very fine. Exercise caution



CAUTION: Do not slap or drop Head / Imager or lens train may be damaged

### Flexicam Operation



Figure 3 Flexicam Steering

### CCU Controls and connections



<b>LED 1</b>	Green if camera head is connected and comm channel is locked, Yellow if not
<b>LED 2</b>	Power

Figure 4 CCU Front



Figure 6 CCU Back

### Connections



Figure 7 Labeled Front of CCU

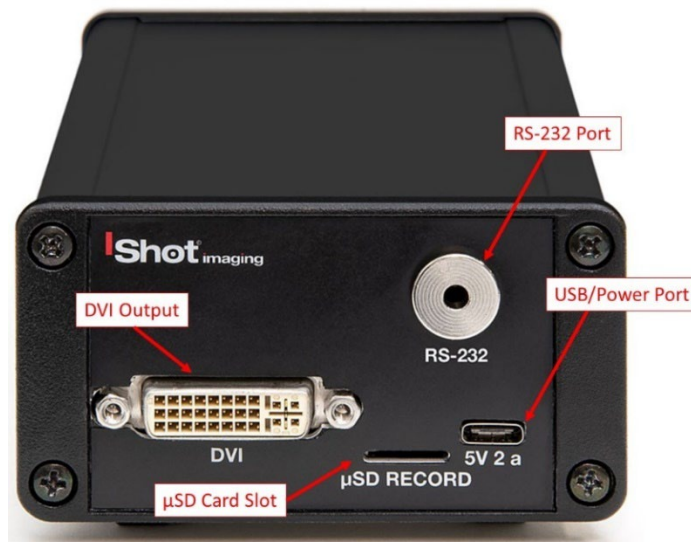


Figure 8 Labeled Back of CCU

### Standard Connections

DVI	video output
USB-C	power input and USB video output
MicroSD	image storage
External COM Port	RS232 Communication from / to the CCU (EM69477)
Chassis Ground Connection	#8-32 x 3/8" Long Grounding Connection (See Fig # 5) Used to ensure CCU is at the same ground potential to avoid unforeseen ground loops

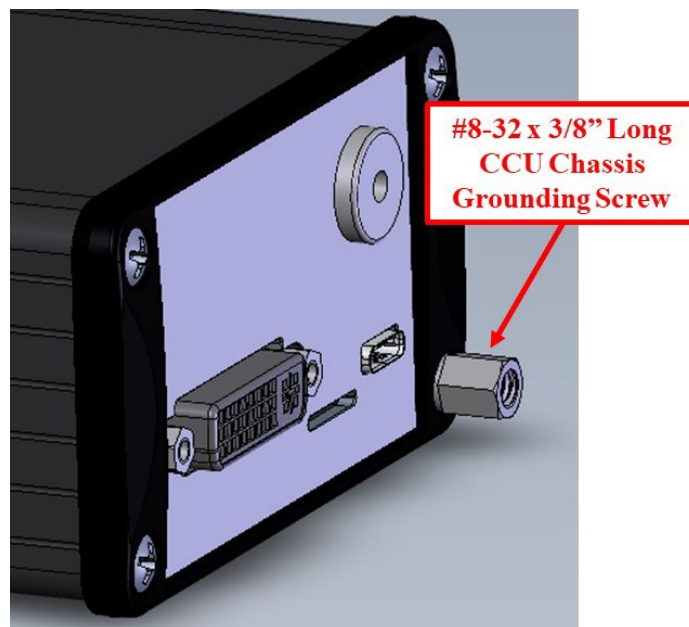


Figure 9 External Chassis Ground Connection

## General Operation

After power is applied, Right indicator LED will light up, wait 5 seconds, until the Main Menu appears in the CCU Screen.

DVI is disabled when USB is connected. The Image is transmitted through USB to the PC, not the DVI port.

MicroSD card is used to save images. High speed card required.

If faster response time is needed operate in 720p with Zoom On (crop mode) rather than Off (scale mode). Scale mode still reads the whole sensor array thus running as if in 1080p.

Settings changes will be saved automatically on power down. If any parameter is changed a back step in menu is required for it to be saved on power down.



## Operation & Menu Top Level



## Menu Tree

```

Main Menu
> Image Quality
- Capture Setup
- Utility Menu
- Pan-Tilt-Zoom
- Set to Defaults
  
```

Menu tree home.

## Image Quality

```
Image Quality
> Brightness      126
- Contrast        19
- Saturation      31
- Sharpness       5
- More...
- Return to Main
```

Brightness: 0 to 255, Default: 128

Contrast: 0 to 63, Default: 19

Saturation: 0 to 63, Default: 31

Sharpness: 0 to 31, Default: 5

More continues to options on More Image Quality page.

Return to Main: returns to top of menu tree and saves settings.

## More Image Quality

```
More Image Quality
> White Balance Auto
  WB Level      128
- Gamma         1
- Hue           20
- More...
- Return to Img Qual
```

White Balance: Auto or Set Set mode allows user to select fixed value.

WB Level: 0 to 255 Default: Auto

(50 appears to be about neutral in fluorescent lighting.)

Gamma: 0, 1, or 2 Default: 1

Hue: -180 to 180 Default: 0

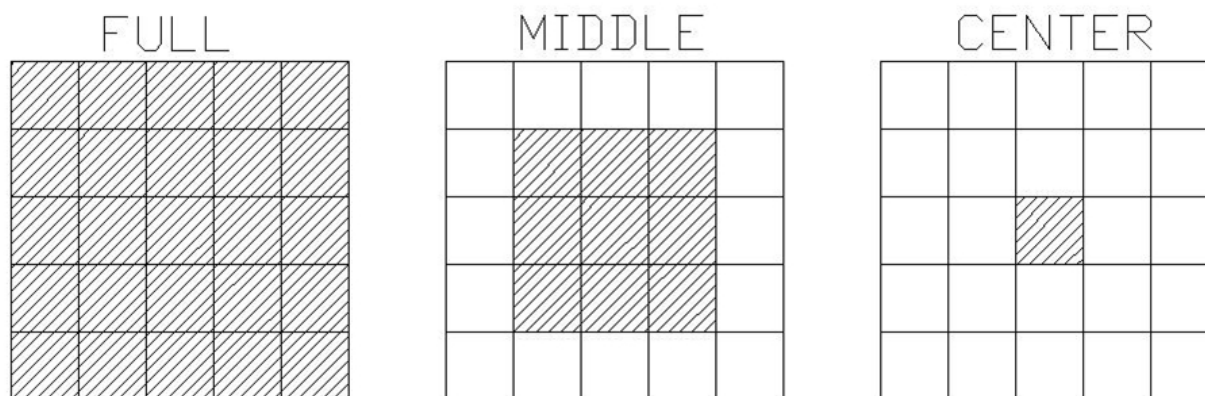
Return to Img Qual: returns to previous page, Image Quality.

## Capture Setup



Mirror: No, H, V, HV. Default: No  
 Frame Rate: Auto, 1 to 30 Hz in 1080 Default: Auto  
                   1 to 60 Hz in 720  
                   1 to 120 Hz in VGA

Exp ROI: Full, Middle, Center Exposure Region Of Interest. Area analyzed to adjust Image  
 Exp ROI: Full, Middle, Center Exposure Region Of Interest. Area analyzed to adjust Image



EXP Sec: Auto, 1, 1/2, 1/3, 1/4, 1/5, 1/6, Default: Auto  
 Length of time image is exposed per second  
 1/7, 1/8, 1/9, 1/10, 1/15  
 1/20, 1/25, 1/30, 1/50,  
 1/60, 1/100, 1/120, 1/250  
 1/500, 1/1000, 1/5000,  
 1/10000, 1/20000, 1/30000

## Utility Menu

```
Utility Menu
> LED Level          0
- Show Diagnostics
- Save Presets
- Load Presets
- Lens Correction
- Return to Main
```

LED:	0 to 10 Light intensity level Constant Current @ 8VDC (See Aux Light QNHD Command List for RS232)
Show Diagnostics	Displays system diagnostics Status
Save Presets	Allows current settings to be stored for later recall
Load presets	Allows previously stored settings to be restored
Lens Correction	For setting color correction of the lens installed

## System Diagnostic

```
System Diagnostics
H1 Failed   H2 Failed
UART Comms   Fail
PCB Temp     32 C
I2C Check    Pass
Ev3.237   Pv1.68
** Any key to exit **
```

1080/30 (H1): Locked/Failed Camera type attached

1080/60 (H2): Locked/Failed Camera type attached

Note: Only one camera type will read as "Locked". The other will indicate fail

UART Comms:Pass/Fail                      USB communication functioning

PCB Temp:                                    xx-xx C typ

(Temp on PCB)

I2C Error:                                  00xx

Ev#.### Pv#.##                      firmware revision loaded in CCU.

### Save Setup

```
Save Setup Menu
> Custom Setup 1
- Custom Setup 2
- Custom Setup 3
- Custom Setup 4
- Return to Utility
```

Allows up to 4 sets of camera settings to be stored for later recall and use.

### Load Presets

```
Load Setup Menu
> Custom Setup 1
- Custom Setup 2
- Custom Setup 3
- Custom Setup 4
- Return to Utility
```

Allows recall and use of any of 4 previously store sets of camera settings.

### Lens Correction

```
Lens Correction
> Lens Type      7mm
- Color Temp    2800K
- Return to Utility
```

Allows setting lens installed and color temp for image correction.

LENS TYPE: A, B, C, D, E

Color Temp: 2800K, 4500K or 6500K

## Pan Tilt Zoom Menu

```
Pan-Tilt-Zoom Menu
> Resolution      1080p
  Zoom           On
  Pan            0
  Tilt           0
- Return to Main
```

Resolution:	USB output	1080p, 720p, 480	Default: 1080p
	DVI output	1080p, 720p	
	In 1080p	Pan, Tilt & Zoom Disabled	
Zoom: (On/Off)	Default: Disabled		
Pan:	+/- 320 in 720p	Default: Disabled	
	+/- 640 in 480		
Tilt:	+/-180 in 720p	Default: Disabled	
	+/- 300 in 480		

## Set to defaults

```
Reset to Defaults
> Confirm
- Return to Main
```

Confirm: changes settings to the factory default settings and returns to Main Menu.

Return to Main: Returns to top of Menu Tree (Main Menu), without changing settings.

## microSD card

Must be CLASS 10 (10MB/s) or better (UHS-1, 2, or 3)

## Saving images

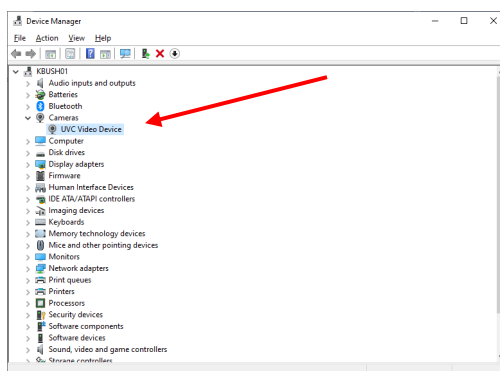
With a microSD card installed, images can be captured by pressing the camera button on the front of the CCU. A slight dip in the intensity of the displayed image indicates the image has been saved.

## Using With A PC

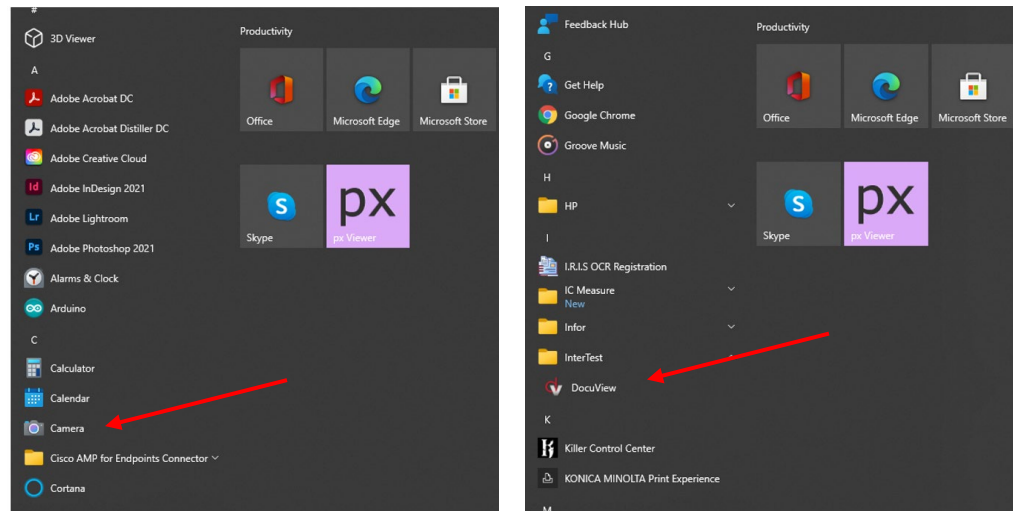
When the CCU is attached to a PC via a USB cable, the DVI display output connector is disabled and the image is displayed on the PC.

## Connection Steps

- 1) Connect the camera.
- 2) Connect the USB Cable to the CCU & a USB 3.0 Port (Recommended)
- 3) The computer should recognize the camera as a UVC Device



- 4) InterTest DocuView\*\* or MS Windows Camera Applications can be used.
  - a. Resolution, frame rate, brightness & contrast can be adjusted in the Windows app.
  - b. Video recording & Image Snapshots are done with the computer



- c. Shutter and all other camera related functions are controlled through the QNHD CCU

## QNHD Serial Commands:

Overview of communication:

RS232 Standard

9600 Baud Rate

8 byte packet size

Non parity

## Software Disclaimer

SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTOR(S) "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTOR(S) BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR





BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE\*

### Communication Specifications:

Each command or inquiry packet is made up of 8 bytes. The first byte will contain the target address followed by command or inquiry action byte, command byte, command modifier byte, three data bytes, followed by the end byte. The address will be either 0x42 for functions handled by the camera, or 0x43 for commands handled by the CCU. The action byte will be either 0x01 for a command or 0x09 for an inquiry. The command byte will specify which parameter or action is to be modified, taken, or inquired about. The command modifier byte determines what changes are made to the parameter specified in the command byte as defined below. The data bytes contain the values for the parameters to be set at during a direct command. The end byte is always 0xff to signify the end of a packet.

### Communication Pin-Out

3.5mm TRS Plug

Tip: TX

Ring: Rx

Sleeve: GRND



### Command Structure:

	Address	Action	Command	Command Modifier	Data	Data	Data	End
Byte	1	2	3	4	5	6	7	8
	0x42 (Camera)	0x01 (command)	0xpp (range 00-FF)	0x0p	0x00	0x00	0x0q	0xFF
	0x43 (Control Unit)	0x09 (Inquiry)		0xpp		0x00	0xqr	
						0xqr	0xst	

Byte 4 is the Command Modifier and is defined thus:

00 = Off/auto (only valid for some commands)

01 = Direct

02 = Increment

03 = Decrement

04 = Reset

Other = defined differently for each specific command

### Command/Inquiry:

Command packets send action items to the camera

Inquiry packets are used to ask for the current state of the CCU or camera.

### Responses:

Command execution information will be stored in byte 2 of the response packet, and will be as follows:

50 = command executed

60 = command could not be executed

61 = no camera head detected



All other bytes of response will be an echo of the code received by the CCU. Improper inquiries will return a value of 60 in the 2nd byte, and other bytes of the response packet will be an echo of the data sent.

A response to an inquiry will have the requested data stored in the three data bytes of the response packet. All other bytes will be an echo of the inquiry packet that was sent.

The CCU will wait for the response packet to be sent before accepting any new commands.

### QNHD Command List

Command		Command HEX	Definition
AUX_Light	Off	43 01 01 00 00 00 00 FF	Off
	Direct	43 01 01 01 00 00 qr FF	on, % of max,(qr = 0x00 to 0x63)
	Up	43 01 01 02 00 00 00 FF	Light Increase 10%
	Down	43 01 01 03 00 00 00 FF	Light Decrease 10%
Image_Capture	Save	43 01 02 00 00 00 00 FF	Save image to SD
Custom_Setup	Save	43 01 03 01 00 00 0q FF	Save 1-4 (q = 1 to 4)
	Load	43 01 03 02 00 00 0q FF	Load 1-4 (q = 1 to 4)
Mirror	Direct	42 01 04 01 00 00 0q FF	q: 0-3 0 = No mirroring 1 = Horizontal mirror 2 = Vertical mirror 3 = Horizontal and vertical mirror
Frame_Rate	Auto	42 01 0A 00 00 00 00 FF	Auto
	Direct	42 01 0A 01 00 00 qr FF	1 - 30 qr: 01 to 1E 1080p
		42 01 0A 01 00 00 qr FF	1 -60 qr: 01 to 3C 720p
		42 01 0A 01 00 00 qr FF	1 - 120 qr: 01 to 78 640x480
EXP_ROI	Direct	42 01 11 01 00 00 00 FF	Full
		42 01 11 01 00 00 01 FF	Middle
		42 01 11 01 00 00 02 FF	Center



Command		Command HEX	Definition
EXP_ESC	Up	42 01 15 02 00 00 00 FF	See Shutter Table
	Down	42 01 15 03 00 00 00 FF	
	Direct	42 01 15 01 00 qr st FF	
	Auto	42 01 15 01 00 00 00 FF	
Brightness	Reset	42 01 01 04 00 00 00 FF	0 to 255, default 128 qr:00 to FF
	Direct	42 01 01 01 00 00 qr FF	
Contrast	Reset	42 01 02 04 00 00 00 FF	0 to 63, default 19 qr: 00 to 3F
	Direct	42 01 02 01 00 00 qr FF	
Saturation	Reset	42 01 03 04 00 00 00 FF	0 to 63, default 31 qr: 00 to 3F
	Direct	42 01 03 01 00 00 qr FF	
Sharpness	Reset	42 01 05 04 00 00 00 FF	0 to 31, default 5 qr: 00 to 1F
	Direct	42 01 05 01 00 00 qr FF	
Reset_to_Default		42 01 80 04 00 00 00 FF	Reset above 4 to Default value
WB Mode	Auto	42 01 0C 01 00 00 00 FF	Set WB to be auto or manual
	Manual	42 01 0C 01 00 00 01 FF	
WB Value	Direct	42 01 0D 01 00 00 qr FF	0 to 255, 128 default qr: 0x00 - 0xff Only works if WB is in manual mode
	Increment	42 01 0D 02 00 00 00 FF	
	Decrement	42 01 0D 03 00 00 00 FF	
	Reset	42 01 0D 04 00 00 00 FF	
Gamma	Reset	42 01 06 04 00 00 00 FF	Reset
	Direct	42 01 06 01 00 00 0q FF	0 to 2, default 1 q: 0-2
Hue	Reset	42 01 17 04 00 00 00 FF	neg 180 to 180, default 0 v: 0 for positive, 1 for negative. qr: 00 - B4
	Direct	42 01 17 01 0v 00 qr FF	



Command		Command HEX	Definition
Pan	Disabled		Disabled in 1080 Resolution
	Reset	42 01 08 04 00 00 00 FF	Reset to 0
	Direct	42 01 08 01 0v qr st FF	<p>Called Pan in UVC; Uses sensor windowing to adjust which part of the frame is shown.</p> <p>Limits are:</p> <ul style="list-style-type: none"> <li>•1080p: Not available, always show full image</li> <li>•720p, Zoom = 1: <ul style="list-style-type: none"> <li>oMax, min X = +/- 320 This is (1920-1280)/2</li> <li>qr st: 00 00 - 01 40</li> <li>v: 1 = negative 0 = positive</li> </ul> </li> <li>•480p (USB Mode), Zoom = 2: <ul style="list-style-type: none"> <li>oMax, min X = +/- 640 This is (1920-640)/2</li> <li>qr st: 00 00 - 02 80</li> <li>v: 1 = negative 0 = positive</li> </ul> </li> </ul>
Tilt	Disabled		Disabled in 1080 Resolution
	Reset	42 01 09 04 00 00 00 FF	Reset to 0
	Direct	42 01 09 01 0v qr st FF	<p>Called Tilt in UVC; Uses sensor windowing to adjust which part of the frame is shown.</p> <p>Limits are:</p> <ul style="list-style-type: none"> <li>•1080p: Not available, always show full image</li> <li>•720p, Zoom = 1: <ul style="list-style-type: none"> <li>oMax, min Y = +/- 180 This is (1080-720)/2</li> <li>qr st: 00 00 - 00 B4</li> <li>v: 1 = negative 0 = positive</li> </ul> </li> <li>•480p (USB Mode), Zoom = 2: <ul style="list-style-type: none"> <li>oMax, min Y = +/- 300 This is (1920-480)/2</li> <li>qr st: 00 00 - 01 2C</li> <li>v: 1 = negative 0 = positive</li> </ul> </li> </ul>
Save Settings	Enable	43 01 03 04 00 00 00 FF	
	Disable	43 01 03 03 00 00 00 FF	



Saturation	Reset	42 01 03 04 00 00 00 FF	0 to 63, default 31
	Direct	42 01 03 01 00 00 qr FF	qr: 00 to 3F
Sharpness	Reset	42 01 05 04 00 00 00 FF	0 to 31, default 5
	Direct	42 01 05 01 00 00 qr FF	qr: 00 to 1F
Reset_to_Default		42 01 80 04 00 00 00 FF	Reset above 4 to Default value



Inquiries:

Command	Inquiry Hex	Reply HEX	Definition
AUX_Light	43 09 01 00 00 00 00 FF	43 09 01 00 00 00 00 qr FF	% of max,(qr = 00 to 64)
Mirror_H	42 09 04 00 00 00 00 FF	42 09 04 00 00 00 00 0q FF	q: 0 = No mirroring 1 = Horizontal mirror 2 = Vertical mirror 3 = Horizontal and vertical
Frame_Rate	42 09 0A 00 00 00 00 FF	42 09 0A 00 00 00 00 qr FF	1 - 30 qr: 01 to 1E in 1080p 1 -60 qr: 01 to 3C in 720p 1 - 120 qr: 01 to 78 in 480p
EXP_ROI	42 09 11 00 00 00 00 FF	42 09 11 00 00 00 00 FF	Full
	42 09 11 00 00 00 00 FF	42 09 11 00 00 00 01 FF	Middle
	42 09 11 00 00 00 00 FF	42 09 11 00 00 00 02 FF	Center
EXP_ESC	42 09 15 00 00 00 00 FF	42 09 15 00 00 00 00 FF	Auto
	42 09 15 00 00 00 00 FF	42 09 15 00 00 00 qr st FF	qr st: See Shutter Table
Brightness	42 09 01 00 00 00 00 FF	42 09 01 00 00 00 00 qr FF	0 to 255 qr: 00 to FF
Contrast	42 09 02 00 00 00 00 FF	42 09 02 00 00 00 00 qr FF	0 to 63 qr: 00 to 3F
Saturation	42 09 03 00 00 00 00 FF	42 09 03 00 00 00 00 qr FF	0 to 63 qr: 00 to 3F
Sharpness	42 09 05 00 00 00 00 FF	42 09 05 00 00 00 00 qr FF	0 to 31 qr: 00 to 1F
WB Mode	42 09 0C 00 00 00 00 FF	42 09 0C 00 00 00 00 0q FF	q: 0 - auto 1 - manual
WB Value	42 09 0D 00 00 00 00 FF	42 09 0D 00 00 00 00 qr FF	0 to 255 qr: 00 to ff
Gamma	42 09 06 00 00 00 00 FF	42 09 06 00 00 00 00 0q FF	0 to 2 q = 0-2



Command	Inquiry Hex	Reply HEX	Definition
Hue	42 09 17 00 00 00 00 FF	42 09 17 00 0v 00 qr FF	neg 180 to 180 v: 0 = Positive, 1 = Negative qr: 00 to B4
Lens_Type	42 09 1B 00 00 00 00 FF	42 09 1B 00 00 00 00 FF	Lens A
		42 09 1B 00 00 00 01 FF	Lens B
		42 09 1B 00 00 00 02 FF	Lens C
		42 09 1B 00 00 00 03 FF	Lens D
		42 09 1B 00 00 00 04 FF	Lens E
		42 09 1B 00 00 00 05 FF	Lens F
		42 09 1B 00 00 00 06 FF	Lens G
Color_Correction	42 09 1A 00 00 00 00 FF	42 09 1A 00 00 00 00 FF	2800K
		42 09 1A 00 00 00 01 FF	4500K
		42 09 1A 00 00 00 02 FF	6500K
Resolution	42 09 0B 00 00 00 00 FF	42 09 0B 00 00 00 00 FF	1080
		42 09 0B 00 00 00 01 FF	720
		42 09 0B 00 00 00 02 FF	480
Zoom	42 09 07 00 00 00 00 FF	42 09 07 00 00 00 0q FF	q : 0 =Off, 1 = On
Pan	42 09 08 00 00 00 00 FF	42 09 08 00 0v qr st FF	720: neg 320 to 320 480: neg 640 to 420 v: 0 = Positive, 1 = Negative, qr st: 720: 00 00 to 01 40 480: 00 00 to 02 80
Tilt	42 09 09 00 00 00 00 FF	42 09 09 00 0v qr st FF	720: neg 180 to 180 480: neg 300 to 300 v: 0 = Positive, 1 = Negative qr st: 720: 00 00 to 00 B4 480: 00 00 to 01 2C





Command	Inquiry Hex	Reply HEX	Definition
Read P Version	43 09 E0 00 00 00 00 FF	43 09 EE 00 00 qr st FF	Returns PIC Version qr st in hex. LCD shows in decimal.
Read E Version	43 09 E1 00 00 00 00 FF	43 09 EE 00 00 qr st FF	Returns EM Version qr st in hex. LCD shows in decimal.

### Shutter Table:

The shutter increment and decrement functions have 26 total steps as seen in the following table. The shutter value can be set to any value between 1/1 to 1/30000 using the direct command. If the shutter value is set to a different value than one in the table, the increment and decrement commands will set the shutter value to the next highest or next lowest shutter step respectively. If the shutter is given a decrement command while at shutter value 1/1 the shutter value will go into auto mode.

Shutter Value	qr Value	st Value
1/1	00	01
1/2	00	02
1/3	00	03
1/4	00	04
1/8	00	08
1/15	00	0F
1/25	00	19
1/30	00	1E
1/50	00	32
1/60	00	3C
1/100	00	64
1/250	00	FA
1/500	01	F4
1/1000	03	E8
1/2000	07	D0
1/3000	0B	B8
1/4000	0F	A0
1/5000	13	88
1/6500	19	64
1/8000	1F	40
1/10000	27	10
1/12500	30	D4
1/15000	3A	98
1/17500	44	50
1/20000	4E	20
1/30000	75	30



## Specifications

### Camera Head

Image Sensor	1/6 CMOS 2MP		
Active Array (H x V)	1920 x 1080		
Image Area (mm)	2.73 x 1.55		
Output Format	1080/30P	720/60P	VGA/120
Output Type	DVI & USB	DVI & USB	USB
Environmental	Temperature	RH	
Operational	0 to 60 C	90% non condensing	
Storage	neg 20 to 85 C	non condensing	
Weight	3 g	without cable	

### Camera Cable

	PVC	PFA
Temperature	neg 55 to 105 C	neg 65 to 210 C
Length	15 m max	15 m max
Weight	31 g/m	24g/m
Diameter	4.1 mm	3.7 mm

### Camera Control Unit (CCU)

Power Supply (USB 3 C)	5V 1A	with LED driver active
Environmental	Temperature	RH
Operational	0 to 60 C	90% non condensing
Storage	negative 20 to 85 C	non condensing
Size	87 x 47 x 170	W x H x L
Weight	370 g	
Remote communications	RS232	
	Still Photo Capture	
Output 1	DVI	1080/30p & 720/60p
Output 2	USB 2	1080/30p, 720/60p, 640x480/120p
LED driver output		
constant current P/S	Up to 1A @ 8VDC	10 step control

### LED Output (CCU)

LED Step	Current (mA)
1	120
2	140
3	170
4	190
5	220
6	315
7	424
8	522
9	782
10	1081

### Controller & Camera Mechanical Specifications (Non-LED Version)

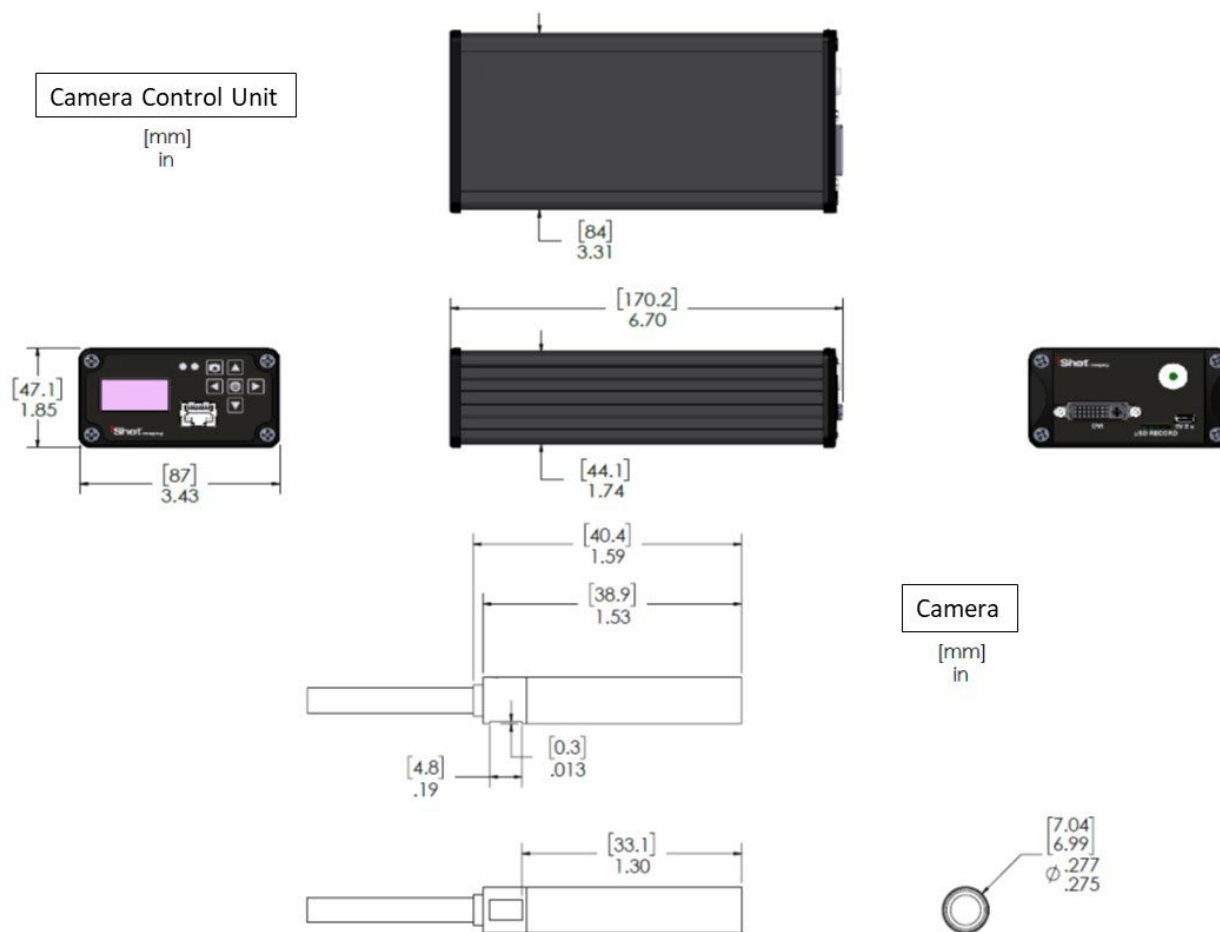


Figure 10 Non-LED Version CCU & Camera Dimensions

### Controller & Camera Mechanical Specifications (LED Version)

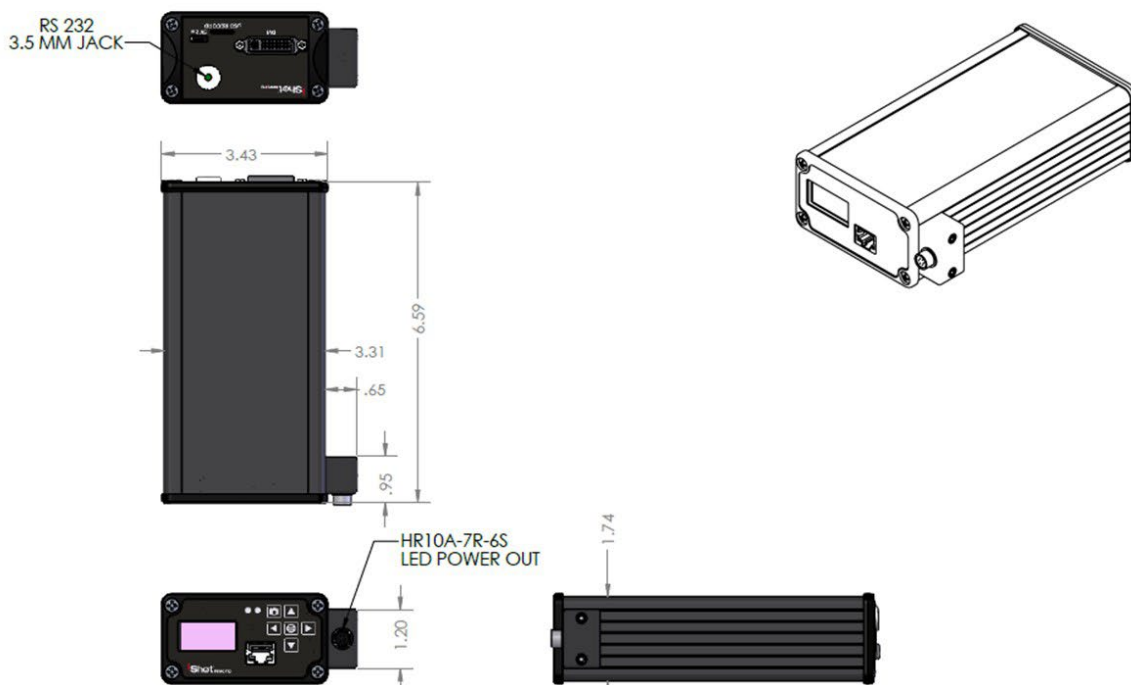


Figure 11 LED Version CCU Dimensions



Figure 12 LED Version CCU Pin Out



Control Menu Values & Defaults

Menu Tier	Item	Sub Item	Sub sub item	Values	Default	
1	Image Quality					
		Brightness		0 to 255	128	
		Contrast		0 to 63	19	
		Saturation		0 to 63	31	
		Sharpness		0 to 31	5	
		Return to Main				
		White Balance	auto		x	
				set	0 to 255	
		Gamma			0, 1, 2	1
		Hue			-180 to 180	0

Menu Tier	Item	Sub Item	Sub sub item	Values	Default	
2	Capture setup	Mirror		No, H, V, HV	No	
		Frame rate (fps)	auto		x	
				set	1 to 30 Hz in 1080	
					1 to 60 Hz in 720	
			(USB 2 only)		1 to 120 Hz in VGA	
			Exp ROI		full, middle, center	
			Exp Sec	auto		x
				set	auto, 1, 1/2, 1/3, 1/4,	
					1/5, 1/6, 1/7, 1/8, 1/9,	
					1/10, 1/15, 1/20, 1/25,	
					1/30, 1/50, 1/60, 1/100,	
					1/120, 1/250, 1/500,	
					1/1000, 1/5000,	
					1/10000, 1/20000,	
					1/30000	
				Return to Main		



Menu Tier	Item	Sub Item	Sub sub item	Values	Default
3	Utility menu				
		LED level	0 to 10		
		Show Diagnostics	H1	pass, fail	
			H2	pass, fail	
			UART com	pass, fail	
			PCB Temp	°C	
			I2C error	pass, fail	
			Ev	1.112	
			Pv	0.58	
		Save Presets			
			Save Setup 1		
			Save Setup 2		
			Save Setup 3		
			Save Setup 4		
			Return to utility menu		
		Load Presets			
			Custom setup 1		
			Custom setup 2		
			Custom setup 3		
			Custom setup 4		
			Return to utility menu		
		Lens correction			
			lens type	1.8, 2.5, 4, 8, 15	
			Color temp	2000, 4500, 6500K	

Menu Tier	Item	Sub Item	Sub sub item	Values	Default
4	Pan Tilt Zoom Menu				
		Resolution		1080p/30	x
				720p/30	
				480	
		Zoom	(in down scale modes only)	on/off	
		Pan		+,- 640 in VGA	
				+,- 320 in 720	
		Tilt		+,- 640 in VGA	
				+,- 320 in 720	

Menu Tier	Item	Sub Item	Sub sub item	Values	Default
5	Set to Defaults				
		InterTest			
		Reset to Defaults			
		Confirm			
		Return to Main			



## Care & Maintenance

### Overall System

- Do not expose to moisture or direct sunlight.
- Do not operate near intense electromagnetic fields.

### Trouble Shooting

- Ensure camera connection is tight and secure.
- Ensure power is proper voltage and current for unit, and connection is tight and secure.
- Ensure DVI connection is tight and secure.
- Ensure MicroSD memory Card is firmly in place.
- Ensure a proper lens is in place on camera.
- Ensure all menu settings are as desired and correct for equipment in use.
- Restart - disconnect power supply and reconnect power supply

### Returns for Repair or Service

In the event a product is damaged and needs repair, send it to the Service Department at the main office in Columbia, NJ. An RMA (Return Material Authorization Number) must be issued prior to the unit being returned. **Call InterTest, Inc. at (908) 294-8008 to obtain an RMA Number.** Shipments returned without an RMA will have an administrative fee applied to the transaction.

Provide the product number, serial number and a brief description of the problem or damage when obtaining an RMA number

### Return Evaluation Procedure

Once a return is received by InterTest, Inc. it will be evaluated. The fee for any repair evaluation not sent in under warranty is \$55 (USD credited against cost of repair). This cost is in addition to any other charges required. Prior to any repairs being completed, a repair evaluation will be issued and payment arranged. Payment via credit card is preferred and will expedite the repair process.

Once payment is arranged, the authorization to repair the product is given. Completed repairs will ship back to the customer using the pre-arranged shipping methods.



For Service of this product:

InterTest, Inc.

303 State Route 94

Columbia, NJ 07832

1-800-535-3626

+1 908 496 8008

Email: [service@intertest.com](mailto:service@intertest.com)

Internet: <http://www.intertest.com>





## Parts and Accessories

Intertest PN	Description
EM17541	iShot QNHD Control Unit w/ LED Output
EM14515	iShot QNHD Control Unit
EM15681	4 GB Micro SD Card with Adapter
EM15685	16 GB Micro SD Card with Adapter
EM15680	32 GB Micro SD Card with Adapter
EM19884	64 GB Micro SD Card with Adapter
EM16937	DVI (M) to HDMI (F) Type A Adapter
EM13340	iShot® QNHD Camera 2M PVC Cable
EM13342	iShot® QNHD Camera 2M Teflon Cable
EM13582	iShot® QNHD Camera 3.5M PVC Cable
EM13584	iShot® QNHD Camera 3.5M Teflon Cable
EM13246	iShot® QNHD Camera 5M PVC Cable
EM13343	iShot® QNHD Camera 5M Teflon Cable
EM15203	iShot® QNHD Camera 5.5M PVC Cable
EM15230	iShot® QNHD Camera 7.5M PVC Cable
EM13341	iShot® QNHD Camera 10M PVC Cable
EM13344	iShot® QNHD Camera 10M Teflon Cable
EM13583	iShot® QNHD Camera 15M PVC Cable
EM13585	iShot® QNHD Camera 15M Teflon Cable
EM13581	iShot® QNHD Power Supply, USB-C
EM13474	iShot® 1.8mm Lens for QNHD Cam (90 Deg)
EM13475	iShot® 2.5mm Lens for QNHD Cam (60 Deg)
EM13476	iShot® 4.0mm Lens for QNHD Cam (40 Deg)
EM13497	iShot® 7.1mm Lens for QNHD Cam (20 Deg)
EM13477	iShot® 15.0 mm Lens for QNHD Cam (10 Deg)
EM15138	iShot® W/P Housing FOR QNHD
EM69477	DB9F - DC3.5M Serial Cable



## Admin Section

This section of the manual is intended for high level users that take responsibility for use at an OEM level. Settings, programming, and remote communication through RS 232 allow expanded use.

Caution: users at this level are beyond warranty coverage. Note there are ESD sensitive components. Contact InterTest tech support, [service@intertest.com](mailto:service@intertest.com), for further details.

## Dip Switch Settings

<i>Dip Switch</i>	<i>1,2,3,4 Not Used</i>	ON	OFF
5	Enable/Disable Preset Saving	Locked (Save disabled)	Unlocked (Save enabled)
6	AEQ Report Mode	Cable testing mode	Normal Operation
7	Transport Chip Update Control (Switch 8 must be "OFF")	954 Transport Chip	914 Transport Chip
8	Run / Programming Mode	Run Mode	Transport Chip Programming Mode

## Main Menu

Line	Text	Notes	FirstVersion
0	** Intertest QN HD **		0
1	Main Menu	Top level menu	0
2	<b><i>Image Quality</i></b>	Image quality related	0
3	<b><i>Capture Setup</i></b>	Image capture related: FPS, Exposure, Mirroring	0
4	<b><i>Utility Menu</i></b>	LED Level, Diagnostics, Save Preset, Load Preset	0
5	<b><i>Pan-Tilt-Zoom</i></b>	Resolution, Zoom, Pan, Tilt	0
6			
7	<b><i>Reset to defaults</i></b>		0
	<b><i>Bold-Italics means item is a submenu</i></b>		
	Control ID provided for commands that go to the ISP		



### Image Menu

Line	Text	Control ID	Notes	Default	FirstVersion
0	** Intertest QN HD **				
1	Image Quality			Default	FirstVersion
2	Brightness	0x01	Brightness adjustment	0x80	0
3	Contrast	0x02	Contrast adjustment	19	0 Default changed in 0.58
4	Saturation	0x03	Saturation adjustment	0x1F	0
5	Sharpness	0x05	Sharpness adjustment	5	0 Default changed in 0.58
6	<b>More ...</b>		More adjustments in this submenu		0
7	Return to Main		Return to Main menu		0
<b><i>Bold-Italics means item is a submenu</i></b>					
Control ID provided for commands that go to the ISP					

### More Image Quality

Line	Text	Control ID	Notes	Default	FirstVersion
0	** Intertest QN HD **				0
1	More Image Quality...				0
2	White Balance Mode	0x0C	Auto/Manual		0
3	White Balance Level	0x0D	Blue <----> Red		0
4	Gamma	0x06	Non-linear gain	0x00	0
5	Hue	0x17	Hue adjustment	0x00	0
6					Compression removed 0.58
7	Return to Image Quality				0

### Capture Menu

Line	Text	Control ID	Default	Notes	Default	FirstVersion
0	** Intertest QN HD **					
1	Capture Menu					
2	Mirroring	0x04		None, H, V, HV	0x00	0
3	Frame Rate	0x0A		1-30fps in 1080, 1-60 in 720, 1-120 in 480	0x00	0
4	Exp ROI: Full, Mid, Center	0x10, 0x11, 0x12, 0x13		Full = 5x5 equally weighted; Middle = Central 3x3 extra weighted; Center = Central 1x1 extra weighted		0
5	Exp Time: Auto/Manual	0x15		Choose Automatic or set the exposure time {1s, 1/2s, 1/3 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, 1/15, 1/20, 1/25, 1/30, 1/50, 1/60, 1/100, 1/120, 1/250, 1/500, 1/1000, 1/5000, 1/10000, 1/20000, 1/30000s}		0
6						
7	Return to Main					0
<b><i>Bold-Italics means item is a submenu</i></b>						
Control ID provided for commands that go to the ISP						



### Utility Menu

Line	Text	Control ID	Notes	Default	FirstVersion
0	** Intertest QN HD **				0
1	Utility Menu				0
2	LED Level	N/A	Off-10 where 10=1A. Works for LEDs upto a total of <8V in series.		0
3	<b><i>Diagnostics</i></b>	N/A	I2C Test, Lock Status, PCB Temp		0
4	<b><i>Save Preset</i></b>	N/A	4 user presets		0
5	<b><i>Load Preset</i></b>	N/A	4 user presets		0
6	<b><i>Lens Correction</i></b>	N/A	New in 0.56, replaces Serial Number		0.56
7	Return to Main				0
	<b><i>Bold-Italics means item is a submenu</i></b>				
	Control ID provided for commands that go to the ISP				

### Save Preset

Line	Text	Control ID	Notes	FirstVersion
0	** Intertest QN HD **			0
1	Save Preset			0
2	User Setup 1	N/A	Save to user 1	0
3	User Setup 2	N/A	Save to user 2	0
4	User Setup 3	N/A	Save to user 3	0
5	User Setup 4	N/A	Save to user 4	0
6				
7	Return to Utility			0
	<b><i>Bold-Italics means item is a submenu</i></b>			
	Control ID provided for commands that go to the ISP			



## Load Preset

Line	Text	Control ID	Notes	FirstVersion
0	** Intertest QN HD **			0
1	Load Preset			0
2	User Setup 1	N/A	Save to user 1	0
3	User Setup 2	N/A	Save to user 2	0
4	User Setup 3	N/A	Save to user 3	0
5	User Setup 4	N/A	Save to user 4	0
6				
7	Return to Utility			0
	<b><i>Bold-Italics means item is a submenu</i></b>			
	Control ID provided for commands that go to the ISP			

## Diagnostics

<b><i>Bold-Italics means item is a submenu</i></b>	Each hex digit yields 4 bits in binary:		
Control ID provided for commands that go to the ISP	Dec	Hex	Binary
	0	0	0000
Interpreting I2C Error Codes:	1	1	0001
The code is presented as a 1 byte number in Hex	2	2	0010
Convert the Hex code to Binary	3	3	0011
Each bit indicates the pass/fail status of a device on the I2C bus	4	4	0100
Bit 0 = Deserializer	5	5	0101
1 = Serializer	6	6	0110
2 = MIPI Bridge	7	7	0111
3 = Image Sensor	8	8	1000
4 = DVI output chip	9	9	1001
5 = Thermometer	10	A	1010
6 = I2C DAC for LED Level control	11	B	1011
7 = EEPROM	12	C	1100
	13	D	1101
1 in the bit indicates pass.	14	E	1110
So for example 0xF7 indicates that everything passed except the image sensor.	15	F	1111



### PTZ Menu

Line	Text	Control ID	Notes	Default	FirstVersion
0	** Intertest QN HD **				0
1	PTZ Menu				0
2	Resolution	0x0B	Select this to change the camera resolution, however host has to query for it to take	0x00	0
3	Zoom	0x07	Available in 720/480 mode only. Currently this is set to crop only, which is zoom on or reduced FOV, and at a higher frame rate (60, 120 for 720,480 respectively). By software update it will allow the option for scaling (keep full FOV), at which point this control will do something. It is active but lined-out in the GUI right now.	0x00	0.4
4	Pan	0x08	If not in 1080 and zoom is enabled then this allows horizontal pan	0x00	0
5	Tilt	0x09	If not in 1080 and zoom is enabled then this allows vertical pan	0x00	0
6					
7	Return to Main				0
	<b><i>Bold-Italics means item is a submenu</i></b>				
	Control ID provided for commands that go to the ISP				
	Yellow highlighted cells denote controls that are new in this version.				

### Reset to Defaults

Line	Text	Control ID	Notes	FirstVersion
0	** Intertest QN HD **			0
1	Reset to Defaults			0
2	Confirm	N/A	Select confirm to reset	0
3				
4				
5				
6				
7	Return to Main		Select to exit	0
	<b><i>Bold-Italics means item is a submenu</i></b>			
	Control ID provided for commands that go to the ISP			



### Circuit Board Layout / Connections

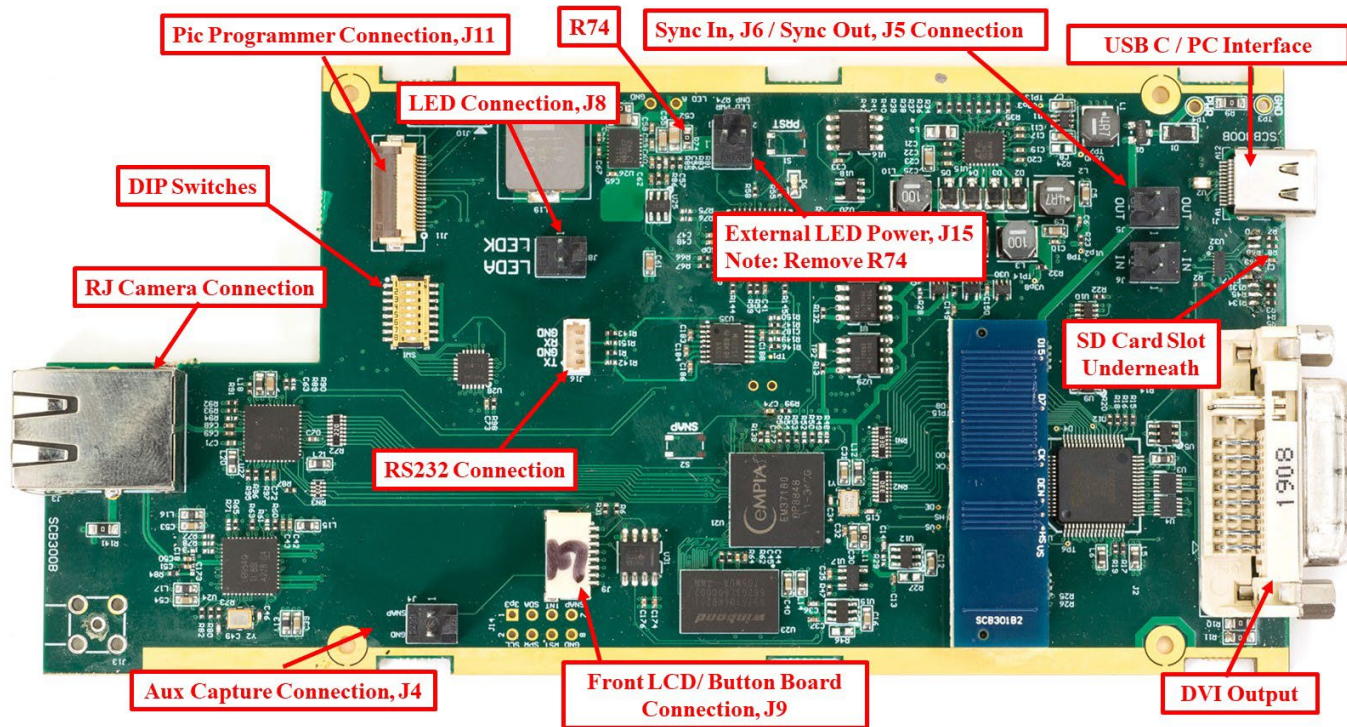


Figure 13 CCU Circuit Brd Layout



<b>Connector</b>	<b>Label/Silkscreen</b>
<i>J4</i>	<i>Aux Capture</i>
	Pin 1, Input
	Pin 2, GRND
<i>J8</i>	<i>LED Output</i>
	LED_A +
	LED_K -
<i>J16</i>	<i>RS232</i>
	Pin 1, Tx
	Pin 3, Rx
	Pin 2 & 4 GRND
<i>J5**</i>	<i>Sync Out</i>
	Pin 1, Signal
	Pin 2, GRND
<i>J6**</i>	<i>Sync In</i>
	Pin 1 Signal
	Pin 2 GRND
<i>J15</i>	<i>Ext LED Power</i>
	Pin 1 +
	Pin 2 -
	Must Remove R74

Figure 14 Connector Pin Out

**\*\*Note: Sync IN & Sync OUT are programable Input/Output Connections**

### SCB300B Firmware Upload Procedure

The SCB300B board allows for both the old and new SerDes to be used and automatically detected when plugged in to the RJ45 jack. In order to do this we must program both the versions of the ISP (EM37180) code into the correct SPI Flash for the system to work properly. In order to make this easy there is a new firmware programming mode that has been added to the PIC firmware (v1.02+) that is accessed via the DIP switches on the SCB300B board.

To use the Firmware programming mode:

- 1. Set DIP8 to the OFF position o Normally DIP8 will be in the ON position to run the camera (Pv1.02+)
- 2. Set DIP7 to OFF for the Old 914 SerDes or to ON for the New 954 SerDes
- 3. Then power on the board using a PC
- 4. The LCD screen should show either 914 or 954 depending on what was set on DIP7
- 5. If it shows a regular main menu then DIP8 is in the ON position. Turn it off and cycle power.
- 6. Start the EM\_Download\_Tool software o The tool should say "USB Init OK" at the top
- 7. Select "Browse" and navigate to the supplied \*914\*.bin or \*954\*.bin file depending on



- which you are trying to program
- 8. Select "Download" and within ~10 seconds the download should be successfully completed
- 9. If you want to program the other SerDes then flip DIP7 and power cycle the board, following from step 3 onwards.
- 10. Once you have programmed both Flash chips set DIP8 to the ON position to enter RUN mode next time you power cycle the board.

### SCB300B AEQ Procedure

The SCB300B board adds a new AEQ mode that replaces the special firmware we had for the SCB300A.

This AEQ mode is accessed by setting DIP6 to the ON position, but follow the steps below for best results.

1. Set DIP6 to the OFF position (this is normal running mode).
2. Power up the board with the camera head you wish to measure connected
3. Once the system is up and running and you see an image flip DIP6 to the On position
4. Within a few seconds you should see the LCD screen readout an AEQ value a. It will tell you which camera head was detected
  - b. If there is no camera it will say there is no lock
  - c. At this point you can unplug/replug cameras to redo AEQ measurements but the most reliable measurement is made with the camera plugged in before powering on the system, and with AEQ mode off at first and then turned on after the camera is running.
5. You can turn off AEQ mode by flipping DIP6 to the Off position. The main menu will return.





## Preface

Thank you for purchasing the iShot® UV-LED Light Source Kit which utilizes state-of-the-art solid-state illumination technology. The light source is a high output, efficient, compact and lightweight fiber optic light source for industrial applications where space is a premium. The iShot® UV-LED Light Source Kit utilizes eco-friendly solid state LED lighting technology and exhibits instant-on and electronic intensity dimming capability with long operating lifetime. The iShot® UV-LED Light Source Kit is equipped with a Machida fiber receptacle. The iShot® UV-LED Light Source Kit accepts 12V DC input voltage for portable battery operation as well. Please read this operating manual in its entirety before using this product.

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## System Symbol Descriptions



Caution: Consult accompanying documentation



Caution: Hot Surface



Caution



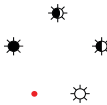
Hazard Warning



Lamp On



Lamp Off



Light; Lighting; Illumination Intensity



UV Light Warning



Storage Humidity



Transport Temperature



Alternating Current



Direct Current



Manufacturer



Do Not Immerse in Any Liquid



Do not dispose of this product as unsorted municipal waste. Prepare this product for reuse or separate collection as specified by Directive 2002/96/EC of the European Parliament and the Council of the European Union on Waste Electronic and Electrical Equipment (WEEE). If this product is contaminated, this directive does not apply.



## Warning and Precautions / Mises en garde et précautions



WARNING /  
MISE EN GARDE

There are no user serviceable or replacement parts. Do not attempt to dismantle box or remove top cover. / Aucune pièce ne peut être réparée ou remplacée par l'utilisateur. Ne pas essayer de démonter la boîte ou de retirer le couvercle du dessus.

WARNING /  
MISE EN GARDE

Only qualified personnel should make electrical inspections and repair of the LED Light Source. / Seul le personnel qualifié doit effectuer les vérifications électriques et les réparations de cette source de lumière à DEL.



WARNING /  
MISE EN GARDE

UV light is emitted from this product, Avoid eye and skin exposure to unshielded product. High intensity light at the front of the LED Light Source and at the tip of the fiber-optic bundle will create high temperatures and UV light. To minimize the risk of injury, avoid direct viewing or contact. / L'ultraviolet (UV) est émis par ce produit. Évitez le contact avec les yeux ou la peau. La lampe à haute intensité, située sur le devant de la source de lumière à DEL et sur le bout du faisceau de fibres optiques, va générer beaucoup de chaleur et une lumière vive. Afin de réduire les risques de blessures, évitez de toucher l'appareil ou d'exposer directement l'oeil à la lumière de la lampe."



WARNING /  
MISE EN GARDE

To prevent temporary blinding and contact with heated parts, always plug the fiber optic bundle into the LED Light Source before turning the power on. / Pour éviter tout aveuglement temporaire ou contact avec les pièces chauffées, toujours brancher le faisceau de fibres optiques dans la source de lumière à DEL avant la mise en marche.

WARNING /  
MISE EN GARDE

Do not use the LED Light Source directly in medical applications. / Ne pas utiliser une source de lumière à DEL directe à des fins médicales.



WARNING /  
MISE EN GARDE

Unit MAY BE HOT. Allow to cool before handling. / L'appareil PEUT ÊTRE CHAUD. Il est important de le laisser refroidir avant d'y toucher.



CAUTION /  
AVERTISSEMENT

Preferred operation is in the horizontal position. Other operating orientations are permitted. / L'appareil fonctionne de façon optimale à l'horizontale. Les autres orientations sont permises.

CAUTION /  
AVERTISSEMENT

Any changes or modifications made to this device that are not expressly approved by manufacturer may void the user's authority to operate the equipment. / Toute modification apportée à cet appareil et non expressément approuvée par le fabricant peut priver l'utilisateur de son droit d'usage.

CAUTION /  
AVERTISSEMENT

PROVIDE ADEQUATE VENTILATION TO PREVENT OVER HEATING. Do not drape this light source. Provide a 1.5 inch (3.8 cm) distance between LED Light Source and any solid objects. / ASSURER UNE VENTILATION ADEQUATE AFIN D'ÉVITER LA SURCHAUFFE DE L'APPAREIL. Ne pas couvrir la source de lumière. Laisser au moins 3,8 cm (1,5 po) de distance entre la source de lumière à DEL et tout objet.



CAUTION /  
AVERTISSEMENT

DO NOT IMMERSE or store liquids above or on the LED Light Source. / NE PAS IMMERGER la source de lumière à DEL dans des liquides ou placer des liquides au-dessus de celle-ci.

CAUTION /  
AVERTISSEMENT

Do not operate device without the cover in place. / Ne pas faire fonctionner l'appareil sans son couvercle.

CAUTION /  
AVERTISSEMENT

DO NOT obstruct the airway paths for sufficient cooling is required. / NE PAS obstruer les voies d'aération afin de permettre le refroidissement adéquat de l'appareil.

CAUTION /  
AVERTISSEMENT

Please read this entire manual prior to operation. / Lire le présent guide en entier avant d'utiliser l'appareil.



CAUTION /  
AVERTISSEMENT

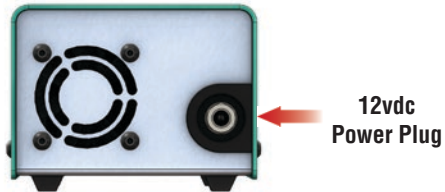
Protection provided by the equipment maybe impaired if not used in accordance with the manufacture recommendations. / La protection assurée par l'équipement risque d'être altérée si l'appareil n'est pas utilisé conformément aux recommandations du fabricant.



## System Description and Operation

1. The light source power switch should be in the OFF position. Plug the external 12vdc power supply into the 12vdc connector. **Figure 1.**
2. Plug the external power supply cord into AC receptacle main power.
3. Plug the fiber-optic bundle into the light port and connect the opposite end to the equipment being used. **Figure 2.**
4. Turn the power switch to the ON position. LED indicator light will turn on when light source is powered. **Figure 3.**
5. Adjust the intensity control to set the light intensity to the desired light output level. **Figure 3.**
6. Turn unit OFF when not in use. **Figure 3.**
7. This unit is equipped with a fiber sense interlock feature. The device will not emit light unless fiber cable is completely inserted into the front adapter. Please ensure fiber cable is fully seated into receptacle.

**Figure 1. Back View**



**Figure 2. Fiber-Optic Bundle**



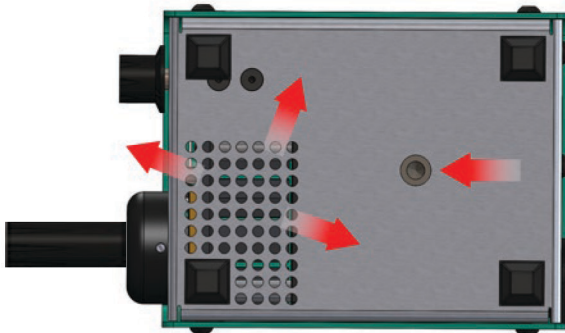
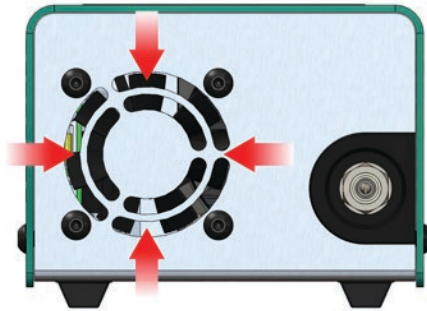
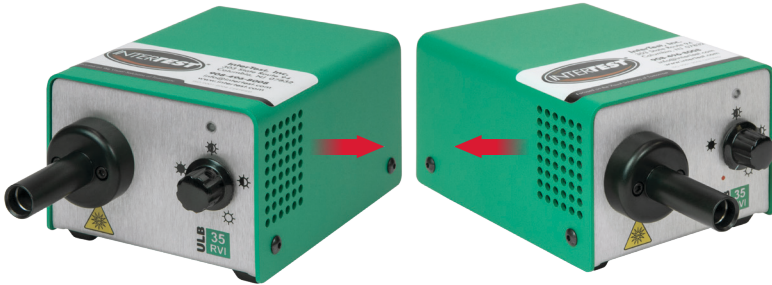
**Figure 3. Front View**





## Figure 4. Cooling and Air Flow Paths

1. Do not obstruct air flow paths. This device is designed to have proper forced air cooling paths to maintain thermal stable operation.
2. Place in an area that provides adequate ventilation to prevent unit from overheating. Do not drape the LED Light Source with cloth or objects restricting airflow.
3. Airflow outlets are shown in below red arrow graphics.
4. 1/4-20 UNC mounting stud located in the middle of box bottom side.



**Threaded  
Mounting Stud:  
1/4-20 UNC**

## Maintenance and Cleaning



1. Turn the LED Light Source off and unplug the power cord from both the wall outlet and the rear of the unit.
2. Wipe the external surfaces clean with a cloth dampened with mild soap and water. **DO NOT IMMERSE.**
3. Wipe the power cords clean with a cloth dampened with mild soap and water. **DO NOT IMMERSE. DO NOT RECONNECT WET.**
4. DO NOT plug the power source into a wall outlet until it is thoroughly dry.
5. It is recommended to periodically clean the optical surface near the LED. Please use a soft cotton swab dipped in Isopropyl Alcohol and wipe the optic surfaces and allow to thoroughly dry prior to use.

## Troubleshooting Suggestions

In the event the unit stops functioning, try the following steps to operate light source. The power supply exhibits internal protection circuitry for user safety precautions and will shutdown during certain instances. This equipment has been tested to ESD conditions according IEC 61326-1 and performs to performance criterion C. This means, that under certain conditions the overvoltage protection of the power supply may turn the power supply output and the unit off to prevent damage to the unit. In such case the power supply must be disconnected from main power to reset this fault condition. In the event the unit suddenly turns off, turn the unit off. Unplug the power supply from mains voltage (120V/ 230V). Wait ~5 seconds and plug the power supply back into mains voltage. Turn the unit on.

1. Turn OFF light source by rotating intensity control knob counterclockwise until the switch clicks off.
2. Completely disconnect power supply from both light source and mains (power plug into ac outlet).
3. Wait for ~5 seconds until power supply discharges as observed on the power supply LED indicator will turn off.
4. Reconnect power supply to both ac to main voltage and dc connector to light source.
5. Turn ON light source by rotating knob clockwise until clicks on and LED indicator light is on.
6. Insert fiber cable completely to deactivate fiber sense interlock feature.
7. Rotate knob to increase light output intensity to desired output.

## Repair

For repair information, please contact our team at:

Phone: Office: 908-496-8008

Email: [support@intertest.com](mailto:support@intertest.com)



## Manufacture Information

Supplier Name: USHIO America, Inc.  
Address: 5440 Cerritos Ave.  
Cypress, CA 90630  
  
Model or Type: ULB-35rvi




## Environment Ratings

Operating Temperature: 41° F to 104° F (5° C to 40° C)  
Humidity: 0 to 95% rh (non-condensing)  
Storage Temperature: -10° F to 140° F (-20° C to 60° C)  
Humidity: 30 to 75% rh  
Atmospheric Pressure: 700 hpa to 1060 hpa  
Mode of Operation: Continuous  
Safety System Classification: Class II  
System Pollution Degree: 2  
Installation Category: II

## Electrical Ratings

### External Power Supply Ratings:

Input: 100 - 240 V~, 50/60 Hz, 1.4 A max  
Output: +12 V , 5.0 A  
Recommended PS: UAI Part: UPS-00

### ULB-35 Power Ratings:

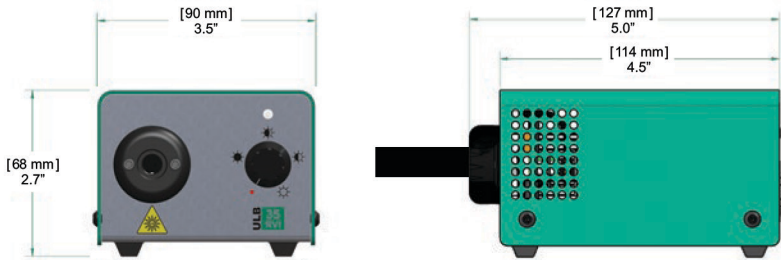
Voltage: +12V DC; 14V DC maximum  
Current: 5.0 amp

Battery: USHIO America, Inc. recommends using a UR (or other recognized testing laboratory) recognized battery rated at 12V/8Ahr or equivalent with a minimum 5.0 amp current limit rating.



## Dimensions

Length:	127MM (5.0")
Width:	90MM (3.5")
Height:	68MM (2.7")
Weight:	0.45 kg (1.0 lbs)



## Illumination Source

Type:	LED Custom Module
Wavelength:	365-370nm Peak
Power:	50 Watts
Average LED Life*:	10,000+ Hours

\* Based on LED manufacturer rated wattage and thermal operation.

## Product Ordering Information

Part Number	Description
EM14466	35W RVI UV LED Light Source, Machida
EM66693	Universal Input Power Supply (60W 12V P/S)
EM11890	US power cord (NEMA 5-15P to IEC C13)



## Approvals



The CE mark on this product indicates that it has been tested to and conforms to the provisions noted within the following directives:

Low Voltage: 2014/35/EU  
EMC: 2014/30/EU  
RoHS 2: 2011/65/EU

In accordance with the following standards:

EN 61010-1  
IEC 61326-1  
EN 61326-1  
IEC/EN 61000 3-2  
IEC/EN 61000 3-3  
EN 50581  
IEC/EN 62471:2006 LED Photobiological safety lamp standard, categorized as Risk Group 3 (High-Risk).



**Intertek**  
**4009043**

Conforms to UL Std 61010-1  
Certified to CSA Std C22.2 No. 61010-1



WEEE  
([www.lamprecycle.org](http://www.lamprecycle.org))

## Limited Warranty

USHIO America warrants the LED Light Source, when new, to be free of defects in material and workmanship and to perform in accordance with the manufacturer's specifications when subject to normal use and service for a period of one year from the date of purchase from USHIO America or an authorized agent. USHIO America will either repair or replace any components found to be defective or at variance from the manufacturer's specifications within this time at no cost to the customer. It shall be the purchaser's responsibility to return the instrument to the authorized distributor, agent, or service representative.

This limited warranty does not cover the breakage or failure due to tampering, misuse, neglect, accidents, improper installation, modification, shipping, or to improper maintenance, service, and cleaning procedures. This limited warranty is also void if the instrument is not used in accordance with the manufacturer's recommendations or if required service is performed by anyone other than USHIO America or an authorized agent. The purchase date determines limited warranty requirements. No other express or implied limited warranty is given.



## Agency Compliance Statements

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### FCC Class A Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.



#### CAUTION

Any changes or modifications made to this device that are not expressly approved may void the user's authority to operate the equipment.

#### NOTE

To maintain compliance with FCC Rules and Regulations, cables connected to this device must be shielded cables, in which the cable shield wire(s) have been grounded (tied) to the connector shell.

### Canadian Notice

This equipment does not exceed the Class A limits for radio noise emissions as described in the Radio Interference Regulations of the Canadian Department of Communications.

Le present appareil numerique n'emet pas de bruits radioelectriques dépassant les limites applicables aux appareils numeriques de la classe A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.



**Sold By:**



**[www.intertest.com](http://www.intertest.com)**

303 State Route 94  
Columbia, NJ 07832 USA  
Office: 908-496-8008  
Toll Free (U.S.): 800-535-3626  
Fax: 908-496-8004



MADE IN USA

Rev1-092017



# User's Manual

Multi Test Monitor

## **Video Surveillance Products (Installation and management)**

- This product is for CCTV system installation and management. Some problems may occur with inappropriate use.
- Please read the instructions prior to its use and keep it with the warranty certificate.



# Cautions for Use of This Product

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- If you give excessive shock to this product or drop it, LCD may be damaged. Therefore, have a special care not to break it. (The damaged LCD is not available for free A/S even in warranty.)
- Do not spray water directly and wipe this product gently with a dry towel when you clean it. Have a special care for LCD shock during cleaning.
- When using outdoors, be careful to prevent water or other foreign objects from entering this product. (It may cause fire or malfunction of the product. In this case, free A/S is not available even in warranty.)
- Do not use this device in close proximity to a device that produces strong waves such as radio set(TRANSEIVER, Walkie-talkie, etc.) or repeater. It may affect HD-SDI and EX-SDI image signal, or cause disorders such as noise or crack on the screen.
- Use exclusive charger only for recharging the built-in batteries. Otherwise, it may cause fire or explosion.
- If this product is left unused or uncharged for a long time, the performance of battery may degrade. Regular charging is recommended.
- If you use any function while charging this monitor, the charging speed will be slower. Terminate the operating function and charge.
- LI-Polymer Batteries (11.1v / 5,680mAh) are built in this product. Do not disassemble or short-circuit the batteries. (Free A/S is not available in this case)
- If the charger terminal is short-circuited or has the polarity in opposite way, the batteries may be damaged.
- Do not keep this device in the vehicle because there is a risk of explosion due to high temperature inside the car.
- Do not put any conductive materials such as screwdrivers, coins, metal parts, etc.
- Do not place this product to where water is falling or splashing and where has water inside such as flower vases.
- Stop using this product immediately and contact where you purchased this product when any smoke or smell is produced.
- Do not disassemble this product on your own and contact where you purchase this product when it does not work properly. (You do not have free A/S for any failure caused by your own decomposition)
- When this product is left for a long time and discharged, connect to WI-FI. When WI-FI is connected, the time is set automatically.
- When Micro SD Card is bent or cracked, it may cause some problems.

# Cautions for Use of This Product

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- Do not supply power to video input port.
- When PoE is ON, do not connect UTP camera as the product may be damaged.
- When connecting non-PoE supported Network devices, please set PoE as OFF.
- Reset it to factory defaults if the product is paused frequently or does not work properly. All the saved data will be deleted.
- Press and hold the power button for about 7 seconds to shut down this product forcibly when it is paused during use or the touch pad or D-pad does not work properly. After then, please turn it on again for use.
- Press and hold the power button for about 7 seconds to shut down this product forcibly when it is paused during use or just after resetting to factory defaults. After then, please turn it on again for use.
- All video of 1920x1080 or higher resolution will be recorded in 1920x1080 and ones of 1920x1080 or less resolution will be recorded in 1280x720.
- Video in 1920x1080 will be played back properly. However, video in higher resolution may cut off during its playback.
- The built-in battery life depends on your working condition and environment and its discharge duration may get shorter depending on your number of uses.
- If the provided exclusive charger's LED turns to green, the battery is recharged completely. Then, please remove the charger from your test monitor.
- A test monitor that was not used for a long time may be discharged and require recharging prior to use. If it is discharged, the time will be reset to the factory default settings.
- This product life may get shorter if you do not follow this instructions. The warranty does not cover any damage caused by a user's negligence.

# Cautions for Use of External Devices

## Checklist for External Device Selection

- Micro SD/SDHC/SDXC memory cards are compatible with this test monitor.
- Compatibility between memory cards and this test monitor depends on the brand and type of memory cards.
- Memory cards from the following brands are recommended for use with this test monitor.  
Micro SD/SDHC/SDXC Memory Card: Sandisk, Transcend, Samsung
- The recommended capacity of Micro SD card is 4GB~64GB.
- When the frame rate is 30fps or lower in saving video, a memory card of class 6 or higher is recommended. When the frame rate is 31fps or higher, a memory card of class 10 or UHS-1 is recommended.
- Android supports the FAT32 method only. A SD memory card must be formatted prior to its use, and a separate program is required to use a memory card with 64GB or higher capacity as it is unavailable to format it in FAT32 method in the window.

## Micro SD Card Type and Capacity

- Please check the memory card logo (SD, SDHC, SDXC) on the label of the memory card.

Type	Capacity
Micro SD card	2GB Memory Card
Micro SDHC card	4~32GB Memory Card
Micro SDXC card	64GB Memory Card

## Micro SD Card Classes

- You can find a number marked in a circle on the memory card. It is called 'Class'.
- The classes of memory cards indicate the transmission speed per second and a high-class memory card is required for high quality video transmission.

Type	Capacity
Class 2	The class 2 can transmit 2MB per second and is not appropriate for video and/or voice storage.
Class 4	The class 4 can transmit 4MB per second and is not appropriate for video and/or voice storage.
Class 6	The class 6 can transmit 6MB per second and is appropriate for <u>low- quality video and/or voice storage.</u>
Class 10	The class 10 can transmit 10MB per second and is appropriate for <u>high- quality video and/or voice storage.</u>
Class UHS	The class UHS can transmit 50MB per second and is appropriate for <u>high- quality video and/or voice storage.</u>

# Cautions for Use of External Devices

## Removal of the Memory Card in Main Home

- Errors may occur in the saved file if you remove the memory card during use.
- Please refer to the following instructions to remove external devices.



Main Home

### How to remove external device

- ① When the external device is inserted, Remove External Device icon is activated.
  - ② Select Remove External Device icon and the selection popup is output.
  - ③ Select OK in the popup to unmount external device.
- The priority of the external device is the order of insertion first.

### ! If the button is not activated after inserting external device

- If the Remove External Device icon is not activated in the Main Home even though the external device is inserted, it is able to remove in Settings → Storage menu.

# Overview

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# Overview

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## Introduction

This IP test monitor is a multifunctional test monitor based on Android system for convenient monitoring and maintenance for video surveillance systems. It is able to monitor cameras with various input signals, and apps are available to help installing CCTV.

7" IPS capacitance-type touch screen in 1920 X 1200 resolution is applied on the front side, and D-pad(directional keys) and other function buttons are added on the right side for the user's convenience. Also, optical bonding is applied for visibility in outside work to provide the screen with clear image.

## Features

- 1920 x 1200 High resolution IPS 7 inch TFT-LCD panel with capacitance-type touch screen
- LED Back light for clear image
- Optical bonding applied for outdoor environment
- Power supply to camera (DC12V / 1A) by using DC Jack
- USB Port (2.0) with 5V / 1A power out
- Micro SD card port for internal capacity expansion
- Dual speaker for sound play
- Sleep mode to save the battery
- 5,680mAH Li-polymer battery
- Exclusive charger for this test monitor
- Portable bag with the strap for hands-free use and convenient installation
- LED indicators for D-pad(directional keys) and other function buttons
- HDMI output and Miracast to connect with external monitor

## IP App. Functions

- **IP camera search**  
Discover the IP address of your network camera connected to this test monitor or all network cameras on your LAN by Auto Discovery function.
- **Live video checking**  
Real-time video monitoring of your connected IP camera.
- **IP camera settings**  
Change media profile, network information of standard ONVIF camera.
- **Support various types of devices**  
Check the video by connecting ONVIF or by inputting RTSP/MJPEG address of camera.
- **Auto-complete feature for camera setting information**  
Easy camera settings by the auto-complete feature once the camera setting information is saved.
- **Support various transport protocols**  
Support HTTP, TCP and UDP.
- **Camera configuration storage**  
Save network camera configuration to the IP App. main page.

# Overview

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- **Ping test for network status check**  
Send/receive ping to the network camera connected to check the network connection status.
- **PoE Voltage check**  
Check the voltage of the PoE supplied from an item.
- **PoE Output**  
PoE output to PoE camera without separate power source.
- **Video recording and snapshot**  
Video recording and snapshot for each signal and real-time playback.
- **PTZ function**  
Pan/Tilt/Zoom/Preset the connected PTZ camera.
- **G.711 Audio playback**  
Playback of the audio for the connected camera.
- **Real-time video information checking**  
Check data/frame transmission rates.
- **Camera initialization**  
Reset a camera to factory defaults.

## Viewer App. Functions

- **Various Input**  
Support various Input. Please refer to page 75 for more information on the supported resolution.
- **RS-485 Communication**  
Data transmission in RS-485 Tx. mode and data analysis in RS-485 Rx. mode.
- **Video recording & Snapshot**  
Video recording and snapshot function.
- **PTZ /OSD Settings**  
Camera OSD menu setting and PTZ (Pan/Tilt/Zoom) function implementation by RS-485 communication.
- **Level meter (SDI / AHD / TVI / CVI / CVBS Support)**  
Show the current status of the input signal in numerical values on the screen. This function is especially useful when any problem occurs in your system such as cables and it must be figured out.
- **Focus meter (SDI / AHD / TVI / CVI / CVBS Support)**  
Show the current status of the camera focus in numerical values on the screen to adjust camera focus more easily and accurately.
- **CRC Error count (SDI Support)**  
Built-in CRC error count function to check data loss transmitted through cables.
- **UTC (Up The Coaxial Communication / AHD, TVI, CVI, CVBS Support)**  
Camera OSD menu setting and PTZ (Pan/Tilt/Zoom) function implementation through a coaxial cable without wiring data lines by UTC function.
- **UCC (Up The Coaxial Communication / EX-SDI Support)**  
Camera OSD menu setting and PTZ (Pan/Tilt/Zoom) function implementation through a coaxial cable without wiring data lines by UTC function.



# Overview

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## TDRC App. Functions

- **Coaxial cable length measurement**  
Measure the length of coaxial cable by connecting to VIDEO BNC.
- **Coaxial cable status measurement**  
Check Open, Short status of coaxial cable.
- **Coaxial cable loop resistance measurement**  
Measure loop resistance value of coaxial cable by connecting to TG-01.
- **Select manufacturer & Type**  
Select the cable manufacturer and type to measure more accurate length.

## TDRU App. Functions

- **UTP cable length measurement**  
Measure the length of UTP cable by connecting to IP CAM/Network RJ45 port.
- **UTP cable status measurement**  
Check Open, Short status of coaxial cable.
- **UTP cable return loss measurement**  
Check whether the signal loss is caused or not by measured return loss value.












## Network Test Tools App. Functions

- **Read PCAP files**  
Read packet files in PCAP format.
- **PCAP file analysis**  
Check the header and contents of packet data in detail.
- **Bandwidth analysis**  
Analyze the amount of packet data and displays the used bandwidth to graph.
- **Real time packet monitoring**  
Monitor packet in real time after setting network mode and filter.
- **Packet capture mode**  
Capture packet in Single or Repeat capture mode.
- **Maximum bandwidth measurement**  
Configure server and client and measure the maximum bandwidth in the network line.
- **Packet send and receive**  
Generate UDP packet to transmit or receive.

# Overview

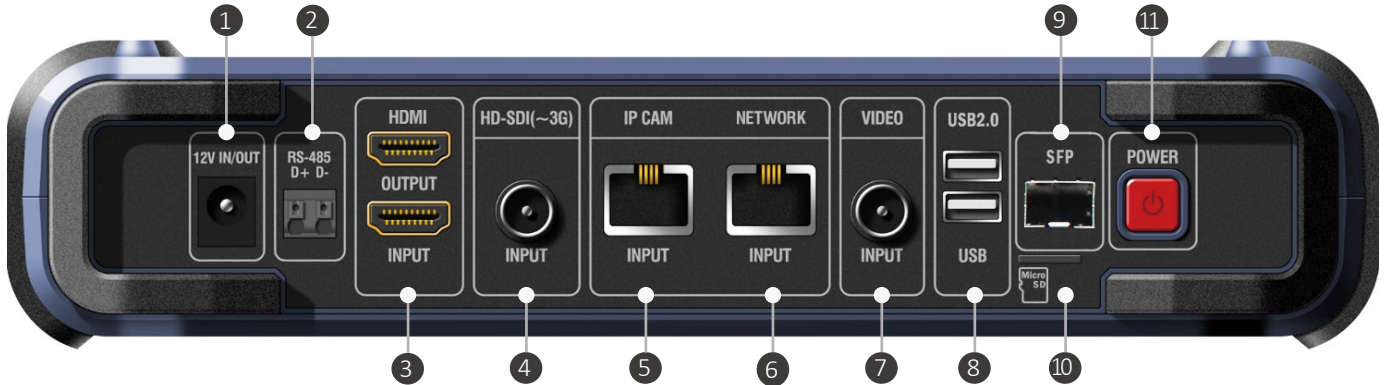
## Components

- Please check if the following components are all included in your package when you receive this item.
- All standard accessories included in this package are available for purchase separately.

Item	Name	Description
	Professional IP Test Monitor	Charge the battery prior to its use. It may be discharged at the time of delivery.
	Exclusive bag with strap	Keep the test monitor in this bag for its storage or use. Otherwise, the LCD and main body may be scratched.
	Exclusive Charger	This charger is exclusive for this test monitor. If any other charger is used to recharge this device, it may generate some problems.
	Power output leads	Use this cable for DC12V power output from this test monitor through DC12V IN/OUT port.
	Coaxial Cable	Use this cable for SDI or Analog video signal input.
	Power input leads	Use this cable for DC power input.
	User's Manual	The manual is provided in a booklet and a separate quick guide is provided.
	USB LAN Card	Wi-Fi is available to use only when the USB LAN card is mounted on this test monitor.
	TG01	BNC to TB(2P) connector to check the Loop resistance and status of coaxial cable.
	TG02	BNC to RJ45 connector to check long distance of UTP cable by BNC.
	BNC-A-JJ	Connect to cable when using TG01, TG02.

# Product Parts and Descriptions

## Top Interface



No.	Name	Description
①	Power Connector	The exclusive charger included in this package is only allowed to recharge this test monitor. DC12V power supply for camera operation is also available through this port by using the power output lead. There are 5,680 mAH Li-Polymer batteries built in this monitor.
②	RS-485 Communication	Camera PTZ and OSD menu settings are available by RS-485 communication function. In addition, data reception and analysis are possible in RS-485 Rx. and Analysis modes.
③	HDMI Input/Output	HDMI input up to 1080p 60Hz resolution is possible, which is received from external devices such as NVR or DVR. HDMI output in 1080p 60Hz resolution is also possible.
④	HD-SDI(~3G) Input	HD/EX/3G-SDI video input is available Camera PTZ and OSD menu settings are available by UCC function.
⑤	IP Camera Port	It is able to input network data from IP camera or HUB and connect to camera, and supply power to PoE camera. Also, this port is used for measuring Ethernet cable distance with TDRU app.
⑥	NETWORK Port	Same usage as IP CAM port, but does not support PoE.
⑦	VIDEO Input	Able to input AHD, TVI, CVI and CVBS video signals and camera PTZ and OSD menu settings are available by UTC function. Also, this port is used for measuring coaxial cable distance with TDRC app.
⑧	USB Port	Support FAT32 USB storage device.
⑨	SFP Port	Mount standard SFP module to receive network data.
⑩	Micro SD Input	Support FAT32 Micro SD card.
⑪	Power Switch	Hold the power switch to this monitor. While operating, press the power switch to change to sleep mode.

# Product Parts and Descriptions

## Front Interface



No.	Name	Description
①	D-Pad (Directional Keys)	Select up, donw, left, right in App.
②	Mode button	Change mode in App.
③	Home button	Press this button to move to home screen.
④	Menu button	Open menu in App.
⑤	BACK button	Press this button to terminate the App. or move to the previous screen.
⑥	Screenshot	Capture and save the current screen.
⑦	Volume control	Adjust the volume of the product.

# Product Parts and Descriptions

## Backside Interface



No.	Name	Description
①	Monitor Stand	Test monitor stand for convenient monitoring. Adjust the angle of this test monitor.
②	Speaker	Dual speakers are mounted. Adjust volume.

# Product Parts and Descriptions

## Launcher

- The following launcher screen will be shown once this test monitor is turned on.



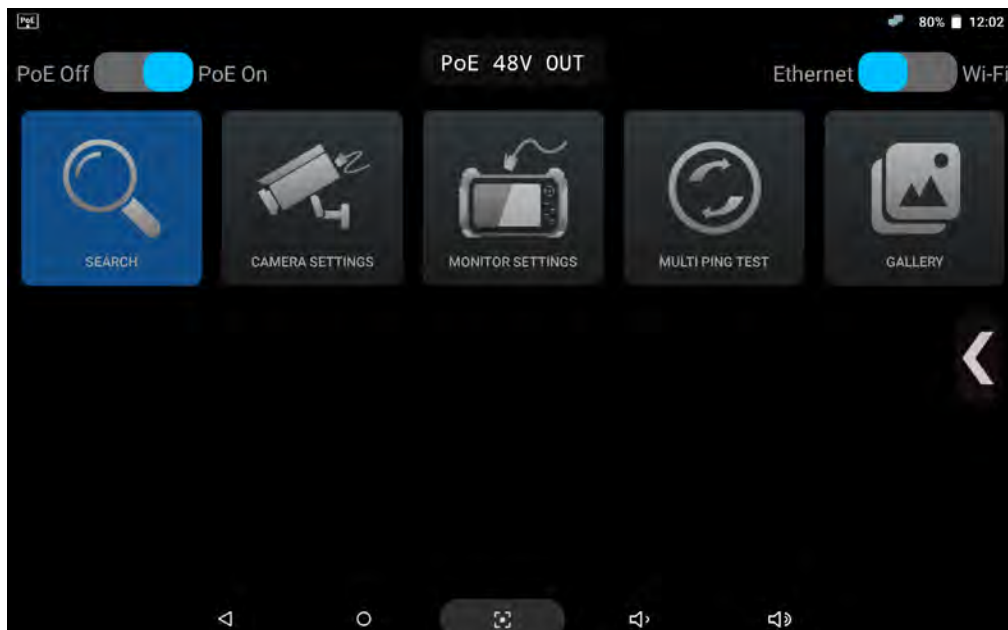
No.	Name	Description
①	Network Camera	This App. is for IP camera connection. Tap the icon to open the IP App.
②	SDI Camera	This App. is for HD/EX/3G-SDI Video. Tap the icon to open the SDI Viewer App.
③	HD Analog Camera	This App. is for AHD, TVI, CVI, CVBS Video. Tap the icon to open the HD Analog Viewer App.
④	HDMI Viewer	This App. is for HDMI Video. Tap the icon to open the HDMI Viewer App.
⑤	Coaxial cable measurement	This App. is for coaxial cable length and status measurement. Tap the icon to open the TDR C App.
⑥	UTP cable measurement	This App. is for UTP cable length and status measurement. Tap the icon to open the TDR U App.
⑦	My Apps	Show all installed apps.
⑧	Network Test Tools	This App. is for analyzing packet file, monitoring packet and measuring maximum bandwidth. Tap the icon to open the Network Test Tools App.
⑨	App Update	Update to the latest Apps.
⑩	Quick Menu	Use Gallery, File Manager or Setting function

# IP App. Functions

Launch IP App.



① Select IP Camera App. to connect a network camera.



② Monitor network setup is required to connect camera. Select Monitor Setting to move to network settings page.

# IP App. Functions

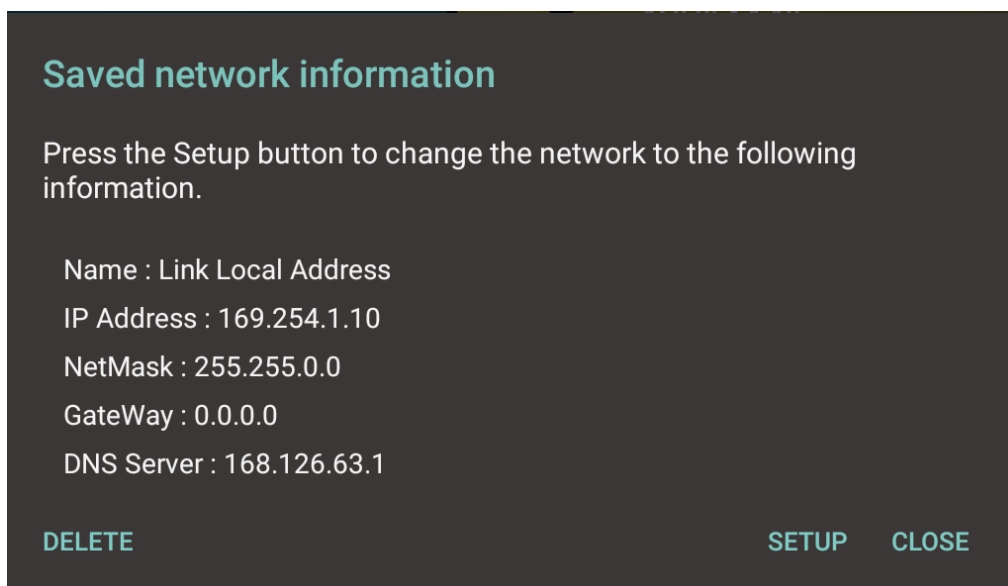
## IP Camera Connection by LAN

- # 1) is available when the camera's Zero configuration function is activated.  
If you know the camera IP address, use # 2).

### 1) When you do not know the camera IP address



- ① Tap the Monitor Settings icon in the IP App. main page to see the above page.
- ② Select Link Local Address on the right.



- ③ Tap the SETUP button to set as above IP address.
  - When set as above, it means the searched camera supports Zero configuration. If any camera is not searched, initialize the camera and refer to this user's manual to use the guided IP address range.

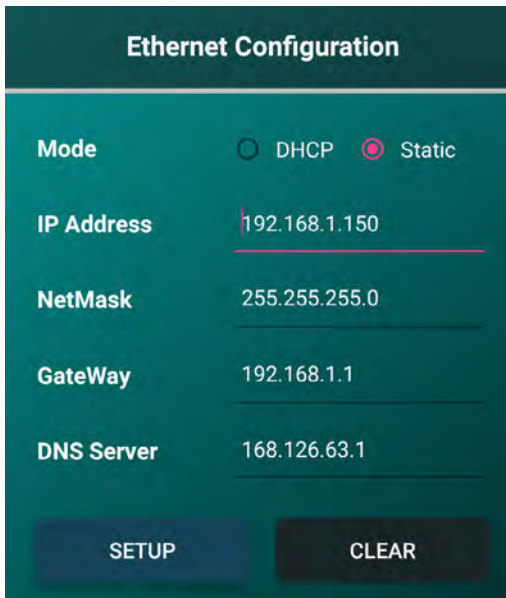


# IP App. Functions

## 2) When you know the camera IP address



- ① Tap the Monitor Settings icon in the IP App. main page to see the above page.
- ② Enter the IP address to the same range of the camera IP address in Ethernet Configuration and press SETUP button.

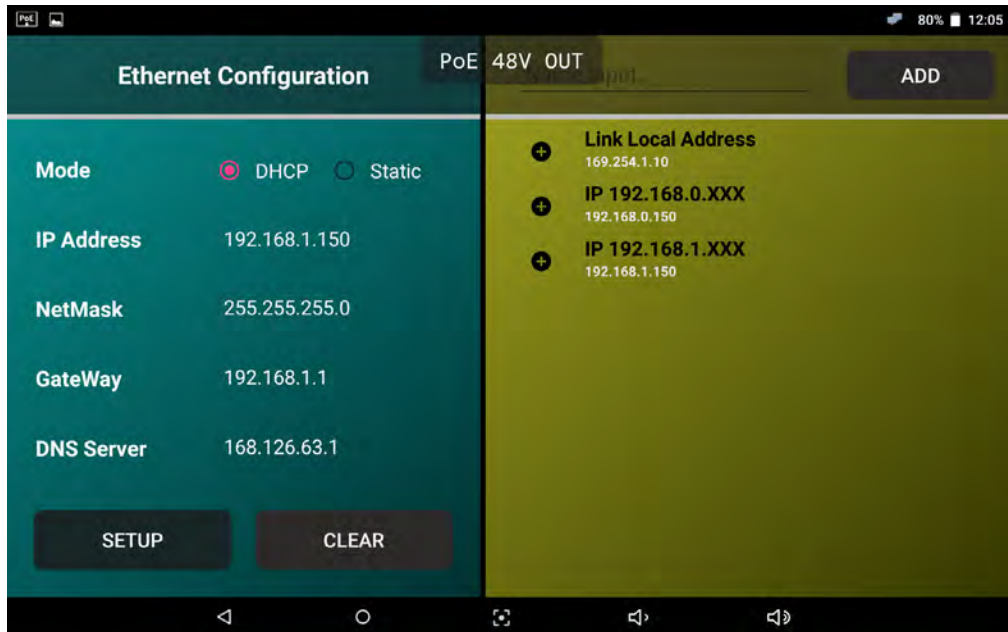


- The left image shows the IP settings that should be set on the monitor when the camera IP address is 192.168.1.100.
- Enter the Gateway value after changing the rightmost value of the IP address to 1.
- If you do not enter the DNS server value or enter it incorrectly, you may have problems using the web page.

# IP App. Functions

## IP Camera Connection by a DHCP Server

- The DHCP mode can be assigned an IP address from a DHCP server.



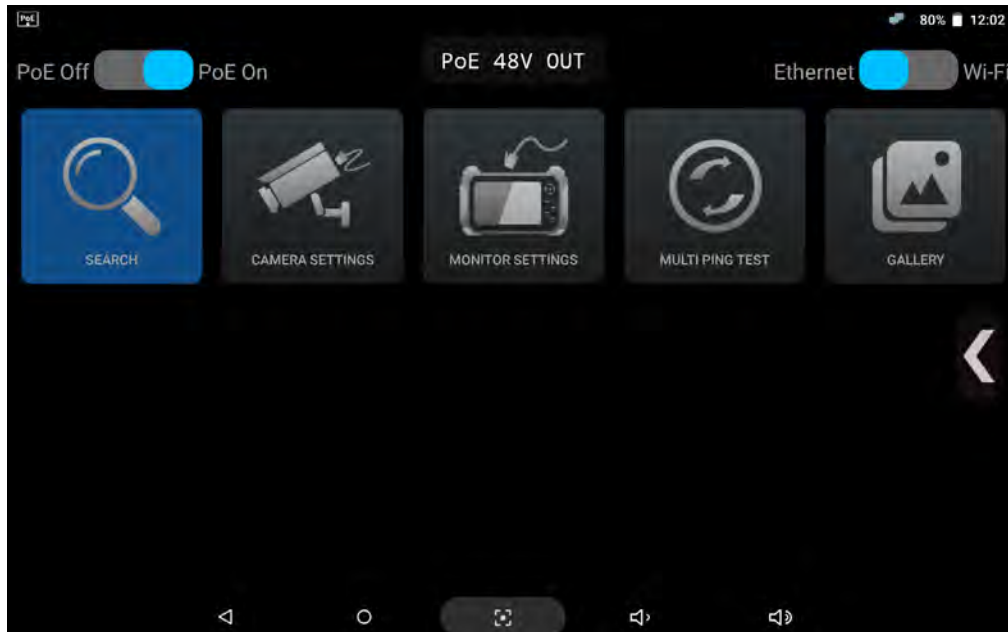
- ① Tap the Monitor Settings icon in the IP App. main page to see the above page.
- ② If you select DHCP in the mode and tap SETUP, the IP address is assigned from the server.
  - This test monitor does not assign an IP address to a camera. A DHCP server or a router should be configured.
  - When a DHCP server is configured, the monitor can be assigned an IP address as the camera.
  - IP address, Mask address and Gateway cannot be arbitrarily modified.

# IP App. Functions

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## Checklist Prior to the Camera Discovery and Connection

- Check the following items and move to the next step after completing the monitor settings.



**STEP 1 :** Check the PoE status in the upper left corner. Turn on the PoE to supply PoE to your camera. If PoE is off, this monitor will not supply PoE to your camera.

**STEP 2 :** Check the Ethernet/Wi-Fi status in the upper right corner. Make sure to turn on Ethernet when connecting your camera with LAN cable and turn on Wi-Fi when connecting your camera wirelessly.

**STEP 3 :** Check the LAN port LED status. If the network status is normal, both LEDs must be on. If the LED is not on, the camera may still be booting or there may be a problem with communication.

### **Wireless connection :**

The monitor setting is not required when connecting the product wirelessly. Connected routers and servers automatically assign IP to cameras and monitors. After the Wi-Fi connection is complete, it is able to check the searched cameras.

# IP App. Functions

## IP Device Discovery



- ① When you tap Search in the IP App. main page, IP devices are searched automatically and the discovered cameras are displayed on the right side.
  - When a discovered IP camera's address is in the same range of this monitor's IP, it will be shown in dark gray with the camera's hardware, location, name and IP address like #1 or #2 cameras in the above picture. However, in case of an IP camera having different range of the monitor's IP, it will be shown in red only with the camera's name and IP address like #3 camera in the above picture.
  - In case of #1 and #2 cameras in the above picture, either of the cameras can be connected immediately. But for #3 camera, the monitor's IP address must be changed to match the IP camera's IP range.
- ② Tap one of the discovered cameras to open the IP Camera Settings page.

### ! When the camera is not discovered

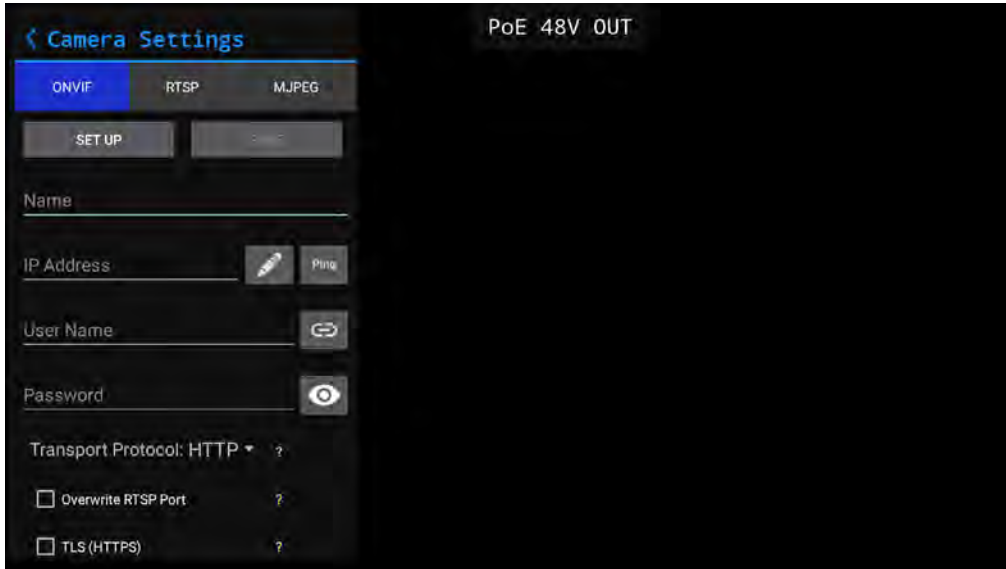
- When using unsupported protocol.

If the camera does not support ONVIF, IP search and camera connection will not work. In this case, you have to connect manually using RTSP. The RTSP address is different for each camera company and must be checked with the camera manual or manufacturer.
- When using a wireless router.

If you connect the camera wirelessly, you must change the monitor's network settings to Wi-Fi and then perform discovery. When the camera is in DHCP mode, the router automatically assigns the camera IP address. (IP assignment method may vary depending on the connected IP router model)

# IP App. Functions

## IP Camera Connection and Settings



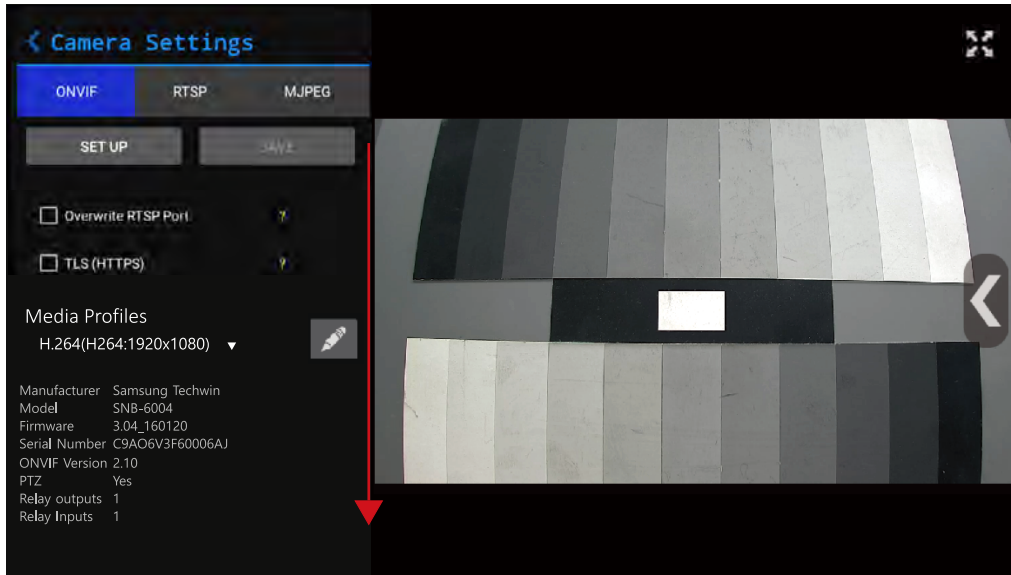
- ① Once you select the Camera Settings icon or one of discovered cameras in the Search page, the camera setting screen is displayed.
- ② Enter any word such as the camera name or installed location to identify the camera in the Name field.
- ③ Enter the camera IP address in the IP address field. If one of the discovered cameras is selected, the IP address is filled automatically.
- ④ When the camera is selected, admin is entered as the user name. If you do not know the user name, reset the camera to its default factory setting and enter the default user name. The default user name depends on the manufacturer. You can find the default information in the camera instructions.
- ⑤ Enter the password in the Password field. If you do not know the password, reset the camera to its default factory setting and enter the default password. The default password of each camera is normally specified in the camera instructions.
- ⑥ For transport protocol and RTSP port overwrite, no need to change them now. Once all values are added, tap the SETUP button to test the camera.


### ! When the camera connection fails

- When the IP address is uncertain.  
Tap the Ping button to check the IP address after entering the IP address. Ping will fail if the address is wrong. The IP range of the monitor and camera should be same as well.
- When you cannot remember the user name and password.  
When you forgot the user name and password, reset the camera to its default factory setting and enter the user name and password set by the manufacturer.

# IP App. Functions

- Once the camera is connected, the preview video will be displayed as shown in the following picture.



- ⑦ Scroll-down the left setup panel after the camera is connected. you can modify the profile settings.
- ⑧ After completing all the settings, tap Save to store the camera name, IP address, user name, password, media profile, transport protocol, etc. in one configuration in the IP App. main page.
- ⑨ To watch the live video of the connected camera, press the Full Screen  at the right upper corner in the preview video mode.

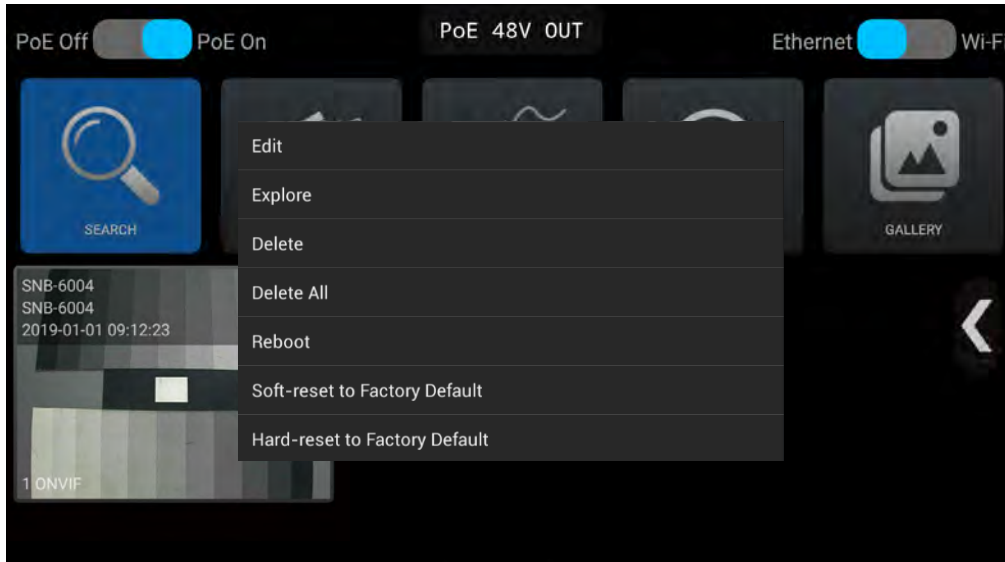


- ⑩ Tap the saved configuration of the camera on the IP App. main page to see the live video in full screen without the need camera search and settings.

# IP App. Functions

## Utilize Configuration

- After completing the camera setup, click Save to create the configuration.



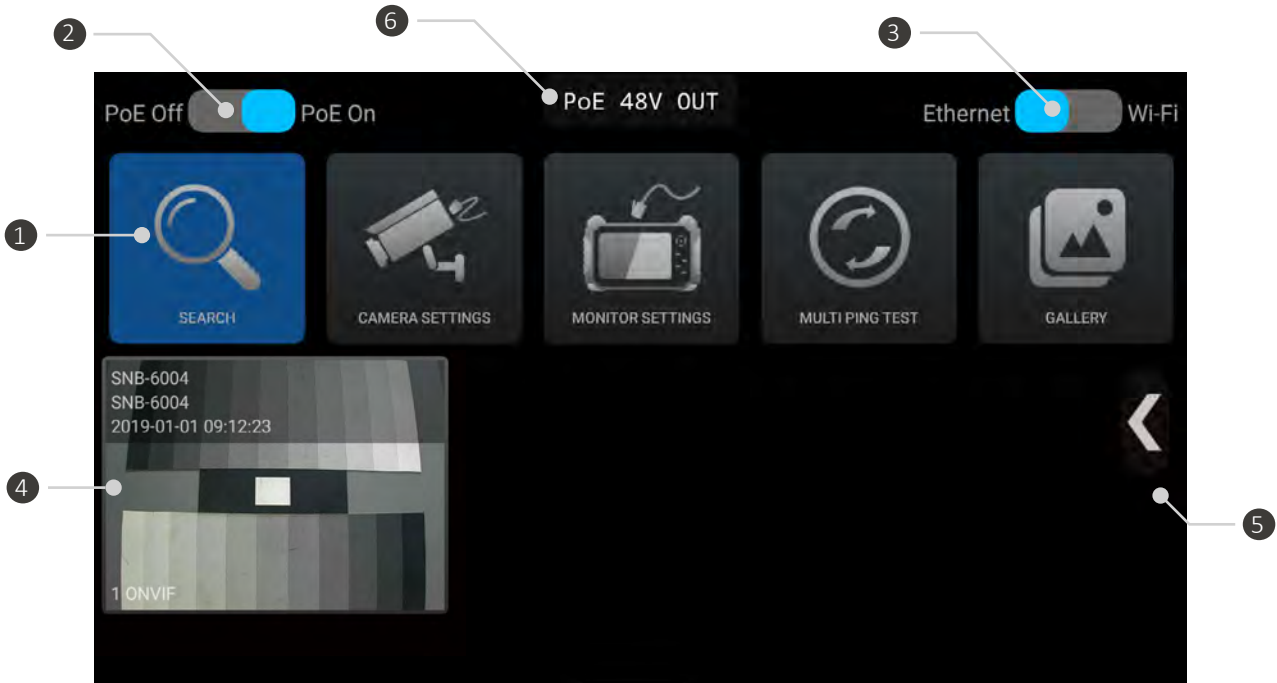
- ① In the IP App. main page, press and hold the saved configuration or press the SET key to display a context menu.
- ② Select Edit to change the configuration and select Explore to check the information of the configured camera.
- ③ If the camera supports resets, it is possible to initialize the camera settings to have the factory default values.

### ! How to use the configuration effectively

- When installing the same type of cameras  
All cameras have their default IP addresses. As the saved camera configuration includes the camera IP address, ID, password, etc., you can use it for the installation of the same type of cameras. However, the same type of the camera needs to be the default mode or it must have the same IP address range.
- How to register the IP address used frequently for your installation  
After saving the configuration of the installed camera, you can export the saved configuration and make a configuration list per installed location. During maintenance, you can import the relevant configuration and check the camera connection status without any setup process.

# IP App. Functions

## IP App. Main Page



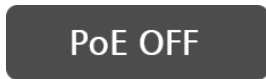
No.	Name	Description
①	Action Menu Icon	Use Search, Camera Settings, Monitor Settings, Multi Ping Test, Gallery.
②	PoE Setting	Set whether to use PoE (Power of Ethernet) or not. When PoE On is set, the built-in battery of the monitor is used to supply the PoE voltage and the battery is consumed more quickly. When PoE Off is set, the PoE voltage supply is stopped.
③	Network Type	Change the network settings of the product. When connecting the camera wirelessly using a router, the network must be changed to Wi-Fi and connected. When connecting the camera to a wired network, the network must be changed to Ethernet.
④	Saved Configuration List	Click Save in Camera Settings to add the configuration. If you have the same IP address, ID and password as the added configuration, it is able to check the video by selecting the saved configuration without any setting.
⑤	Menu of IP App. Main Page	Use Sort Tiles, Settings, Feedback, and About function.
⑥	PoE Voltage Check	When the PoE function is on in the PoE setting button, PoE 48V OUT will be shown on the top of the monitor screen. When the PoE function is off, it will show PoE OFF. The NETWORK port displays the PoE voltage supplied when the PoE voltage supply is connected. When the camera is connected to the CAM port, the device connected to the NETWORK port supplies the PoE voltage to the camera. You can tap and drag this voltage check sign to where you would like to put it on.



# IP App. Functions

## PoE Voltage Check

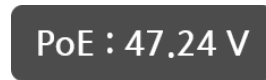
- When the IP app is launched, a PoE status confirmation window is displayed at the top of the home screen. When the PoE voltage supply is connected to the NETWORK port, the supplied PoE voltage is displayed.



PoE OFF




PoE ON

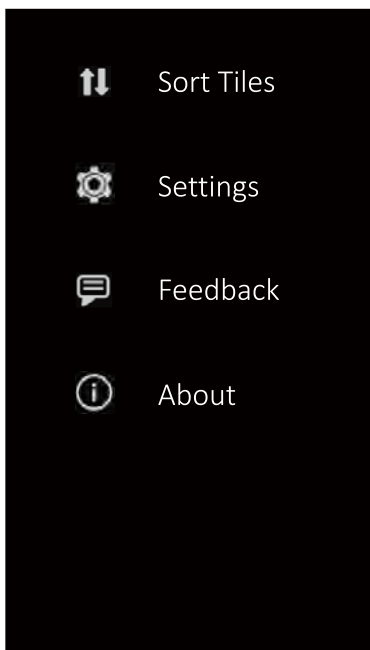


PoE Voltage Check

- ① PoE OFF
  - PoE function is OFF.
- ② PoE ON
  - When turning the PoE function on, PoE 48V OUT will be shown on the top of the screen.
  - This monitor supplies PoE from its built-in battery.
- ③ PoE Voltage Check
  - When any power supply unit is connected to the NETWORK port, the voltage of the PoE supplied from the device will be shown on the top of the screen.
  - Supply PoE to a device connected to the CAM port from the power supply unit connected to the NETWORK port.

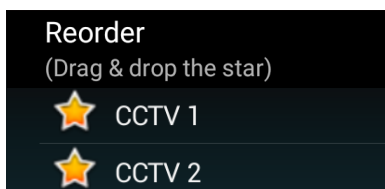
## Menu in the IP App. Main Page

- In the IP App. main page, once you press the menu or mode key or touch menu icon  the menu bar will be shown as follows.



- ① Sort Tiles
  - You can rearrange the order of saved configurations.
- ② Settings
  - Import/export the device configuration.
  - Select the location for saving recorded or captured images.
  - Choose whether to display the time and model of the saved configuration on the device.
- ③ Feedback
  - You can send an e-mail when there is anything to be improved.
  - This function is available for use only when this monitor is connected to the Internet.
  - This function is available only when the email setting is done.
- ④ About
  - You can see the version and copyright of this test monitor.

## Configuration rearrangement



- All saved configurations will be shown.
- Drag any of the star-shaped icons to where you want to set.

# IP App. Functions

## IP Device Search

- Tap the search icon to start camera discovery as shown below.
- All IP cameras will be searched automatically when entering this screen.



No.	Name	Description
①	Refresh	Touch this button to try the search again.
②	Ping IP Range	This is a method to search IP devices by using Ping and available for use after entering the Start IP address and the End IP address. The greater the search range is, the longer it may take to search the IP devices.
③	Search Results	The discovered IP cameras are displayed with their names and IP addresses. The discovered information depends on the camera's brand.

### ! When the camera is not searched

- **When using unsupported protocol.**  
If the camera does not support ONVIF, IP search and camera connection will not work. In this case, you have to connect manually using RTSP. The RTSP address is different for each camera company and must be checked with the camera manual or manufacturer.
- **When using a wireless router.**  
If you connect the camera wirelessly, you must change the monitor's network settings to Wi-Fi and then perform discovery. When the camera is in DHCP mode, the router automatically assigns the camera IP address. (IP assignment method may vary depending on the connected IP router model)
- **When the IP address is changed manually.**  
When changing IP address of the camera randomly, the camera may not be discovered. If you have forgot or lost the camera IP address, initialize the camera manually to its factory default. Refer to the camera user manual to initialize.

# IP App. Functions

## Camera Settings


- Tap the Camera Settings icon in the IP App. main page to test an IP camera.
- Selecting one of the discovered camera in the Search page also opens Camera Settings as following.

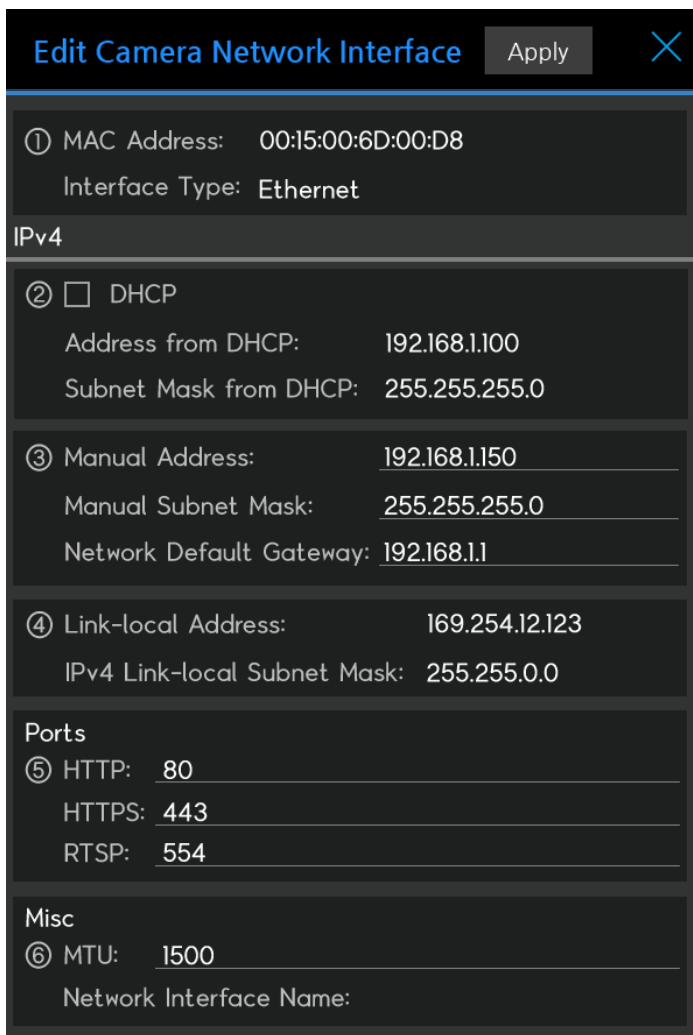


No.	Name	Description
①	Device Type	Select your device type such as ONVIF, RTSP and MJPEG.
②	Set up	Connect the camera with the setting information entered below. Press this button after completing the below setting information.
③	Camera Name	Enter a camera name as you wish.
④	Camera IP Address	Enter the IP camera address.
⑤	User Name / Password	Enter the user name and password of the credential used to connect the camera.
⑥	Transport Protocol	Select a transport protocol between HTTP, TCP and UDP. HTTP is recommended. If HTTP is not supported, this test monitor finds the appropriate protocol automatically in TCP, UDP order.
⑦	Overwrite RTSP Port	Overwrite when the camera is set to any RTSP port.
⑧	TLS(HTTPS) Setting	Use when the camera is set as HTTPS.
⑨	Save	Save the configuration to the main page of the IP App.
⑩	Import	Enabled only when there are saved configurations. Import one of the saved configurations.
⑪	Network Edit	Modify the network settings of the connected camera.
⑫	Ping Test	Ping the connected camera and check the connection status.
⑬	Website Link	Connect the web page to the entered IP address.
⑭	View Password	Display the entered password.
⑮	Full Screen	Activated when camera is connected. Display full screen mode.

# IP App. Functions

## Camera Network Settings

- This function is available only when the camera is connected.
- Tap the Network Setting icon  to enter the following page.



- ① Camera Network Information
  - MAC Address is fixed for each camera and cannot be changed.
  - Interface Type represents the current network type of the connected camera.
- ② DHCP Settings
  - Check the DHCP box to enable DHCP.
  - IP, Subnet mask shows the address automatically assigned by the DHCP server.
- ③ Manual IP Settings
  - You can change the camera IP address, Subnet Mask and/or Gateway.
- ④ Link-local Address
  - You can check the link-local address of the camera.
  - Link-local address is not available for modification.
- ⑤ Camera Ports
  - You can check the ports used for the camera's HTTP, HTTPS and RTSP servers.
- ⑥ Misc.
  - MTU: You can set the packet size for the transmission in network.


### ! When the error window is displayed.

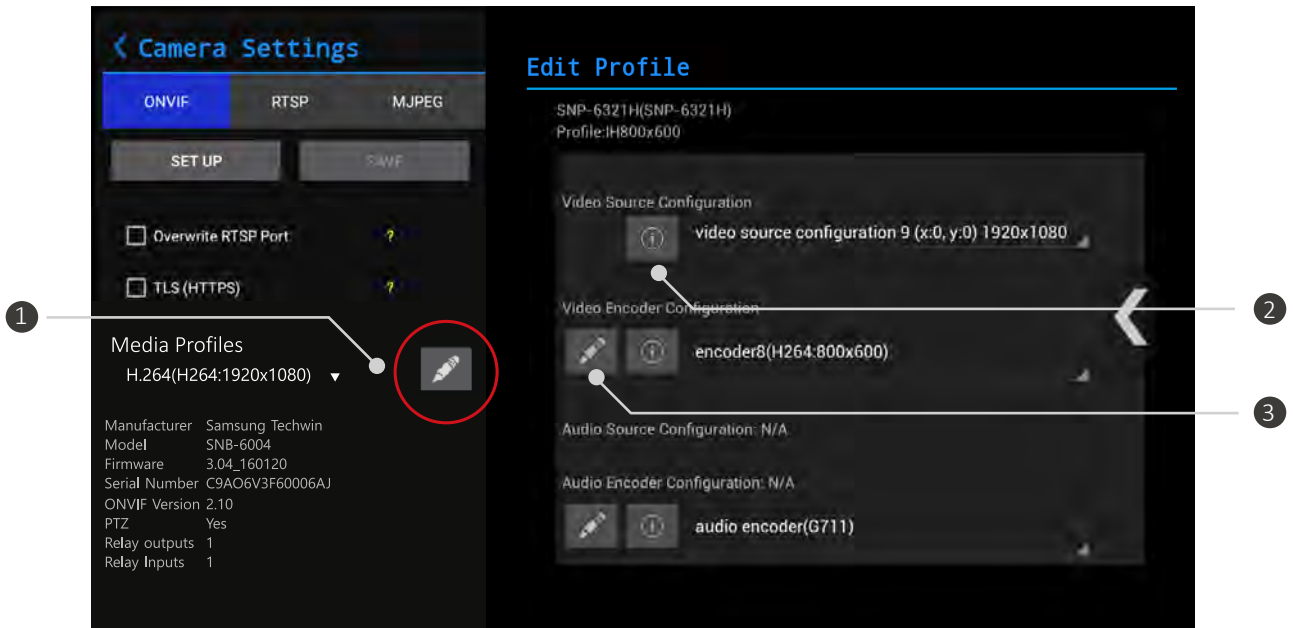
The operation depends on camera network specifications as each manufacturer has different specifications.



- When the IP address is not changed after modification.  
The IP address will be changed once you reboot the camera.
- When an error window is displayed.  
The IP address will be changed once you reboot the camera.

# IP App. Functions

## ■ Edit Media Profile


- Once a camera is connected, you can edit the media profile.
- Tap the  profile edit icon to see the following image.

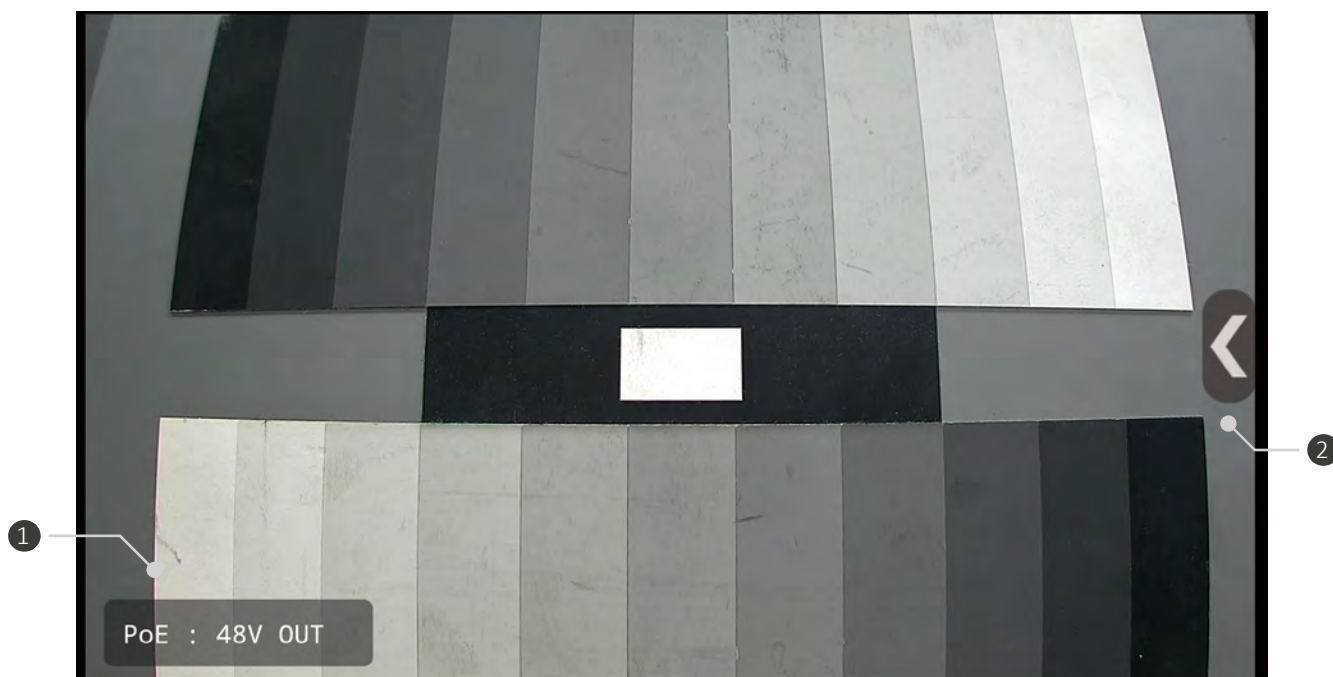


No.	Name	Description
①	Profile Edit Settings	You can set its resolution, encoding type, video quality through video encoder and also you can set bit rate, encoding type, sample rate through audio encoder.
②	View details	Tap  icon to check its source and encoder's contents in details.
③	Encoder Edit Settings	Tap the  to change its video and audio encoders' configurations. In case of not supporting audio, it will be indicated as N/A.

# IP App. Functions

## Main Page

- If tapping the  at the top right of the screen after a camera is connected, the window will be shown as the following image.

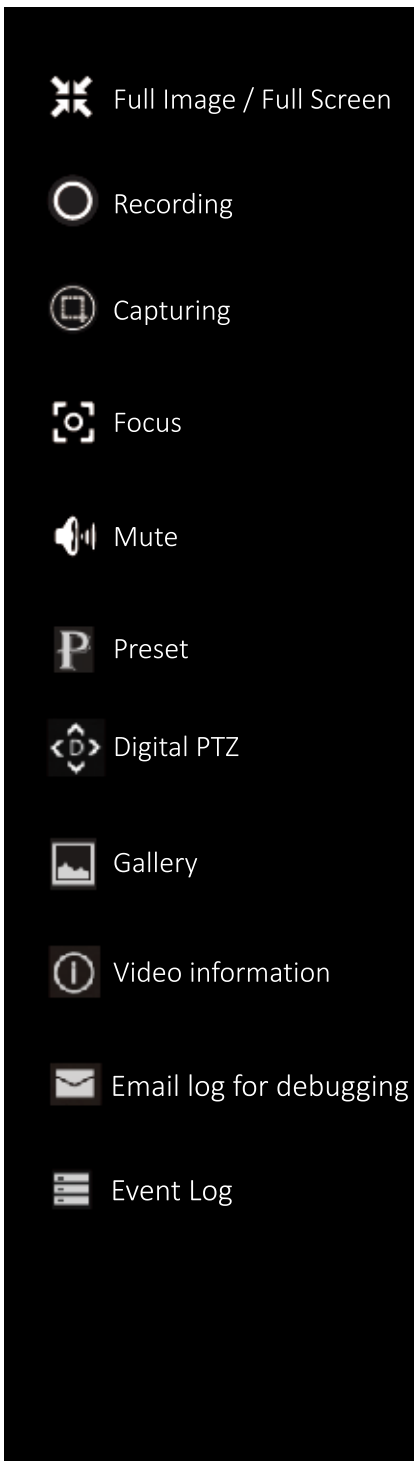


No.	Name	Description
①	PoE Status Check	The PoE voltage status sign on the top will move to the left bottom in video full screen mode. This cannot be moved by dragging.
②	Video Menu Bar	This menu includes aspect ratio settings (Full/Original images), recording, capturing, mute, presets, digital PTZ settings, gallery(playback), video information and e-mail log for debugging, event log, etc.

# IP App. Functions

## Live Video Menu Bar

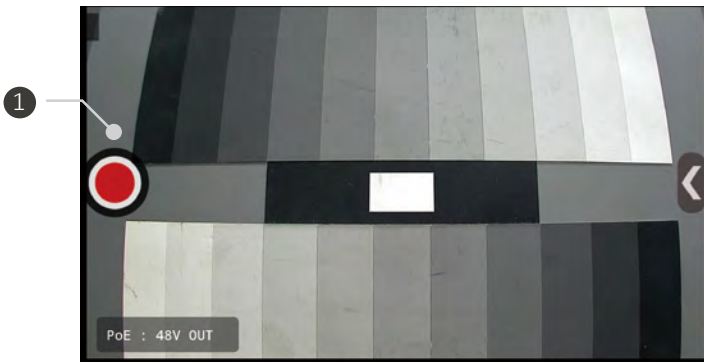
- In the IP App. video page, tap the MENU key or touch the  menu icon to show the following menu bar.





- ① Full Image / Full Screen
  - In the full image mode, the full image is displayed.
  - In the full screen mode, the video is scaled to fill the monitor screen completely while maintaining its aspect ratio.
- ② Recording
  - It is for recording the input video.
  - The video recording is available up to 5 minutes.
  - Make sure to check the cautions for recording.
- ③ Capturing
  - It is able to capture the input video.
  - Make sure to check the cautions for capturing.
- ④ Focus
  - It is able to adjust the focus of Hanwha Techwin zoom lens camera.
  - This function is not enabled when connecting other manufacturer's cameras.
- ⑤ Mute
  - This function is enabled on cameras that support audio input.
  - Audio may be interrupted depending on the network conditions.
- ⑥ Preset
  - This function is enabled on cameras that support presets.
  - It is able to use presets stored in the camera.
- ⑦ Digital PTZ
  - This function is enabled only for Digital PTZ cameras.
  - Digital Zoom function is available for use.
- ⑧ Gallery
  - Recorded or captured images are stored here.
- ⑨ Video Information
  - You can check the information of the input video in real time.
- ⑩ Email log for debugging
  - You can send the errors generated during the product operation by e-mail.
  - This function is available only during Wi-Fi.
- ⑪ Event Log
  - You can check the camera connection log.

# IP App. Functions

## Video Recording



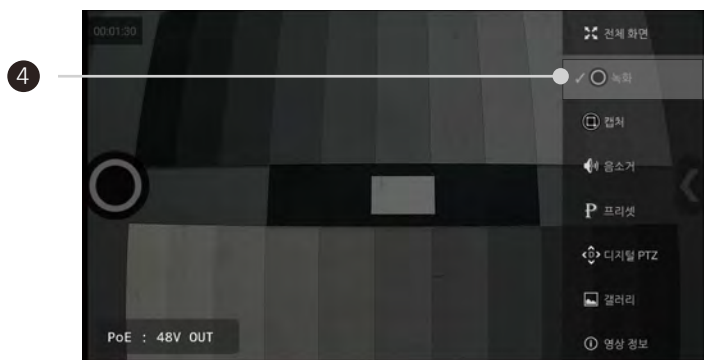
- ① Recording Start Button
  - Start recording by tapping  button.
- ② Recording Status Display
  - The recording time is displayed.
  - The recording is available up to 5 minutes.
- ③ Recording End Button
  - End recording and save the recorded file by tapping  button.



- ④ Recording Function Termination
  - Select the Recording in the menu bar. Then, the "V" mark will be removed and the recording function will be terminated.
  - You can also terminate the recording function and move to IP App. main page by pressing the Back key.

### ! Cautions for recording

- Recording specifications depend on each camera manufacturer.
- Change the media file saving location from Internal to SD Card, which is in the Settings of the menu bar in the IP App. main page.
- The recorded video is saved in MP4 format.
- The maximum recording time is 5 minutes.
- Check the storage space prior to continuous recording.

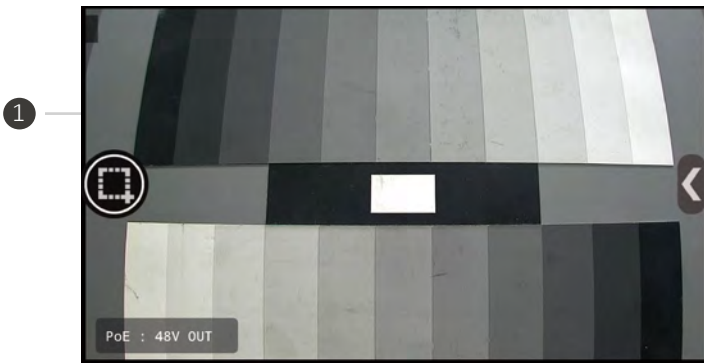



- If you take the SD card out or turn off the test monitor during recording, the recorded video file will not be saved.
- If you terminate the recording during recording preparation, the file will not be saved.
- In JPEG profile, only capturing is available.
- If the network is disconnected during recording, recording will stop automatically after 15 seconds, and the recorded video file will not be saved.



# IP App. Functions

## Snapshot Capturing



- ① Capturing Start Button
  - Start capturing by tapping  button.
- ② Capturing Status Display
  - Display the capturing status.
- ③ Capturing Function Termination
  - Select the Capturing in the menu bar. Then, the “v” mark will be removed and the capturing function will be terminated.
  - Press the BACK key to terminate the capturing function and and move to IP App. main page.

### ! Cautions for capturing

- Capturing specifications depend on each camera manufacturer.
- Change the media file saving location from Internal to SD Card, which is in the Settings of the menu bar in the IP App. main page. Then, the captured image will be saved in the SD card.
- The captured image is saved in JPG format.
- If you tap the capture button continuously, the image may not be saved.

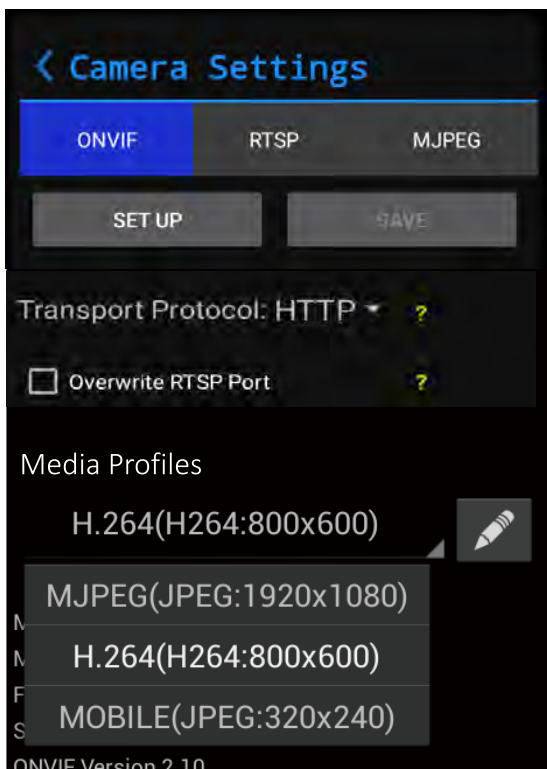
# IP App. Functions

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## Audio Input

- This monitor supports G.711 audio codec.
- When audio is input to the camera side, audio is output through the monitor speakers.
- You can control the speaker output by using the mute function.

## Video Output Codec Change



- This test monitor supports H.264, H.265 and JPEG codecs.
- You can select the video codec by choosing a Media Profile of the IP camera setting page accordingly.
- When saving the configuration or turning to full screen after selecting a profile, the new profile will be applied.

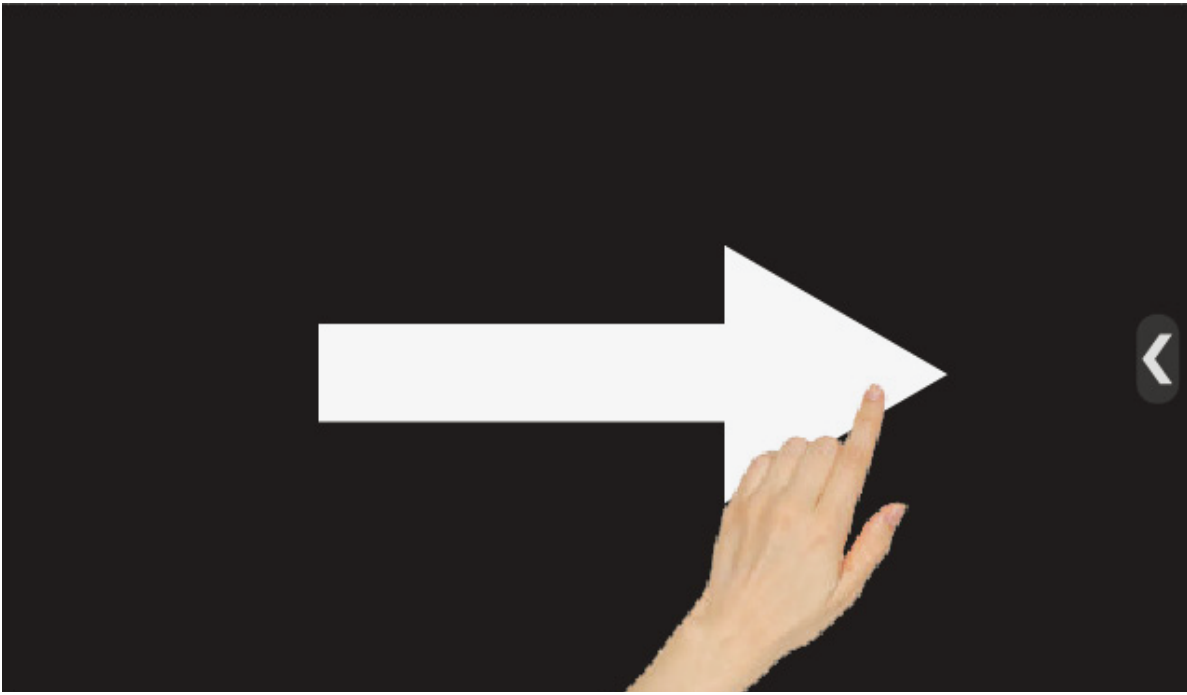
### ! Cautions for changing codecs

- Codec specifications depend on each camera manufacturer.
- MPEG4 is not supported.
- JPEG over 3Mega is not supported.
- Multicast method is not supported.
- H.265 supported camera may not be displayed in the media profile list when connected.

# IP App. Functions

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## ■ Pan/Tilt Functions



- Opto-mechanical pan/tilt functions are available for PTZ cameras only
- Pan/tilt the camera by touching the screen and wiping it.
- Pan/tilt functions are available by both touching the screen and using the arrow keys.
- The pan/tilt speed depends on each camera brand when operating by the arrow keys.



- Swipe left from right
- Press the right arrow key



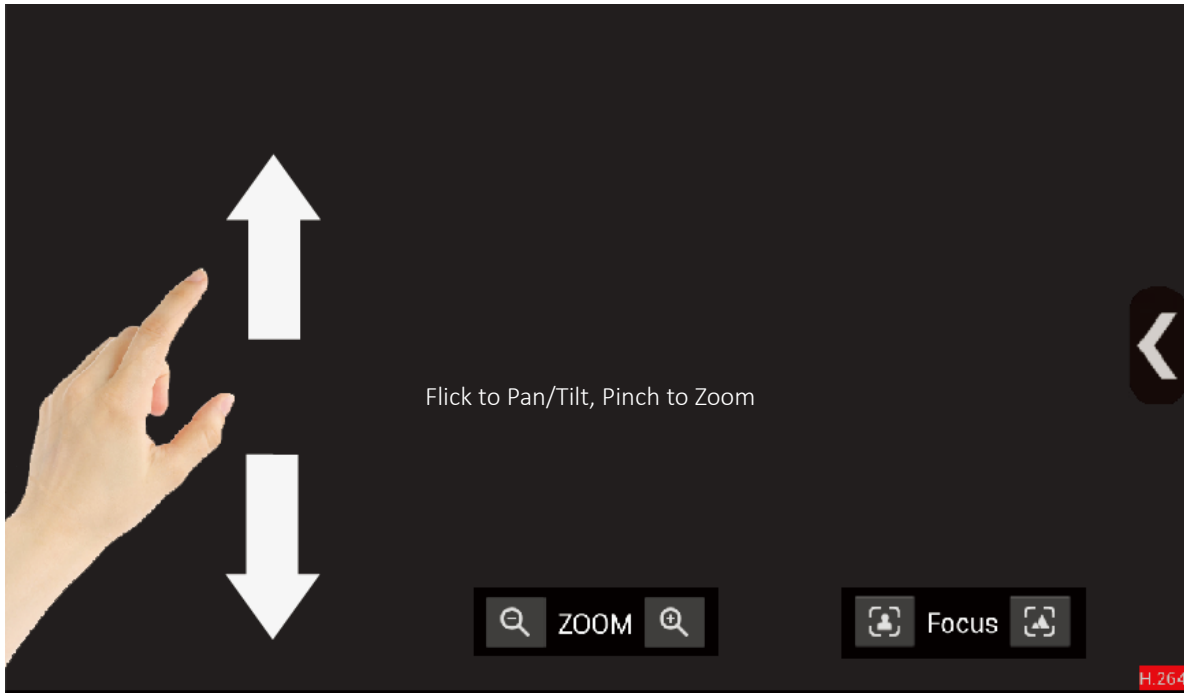
- Swipe up from down
- Press the down arrow key



- Swipe diagonally
- Unavailable to operate it by arrow keys.

# IP App. Functions

## Zoom Function



- If the camera supports opto-mechanical PTZ, enable the Digital PTZ first to use Digital Zoom function. Otherwise, opto-mechanical Zoom will be applied.
- Zoom out/in the video screen by your fingers.
- Pinch two or more fingers together to zoom out.
- Stretch two or more fingers apart to zoom in.
- Zoom out/in available by pressing -/+ of the zoom bar at the bottom of the screen.

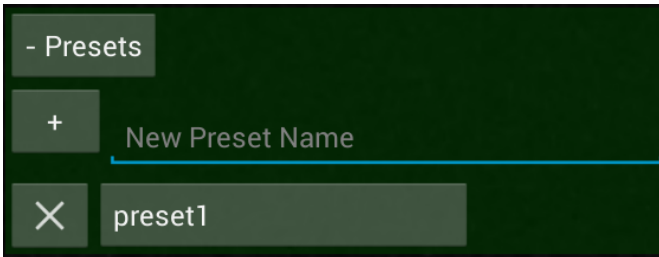
### ! Cautions for Zoom Function

- When the screen is switched abnormally while using Digital PTZ, zoom or swipe again to return to normal.

# IP App. Functions

## Presets

- This function is enabled only for cameras supporting presets.
- Some characters may not be allowed in preset names by some camera brands.



- Presets function can save and load Pan/Tilt/Zoom status values.
- Type the Preset Name and press the + button to add a preset.
- Select a preset from the list to move the camera to the preset position.

## Video Information

- Select the Video Information from the video menu bar. It will be shown as follows.



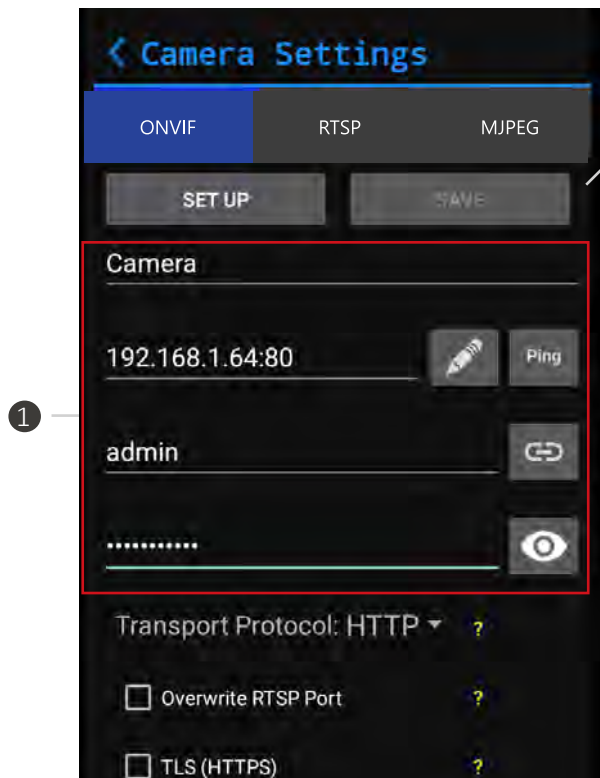
- |   |                                       |
|---|---------------------------------------|
| ① Network Video Transmitter               | ⑩ RTP packets lost <b>(Real-time)</b> |
| ② NVT type                                | ⑪ Frame rate <b>(Real-time)</b>       |
| ③ Camera model                            | ⑫ Audio codec (If available)          |
| ④ Media profile                           | ⑬ ONVIF port                          |
| ⑤ Video resolution                        | ⑭ RTSP port                           |
| ⑥ Video encoding                          | ⑮ Data rate <b>(Real-time)</b>        |
| ⑦ Transport protocol                      |                                       |
| ⑧ Profile level                           |                                       |
| ⑨ RTP packets received <b>(Real-time)</b> |                                       |

- Information about the functions supported by the camera is displayed. Therefore, displayed information may differ depending on the manufacturer and specifications of the camera.

# IP App. Functions

## Configuration Storage

- You can save the configuration after entering all camera information required and previewing the video.
- Once you save the configuration, you can easily start its corresponding video from the IP App. main page.
- All camera settings are saved. When changing the camera settings, please save the configuration again.

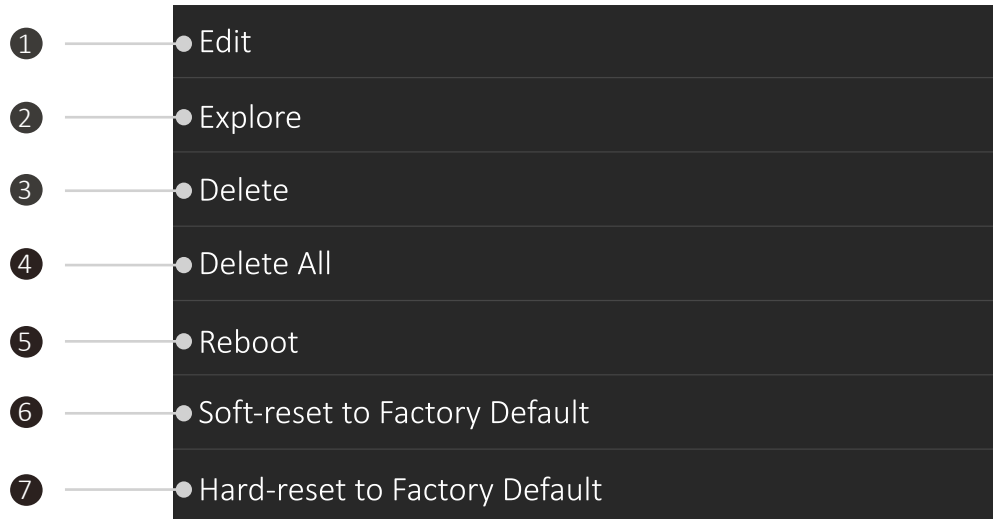


- ① Stored Information
  - All setting information to set a camera such as Name, IP Address, ID and Password is saved.
  - Configuration saving is available only when any camera has been connected successfully.
  - The camera model name is not displayed in RTSP, MJPEG configuration.
- ② Save
  - Tap the Save button in the Camera Setting page to save the configuration to the IP App. main page.

# IP App. Functions

## Camera Configuration Context Menu

- Press and hold a saved configuration or Set key. A menu will be shown as the following picture.
- Some functions are not available for RTSP, MJPEG configurations, which are not ONVIF.

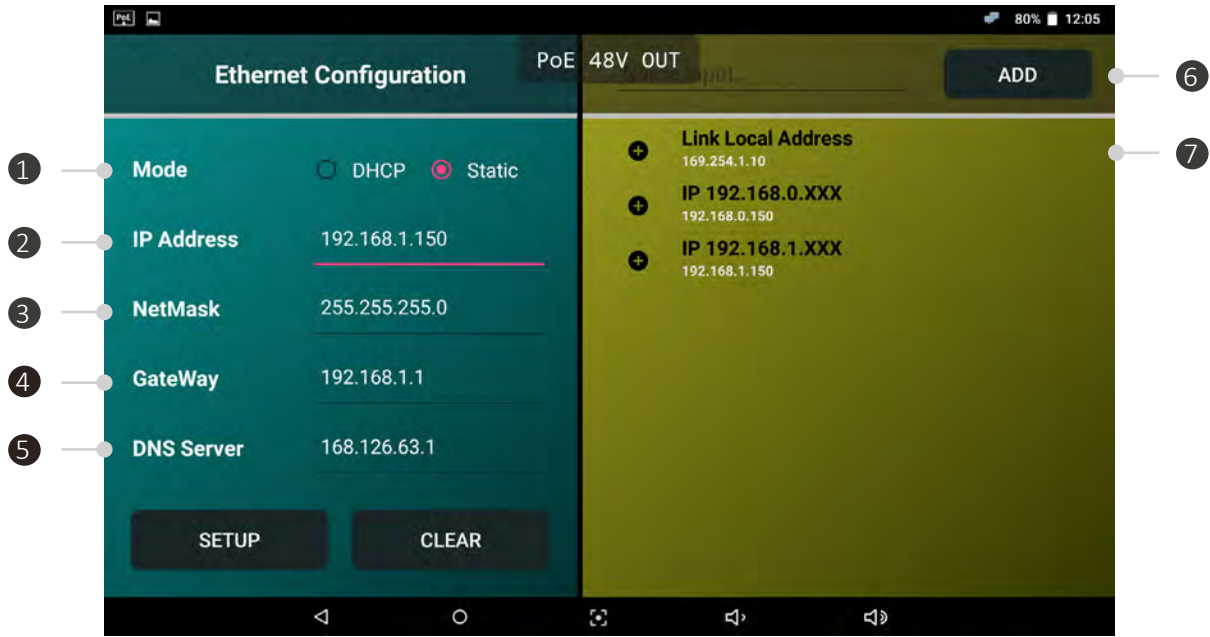


No.	Name	Description
①	Edit	Open the IP Camera Settings page to modify the configuration.
②	Explore	Check extensive ONVIF properties of the camera.
③	Delete	Delete the selected configuration.
④	Delete All	Delete all saved configurations.
⑤	Reboot	Reboot the selected camera.
⑥	Soft-reset to Factory Default	Reset the camera settings except for the network setting to the factory default.
⑦	Hard-reset to Factory Default	Reset the camera settings to the factory default.

# IP App. Functions

## Monitor IP Settings

- Tap the Monitor Settings icon in the main page of the IP App. to open the Monitor Network Settings page.



No.	Name	Description
①	Operation Mode	If you check DHCP, a DHCP server can assign IP to this test monitor. If there is no activated server or the server is abnormal, IP will not be set up normally. If you check Static, you can use static IP address.
②	IP Address	Enter the IP address.
③	NetMask	Enter the NetMask address.
④	Gateway	Enter the Gateway address. It has to be modified depending on the entered IP address.
⑤	DNS Address	Enter 168.126.63.1 to use website.
⑥	Name	Enter the name to save the network information entered on the left.
⑦	Saved List	Display the list of saved network information.



# IP App. Functions

## IP Address Selection

- IP address classes shall match each other to discover and connect network.
- The range of the numbers available for IP address is from 0 to 255. All IP address classes can be identified with the bit of the first number. With other classes, it cannot communicate with each other.
  - Class A: 1.0.0.1 ~ 127.255.255.254
  - Class B: 128.0.0.1 ~ 191.255.255.254
  - Class C: 192.0.0.1 ~ 223.255.255.254
  - Class D: 224.0.0.0 ~ 239.255.255.255
  - Class E: 240.0.0.0 ~ 254.255.255.254

Class	No. of available addresses	Subnet Mask	Private IP
Class A	16,777,216	255.0.0.0	10.0.0.0 ~ 10.255.255.255
Class B	1,048,576	255.255.0.0	172.16.0.0 ~ 172.32.255.255
Class C	65,536	255.255.255.0	<b>192.168.0.0 ~ 192.168.255.255</b>
Class D	Not available. Normally for multitasking.		
Class E	Not available. Normally for testing.		

- Private IP address in the above table is available for communication on the same network, but cannot pass through the router. It is used for LAN only.
- If you connect an IP camera with an IP address except for private IP addresses, it may be disclosed on the Internet and be in danger of being hacked.
- Specific IP addresses such as Class D/E are not available for use. These IP addresses are normally used for specific purposes such as multicasting or broadcasting. If you use this kind of IP addresses in general, it may cause some problem in network.
- Network specifications depend on each camera manufacturer. Class C is used in common and for large/medium-sized network, Class B is generally used.

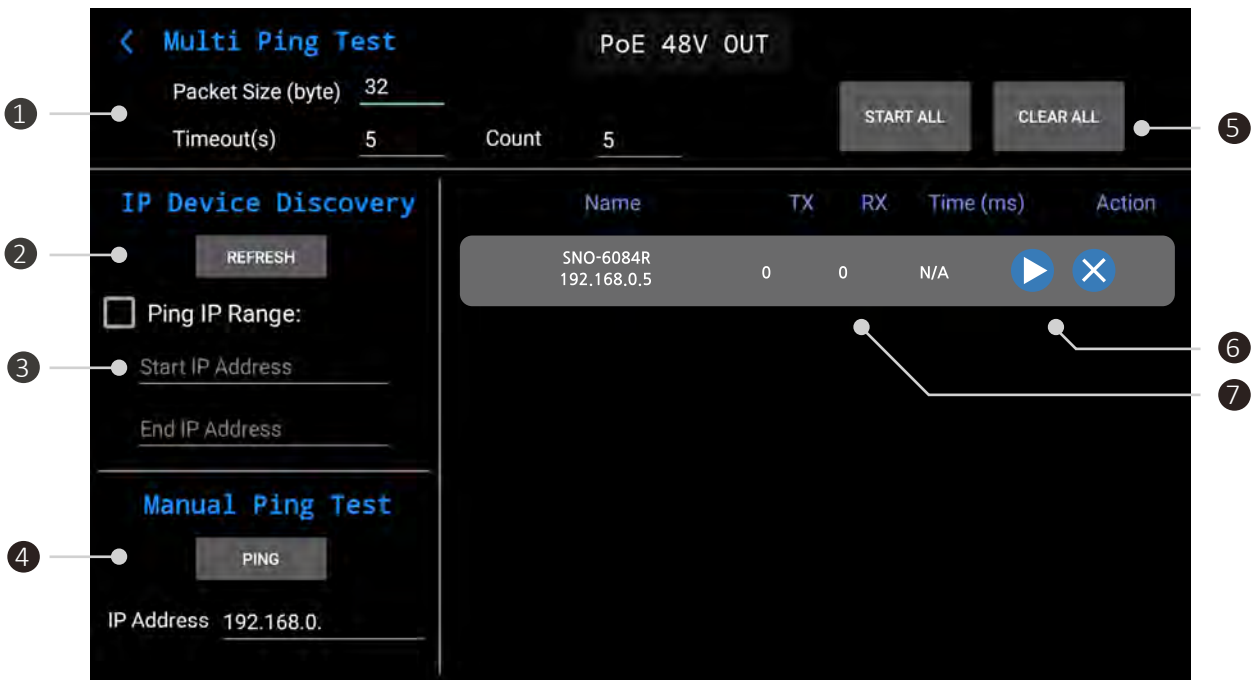
## Link-local Address

- All devices using network are able to have one or more link-local addresses.
- The range of the link-local address is from 169.254.0.0 to 169.254.255.254
- All network cameras have link-local address and can be discovered and connected with this test monitor.

# IP App. Functions

## Multi Ping Test

- You can check the connection status of the camera by Ping test.
- For Ping test, the camera's IP address is used only.



No.	Name	Description
①	Packet Setting	Set the size, response time and number of packets to be sent.
②	Refresh Button	Rediscover the connected IP camera.
③	IP Device Range Search	Discover manually connected IP camera.
④	Single Ping Test	Ping the input IP address.
⑤	Start All Button	Ping or initialize all discovered cameras.
⑥	Operating Button	Ping or initialize the selected camera.
⑦	Status Window	Check the number and time of packet transmission / reception.

# Viewer App. Functions

## Main Page

- Viewer App. can check SDI, HDMI, AHD, CVI, TVI, CVBS signals.
- SDI products should be connected to SDI Input BNC port and HD analog/CVBS products shall be connected to Video Input BNC port for the relevant video signal input.
- Wi-Fi should be off for SDI input. It may generate some video noise in a long-distance transmission.



No.	Name	Description
①	Video Input Status	When no video is entered, it displays "----" as shown in the above picture. The resolution of the input video is shown just after entering video and the window will be closed in 10 seconds.
②	Level Meter/ Focus Meter	SDI mode has S. Level meter and AHD/CVI/TVI/CVBS modes have A. Level and F. Level meters. Focus Meter function is to adjust the camera focus more easily and accurately in numerical values. This function is shows the optimum and current focus status(depth) in real time.
③	Video Menu	This menu includes PTZ/OSD/UTC, Record, Capture, Gallery(Playback), PoC functions and Settings, etc.

### ! Cautions for SDI Input

- When a specific SDI signal is input, abnormal audio may be output. It is not possible to solve this compatibility problem, so please adjust the sound.

# Viewer App. Functions

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## Supported Resolution

**SDI**  
**1920X1080p30**

- ① HD-SDI Input
  - Displayed as SDI.
  - Input signal resolution is displayed.
  - Support standard SDI input.

**EX-SDI**  
**1920X1080p30**

- ② EX-SDI Input
  - Displayed as EX-SDI.
  - Input signal resolution is displayed.
  - Support EX-SDI 1.0, 2.0.

**3G-SDI**  
**1920X1080p60**

- ③ 3G-SDI Input
  - Displayed as 3G-SDI.
  - Input signal resolution is displayed.
  - Support standard 3G-SDI input.

**AHD**  
**1920X1080p30**

- ④ HD Analog Input
  - Displayed as AHD, TVI, CVI.
  - Input signal resolution is displayed.
  - For AHD, TVI, CVI cameras, signal formats are not standardized so the video may not be displayed depending on the manufacturer.

**CVBS**  
**NTSC**

- ⑤ CVBS Input
  - Displayed as NTSC/PAL.
  - Support standard CVBS input.

**HDMI**  
**1920X1080p60**

- ⑥ HDMI Input
  - Displayed as HDMI.
  - Support up to 2160p 30Hz input.

# Viewer App. Functions

## Signal Level Meter Function

### 1. SDI Level Meter

- SDI Level Meter represents the current SDI signal status signal size in percentage.
- 100% means the most optimum signal status (the biggest signal size) and the lowest value is 0%.

**S. LVL : 015% NG**  
**FOCUS : 100/100**

- ① No Good
- NG displayed in 0~29%
  - Severe signal attenuation

**S. LVL : 045% Normal**  
**FOCUS : 100/100**

- ② Normal
- Normal displayed in 30~59%
  - Normal-state signal

**S. LVL : 090% Good**  
**FOCUS : 100/100**

- ③ Good
- Good displayed in 60~100%
  - Signal in good condition

### 2. Analog Level Meter

- Analog Level Meter represents the current Analog signal status (signal size and brightness) in percentage.
- The Level Meter can measure signal attenuation rate and adjust the level of the UTP receivers.

**A. LVL : 100%**  
**F. LVL : 100%**  
**FOCUS : 100/100**

- ① A. Level
- A. Level represents the signal brightness size (Sync.) and the standard value is 100%. Lower value means more signal loss, that is, decreased brightness and increased noise.
- ② F. Level
- F. Level represents the video color size (Burst) and the standard value is 100%. Lower value means lower resolution and worse color reproduction.

#### ! How to adjust the level value of UTP receivers

- It is possible to adjust the level value accurately in case of the UTP receivers.
- Set both A. Level and F. Level close to 100% and adjust it by checking the actual video.

# Viewer App. Functions

## Focus Meter Function

- Focus Meter represents the optimum and current focus status(depth) in numerical values.
- The focus depth is represented in numerical values between 255 and 0. Adjust the optimum and current focus depth to be matched.
- Focus meter value differs depending on the subject. Use SET button to reset the focus value in initial operation.



A. LVL : 100%  
F. LVL : 100%  
FOCUS : 098 / 225

Current Value      Optimum Value



A. LVL : 100%  
F. LVL : 100%  
FOCUS : 225 / 225

## CRC Error Count Function

- CRC Error Count measures the number of CRC errors in HD/EX/3G-SDI mode.
- When HD/3G-SDI is entered, CCRC and YCRC values will be displayed. For EX-SDI input, XCRC value will be displayed.

CCRC : 000  
YCRC : 000  
TIME : 00 : 00 : 00

HD/3G-SDI Mode

XCRC : 000  
TIME : 00 : 00 : 00


EX-SDI Mode

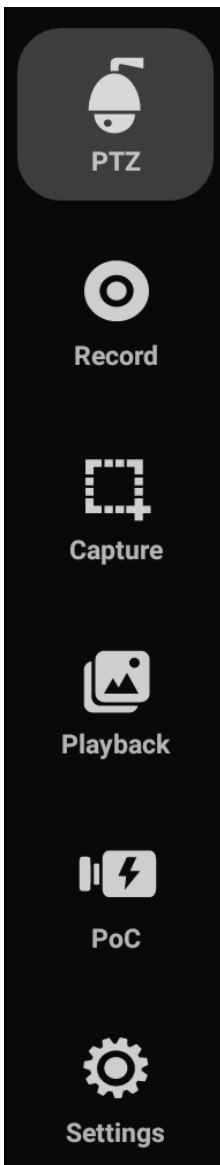
- ① To activate this function, press the Set button once after connecting the camera.
- ② To initialize the values, press the Set button for two seconds during CRC measurement.
- ③ To terminate this function, press the Back button.

# Viewer App. Functions

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## Video Menu Bar

- Only activated menus are available for each video mode : SDI, HD Analog, HDMI.
- Press the Menu button or Menu icon . The Menu bar will be popped up as shown as follows.

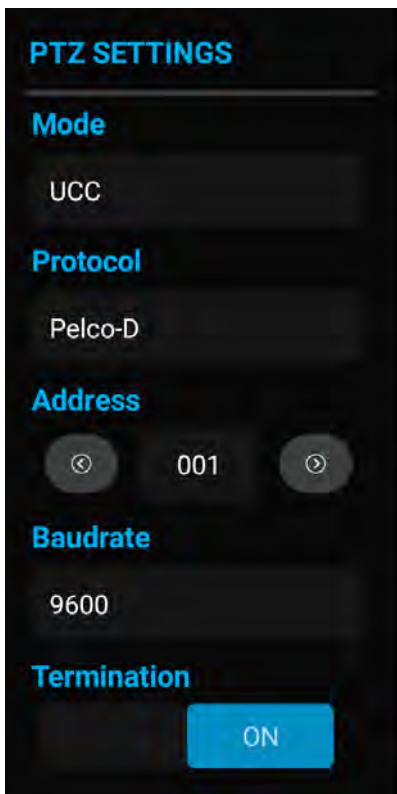


- ① PTZ
  - Camera PTZ or OSD settings are available through RS-485 TX function.
  - It is possible to receive or analyze data by using RS-485 RX, Analyzer function.
  - Camera PTZ or OSD settings are available through UTC/UCC function.
    - Deactivated in HDMI mode.
- ② Record
  - It is possible to record the input video.
  - Other Capacity is not available during recording.
  - The maximum recording time is 5 minutes.
- ③ Capture
  - It is possible to capture the input video.
  - The recorded or captured images are saved in Gallery.
- ④ Playback (Gallery)
  - Recorded or captured images are stored here.
- ⑤ Settings
  - Set where to save the recorded or captured images.
  - Turn on/off the Level and Focus Meter functions.

# Viewer App. Functions

## PTZ

- To implement PTZ function, the Mode, Protocol, Address and Baudrate must be set.
- UTC function is activated in HD Analog and CVBS modes and by this function, camera control via coaxial cable is available.
- UCC function is activated in SDI mode and by this function, EX-SDI camera that supports UCC control is available.



### ① Mode Settings

- This part includes RS-485 TX, RS-485 RX, Analyze, UTC, UCCA and UCCB.
- RS-485 TX mode is for PTZ and OSD control of connected camera.
- RS-485 RX mode receives PTZ control and displays as Hex value.
- Analyze mode analyzes protocols received through RS-485 port and confirms the command and Hex values at the same time.
- UTC/UCC modes are to control a camera over coaxial cable.

### ② Protocol Settings

- The protocol must be set same as the device to control.

### ③ Address Settings

- The address must be set same as the device to control.

### ④ Baudrate Settings

- The baudrate must be set same as the device to control.
- The available baudrate is 2400, 4800, 9600, 19200.

### ⑤ Termination Resistance Settings

- 75Ω termination resistance is available.
- Termination resistance is used to avoid of reflection effects which is generated by the impedance of transmitters.

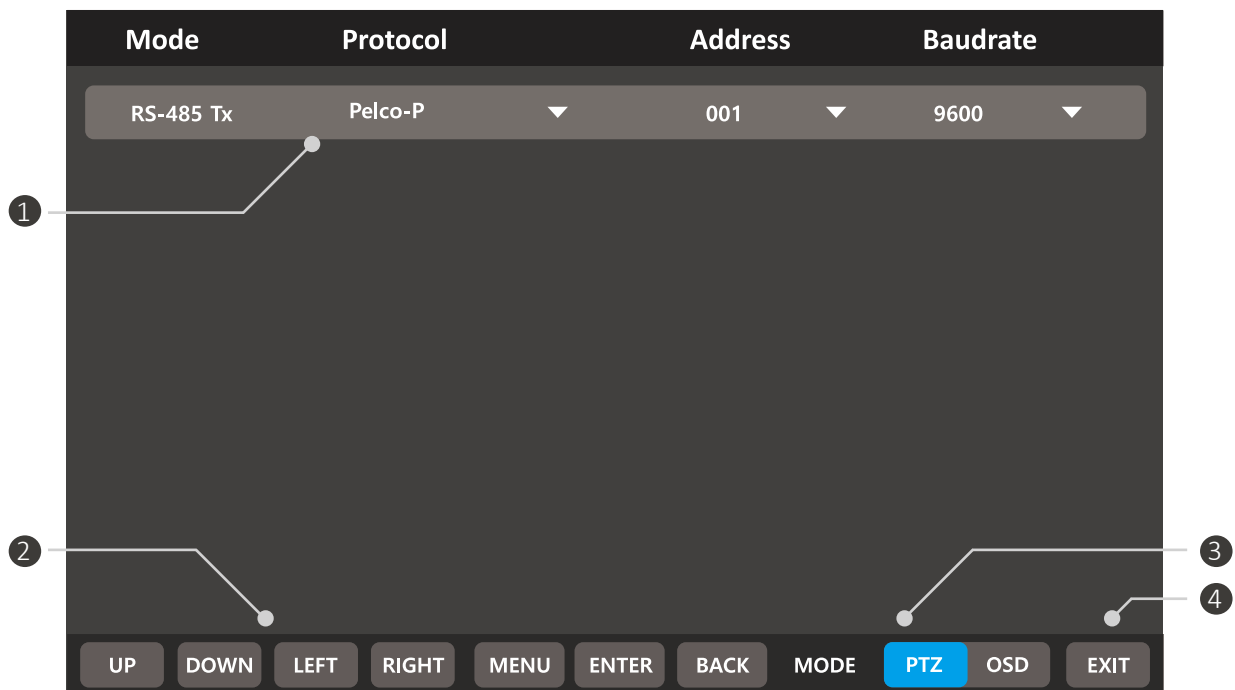
## ! Cautions for RS-485 Settings

- Make sure to check the polarity in RS-485 connection.
- Protocol and Address settings are not required for use of RS 485 Rx.
- Address settings are not required to use Analyze function.
- Address and Baudrate settings are not required for UTC.
- Make sure to check the camera specifications before using UCC. There may be a difference between protocol and baudrate by each manufacturer.



# Viewer App. Functions

## RS-485 Tx.



No.	Name	Description
①	Setting Status	All setting values such as mode, protocol, address, baudrate are displayed. It is able to change the setting value by pressing the triangle button on the right except the operation mode.
②	Touch Button	Use operation keys by touching the buttons.
③	Operating Mode	Change as PTZ or OSD mode. The function of the SET part changes according to the mode.
④	Exit Button	Terminate the PTZ operating mode.

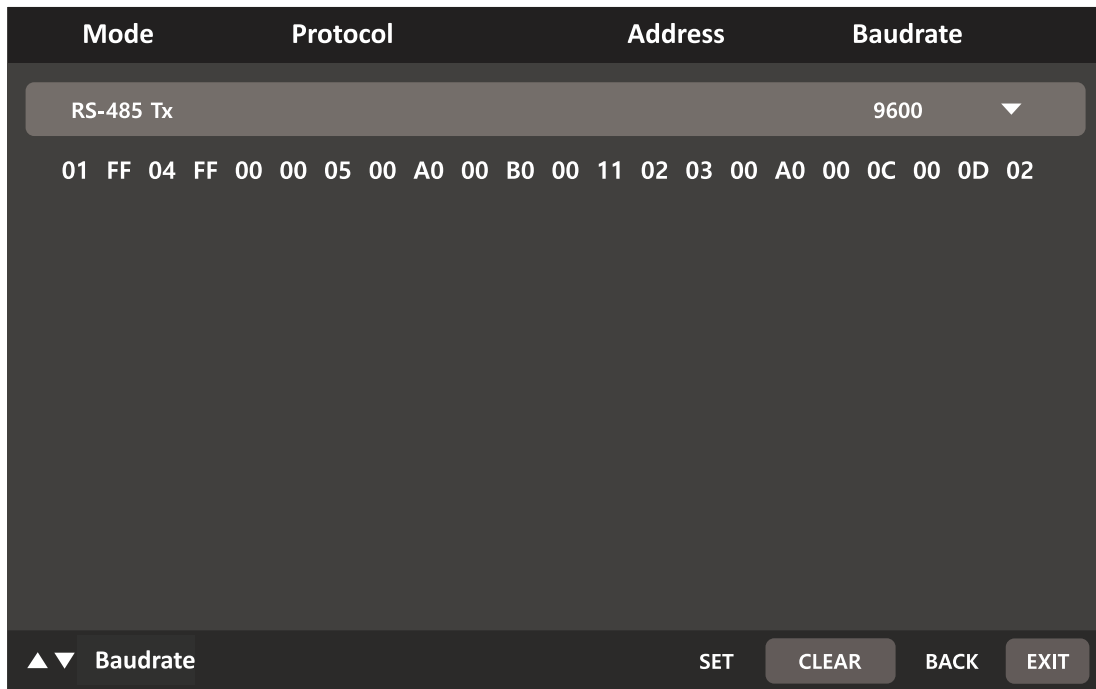
### ! Cautions for setting protocols

- Protocol commands depend on camera manufacturer.
- Appropriate protocol for camera shall be used.
- BACK button may not work in OSD mode depending on protocol.

# Viewer App. Functions

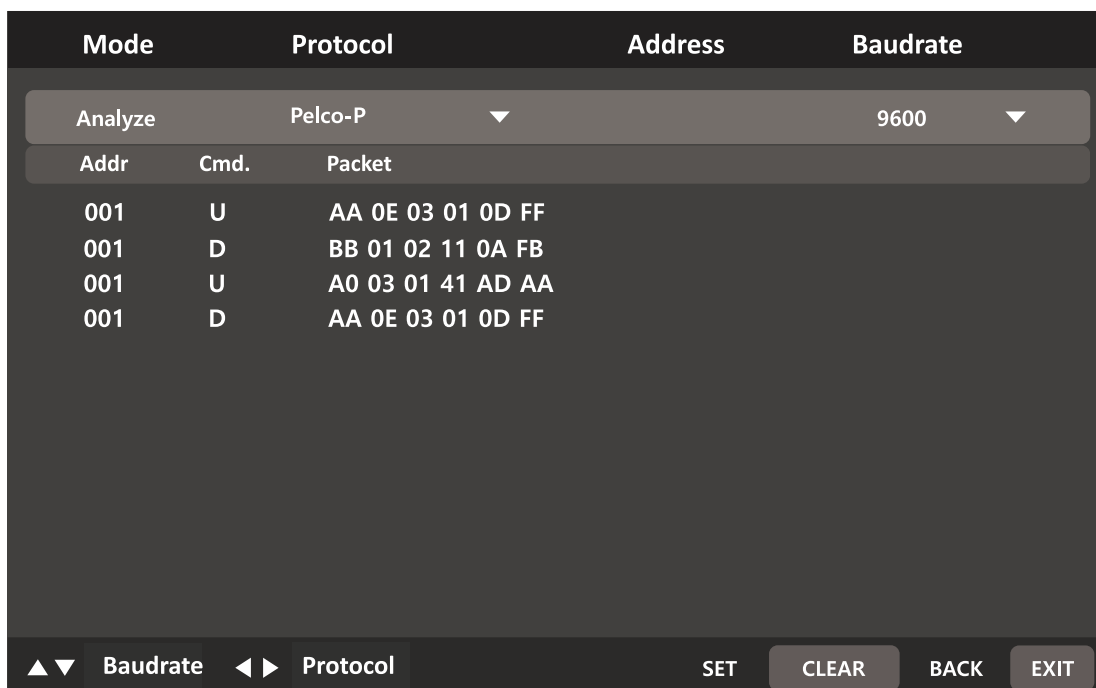
## RS-485 Rx.

- The current settings are displayed on the top of the screen.
- Data transmitted through RS-485 cable is displayed in HEX value on the screen.
- When the data is more than 264 Byte, the previous data will be deleted.



## Analyze Function

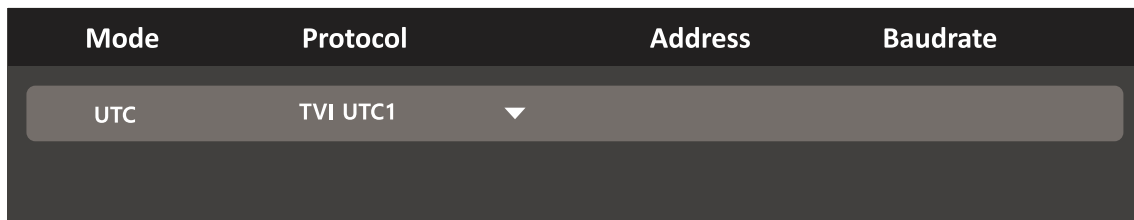
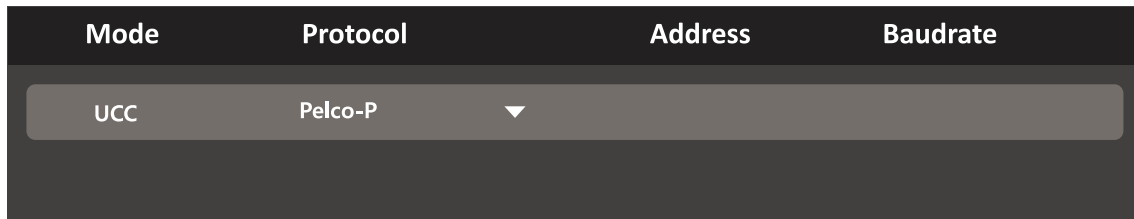
- RS-485 commands received from CCTV controller or external devices are displayed.



# Viewer App. Functions

## UCC, UTC

- UCC is a function that can set PTZ and OSD of cameras that supports 3G/HD/EX-SDI UCC through coaxial cable.
- UTC is a function that can set PTZ and OSD of analog cameras through coaxial cable.



Mode	Input Signal	Supported Items
UCC	EX-SDI	Support Coaxial communication of cameras that support EX-SDI UCC
UTC	CVBS	Support Coaxial communication of cameras from Hanwha(Samsung) Techwin (Winner 5), Pelco, D-Max(PIXIM)
	AHD	Support Coaxial communication of cameras that support AHD UCC
	TVI	Support Coaxial communication of cameras that support TVI UCC
	CVI	Support Coaxial communication of cameras that support CVI UCC

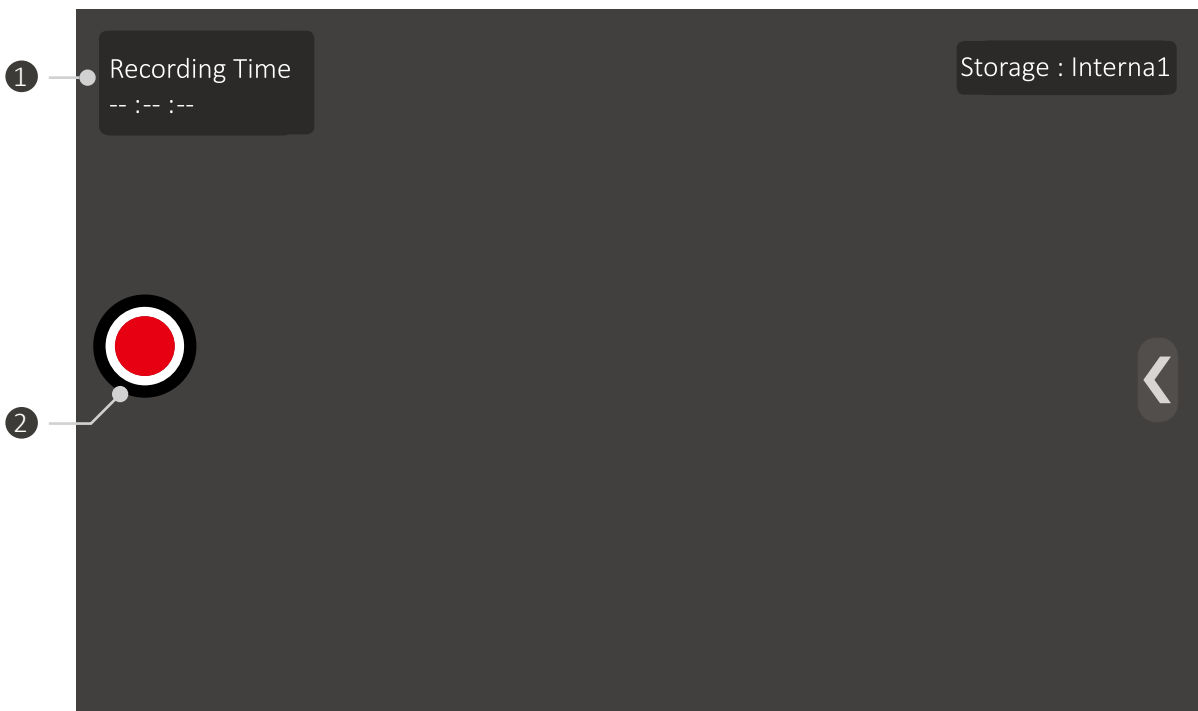
### ! Cautions for using UTC function

- UTC function for HD Analog may not work properly in a long distance
- Video may be flickering during UTC operation.
- UTC function for 3MP or higher-resolution cameras may not work properly, depending on the camera's brand.

# Viewer App. Functions

## Video Recording

- It is not recommended to record for a long time.
- If the internal storage capacity is not sufficient, mount external storage device.
- You can set the storage location in Settings after mounting external storage device.
- When recording video, it is saved in MP4 format.



No.	Name	Description
①	Recording Status	When recording is started, the time will increase and it is able to know the recording progress time. When recording is stopped, the time stops and the video is saved. You can see saved video in Gallery.
②	Recording Button	Start/End recording by pressing the recording button.

### ! Cautions for recording and capturing

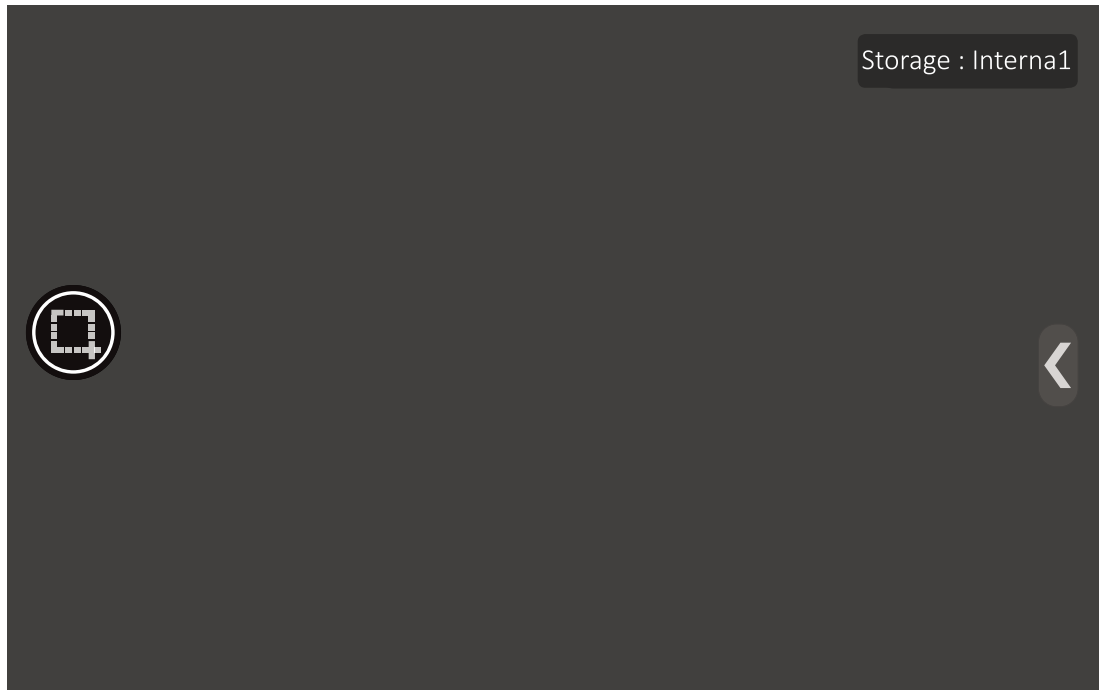
- When the internal capacity is full, recording is terminated and recorded video is saved automatically.
- If the recording file capacity is 3.5G or more, recording is stopped and recorded video is saved automatically.
- There are differences in recording quality depending on the video transmission quality.
- All video of 1920x1080 or higher resolution will be recorded in 1920x1080 and ones of 1920x1080 or less resolution will be recorded in 1280x720.

# Viewer App. Functions

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## Video Capturing

- It is available to capture the video and save as an image.
- If the internal storage capacity is not sufficient, mount external storage device.
- You can set the storage location in Settings after mounting external storage device.



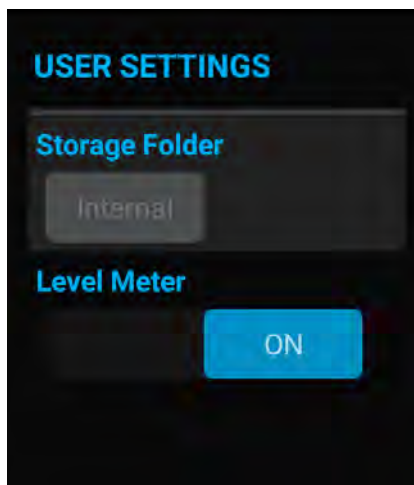
## How to Use Gallery

- The recorded or captured images are saved in Gallery.
- The routes for video generated in the IP App. and Viewer App. are displayed differently.
- If you unmount the Micro SD card during using Gallery App., some problems may occur in the stored files.

# Viewer App. Functions

## User Settings

- This menu is to set the storage location, or turn on/off the Level/Focus meter functions.



- ① Storage Folder
  - Set where to save the recorded or captured images.
  - Activated only when Micro SD Card is mounted.
- ② Level/Focus Meter
  - Turn on/off the Level/Focus meter functions.
  - The level meter will not be displayed in HDMI mode.

## How to Use USB LAN card

- You must use a USB LAN card that is supplied with the components. Other USB LAN cards may not work.
- Insert a USB LAN card into the USB port and select Wi-Fi in the setting to use.

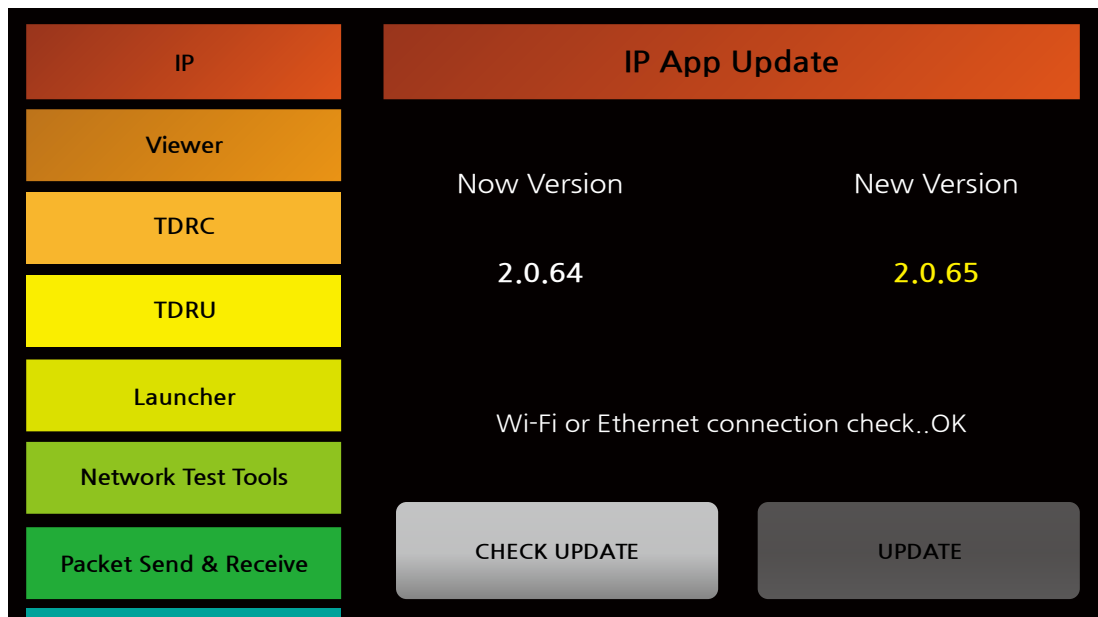


# Update App.

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## How to Use Update App.

- It is able to update to the latest Apps.
- Ethernet or Wi-Fi must be connected to use Update App.



- ① Check Update
  - With Wi-Fi connected, tap CHECK UPDATE button to see the current version installed.
  - If the installed Apps are the latest version, CHECK UPDATE button is not activated.
- ② Update
  - After checking the version and the installed Apps are not the latest version, the UPDATE button will be activated.
  - Tap the UPDATE button to update each App. There may a difference in update speed depending on the Wi-Fi environment.

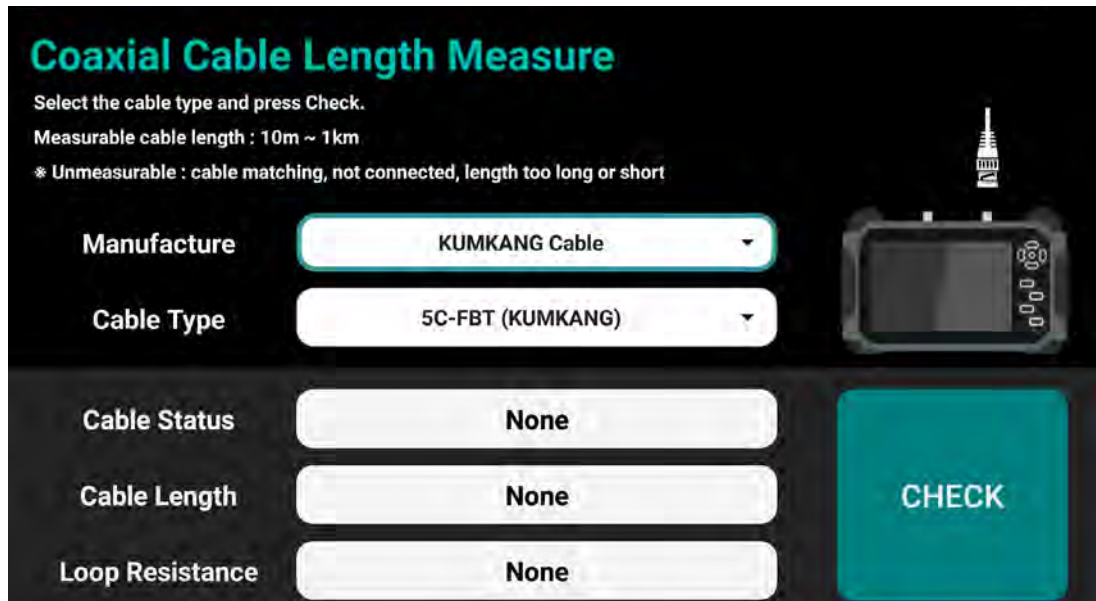
### ! When the update is not working

- If an error occurs during the update, delete the App. and run again.
- If the installation is interrupted, restart the Update App.
- If a parsing error message popped up, check if the internal storage is enough.
- Make sure that the Internet is connected properly.

# TDRC App.

## Operating Specifications

- Measurable cable length is 10m ~ 1km based on KumKang 5C-HFBT coaxial cable.
- It is not able to measure the cable if the cable length is too short or too long.
- If the other side of the cable is connected to a camera or other devices, it is not possible to get accurate value or measurement may not be done.



- ① Manufacturer and Cable Type
  - Select the manufacturer and cable type for accurate measurement.
  - If you do not know the cable manufacturer, you can select random cable to measure, but it is not possible to get accurate value.
- ② Cable Status
  - Displayed as Open, Short, Unmeasurable.
  - Open is displayed when nothing is connected to the other side of the cable.
  - Short is displayed when there is a Short on the other side of the cable or when there is a severe pressing in the middle of the cable.
  - Unmeasurable is displayed when the cable is matched, or the length is too long or too short.
- ③ Cable Length
  - Displayed in meter(m) and feet(ft).
- ④ Loop Resistance
  - Set the switch of TG01 to Loop and connect it to the end of coaxial cable to measure.
  - If the loop resistance value is abnormal, check the connection status of TG01.

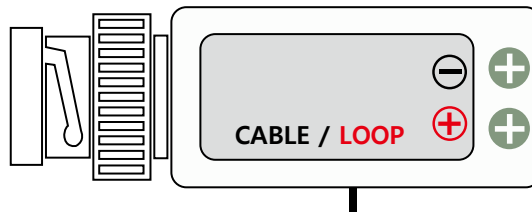


# TDRC App.

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## How to Use TG01

- This BNC to TB(2P) connector is for measuring loop resistance of coaxial cable.
- Connect BNC-A-JJ to the end of coaxial cable and connect TG01.



- ① Operating Switch
  - CABLE: Displayed as OPEN in Cable Status.
  - LOOP: Displayed as SHORT in Cable Status, and loop resistance value is displayed.
- ② Terminal Block
  - Measure UTP cable length that RJ45 is not connected.
  - The switch must be set to CABLE to measure cable length.

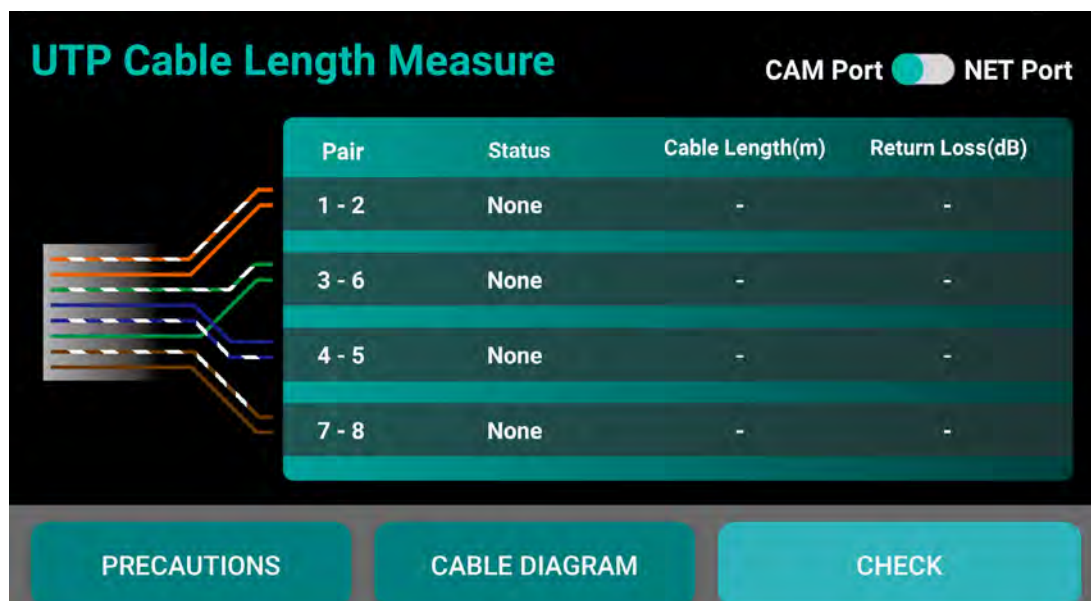
## How to Use TG02

- This BNC to RG45 connector is for measuring UTP cable length between 200m ~ 500m.
- Only the length of UTP cable #1 and #2 (1 pair) are measured.
- Select UTP Cable- TG02 in Manufacturer, and set the Cable Type to match the UTP cable.

# TDRU App.

## Operating Specifications

- Measurable cable length is 10m ~ 200m based on CAT 5E UTP cable.
- It is not able to measure the cable if the cable length is too short or too long.
- If the other side of the cable is connected to a camera or other devices, it is not possible to get accurate value or measurement may not be done.



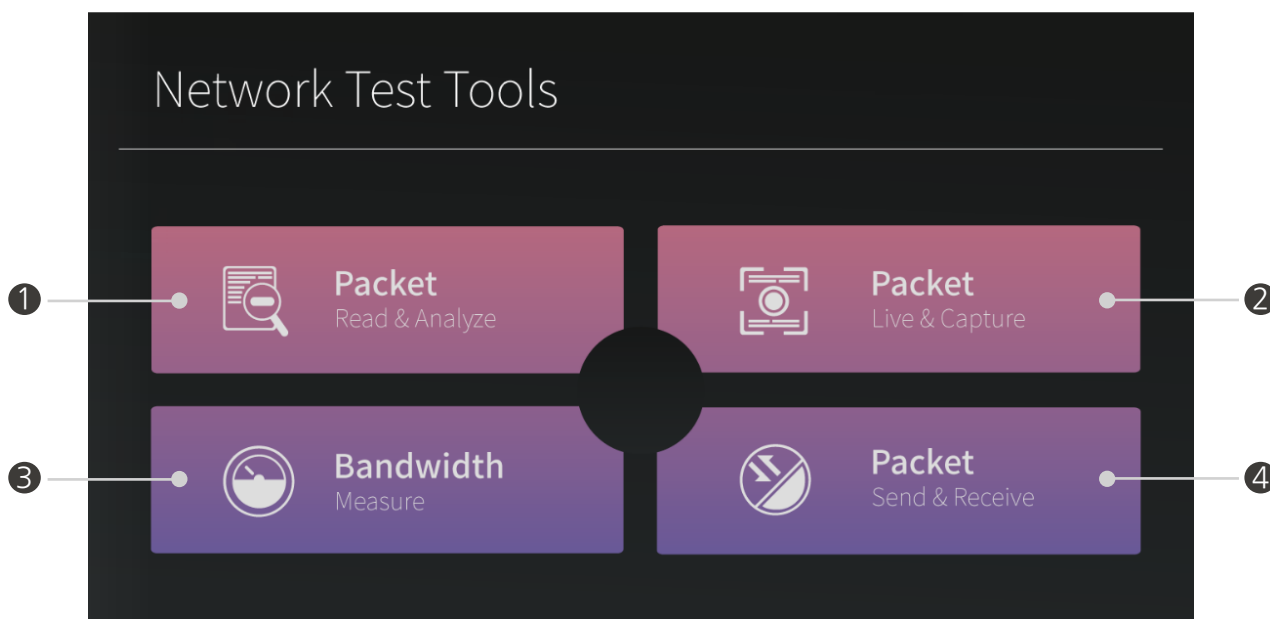
### ① Cable Diagram

- Check the image of standard cable specifications.
- Pairs are displayed differently according to 568A, 568B.

### ② Cable Status

- Displayed as Invalid, Pair OK, Pair Open, Same Pair Short, Cross Pair Short, Pair Busy.
- Invalid, Pair Busy is displayed when the measurement is cannot be done by unknown reason. Check if the cable length is too short or too long.
- Pair OK is displayed when the cable is connected to other device. The length may be measured depending on the other device.
- Pair Open is displayed when nothing is connected to the cable. Even when the cable is connected, Pair Open may displayed to a specific pair depending on the other device.
- Same Pair Short is displayed when a Short occurred to the cables in same pair.
- Cross Pair Short is displayed when a Short occurred to the cables in cross pair.

# Network Test Tools

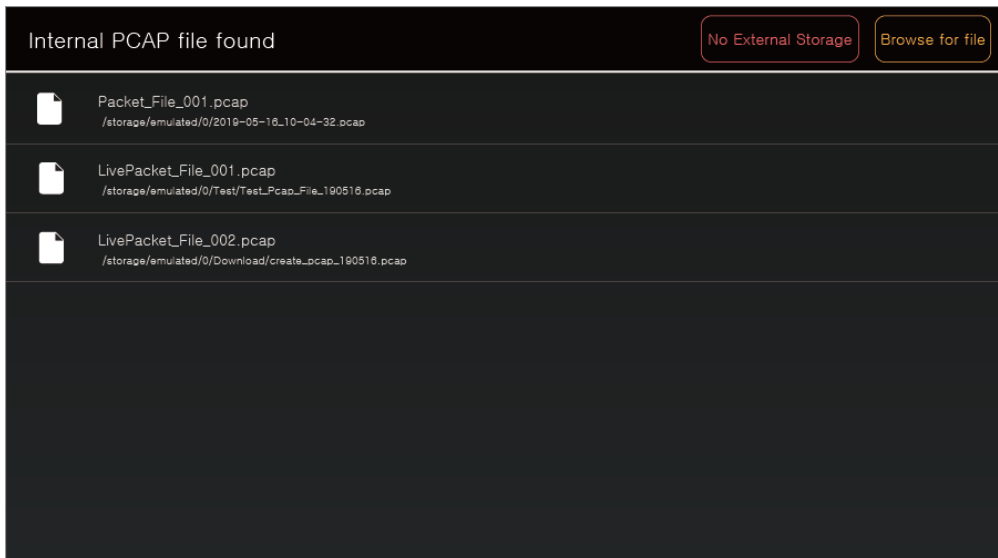


No.	Name	Description
①	Packet Read & Analyze	Open the stored packet file to read and analyze in detail. Able to view the total bandwidth and bandwidth usage by protocol captured from the file as a graph.
②	Packet Live & Capture	Display the packet data on the Network line in real time or save as PCAP (standard packet file). Apply various filters to display the corresponding packets.
③	Bandwidth Measure	Measure the maximum available bandwidth on the network line. Use two IP monitors or one IP monitor and PC for Server and Client.
④	Packet Send & Receive	Generate UDP packet to send or receive.

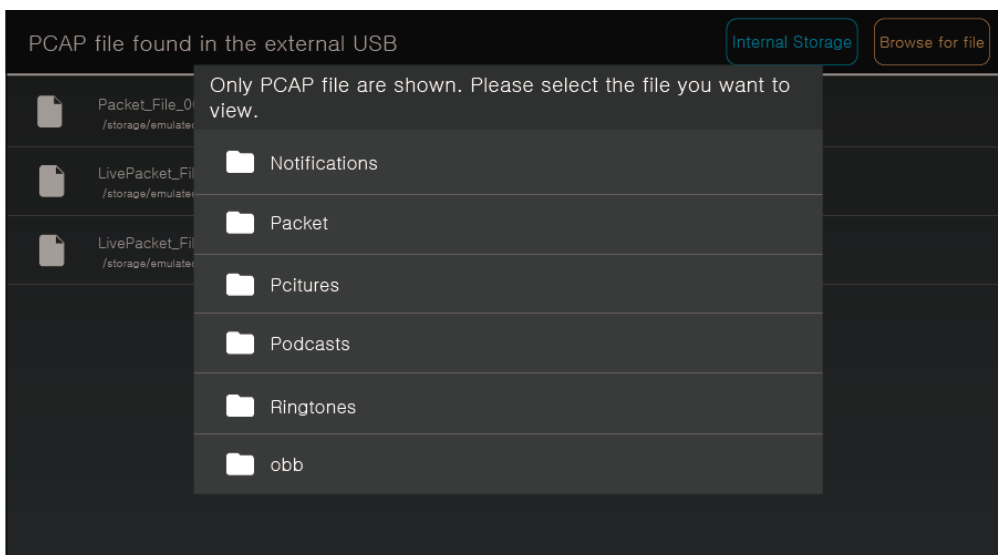
# Network Test Tools

## Packet File List

- Press Packet Read & Analyze button to move to the file list.



- Search PCAP file in the storage and display in the list.
- If an external storage device is inserted, No External Storage button is changes to External Storage button.



- Some packet data files may not displayed in the list. In this case, click the Browse for file button in the upper right corner to open the file manually.

### ! When the file is not opened

- If the file is not saved normally, it will not be opened.
- If you open and close the file repeatedly, the App. may stop. In this case, please try to open the file again.

# Network Test Tools

## Read Packet Files

No.	Time	Source	Destination	Protocol	Length
1	0.000000	88:51:FB:70:8C:D3	FF:FF:FF:FF:FF:FF	ARP	60
2	0.000050	88:51:FB:70:8C:D3	FF:FF:FF:FF:FF:FF	ARP	60
3	0.006870	FC:AA:14:93:88:08	FF:FF:FF:FF:FF:FF	ARP	60
4	0.006887	FC:AA:14:93:88:08	FF:FF:FF:FF:FF:FF	ARP	60
5	0.176888	175.195.153.112:138	175.195.153.255:138	UDP	215
6	0.176850	175.195.153.112:138	175.195.153.255:138	UDP	215
7	0.176904	175.195.153.112:138	175.195.153.255:138	UDP	215
8	0.176952	175.195.153.112:138	175.195.153.255:138	UDP	215
9	0.221810	FE80:0000:0000:0000:F4B7:B7AB:36E1:A3B1	FF02:0000:0000:0000:0000:0001:FF53:A30B	IPv6	86

- Read the selected packet file from the list and display it as a list.

Name	Description
Time	Time when packets were captured in a file.
Source	Address of the network device that sends packets on the network line. Displayed as IPv4, IPv6, and MAC address.
Destination	Address of the Network device that receives packets on the network line. Displayed as IPv4, IPv6, and MAC address.
Protocol	Protocol used to send/receive packets.
Length	Data size of the corresponding packet.

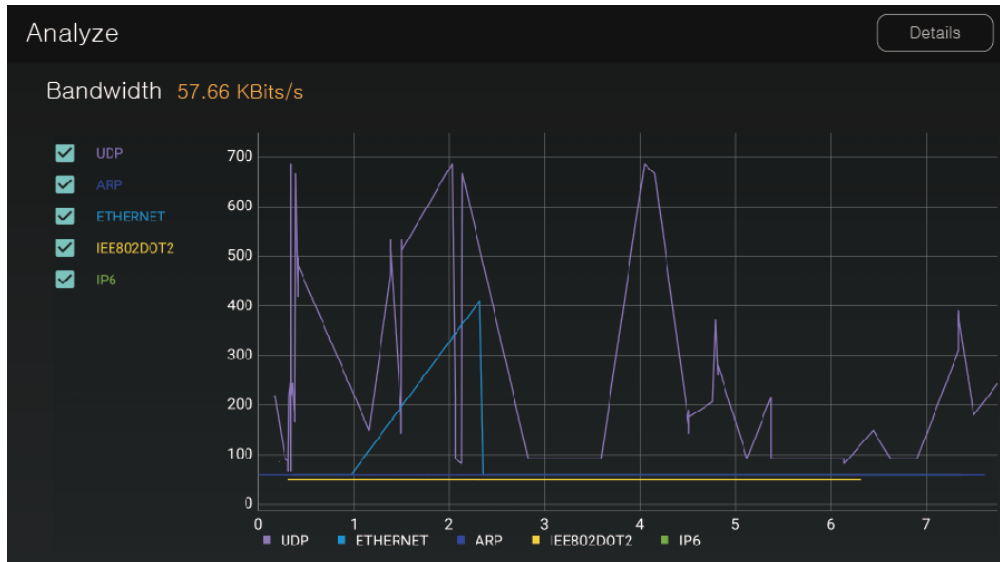
## Packet Search Mode

No.	Time	Source	Destination	Protocol	Length
5	0.176888	175.195.153.112:138	175.195.153.255:138	UDP	215
6	0.176850	175.195.153.112:138	175.195.153.255:138	UDP	215
7	0.176904	175.195.153.112:138	175.195.153.255:138	UDP	215
8	0.176952	175.195.153.112:138	175.195.153.255:138	UDP	215

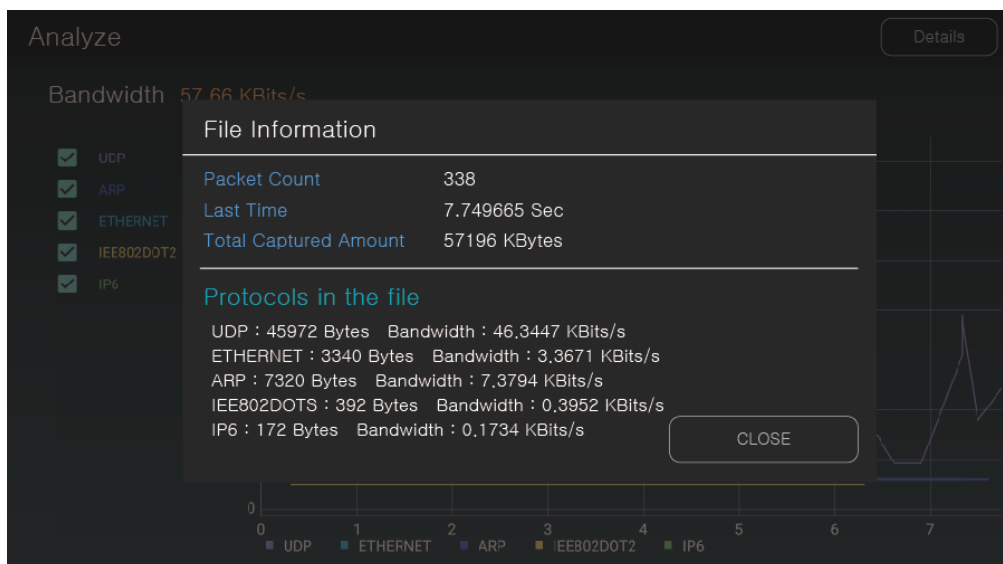
- Press Search button to enter Search Mode.
- Select the item and search to display the corresponding packet.

# Network Test Tools

## Packet File Analyze



- Press Analyze button to display the measured bandwidth in the packet file as a graph.
- Select the checkbox on the left to display the bandwidth and graph of corresponding protocol.
- Only the bandwidth of the checked items is displayed as a number.

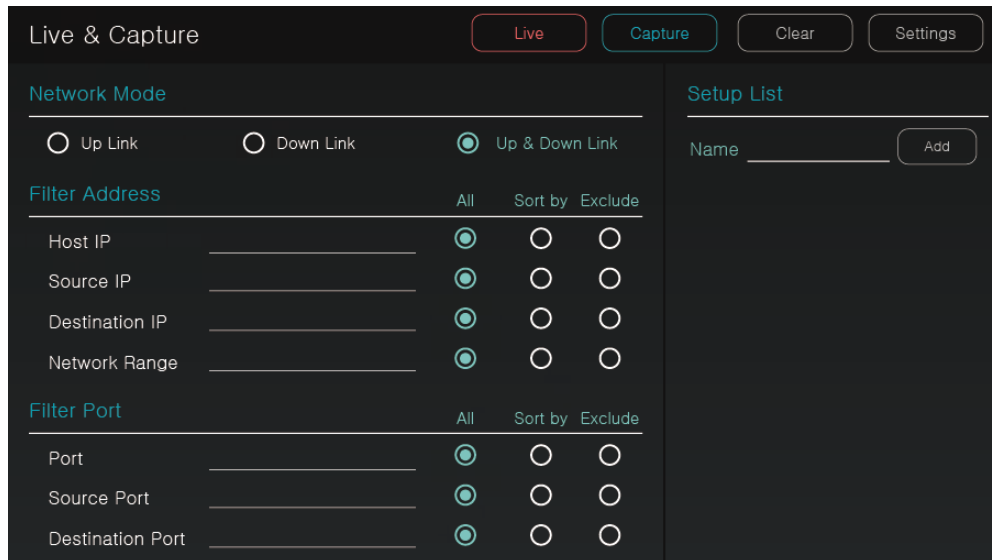


- Press Details button on the upper right to display file information.
- The protocol included in the file depends on whether the checkbox is selected or not.

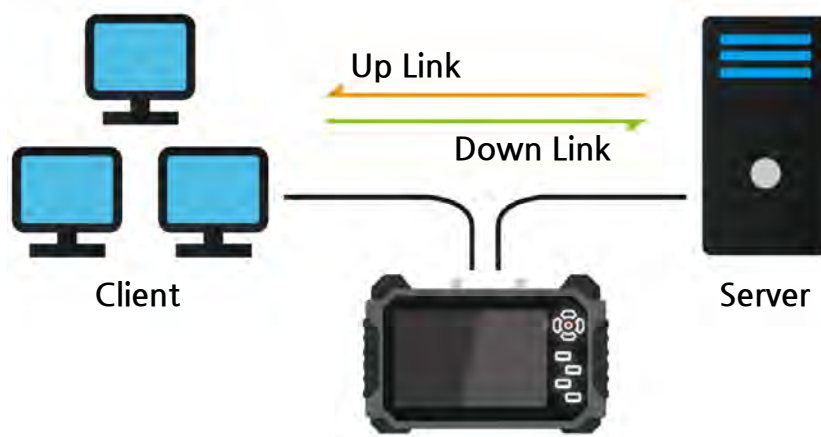
# Network Test Tools

## Packet Filter Setting

- Press Packet Live & Capture button to move to the filter setting.



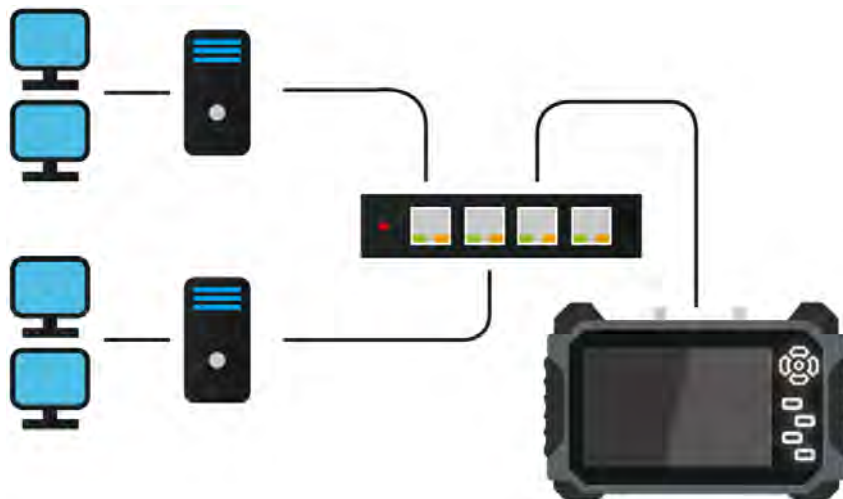
### ① Network Mode



- It is able to set the direction of network packet monitoring by selecting the mode as Up Link / Down Link / Up & Down Link.
- The server must be connected directly to the client to see which packets communicate between the server and the client.

# Network Test Tools

## Packet Filter Setting



- After connecting the monitor to the hub where the Network is configured, it is able to check the packet data.
- In above case, packets that directly communicate with the server cannot be checked. To check them, the server and client should be connected to two ports of IP monitor as shown in figure 1.

### ② Filter Address

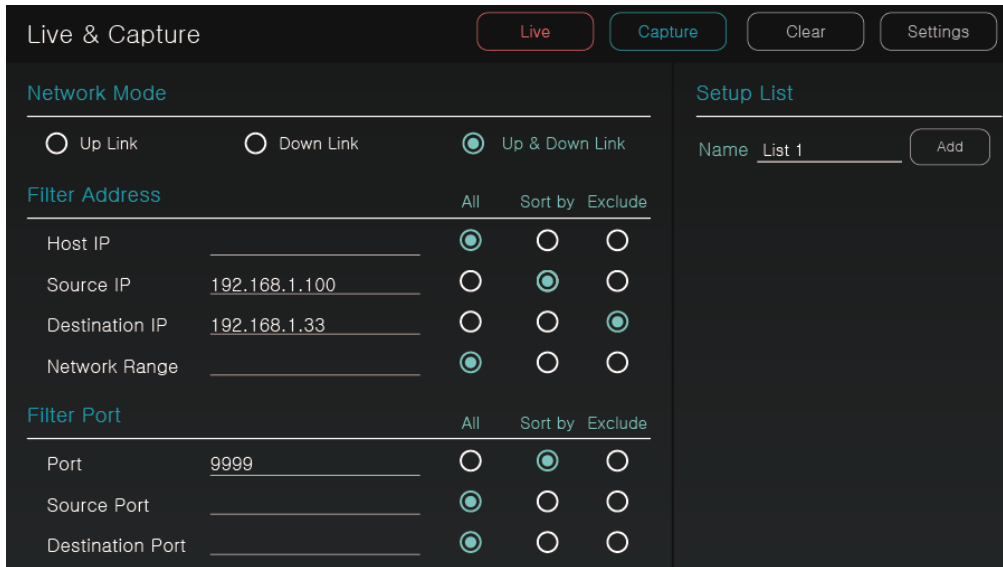
- Set filters to monitor corresponding packets, not the entire packets.
- Select All to show input value. Select Exclude to show values excluding input value.

Name	Description
Host IP	Search packets that use the entered IP address as Host.
Source IP	Search packets that use the entered IP address as Source.
Destination IP	Search packets that use the entered IP address as Destination.
Network Range	Set the entered IP address as a range, and search packets related to corresponding range. Ex) When selecting All and input 192.168.1, 192.168.1.xxx packets are displayed. When selecting Exclude and input 192.168.1, 192.168.1.xxx packets are not displayed.
Port	Search packets that use the entered Port.
Source Port	Search packets that use the entered Port as Source.
Destination Port	Search packets that use the entered Port as Destination.
Port Range	Set the entered Port as a range, and search packets related to corresponding range.
Transport	Select either TCP or UDP to search corresponding packet.
Network Layer	Select among ICMP, ARP or IPv6 to find corresponding packet.

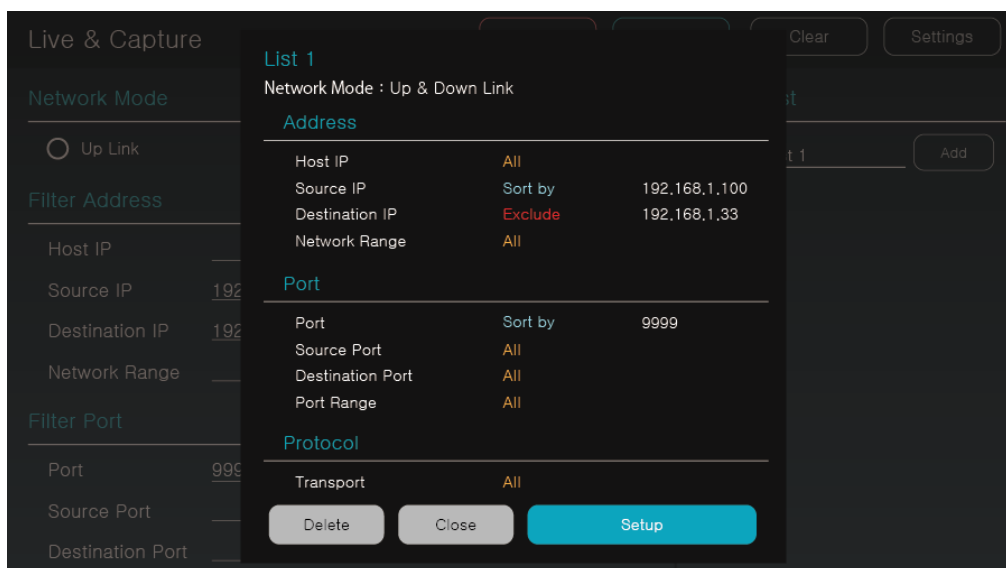


# Network Test Tools

## Filter Setup List



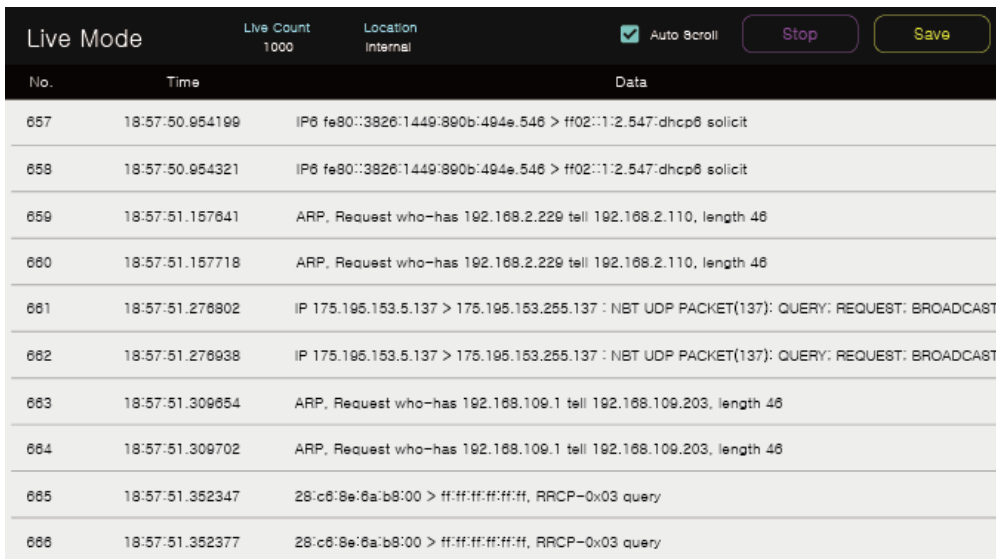
- Setup list stores the values entered in the filter.
- After entering the name to display the list, press Add button to create the list.



- Select the saved list and press Setup to apply saved filter values.
- Press Delete to delete the filter list.

# Network Test Tools

## Live Mode



No.	Time	Data
657	18:57:50.954199	IP6 fe80::3826:1449:890b:494e,546 > ff02::1:2,547:dhcp6 solicit
658	18:57:50.954321	IP6 fe80::3826:1449:890b:494e,546 > ff02::1:2,547:dhcp6 solicit
659	18:57:51.157641	ARP, Request who-has 192.168.2.229 tell 192.168.2.110, length 46
660	18:57:51.157718	ARP, Request who-has 192.168.2.229 tell 192.168.2.110, length 46
661	18:57:51.276802	IP 175.195.153.5.137 > 175.195.153.255.137 : NBT UDP PACKET(137): QUERY: REQUEST: BROADCAST
662	18:57:51.276938	IP 175.195.153.5.137 > 175.195.153.255.137 : NBT UDP PACKET(137): QUERY: REQUEST: BROADCAST
663	18:57:51.309654	ARP, Request who-has 192.168.109.1 tell 192.168.109.203, length 46
664	18:57:51.309702	ARP, Request who-has 192.168.109.1 tell 192.168.109.203, length 46
665	18:57:51.352347	28:c6:8e:6a:b8:00 > ff:ff:ff:ff:ff:ff, RRCP-0x03 query
666	18:57:51.352377	28:c6:8e:6a:b8:00 > ff:ff:ff:ff:ff:ff, RRCP-0x03 query

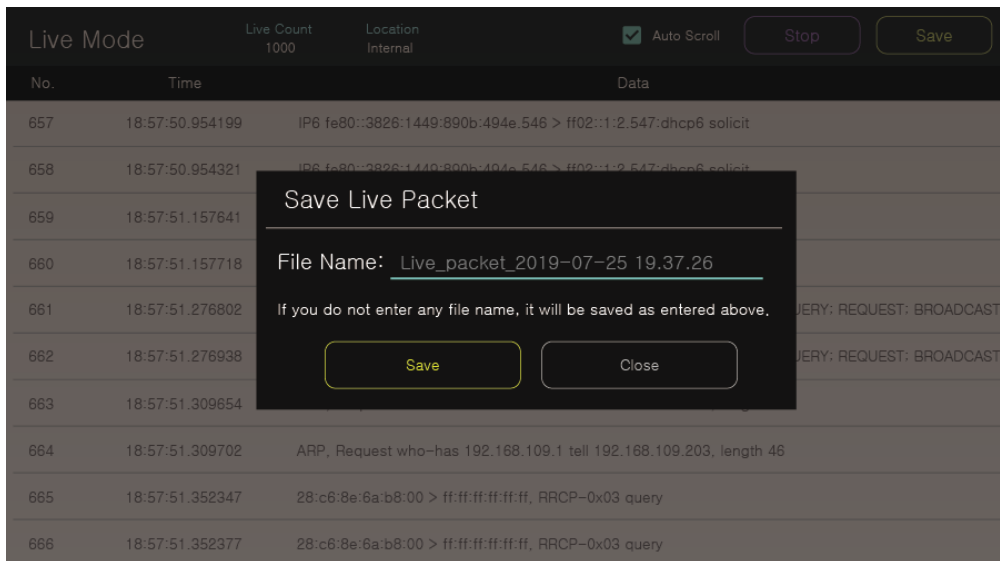
- Press Live button on the filter screen to activate Live Mode that can monitor packets in real time.
- Live Mode does not display detailed packet information. For detailed packet analysis, save the packet as a file and analyze it.
- There is a limit on the number of packets in Live Mode. The number can be changed in the Settings.
- After Live Mode is completed, the packet can be saved as a file and the specified storage location is displayed in the Settings.
- When Auto Scroll is set, the scroll automatically goes down according to the packet input.
- Packet Save is available after the Live Mode is stopped.
- During Live Mode operation, press the back key twice to move to the previous screen.

### ! Precautions

- If the number of packets increases rapidly due to the sudden increase of bandwidth usage, the packet output is paused and displayed after stabilization.
- If packets are not displayed after a certain period of time during Live Mode, the network should be checked again.
- If any traffic that cannot be processed is searched during Live Mode, Live Mode is stopped.
- The time of Live Mode is set to GMT-1, so it is displayed differently from the time of the monitor.

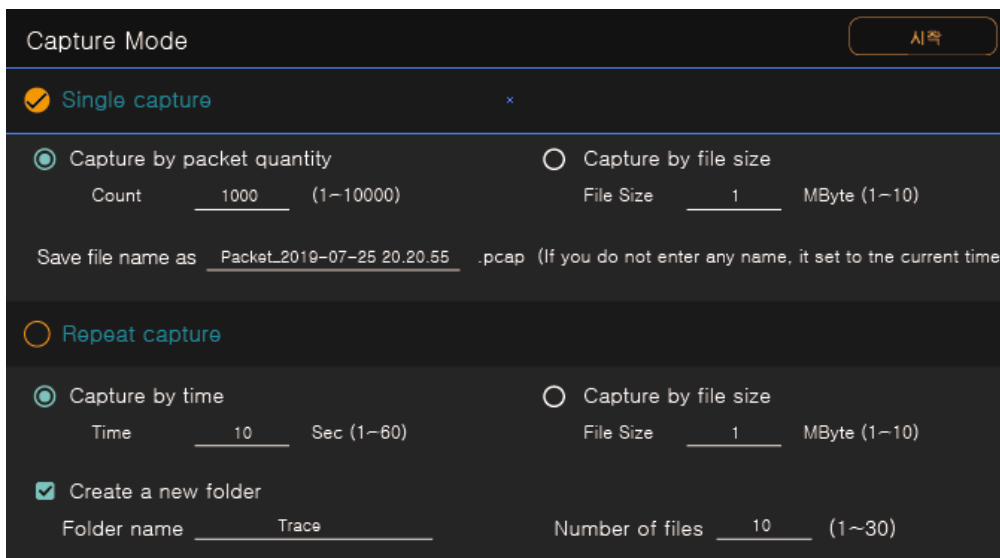
# Network Test Tools

## Save Live Packet



- After Live Mode is stopped, press Save button to display Save Live Packet pop-up.
- If you do not enter anything in the File Name, the file will be saved as current time.

## Capture Mode

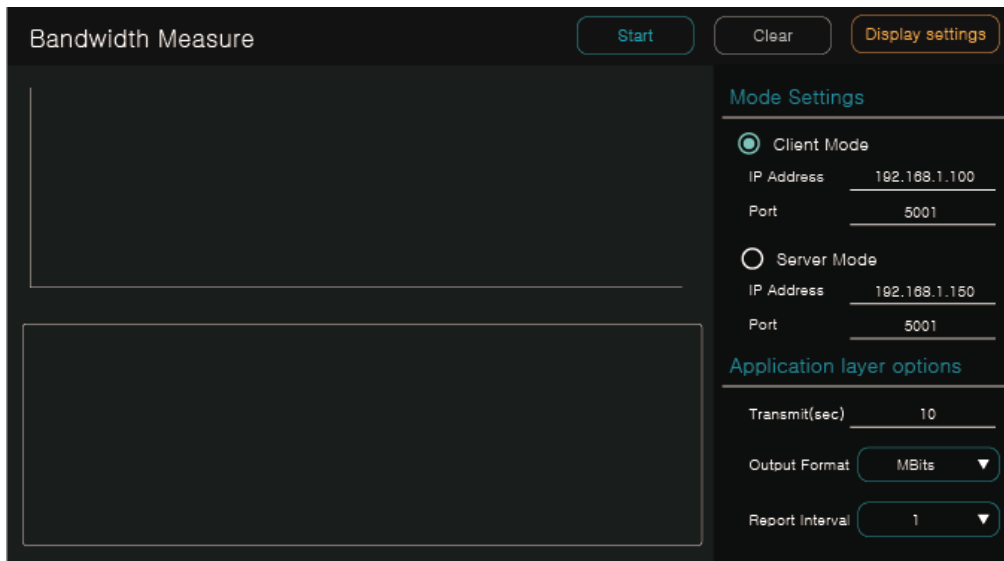


- Select between Single Capture and Repeat Capture modes.
- In Single Capture mode, it is able to select the maximum number of packets and file size, and set the file name.
- In Repeat Capture mode, it is able to capture repeatedly in capture time and file size as many times as the entered number of files.
- In Repeat Capture mode, select Create a new folder to create new folder with the name you entered, and the packet file is saved in the created folder.

# Network Test Tools

## Bandwidth Measure

- Press Bandwidth Measure button to move to the main page of Bandwidth Measure App.
- To measure bandwidth, two IP monitors are required to act as a server and a client.
- Measure the maximum bandwidth available on the Network.



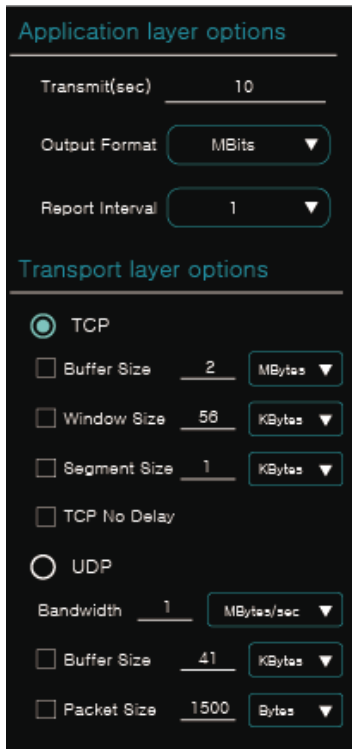
- ① Client Mode
  - To operate in Client Mode, the IP address must be set to the same IP address as the Server IP address.
  - Enter the IP address of server monitor connected to IP address and start.
- ② Server Mode
  - Server Mode IP address is set to the IP address of this monitor.
  - The server can receive data from the client continuously while it is active.

### ! Precautions

- Abnormal value is output if Server Mode is forcibly terminated during Bandwidth Measure.
- If the server is not active, Bandwidth Measure does not work even though you press Start in Client Mode.
- If this function is executed in operating line, it may cause network load.

# Network Test Tools

## Bandwidth Measure Layer Options



### ① Application Layer Options

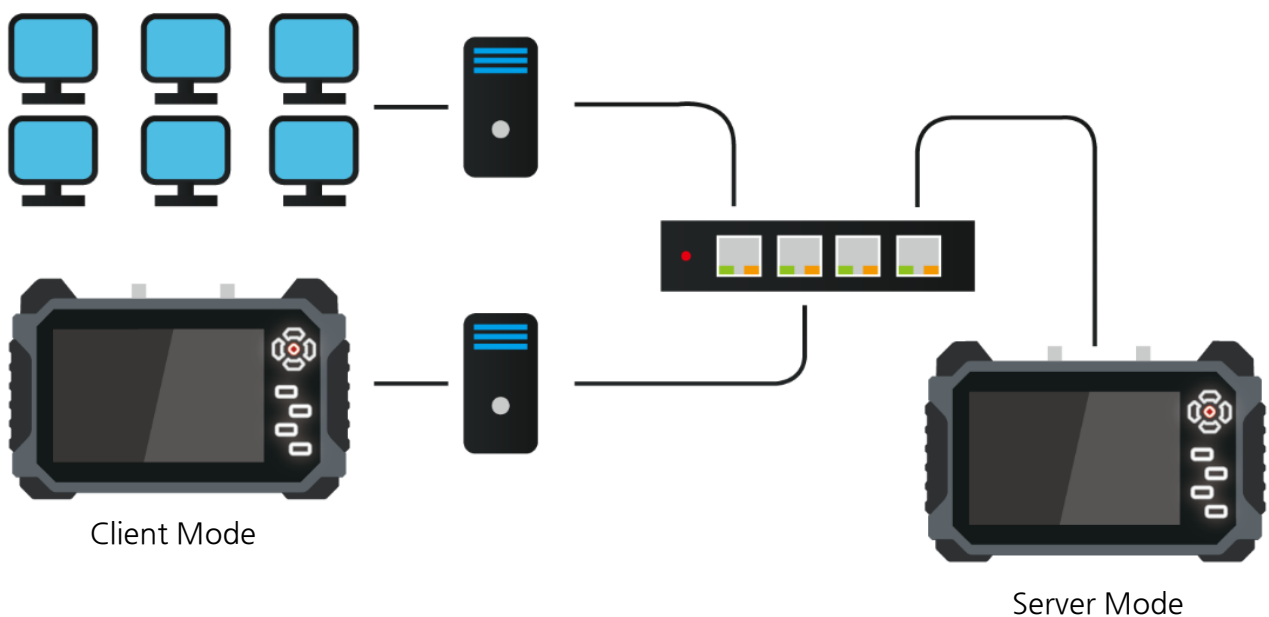
- Transmit(sec) is used in Client Mode and sets the measurement time.
- Output Format sets the output unit of the graph and the result value.
- Report Interval sets the display interval of the graph and the result value.

### ② Transport Layer Options

- Set the TCP option to measure bandwidth similar to the field.
- When set as UDP, the default bandwidth is set to 1MBytes/sec.

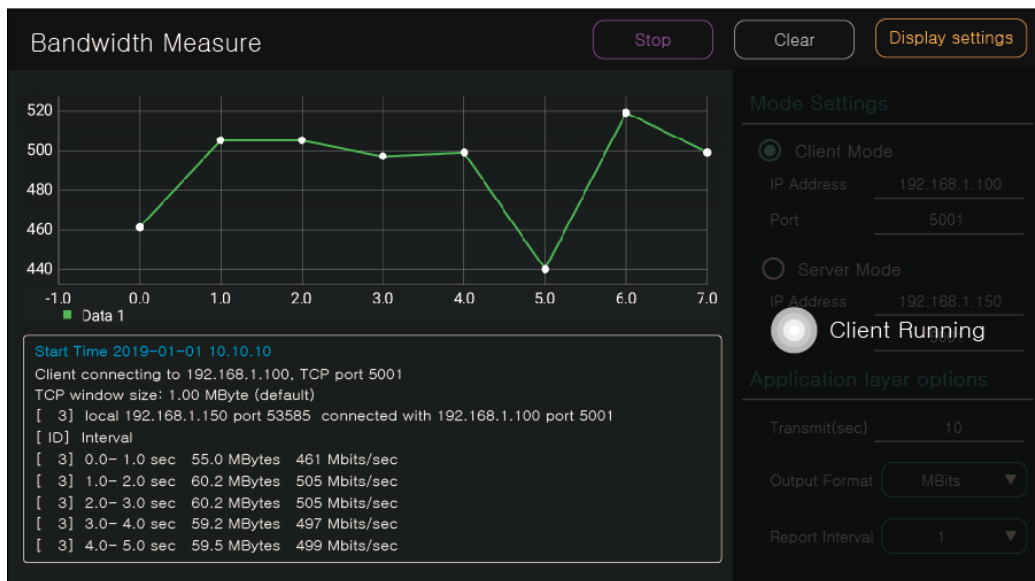
## Bandwidth Measure Configuration

- The following figure shows a configuration example. This function is available on various network lines.



# Network Test Tools

## Client Mode Operation



- Select Client Mode, enter the server IP address 192.168.1.100 in IP and press Start button.
- If Transmit(sec) is set to 10, 10 points are created on the graph.
- If the Output Format is set to MBits, the unit of the left value of the graph is displayed in MBits.
- If the Report Interval value is set to 1, the measurement is performed in every second.

## Server Mode Operation

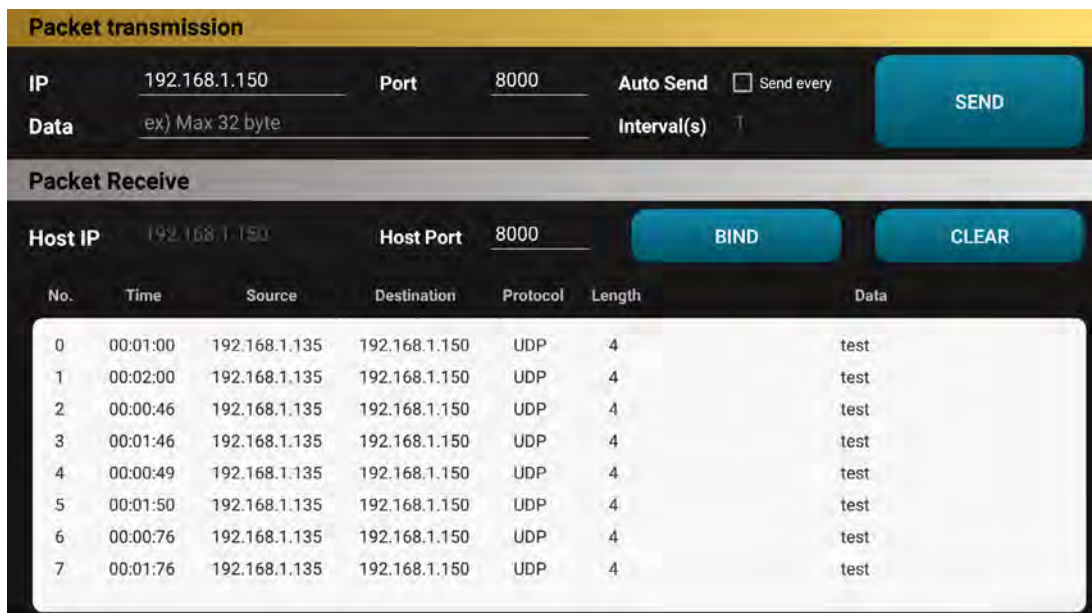


- Select Server Mode and press Start button to execute the server with the address of 192.168.1.100.
- Server Mode continues to run until pressing Stop and displays the measured value in duplicate.
- The measurement time depends on the client setting values. Output Format and Report Interval are also applied in Server Mode.

# Packet Test App.

## Packet Send& Receive

- Check network connection status by transmitting/receiving UDP packets.
- To transmit packet, you need IP address of the destination, port and data to send.
- When transmitting packet, single packet is transmitted from the source. If you mark Repeat, the packet will be transmitted at the set interval.
- When receiving packet, Host IP address (IP of this monitor) and receiving port must be entered.



### ► How to Use Packet Receive

- ① Make sure to enter Host IP. If Host IP is not entered, check the network status of this monitor.
- ② The Host port must be set the same as the port number of transmitting side.
- ③ Tap BIND to receive the data entered into the Host IP and Host port.

# Appendix

## Specifications

Function		Specification	
LCD	Display Resolution	1920 X 3 (RGB) X 1200	
	Size	7.0 inch (Diagonal)	
	Pixel Pitch	0.07875(H) X 0.07875 (V) mm	
	Brightness(cd)	450 cd/m <sup>2</sup>	
	Viewing Angle	80deg (Horizontal) / 80deg (Vertical) Total: 160deg (IPS Panel)	
	Response Time	11ms	
Video	INPUT	HD-SDI	1.485Gbps
		3G-SDI	2.970Gbps
		EX-SDI	135 / 270Mbps
		HDMI	Up to 2160p 30Hz
		AHD	Refer to Appendix- Supported Resolution
		CVI	Refer to Appendix- Supported Resolution
		TVI	Refer to Appendix- Supported Resolution
		CVBS	NTSC, PAL
		LAN	10 / 100 / 1000Mbps- IP Cam & PoE (Power of Ethernet) Support
	OUTPUT	HDMI	1080p 60Hz
Measurement	Analog	A.LEVEL	10 ~ 118 %
		F.LEVEL	20~120 %
		Error Rate	± 2%
		FOCUS LEVEL	0 ~ 255



# Appendix

## Specifications

Function		Specification	
Measurement	SDI	SDI LEVEL	0 ~ 100 %
		Error Rate	± 2%
		FOCUS LEVEL	0 ~ 255
Power	INPUT	DC 12.6V (Exclusive charger)	
	OUTPUT	DC JACK 12V / 1A	
		USB 5V / 1A	
Connection Port	HDMI Input / Output	Dual HDMI C Type F	
	HD-SDI Input	BNC-F	
	LAN Input	RJ-45	
	Analog Input	BNC-F	
	USB Input	USB Dual A Type + Mini USB Type	
	Micro SD Input	Micro SD Socket	
	RS-485 Input	2P Terminal Block	
Battery		Li-Polymer 11.1V, 5,680mAh	
OSD Language		Korean, Japanese, English, Italian, German	
Operating Temperature		0°C ~ + 50°C	
Operating Humidity		0% ~ 80%	
Storage Temperature		-10°C ~ + 50°C	
Material		PCABS Flame Retarding Material	
Weight		1014g	
Dimensions		246(W) X 160(H) X 49.9(D)mm	

# Appendix

## Supported Resolution

- For AHD, TVI, CVI cameras, signal formats are not standardized so the video may not be displayed depending on the manufacturer.

Signal Format	Resolution	Description
HD-SDI	1280x720p	23.97 / 25 / 29.97 / 30 / 50 / 59.94 / 60Hz
	1920x1080i	50 / 59.94 / 60Hz
	1920x1080p	23.97 / 24 / 25 / 29.97 / 30Hz
3G-SDI	1920x1080p	50 / 59.94 / 60Hz
EX-SDI 1.0 EX-SDI 2.0 EX-TDM	1280x720p	25 / 30 / 50 / 60Hz
	1920x1080i	50 / 60Hz
	1920x1080p	25 / 30 / 50 / 60Hz
	2560x1440p	30Hz
AHD, TVI	3840x2160p	30Hz
	1280x720p	25 / 30Hz
	1920x1080p	25 / 30Hz
	2048x1536p	18.75 / 20Hz
	2560x1440p	25 / 30Hz
	2688x1520p	15Hz
CVI	2592x1944p	12.5 / 20Hz
	1280x720p	25 / 30 / 50 / 60Hz
	1920x1080p	25 / 30Hz
	2048x1536p	18.75 / 20Hz
CVBS	2560x1440p	25 / 30Hz
		NTSC / PAL
HDMI	640x480p	60Hz
	720x480i	59.95 / 60Hz
	720x576i	50Hz
	720x480p	59.94 / 60Hz
	720x576p	50Hz
	1280x720p	50 / 59.94 / 60Hz
	1920x1080i	50 / 59.94 / 60Hz
	1920x1080p	23.97 / 24 / 25 / 29.97 / 30 / 50 / 59.94 / 60Hz
3840x2160P	24 / 25 / 30Hz	

# Appendix

## FAQ

Symptom		Checking Method	
No video display	Viewer	Reboot this test monitor.	
		Check the connected cable status. Video may not be displayed, depending on the damage or length of the cable.	
		Check the connected camera status. There may be some problems with the connected camera.	
		Check the signal of camera. SDI products must be connected to HD-SDI port, and HD Analog products must be connected to VIDEO port.	
			Check the resolution of camera. Supported resolutions are different for each signal, so you need to check if the resolution is able to input.
	IP		Check the connected LAN cable status. There may be some problems with the video, depending on the damage of the cable or interference.
			Check the cable type. There may be some problems with the product operation, depending on cable types.
			Check the WI-FI status if connected wirelessly. The video may not be displayed if the strength of the signal is weak or the signal dies frequently.
			Check the networking settings. If setting value is different such as the camera IP address, subnet mask and gate way, the video may not be displayed.
			Check the network settings of this product. The IP range of the IP camera and this product should be same to check the video.
			Check the status of connected network devices such as routers, Hubs, etc. There may be some problems with the network settings.
			Check if the camera supports ONVIF. This product supports ONVIF protocol cameras.
			Check the supported camera codecs. This product supports H.265, H.264, JPEG codec.
			Check the camera network mode. This product does not support DHCP server and is available for connection in manual IP.

# Appendix

## FAQ

Symptom		Checking Method
Video is NOT displayed	IP	When a camera uses any separate RTSP port, it may not be connected. For camera settings, please overwrite and change the RTSP port. - The default RTSP port is 554. It may depend on each camera brand.
		If you initialize a camera after saving its configuration, it may not be able to connect the camera via the saved configuration. It may be caused due to the difference of the initialization methods per camera brands. In this case, you should search the camera and follow the other steps for its connection again.
PTZ and/or OSD are Not available	RS-485	Check the connected cable status. It is not available in different polarity.
	UTC/UCC	Check camera UTC protocols. The protocols depend on each camera manufacturer.
		Check the length of the connected cable. UTC may not work, depending on the length of the cable.
Micro SD and/or USB are NOT available		Check Micro SD/USB status. There may be some problems with the operation if the product is bent or cracked.
		Check the manufacturers of Micro SD/USB. If not certified memory cards are used, there may be some problems with the product operation.
		Unmount and mount Micro SD/USB again. Recognition errors may be generated intermittently.
		Check the USB supported version. This product supports USB 2.0
		Reboot this product. There may be some problems with the program.
The test monitor is paused		Press and hold the power button for about 7 seconds to shut down this test monitor forcibly when the touch pad or D-pad does not work properly. After then, please turn it on again for use.
		Press and hold the power button for about 7 seconds to shut down this test monitor when the monitor is paused during use . After then, please turn it on again for use.

# Appendix

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## Warranty Certificate

Model No.		
Serial No.		
Date of Purchase		
Place of Purchase		
Purchaser	Name	
	Address & Contact No.	
Distributor	Name	
	Address & Contact No.	
Warranty Period	Two (2) years from the date of purchase	

Any failure that occurs in the normal use for only two years after purchase will be repaired free of charge.

Contact the phone number listed on the user's manual for repair.

When reporting the failure, please inform the model name and condition of the product accurately.

It is convenient to know the name and department of the person in charge.

Please check this user's manual again before reporting the failure.

Product shapes and circuits are subject to change without notice to improve performance.

Faults following will be treated as a charge:

- Failure by user's handling without care
- Not connecting the rated power
- Disassembled or repaired arbitrarily by user
- Failure caused by natural disaster (fire, flood, tsunami, lightning, etc.)
- Replacing consumables