PHASEONE
INDUSTRIAL

Phase One
iXM-MV150F / IXM-MV100
Machine Vision Cameras
Installation Guide

This guide describes installation of your Phase One iXM-MV150F/iXM-MV100 camera system. As new features are introduced via firmware updates, the downloadable version of this document changes accordingly. Downloads are available HERE

Contents

1 What's in the Box?

The Standard Components below are included with the camera; the Optional Components can be purchased separately.

Optional Components

Cables and Other Accessories	Lenses & Focusing Accessories
· USB 3.1 (Gen.1) Shield Cable for iXM, 1m (P/N: 73233) · USB 3.1 (Gen.1) Shield Cable for iXM, 3m (P/N: 73235) · iXM Strobe Cable (3m) – Audio (P/N: 76002400) · M72 to modular focus adapter (P/N: 75048) · iXM to M72 Adapter (P/N: 75049) · iXM Heat Sink kit (P/N: 73217) · iXM to MV Camera Tripod adapter (P/N: 75050) · IXM to SK Lenses adapter (P/N: 73201)	· Inspec.x L 105mm f/5.6 float Lens (P/N: 73220) · Inspec.x L 105mm f/5.6 -1.0x Lens (P/N: 73211) · Inspec.x L 105mm f/5.6 -0.76x Lens (P/N: 73210) · Inspec.x L 105mm f/5.6 -0.5x Lens (P/N: 73214) · Inspec.x L 105mm f/5.6 -0.33x Lens (P/N: 73213) · Inspec.x L 100mm f/4 Lens (P/N: 73215) · Inspec.x L 60mm f/4 Lens (P/N: 73212) · Modular focus S (P/N: 75047) · Extension Tube M72 - M72, 24mm long (P/N: 75045) · Modular focus to 105mm Lens adapter (P/N: 75046)

2 Camera Systems Overview

1. Pod mounting threaded holes (four)
2. Lens secure screws (four)

17 M72 MV Interface

3. XQD card cover
4. XQD card cover screw
5. Storage LED
6. Operation LED
7. USB 3.1 port cover screw
8. USB 3.1 port cover
9. Data terminal A
10. Data terminal B
11. Power terminal
12. Power LED
13. Ethernet port cover screw
14. Ethernet port cover
15. HDMI port cover screw
16. HDMI port cover
17. M72 MV Interface

3 Setting up the iXM-MV Camera

3.1 Exposure Sequence

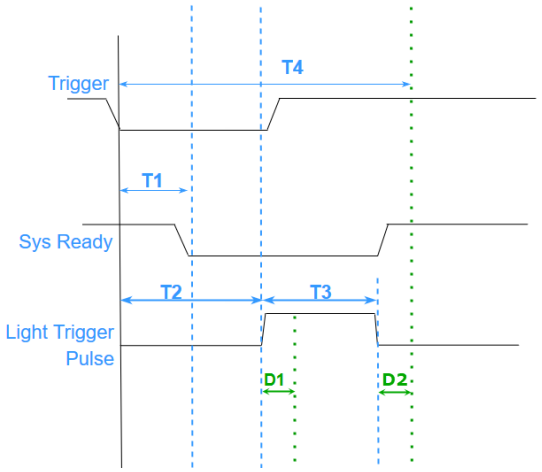
These signals control the iXM-MV150F/iXM-MV100 exposure sequence:

Hardware pulses

- **Trigger in**: Used for hardware triggering. It signals the iXM-MV150F/iXM-MV100 to take an image.
- **System ready**: Camera ready / busy output signal. Returns to 'high' position shortly after exposure (T3).
- **Light Trigger Output**: Signals the start **and** stop of exposure. *This pulse is software configurable*.

Delay Parameters for Global Reset (GR) Shutter Mode (Software Configurable)

- **D1**: Delay time (-100us — +100us); Light trigger pulse ON, to start integration (sensor reset).
- **D2:** Delay time (0 — +100us) Light trigger pulse OFF, to start (sensor) readout.



3.1.1 Light Trigger Output Pulse for Global Reset (GR) Shutter Mode

The T2 and T3 trigger pulses can be software configured as follows:

- **Single pulse active low**: Starts exposure at signal 'low', stops exposure at signal 'high'

Double pulse active low: Starts and stops exposure at signal 'low'

Single pulse active high: Starts exposure at signal 'high', stops exposure at signal 'low'

Double pulse active high: Starts and stops exposure at signal 'high'

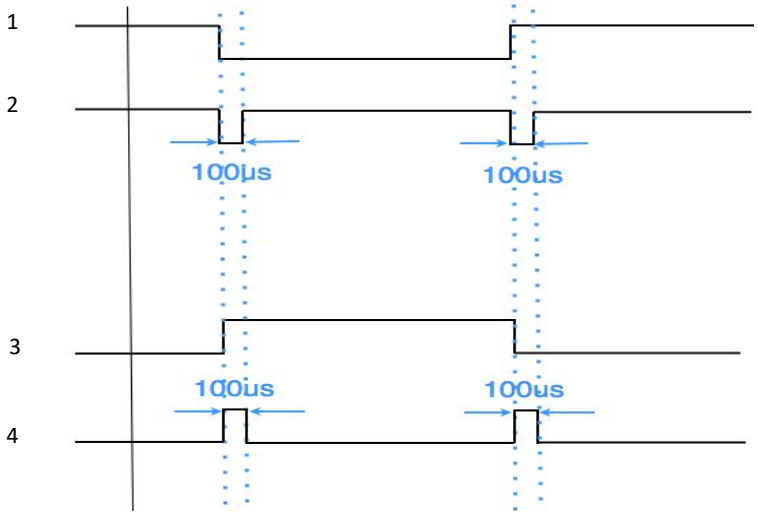


Table 1: Exposure Sequence

Typical Values	iXM MV100	iXM MV150F
T1 Trigger IN	SysRdy (Low) 2 ms	SysRdy (Low) 2 ms
T2 Trigger IN – Start exposure	30 ms	30 ms
T3 Start Exp – End Exp	T2 + Exposure time	T2 + Exposure time
T4 Trigger IN – SysRdy High (Cycle time)	**12bit pixel depth:** 290ms + Exposure time **14bit pixel depth:** 390ms + Exposure time **16bit pixel depth:** 800ms + Exposure time	**12bit pixel depth:** 390ms + Exposure time **14bit pixel depth:** 520ms + Exposure time **16bit pixel depth:** 1060ms + Exposure time

3.2 Wiring a Control Cable for the iXM MV Camera

Table 2: Control Cable Wiring

Pin	Color	Name	Description	Direction	Level	Notes
1	Orange	Reserved	Reserved	Reserved	Reserved	Reserved
2	Green	System Ready	Camera ready for next capture.	Out	VOH, min = 4.0V (Io = -10uA) VOL, max = 0.8V (Io = 4mA)	5 Volt Level Pull up resistor 47.5K Ohms to +5 V
3	Red	Black Reference Control	Indicates a black reference sequence is required.	In	VIH, min = 2.4V VIL, max = 0.8VtiF, tiR < 1uSec	Isolated. Active low. See “Understanding Black Reference” on page 8
4	Purple	Trigger In	Trigger the new capture cycle	In	VIH, min = 2.4V VIL, max = 0.8V tiF, tiR < 1uSec	Active low. (For manual triggering, activate by short to common signal, otherwise leave floating)
5	Blue	Reserved	--	--	--	--
6	Yellow	Reserved	--	--	--	--
7	White	Light Trigger Pulse	Marks start and stop of exposure	Out	VOH min = 4.0V (Io= -4mA) VOL max = 0.8V (Io= 4mA)	5 Volt Level
8	Gray	Reserved	Reserved	In		Short to pin 9
9	Black	Common		Common		

Table 3 – Camera Control Cable Description

VIL	Maximum voltage level that is interpreted as a '0' by an input.
VIH	Minimum voltage level that is interpreted as a '1' by an input.
VOL	Guaranteed maximum voltage level that appears on output set to '0'.
VOH	Guaranteed minimum voltage level that appears on output set to '1'.
VIT+	Input threshold voltage when the input voltage is rising;
VIT -	Input threshold voltage when the input voltage is falling.

Table 2 above, describes the functionality of the wires in the iXM-MV Camera control cable; the figures below show the wire numbering order.

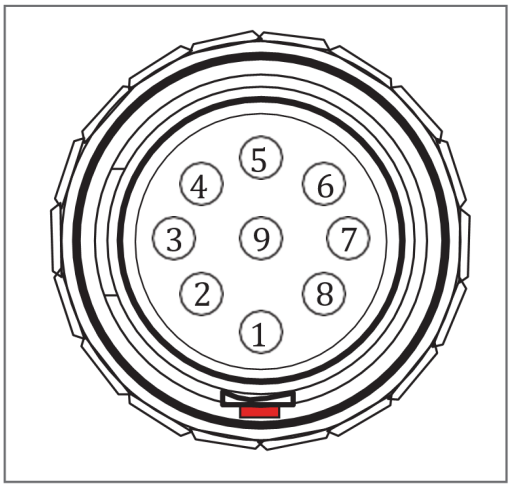


Figure 1: Control Cable Plug Pinout

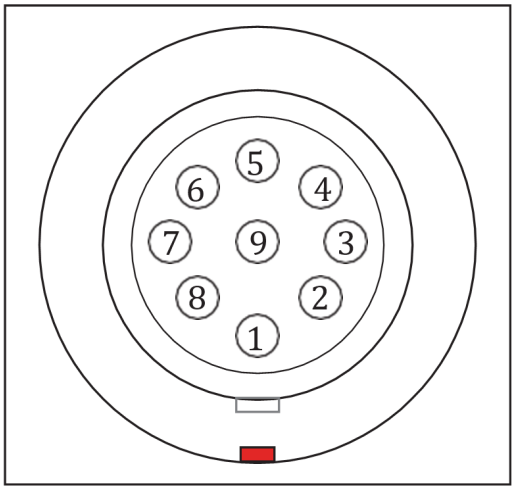


Figure 2: Control Socket Pinout

3.3 Understanding Black Reference

A Black Reference is an on-site camera calibration for the current camera settings and environmental conditions.

It is recommended to perform a new Black Reference calibration whenever you change the exposure time by more than 100ms, or whenever the camera temperature changes by more than 10^0 C.

To perform a new Black Reference, take an image while the camera is not exposed to light (**see details below**).

3.4 Hardware Activation of Black Reference

To activate black reference using Hardware line, keep the black reference control signal low during a full capture cycle.

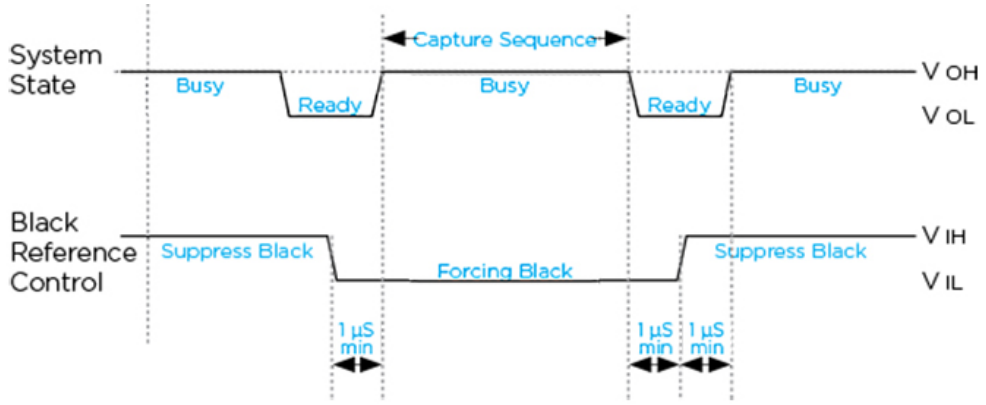
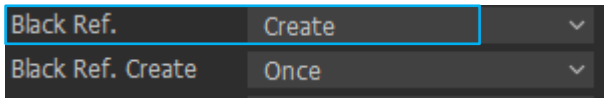
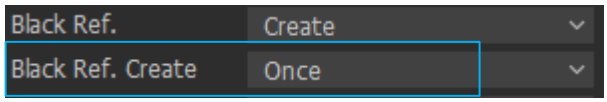


Figure 3: Black Reference Timing

3.5 Software Activation of Black Reference

Use the following table to determine the Black Reference mode to use for your capture flow:

Black Reference Mode	Description
Black Ref:	
Prerecorded	Uses a Factory set black calibration. The camera uses this until the user creates a Black reference for the current session.
Create	Create and use a Black reference.
Black Ref. Create:	This setting is for selecting when to create a Black reference image. Use “Once” for non-digital lenses. 
Once	Performs a Back Calibration in the next capture cycle. *If the Shutter Mode is ‘ES’ make sure the camera is not exposed to light during next capture*. **Note**: The Black reference is not saved after the camera is powered down.
Always	Performs black calibration for every capture.
Normal	The iXM-MV camera creates a Black Reference when required.

3.6 Wiring the Power Cable

The camera connects to the power bus with a power cable.

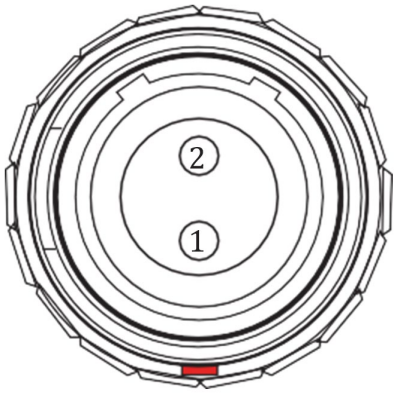


Figure 4: Power Cable Plug

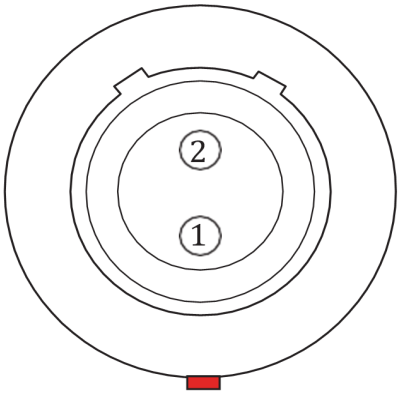


Figure 5: Power Socket Pinouts

Note: Power the iXM-MV150F/iXM-MV100 cameras by a limited fused power source only, up to 8A single fault condition.

Attention: La caméra iXM-MV150F/iXM-MV100 doit être alimentée par une source d'alimentation protégée par un fusible, d'une capacité maximale de 8 Ampères.

Wire the power cable using the information in the table below.

Table 4: Power Cable Description

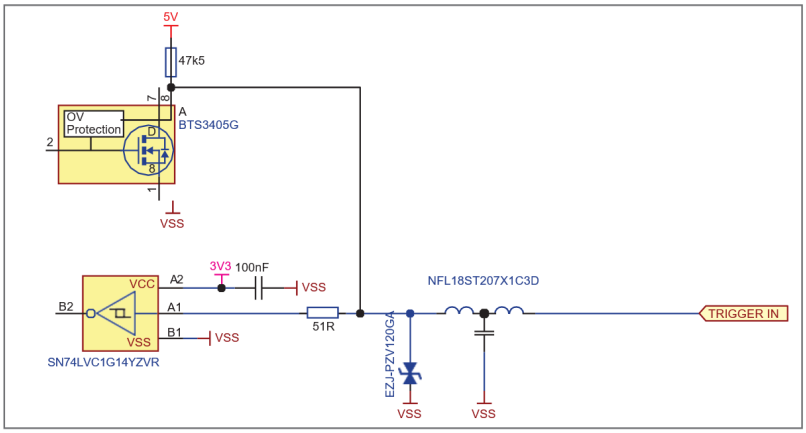
Connector Pin	Color	Name	Description	Direction	Level	Notes
1	White or yellow	DC In +	Provides positive power	Input	12 - 30 V DC	Provides up to 20 Watts
2	Black	DC In -	(Common)	Input		

3.7 Control Signal Electrical Interfaces

The schematic drawings contain component part numbers for reference.

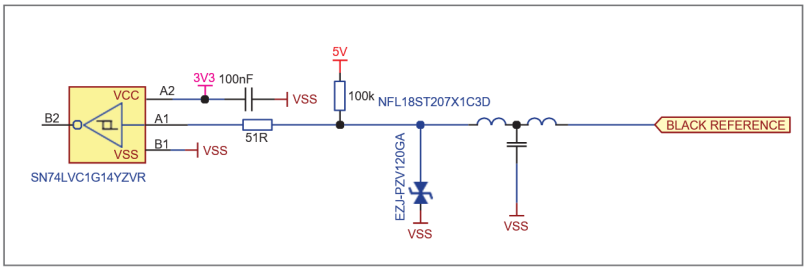
Trigger in

Triggers the iXM-MV150F /iXM-MV100 camera for new capture cycle.



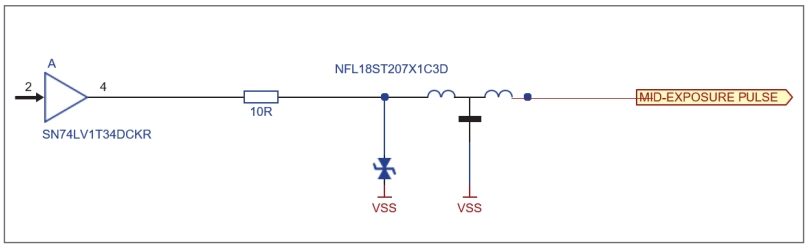
Black reference

Triggers the iXM-MV150F /iXM-MV100 camera for a black reference.



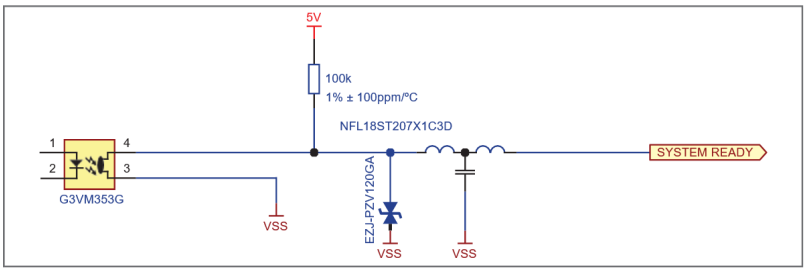
Light Trigger pulse

Turns light ON/OFF.



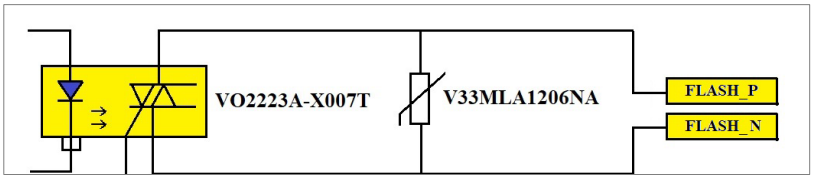
System ready

Camera ready/busy output signal.



Strobe

Triggers strobe light



4 Preparing the Camera with Lens

iXM-MV cameras are equipped with the M72 adapter fitted as standard. To use SK lenses, replace the M72 adapter with an SK Lens Adapter.

Note: Before mounting or dismounting a lens, or attaching or removing an adapter, ensure that the power cable is not attached to the camera.

- Mount/dismount lenses and attach or remove adapters only in a clean environment.
- Place a soft cloth onto the table to avoid scratching camera or lens and put a lens cap on the lens.

4.1 Mounting a Lens onto M72mm MV Interface

To mount a lens on the M72mm MV interface (adapter):

- Remove the cap from the back of the lens and set it aside.
- Remove the cap from the camera body and set it aside.
- Align the back of the lens (the threaded end) with the camera mount and fit the lens into the interface.
- Gently, rotate the lens *clockwise* into the mounting threads until it is fully stopped.
  The lens is mounted.

Figure 6: Mounting lens onto M72mm interface

4.2 Dismounting a Lens from the M72mm Interface

- Place a lens cap on the lens.
- Hold the lens and the camera body firmly with 2 hands and rotate the lens *counterclockwise* until it detaches from the camera body.
- Place a cap on the back of the lens and set it aside.
- Place a cap on the camera body and set it aside.

4.3 Removing the M72 Interface

The iXM-MV camera is sold with the M72 adapter fitted as standard.

To remove the M72 interface (adapter):

- Remove the M72 lens, put a cap on it (front and back) and set it aside.
- Use a 2mm hex driver to unscrew the four mounting screws on the top and bottom of the camera body.
- Hold the M72 interface and pull it forward and off the camera body.

Figure 7: Camera with M72mm MV Adapter

Figure 8: M72mm MV Adapter Removed

4.4 Attaching an SK Lens Adapter

To attach an SK Lens Adapter to the camera:

- Before attaching an SK Lens Adapter, remove the M72 interface from the camera, if installed.
- Align the back of the lens adapter with the camera and fit the lens adapter into place.

Use a 2mm hex driver to screw the four mounting screws on the top and bottom of the camera body.
The adapter is now mounted.

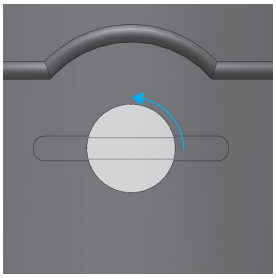
Figure 9: MV Camera Body

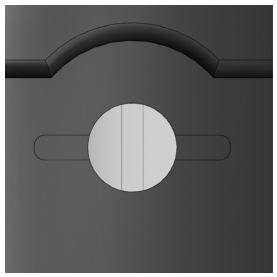
Figure 10: MV Camera with SK Lens Adapter

4.5 Mounting a Lens onto an SK Lens Adapter

Note: Before mounting or dismounting a lens, ensure that the power cable is not attached to the camera.

1. Ensure that the three clamp cams (only 2 shown in image) are in the unlocked position. If locked, use a flat screwdriver to rotate each cam 90 degrees counter-clockwise.





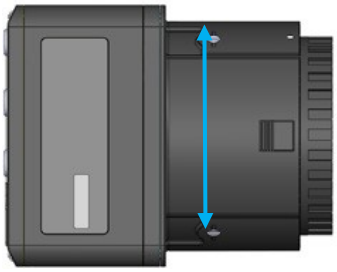
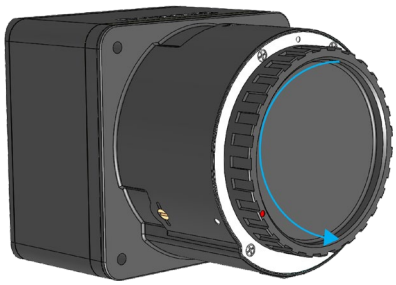
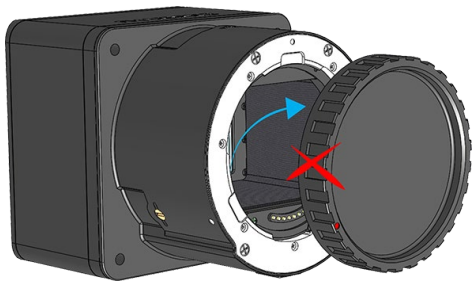


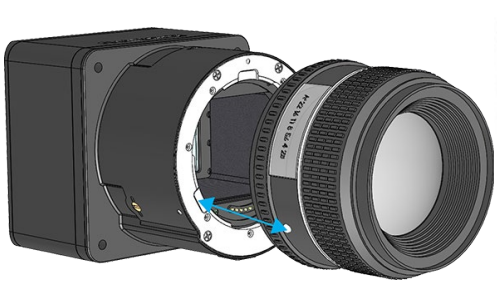
Figure 11: CAM Locked **Figure 12**: CAM Unlocked

2. Rotate the front body cap counterclockwise and lift it out.



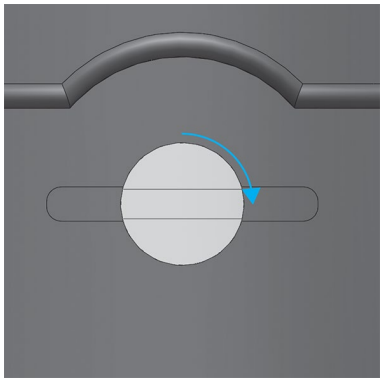


3. Remove the rear cap from the lens.
4. Align the white alignment dot on the lens adapter with the white alignment dot on the lens and fit the lens into place.



5. Rotate the lens clockwise until it locks into place.

6. Use a flat screwdriver to lock each of the three lens adapter clamp cams by rotating each cam clockwise 90 degrees



4.6 Dismounting a Lens from an SK Lens Adapter.

To dismount a Lens from the SK Lens Adapter:

- With a flat screwdriver, unlock each of the three lens clamp cams by rotating each clamp cams 90 degrees counter clockwise as illustrated above.
- Push and hold the lens release button (1) toward the camera.
- Rotate the lens counterclockwise (2) and lift out.
- Put a cap on the SK adapter to protect it or place another lens on the camera.

Figure 13: Dismounting Lens from SK Lens Adapter

5 Connecting a camera

5.1 Inserting iXM-MV Camera Control Cable to Data Terminal

1. Insert the Camera control cable into a data terminal on the camera body.
2. Connect the other end of the control cable to an external device.

Figure 14: Camera control cable

5.2 Connecting Power Cable

To connect the camera to a power bus:

1. Insert the Camera power cable to the power input of the iXM-MV camera.
2. Connect the other end of the iX Camera power cable to the power bus.

Figure 15: iX Power Cable Attached to Camera

5.3 Connecting a USB Cable

To connect a USB 3.1 cable to an onboard computer:

- Unscrew the bolt on the cover of the USB 3.1 port (use a 2mm hex key).
- Remove the cover and store it.
- Insert the end of the USB 3.1 cable into the camera's USB 3.1 port.
- Secure the USB 3.1 cable to the camera with the two bolts.

Figure 16: Unscrewing USB port cover

Figure 17: Screwing down USB plug (Data A and Power connected)

5.4 Connecting the Strobe Light.

To connect the Strobe light to an iXM-MV camera, connect the strobe cable into the Strobe Trigger socket underneath the HDMI connector socket.

Figure 18: Strobe Trigger Cable

Figure 19: Strobe Trigger Cable & HDMI cable

5.5 Connecting an HDMI Cable

To connect an HDMI cable to an iXM-MV150F/iXM-MV100 camera:

1. Remove the HDMI cover of the HDMI port (use a 2mm Hex screwdriver).
2. Insert an HDMI cable into the iXM camera's HDMI port and connect the other end of the HDMI 3.1 cable to an HDMI capable display.

Figure 20: Remove HDMI cover

Figure 21: HDMI socket

6 Camera Settings

To change camera setting, Use Phase One Capture One software or Phase One SDK.
Open Capture One. The Capture Settings pane is in the left panel. You can detach it and/or expand it.

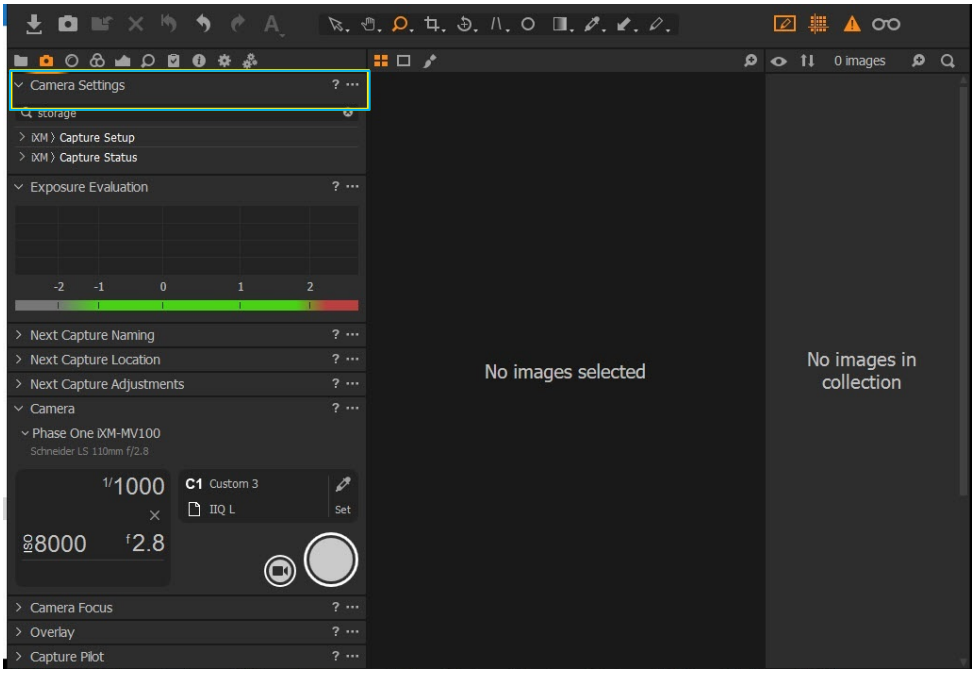


Figure 22: Capture One Interface

Camera Settings includes all the general parameters shown in this screen shot. Expand the parameters set/s needed for specific parameters.

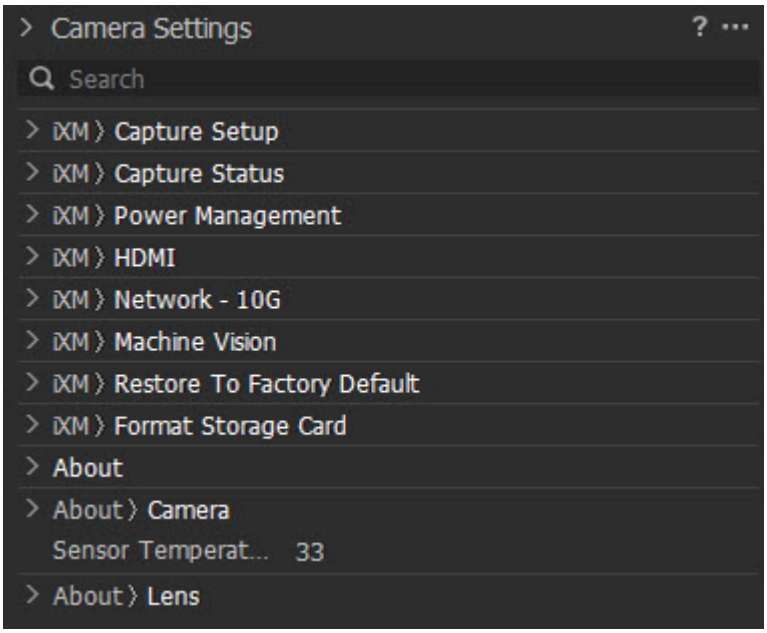
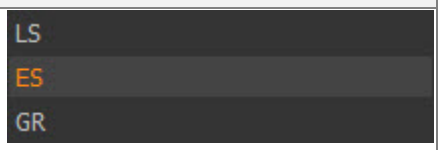
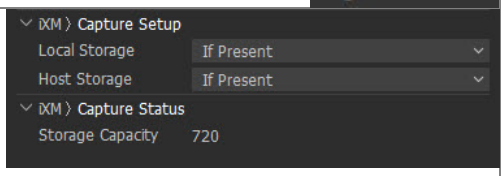


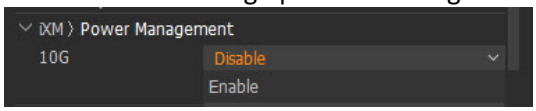
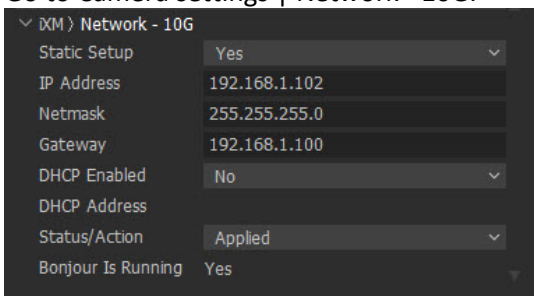
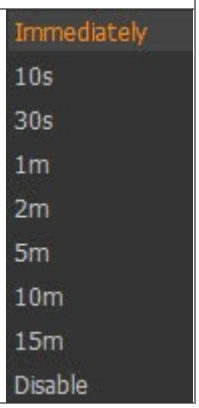
Figure 23: Camera Settings

To configure Camera Settings:

- Go to Camera settings.
- Click or Scroll to the sub settings to use (e.g., Capture Setup, Capture Status, Power Management, etc.) and open it (if not already open).
- Select the specific parameter to configure, e.g., ISO (under Capture Setup).
- Click the dropdown arrow (or click the minus [–] or plus [+]) sign).
  a Select the specific value to use.

Table 5: Important Camera Settings

Function	Description
Shutter Mode	**To set the Shutter Mode:** 1. Go to Camera settings | Capture Setup. 2. Click Shutter Mode. 3. Select the shutter Mode to use (ES, LS, GR). **Note:** LS is shown only if an LS lens is connected. 
File Compression	**To set the File Compression:** 1. Go to Camera settings | Capture Setup. 2. Click Compression. 3. Select the compression type to use. 
Storage	**To configure Storage settings:** 1. Enter "Storage" into the search box. The storage configuration options display.  2. Select the option to use for local storage (XQD card) and host storage (using USB/10G): • "**Enable**" - The respective storage must be connected otherwise the camera will not be ready to capture. • "**If Present**" - The respective storage will be used if it is present. • "**Disable**" - The respective storage will not be used.

Function	Description
Network 10G	**To set Network 10G:** 1. Go to Camera settings | Power Management | 10G.  2. Select Enable. 3. Go to Camera settings | Network - 10G.  4. Enter the values for each parameter. 5. Once finish setting the parameters, go to Status/Action parameter and select Apply now.
Low Power Mode	**To set Low Power mode:** 1. Go to Camera settings | Power Management | Low Power Mode. 2. Select the time to wait before entering low power mode. **Note:** Selecting "Immediately" may affect high capture rate. 

6.1 Storing Images

You can save images to an onboard computer running iX Capture, to the Phase One SDK or to Capture One using a USB 3.1 cable or a 10G cable. An alternative method is to work in **portable mode** and to use a XQD card as your storage device.

6.1.1 Using XQD Cards

It is important to follow a few simple guidelines to help avoid loss of data when working with XQD cards, card readers and digital cameras. Phase One recommends that you test-drive all new XQD cards.

To avoid possible malfunctions, perform an initial test to verify that the capture files are stored properly on the XQD card and can be accessed by your computer. Note: XQD cards are manufactured by external suppliers; Phase One is not responsible for defective cards.

Inserting and Ejecting an XQD Card

Insert the XQD card into the slot that is underneath the cover on the left hand side of the iXM-MV150F/iXM-MV100 camera.

To insert an XQD card:

1. Use a 2mm hex key, unscrew the screw on the XQD cover and remove it.
2. Insert a XQD card with the brand label facing the backside of the camera as shown in the image below.
3. Replace the XQD cover and tighten the XQD card screw – apply 15cNm torque.

To eject the XQD card:

4. Always make sure the camera is in “Low power mode” before ejecting the XQD card to prevent data corruption. "Low power mode" setting value can be found under camera settings (default is 10 seconds)
5. Push the XQD card further inside and release. The XQD card ejects.

Formatting an XQD card

To use Capture One to format the XQD card:

- In the Capture One camera menu, go to Camera Settings | Format Storage Card.
- Click the drop down arrow and select Format.
- Wait until the value of the setting returns to “None”.

Note: Before shooting for the 1st time, verify that local storage is set to:

- “**Enable**” to force use of the XQD card (camera will not capture if no XQD card is installed), or to:
- “**If Present**” to save to an XQD card if one is present.

7 Operating Phase One iXM-MV cameras using 10G

Phase One iXM-MV cameras use both USB3 and 10G interfaces (not simultaneously).

To connect a Phase One iXM-MV camera using 10G networking, use one of the following medias:

- **Up to 5 meters**: Use SFP + DAC passive cable. Consumes less power on the camera side.
- **Up to 30 meters**: Use SFP + copper transceivers (use CAT6e cable or better)
- **30+ meters**: Use SFP + optical transceivers

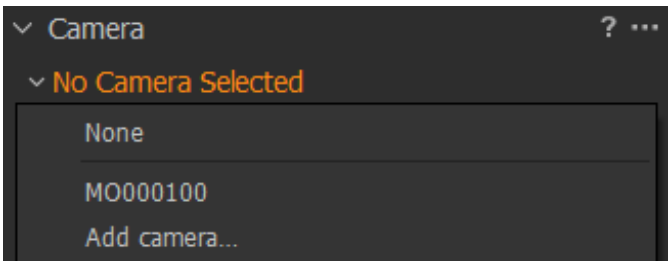
Some PCs have a 10G interface built-in adapter board. Configure the computer's network port for Jumbo packets using the largest option available on that PC to optimize 10G performances (see section "Configuring Packets").

- The IP address of each camera is factory set. The default address is: "192.168.1.XXX"
- "XXX" refers to the last 3 digits of the camera's S/N (located on the bottom of the camera)
- The default mask is 255.255.255.0

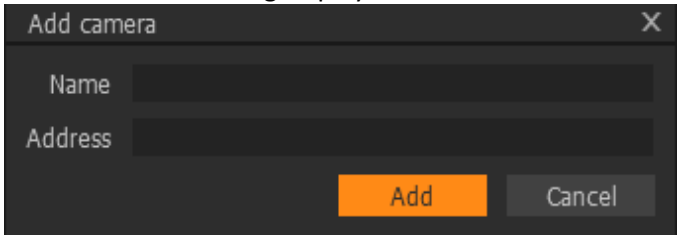
Note: If you are using two cameras with the same last 3 digits on your local network, there will be an IP configuration conflict. In this case, connect one of the cameras using a USB3 connection and manually configure its IP address so that it is different from the address of any other camera connected on the network.

7.1 Connecting a new camera to Capture One

1. Connect the camera to the computer running Capture One.
2. Click Camera > Camera Network Manager
3. Select **Add Camera**.



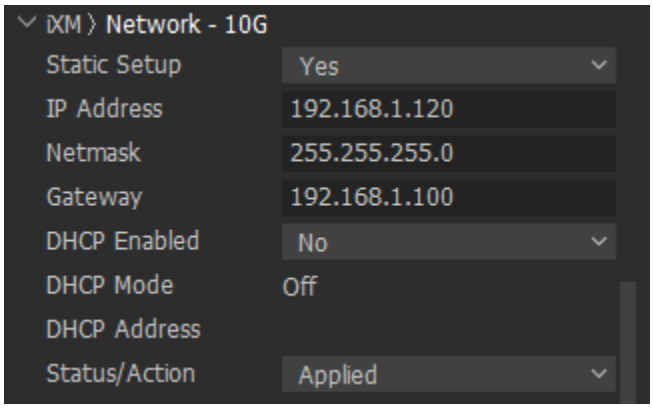
The Add camera dialog displays.



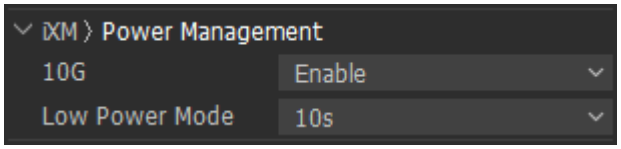
4. Enter a unique name and **IP address** for the camera.
5. After several seconds, the camera connects to the host computer.
6. If the camera does not connect over 10G, disconnect it from 10G and reconnect it using a USB3 cable.

7.2 Verifying a camera's IP address

7. Connect the camera to Capture One using a USB3 cable.
8. Go to the tab: Camera > Camera settings > Network – 10G.



9. Make sure that the IP configuration settings are valid and that the 10G option is set to Enable in
   Camera Settings > Power Management.



7.3 Verified hardware for 10G networking

Company: www.SFPcables.com.

7.4 Adapters

Single port:	10Gb/s Ethernet Converged Network Adapter, Compatibility: Intel X520-DA1: X520-10G-1S-X8
Dual port:	10Gb/s Ethernet Converged Network Adapter Compatibility: Intel X520-DA2: X520-10G-2S-X8

7.5 SFP+ modules

Copper:	SFP + copper transceiver 10GBase-T, Cat 6a/7, 30m (ASF-10G-T). Compatibility: None, Intel, Cisco. Model: ASF-10G-T
Fiber:	10Gb/s SFP+ SR Transceiver 10GBase-SR 850nm, 300M, for Intel. Model: AXS85-192-M3

7.6 Media

Copper:	Cat 6e and better are required for 10G communication. Lengths range from 1 meter up to 10 + meters.
Fiber optic:	LC to LC, Multimode OM3 10Gb 50/125µm, Duplex. Lengths range from 1 meter up to 100+ meters.

7.7 iXM 10G Port Cover

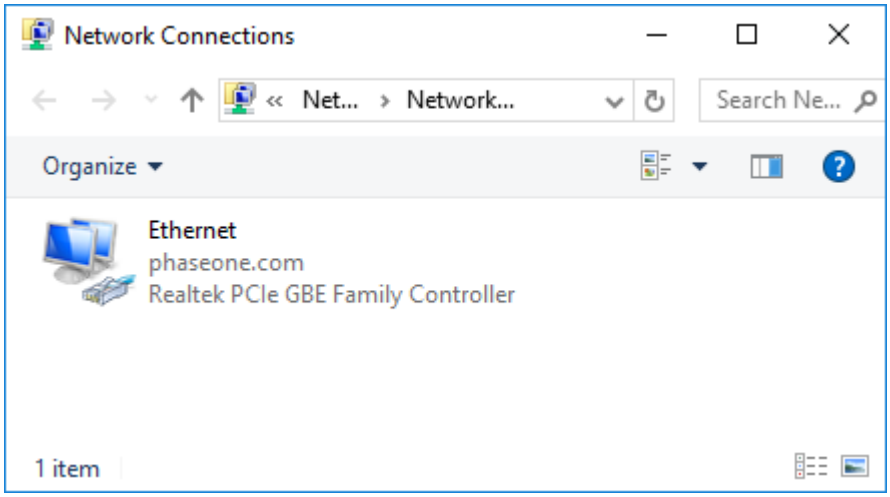
When inserting a cable to the 10G port on a Phase One iXM-MV camera, add a cover to reduce the opening around the cable.

Connection Types	
Connection	75065000
Active - Copper media	75066000
Active - Optical media	75065000

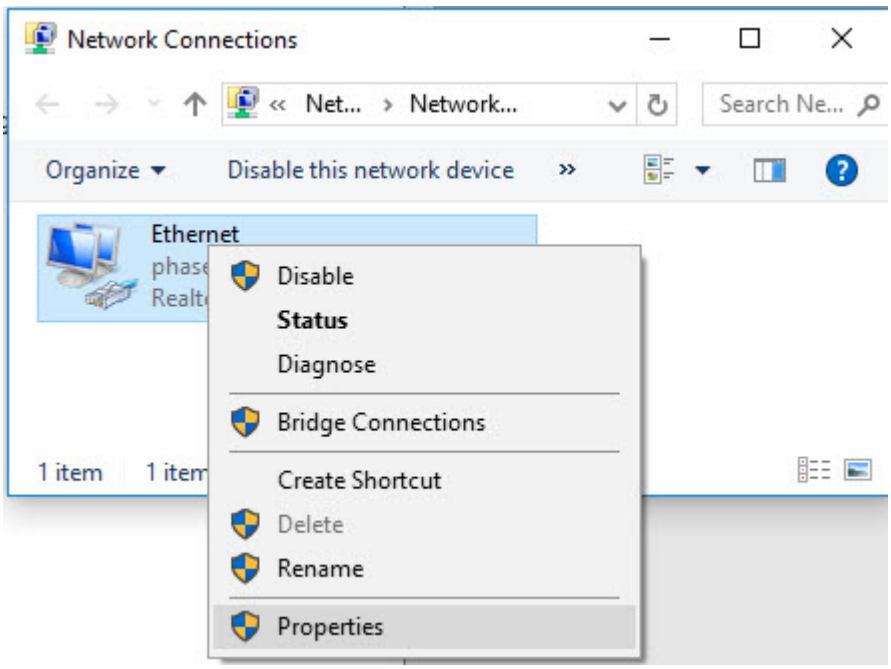
7.8 Configuring Jumbo Packets

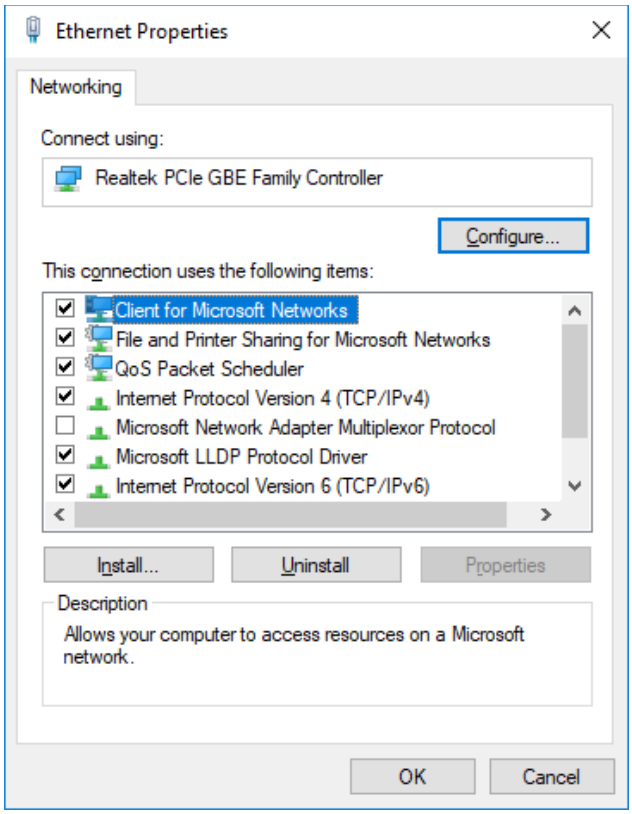
Setting Jumbo Packets is unique to each network card. However, in Windows 10, many cards share the procedure described below:

1. Open the Network and Sharing Center.
2. Click **Change adapter settings**.

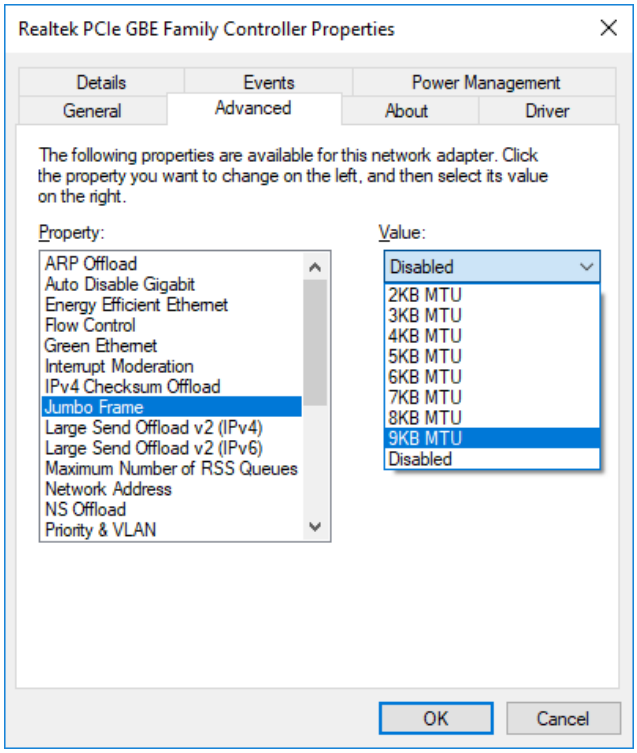


3. Right-click on the NIC you want to enable jumbo frames and select Properties.





4. Click **Configure** for the network adapter and select **Advanced** tab.



5. Select Jumbo Frame and the required value for your system, (e.g., **9kB MTU** [9,014 Bytes]) depending on the NIC.
6. Click **OK** to all dialogs.
    - **NOTE:** When you make this change, the NIC loses network connectivity for a few seconds.
7. Reboot to ensure the change takes effect.
8. Approve all changes.

8 Firmware

8.1 Installing the Firmware Updater Application

To install the Phase One Firmware Updater Application:

1. Download the Phase One Firmware Updated here.
2. Double-click "*Firmware Updater.<version>.exe"* file to start the Firmware Updater Setup Wizard.
3. When installation completes, click **Start > Phase One > Firmware Updater**.

8.2 Updating the Firmware

Before starting, ensure that your computer has the Firmware Updater application installed and the computer is connected to the Internet.

To update the iXM-MV150F/iXM-MV100 camera firmware:

1. Connect the camera to the computer with a USB 3.1 cable.
2. Connect the camera to a power source and turn the power on.
3. Start the Firmware Updater application
4. The Firmware Updater automatically checks online for a new version of firmware and displays a download button if your camera requires an update
5. If displayed, click the link to download the firmware. The firmware is saved locally
6. From the Select Firmware dropdown menu, select the firmware that you want to update.
7. After downloading the new firmware, the Release Notes button is no longer grayed out.
8. Click the Release Notes button to download the release notes for the newest firmware.
9. To update the camera to the latest firmware, click Update. The firmware is written to the camera and a gear icon  is displayed next to the MAIN component and a progress bar displays the progress of the update.
10. Wait until the camera finishes the update uninterrupted; **do not power off the camera**. The update process usually ends with the camera undergoing an automatic power cycle.
11. Upon a successful completion of the update, the MAIN component is marked with a green check mark icon.
12. If the update fails, disconnect the USB 3.1 cable, reconnect it, and repeat the procedure described above.

8.3 Checking Firmware Version

To check the camera's firmware version:

- Go to Camera Settings | About | Camera.
  The camera's firmware version displays.

To check the lens's firmware version:

- Go to Camera Settings | About | Lens.
  The lens's firmware version displays.

8.4 Restoring Firmware to Factory Version

To restore the camera's firmware to the factory version (camera settings are not affected):

1. Open the XQD card cover (see Using XQD Cards).
2. Insert a pin into the hole shown in the picture and hold it down.
3. Connect the camera to power while holding down the pin.
4. Wait 3 – 4 seconds.
5. Put the camera aside for several minutes while the firmware is restored to the factory version. Do not power off the camera until all LEDs resumes normal colors (see interpreting the camera LEDs section)

9 Interpreting the Camera LEDs

The camera has three LEDs on its back to show camera status, as follows:

Color:➔ LED #:➘	Off	Orange	Green	Red	Blue
1. Storage	No storage	Storing	Storage available	X	X
2. Operation	X	Capturing	Ready	Not ready	Live view / HDMI modes
3. Power	No power	Starting-up	Power on	X	X

9.1 Temperature Warning

When the internal temperature of the iXM-MV150F/iXM-MV100 camera exceeds its upper limit (usually while working continuously for an extended amount of time: e.g. in HDMI mode or rapid capturing), the camera signals a warning by toggling the Operation LED. The warnings are activated as per the Temperature Warnings table:

Temperature High	Flashes slowly in *Green* (regular mode) or *Blue* (Live View or HDMI modes).
Temperature too high	Flashes quickly in *Green* (regular mode) or *Blue* (Live View or HDMI modes).
Thermal Shutdown	Flashes quickly in *Red*.

Note: Thermal shutdown stops all active capturing:

- All images not saved will be lost.
- If the temperature falls below the warning level, capturing restarts and works normally.

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