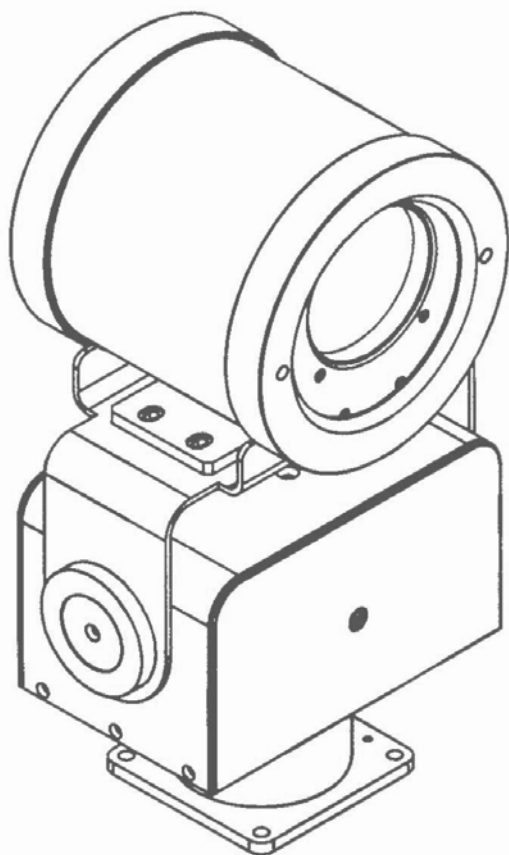


Thermal Imaging Systems Manufactured By:



HurleyIR, Inc.
thermal visionaries



Perimeter Security Models

SRTI

MRTI

LRTI

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Rev. c: 10/07 > control utility

While every reasonable effort has been made to ensure the accuracy of the documentation contained herein, Hurley IR Inc. makes no warranty of any kind and assumes no responsibility for errors and omissions. No liability is assumed for incidental or consequential damages in connection with or arising from the use of the information contained herein.

About Hurley IR Inc.

Hurley IR, Inc. is a value added engineering and manufacturing company that is dedicated to producing high quality infrared products to meet the demands of a constantly evolving security environment. Whether our imagers are being used to protect sensitive installations at home or abroad, domestic infrastructure, or our country's most valuable assets, the armed forces, HurleyIR, Inc. strives to meet each objective and to use the lessons learned to advance our products to the next level.

Technical Support

If you should need assistance after reviewing the material contained in this manual contact your approved HurleyIR Inc. distributor.

HurleyIR, Inc. technical support personnel also remain available to assist you with your HurleyIR thermal imager and any related hardware or software questions.

HurleyIR, Inc. technical support can be reached via:

Internet	info@hurleyir.com
Telephone	1 410 875 0234
Facsimile	1 410 875 0291

Warranty Information

Limitations of Liability

SELLER's liability and BUYER'S sole and exclusive remedy for damages for any claim with respect to a sale, or any supplemental sale of Product(s), or its use or non-use, or its delivery or non-delivery, and regardless of legal theory, will not be greater than ten percent of the actual purchase price of the Products(s) with respect to which such a claim is made.

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This Standard Repair Terms and Conditions ("SRTC"), referenced by SELLER, is in addition to SELLER's delivered Product original warranty for the Product previously delivered to BUYER, and includes the following:

Repair Warranty

Notwithstanding delivered Product original warranty, all repaired Product(s) will conform to SELLER's then current drawings and specifications and be free from defects in material and workmanship under normal use and service ninety (90) days from date of repair or the balance of the original warranty, if any. The warranty shall not apply to Products: 1. used for purposes for which they are not designated or intended, or 2. which have been repaired or altered without SELLER's prior written consent, or 3. which have been subjected to misuse, negligence, accident or improper maintenance or installation, or 4. upon SELLER's examination that do not disclose to SELLER's examination that do not disclose to SELLER's satisfaction non-conformance to the Warranty. The Pre-Installation Confirmation Form must be returned to SELLER for Warranty provisions stated herein and above to be effective. SELLER ADVISES, NO OTHER WARRANTIES, EXPRESSED OR IMPLIED ARE MADE WITH RESPECT TO THE PRODUCT(S) INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, NON-INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE. BUYER agrees that any documentation

and or representation provided to its customer(s) shall include the preceding advisement by SELLER.

Standard Terms of Sale

This Standard Terms of Sale (“STS”), referenced by BUYER (defined as the party issuing the respective purchase order) upon its purchase order to HurleyIR, Inc. (SELLER), hereby attaches and makes the following terms and condition effective for said order.

Sale Warranty

Product(s) will conform to SELLER’s then current drawings and specifications, and will be free of defects in material and workmanship under normal use and service for twelve (12) months, beginning on the date the product is delivered to the BUYER.

SELLER’s sole obligation, and BUYERS exclusive remedy, under the warranty is for SELLER at its option to repair, replace, or refund BUYER’S purchase price in the form of credit, for any part of the Product which fails to meet the Warranty.

For Warranty repairs/replacements from SELLER, BUYER shall return Product(s) to SELLER’s facility designated by SELLER with a written explanation of failure. The Warranty shall not apply to Products: 1. used for purposes for which they are not designated or intended, or 2. which have been repaired or altered without SELLER’s prior written consent, or 3. which have been subjected to misuse, negligence, accident or improper maintenance or installation, or 4. following Hurley IR, Inc’s. examination, do not disclose to SELLER’s satisfaction non-conformance to the Warranty. The Pre-Installation Confirmation Form must be returned to SELLER for Warranty provisions stated herein and above to be effective.

SELLER ADVISES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, OR MADE WITH RESPECT TO THE PRODUCT(S) INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY, NON- INFRINGENT OR FITNESS FOR A PARTICULAR PURPOSE. BUYER agrees that any documentation and or representation provided to its customer(s) shall include the preceding advisement by SELLER.

Returns

Unless otherwise authorized in writing, SELLER will not accept Product non-warranty returns for credit. Obsolete, closeout, demo, used, blemished or specifically manufactured goods are not returnable.

Note: Sale Warranty will be void unless the Pre Installation Test Confirmation Form is completed and is mailed back to HurleyIR Inc. to be filed with all records pertaining to your order.

Export Notification

Please be aware that the HurleyIR, Inc Thermal Imaging equipment is currently under the licensing jurisdiction of the U.S. Department of Commerce. This equipment may require an export license prior to exporting or taking this equipment out of the United States.

The export control classification number (ECCN) that Hurley IR Inc. uses for this equipment is 6A003.b.4.

It is your responsibility to comply with the export control laws and regulations of the United States Government and to obtain export licenses if required.

The U.S. Department of Commerce export administration regulations can be found at <http://www.bis.doc.gov/>.

If you need additional information regarding this product, please contact Hurley IR Inc. (410-875-0234)

About Hurley IR Thermal Imagers

Hurley IR, thermal imagers are long wavelength (8-12 micron), infrared video cameras intended for use in all weather applications. HurleyIR, Inc. thermal imaging systems utilize uncooled technology to produce high quality imagery for high security applications. This type of thermal imager will detect thermal activity in total darkness, through smoke, dust, blowing sand, fog and other obscurants, while the modular design helps to ensure robust quality and performance.

Cleaning and Maintenance

Hurley IR Inc. systems utilize uncooled thermal imaging technologies and are constructed to meet military specifications therefore requiring minimal maintenance. If it is deemed that an imager needs cleaning a mild detergent and non-abrasive cloth can used to clean the housing. A rinse with water will finish. Any maintenance internal to the thermal imager housing should only be conducted by qualified personnel whom can be contacted through technical support.

Nomenclature

SRTI - FOV: Short Range Thermal Imager
-52°, -46°, -36°, -30°, -18°, -15°

MRTI - FOV: Mid Range Thermal Imager
-12°, -10°, -9°, -8°

LRTI - FOV: Long Range Thermal Imager
-6°, -5°, -4.5°, -2.8°

The above are considered Fixed Thermal Imagers and consist of a thermal imager in a rugged, military enclosure, debris/bird shield, 40' power/video/com cable, and an AC/DC approved power supply. All systems are RS485 serial controllable with 3 protocols.

SMRTI-PT-Kit: A pan and tilt positioning unit that can be added to any of the SRTI-52 through LRTI-6 fixed cameras for added surveillance coverage. The SMRTI-PT-Kit comes complete with an integrated Head Board for expanded control operations, and video switching.

LRTI-PT-Kit: A pan and tilt positioning unit for the larger payload of the LRTI 15-5 and the 4.5. The LRTI-PT-Kit comes complete with an integrated Head Board for expanded control operations, and video switching.

INTC-PT-Kit: A pan and tilt positioning unit for the very large payload of the LRTI 15-5 or the 8-2.8 with the VIS-1320-D/N, and 640480 options. The INTC-PT-Kit also comes complete with an integrated Head Board for expanded control operations, video switching.

EXCAB-##: Extended cable length for the thermal imaging systems, 100' maximum or EXCAB-60'.

VIS-312-DN: 312x Low Lux, Day / Night color video camera option that can be added to any thermal imager. The VIS-312-DN is housed in a rugged, military enclosure and comes complete with a debris/sun/bird shield and a interconnect loop cable.

VIS-1320-D/N: 1320x Low Lux, Day / Night color video camera option that can be added select thermal systems. The VIS-1320-DN is housed in a rugged, military enclosure and comes complete with a debris/sun/bird shield and a interconnect loop cable.

640480: Ultra high thermal resolution upgrade that can be added to select FOV's or optics. The 640480 will double recognition distance while preserving the desired FOV for coverage.

EXSRL-HB: Head board serial extension for fixed camera systems that require video switching and serial extensions for additional peripherals and even a 3rd video device such as GenIII night vision.

GEN3-NV: The GEN3-NV is an option that can be added to thermal systems that require near IR night vision to round out the system capabilities. The GEN3-NV is housed in a rugged, military enclosure and comes complete with a debris/sun/bird shield, an ambient light protection sensor, and a interconnect loop cable.

C-MNT: The C-MNT consists of a family of mounting platforms including wall mounts, pole mounts, and custom designed solutions

F.O.V.

The field of view (F.O.V.), or optics available for the SRTI through the LRTI family of imagers are described in the chart below. This chart illustrates the recognition range for the high resolution 320X240 thermal imagers. 1X is the recognition distance for 6 foot man. 2X is the recognition distance for a small vehicle or vessel like a box truck or a 14 foot craft. Upgrading to the Ultra High Resolution 640480 on select optics (*) will double the recognition distances of those optics. The 8/2.8 is only available with the 640480. Some FOV's have been coupled into Dual Field of View or DFOV optics (^) to provide expanded capabilities.

<u>FOV</u>	<u>Lens mm</u>	<u>1X</u>	<u>2X</u>
52°	13mm	130 meters	260 meters
46°	18mm	180 meters	360 meters*
36°	25mm	250 meters	500 meters*
30°	30mm	300 meters	600 meters*^
18°	50mm	500 meters	1000 meters*
15°	60mm	600 meters	1200 meters*^
12°	75mm	750 meters	1500meters*
10°	90mm	900 meters	1800meters*^
9°	100mm	1000meters	2000meters*
8°	115mm	2600meters	5200meters^
6°	150mm	1500meters	3000meters*
5°	180mm	1800meters	3600meters*^
4.5°	200mm	2000meters	4000meters
2.8°	345mm	8000meters	16000meters^

System Specifications

Thermal Imager

Power: 24VDC , 7a peak, 1.75a cont. 3a w/ heat and focus
Temp: -20°F-120°F Operating, -40°F-140°F Storage
Sensitivity: 30 - 80 milikelvin
Wavelength: 8-12um

VIS-312-DN

Power: 24VDC , 1a peak, .5a cont. 2 a w/ heat
Temp: -20°F-120°F Operating, -40°F-140°F Storage
Sensitivity: .15 lux
Optics: 26X (2.5mm-91mm / F1.6-F3.8)

SMRTI-PT-Kit

Power: 24VDC , 4a peak, 1a cont. 5 a peak w/ heat
Temp: -20°F-120°F Operating, -40°F-140°F Storage
Speed: 22° / s

Pre-Installation Testing Procedure

Pre-installation testing allows the user / installer to become acquainted with the thermal imaging system while helping to verify that all components are working properly upon receipt. These steps have been compiled to ensure that all components and operations are thoroughly covered and checked. Please follow the steps indicated below.

Unpack and check that all parts and components have been included with your shipment.

- All Perimeter Security, Fixed thermal imagers come housed in a military approved and tested environmental enclosure that is double O-Ring sealed, thermostatically regulated, containing on-board heaters and drying components.
- A debris/bird shield with mounting strap will be supplied with each camera to prevent debris from falling onto and blocking the optics. The debris shield should be rotated 180° and strapped back in place for permanent mounting.
- A minimum 40' main power/video/com cable with a military connector is supplied standard with all thermal imagers.
- A 120VAC to 12/24 VDC regulated power supply is tested and included with each thermal camera system.
- A HurleyIR, Inc. Systems Manual is included with all thermal imaging systems.
- Some Imagers will also be delivered with a rubber protector cap that should be removed and saved. The rubber protective cap is for safeguarding the equipment during shipping and storage and must not be placed on the rear of the camera housing during operation.

Systems will be sent with a bench test kit for testing and evaluation prior to installation. The kit will include a controller, either desktop or software application, and a programming harness for configuring the camera system. The test kit should be sent back to HurleyIR, Inc along with a system test confirmation form for each system after testing is complete.

PT-Kits come complete with a rugged pan and tilt, side mount wire guard, and an integrated head board installed in the camera enclosure.

All optional imagers are in their own independent military approved housing and come complete with a debris/sun/bird shield and a interconnect loop cable.

Prepare the Testing Area

The Pre-Installation Test procedure is best performed in a controlled environment before the final installation and mounting of the equipment.

-In order to successfully complete the testing procedure, allocate enough space to unpack and check all of the components.

-Locate the pan and tilt with camera housing as far from the edge of the test bench is possible. Doing so will limit the possibilities of the pan and tilt and camera from falling off of the test bench. Remove the protective lens cap.

-Allocate a monitor that can accept RCA input from the camera system. -A rated power supply will also be necessary to complete the Pre-Installation Testing Procedure. The power supply must be capable of supplying 24 volts DC and should be rated at 7amps or more to meet the equipment power specifications. Each system is clearly marked with the appropriate voltage and power requirements, and supplied with a tested and approved power supply. Damage can be caused by under powering the system.

Note: DO NOT use a battery charger or vehicle battery charger to power the Thermal System. Battery chargers employ specialized power

Connections Described

-The connections for the Master Cable are the most important connections on the system. If the Master Cable connections are not properly seated, the system may not work properly.

-Connect to IR video, primary BNC video connector in order to view and operate the camera.

-Connect Video Cables to the viewing Monitor and ensure that the monitor has power and is on.

-Ensure that the power supply is OFF and attach the power leads to the power supply as follows: Verify that DC polarity to the power leads is correct, Red = VDC+ and Black = VDC- and Chassis should be coupled to the VDC-. It is recommended that the Hot, VDC+ side of power be fuse protected with a 5 amp quick-blow fuse.

-Connect Serial Rx, Tx, and GND to meet the appropriate control configuration. Wiring diagrams and schematics can be found at the rear of the manual.

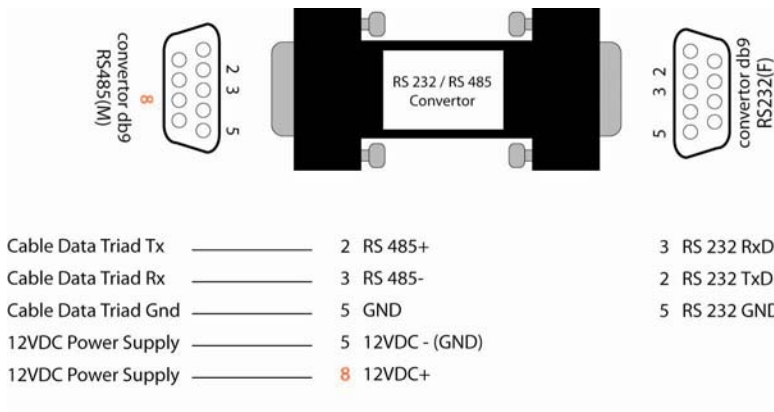
Turning System On

At this point the system has been compiled in a controlled test environment, and all connections have been verified. Check the power source once again and match it to the requirement indicated on the system. The system power specifications are 24 volts DC, 7 amps. Verify that DC polarity to the power cord is correct, Red VDC+ and Black VDC- and Chassis should be coupled to the VDC-.

***NOTE*: HURLEYIR, INC. SYSTEMS ARE NOT CONFIGURED FOR USE WITH AC UNLESS EXPLICITLY SPECIFIED UPON PLACEMENT OF ORDER. ONLY USE 24VDC POWER. DO NOT HOOK AC POWER TO CAMERA POWER UNLESS DIRECTED IN WRITING UPON RECEIPT OF CAMREA SYSTEM**

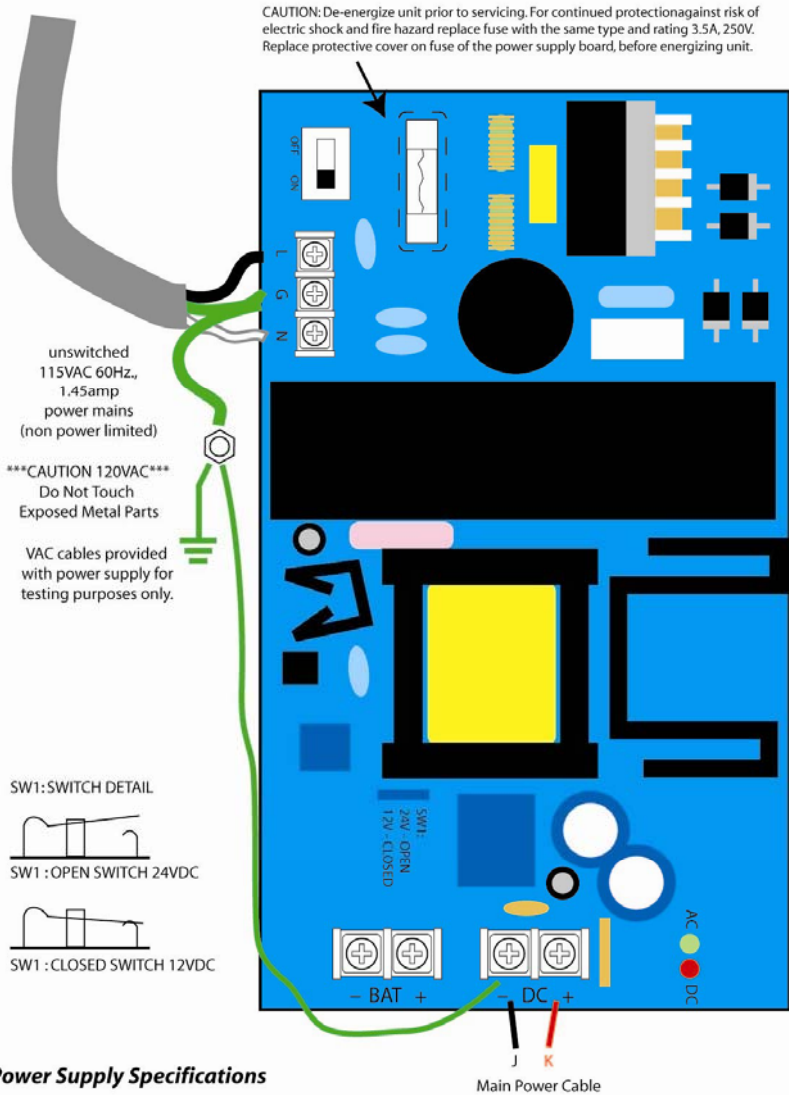
MS3116F14-12

A	232/485 Gnd	22AWG Violet
C	232/485 Tx	22AWG Brown
D	232/485 Rx	22AWG Grey
B	Vid 2 Center	BNC terminated lead
H	Vid 2 Shield	BNC terminated lead
G	IR Center	BNC terminated lead
M	IR Shield	BNC terminated lead
L	Chassis Gnd	18AWG Green
K	24 VDC -	18AWG Black
J	24 VDC +	18AWG Red



AC to DC Power Supply

The power supplies packaged with each system was tested and approved for use with that system.



Power Supply Specifications

- Input: 115VAC / 60 Hz., 1.45 amp
- 12VDC or 24 VDC selectable output @ 6 amp continuous supply current.
- Maximum charge current .7 amp.
- Filtered and electronically regulated outputs.
- Built-in charger for lead acid or gel type batteries.
- Automatic switch over to stand-by battery when AC fails (zero voltage drop).
- AC input and DC output LED indicators.
- Short circuit and thermal overload protection.
- NEMA 4 Rated, UL Listed weatherproof enclosure.

Serial Configuration and Programming

All Perimeter Security Thermal Imaging System from HurleyIR, Inc. come formatted for RS485 data communications for extended transmission lengths. Use the wiring for data conversion shown below in conjunction with the HurleyIR, Inc. ID Control Application to set the camera ID's for integration with pre existing protocol infrastructures. Only one camera can be set at a time. If using a USB to serial converter the Rabbit Semiconductors part number 540-0070 has been found to operate best.

Once the system has calibrated and initialized, operation testing can begin. Consult the section of the manual that describes system function and command structure. Successful operation of the system is dependent upon the duration of time spent learning the methods of operation. After the operation of the system has been verified as being in good order, the system can be configured for installation. To complete the Pre-Installation Testing Procedure, fill in and mail back the Test Confirmation Form that can be found at the rear of the manual. Failing to mail back the Test Confirmation Form may compromise the warranty coverage of your system.

Should you encounter problems during the Pre-Installation Test Procedure, contact tech support at 410-875-0234

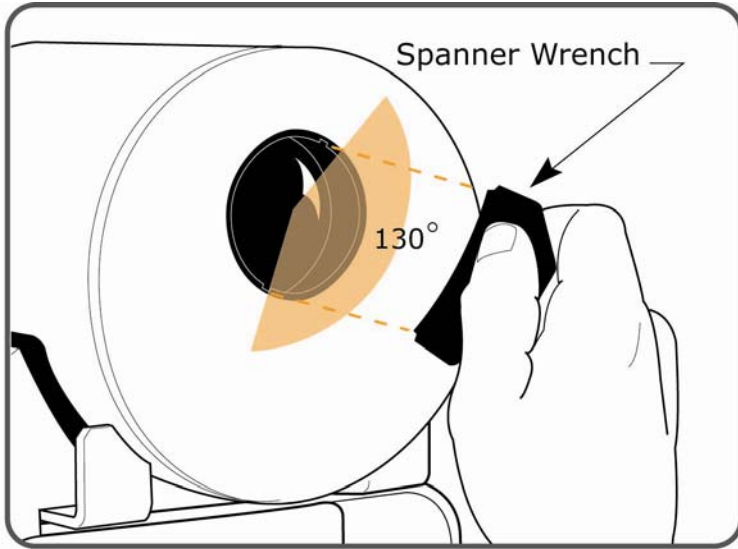
Installation Configuration

Focus Adjustment

Hurley IR Thermal Imagers are supplied in one of three formats of focus adjustment. Optic ranging from 100mm-and up have electric focus adjustments that can be operated serially. Most imagers that have been specified for optics ranging between 13mm- 75mm are focus free and have been optimized by the manufacturer to obtain the best depth clarity of each lens. Manual focus of select lenses can be achieved by using the spanner wrench that is supplied with your system

Manual Focus using Spanner Wrench

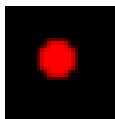
Please remember that the lenses have been optimized by the manufacturer to obtain the best depth clarity, therefore, only very small tuning increments will be needed to adjust focus. The Spanner Wrench Illustration shows the maximum focus movement from the lenses clockwise turning limit. Please note that excessive counter clockwise rotation of the lens focus ring can back the lens off of its internal mount. Rotating the lens ring until it hits its clockwise limit and stops will reset the focus ring for a max 130 degree counter clockwise rotation.



Hurley Control Utility Overview

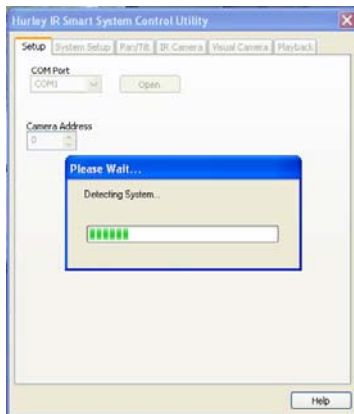
The HurleyIR Control utility allows the user to define and test operation parameters within the HurleyIR line of Short Range, Mid Range, Long Range and Extended Range thermal images, with or without PT positioning systems. At this time, the Control utility is for configuration and testing of HurleyIR thermal imaging systems and is not intended to be used as a continuous, permanent controller for HurleyIR system operations.

1. Once loaded, use the desktop icon below to launch the HurleyIR Control utility.



SmartSystemControlApp.exe

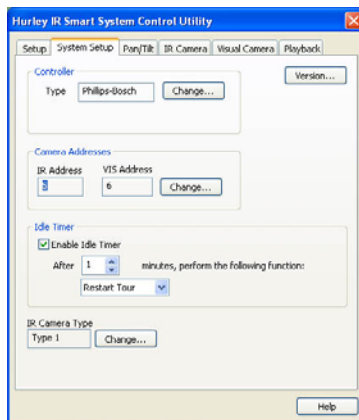
2. When the application is first launched the window shown right will appear. Select the appropriate com port and select the open button. The Detecting System window will quickly appear. If you should receive an error message, close the utility, reverse Rx and Tx on the RS 485 output side and retry the utility.



It is recommended that COM1 be used when possible and that the settings are the following.

Baud Rate = 9600
Data bytes = 8
Stop bytes = 1
Parity = none

3. In the System Setup pane, select the control protocol that will be used, change the address of the devices being controlled and if using a PT system, enable the inactivity idle timer if desired.

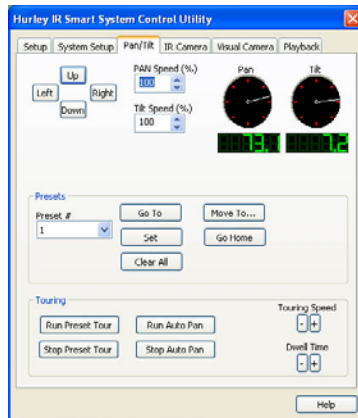


Controller selections are Philips Bosch or Pelco D and camera Addresses can reach over 9,999 in Bosch, and up to 255 in Pelco.

The Inactivity Idle timer allows a PT system to be configured to return to a previous tour sequence, or configured to go to soft home if broken out of a tour sequence and not returned voluntarily. The time laps to return can be set from one through fifteen minutes.

Also shown in the System Setup pane is a selection for IR camera type. Camera types are configured in the factory and will display correctly in the utility when connected to individual cameras. In some scenarios, the IR Camera Type can be used to diagnose IR camera functionality.

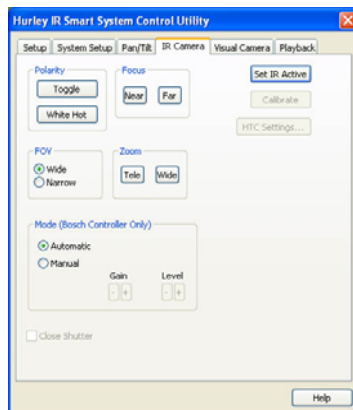
4. The Pan / Tilt pan allows the user to control the azimuth and elevation of a HurleyIR PT camera system. The user can define, recall and clear presets in the Pan / Tilt pane. By using the go home button the user can send the PT system back to absolute 0 which is factory home. Through the move to button, exact azimuth and elevation coordinates can be entered and moved to. Speed settings and dwell times can be configured through the Pan / Tilt pane. Touring can also be activated.



5. The IR Camera pane allows for user defined control over IR camera settings, but note that not all settings apply to all cameras.

Polarity is used to select between color pallets, most commonly black hot or white hot.

Focus is used to adjust image clarity on thermal imagers configured with electric focus optics. This control capability applies to all imagers with FOV (fields of view) 9° and lower.



FOV will switch fields of view on lenses configured with dual fields. This function applies to 2/8, 5/15, and 10/30 systems.

Zoom will control digital zoom enhancement of some thermal images.

Mode controls the gain and level setting of the thermal imager when in manual mode. Automatic is the recommended choice for optimal image performance.

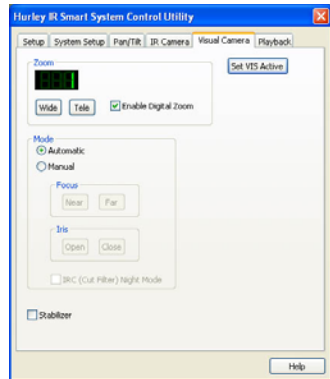
Close shutter applies to type 2 and type 3 thermal imagers and can be used to protect the imager from potential damage during

operation. Calibrate will force a calibration or renormalization of the IR image on type 2 and type 3 thermal imagers.

Set IR Active calls the IR video to the primary video line through on-board video switching located in the camera modules.

HTC Settings is a menu of Hot Target Color pallets that the user can activate to aide in target deseriination.

6. The Visual Camera Pane allows the operator to interact with the visual camera. Zoom can be controlled and the position feed back can be read. The digital zoom of the CCD camera can also be enabled or disabled when preferred.



The CCD camera can be set to manual or automatic mode to enhance control over focus, iris, and the low light cut filter.

The Digital Stabilizer can also be activated on models that come equipped. VIS-312S-D/N series are most commonly outfitted with the stabilizer option.

As with the IR camera, the Set VIS Active will toggle the CCD video over to the primary video line.

7. The Playback Pane will allow the user to Record and Playback a tour sequence. During this operation the camera system will record all sequences that the operator inputs into the system using the controller. Playback can be looped continuous or set to playback once.



It should be noted that duration of the record playback is dependent upon amount of activity being recorded and availability of memory. Because of this type of memory recall format, accuracy is dependent upon device configurations and limitations.

Protocol Op-codes and Functions.

Control Operations for HurleyIR Thermal Imaging PT – PELCO D Systems.

Serial Protocol Notes

The Pelco “D” controller serial commands are set at 2400 baud, with 1 start bit, 8 data bits, 1 stop bit and no parity.

For the purposes of this document, all values are represented in hexadecimal format, preceded by *0x*.

Packets sent from the controller are 7 bytes long.

Byte 1: Sync byte (always *0xFF*)

Byte 2: Address of the of the camera being controlled. In this document, this byte is denoted with *aa*.

Byte 3: Command 1. Denoted with *c1*.

Byte 4: Command 2. Denoted with *c2*.

Byte 5: Data 1. Denoted with *d1*.

Byte 6: Data 2. Denoted with *d2*.

Byte 7: Checksum. Denoted with *cc*. The checksum is calculated by performing an 8-bit sum of bytes 2-6.

Command List

Component	Component Function	PELCO D Function	Serial Command
Pan and Tilt	System Select	Press Camera # and CAM button.	N/A
	Direction Control	Move the joystick until the camera reaches the desired position	Modify bits 1-4 of the <i>c2</i> byte. Bit 1: Right (0x02) Bit 2: Left (0x04) Bit 3: Up (0x08) Bit 4: Down (0x10) Examples: Pan Right, No Tilt: <i>0xFF aa 0x00 0x02 ps</i> <i>0x00 cc</i> Pan Left, Tilt Up: <i>0xFF aa 0x00 0x0C ps</i> <i>ts cc</i> <i>ps</i> is the pan speed, 0x00-0x3F, or 0x40 for turbo speed.

			<i>ts</i> is the tilt speed, 0x00-0x3F.
	Set Pre-Position Scene	Position the camera using the keypad, enter a scene number (1-10 and 12-20) and press and hold the PRESET button for 2 seconds to store the scene. Position #11 is factory set and stored to be the “Home” position. (U)	0xFF aa 0x00 0x03 0x00 <i>id</i> <i>cc</i> <i>id</i> : The scene number to store.
	Recall a Pre-Position Scene	Enter a previously stored scene position number and press the PRESET button to send the camera to the stored location. (U)	0xFF aa 0x00 0x07 0x00 <i>id</i> <i>cc</i> <i>id</i> : The scene number to which to move
	Set Preset Tour	The pattern tour region is designated by the set Pre-Position Scenes 1-10 and will move across these presets in ascending order.	N/A
	Set Tour Dwell Time	Using the keypad, enter the dwell time, in seconds, and press and hold the PATTERN button for 2 seconds.	0xFF aa 0x00 0x1F 0x00 <i>id</i> <i>cc</i> <i>id</i> : Dwell time, in seconds
	Start Preset Tour	To run a Preset Tour, press the PATTERN button. To stop a tour, move the joystick.	0xFF aa 0x00 0x23 0x00 0x00 <i>cc</i>
	Set Pattern Speed	To increase the pattern speed; press 6 – AUX ON. To decrease the pattern speed; press 6 – AUX OFF.	Increase: 0xFF aa 0x00 0x09 0x00 0x06 <i>cc</i> Decrease: 0xFF aa 0x00 0x0B 0x00 0x06 <i>cc</i>
	Clear Presets 1-10	To clear the presets 1-10 press 5 – AUX ON. This sequence will also redefine presets 1 and 2 as +90 and -90 degrees from the home position, and 0 degrees tilt. (L)	0xFF aa 0x00 0x09 0x00 0x05 <i>cc</i>
IR Camera	Primary Video Select IR	At power-up, default primary video is set to be IR video. To select IR video as primary video, press 3 – AUX OFF. The device displayed on the	0xFF aa 0x00 0x0B 0x00 0x03 <i>cc</i>

		primary video is the one that will be controlled.	
	IR Dig Zoom	To engage 2X digital zoom twist the joystick CW, to disengage 2X zoom twist joystick CCW.	2X Engage: 0xFF aa 0x00 0x20 0x00 0x00 cc 2X Disengage: 0xFF aa 0x00 0x40 0x00 0x00 cc
	IR Focus	Use the NEAR and FAR buttons to fine tune the IR image focus.	Near: 0xFF aa 0x01 0x00 0x00 0x00 cc Far: 0xFF aa 0x00 0x80 0x00 0x00 cc
	IR Polarity Black/White Hot	To set Black Hot Polarity, press 88 -- PRESET. To set White Hot Polarity; press 89 -- PRESET. White Hot Polarity is the default setting upon power-up.	Black Hot: 0xFF aa 0x00 0x07 0x00 0x58 cc White Hot: 0xFF aa 0x00 0x07 0x00 0x59 cc
	Calibrate IR Camera	N/A	N/A
	Field of View	N/A	N/A
CCD Camera	Primary Video Select CCD	At power-up, default primary video is set to be IR video. To select CCD video as primary video, press 3 – AUX ON. The device displayed on the primary video is the one that will be controlled.	0xFF aa 0x00 0x09 0x00 0x03 cc
	CCD Telephoto Zoom	To telephoto zoom the CCD camera, twist the joystick CW. To retract the telephoto zoom twist the joystick CCW.	Zoom: 0xFF aa 0x00 0x20 0x00 0x00 cc Retract: 0xFF aa 0x00 0x40 0x00 0x00 cc
	CCD Manual/Auto Control Select	To put the CCD video Camera in manual control mode, press 4 – AUX OFF. To put the CCD camera back into auto mode press 4 – AUX ON. Auto mode is the default mode upon power-up.	Manual: 0xFF aa 0x00 0x0B 0x00 0x04 cc Auto: 0xFF aa 0x00 0x09 0x00 0x04 cc
	CCD Focus	When in Manual control mode, use the NEAR and FAR buttons to fine tune the CCD camera focus.	Near: 0xFF aa 0x01 0x00 0x00 0x00 cc Far:

			0xFF aa 0x00 0x80 0x00 0x00 cc
	IR Cut Filter	When in Manual Mode, to turn the filter on; press 88 -- PRESET. To turn the filter off; press 89 -- PRESET. When in auto mode the Cut Filter will engage based on light conditions.	On: 0xFF aa 0x00 0x07 0x00 0x58 cc Off: 0xFF aa 0x00 0x07 0x00 0x59 cc

Control Operations for HurleyIR Thermal Imaging PT – bos85 systems.

Bosch Serial Protocol Notes

Parameters: 9600 baud, 1 stop bit, 8 data bits, no parity, no flow control

In the commands described above, the following notations are used:

All values are listed in hex format, using capital letters.

xx yy

These two bytes form the 14-bit receiver address, minus 1. The first byte (xx), contains the upper 7 bits of the address. The second byte (yy) contains the lower 7 bits of the address. Note that the MSB of both address bytes is NOT counted. For example, address 1 is 00 00, address 2 is 00 01, and address 256 is 01 7F.

cc

This is a checksum byte, and appears at the end of every command packet. It is computed as the sum of all previous bytes in the message, modulo 128 (logical AND sum with 7F). For example, using camera address 1, the select IR video command would be: 86 00 00 07 00 02 0F, with the last byte (0F) being the checksum.

Component	Component Function	PHILIPS – Allegiant LTC 8555/00 Keyboard Function	Command
Pan and Tilt	System Select	In Camera Entry Mode, Enter Camera Number (1-8) and press ENTER to select	N/A
	Direction Control	Move the joystick until the camera reaches the desired position	87 xx yy 08 aa bb dd cc aa bits 0-3: Tilt speed bits 4-6: Zoom speed bit 7: 0 bb bit 0: Set if focus far engaged bits 1-2: 0 bits 3-6: Pan speed bit 7: 0 dd bit 0: Set if panning right bit 1: Set if panning left

		<p>bit 2: Set if tilt down bit 3: Set if tilt up bit 4: Set if zoom out bit 5: Set if zoom in bit 6: Set if focus near engaged bit 7: 0</p> <p>If any of these functions are engaged, this command must be sent at no less the 20 Hz.</p>
Set Pre-Position Scene	<p>Position the camera and press the SET button. Using the keypad, enter a scene number (1-10 and 12-20) and press the ENTER button to store the scene. Position #11 is factory set and stored to be the "Home" position. (U)</p>	<p>86 xx yy 07 04 aa cc aa bits 0-6: Scene number bit 7: 0</p>
Recall a Pre-Position Scene	<p>Press the SHOT button. Then enter a previously stored scene position number and press the ENTER button to send the camera to the stored location. (U)</p>	<p>86 xx yy 07 05 aa cc aa bits 0-6: Scene number bit 7: 0</p>
Set Preset Tour	<p>The pattern tour region is designated by the set Pre-Position Scenes 1-10 and will move across these presets in ascending order.</p>	N/A
Set Tour Dwell Time	<p>To increment the tour dwell time by 2 seconds; press ON – 15 - ENTER. To decrement the tour dwell time by 2 seconds; press OFF – 15 – ENTER. The default tour dwell time on power-up is 5 seconds.</p>	<p>Increment: 86 xx yy 07 01 0F cc Decrement: 86 xx yy 07 02 0F cc</p>
Start Preset Tour	<p>To run a Preset Tour, press ON – 8 – ENTER. To stop a tour, press OFF – 8 – ENTER or move the joystick.</p>	<p>Start: 86 xx yy 07 01 08 cc Stop: 86 xx yy 07 02 08 cc</p>
Set Pattern Speed	<p>To increase the pattern speed; press ON – 14 – ENTER. To decrease the pattern speed; press OFF – 14 – ENTER.</p>	<p>Increase: 86 xx yy 07 01 0E cc Decrease: 86 xx yy 07 02 0E cc</p>
Clear Presets 1-10	<p>To clear the presets 1-10 press the ON – 40 – ENTER. This sequence will also redefine presets</p>	<p>86 xx yy 07 01 28 cc</p>

		1 and 2 as +90 and -90 degrees from the home position, and 0 degrees tilt. (L)	
IR Camera	Primary Video Select IR	At power-up, default primary video is set to be IR video. To select IR video as primary video, press the OFF button, the 2 key and ENTER. The device displayed on the primary video is the one that will be controlled.	86 xx yy 07 02 02 cc
	IR Dig Zoom	To engage 2X digital zoom twist the joystick CW, to disengage 2X zoom twist joystick CCW.	(See the command for the Direction Control function listed above. To engage 2X zoom, set the zoom in bit. To disengage 2X zoom, set the zoom out bit.)
	IR Focus	Use the FOCUS buttons to fine tune the IR image focus.	(See the command for the Direction Control function listed above.)
	IR Polarity Black/White Hot	To set Black Hot Polarity; press ON – 88 – ENTER. To set White Hot Polarity; press OFF – 88 – ENTER. White Hot Polarity is the default setting upon power-up.	Black Hot: 86 xx yy 07 01 58 cc White Hot: 86 xx yy 07 02 58 cc
	Calibrate IR Camera	To force calibration of the IR camera to adjust to the scene, press ON – 3 – ENTER.	86 xx yy 07 01 03 cc
	Field of View	To set a narrow field of view, press ON – 4 – ENTER. To set a wide field of view, press OFF – 4 – ENTER.	Narrow: 86 xx yy 07 01 04 cc Wide: 86 xx yy 07 02 04 cc
CCD Camera	Primary Video Select CCD	At power-up, default primary video is set to be IR video. To select CCD video as primary video, press the ON button, the 2 key and ENTER. The device displayed on the primary video is the one that will be controlled.	86 xx yy 07 01 02 cc
	CCD Telephoto Zoom	To telephoto zoom the CCD camera, twist the joystick CW. To retract the telephoto zoom twist the joystick CCW.	See the command for the Direction Control function listed above. To telephoto zoom, set the zoom in bit. To retract the telephoto zoom, set the zoom out bit.)
	CCD Manual/Auto	To put the CCD video Camera in manual	Auto Mode: 86 xx yy 07 01 07 cc

Control Select	control mode, press the OFF button, the 7 key and ENTER. To put the CCD camera back into auto mode press the ON button, the 7 key and ENTER. Auto mode is the default mode upon power-up.	Manual Mode: 86 xx yy 07 02 07 cc
CCD Focus	When in Manual control mode, use the FOCUS buttons to fine tune the CCD camera focus.	See the command for the Direction Control function listed above.)
IR Cut Filter	When in Manual Mode, turn the filter on; press ON – 57 – ENTER. To turn the filter off; press OFF – 57 – ENTER. When in auto mode the Cut Filter will engage based on light conditions.	On: 86 xx yy 07 01 39 cc Off: 86 xx yy 07 02 39 cc



HurleyIR, Inc. Pre-Installation Test Confirmation Form

System Information

Purchased From

State

System Config: SRTI MRTI LRTI SMRTI-PT-Kit LRTI-PT-Kit INTC-PT-Kit
circle all that apply 640480 VIS-312-DN VIS-1320-DN GEN3-NV EXSRL-HB

System Serial Number

Application

Contact Information

Registration Owner/Agency/Company

Street Address

City

State

Zip

Name tester

Signature tester

Date Tested

Please sign to verify that system was operating properly upon receipt

FAILURE TO SUBMIT TEST CONFIRMATION FORM WILL VOID TERMS OF WARRANTY