IRIS
INNOVATIONS

SENTINEL

Installation Instructions & User Guide

Contents:

Introduction

Thank you for purchasing your new Sentinel imager from Iris.

Sentinel cameras have been designed and built to operate in the harshest conditions to provide the very best imaging quality whether you are on the water, operating fire trucks, emergency service or military vehicles or permanently locating in hazardous environments.

Sentinel cameras are available in a wide range of video formats and resolutions to meet your requirements including IP video, composite video, thermal imaging, dual payload options. Cameras are available in single and dual payload options and a number of lens and resolution configurations are possible.

Sentinel cameras are waterproof and shock resistant. They can be installed upright or in the hanging orientation and are shipped with a 2 year return to base warranty.

This document contains safety, handling, disposal and recycling regulatory and software information. In order to activate your warranty please follow the instructions within the guide.

Please ensure your camera is installed in accordance with the instructions and guidelines provided within this document. We recommend visiting www.boat-cameras.com from time to time to check for updates to the manual and observing the latest versions of the manual when released.

Model Numbers & Specifications

Sentinel cameras are available in a range of configurations and resolutions as detailed in the table below:

Model No.	Payload 1	Resolution	Lens	Zoom	Payload 2	Resolution	Lens	Zoom	Illumination
S-118	Analogue	550TVL	3.4 ~ 122.4mm 57.8˚Wide / 1.7˚Tele	36x Optical / 12x Digital	NA	NA	NA	NA	IR Cut Filter / Range = 50 Meters
S-418	Network IP	2.0 Megapixel	4.5mm ~ 135mm	30x Optical / 10x Digital	NA	NA	NA	NA	IR Cut Filter / Range = 50 Meters
S-X100	Super Low-Light	1280 x 1024	Various	4x Digital (stepped)	NA	NA	NA	NA	Not Required
S-290	Thermal (Analogue)	384 x 288	19mm 19.5˚H x 14.7˚V	4x Digital (stepped)	NA	NA	NA	NA	Not Required
S-390	Thermal (Analogue)	640 x 512	25mm 24.6˚H x 18.5˚V	4x Digital (stepped)	NA	NA	NA	NA	Not Required
S-4290	Thermal (IP)	384 x 288	20mm 18˚H x 14˚V	4x Digital (stepped)	NA	NA	NA	NA	Not Required
S-4390	Thermal (IP)	640 x 512	20mm 18˚H x 14˚V	4x Digital (stepped)	NA	NA	NA	NA	Not Required
S-295	Thermal (Analogue)	384 x 288	20mm 18˚H x 14˚V	4x Digital (stepped)	Analogue	800 TVL	5 ~ 50mm	NA	Not Required
S-395	Thermal (Analogue)	640 x 512	20mm 18˚H x 14˚V	4x Digital (stepped)	Analogue	800 TVL	5 ~ 50mm	NA	Not Required
S-X295	Super Low-Light	1280 x 1024	Various	4x Digital (stepped)	Thermal (Analogue)	384 x 288	20mm	4x Digital (stepped)	Not Required
S-X395	Super Low-Light	1280 x 1024	Various	4x Digital (stepped)	Thermal (Analogue	640 x 512	25mm	4x Digital (stepped)	Not Required

Analogue Specs:

Pan Details	Continuous Rotation 0~360˚ 0.5˚/s ~ 80˚/s
Tilt Details	-25˚ ~ +90˚ (Auto Reverse) 0.5˚ ~ 60˚/s
Video Format	1V P~P Composite Analogue Video 75Ω - PAL / NTSC
Presets / Patrols & Patterns	100 Presets, 6 Patrols (up to 18 presets each), 4 Patterns
Communications Interface	RS485 Serial Data
Protocols	Pelco D, Iris Variant, 9600 Baud
Power	+12VDC / +24VDC. Max Consumption 36W (LED's ON)
Weight	3KG
Operating Temperature	-50˚C ~ +65˚C / Humidity: 10% ~ 95% RH
Environmental	IP66 / TVS 4000V Overvoltage / Lightning Protection

IP Model Specs:

Pan Details	Continuous Rotation 0~360˚ 0.5˚/s ~ 80˚/s
Tilt Details	-25˚ ~ +90˚ (Auto Reverse) 0.5˚ ~ 60˚/s
Video Compression	H.265 / H.264
Frame Rate	Main: 2MP - Max 30fps; Sub: 2MP - 30fps; Third: D1 - 30fps
Communications Interface	1RJ45 10M/100M Base-TX Ethernet (Addional RS485 Serial Data Connection - Pelco D / Iris Variant)
Protocols	ONVIF2.4, L2TP, IPv4, IGMP, ICMP, ARP, TCP, UDP, DHCP, PP-PoE, RTP, RTSP, DNS, DDNS, NTP, FTP, UPnP, HTTP, SNMP, SIP
Power	+12VDC / +24VDC. Max Consumption 36W (LED's ON)
Weight	3KG
Operating Temperature	-50˚C ~ +65˚C / Humidity: 10% ~ 95% RH
Environmental	IP67 / TVS 4000V Overvoltage / Lightning Protection

Height: 220mm

Diameter: 191mm
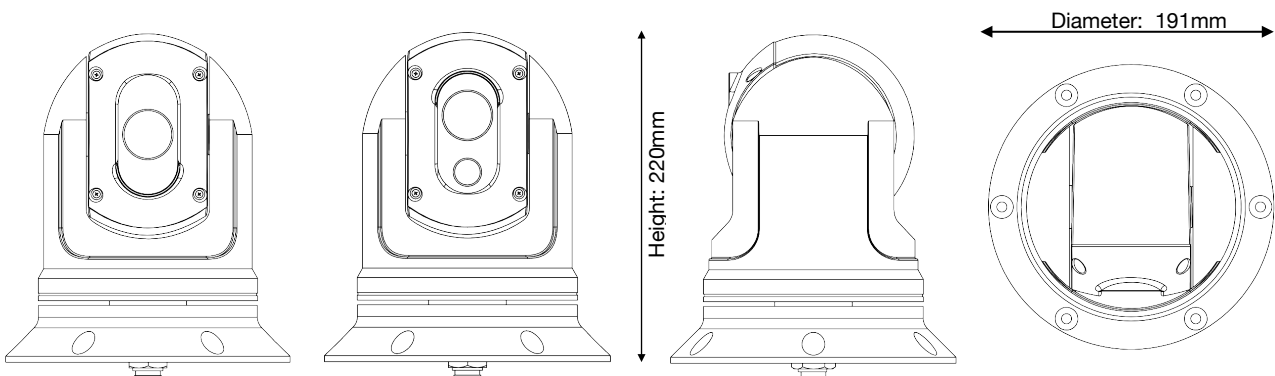
Conventions:

At various points within this guide, the following icons are used to illustrate important and/or potentially dangerous information:

INFORMATION:
This symbol points out important information pertaining to the installation, operation and maintenance of the camera.

WARNING:
This symbol indicates a risk of damaging the camera or other items, or an important issue that may effect the operation of the camera.

DANGER:
This symbol is used to alert the user / installer / maintainer of a serious risk of damage or personal injury or death.

Export Regulations:

Certain models within the sentinel range feature imagers strictly controlled by international export regulations.

Sentinel Thermal Imaging cameras, and dual payload models containing thermal imaging cores with a refresh rate above 9Hz are subject to international export regulations which strictly control their movement across international borders.

US Department of Commerce (DoC) Export Administration Regulations (EAR). Export control classification number: 6A003B4B. US Government authorisation may be required for all destinations outside the US except Canada.

UK export controls are enforced by the UK Department for International Trade Export Control Organisation (ECO). Export control classification number: 6A003B4B - dual use regulations. Prior authorisation is required for all exports (permanent or temporary) to countries outside of the EU. To export outside of these territories export licences are required.

These controls apply to the sale, re-sale and also the transit of goods. It is your responsibility to ensure export controls are met in accordance with the laws of your jurisdiction.

The buyer agrees not to export, re-export, see, distribute, disclose or transfer any product or information provided to any country, person or entity prohibited under these export laws to parties and entities located, organised or ordinarily resident in a country or territory that is, or whose government is, the target of comprehensive UK or US trade sanctions, including the Crimea Region, Cuba, Iran, North Korea and Syria, located, organised or ordinarily resident in a country designated as a "State Sponsor of Terrorism" by the US Department of State or the UK Government, or identified on the Specially Designated Nationals and Blocked Persons List, the Denied Persons list, the Entity List, the Unverified List or the Debarred list or any other applicable prohibited party list issued by the US or UK governments.

Failure to comply with the export regulations of your jurisdiction could result in prosecution and severe penalties including imprisonment.

Iris shall not be liable if any government export authorisation is delayed, denied, revoked, restricted or not renewed. Iris shall not be liable should the buyer contravene any international export restriction as outlined above or set out in law.

For more information on the export regulations pertaining to this technology contact Iris Innovations Limited or visit the following websites:

USA: www.bis.doc.gov
UK: www.bis.gov.uk/exportcontrol

Limited Warranty:

THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY HAVE OTHER LEGAL RIGHTS, WHICH VARY FROM TERRITORY TO TERRITORY. IRIS DOES NOT EXCLUDE, LIMIT OR SUSPEND OTHER LEGAL RIGHTS YOU MAY HAVE UNDER THE LAWS OF YOUR TERRITORY.

This product is warranted to be free from defects in materials or workmanship for one year from the date of purchase. Upon registration of the product an additional 12 months warranty will be awarded FOC.

Within this period, Iris Innovations will, at its sole option, repair or replace any components that fail in normal use. Such repairs or replacement will be made at no charge to the customer for parts or labour, provided that the customer shall be responsible for any transportation cost. Repaired or replaced devices have a 90 day warranty. If the unit sent for repair is still within its manufactures initial warranty period then the new warranty is limited to the end of the initial period and will not extend beyond the end of the initial warranty period.

If you seek warranty service outside of the original country of purchase, Iris cannot guarantee that the parts needed to repair or replace your product will be available due to differences in product offerings and applicable standard, laws and regulations. In that case, Iris, at its sole discretion and subject to applicable laws, repair or replace your Iris product with comparable Iris products or parts, or require you to ship your product to a service facility in another territory that can service your product in which case you will be responsible for complying with all applicable import and export laws and regulations and for paying all customs duties, VAT, shipping fees, insurances and any other associated taxes and charges.

This warranty does not apply to: (i) cosmetic damage, such as scratches, nicks and dents; (ii) consumable parts, such as batteries, unless product damage has occurred due to a defect in materials or workmanship; (iii) damage caused by accident, abuse, misuse, water, flood, fire, or other acts of nature or external causes; (iv) damage caused by service performed by anyone who is not an authorised service provider of Iris Innovations Limited; or (v) damage to a product that has been modified or altered without the written permission of Iris Innovations. In addition, Iris reserves the right to refuse warranty claims against products or services that are obtained and/or used in contravention of the laws of any country.

This product is intended to be used only as a travel aid and must not be used for any purpose requiring precise measurement of direction, distance, location or topography.

For products purchased through unauthorised dealers or online resellers, any warranty claims should be made against the seller and not Iris. Iris is not liable for any warranty claim made on products purchased through unauthorised vendor.

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, THE WARRANTIES AND REMEDIES CONTAINED IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND IN LIEU OF, AND IRIS EXPRESSLY DISCLAIMS, ALL OTHER WARRANTIES AND REMEDIES, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, STATUTORY REMEDY OR OTHERWISE. IF IMPLIED WARRANTIES CANNOT BE DISCLAIMED UNDER THE LAWS OF YOUR TERRITORY THEN SUCH WARRANTIES ARE LIMITED IN DURATION TO THE DURATION OF THIS LIMITED WARRANTY.

IN NO EVENT SHALL IRIS BE LIABLE IN A CLAIM FOR BREACH OF WARRANTY FOR ANY INCIDENTAL, SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, WHETHER RESULTING FROM THE USE, MISUSE OR INABILITY TO USE THIS PRODUCT OR FROM DEFECTS IN THE PRODUCT.

Warnings & Product Information:

LEGAL NOTICE:

In some jurisdictions it could be considered an invasion of privacy rights to take or publicly display photographs or videos of people or their vehicles using this product.

It is your responsibility to know and comply with applicable laws and rights to privacy I your jurisdiction.

DISTRACTION WARNING:

This device is intended to enhance the situational awareness when used properly. If used improperly you could become distracted by the display which could lead to an accident causing serious personal injury or death to yourself or others.

Always maintain awareness of your surroundings and do not stare at the display or become distracted by the display. Focusing solely on the display and not on your surroundings could cause you to miss obstacles or hazards. Use the device at your own risk.

Do not rely solely on the video from the camera to judge distances. Use the camera as a guide only to enhance your situational awareness.

INSTALLATION & OPERATION:

This product must be installed and operated in accordance with these instructions. Failure to do so may result in poor product performance, damage to the product or vessel and/or personal injury. Installation should only be carried out by qualified personnel or by persons competent in the installation of electronic systems.

POWER SUPPLY & GROUNDING:

Ensure the boats power supply is switched off during installation. Ensure suitably rated circuit breakers / fuses are used in the installation of the product in accordance with the electrical values shown in the technical specifications of the product. Never switch on power until the power connections are correctly terminated in accordance with the information provided in this document. Do not connect or disconnect the product with the power supply switched on. Never disconnect the DC ground with the power supply on. This could result in the DC power being grounded through the common video ground which could in turn damage the video output circuit of the camera.

WARNING: WIRING TERMINATIONS

Where the products video, power and data terminations are extended, ensure that suitable connectors are used and that the point of termination for each cable is adequately protected against moisture ingress. Ensure correct polarity is strictly observed. Do not cut or remove cable connectors without prior permission from Iris Innovations Limited.

WARNING: DO NOT OPEN THE UNIT

There are no user serviceable parts within the product so there s no need to open the device other than temporarily removing the Camera Address DIP Switch window whilst setting addresses. Ensure the DIP switch window is correctly replaced and that the rubber seal is not lost, pinched or damaged. The product has been certified to IP66 standards, however, submersion or the product or exposure to high pressure washing will invalidate the warranty.

WARNING: DISCLAIMER

This product is intended to be used only as an aid to navigation and must never be used as an alternative to correct navigational practices and judgements made on the basis of approved navigation methods. It is the users responsibility to observe correct and proper navigational skill when using this product. Only officially approved charts and notices to mariners contain the current information required for safe navigation.

Operating the camera or viewing the video input whilst the vessel is moving could cause a distraction and result in accidental collision resulting in property damage, injury or death. Iris Innovations cannot be held liable for any incidental, special, indirect or consequential damages whether resulting from the use, misuse or inability to use this product.

CAUTION: SWITCH CAMERA OFF WHEN NOT IN USE

To prolong the operation life of the thermal camera's micro-bolometer sensor we strongly advise that power to the camera is routed via a dedicated switch.

CAUTION: SERVICE AND MAINTENANCE

This product contains no user serviceable parts. Please refer all maintenance and repair issues to your authorised Iris Innovations dealer. Any unauthorised work to the product may affect the warranty.

CAUTION: CARE AND CLEANING

This product is a sensitive piece of electronic, imaging equipment and must be handled and treated accordingly. Do not drop or shake the unit during installation. Never manually alter the pan or tilt position whilst the power to the unit is on as this may permanently damage the motors. Avoid exposure of the imager to direct sunlight where possible as this may degrade the cameras performance over time.

When cleaning the device, ensure power is switched off to avoid unintentional movement of the cameras motors. Clean the camera housing with a soft cloth. Moisten the cloth and use a mild detergent if required but take care not to get detergent on the lens window. The lens window has a protective coating which may suffer damage as a result of improper cleaning. To clean the lens window use a soft cotton cloth. Moisten with clean water if necessary. For further advise on cleaning the lens window, contact Iris Innovations.

INFORMATION: PRODUCT DISPOSAL AND RECYCLING

Dispose of this product in accordance with the WEEE Directive. The Waste Electrical and Electronic Equipment (WEEE) Directive requires the recycling of waste electronic and electrical equipment. Iris Innovations supports the WEEE policy and politely request you observe correct disposal methods. For further information on how to correctly dispose of this product please contact Iris Innovations.

Please recycle unwanted packaging and documentation. The cardboard carton, all paper manuals and documents and the protective plastic bag in which the camera is shipped are widely recyclable. Please check with your local recycling plant for confirmation.

Key Feature Overview:

Here's brief list of some of Sentinels Key Features:

• Available in multiple formats to suit your requirements and budgets,

• Single and Dual Payload Options

• Thermal Imaging / Super-Low Light / Hi-Def IP and High Resolution Analogue Modules.

• Rugged Anodised & Powder Coated Aluminium Housing

• Built in Thermal Management

• Fast, Smooth PTZ Control

• IP66 Environmental Protection

• Absolute Referencing Control

• 10 Colour Palettes (Thermal Models)

• Image Contrast Enhancement (ICE™) Feature

• Daylight Cameras Feature Optical Zoom (10x on Dual payload models, 30x on S118 and S418)

• Thermal Cores Support 8x Smooth Digital Zoom in 64 Steps

• Easy Installation

Applications:

• Work Boat & Commercial Shipping

• Luxury Motor Yachts

• Fishing & Sports Fishing

• Ferry Boats & Passenger Vessels

• Law Enforcement & Emergency Services

• Rapid Deployment Applications

• Fire, Search & Rescue

Package Contents:

Please unpack your new Sentinel camera and check to make sure the following items are included in the box. If there are any items missing please contact your Iris dealer immediately:

- The Manual (obviously ;-)
- Sentinel Camera
- Umbilical Cable Tail - Part Number IRIS-S9125
- BNC / RCA Adapter
- 2 x Screw Terminal Jack Plug
- 2 x Screw Terminal Jack Socket
- Pack of 6 x 1/4" x 3" Self Tapping Fixing Screws
- Pack of 6 x 1/4" x 3" Fixing Bolts with Washers
- 2 x Video / Data Balun Adapter
- Fixing Template
- Warranty Card

Basic Configuration

It is possible to create a system using multiple cameras, controllers and viewing positions simply by introducing video switchers and amplifiers, serial data distributors and a variety of other transmission peripherals.

If your system consists of a single camera / single controller setup, the simplest method of connection is shown below.

There are three aspects to the cameras connectivity:

Video: 1VP~P Composite Video 75Ω impedance (such as RG59 / RG6 etc)
Data: RS485 Serial Data - 2 wire (RS485 A / RS485 B) - 24AWG
Power: 2 Core (DC+ / DC GND), 18AWG, 12VDC < 2A

The diagram below show a basic 1 camera 1 controller setup using combined power/video/data cable to simplify cabling. For more details on Iris cable options see page 15.

+12VDC ±10%
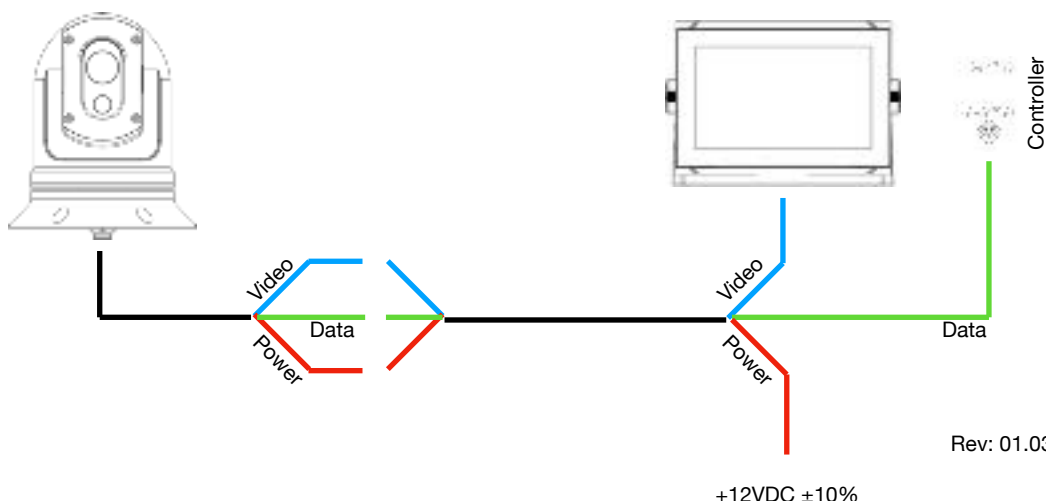
Typical Configuration Examples:

Analogue cameras:

The simplest configuration is a single controller and single camera, viewing the video on a single monitor (or MFD). No additional hardware is required, simply connect your camera controller directly to the data lines of your breakout balun and do the same with the data wires at the camera end, hook the video feeds from the camera into the balun and from the control balun into your monitor, and finally hook your power up. See diagram below:
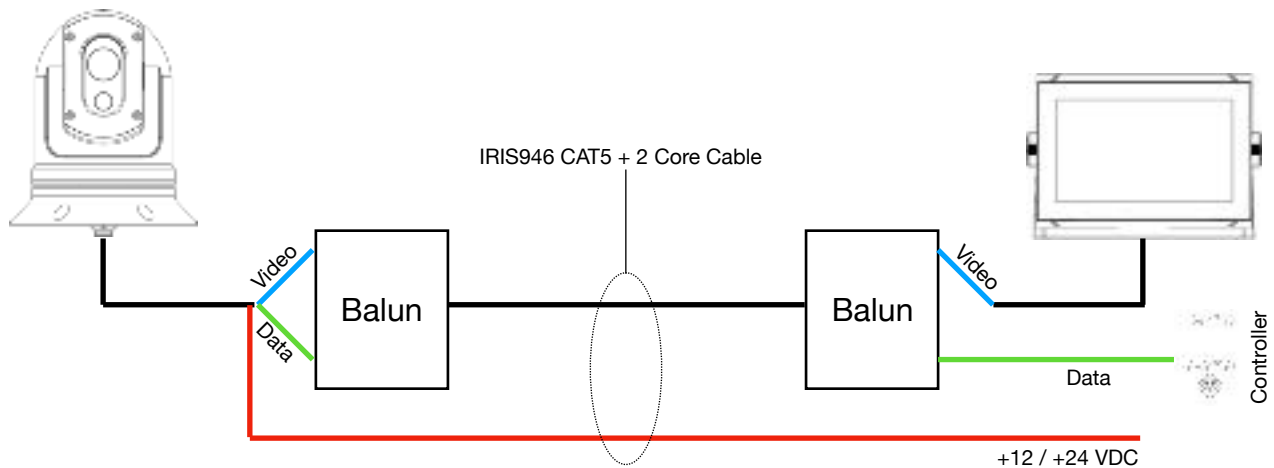
Single Camera / Controller / Monitor

If there are multiple Sentinel cameras, controllers or other PTZ cameras on the system (such as the IRIS106 for example), it will become necessary to add a serial data distributor in order to balance the data and ensure there are no signal reflections that could result in over-runs and poor camera control. Below is an example of a system with 2 controllers and 2 cameras. An IRISEXP0204 data expander has been used to manage the data cables, and an IRIS-HVR4 Recorder / Switcher has been used to manage the two video feeds.
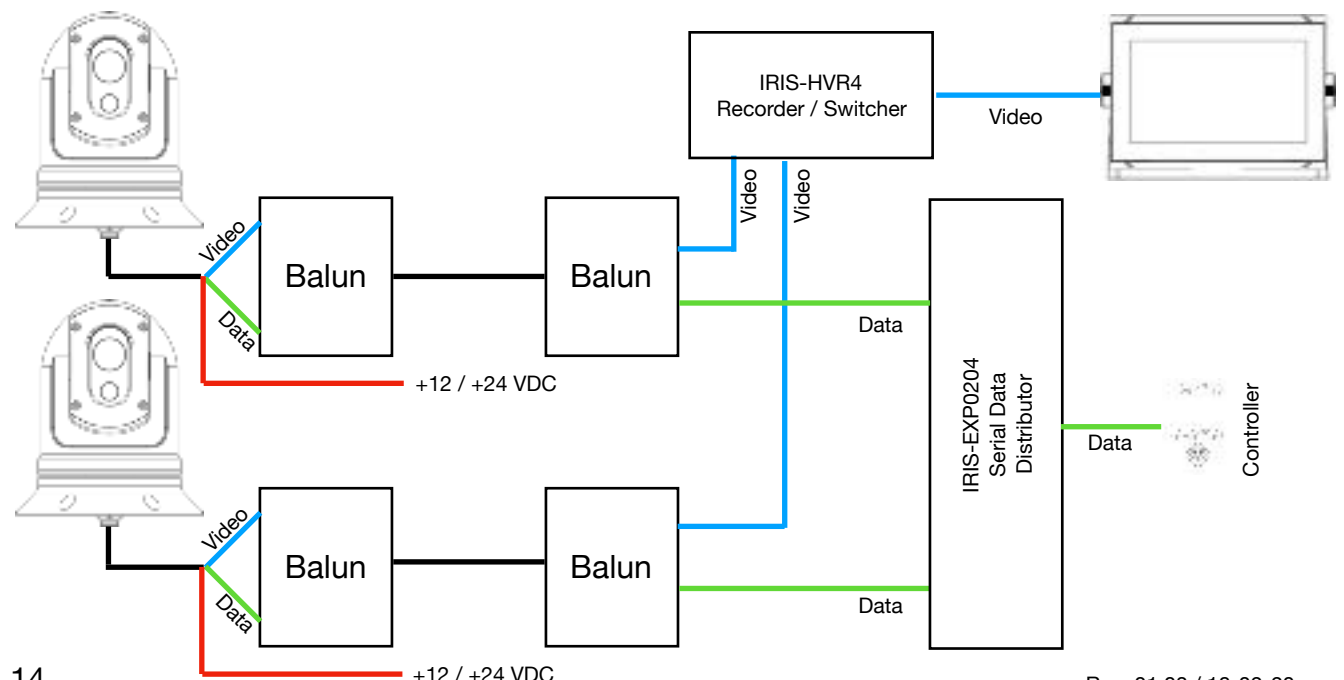
IP cameras (Network Cameras):

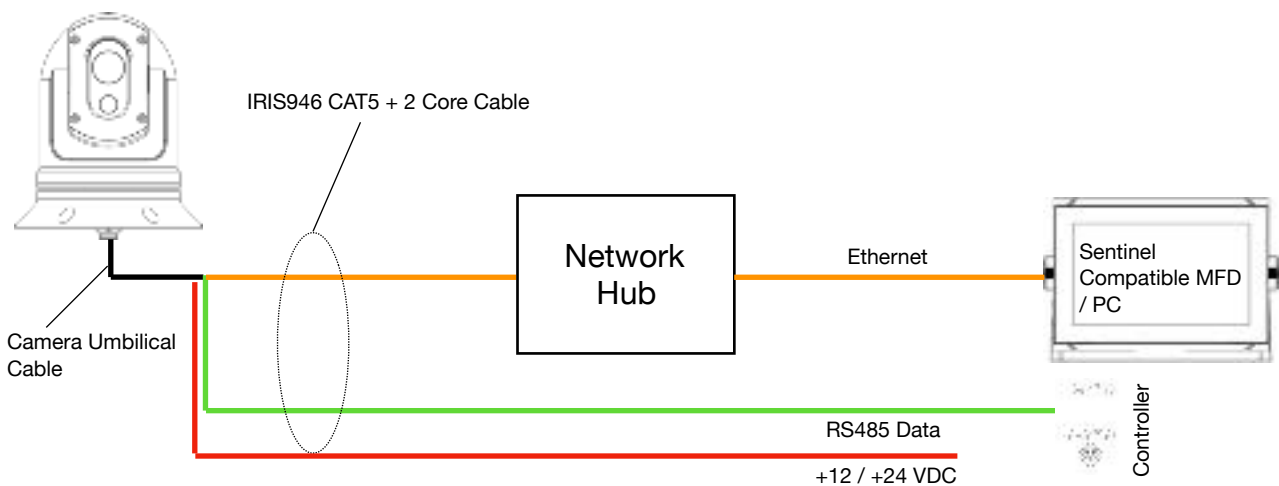For IP models, cameras can be connected and control in a number of different configurations as shown below.

IRIS946 CAT5 + 2 Core Cable

Network Hub

Ethernet

Sentinel Compatible MFD / PC

Camera Umbilical Cable

+12 / +24 VDC
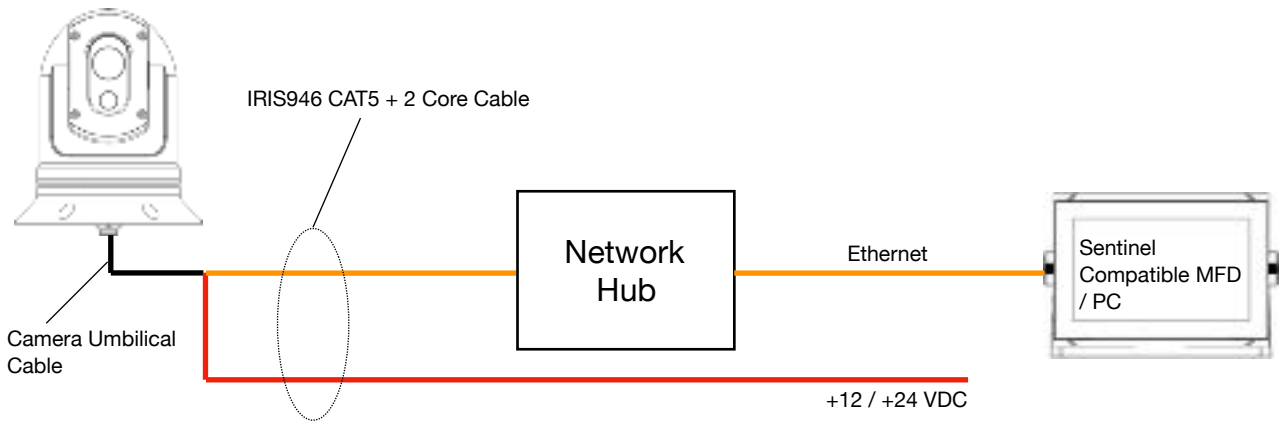
The example above shows a camera and an MFD connected to the same network via a network hub. IRIS946 combined CAT5+2 Core cable is used so camera power can be supped from the 'control' end. The solution is applicable for systems using Sentinel compatible MFD's or computer based control systems / chart-plotters.

IRIS946 CAT5 + 2 Core Cable

Network Hub

Ethernet

Sentinel Compatible MFD / PC

Camera Umbilical Cable

RS485 Data

Controller

+12 / +24 VDC

The example above shows a more typical marine system, whereby the MFD can display the IP video feed from the camera but does not support compatible control data. Most MFD chart plotter manufacturers have either locked their user interfaces down to work with only a very small number of very specific camera manufacturers (who more often than not do not produce marine suitable PTZ cameras) or do not support IP PTZ cameras. By using the IRIS946 CAT5+2 cable, the 2 additional cores can be used to carry RS485 data from the IRIS595 controller. A separate power cable is required for the camera.

With this configuration, multiple cameras and controllers can be added to the system using a serial data distributor to handle the control data as shown on the next diagram…
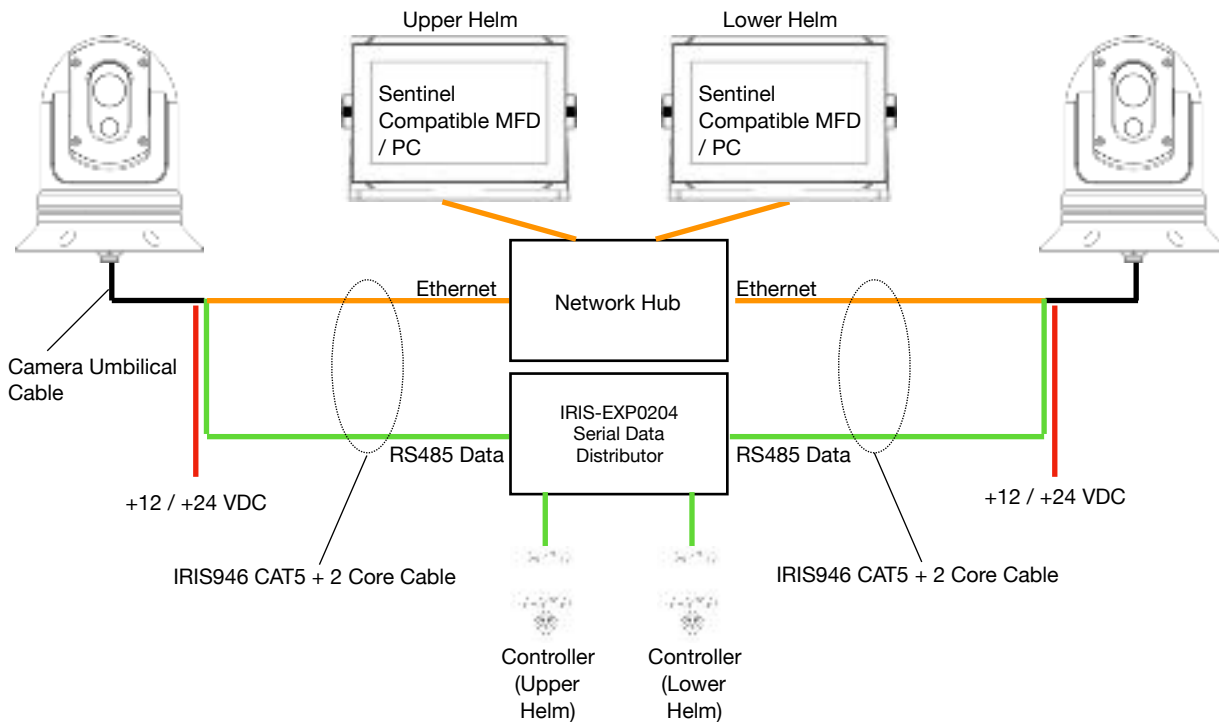
This example shows two control positions (upper and lower helm) and two cameras. An IRIS946 CAT5+2 cable is run to each of the cameras. The ethernet cable from the IRIS946 cable is used to carry network video traffic from the camera and the 2 x additional cores are used to handle the RS485 data. Power is either fed from a separate, suitably rated 2 core cable or taken from a source local to the camera. At the control end, each of the two network cables plug into a network hub, along with the network cables from your MFD (or PC). RS485 data from each controller hooks into the serial data distributor (IRIS-EXP0204) along with the additional cores from each of the IRIS946 cables.

Iris are working with MFD manufacturers to integrate camera control into their user interfaces. Please refer to boat-cameras.com for updates as to when this feature will be available and upon which MFD models.

Using Web Encoders to Connect an Analogue Camera to a Network:

If you wish to connect an analogue camera to a network MFD, a suitable IP encoder can be used to encode the analogue video into a network stream as shown below…
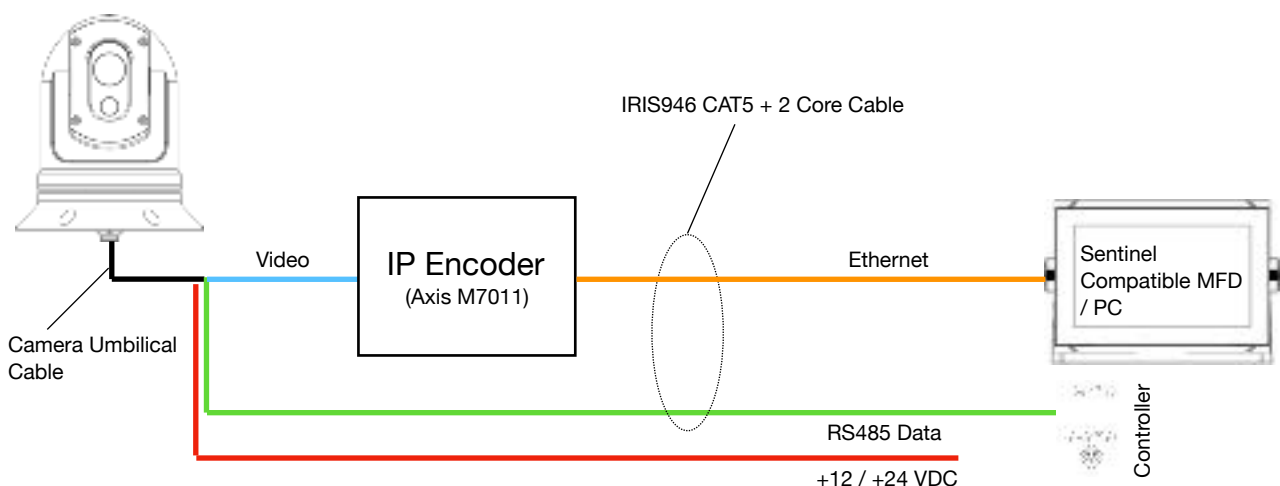
The example on the previous page shows how an IP encoder (such as the Axis M7011) can be used to encode the composite video from an analogue Sentinel camera into an IP stream and then connected directly to a network MFD (such as Garmin 8000 series or Raymarine Axiom). This example shows a basic connection of a single camera directly to an MFD, however you can connect multiple cameras in the same way shown above (depending on the scope and functionality of your MFD) using network hub(s) and serial data distributors.

Compatibility Information:

Compatibility with MFDs:
Sentinel cameras all have an analogue video output (even the IP modules) compatible with all MFDs that feature a composite video input. IP camera compatibility depends on the make and model of your MFD.

Sentinel cameras also feature an RS485 serial data connection for control, as well as ONVIF compliant control functionality.

At time of publication, only a few MFD manufacturers have introduced IP camera compatibility into their devices, and those that have done have written their user interface software around certain models of cameras and encoders only. Therefore it is important that you ensure your MFD is compatible with any third party device before you purchase. Certain IP Encoders also support RS485 connections specifically to drive PTZ cameras such as Sentinel but this feature will only work if it features in your MFD's software. This is why Iris also include an RS485 serial data connection and composite feed output on each camera.

Sentinel IP cameras can also be controlled across an ethernet network (computer, NVR, network joystick etc) using standard ONVIF PTZ commands. Iris are working with MFD manufacturers to integrate camera control into chart plotter interfaces. For progress updates visit boat-cameras.com or contact your Iris dealer.

Serial Data Distributors:
If your MFD or web encoder do not support PTZ control, serial data distributor boxes can be used to connect multiple cameras and controllers.

Iris produce a range of serial data distributors depending on your requirement. Please contact your Iris dealer for further product information or visit boat-cameras.com
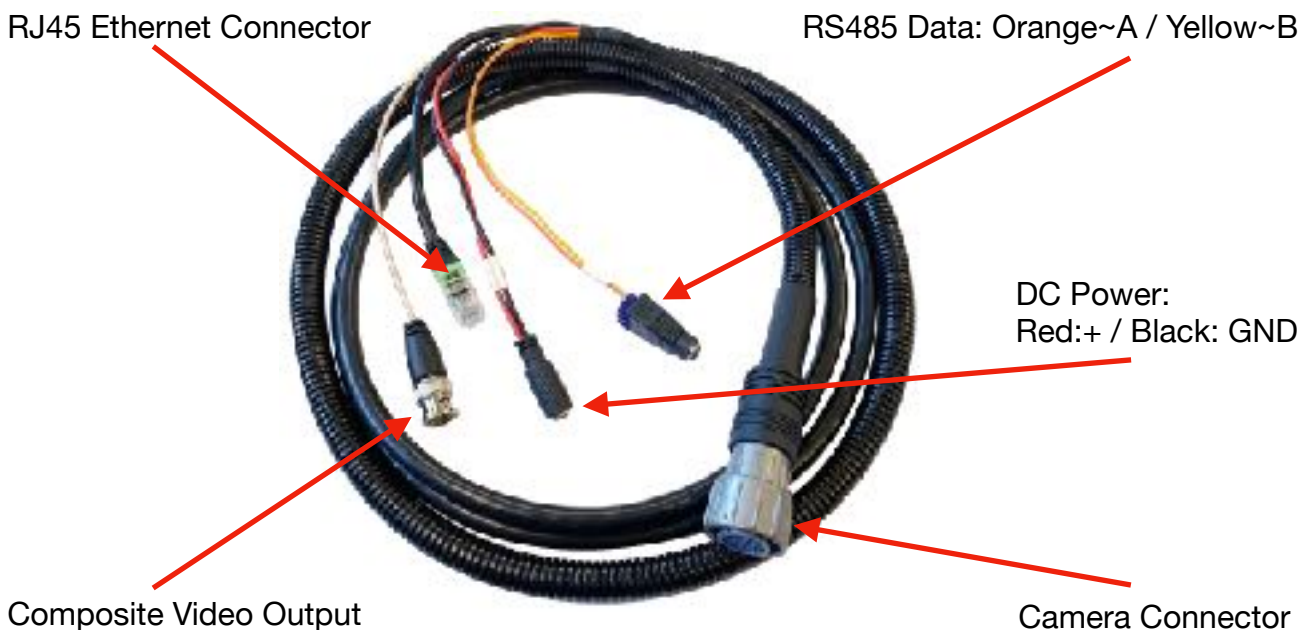
Camera Control

Sentinel cameras are controlled via an RS485 serial data connection, using a variant of the Pelco-D CCTV camera control protocol. The Pelco-D protocol was designed to provide accurate controls for a wide range of standard CCTV features, such as pan, tilt, user preset features etc, but do not include certain extended features supported by Iris cameras. Because of this, Iris have mapped their product specific features to certain user preset commands and to other modified Pelco-D commands. This means that NightRunner cameras can be controlled either by a dedicated Iris controller such as the IRIS595 or Iris's IRIS596, as well as other control devices, such as compatible chart-plotters, multifunctional displays and third party joysticks. For further information on compatible third party control interfacing please contact Iris Innovations. Details of the Pelco-D commands mapped for Thermal Camera functions are included in this document.

Sentinel IP cameras can also be controlled across an ethernet network (computer, NVR, network joystick etc) using standard ONVIF PTZ commands. Iris are working with MFD manufacturers to integrate camera control into chart plotter interfaces. For progress updates visit boat-cameras.com or contact your Iris dealer.

Cabling:

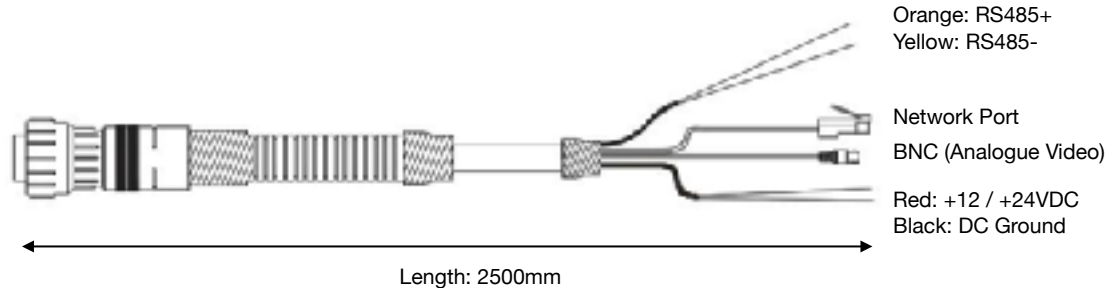Sentinel cameras are supplied with a 2.5 meter long umbilical cable which connects to the camera via a waterproof, multipole circular connector. The other end of the cable features a number of termination points as described in the image below:

RJ45 Ethernet Connector

RS485 Data: Orange~A / Yellow~B

DC Power:
Red:+ / Black: GND

Composite Video Output

Camera Connector

Umbilical Cable Tail - Part Number IRIS-S9125

UMBILICAL CABLE TAIL - PART NUMBER IRIS-S9125

Orange: RS485+
Yellow: RS485-

Network Port
BNC (Analogue Video)

Red: +12 / +24VDC
Black: DC Ground

Length: 2500mm

Umbilical Cable Pin-Outs	6 Pin Connector (Thermal Models)	12 Pin Connector (IP Models)
Power +		1,2
Power GND		3,4
Video +		6
Video GND		5
RJ45: 1,2,3,6	N/C	7,8,9,10
RS485 +		11
RS485 -		12

For installation onto smaller vessels, the umbilical cable may be sufficient, but in many cases an extension cable(s) will need to be run.

Running separate cables for power, video and data (or network cable and power for IP models) may not be possible or desirable. Therefore Iris supply optional combined cables to simplify installation and reduce costs.

Details of Iris Extension Cables are listed in the table below:

Part No.	Details / Conductors	Unit	Termination
IRIS945	Waterproof CAT5e Cable / 7mm OD / IP68 Outer Sheath	Per Meter	Free Ends
IRIS946	Waterproof CAT5e Cable / 7mm OD / IP68 Outer Sheath with 2 additional 18AWG cores	Per Meter	Free Ends
IRIS961	Combined RG59 Coaxial Video Cable 75Ω / 2 x 24AWG Cores for Serial Data + 2 x 18AWG Cores for Power	Per Meter	BNC Male Plugs for Video, other cables Free Ends
IRIS918	2 Core 18AWG Gauge for DC Power (10A)	Per Meter	Free Ends
IRIS959	RG59 Coaxial Video Cable, 75Ω	Per Meter	BNC Male Plugs
IRIS960	Combined RG59 Coaxial Video Cable 75Ω with additional 2 core 18AWG for power or data	Per Meter	BNC Male Plugs for video, other wires Free Ends

POWER CONSIDERATIONS:

Sentinel cameras can be powered from either +12 or +24VDC. Ensure the voltage reaching the camera is as close to the input range as possible. When choosing your power cable, consider voltage drop over distance and select a gauge of cable that will minimise any potential issues.

Allow for a maximum power consumption of 36W.

Remember, the voltage going into the cable is not going to be the same as the voltage at the camera end, especially if the cable run is over distance or if the cable is kinked or damaged!

Power Connections

Installation should only be carried out by qualified personnel or by persons competent in the installation of electronic systems. Failure to adhere to the wiring conventions in this guide and the practices stated could lead to product failure, damage to property and personal injury or death.

To prolong the lifespan of the thermal cameras sensor, it is recommended that power to the camera is routed via a helm mounted switch, and that the camera is switched off when not in use.

The power cores within the S9125 Umbilical Cable are colour coded **RED** for 12/24 DC+ and **BLACK** for DC GROUND. The power wires are terminated with a 2.5mm DC Barrel Socket Plug. Always ensure your power supply is protected by a sufficiently rated fuse or breaker depending on the supply voltage and cable characteristics.

Video connections (Analogue):

All Sentinel models, even IP versions, feature an analogue composite video output (CVBS). The video format (PAL / NTSC) can be configured in the cameras on screen menu set up pages. See On Screen Menu for further details.

Sentinels' video output is a 1VP~P Composite video signal compatible with most Multifunctional Displays (MFD's), Digital Video Recorders (DVR's) and TV's (via AV input).

Use 75Ω Coaxial cable such as RG59. Please note, RG59 has a solid core conductor which may not be suitable. In this case use a stranded coaxial cable such as URM70.

A BNC 'straight-thru' adapter is supplied with Sentinel in case you need to extend the video cable run.

Many Multifunctional Displays (MFD's) / Chart Plotters use RCA (Phono) jacks for video inputs. Sentinel is supplied with a BNC/RCA adapter for this eventuality.

Serial Data Connections:

Control commands are sent to Sentinel over an RS485 Serial Data connection which has 2 wires usually labelled either A and B or + and -. The data wires from the Sentinel umbilical cable are identified accordingly:

Orange: RS485 A (RS485+) / Yellow: RS485 B (RS485-)

When connecting directly to an IRIS595 controller, observe the following polarity:

IRIS-S9125 Umbilical Cable	Function	IRIS595 Controller
Orange	RS485 A (+)	Green
Yellow	RS485 B (-)	White

NOTE:

One of the most common faults when connecting serial data is incorrect polarity. In the event that there is no camera control when you have connected up, please check the polarity of the data wires. You cannot damage the equipment by reversing polarity of the data wires.

Connecting Multiple Cameras & Controllers

If your system features multiple cameras and / or controllers it is advisable to use a Serial Data Distributor. Iris supply a range of data distributors as listed below:

Part Number	Control Inputs	Outputs (Cameras)
EXP0204	2	4
EXP0408	4	8
EXP0208	2	8
EXP0216	2	16

Controllers are referred to as Inputs and cameras are referred to as outputs. If you require more than 2 controller inputs contact Iris for details of how to configure your system.

Page 16 shows an example of how Serial Data Distributors can be used. In this example the system consists of IP cameras being controlled via RS485, and using a Serial Data Distributor to facilitate multiple controllers and cameras. This works exactly the same with all analogue systems.

Connecting IP Cameras

The IRIS-S9125 Umbilical Cable features a tail terminated in an RJ45 plug for network connectivity (see page: 18) to T568B conventions (see diagram below):

1. White Orange   5. White Blue
2. Orange   6. Green
3. White Green   7. White Brown
4. Blue   8. Brown
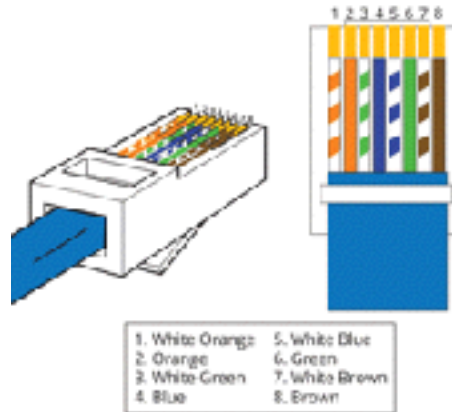
A CAT5 coupler is included with your camera to facilitate connection to a CAT5 extension cable. If extension cables are used, please ensure they are wired to T568B (straight-through) conventions as shown above.

Using RS485 data with IP cameras:

It may be necessary to control your IP camera with RS485 serial data (if viewing the cameras high definition video on an MFD than doesn't support PTZ control for example). In this case, IRIS946 Combined CAT5 + 2 core cable can be used to reduce the number of cables that need to be run to the camera. Connect the RJ45 plug to the network connection and use the 2 additional cores for RS485 data. Separate power must be run in this case.

Using IRIS946 combined cable for power:

If your control interface supports PTZ controls (PC based chart-plotter software or ONVIF compatible MFD's for example) then the 2 additional cores from the IRIS946 can be used to power the camera. This means only one cable needs to be run to the camera.

Camera Addressing

Each camera must have it's own unique address so that only control data intended for that camera is received and processed by the camera. If multiple cameras had the same address, they would all move together when pan and tilt commands are transmitted.

Analogue cameras and IP cameras are addressed differently and addressing analogue Sentinel cameras depends on your controller. Consult the manual for your specific Iris controller for details of how to set the camera address.

Analogue Camera Addressing:

TO SET THE ADDRESS USING A STANDARD CCTV CONTROLLER, SOFTWARE CONTROLLER OR DVR/NVR:

1) CALL Preset 96

2) Use Left/Right to select the desired address.

3) Press IRIS CLOSE to save the address. This will automatically save the address and exit from the menu system.

4) Reboot the camera.

By default all cameras will leave the factory set to Address 1.

(Camera addressing is also possible through the cameras standard configuration menu accessed by calling Preset 95.)

IP Camera Addressing:

IP Sentinels must have a unique IP address. By default, Sentinel IP cameras are set to:

192.168.1.108

To view the camera from a browser, you must ensure the IP address of your computer's NIC (Network Interface Controller) is in the same range as the camera, ie, 192.168.1.x (where x is any number between 1 and 255 and does not conflict with any other device on your network, including the camera).

Once you have accessed the cameras User Interface, you can change the IP address of your Sentinel as desired or set it to DHCP in order to receive an IP address automatically from a router or device set to assign addresses automatically. Many IP compatible MFD's act as DHCP servers, which means your Sentinel will need to be set to DHCP in order to receive an address from the chart-plotter.

Consult your IT provider for further details on how to set device IP addresses and/or DHCP configuration and operation.

Installation

Installation Considerations

It's important to fully consider the intended position of the camera and the desired fields of view prior to installation, in terms of how you are going to get cables to the position, will the camera be able to see the appropriate areas, will the camera interfere with any other fixture such as a doorway or walkway once it's fixed in place, or are there any obstructions behind the surface onto which the camera is to be installed.

It's strongly recommended that if possible the camera should be temporarily powered up prior to final installation and offered into position so that these factors can be assessed and any possible issue can be addressed before holes are drilled and difficult, time consuming and costly cable runs are attempted. Check third party hardware to ensure it doesn't effect the operation of the camera and vice versa.

Camera Installation

Observe extreme caution when siting the camera. Ensure the act of drilling the pilot holes and cable entry hole does not infringe any cables, equipment or fixtures behind the panel onto which the camera is to be installed.

Once you've established a suitable fixing position, offer the camera into place to mark off the six Surface Fixing Positions and the cable clearance position.

The camera is supplied with 6 x Stainless Steel, No.10x1" self tapping screws. Drill pilot holes accordingly and use a 38mm hole saw to create the cable entry hole in the centre. A fixing template is supplied to help you mark off the drilling positions.

Pass the cable through your cable entry hole and terminate, carefully ensuring there are no polarity issues and the integrity of each termination is sound. Although the termination points may not be immediately exposed to moisture, the environment in which your camera operates may not always be completely dry - therefore, ensure any joints, connections, terminations etc are sealed using adhesive lines heat shrink or a suitable insulating / amalgamating tape.

When your cables are in place and correctly terminated, offer the camera up into the fixing position and firmly screw into place.

To avoid moisture ingress between the bottom of the camera and the surface onto which the camera is to be attached, apply a bead of suitable silicone sealant around the edge of the plate to create a seal. Use a non-permanent sealant in case the camera has to be removed at any point in the future. Using a permanent sealant could result in damage to both the mounting surface and the camera itself.

Camera Anatomy

Inner Dome Front
Single or Dual Window Depending on Model

Inner Dome Rear
Houses Camera Modules, Fan / Heater / LED's
(Depending on model)

Optical Camera Window
Optically Clear Glass Window for Day Camera

Thermal Camera Window
Germanium Lens

Cowling
Contains Processor Circuit & Motors

Base Section
Contains Power Circuit

Height: 220mm

Diameter: 191mm

Connector
Connect Umbilical Cable IRIS-S9125

IRISx95 Thermal Imaging / Daylight Dual Payload PTZ Camera in Standard (Desktop) Orientation.

Operation

Powering Up / Initialisation:

Never apply power to the camera unless all connections are terminated correctly. Never disconnect the DC ground for any reason whilst the camera is powered up as this could result in damage to the electronic circuitry.

Upon switching on the circuit breaker that isolates the camera, the unit will perform an initialisation routine. During this routine, which lasts approximately 30 seconds, the camera will pan and tilt automatically in order to calibrate itself. On thermal models you will notice the mechanical shutter 'wiping' the image frequently for the first few minutes as the unit warms up. This will eventually settle into an automatic interval of wiping approximately every couple of minutes. This only lasts for a fraction of a second and allows the camera to calibrate itself for the best possible image in accordance with the ambient temperature.

When the camera has completed its boot-up routine, a text overlay table will appear in the screen displaying the camera address, protocol, baud rate and current firmware version. You will also notice positional indicator information on the top right hand corner of the screen and the current zoom level. When this message appears the camera is ready to use and you are able to control the device.

Controlling the Camera - Overview

Your camera features positional controls and extended features. Positional features such as Pan, Tilt and Zoom are usually controlled via a compatible joystick controller, such as the IRIS595 or IRIS596 controllers or via a compatible MFD / ChartPlotter - sometimes via touch-screen controls depending on the make and model. Third party control methods may differ from Iris controllers. For details of compatible third party control interfaces please contact Iris Innovations. Control of extended features depends on the type of controller you are using, but is usually accessed via a menu system on the controller or third party device (MFD / Chart-plotter etc). If using a third party control interface consult the relevant user documentation for the specific equipment for details.

A list of feature commands is included at the end of this document.

Extended Features:

SET HOME POSITION:

This feature lets you set the home position of the camera following install. Usually this is aligned with the bow of the boat or directly forward. The Home position is very useful for returning the camera to a specific point at the touch of a button, and is also used to calibrate the camera heading for tracking functions* and absolute referencing functions.*

USER PRESETS:

The camera has a built in memory that can be used to store up to 100 user 'preset' positions. A preset allows you to move the camera to a favourite or important position and learn that position so that the camera can be instructed to move at top speed to that position at the touch of a button. For example, you may want to point the camera so that it's facing directly aft so you can take a look at what's coming up behind you. By saving this position as a Preset, you can send the camera back to this position immediately by recalling the preset. Presets can also be used to form 'Tours', where the camera can be instruction to step through each preset within the Tour in sequence with a predetermined dwell time between each position.

User presets are numbered 1-100. Usually the controller you are using will have the ability to SET a Preset to learn the position and then CALL a Preset to send the camera to that position. This will depend on the model of controller you are using. Consult the user guide of your controller for details.

SYSTEM PRESETS

Certain functions of the camera that are not deflned by the Pelco-D Protocol are called by using Presets. A list of System Presets can be found later in this document.

SCAN MODES*

The camera supports 4 different Scan Modes. Once activated, tilt and zoom commands are still accepted by the camera but you will not be able to pan the camera until the Scan has been Stopped:

45° Auto Scan Camera pans back and forth 22.5° either side of the centre point (the position the camera is facing when the scan is activated.

90° Auto Scan Camera pans back and forth 45° either side of the centre point (the position the camera is facing when the scan is activated.

180° Auto Scan Camera pans back and forth 90° either side of the centre point (the position the camera is facing when the scan is activated.

360° Auto Scan Camera pans continuously through 360°, pausing every 108°.

There are three speed controls for each Scan. Slow, Medium and Fast. A command is also available to 'Re-Centre' the scan. This can be found in the command list.

*Not Yet Available On All Models

COLOUR PALETTES (THERMAL MODELS)

Thermal models feature the following colour palettes:

- White Hot

- Black Hot

- Fulgurite

- Iron Red

- Hot Iron

- Medical

- Artic

- Rainbow 1

- Rainbow 2

- Tint

Palette selection depends on the controller you are using. For Iris controllers refer to the user manual. For third party control, colour palettes can be selected using Pelco D Preset commands. A full list of extended feature Preset commands is included in this document.

ICE™ IMAGE CONTRAST ENHANCEMENT

Thermal model Sentinel cameras feature Iris's incredible new ICE® Image Contrast Enhancement feature, which processes each image pixel individually in order to provide digital edge enhancement in scenes of a low thermal contrast, dramatically boosting the detail in an otherwise flat image.

With all thermal imaging cameras, if the thermal scene is flat (ie, similar temperature), the image may not appear as sharp as it could be. With Iris's ICE™ feature enabled, each pixel is analysed and where there are distinct differences in pixel colour, the cameras processor accentuates the contrast in order to provide a much more defined and clearer image.

There are seven user definable levels of ICE™ processing, with level 1 being the default, non-processed, image, and 7 being the highest level of processing.

SENTINEL S418 IP CAMERA INTERFACE

The IRIS-S418 model camera can be fully configured through a web browser such as Internet Explorer. Active-X needs to be allowed in your browser setup to properly via the User Interface and camera video.

DEFAULT IP ADDRESS:
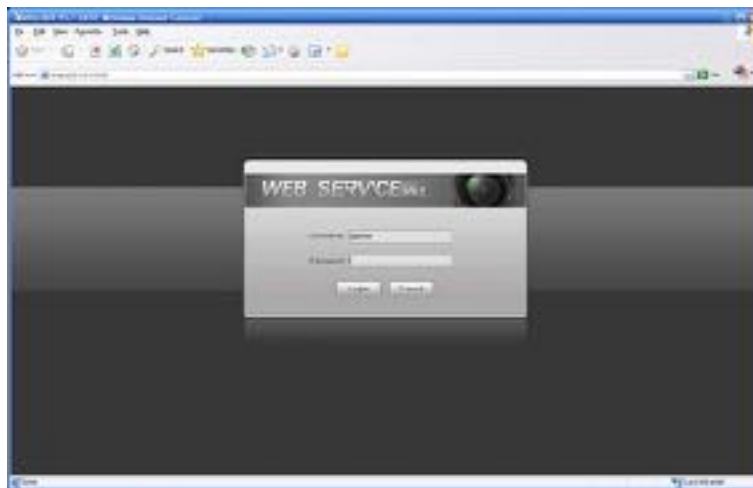The default IP address of the S418 is: **192.168.1.108**

Default user name: admin

Default password: admin

For security reasons we recommend you changing your log-in credentials.

Upon successful connection to the camera interface you will see the screen below:

On initial login, you may be presented with a pop-up asking to install control: **webrec.cab**. Click OK to install the control which is necessary to display the cameras web page correctly and access features.

If you experience difficulties downloading the ActiveX control from the camera, make the changes shown below to your security settings. Once the files have successfully downloaded, please ensure you change your security settings back to your usual settings.

CAMERA LIVE WINDOW:

Once logged in, the Live window will be displayed in your browser. Here you will see the live video from the camera as well as fully configure all aspects of the camera including network settings, video settings, motion alarm settings, streaming settings etc.

For full details of the camera interface refer to the Advanced Set-Up guide.

Protocol Information

IRIS20190522_bps115200.hex 08/07/2019

Function:	9600 baud Controller/516/595 to TR	115200 baud TR to PCCon	Analogue	IP
Pan/Tilt	Pelco P/T		Y	Y
Zoom In	Pelco ZI		Y	Y
Zoom Out	Pelco ZO		Y	Y
Zoom Stop	Pelco Stop		Y	Y
Auto Day/Night	69			
Lamp off	70			
Lamp on	Set 70			
Colour mode	71			
B+W mode	72			
System Restart	94			
Main Menu	95		Y	?
Address Menu	96		Y	?
Stop Scan	97			
White hot	201		Y	N
Black hot	202		Y	N
Arctic	203		Y	N
Spare	204		Y	N
Hot Iron	205		Y	N
Spare	206		Y	N
Rainbow 1	207		Y	N
Fulgurite	208		Y	N
Medical	209		Y	N
Rainbow 2	210		Y	N
Tint	211		Y	N
Iron Red	212		Y	N
Spare	213		Y	N
Spare	214		Y	N
Spare	215		Y	N
Spare	216		Y	N
Spare	217		Y	N
Spare	218		Y	N
Switch to Col Cam	226		Y	N
Switch to TI Cam	229		Y	N
Call Home	230		Y	N
Spare	231		Y	N
Spare	233		Y	N
Flip Ball up	236		Y	Y
Flip Ball-Up Mirrored	237		Y	Y
Flip Ball-Down Mirrored	238		Y	Y
Flip Ball-Down	239		Y	Y
Passive Calibration / AutoNUC only	240		Y	N
Spare	241		Y	N
Spare	242		Y	N
Spare	243		Y	Y
Set PID 1 - Stable	244		Y	Y
Set PID 1 - Agressive	245		Y	Y
Spare	246		Y	Y
Spare	247		Y	Y
Spare	248		Y	Y
Gyro Trim Down	249		Y	Y
Gyro Trim Up	250		Y	Y
Gyro On	**251**		Y	Y
Gyro Off	**252**		Y	Y
ICE -	**253**		Y	Y
ICE +	254		Y	Y
Spare	255		Y	Y
Set Home Position	FF AD 00 49 00 00 CS ie. FF 01 00 49 00 00 4A (Also Set PS:230)		Y	?
45 Degree Scan Slow (from Home/0)				Not implemented
45 Degree Scan Medium				Not implemented
45 Degree Scan Fast				Not implemented
90 Degree Scan Slow				Not implemented
90 Degree Scan Medium				Not implemented
90 Degree Scan Fast	Implementation Pending			Not implemented
180 Degree Scan Slow				Not implemented
180 Degree Scan Medium				Not implemented
180 Degree Scan Fast				Not implemented
360 Degree Scan Slow				Not implemented
360 Degree Scan Medium				Not implemented
360 Degree Scan Fast				Not implemented
Set Abs Pos - Pan	FF AD 00 4B MSB LSB CS		Y	Y
Set Abs Pos - Tilt	FF AD 00 4D MSB LSB CS		Y	Y