NIGHTRUNNER

IRIS295V2 / IRIS395 Installation Manual & User Guide

V3.00 Iss 05-06 18 - 1

1.01 Conventions:

At various points within this guide, the following icons will be used to illustrate important or potentially dangerous information:

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.

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

DANGER
This symbols alerts the user of a serious risk of damage or personal injury or death.

1.02 Export Regulations:

Versions of this product with a refresh rate in excess of 9Hz are subject by European and US Export Regulations:
US Department of Commerce (DOC) Export Administration Regulations (EAR). The Export control classification number is 6A003b4b. US Government authorization may be required for all destination outside the US except Canada.
UK Export Controls are enforced by the UK Department for Business, Innovations and Skills (BIS) Export Control Organisation (ECO). These products are controlled under classification 6A003b4b of the Dual Use Regulation. Prior authorization is required for all exports to countries outside of the EU and General Licenses may be available for certain destinations.
For more information on the export regulations required for these such devices contact Iris Innovations Ltd, Iris Innovations USA Corporation or visit the following websites:
USA: www.bis.doc.gov
UK: www.bis.gov.uk/exportcontrol

1.03 Limited Warranty:

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. 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 authorized service provider of Iris Innovations Limited or Iris Innovations USA Corporation; 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.

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2.01 Warnings & Important Product Information

WARNING: Installation and 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 be qualified personnel or by persons competent in electrical systems.

WARNING: Power Supply and 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.

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 authorized Iris Innovations dealer. Any unauthoriZed 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.

3.01 Introduction

Thanks for buying NIghtRunner from Iris Innovations!

By choosing NightRunner you have added a highly sensitive imaging device to your boat that aids visibility during the day and perhaps more importantly, at night or in low light conditions, thus enhancing your on board safety and enjoyment.

NightRunners Thermal Camera has a detection range of up to 2.2Km, and detecting thermal radiation rather than light, can provide clear, detailed images in zero light conditions.

NightRunner has been especially designed for practical and extreme operating environments such as marine, military and emergency service vehicles.
In addition to it's remarkably compact and sleek design, the PTZ is water-resistant and has anti-vibration and anti-corrosion properties.

This document contains safety, handling, disposal and recycling regulatory and software license information as well as the one-year limited (and second year optional) warranty for your NightRunner Camera. Please follow the information in this guide and keep in a safe place for future reference.

3.02 Overview of Key Features

Here's a brief list os some of NightRunners Key Features:

- 320 x 240 Vanadium Oxide Thermal Core (295)
- 640 x 512 Vanadium Oxide Thermal Core (395)
- 17μm Sensor Pitch
- <50mK NETD Thermal Sensitivity
- Hi-Resolution 700TVL Daylight Camera
- Digital Zoom on both Thermal & Daylight Cameras.
- Colour Palettes & ICE™ Image Enhancement
- Single, user selectable camera output
- Easy to install CAT5 connection
- Ball Up or Ball Down Configuration
- Built in Mounting Bracket
- Small, stylish compact housing measures only 16cm high by 15cm in diameter.

3.03 Contents of Package

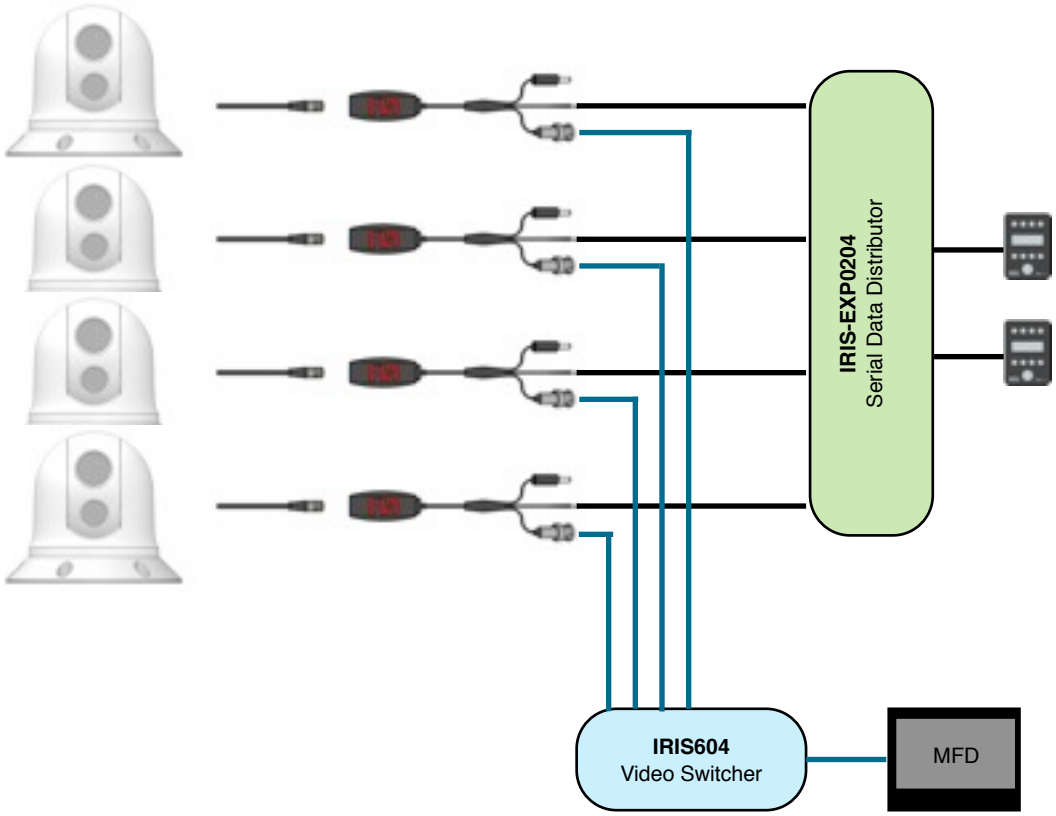
Please unpack your NightRunner and check to make sure the following items are included. If there are any items missing please contact your Iris dealer:

1. NightRunner Camera
2. Breakout Balun
3. 60ft Waterproof CAT5 Cable
4. 2m RG59 Coaxial Video Cable
5. BNC ~ RCA Adapter
6. In-Line Ground Loop Isolator
7. Pack of 6 1/4" x 3/" Stainless Steel Fixing Screws
8. DC Socket with Screw Terminals

4.01 Typical Configuration Examples.

For single camera, single controller installs no additional hardware is required. Simply connect the IRIS595 controller directly to the data lines of the breakout balun, and run the video from the breakout balun directly into your screen (or chartplotter etc).

If there are multiple NightRunner cameras, controllers or other PTZ cameras on the system, 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 4 cameras. An IRISEXP0204 data expander has been used to manage the data cables, and an IRIS604 Quad Video Switcher has been used to manage the four video feeds.



Systems can be expanded by using Serial Data Expanders to manage the control data and Video Distribution Amplifiers, Video Switchers or Matrices to manage multiple video feeds. In addition, IP encoders can be added to enable connection over a computer network so cameras can be viewed and controlled from smart-phones, tablets and computers.
For further information or to discuss your requirements, please contact Iris.

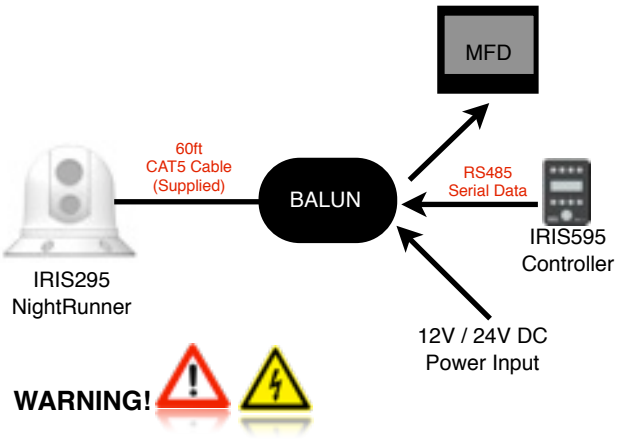
5.01 Camera Control Data

NightRunner 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 NightRunner joystick controller such as the IRIS595 or Iris's IRIS516 (v2), as well as other control devices, such as compatible chart-plotters, multi-functional displays and third party joysticks. For further information on compatible third party control interfacing please contact Iris Innovations. For certain third party interfacing, additional serial protocol convertors may be required where NMEA0183 or NMEA2000 connections are used. Details of the Pelco-D commands mapped for Thermal Camera functions are included in this document.

5.02 Cabling Requirements

NightRunner utilizes a unique, new cabling system designed to simplify most installations and therefore cut cabling and install costs.

The camera features a single, water resistant RJ45 socket into which power, video and control data are fed via a single waterproof CAT5 cable (supplied). An active balun adapter is supplied to connect to the other end of the CAT5 cable. Into the balun, DC power is fed, composite video is output and RS485 control data from the controller is fed. See Diagram Below:



WARNING!

Due to voltage drop and the associated increase in current draw, power must be introduced no further than 50ft from the camera when using CAT5 cable. If the 60ft CAT5 cable supplied is not long enough, power must be run separately or taken from a source local to where the 60ft NightRunner cable ends. See Section 5.07 Extending Cable Length for further details.

NEVER USE CAT5 CROSS OVER CABLE WHEN RUNNING YOUR OWN CABLE. SEE APPENDIX B FOR FURTHER DETAILS

5.03 Video Connections

NightRunners' video output is a 1VP~P Composite video signal compatible with most Multifunctional Displays (MFD's) and TV's (via AV input).
The balun adapter features a male BNC connector for the video signal, and NightRunner is supplied with a pre-made 2 meter extension cable. Iris supply a range of pre-made extension cables if required, alternatively, i've you wish to make your own cable 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 NightRunner in case you need to extend the video cable run.

As well as pre-made cables, Iris supply a range of connectors, tools and adapter plugs. Contact your Iris dealer for further information.

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

5.04 Data Connections

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

White: RS485 A (RS485+)
Braid: RS485 B (RS485-)

When connecting directly to an IRIS595 or IRIS516 controller, observe the following polarity:

Balun	Function	Controller
White	RS485 A (+)	Green
Braid	RS485 A (-)	White

Note

One of the most common faults when connecting 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.

5.05 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	Inputs	Outputs
EXP0204	2	4
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.

See Page 21 for connection example diagrams.

5.06 Power Connections

The power tail from NightRunners balun is terminated with a 2.1mm DC Barrel plug, with a positive center pin. Connect your DC supply to this plug using the Screw Terminal DC Socket supplied. Always ensure your power supply is protected by a sufficiently rated fuse or breaker. The NightRunner balun is fitted with a 3A resettable fuse for added safety.

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 table below provides information on current draw depending on the input voltage:

Input Voltage	Consumption (Idle)	Consumption (Full Load)	At Cable Distance
12VDC	1.2A	2.2A	60ft
24VDC	500mA	650mA	60ft

Details on the considerations that apply if you need to extend the 60ft CAT5 cable supplied are listed in the section below.

5.07 Extending Cable Length

In the event that the 60ft cable supplied is not long enough, the following considerations must be taken into account. Failure to do so could result in damage to the camera, vessel and possibly personal injury. Electrical connections to NightRunner must only be conducted by fully qualified personnel.

1. On no account must a CAT5 cable longer than the 60ft cable supplied be used to deliver power to the camera. Take power locally to the end of the 20m cable or run a separate power cable, suitably rated, back to the supply. Iris supply a combined CAT5 + 2 core cable for this very purpose.

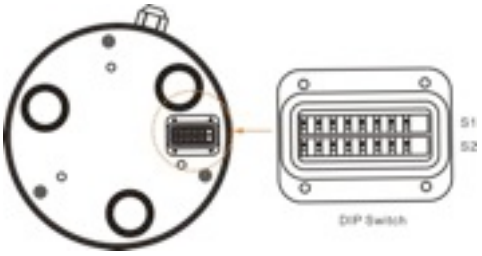
2. Video and Data can be extended further using CAT5 cable and an additional set of baluns. Part numbers for cable extension accessories are as follows:

Part No	Item
IRISX95-EXT-XX	Extension Kit. XX denotes cable length
CAT5-2-XX	CAT5 Cable + 2 Cores for Extending DC Supply. 'XX' denotes desired length in meters.
BALX95	NightRunner Balun (Individual)
IM-POW-XX	DC Power Cable (50V, 5A). 'XX' denotes desired length in meters
IM-BNC-XX	75Ω RG59 Coaxial Cable (BNC~BNC) Video Extension Cable.
IM-DAT-XX	Single Twisted Pair Data Cable for RS485 Control. 'XX' denotes desired length in meters.
BNC-THRU	Straight Thru BNC Adapter

3. **The diagram in section 6.03 illustrates methods of extending the cabling.**

5.08 Setting Camera Address / Image FLIP

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.
To set the camera address, remove the DIP switch cover plate on the base of the camera with a small cross-head screw driver, taking care not to loose the 4 screws or the rubber 'O' seal, and set the DIP switches on switch bank 1 accordingly. A table detailing the switch settings can be found at the end of this document and further details in Appendix A (Page 19)
Once the desired address has been set, carefully replace the DIP switch cover plate.
Switch No.8 on bank S1 will also set the image orientation. See section 10.02 Hardware Image Flip for details.



5.09 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 considered 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.

5.10 Protocol Information

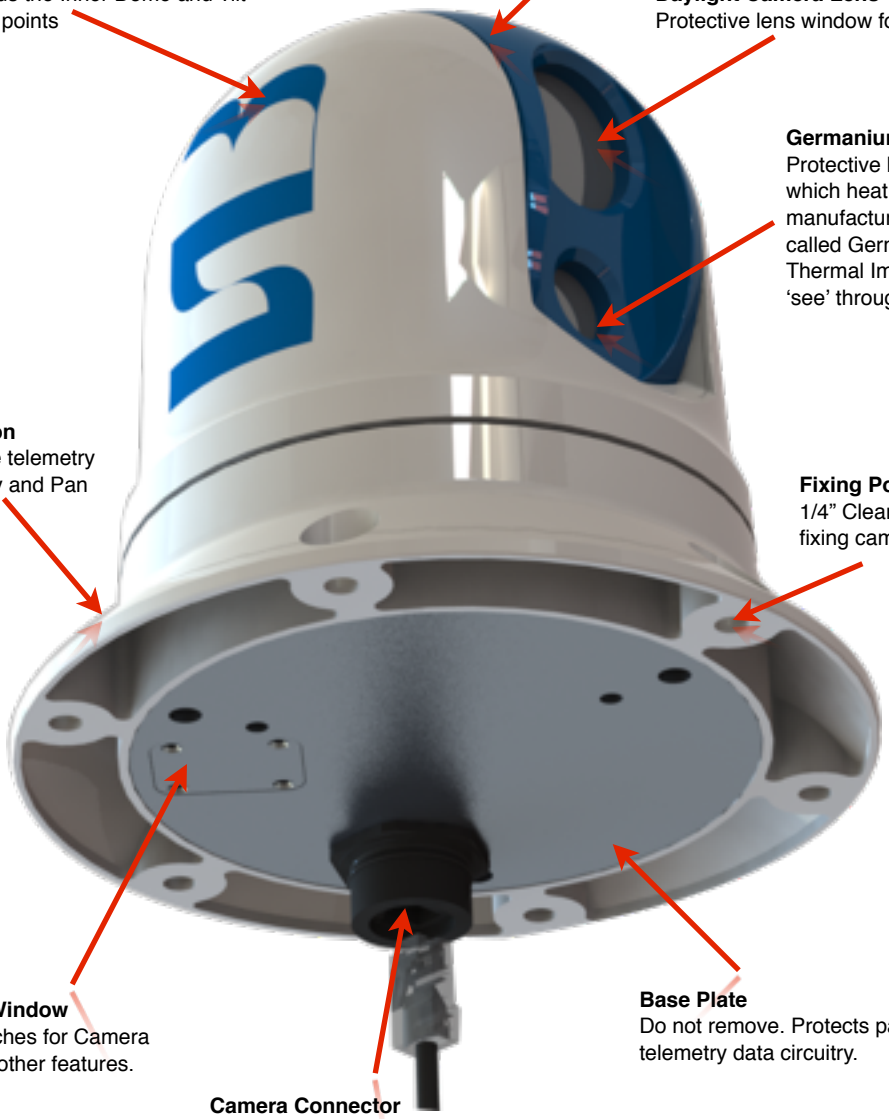
DIP switch bank 2 is reserved for setting the baud rate and protocol details. This is factory set to 9600 Baud, Pelco-D Protocol, N-8-1 (No Parity Bits, 8 Data Bits, 1 Stop Bit). Do not attempt to change these settings as they are locked. Changing the settings of Switch bank 2 could result in the camera not responding to data commands.

Full details of the Pelco-D control protocol can be found at www.pelco.com.

As well as the standard Pelco-D command set, Iris cameras use their own commands based on the Pelco protocol to call features that are specific to the model or are not covered by the Pelco command set. A list of these features is included later in this document. For further details contact Iris Innovations.

6.01 Hardware Installation

Get to know your NightRunner!
The different parts of your camera are labelled here:



Inner Dome
Contains the thermal camera module and tilt motor

Protective Cowling
Shields the Inner Dome and Tilt Pivot points

Daylight Camera Lens Window
Protective lens window for daylight camera.

Germanium Lens Window
Protective lens window through which heat is conducted. This is manufactured through a material called Germanium - not glass. Thermal Imaging cameras cannot 'see' through glass.

Base Section
Contains the telemetry data circuitry and Pan motor

Fixing Points
1/4" Clearance holes in six positions for fixing camera in place.

DIP Switch Window
Protects switches for Camera Address and other features.

Base Plate
Do not remove. Protects pan motor and telemetry data circuitry.

Camera Connector
Waterproof RJ45 Connector for camera Power, Video & Data.

IRIS295 Thermal Imaging / Daylight Dual Payload PTZ Camera in Standard (Desktop) Orientation.
This style of housing is known as the NightRunner Series Housing.

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, 1/4"x3/4" self tapping screws. Drill pilot holes accordingly and use a 30mm hole saw to create the cable entry hole.

When the CAT5 cable is correctly terminated (see next section), offer the camera up into the fixing position and firmly screw into place.

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.

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.

6.01 Hardware Installation (Continued...)

1. Once you've established a suitable installation position, offer the camera in to place and mark of the six fixing holes. Alternatively, use the drilling template supplied to mark of the fixing positions and cable entry hole.

2. Use a suitably sized drill to create pilot holes for the 6 x 1/4"x3/4" fixing screws.

3. Use a 35mm hole saw to create the cable entry hole

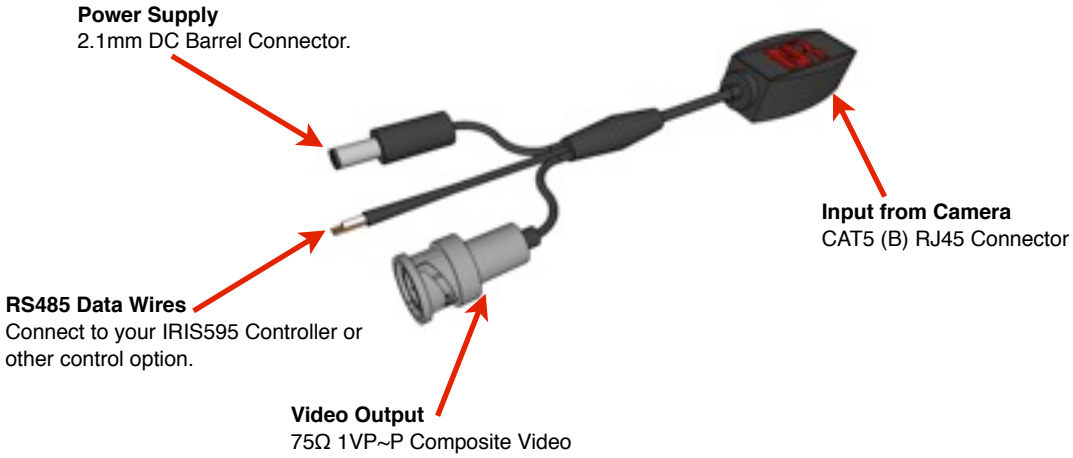
4. Apply a thin bead of water resistant marine silicone around the rim of the camera base to prevent water ingress through the screw holes and cable entry point.

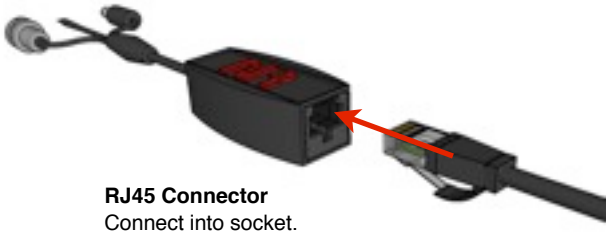
5. Pass your cable through the cable entry hole and connect to the base of the camera, ensuring the waterproof back shell is fully tightened and not cross threaded.

6. Position the camera as desired and fix into place with the 6 x 1/4"x3/4" fixing screws. Loosely tighten each of the six screws so the camera is in the correct position and then fully tighten each screw until secure. Make sure you do not over-tighten. If whilst fixing the cameras it becomes difficult to tighten a screw, or the GRP shows signs of stress, remove the screw and carefully open out the pilot hole slightly to relief the stress.

6.02 Breakout Balun

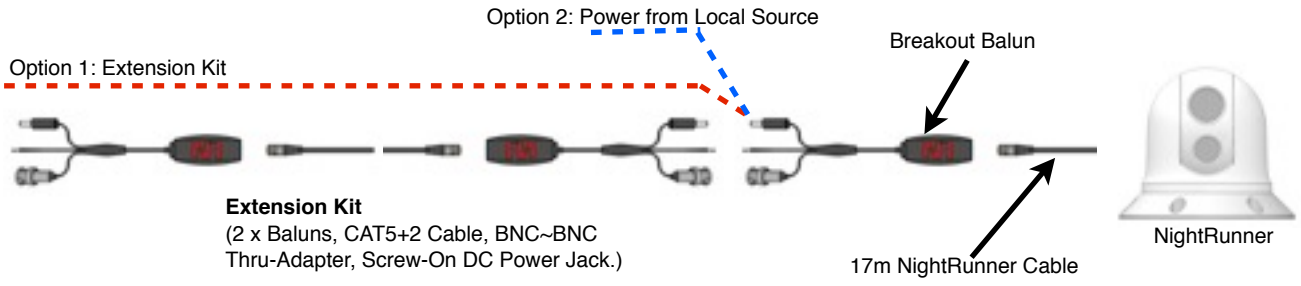
The 60ft CAT5 cable from your NightRunner terminates in the supplied Breakout Balun that's pictured below.





6.03 Details on Extending Cable

As described in section 5.07 Extending Cable Length, if you need to extend the cable run, you must not run power along the CAT5 cable . Either apply the power local to the end of the 50ft cable supplied or run the power separately. See diagram below:



Option 1:
The IRISX95EXT-XX kit contains all you need to extend the cable run. The XX in the part number denotes the desired length in multiples of 5 meters. The cable itself is CAT5 cable with an additional 2 cores for power. All the necessary connectors and adapters are provided to enable plug and play installation.

Option 2:
Alternatively, it might be possible to connect to a power source close to the end of the 20m CAT5 supplied. In this instance, use the extension kit for the video and data signals.

7.01 Powering Up

Upon switching on the circuit breaker that isolates the camera, the unit will perform an initialization routine. During this routine, which lasts approximately 30 seconds, the camera will pan and tilt automatically in order to calibrate itself. 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.

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.

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 the positional indicator icon in the bottom left hand corner of the screen and the zoom bar at the center bottom of the screen. When this message appears the camera is ready to use and you are able to control the device.

8.01 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 IRIS516 controllers or via a compatible MFD / Chart-Plotter - 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.

8.02 Set-Up Features

The following features will only usually be called during the initial set-up of the camera following installation and are accessed through the MENU function detailed below.

- **Video Orientation**
  UP / DOWN / UP+MIRROR / DOWN+MIRROR

Setting the vertical orientation (UP or DOWN) is determined by the orientation of the camera (Standard = UP / Hanging (also known as Ball Down) = DOWN). The mirror option is usually only used when the camera is facing aft, and is usually only applied to fixed cameras, as with a PTZ camera such as NightRunner, the camera pan position is frequently changing. Video orientation can however easily be 'flipped' as required with the IRIS595 or IRIS516 controller.

- **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. This calibrates the positional indicator with the direction of the camera.

8.03 Auto-Flip

When the camera is tilted past its azimuth the Auto-Flip feature is triggered. This automatically pans the camera through 180˚ at full speed (Proportional Control is disabled during this procedure) to the original pan position and continues the tilt movement as long as the camera is still being tilted. This corrects the orientation of the camera module as if the unit kept tilting past the azimuth without the automatic correction, the module would be upside down.

8.04 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 pre-determined 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.

8.05 System Presets

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

8.06 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.

9.01 Auto-Standby Feature

As well as the manual standby function, NightRunner also features an automatic standby which will operate if the camera has not received a control command after a period of one hour.

Immediately prior to the camera going into auto-standby, a message will be displayed on the screen informing the user that the camera is going to sleep. To prevent the camera going into standby mode, simply nudge the joystick, or from a third party control device, send the camera any control command. This will re-set the timer. If a control command is not received after 60 seconds, the camera will proceed to go into standby mode, during which the inner dome will tilt down into the base of the camera and switch off the power to each camera module.

Auto Standby is intended as a power-save and safety feature to prolong the operational life of the product.

9.02 Colour Palettes

The IRIS295v2 & 395 features 12 colour palettes grouped 2 per button on the 595 controller as list below:

- Button 1 - ‘HOT’ - (Black Red / Red Hot)
- Button 2 - ‘Blue’ - (Blue Green Red / Rainbow 1)
- Button 3 - ‘Warm’ - (Blue Red Yellow / Purple Red Yellow)
- Button 4 - ‘Grey’ - (White Hot / Black Hot)
- Button 5 - ‘Mix’ - (Black Green Red / Mixed)
- Button 6 - ‘R.Bow’ - (Rainbow 2 / Black Green Red-Pink)

Colour palettes have been grouped to provide the most logical pairing.

9.03 ICE™ Image Contrast Enhancement

All NightRunner 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 analyzed 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.

10.01 Protocol Command List

The table below lists features specific to IRIS295 Series (NightRunner) Cameras that are not covered by the standard Pelco-D protocol and the commands that have been mapped in IRIS camera software to operate those features. Values are shown in hexadecimal. The checksum for all Pelco-D commands is the 8 bit (modulo 256) sum of the payload bytes (bytes 2 ~ 6) within the message. Refer to the Pelco-D protocol document for further information.

For more in depth information on Iris Protocol mapping please contact Iris Innovations.

Function	Command	H	Add	C1	C2	D1	D2	CHK
Flip Ball Up	Preset 236	FF	AD	00	07	00	EC	CHK
Flip Ball Down	Preset 239	FF	AD	00	07	00	EF	CHK
Flip Ball Up Mirror	Preset 237	FF	AD	00	07	00	ED	CHK
Flip Ball Down Mirror	Preset 238	FF	AD	00	07	00	EE	CHK
Black Hot / Colour Camera	Preset 202	FF	AD	00	07	00	CA	CHK
White Hot / Inverse Camera	Preset 201	FF	AD	00	07	00	C9	CHK
Ocean Blue Scale	Preset 217	FF	AD	00	07	00	D9	CHK
Ocean Blue Scale Invert	Preset 218	FF	AD	00	07	00	DA	CHK
Inferno / Hot	Preset 213	FF	AD	00	07	00	D5	CHK
Inferno / Hot Invert	Preset 214	FF	AD	00	07	00	D6	CHK
Blue Green Red	Preset 205	FF	AD	00	07	00	CD	CHK
Rainbow 1	Preset 206	FF	AD	00	07	00	CE	CHK
Rainbow 2	Preset 207	FF	AD	00	07	00	CF	CHK
Black Red	Preset 208	FF	AD	00	07	00	D0	CHK
Black Green Red	Preset 209	FF	AD	00	07	00	D1	CHK
Black Green Red/Pink	Preset 210	FF	AD	00	07	00	D2	CHK
Mixed	Preset 211	FF	AD	00	07	00	D3	CHK
Red Hot	Preset 212	FF	AD	00	07	00	D4	CHK
Full Spectrum	Preset 215	FF	AD	00	07	00	D7	CHK
Full Spectrum Invert	Preset 216	FF	AD	00	07	00	D8	CHK
Blue Red Yellow	Preset 203	FF	AD	00	07	00	CB	CHK
Purple Red Yellow	Preset 204	FF	AD	00	07	00	CC	CHK
Daylight Camera Select	Preset 226	FF	AD	00	07	00	E2	CHK
Thermal Camera Select	Preset 229	FF	AD	00	07	00	E5	CHK
Standby	Preset 231	FF	AD	00	07	00	E7	CHK
Wake Up	Preset 230	FF	AD	00	07	00	E6	CHK
ICE Decrease Level by 1	Preset 253	FF	AD	00	07	00	FD	CHK
ICE Increase Level by 1	Preset 254	FF	AD	00	07	00	FE	CHK
Factory Reset	Preset 255	FF	AD	00	07	00	FF	CHK

10.02 Hardware Image Flip

As well as storing the cameras address, the DIP switches in the base of the camera also control the camera orientation.

Switch 8 on bank S1 should always be set to ON. This enables the camera orientation memory so that on bootup, the camera will always revert to the last position stored in memory.

Ordinarily, the camera's orientation will only ever be changed during install. For example, if the camera is installed in the hanging orientation, the installer will use the IRIS595 MENU system to select the correct orientation. This will now be stored in memory and as long as Bank S1 Switch 8 is set to ON, the camera will read this position on boot-up and set the orientation accordingly.

10.03 Ground Loop Isolator

For situations when the DC ground and Video Ground of your monitor are common, the CAT5 / Balun wiring method may introduce a ground loop onto the video which manifests as interference / ghosting on the video image.
To counter this, an in-line Video Ground Loop Isolator is included with your NightRunner. This may also help with other kinds of video interference which are induced by proximity of power cables, and other general noise and interference issues.
In the event that such noise is present on your video image, connect the Ground Loop Isolator in line with the coaxial video cable from the output of your breakout balun - observing the polarity marked on the body of the device.

11.01 Camera Address Table

The cameras unique device address is set using DIP switch Bank 1. The following table lists switch positions for each address from 0~38. There are a total of 255 address positions available. For address settings above 38 please contact Iris Innovations technical support.

Do not use address 0 as this is rarely used by control equipment.

ADDRESS	1	2	3	4	5	6	7	8
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
17	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF
18	OFF	ON	OFF	OFF	ON	OFF	OFF	OFF
19	ON	ON	OFF	OFF	ON	OFF	OFF	OFF
20	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
21	ON	OFF	ON	OFF	ON	OFF	OFF	OFF
22	OFF	ON	ON	OFF	ON	OFF	OFF	OFF
23	ON	ON	ON	OFF	ON	OFF	OFF	OFF
24	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF
25	ON	OFF	OFF	ON	ON	OFF	OFF	OFF
26	OFF	ON	OFF	ON	ON	OFF	OFF	OFF
27	ON	ON	OFF	ON	ON	OFF	OFF	OFF
28	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
29	ON	OFF	ON	ON	ON	OFF	OFF	OFF
30	OFF	ON	ON	ON	ON	OFF	OFF	OFF
31	ON	ON	ON	ON	ON	OFF	OFF	OFF
32	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
33	ON	OFF	OFF	OFF	OFF	ON	OFF	OFF
34	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF
35	ON	ON	OFF	OFF	OFF	ON	OFF	OFF
36	OFF	OFF	ON	OFF	OFF	ON	OFF	OFF
37	ON	OFF	ON	OFF	OFF	ON	OFF	OFF
38	OFF	ON	ON	OFF	OFF	ON	OFF	OFF

12.01 Technical Specifications

Dimensions	160mm High x 172mm Diameter	
Weight	1.4KG	
Material	UV Stabilized ABS Plastic Housing. Anodized Aluminum Base Plate	
Pan Movement	Range: 360˚ Continuous Rotation	Speed: 0.05~70˚/Sec ~ 0.05~240˚/Sec Max
Tilt Movement	Range 200˚ with Auto-Tilt at azimuth	Speed: 0.03~38˚/Sec ~ 0.05~140˚/Sec Max
Fixings	6 x 1/4" x 3/4" 316 Stainless Steel Pozi Screws, Self Tapping (Supplied)	
Connections	RJ45 Socket - Waterproof Screw Type Seal. IP66. 50ft CAT5 Cable Supplied	
Power Consumption	12/24VDC (min=9V / Max=30V)	Consumption: 1.2A Idle, 2.2A Max @ 12V
Video Output	1V P~P Composite Video Output / 75Ω Impedence	
Synchronization	Internal	
Temperature Range	-30 ~ +50˚C	
Environmental	IP66	
Thermal Core - IRIS295V2	17μm 384x288 Uncooled Vanadium Oxide (VOx) Long Range Infra Red Core	
Thermal Core - IRIS395	17μm 640x512 Uncooled Vanadium Oxide (VOx) Long Range Infra Red Core	
Thermal Attributes	8~14μm Spectral Band / Thermal Sensitivity <50mK	
Video Format	NTSC: 480i @ 30HZ	PAL: 576i@25HZ
Thermal Refresh Rate	60Hz	
Thermal Palette Control	12 Palettes	
Digital Zoom Control	Thermal: 1~4x (32 Steps)	Daylight: 1~10x (255 steps for smooth zoom)
Daylight Camera Imaging Device	1/3" SONY Super HAD CCD II Sensor (960H Double Speed CCD)	
Picture Elements	NTSC: 976 x 494	PAL: 976 x 582
Resolution	700TVL	
Lens Option	Thermal: 19mm (295v2) / 25mm (395)	Daylight: 12mm
Mirror Imaging	Thermal: OFF / V-Flip / H-FLIP / VH-Flip	Daylight: OFF / V-Flip / H-FLIP / VH-Flip
Digital Image Stabilization	Thermal: ON	Daylight: ON
Wide Dynamic Range	Thermal: ON	Daylight: ON
Digital Noise Reduction	Thermal: ON	Daylight: ON
Gain Control	Thermal: Automatic	Daylight: Automatic
Serial Data Connection	RS485 / Pelco-D (Extended Features Accessed via Iris Variant)	
Shock and Vibration	IEC60945 MIL STD 810E	
Sand and Dust	IEC60945 MIL STD 810E	

APPENDIX: A

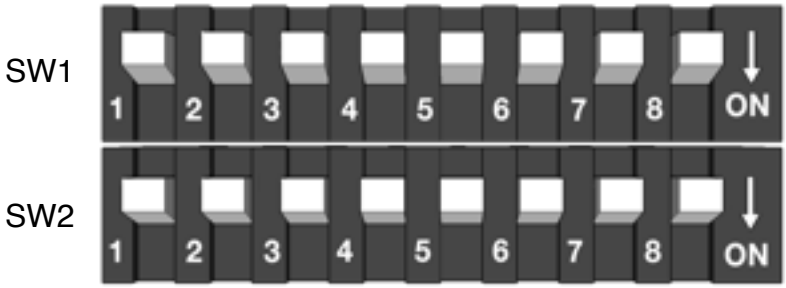
DIP SWITCH SETTINGS

Its vitally important to ensure the DIP switch settings for your camera are correct. Incorrect settings could result in issues such as video loss or no control.

When you open the DIP switch window, hold the camera so the switches are orientated as shown below.

Switch Bank 1

The top bank of switches is Switch Bank 1 and controls the video format (switch 3) and image flip (switch 8). **You should never need to touch switch bank 1 as it is factory set depending on your region**. Switch 3 sets PAL/NTSC, switch 8 sets the cameras memory to remember image flip commands sent from the IRIS595 controller and also flips image when set from OFF to ON).

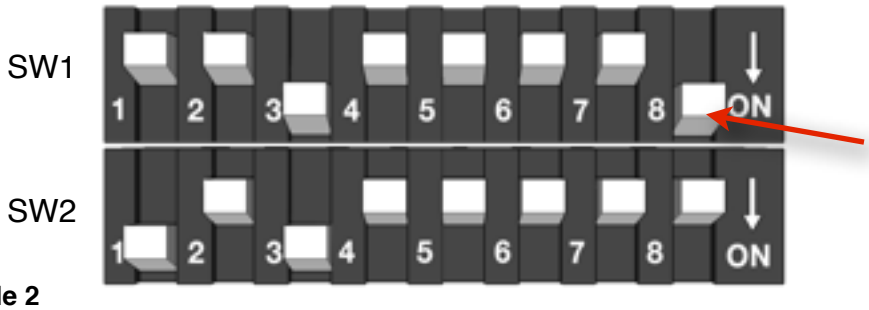


Switch Bank 2

The bottom bank of switches is Switch Bank 2. This sets the camera's address between 01 and 255 in binary. Therefore, switch 1 has the value of 1 when it is in the ON position, switch 2 has the value of 2, switch 3 has the value of 4, switch 4 has the value of 8 and so on. A table showing the correct address settings from Address 1 to Address 38 is provided as an example on page 17.

Example 1

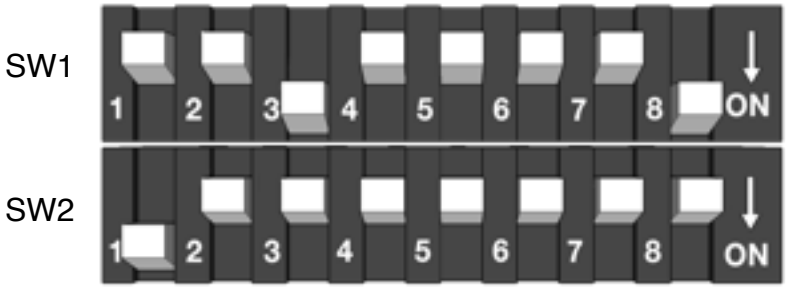
The example below shows the camera set to NTSC (Bank 1, Switch 3 = ON), Image flip memory ON(Bank 1, Switch 8) and address 5 (Bank 2, switches 1 and 3 - ie, switch 1 = value 1, switch 3 = value 4, therefore 1+4=5.



When Bank 1 Switch 8 is set from OFF to ON the video output will flip to the 'ball down' orientation and the cameras memory will be activated. This stores any subsequent image flip command sent from the IRIS595 controller.

Example 2

The example below shows the camera set to NTSC (Bank 1, Switch 3 ON), Ball Down (hanging) orientation (Bank 1, Switch 8 = ON), and address 1.



WARNING!

The settings for Bank 1 switches 1~7 are factory set and should never be changed! Changing these settings can seriously effect the performance of your camera.

APPENDIX: B

CABLING

NightRunner is supplied with a 50ft water resistant CAT5 568B Straight-Thru Cable.

WARNING!

Although CAT5 cable is utilized, **NIGHTRUNNER IS NOT A NETWORK DEVICE AND MUST NEVER BE CONNECTED TO ETHERNET EQUIPMENT SUCH AS SWITCHES, ROUTERS, PoE INJECTORS** etc.

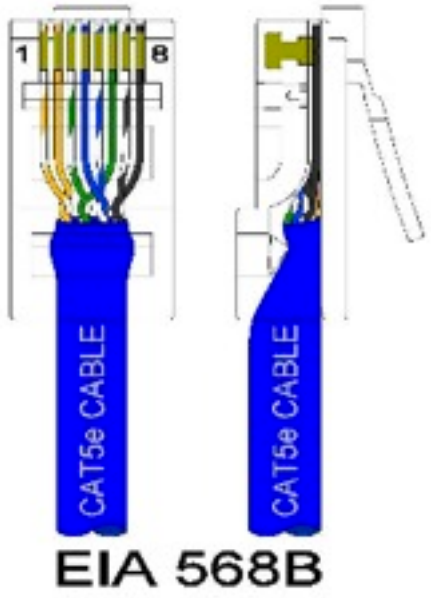
Connecting to such devices could damage the camera beyond economical repair and also damage the IRIS595 controller and any other equipment that may be on the network.

If the supplied cable is not long enough, contact your Iris dealer for information on our cable extension kits.

If you need to shorten the cable, please ensure the correct termination polarity is observed as shown below. Remember, NightRunner has a **Straight-Thru CAT5 568B** cable.

WARNING!

NEVER USE A CAT5 CROSS OVER CABLE AS THIS WILL CAUSE PERMANENT DAMAGE TO YOUR CAMERA AND IRIS595 CONTROLLER. BOTH ENDS MUST BE TERMINATED AS SHOWN BELOW:



PIN NUMBER	WIRE COLOUR	FUNCTION
1	White / Orange	DATA+
2	Orange	DATA-
3	White / Green	DC GND
4	Blue	DC+
5	White / Blue	DC GND
6	Green	DC+
7	White / Brown	VIDEO SIGNAL
8	Brown	VIDEO GND

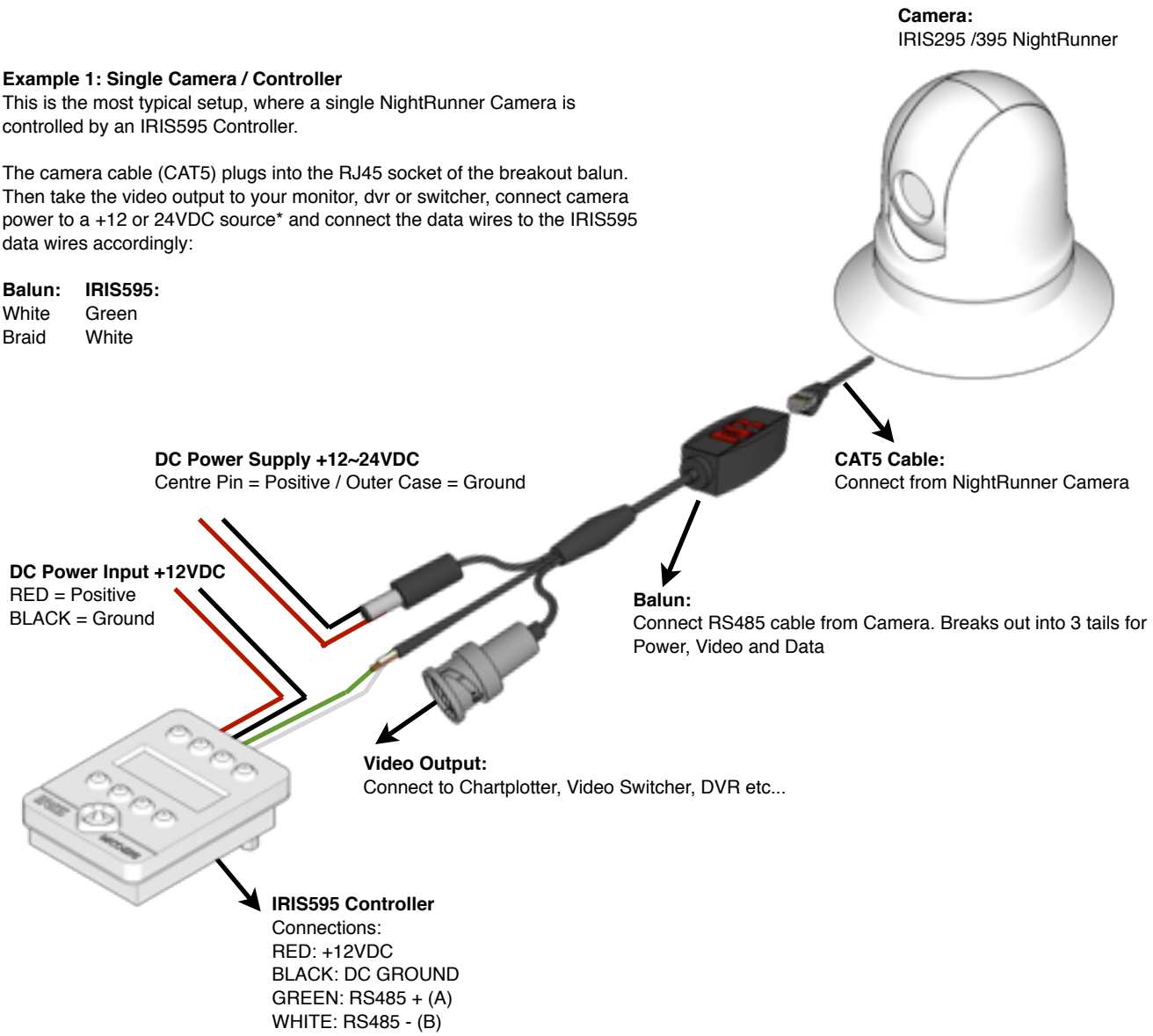
APPENDIX: B

CABLING (Continued): Typical Connection Examples

Example 1: Single Camera / Controller
This is the most typical setup, where a single NightRunner Camera is controlled by an IRIS595 Controller.

The camera cable (CAT5) plugs into the RJ45 socket of the breakout balun. Then take the video output to your monitor, dvr or switcher, connect camera power to a +12 or 24VDC source* and connect the data wires to the IRIS595 data wires accordingly:

Balun:	**IRIS595:**
White	Green
Braid	White



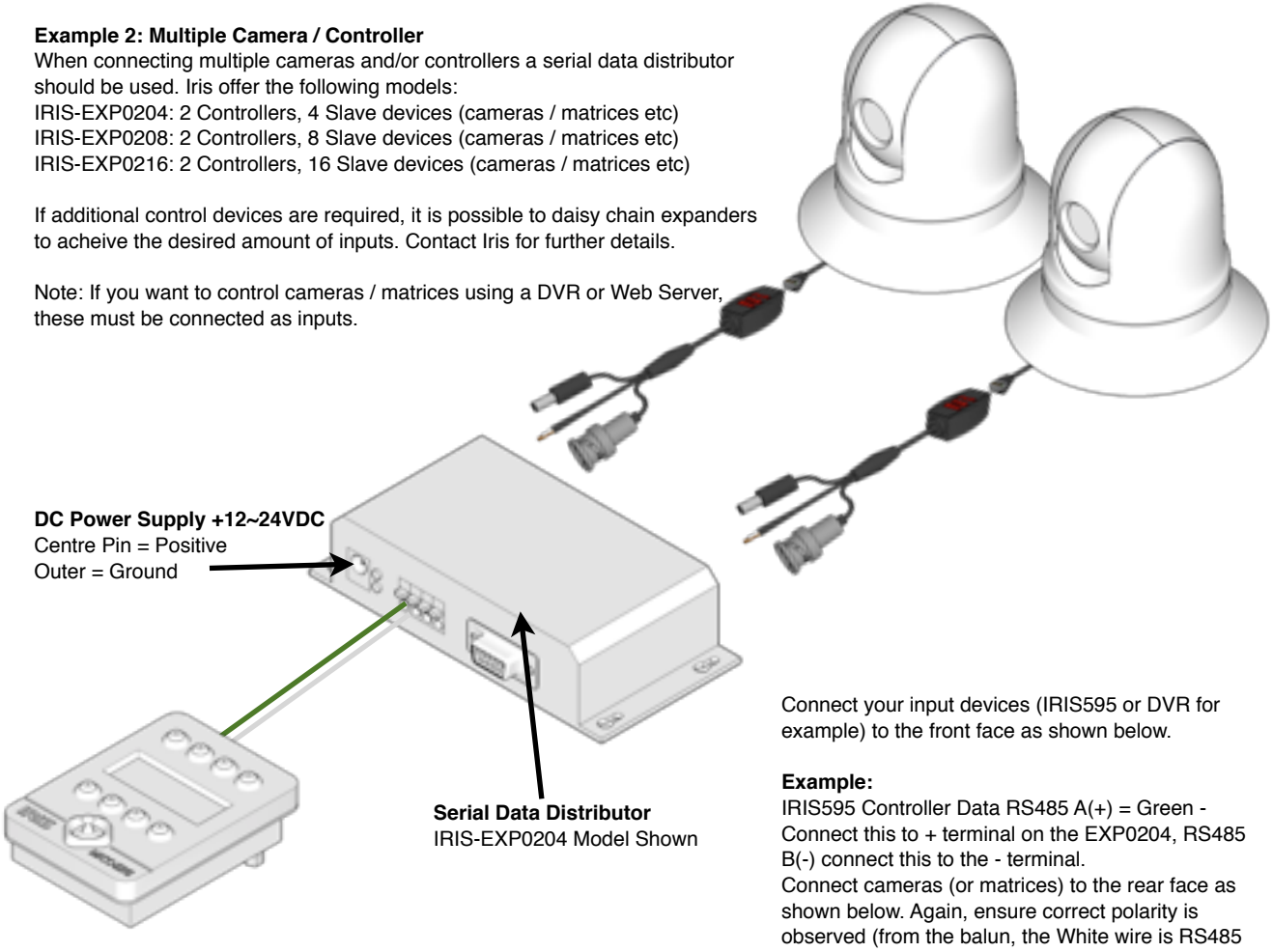
APPENDIX: B

CABLING (Continued): Typical Connection Examples

Example 2: Multiple Camera / Controller
When connecting multiple cameras and/or controllers a serial data distributor should be used. Iris offer the following models:
IRIS-EXP0204: 2 Controllers, 4 Slave devices (cameras / matrices etc)
IRIS-EXP0208: 2 Controllers, 8 Slave devices (cameras / matrices etc)
IRIS-EXP0216: 2 Controllers, 16 Slave devices (cameras / matrices etc)

If additional control devices are required, it is possible to daisy chain expanders to acheive the desired amount of inputs. Contact Iris for further details.

Note: If you want to control cameras / matrices using a DVR or Web Server, these must be connected as inputs.



Connect your input devices (IRIS595 or DVR for example) to the front face as shown below.

Example:
IRIS595 Controller Data RS485 A(+) = Green - Connect this to + terminal on the EXP0204, RS485 B(-) connect this to the - terminal.
Connect cameras (or matrices) to the rear face as shown below. Again, ensure correct polarity is observed (from the balun, the White wire is RS485 A(+) and the Braid is RS485 B(-).

IRISEXP0204 Serial Data Expander - Front View
Connect 12~24VDC Power. to DC socket.
Data lines from up to 2 control devices connect to the 2 data input ports.
Port 1 is colour coded Red=RS485 A(+) / Black=RS485 B(-)
Port 2 is colour coded Orange=RS485 A(+) / Black=RS485 B (-)

IRISEXP0204 Serial Data Expander - Rear View
Connect up to 4 cameras (or matrix switchers) to the rear panel. Polarity for each channel is printed on the unit.

NOTES

Iris Innovations Limited (UK)
Unit 15 Fareham Innovation Centre
Meteor Way, Lee-on-Solent. Hampshire PO13 9FU
United Kingdom
Tel: +44(0)2392 556509
email: info@boat-cameras.com
web: **www.boat-cameras.com**

Iris Innovations Limited (USA)
2821 SW23rd Terrace, Unit 5
Fort Lauderdale, Florida 33312
United States of America
Tel: +1 (954) 533 9381
email: info@boat-cameras.com
web: **www.boat-cameras.com**

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