15 way D Plug

Pin	Function
1	Pr (HD)
2	Y (HD)
3	Pb (HD)
4	Y (SD)
5	C (SD)
6	V. GND
7	V. GND
8	V. GND
9	n/c
10	SD Composite
11	n/c
12	n/c
13	n/c
14	Composite GND
15	n/c

4 pin XLR

Pin	Function
1	Power GND
2	RS485 Data A
3	RS 485 Data B
4	Power +ve

BNC #1

	SDI or HDSDI

BNC #2

SD mode only	VBS

Bradley Engineering
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Instructions

NetCam 2
Operating Instructions

The **Net_Cam 2** is a rugged HD/SD camera system for mounting inside goal nets for Ice Hockey and similar sports. It is self contained and requires only power to provide full control of both the pan & tilt mechanism and the camera & lens functions. The pan axis is fully slip-ringed for 360 degree continuous rotation.

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Specifications

Weight:	2.8kg	
Data:	RS485	
Power:	12-18v @ 1A	
Pan Range:	360deg. Continuous.	
Tilt Range:	+/- 130deg from vertical.	
Speed Range:	<0.1deg/sec - >150deg/sec.	Other speeds on request.
Camera Sensor:	CMOS	
Active Pixels:	approx. 2M	
Sig / Noise Ratio:	>50dB	
Latency:	< 1 video line	
Jitter:	< 0.04 UI	
SD Standards:	PAL 4:3, PAL 16:9, NTSC 4:3, NTSC 16:9	
SD Outputs:	Composite, Y/C, SDI	
HD Standards:	1080i/50, 1080i/59.94, 720p/50, 720p/59.94	
HD Outputs:	Component, HDSDI (10 bit)	

Note: **The 10bit HD outputs are derived from a 12bit A2D of the full HD component signal - NOT from up-scaling an 8bit signal.**

Lens Angle:	170 degrees with 0.3 wide adaptor.	
MOD:	1cm	
Distortion:	<3% (wide)	
Iris:	F.1.8 - 28 (17 steps)	
Operating Temp:	-10 to +40degC	Out of sunlight

Specifications subject to change without notice.

Operational Controls

All the following controls and adjustments can be accessed via our larger control panels and/or **Remote Engineering Panels**.

The simpler controllers have limited access to these functions.

Proportional Pan
Proportional Tilt
Proportional Zoom
Positional Focus
Positional Iris
Auto White Balance
Auto Tracing White
Manual White
Preset White
Red Gain
Blue Gain
Detail
Shutter
Master Gain
Gamma
Digital Zoom On/Off
Auto Iris On/Off
Auto Focus On/Off
InfraRed Mode On/Off
Preset Store (Pan,Tilt, Zoom, Focus) up to 99 presets
Preset Recall
Pan & Tilt Reverse
Zoom Reverse
Focus Reverse
Pan & Tilt Speeds
Turbo Speed
Head ident change (1 - 99)
Head ident reset to #01
Zoom Limit

Output Standards: 1080i / 50, 1080i / 59.94, 720p / 50, 720p / 59.94
**   PAL 4:3, PAL 16:9, NTSC 4:3, NTSC 16:9**

Power & Data

Power is supplied via the 4 pin XLR4 socket on the base. RS485 data can also be input on this socket however there is a built-in multi channel radio data receiver which matches the **Bradley RD_10** radio data system.

Channel selection is done via the **RD_10 Data Transmitter**. The channel can also be switched by removing the cover and pushing the button on the PCB. The channel is indicated on the LED display.

Pin 1   =   GND
Pin 2   =   RS485 A ch.
Pin 3   =   RS485 B ch.
Pin 4   =   **12-18v 1.5A max.**

RS485 data will work up to 1km over a cable but sending power will only work for shorter runs. Longer runs may require a higher input voltage, perhaps 20v or more to get enough power to the head and camera. For very long distance operation a local PSU should be used in conjunction with a Y cord to split the power and data feed to the **NetCam 2**.

Up to 10 cameras and heads can be connected in a 'daisy chain' manner to a controller. To operate more than 10 heads on a system requires an active data distribution box. You can also use **Stage Boxes**, each of which can supply 4 heads. The **NetCam 2** does all the data and error handling internally and is optimised for live action control. Each head recognises its own ident. The same data loop or radio channel can be used for up to 99 remote heads.

Camera Connections

All analogue outputs are available on the 15D sub connector. Composite video is also available on the BNC connector when in SD modes. This is not available when in HD modes.

Composite video and SDI outputs are both output via the 2 BNC sockets on the base.

The majority of camera settings are stored internally, even when power is removed. When power is restored the **NetCam 2** resets the camera settings to the same as when power was removed. This process takes about 5 seconds.

Rigging

Rigging the **NetCam 2** is achieved using the 2 x 1/4" or 2 x 3/8" female mounting threads on the base of the unit. **The bolts should project no further than 13 mm into the base**. Multiple bearings enable the head to be mounted upright, inverted or horizontal. The horizontal mounting is useful if the shot is predominately vertical. Be sure to use appropriate safety bonds if the unit is mounted above head height.

The Pan & Tilt clutches are factory set but can be adjusted by removing the covers and using a suitable spanner on the adjusting nuts. The clutches are to protect the mechanics from damage should the head be knocked or meet an obstruction during a move. If you should need to adjust them **Set the clutches as lightly as possible**.

Speed & Direction Settings

The latest versions (from Ser.No. BE_121098) all have 10 speed ranges. Both Pan and Tilt speed ranges move up and down together. **Speed 10** is intented for fast sport applications and has a faster reaction time but does not have feedback motor control. **Speed 9** gives the same top speed, a smoother uptake and full feedback speed control. All previous versions can be upgraded to the latest software version.

The direction of all the controls can be reversed to suit individual operator preferences and the rigged orientation. The pan and tilt direction settings are stored in the head and recalled on power up.

Preset Positioning

Using a **Multi Function Controller** gives access to the independent speed settings and to the positional features of the **NetCam 2.** Up to 8 preset positions of Pan, Tilt, Zoom and Focus can be stored and recalled instantly. All the positions and other setups are automatically stored in non-volatile memory and recalled on power up.

Pan Centre

Preset Positioning not possible in this sector.
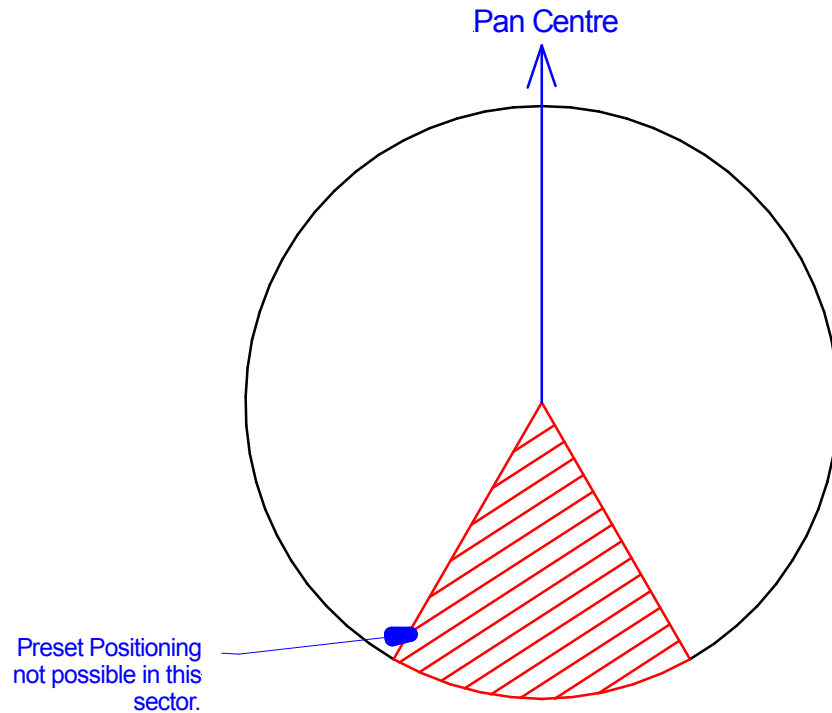
Preset position limits can be shown using the Multi Function Controller. As supplied, positions can be preset over a range of 320 degrees with a 40degree dead band. It is important to set the FRONT of the unit as the Pan Centre in order that presets are not set within the dead band.

The head can be operated with the joystick continuously around 360 degrees.

Blue Status LED

The blue LED on the side of the CamBall 2 indicates the status of the unit.

On power up the LED will flash 3 times. This indicates that power is OK and the microprocessors are functioning correctly.

Slow flashing (1 on and 1 off per second)   -   No data or incorrect data
Continuous on   -   System Data OK but not being addressed
Fast flashing (12-25 times per second)   -   Camera being addressed by controller

Removing the Wide Angle Lens

The **NetCam 2** is fitted as standard with a Century Optics 0.3 wide adaptor. This has a 37mm lens thread and is protected with a polycarbonate domed protector.

In some applications it would be prefferable to remove this lens and the domed protector. Removing these lenses gives a superior picture quality.

First unscrew the domed protector and then the wide angle adaptor can also be unscrewed from the camera.

Additional domed protectors are available from Bradley either fitted with or without the aluminium screw adaptor.

Zoom Range

With the 0.3 wide angle adaptor fitted the zoom range is very limited. After a short zoom in, the picture will become de-focussed and unusable.

To prevent zooming into this range a 'zoom limit' can be set from the controller menu.

Zoom in until the lens is just about to de-focus and **set** the zoom limit.

The zoom limit can be cleared when not required.