Broadcast Camera Control System

User Manual V1.1

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Overview

The Camera Control system comprises of three main elements. The Indoor Unit (IDU) the Outdoor Unit(ODU) and the Camera Processor (CCAM). It is simple to configure, as per the diagram to provide camera control for up to 4 camera on a single UHF channel. The radio channel is programmable from 403 to 474Mhz via the daylight readable display, using the navigation buttons provided.

On opening the box the user should find the follow, note exact contents may vary due to equipment ordered.

1 pce IDU
12VDC PSU (Mains cable not included)
1 pce ODU
1 pce CCAM
2 pce 400Mhz Antenna
1 pce Control Cable (Lemo to DB9)
1 pce 30cm Camera Data Cable

Options:
19" 1RU Rack mounting kit
RCP control data cable

The user will need to provide a 3 pin XLR cable of the desired length to connect the RS485 data out of the IDU to the data in of the ODU and a suitable 12VDC supply, in compliance with local power regulation legislation to power the ODU.

The general set-up is as follows in fig1 below.
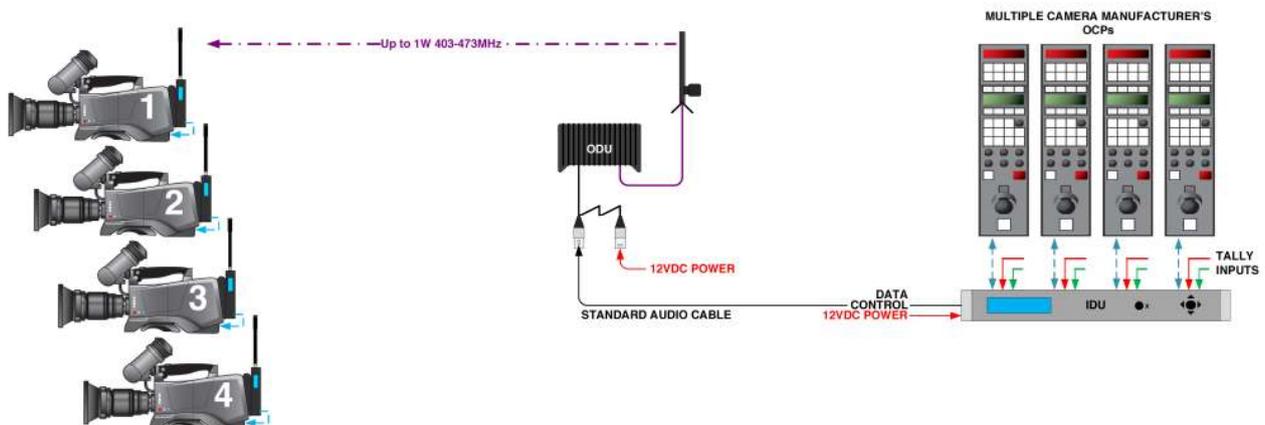
1. Indoor Unit

1.1 Connections

The IDU should be situated in a suitable place to gain access to the front panel when required. A 19" 1RU rack mounting kit is available as an optional extra. The control panel (not supplied) should be connected using the suitable data cable (not supplied). There are four ports on the rear panel, they are labelled RCP1 to 4. The port number relates to the ID that panel will have within the system. ie a panel connected to port number 1 will have a system ID of 1. Up to 4 panels can be connected at any one time to control a maximum of 4 independent cameras. In the case of the Sony control panel, the ID/Port number will be indicated on the panel in the Tally Display area.

Once the control panel(s) are connected, the RS485 data output should be connected to the ODU. This can be done via standard balanced audio cable as a single pair or as part of a multi-cable audio loom. (8 way multi) 3 pin XLR connectors are used, utilising the standard pin configuration. The Data should be capable of correct operation over a distance of 1km, depending on the quality of the cable used.

1.2 Status Display

With the ODU connected the power should be applied to the unit, 12VDC via the 4 pin XLR connector, utilising the standard pin configuration. On power up the Cobham logo should be seen on the splash screen followed by the home status as shown below.
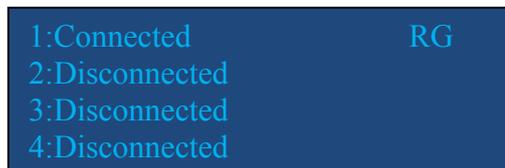
```
1:Connected                    RG
2:Disconnected
3:Disconnected
4:Disconnected
```

Outlined is the status of each port connection, reported Connected or Disconnected. The display is used in conjunction with the navigation buttons to interrogate the unit and read the frequency and power output of the ODU. Notification of a Tally to that port is indicated by R for RED Tally and G for GREEN tally

1.3 Manufacture Status

```
Main Menu

Camera Manufacturer
```

If the NAV button is pressed once the Camera manufacture menu can be seen. By tipping the NAV button up and down different manufactures can be chosen and if the relevant license has been obtained, selected. When the desired manufacturer has been reached, the NAV button is pressed once to select. The display will revert back to the Manufacture Status

```
Camera Manufacturer

Sony
```

NOTE: The power must be cycled before the selection will be actioned by the internal processor.

1.4 Radio Status

```
Main Menu

Radio
```

The frequency and the power output of the ODU can be remotely controlled from the IDU. When the NAV button is pressed once a warning will be displayed. This is because the transmission of camera control data will be interrupted while the ODU is interrogated and no cameras can be controlled. This process is usually done during installation and should not normally be necessary during a program transmission. Feedback from the ODU of the Frequency and Power level will be displayed and on the bottom line of the display the desired edit function can be selected between, frequency and power level.

```
Radio settings Menu
Disables camera ctrl

Enter to continue
```
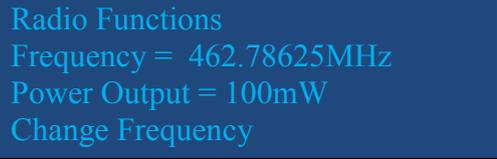
```
Radio Functions
Frequency =  462.78625MHz
Power Output = 100mW
Change Frequency
```

1.4.1   Frequency Selection

If Frequency is selected and the NAV button is pushed once, the display will enter frequency edit mode. Using the NAV button, left, right, up and down the frequency can be entered one digit at a time then the NAV button pushed once to select. If a frequency outside of the range of the radio is selected, there will be an ERROR report and the ODU will revert to the previous frequency.

```
Radio Frequency:

462. 78625
^
```

1.4.2   Power Output Level

If Power Level is selected and the NAV button is pushed once, the display will enter power edit mode. Using the NAV button, left, right, up and down the power output level can be chosen. When the NAV button is pressed once, the selected power level will be programmed.
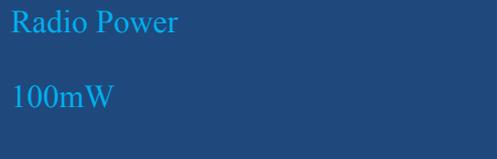
```
Radio Power

100mW
```

When either the frequency or the power level is set, on completion of the ODU programming, the display will revert to the Radio Status Page. Camera control will not be restored until the Radio Status page has been exited. In the event the user does not exit the display, a 10 second time-out will automatically restore the unit to the Unit Status display and camera control will be restored.

1.5 System

The system menu is used to report the current software and firmware versions installed. If the system menu is selected and the NAV button is pushed once, the software version can be checked. The display will read Software Version, if the NAV button is pushed once, the display will show the current version.

```
Main Menu

System
```

```
System Info

Software Version
```

```
Version Info

Software: xx
Firmware: xx
```
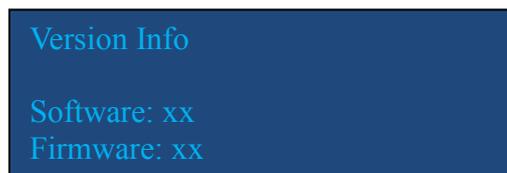
Software updates are easily installed using a PC computer with a USB port. The current software version should be checked. By checking the FTP site **ftp://videosys.no-ip.org** the latest software versions can be checked. If a newer, relevant version is available it can be downloaded as a self executing file. The USB cable should be connected between the PC and the IDU. If it is the the first connection, Windows will report installation of the COM port. Note the COM port number allocated, for example, COM3. The driver required is supplied as part of Windows 7 otherwise it can be downloaded from **ftp://videosys.no-ip.org**

Once the file has been downloaded and the USB connection made, the file can be executed. The file will test to see if there is a connection. You will be prompted for the COM port number, then press enter. The program will self install and reset on completion. However, sometimes the the e2 ROM can be corrupted so it recommended the IDU is power cycled on completion and the desired camera manufacturer is indeed selected.

After the update has completed the software version should be checked and noted.

2. Outdoor Unit

The outdoor unit (ODU) is a UHF radio modem. It is supplied in a 'splash' proof housing. If the ODU is to be installed in open areas, it should be covered with a suitable weather proof housing. Great care should be taken when sighting the ODU. If it is to be placed above head height, approved safety harnesses should be used. If the area is an open roof top, or other high vantage point, care should be taken to avoid direct sunlight an or provision made for lightning conduction. If in any doubt you should consult with a local Civil Engineering bureau to check the requirements and legislation applicable to your working environment.

In any event, the ODU should be placed such that there is a clear line of sight over the desired working area. UHF signals can penetrate through some objects, but operation distance can be severely impeded.

2.1   Connections

Power is applied via the 4 pin XLR and indicated by a green LED. If the power LED illuminates RED, this indicates the power is reverse polarised. The RS485 Data is applied via the 3pin XLR connector. This has a standard audio pin configuration. The data LED will flash green when it receives data from the IDU.

The Control connection (CNTL) is used for advance set up of the radio. This is pre-set in the factory and does not normally require any set-up. For further information see appendix.

The antenna is connected to the TNC style connection on the top of the unit. The ODU is supplied with a 400Mhz DiPole antenna, but other antennas can be used where required.

3. Camera Processor

3.1   Connections

Data:
The camera processor (CCAM) connects to the camera using the supplied data cable. Power for the CCAM is supplied by the camera via the same data cable. The CCAM should be connected before the power is applied to the camera. This is because some cameras only read the data ports on power up.

Tally:
External red and green tally is available on this connector, 5 pin 0B Lemo connector. For the pinout see appendix. It is open collector and Unreg +V/ 75mA is available for am LED. Reverse protection diode in included to allow a small signal relay id larger current control is required.

Control: External control of the Radio Modem is available. This is pre-set in the factory and does not normally require any set-up. For further information see appendix.

Antenna: The antenna is connected to the TNC style connection on the top of the unit. The unit is supplied with a 400Mhz DiPole antenna, but other antennas can be used where required.

When power is applied the Cobham splash screen should appear and then the Unit Status will be displayed.

3.2 Unit Status

Camera: Indicates if the camera data connection is good. If the state reported is disconnected, the most likely cause is the wrong camera type or manufacturer is selected.

Data RX: Indicates if the data received is valid. Used in conjunction with the data RX LED on the base of the unit data communication problems can be diagnosed. The LED indicates the radio modem has received a carrier, but does not indicate the presence of valid data. If the LED is flashing, but the Data RX on the display indicates ERROR, this can mean either the camera ID is set incorrectly and there is no valid data for the ID currently selected. Or it can mean the RF signal is being interfered with.

Camera ID: Indicates the current unit ID. This relates to the port the user has selected on the IDU to control the camera in question.

Tally: Indicates when a tally signal has been received from the IDU.

Neither
Red
Green
Both
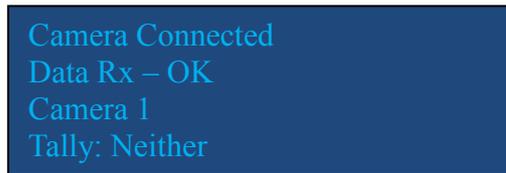
Camera Connected
Data Rx – OK
Camera 1
Tally: Neither

3.3 Manufacturer Status

```
Main Menu

Camera Manufacturer
```

If the NAV button is pressed once the Camera manufacture menu can be seen. By tipping the NAV button up and down different manufactures can be chosen and if the relevant license has been obtained, selected. When the desired manufacturer has been reached, the NAV button is pressed once to select. The display will revert back to the Manufacture Status

```
Camera Manufacturer

Sony
```

NOTE: The power must be cycled before the selection will be actioned by the internal processor.

3.4 Radio Status

```
Main Menu

Radio
```

The frequency of the CCAM can be controlled from the panel. When the NAV button is pressed once a warning will be displayed. This is because the reception of camera control data will be interrupted while the radio modem is interrogated and no cameras can be controlled.
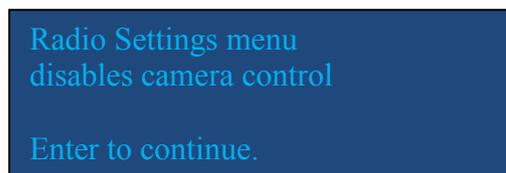
```
Radio Settings menu
disables camera control

Enter to continue.
```

This process is usually done during installation and should not normally be necessary during a program transmission. Feedback of the Frequency will be displayed and on the bottom line of the display the edit function can be selected.

```
Radio Functions
Freq = 462.78952

Change Frequency
```

When Frequency is selected and the NAV button is pushed once, the display will enter frequency edit mode. Using the NAV button, left, right, up and down the frequency can be entered one digit at a time then the NAV button pushed once to select. If a frequency outside of the range of the radio is selected, there will be an ERROR report and the CCAM will revert to the previous frequency. When the frequency is set, on completion of the modem programming, the display will revert to the Radio Status Page. Camera control will not be restored until the Radio Status page has been exited. In the event the user does not exit the display, a 10 second time-out will automatically restore the unit to the Unit Status display and camera control will be restored.

3.5 System

```
Main Menu

System
```

The system menu is used to report the current software and firmware versions installed. If the system menu is selected and the NAV button is pushed once, the software version can be checked. The display will read Software Version, if the NAV button is pushed once, the display will show the current version.

Software updates are easily installed using a PC computer with a USB port. The current software version should be checked. By checking the website, **ftp://videosys.no-ip.org** the latest software versions can be checked. If a newer, relevant version is available it can be downloaded as a self executing file. The USB cable should be connected between the PC and the IDU. If it is the the first connection, Windows will report installation of the COM port. Note the COM port number allocated, for example, COM3. The driver required is supplied as part of Windows 7 otherwise it can be downloaded from **ftp://videosys.no-ip.org**

```
System Functions

Software Version
```

```
Version Info

Software xx
Firmware xx
```

Once the file has been downloaded and the USB connection made, the file can be executed. The file will test to see if there is a connection. You will be prompted for the COM port number, then press enter. The program will self install and reset on completion. However, sometimes the the e2 ROM can be corrupted so it recommended the IDU is power cycled on completion and the desired camera manufacturer is indeed selected.

After the update has completed the software version should be checked and noted.

3.5 Camera Number Status

> Main Menu
>
> Camera Number

The camera number of the receiver unit should be set to the same port number on the IDU you wish you use to control that specific camera. Ie If your RCP is c0onnected to IDU port 2, then the camera number should be set to camera 2.

> Camera Number
>
> 2

NOTE: If the camera number is set incorrectly you will not gain correct control of the desired camera. For instance, if there is only 1 RCP connected to the IDU on port 1 and the camera number is set to camera 2, there will be no camera control at all and the main status will indicated Data ERROR This is because there is no valid data for this camera number receiver.
If however there are two RCP's connected to port 1 and port 2 and the camera number is set to 3 or 4, the same result will be observed. If the camera number were set to be the same on both camera receivers, then both camera receivers would be controlled by the same IDU port.
It can be seen it is crucial the correct camera number is entered during set up of the equipment for correct operation.

Appendix 1
Connector Pinouts IDU

Power - 4 pin XLR
1. GND
2. NC
3. NC
4. +12-16VDC

RCP - Manufacturer dependant

Generic RCP Connection

1. TX (H)
2. TX (C)
3. RX (H)
4. RX (C)
5. GND
6.
7. RS232 TX
8. RS232 RX
9. +VDC OUT
10. GND

TALLY R/G - 8 pin DIN NOTE: The pin configuration of the DIN is a little confusing, please see the picture to understand how it is numbered.
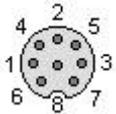
1. Ch1 (H)
2. Ch2 (C)
3. Ch3 (C)
4. Ch2(H)
5. Ch3(H)
6. Ch1 (C)
7. Ch4 (H)
8. Ch4 (C)

DATA OUT RS485 - 3 pin XLR

1. GND
2. DATA (H)
3. DATA (C)

Connector Pinouts ODU

Power - 4 pin XLR
1. GND
2. NC
3. NC
4. +12-16VDC

DATA OUT RS485 - 3 pin XLR

1. GND
2. DATA (H)
3. DATA (C)

Control - Lemo 6 pin 0B

1. NC
2. NC
3. PRG (SHORT TO GND)
4. TX
5. RX
6. GND

Connector Pinouts Camera Processor

Cam Data - Manufacturer dependant

Generic Cam DataConnection

1. TX (H)
2. TX (C)
3. RX (H)
4. RX (C)
5. GND
6.
7. RS232 TX
8. RS232 RX
9. +VDC OUT
10. GND

Tally Lemo 5 pin 0B

1. GND
2. +UNREG
3. RED (Open Collector)
4. Green (Open Collector)
5. NC

Appendix 2

Technical Specifications

Camera Processor

RX RF In   BNC(f)
Control Data Out   Lemo 0B(6)
External Tally Output   Lemo 0B(5)

Indoor Unit

Power In   XLR4(m)
RCP   Manufacture Dependant
                              Generic - HRS (10)
Tally R/G   DIN(8)
USB   TypeA
DataOut   XLR3(f)

Outdoor Unit

Power In   XLR4(m)
Data   XLR3(m)
Control   Lemo 0B(6)

RF

Frequency   403 - 474Mhz Programmable from front panel
Channel B/W   12.5kHz
Modulation   GMSK
TX Power   100/200/500/1000mW Selectable front panel
ODU Data Interface   RS485 9600 baud

Physical

CCAM   W80 x D130 x H30mm - 400g
IDU   W220 x D358 x 44mm (1RU) - 1.5kg
ODU   W190 x D100 x 30mm - 600g