Proteân XMi

Instructions

Ver 2.0 01/03/2018

Contents

Introduction

The **Proteân XMi** has significant advances over previous designs and is available with a variety of options. When referring to this manual check the options fitted to your remote head and be sure to refer to the appropriate section.

The most usual options are;

- Width extenders - 50mm increments
- Height Extenders – 100mm increments
- 2nd Side support – for very heavy cameras
- Slip Rings – for continuous panning
- IP Control Interface
- Fibre Output Interface
- Fibre Control Interface
- External Lens Servo Interface
- External Tally Light

Mounting the Proteân XMi

The **Proteân XMi** can be mounted either, upright, as shown in the cover picture, or inverted. Use *at least* 2 mounting bolts when rigging the head inverted. **Always use the safety bond attachment on the base of the unit.** This is fitted with an M6 bolt for attaching to a safety bond or chain. This bolt passes through the base clamp and into the main pan shaft.

There are 4 mounting threads on the base of the unit. These are standard 3/8" UNC camera mounting threads. They are arranged in pairs, diametrically on a 50mm pitch circle diameter.
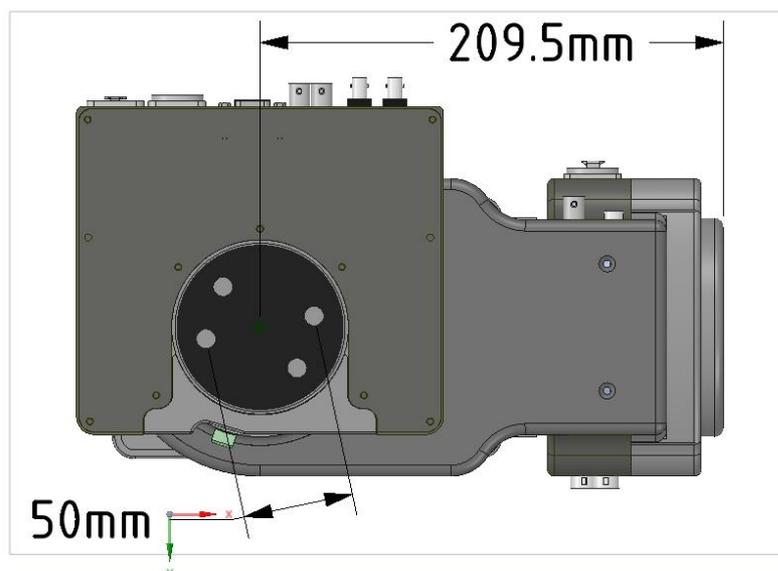
Balancing the Camera

The **Protean XMi** can cope with out of balance loads, but when power is removed the camera will tend to rotate about the TILT axis to settle at the balance position.

With power removed adjust the balance of the camera so that it doesn't move or *just* moves to a settling position that you have set by balancing. One suggestion is to balance the camera Fore and Aft perfectly but allow it to be *slightly* lower than neutral so that it tends to settle horizontally.
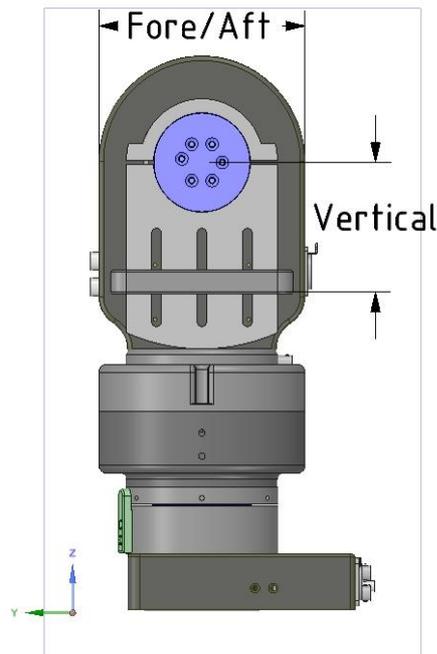
There are 3 bolts securing the camera plate to the drop arm. These are used to adjust the camera plate up and down for perfect balance.

Connections – Back

There are a number of connectors of the base, side and front of the unit. Some of these connectors can be changed or configured to customer specifications.

For example; The *Data In* connector can be either a **3 pin XLR** for RS485 data input or an **RJ45** for IP connection.

The RJ45 can be configured as a simple loop-thru via the slip rings to the RJ45 at the top.

Also in this picture is one of the pan stop bolts. These can be re-positioned to physically limit the rotation of the unit.
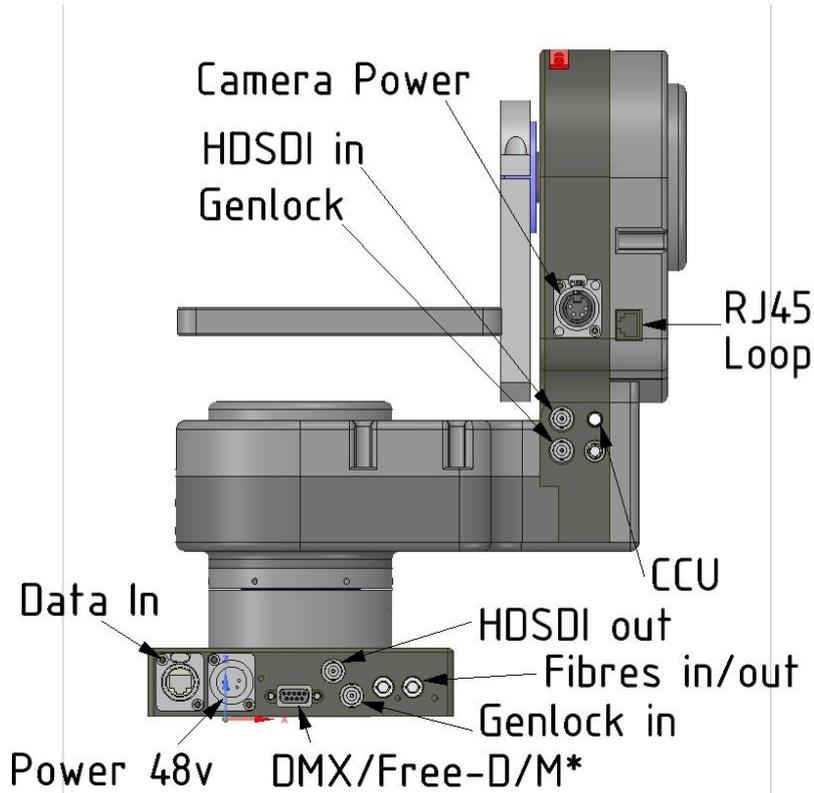
Data In

As standard this is an XLR3 connector for D* Protocol over RS485.
It can be replaced with an RJ45 connector and an **IP interface** fitted inside.
This can receive either D* or M* Protocols over IP.
Alternatively this can be connected through the slip rings (if fitted) directly
to the RJ45 Loop connector at the top.

Power 48v

A 48v PSU is supplied with the unit which connects here. D* data can also
be injected into this socket if required. See Pinout details below.

Dsub9

This connector is designated for motion control inputs and outputs. **DMX**,
Free-D or **M*** protocols can be used for positional control. Metadata, in
Free-D format is continuously output on this connector.
The Free-D format can be either original angular format or RAW as a
numerical format which allows for 360 degree positioning data. The data
format for this connector is configured from our **Multi Function Controller**
or supplied with the customer requirement pre-set.

HDSDI out

This is a 3Gb link via the slip rings from the **HDSDI in** connector at the top
of the unit.

Genlock in

Connects directly to the **Genlock out** connector at the top of the unit.

HDSDI Fibre

If fitted this is an ST connector and carries the HDSDI picture output from
the camera. The camera is connected to the **HDSDI in** connector at the
top of the unit.

Data Fibre

If fitted this is an ST connector and carries the same bi-directional data as
the **Dsub9** and also D* Protocol. To use the data on this fibre a '**Base**

Station' is required to decode the fibre signals. This presents the signals on the same electrical connectors as above.

**Camera Power**   4pin XLR supplies 12v @3A for powering cameras.

RJ45 Loop   If an IP adaptor is not fitted this is a direct loop from the RJ45 socket on the base.

CCU   This is a 7pin Lemo socket which can handle bi-directional RS422 camera CCU data and other formats. Various camera protocols are built-in. This means that many makes of camera can be controlled via data embedded within the movement control data (**Ikegami, Sony, Hitachi, Panasonic, JVC** and others on request).

Spare   A spare connector position is provided on the back. This can be fitted with a connector and used for external functions; an external Tally Light, for example.
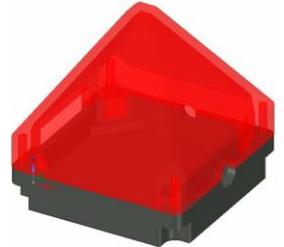
Connectors – Front
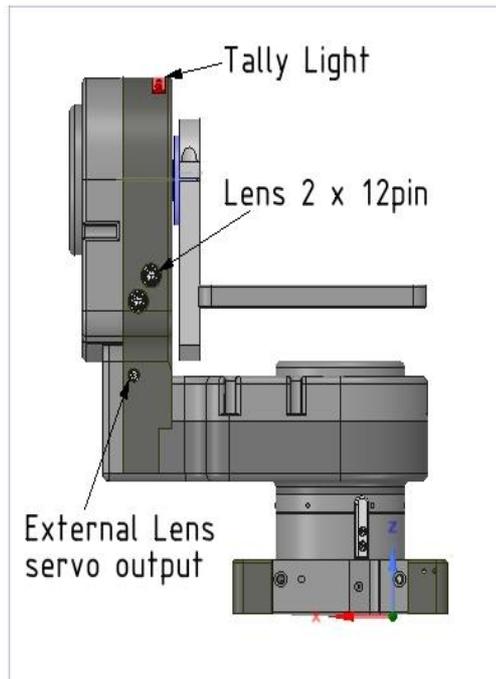
Lens   On the front of the unit are 2 x 12pin Hirose connectors. The female connector duplicates the connector found on many cameras. Using this connector rather than the camera connector gives the head the ability to control the iris directly and the zoom position for the pre-set positioning functions. This connector also provides power for the lens.

The male 12pin connector is a standard remote lens connector and outputs zoom, focus & iris control for 'remote-type' lenses. If the lens is not a 'remote-type' and has only one cable, you will need an adapter cable for the particular lens.

Note: Canon & Fujinon broadcast lenses often use similar connectors but control the zoom on different pins.

Lens Servo   If using external lens servos, this socket can be fitted and configured to supply data and power for lens servos.

Tally Light

A tally light is fitted on the top of the head and a stand-alone unit can also be operated on the system.

Pinouts

Data in – XLR3

Pin 1 – GND
Pin 2 - RS485 A
Pin 3 – RS485 B

Power In – XLR5

Pin 1 – GND
Pin 2 - RS485 A
Pin 3 – RS485 B
Pin 4 – n/c
Pin 5 - +48v

Motion Control – Dsub9

Pin 1 – GND
Pin 2 - Metadata Out A
Pin 3 – DMX / Free-D / M* In B
Pin 4 – n/c
Pin 5 - n/c
Pin 6 – n/c
Pin 7 - Metadata Out B
Pin 8 – DMX / Free-D / M* In B
Pin 9 – n/c

CCU – Lemo 7pin

Pin 1 - GND
Pin 2 - RS 422/485 out A, (TTL out)
Pin 3 - RS 422/485 out B
Pin 4 - 12v In/Out
Pin 5 - RS 422/485) in A
Pin 6 - RS 422/485) in B
Pin 7 – n/c

LCD Display

The LCD display on the side of the unit shows both operational and diagnostic information on several pages. The pages are scrolled using the *Cam Display* function in the MFC main menu.

Connection to a Controller

There are several methods of connecting the **Protean XMi** to a control system;

1. RS485   -   illustrated below
2. IP   -   illustrated below
3. Fibre   -   see additional information with fibre interface

To test the unit, use one of the methods below.

RS485 Connection

PSU 48v

PSU 12v

IP Connection

Network

PSU 48v

PSU 12v
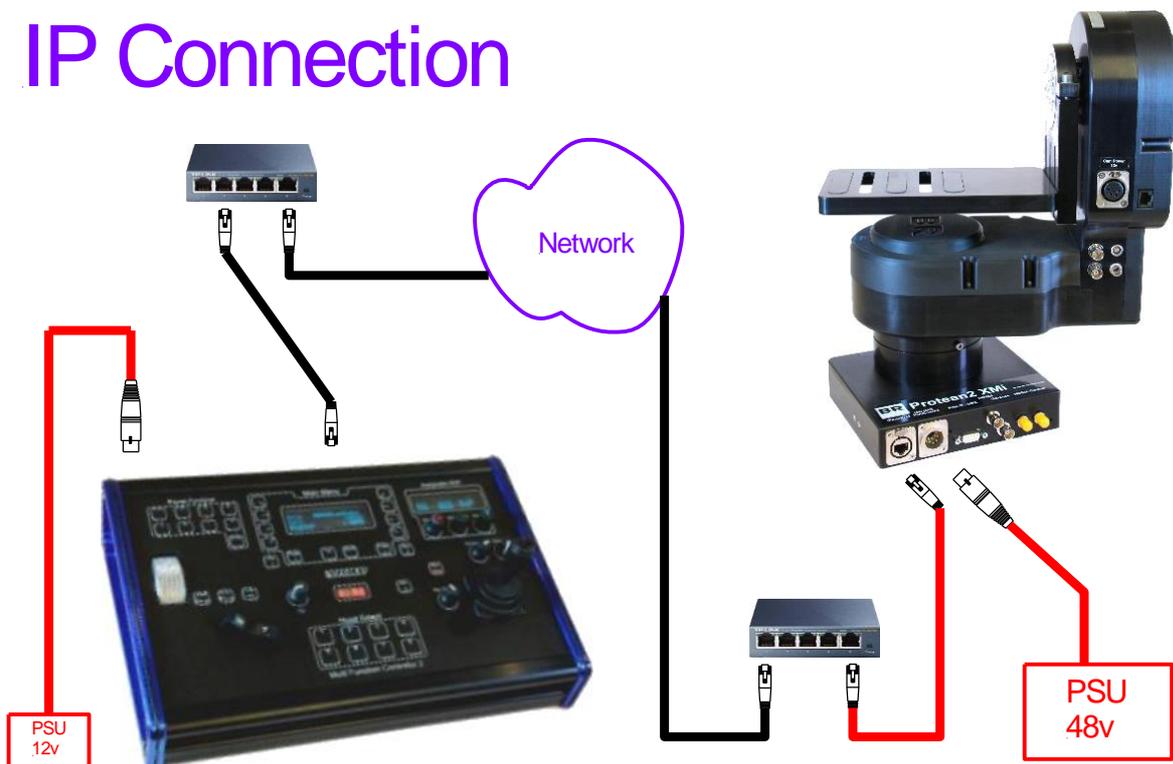
IP addresses are pre-configured and use UDP multicasting as the default setting. This gives the lowest latency and control response. The system is plug-and-play if used on the same network. To use it over the internet it is best to set up a VPN. (Virtual Private Network). No re-configuration is required if this is done.

To re-configure the IP settings contact BR Remote for a link to the web tools.

Manual joystick control is generally the most common method of controlling the **Proteân XMi**. Many parameters can be adjusted including joystick direction, speeds etc.

Even when being controlled manually with a joystick controller, the unit continuously outputs positional metadata which can be used to pin graphics and other AR and VR visuals.

As supplied, the unit is set to HEAD Ident #01. To change the Head ID see the instructions for the controller you are using.

Here are some of the commands the **Protean XMi** can receive and process;

Head

FUNC No.	Command Parameter
0	Pan, Tilt & Zoom
0	Focus
1 & 2	Iris
3 & 4	Power On/Off
5 & 6	Pan & Tilt Gears (1 – 10)
7	Reverse P&T directions
8 & 9	Zoom Drift adjust
10	Restore Factory settings
11 - 14	Set Head ID
23 & 24	Remote Relay
45 & 46	Tally
47	Pan & Tilt Limits
48	Store Pre-set
49	Go To Pre-Set
50	Turbo Speed (Gear 10)
51 & 52	Cam Display
81 & 82	PTZF Absolute positions
84	Profile Move Adjust
85	**Config & Setup**
85	Set Home
85	GoTo Home
85	Acceleration
85	Velocity
85	Deceleration
85	Set Limits
86	Velocity Demand
87	Record Move Trace *TBA
88	Perform Move Trace *TBA
89	Set Protocol
94	PTZ Position Limits
95	Reverse Focus
96	Reverse Zoom
105	Information Request

CCU

FUNC No.	Command Parameter
1 & 2	Iris
15 & 16	Picture Enhance
17 & 18	Master Gain
19 & 20	Auto Iris
25	White Push
26	Auto Tracing White
27 & 28	Auto Focus
31	Pre-set white 3200k
32	Pre-set white 5600k
35 & 36	Camera Format
37 & 38	Shutter
45 & 46	Tally
51 & 52	Cam Display
53	Manual White
54 & 55	Red Gain
56 & 57	Blue Gain
60	Bright
61	Saturation
62	Knee
64 & 64	Master Pedestal
66	Bars
67 & 68	Red Pedestal
69 & 70	Blue Pedestal
71	Gamma
72	Black Gamma
73	Extended Functions (ECS)
74	Dynamic Noise Reduction
75	Genlock & Sync
79	Auto Black
80	Filter Wheel
92	Colour Matrix

108	Picture flip & mirror
111	Set DMX Base Address
116	ND Filter Drive
150-189	Motion Control Commands
199	Head Settings Request

The majority of these parameters can be adjusted with the **Multi Function Controller** and our **Remote Camera Panel**. Virtually any setting value can be requested from the unit.

In addition to the parameters above, there are numerous 'engineering' commands. Setting the PID values for Pan & Tilt, for example.

Pre-Set Positions & Profile Moves

Up to 99 pre-set positions can be stored and recalled in the head. (dependent on controller) Each position includes, Pan, Tilt, Zoom and Focus positions. Once stored, the positions are saved during power loss. Simply drive the head to the required position and **Store** this position as a Pre-Set.

A major feature of the **Proteân XMi** is that it always does a **Smooth Profile Move to** each pre-set position. The profile of this move can be specified by the operator using the **Multi Function Controller**. All axes, Pan, Tilt, Zoom & Focus, move in the same amount of **time** to the pre-set position. A default time of 4.5secs is automatically stored, but can be adjusted at any time.   Total Time, Ramp Up time, and Ramp Down time can be adjusted by the operator for each position independently.

Another feature is the **Move Tracing*** (TBC) ability. The unit can record a move, manually performed by the operator. This move can be re-played and the move time can be adjusted up or down. It can even play the move in reverse which is useful for performing an accurate zoom in. Record it as a zoom out and replay it in reverse. (Further details when complete)

These built-in features enable operators to set up simple motion control moves without needing a controlling computer. It brings the ability to intersperse motion control moves into live action applications quickly and easily.

DMX Control

The **Protean XMi** can be controlled by any DMX lighting control system with 16bit precision for pan, tilt and zoom. Also, if the correct lens is used this can be controlled also. The unit uses 8 DMX channels for full control.   Selecting DMX protocol and setting the '**Base Address'** is done using the **Multi Function Controller.**

Ch Base Address   - Pan coarse
Ch Base + 1   - Pan fine
Ch Base + 2   - Tilt coarse
Ch Base + 3   - Tilt fine
Ch Base + 4   - Zoom coarse
Ch Base + 5   - Zoom fine
Ch-Base + 6   - Focus
Ch Base + 7   - Iris

For Pan values, lower numbers = movement CCW or left.

For Tilt values, lower numbers = movement down

Not all channels need to be used. At any time the operator can take manual control using the **Multi Function Controller**. The unit automatically reverts to DMX control when it detects no operator input **and** the DMX value changes significantly.

The **Proteân XMi** uses our unique *Predictive Motion Smoothing* (PMS) algorithm to ensure that movement is not jerky yet remains accurate. Loss of data is tolerated because the firmware predicts future positions based on the previous move profile and fills in any gaps. This also enables operation with very low data rates and data drop-outs, with just the minimum of variance from the desired move profile.

To inhibit DMX control of any channel, ensure the DMX value does not change.

Motion Control

Full positional motion control can be achieved by using any number of motion control software applications. The unit continuously outputs **Free-D** metadata in either standard angular format or RAW numerical format. The RAW format enables metadata and control over the full 360degrees of movement.

The unit can be controlled with commands in **Dstar, Mstar, DMX** or **Free-D** protocols. Using Mstar protocols enables simultaneous motion control along with all other commands (eg. CCU commands) to be sent on the same data stream, either via RS422 or via an IP network.

Dstar protocol
RS485, 9600 baud, 8 data bits, no parity, 1 stop bit.

Mstar protocol
RS422, 38400 baud, 8 data bits, no parity, 1 stop bit.

DMX protocol
RS422, 250,000 baud, 8 data bits, no parity, 2 stop bits.
RS422 line is not terminated to 120 ohm.

FreeD Protocol
RS422, 38400 baud, 8 data bits, odd parity, 1 stop bit

Full details of both D* and M* protocols are available on request.

Support Equipment

There is a full range of additional equipment available to complement any remote system;

Data repeaters, Data Splitters, Joystick Controllers, Camera RCPs, Data Routers, Auxiliary Interface units, Radio Data Transmitters, Fibre Systems, IP Connectivity, etc.

Weight:	7kg (Compact)
Capacity:	15kg standard (40kg with 2nd side support)
Dimensions:	Compact: W. 293mm, H. 356mm, D. 166mm
	Extended: W. 343mm, H. 656mm, D. 166mm (3 x height extensions)
	Max. width clearance to camera centre. 160mm
	Max. Tilt clearance from axis centre. 429mm
Movement:	Pan. Continuous with slip rings. +/- 170deg. without slip rings
	Tilt. +/- 120deg. (with mechanical limits)
	Software limits can be set on both axes.
Speed:	From <0.05deg/sec to 360deg/sec.
	10 electronic gears
	Fully proportional control.
Position Resolution:	0.005 deg.
Power:	48v 0.1A(idle), 2.3A max. + Camera requirement
	Camera PSU option – 12v 3A nominal.
RS485 Data:	9600 baud – semi duplex
IP:	UDP Multicast - configurable