

The new range of CamBall4 remote cameras



- DMX, Free D, M*, Motion Control Protocols
- **Real Time Metadata for VR & AR**
- **Built in Move Profiles**
- Weatherproof & Rugged Carbon Fibre
- 2.4 Megapixel Sensor to 1080p
- **HDR mode**
- Enhanced CCU Control
- Genlock
- 30x optical zoom
- Slip Rings
- Inverted or Upright Mounting
- 64 Pre-set positions P,T, Z, F
- Switchable to Infra-Red sensitive
- Internal Wide Angle Converter options
- Internal Heater Option

CamBall model	Key Features
CamBall4 XM	As above
Camball4 VR	+ 16bit absolute shaft encoders
Camball4 XM<i>i</i> Camball4 VR<i>i</i>	iBase For built-in IP & Fibre connectivity

The **CamBall4** is the latest in the long evolution of the **Camball**. Taking advantage of the latest in sensor technology and improved 10bit digital signal processing it offers better picture quality, extended CCU functions and a **High Dynamic Range** feature. There are now 2 models, either of which can have the **iBase** which allows for built-in Fibre and/or IP connectivity.

Over the past 15 years the **CamBall** has become a standard in the television and entertainment industries. Consistently outperforming competitors due to its ruggedness, feature-filled performance and weatherproof as standard. Move smoothness and CCU controllability are also notable compared to all others.

The **CamBall4** has many of the previous add-ons included in the standard model including HDR, Genlock, 1080p and Metadata. Our 'future-proof' design ethos has enabled these upgrades to be added to previous models. This ethos continues today and is central to our future developments.

Joystick Control

All the new **CamBall4** versions still respond in exactly the same way to joystick control. Pan & Tilt speeds are now proportional to zoom angle on speeds 1-3 We have only *added* functionality, not removed any.

DMX Control

The '**DMX**' Control', developed in response to requests from leading show facilities, is now standard. It can still be controlled with any of our normal controllers but can also be controlled via 8 DMX channels, allowing 16bit commands in Pan, Tilt and Zoom plus Focus and Iris.

If the show computer can track follow spots then it can track this camera. When used as an auto tracking camera it can follow the artist extremely smoothly, including zoom & focus. The built-in **PMS** (Predictive Move Smoothing) algorithm predicts and smooths the moves. It also copes with missing data packets without stuttering.

BlackTrax has been used extremely successfully for **Camball** auto tracking. The **Camball** 3D model can be downloaded from **Cast-soft** and loaded straight into the show model – just like a lighting fixture. The model includes the pan and tilt angles and limits to get up and running in a matter of minutes.

The **CamBall** is the camera of choice for many stage shows and concert tours etc. It has been tried and trusted for over 15 years. Many are currently in use on major concert tours and configured as auto-tracking cameras, giving more shots-per-dollar than ever before.

Free-D Control

With ever increasing moves towards automation, motion control, virtual reality and augmented reality, the **CamBall4** enables this, using the industry-standard '**Free-D**' protocol for both Metadata and as a control protocol. This enables full Motion Control. The **CamBall4 VR** has 16bit absolute encoders are fitted directly onto the pan & tilt output shafts. This ensures zero mechanical linkage error (backlash) and also absolute positioning without the need for a home position. The **CamBall4** also responds to '**M* protocols**' which adds the ability to simultaneously control the camera CCU functions without interrupting the motion control.

Metadata

Metadata is the essential component for virtual and augmented reality (VR & AR). The **CamBall4** outputs **Real Time** continuous positional metadata in '**Free-D**' format, whilst simultaneously responding to command inputs, either '**M***', '**Free-D**' or '**D***' commands. The metadata output contains, Pan, Tilt, Zoom, & Focus data and genlock status. This is sent as RS422 via the D-sub connector or via the IP interface.

The **genlock** input synchronises both the picture and the metadata and for higher accuracy, the **CamBall4 VR** has absolute shaft encoders which remove all variations due to mechanical backlash and other gear-train errors. They also remove the requirement to find a 'Home' position at start-up.

Profile Moves

Moves to pre-set positions follow a move profile, with Pan, Tilt and Zoom all moving in the same amount of **time**. The **total time**, the **ramp up** and **ramp down** are individually adjustable by the user via the **Multi-Function Controller**.

This built-in on-shot move capability can often remove the need for external control of the camera. The **CamBall4** can perform position-to-position moves itself. So, a simple on-shot move can be programmed into the **CamBall4**. The **Real Time Metadata** enables the graphics computer to keep any overlays pinned to the shot.

These moves can also be externally triggered, either by a data command or via a GPIO unit. In addition to adjusting the times of the move the zoom can be adjusted to start and stop either before or after the pan/tilt move.

The BR Remote **Camera Automation System** is the ideal touch screen interface to utilise this feature and enable straightforward studio automation.



Control Priorities

No features have been removed from the normal joystick operation and the system is rigged in the normal way, with a joystick controller.

On all **CamBall4** models, '**DMX**', '**Free-D**' and '**M***' commands are automatically recognised. The operator can take control with the joystick panel at any time and when no further joystick moves are detected the camera automatically reverts back to the previous control protocol.

The pan and tilt speeds can be set to adjust proportionally to the zoom angle. This greatly assists with shots using pan, tilt and zoom simultaneously. As the camera zooms in the pan & tilt speed reduce so little displacement of the joystick is required to continue the shot. The reverse occurs when zooming out.

Environmental Protection

The **CamBall4** is weatherproof to **IP65** as standard. **IP66** can be specified. It can withstand extended periods outdoors without further protection. A remotely switched internal heater can be fitted to clear lens fogging in cold conditions. Additional heaters can be integrated for operating temperatures below -10C.

Mechanical

The main parts are machined from aluminium with deep pocketing to give a rigid and strong chassis. The carbon-fibre outer shell makes it very strong and durable. The motors and moving mechanics have been proven over many years, evolved from the original **CamBall** to give trouble-free operation.

Slipping clutches are fitted to both axes to protect the motors and gearboxes. Unlike many competitors, these clutches prevent damage whilst rigging and during operation. It can be mounted either way up.

Slip rings enable continuous pans. All the power, data and video signals pass through the slip rings delivering HDSDI on the fixed base.

Pictures

The camera uses the latest sensor and 10bit DSP and is switchable to a number of standards including 1080p. Both 50Hz and 60Hz frame rates are supported as well as interlaced or progressive outputs. Camera CCU functions are be remotely controlled via our **Remote Camera Panel Mk3**. The CCU control on a small camera is unmatched, with both white and black level control, together with many other adjustments not normally available on small cameras. The **CamBall3** is used on many high-end, prestige programmes worldwide and can be matched with larger cameras.

Zoom Lens

A **30x optical** zoom is standard, matched to the larger and higher resolution sensor. This has a wide angle of 64deg. and also the option of fitting a **Wide Angle Adaptor** inside the housing, giving a wide end nearing 90deg.



Specifications

Weight: 2.9kg(S) – 3.1kg(XM)
Dimensions: W.166mm, H.222mm, D.206mm (+ connectors)
Data: RS485, Dstar, DMX, Free-D, Mstar
Power: 12-16v @ 1A

Pan Range: 360deg. Continuous. (DMX 720 deg.)
Tilt Range: +/- 120deg from vertical.
Pan Speed Range: <0.05deg/sec - >180deg/sec. Other ratios on request.
Tilt Speed Range: <0.03deg/sec - >120deg/sec. Other ratios on request.

Accuracy: 0.0055deg (positional) <0.005deg (joystick)
Pre-Set Positions: 64, 16bit accuracy (+/- 0.0055deg. theoretical)

Other features: Profile Move with Ramp Up, Ramp Down, Total Time
 Pan/Tilt Speed, proportional to zoom angle
 LCD status screen
 Tally Light

Camera Sensor: 0.36" NMOS
Active Pixels: 2.38 Mpixels
Sig / Noise Ratio: >50dB

HFOV: 30x zoom – 64deg. to 2.3deg
MOD: <30cm
Distortion: <3% (wide)
Iris: F1.6 - F28
Sensitivity: 30x 1.4 lux. (F1.6 AGC On)

HD Standards: 1080i/50/60, 720p/50/60, 1080p/50/60 HDSDI

Connections: XLR4 - Power & RS485 data
 BNC1 – HDSDI
 BNC2 – Genlock

iBase Connections: IP control (RJ45)
 ST SM Fibre for control (up to 20km)
 ST SM Fibre for pictures (up to 20km)
 SMPTE converter options

Remote: Pan, Tilt, Zoom, Iris, Focus, Auto / Manual White, Preset White, Rgain,
 Bgain, Master Pedestal, Red Pedestal, Blue Pedestal, Shutter, Gain,
 Gamma, Dzoom On/Off, Auto Iris On/Off, Auto Focus On/Off, IR Mode On/Off,
 Chroma, Detail, Shading, Knee, HDR, RGB balance, Output Standard etc.
 Preset Store (P,T,Z,F), Preset Recall, GoTo Absolute Position,
 P,T reverse, speeds 1-10, Turbo Speed, ND Filter

Operating Temp: -10 to >+40degC Out of sunlight
Sealed: IP65 minimum (IP66 option)
Mounting: 2 x 3/8", 2 x 1/4" + safety bond point

'DMX Control': 8 channels - Pan (2Ch), Tilt (2Ch), Zoom (2Ch), F
 16bit positioning – 720deg. Pan



Specifications subject to change without notice
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Options for all models and compatible products:

All the CamBall models can be fitted with:

- Wide angle convertors & Hoods**
- Internal port heaters (7 watt)**
- Internal space heaters**
- Variable ND Filter**
- Roll levelling**
- Genlock**
- GPIO trigger interface**



Variable ND Filter

There is also CamBall **Net-Cam** version. (toughened housing and faster operation for in-goal applications)

Compatible products include:

- Joystick Controllers**
- Remote Camera Panels**
- Radio data links**
- Fibre Converters**
- IP Converters**
- Camera Automation System**



Multi Function Controller



Remote Camera Panel

Please refer to our website for details of other products that we offer – <http://br-remote.com/products>

What our customers are saying about the CamBall:

Video Design have several **Camballs** used on concert tours.

'This is so good I'd be happy putting it on a show tomorrow' – Oli Metcalf

'The pictures are now so good you can't tell whether you're on a big camera or a robocam' – Alex Leinster

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In an article for Zerb magazine (The Guild of Television Cameramen) freelance cameraman **James Aldred** sang the praises of our CamBall cameras:

'By far the best option currently available in my opinion is the CamBall range of camera systems..... CamBalls have played a vital part in filming several tricky sequences at height in the past...

*.....Where the CamBall really came into its own was on a six-month installation inside the nest cave of a Californian condor in the Grand Canyon for Earth's Natural Wonders (TX BBC 2015).
..... That camera took everything Arizona could throw at it: storms, 40° heat, sub-zero cold, grit, sleet, even Condor droppings. It just kept on working. I tried hard to break it but I just couldn't!*

James Aldred, Zerb (Spring 2017)

<http://www.gtc.org.uk/media/fm/Zerb%20articles/High-level-web.pdf>

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Jo Charlesworth, freelance natural history camera operator

'In my opinion BR Remote make the best small form factor remote heads currently available, particularly with regard to the fluidity of pan and tilt control.

They already offer a wide range of products to suit most applications, but also have always been willing to undertake special projects for me, which has been extremely helpful for some of my natural history work.

I have been using their CamBall cameras for the last 10 years and have yet to find anything that performs better. During this time the picture quality has improved and the price has decreased. What more could you want?'

Jo Charlesworth, Freelance camera operator

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