BWR Kit
User Manual

Body Worn Radio

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Document History

Version	Date	Change Sumary
V1.00	23/02/2026	Intitial release based on the BWR

Warranty and Support

All Visual Engineering products are supplied as standard with a 12 month 'Return to Base' warranty.

Please note: Any unauthorised product disassembly, modification or the removal of tamper proof labels will void the warranty.

In the event of a suspected product failure, users should contact the Visual Engineering support team on the telephone number +44 (0) 1206 211842 or please email us at:

support@visualengineering.co.uk

Should the fault persist or if the support team are unable to resolve the fault, it may be necessary to return the equipment.

Equipment should only be returned using the RMA (Returns Management Authorisation) process. Users should contact the support team on the above number and request an RMA number.

Safe Operating Procedure

• The equipment should be operated within the environmental limits as detailed in the Specifications section of this user manual.
• Only authorised and trained personnel should operate the equipment.
• There are no functions that require the user to gain access to the interior, other than as described in the Part Replacement section.
• Changes to the radio settings as described in the Maintainer Guide section should only be carried out by personnel that have had the appropriate training.

User Guide

Introduction

The BWR is a rugged, high-performance video and data transmission device designed for use in demanding tactical and field environments. It integrates secure wireless networking, flexible USB device support, and reliable RF communications within a compact, IP67-rated enclosure.

The system can be purchased across multiple different frequency bands from 1.20 GHz to 5.20 GHz and provides RF output power of up to 200 mW per channel (up to 400 mW total, band dependent). It utilises MeshUltra MANET waveforms to form self-healing mesh networks supporting up to 144 nodes, enabling resilient, low-latency communication in dynamic deployments. Network throughput of up to 87 Mbps allows reliable transmission of high-quality H.264 video and data streams.

Security is supported through optional AES-128 or AES-256 encryption to protect transmitted data. Receiver sensitivity of –98 dBm at 2.5 MHz bandwidth ensures dependable operation in challenging RF conditions.

The unit provides three USB Host ports and one USB Peripheral port, allowing connection of optional devices such as H.264 cameras (up to two simultaneously), GPS receivers, audio headsets, Ethernet adapters, 3G/4G/Wi-Fi dongles, and field control modules. RNDIS support enables Ethernet-over-USB networking where required. Internal storage is provided by a 128 GB microSD card for local data and video recording.

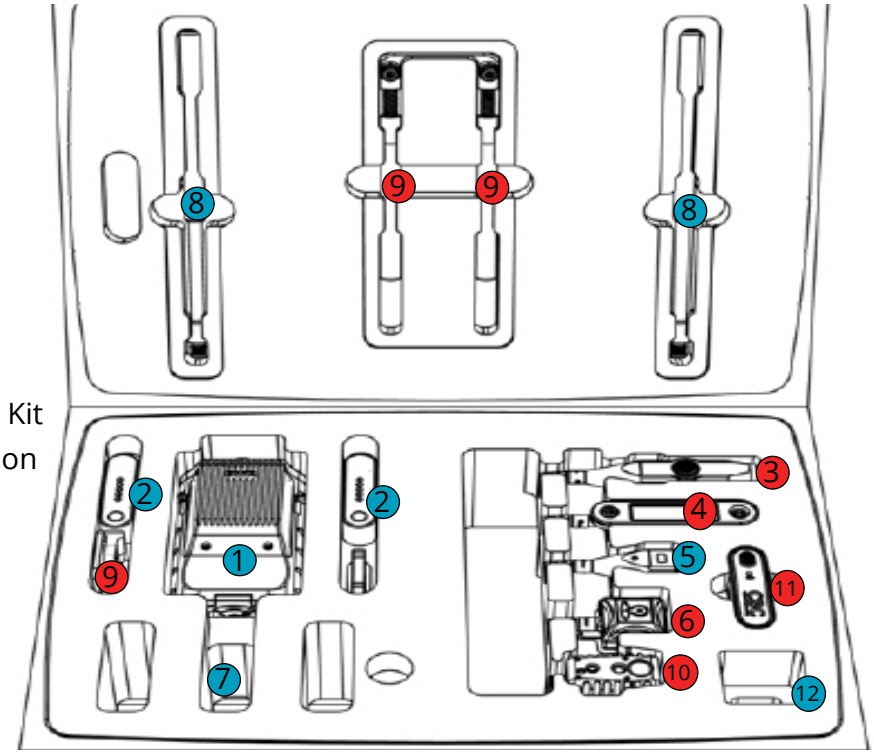
Power is supplied by a removable, rechargeable battery, with USB-C Power Delivery available for charging and backup power. The system is housed in a black anodised aluminium enclosure measuring 151.3 mm × 82.5 mm × 49.75 mm, designed for durability and resistance to dust and water ingress to IP67 standards. It is rated for operation in temperatures from –20 °C to +50 °C.

This manual provides instructions for installation, configuration, operation, and maintenance of the BWR. Users should read this document in full before operating the equipment to ensure safe and optimal performance.

Body Worn Radio Kit

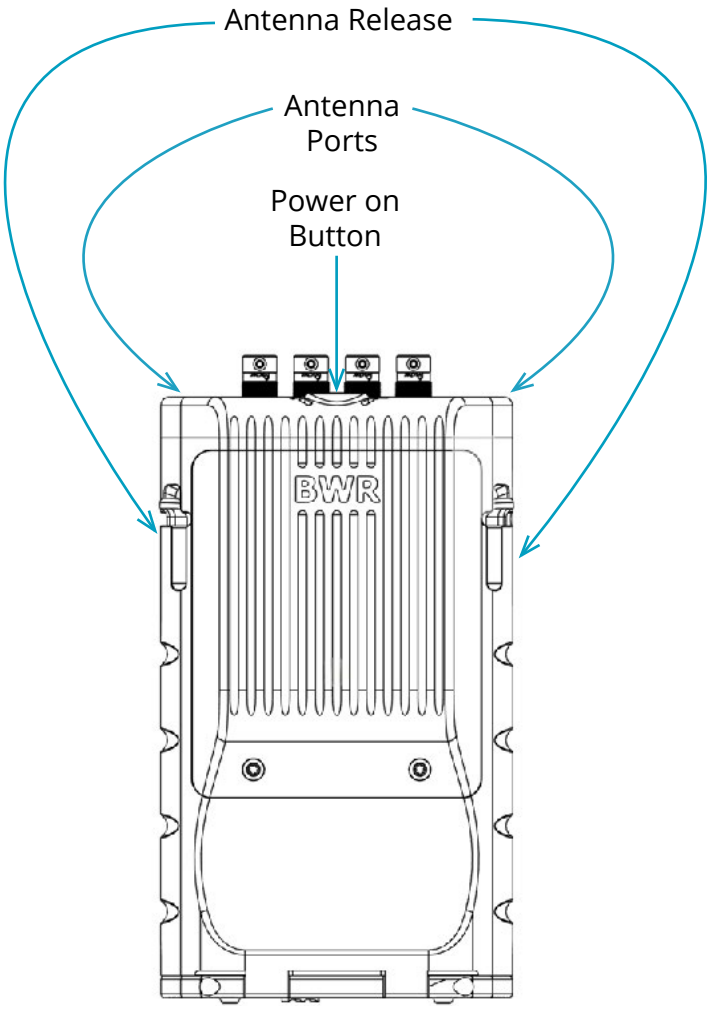
The Body Worn Radio kit comes complete in a foam lined Peli flight case.
The kit contents are shown here and listed below, along with their part numbers.

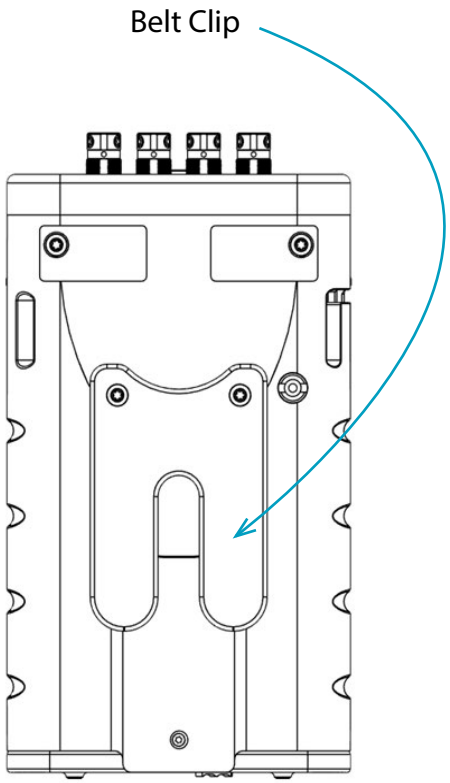
Standard Kit
Cost Option

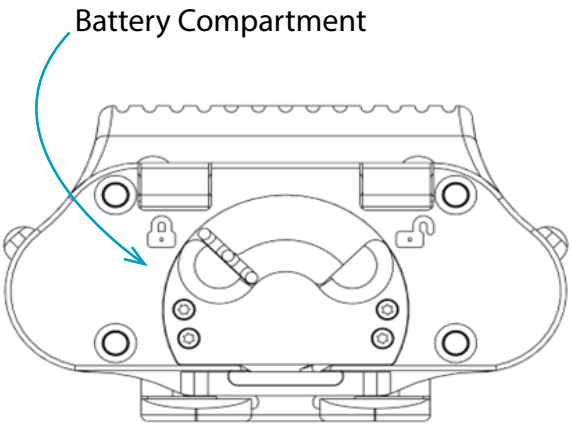


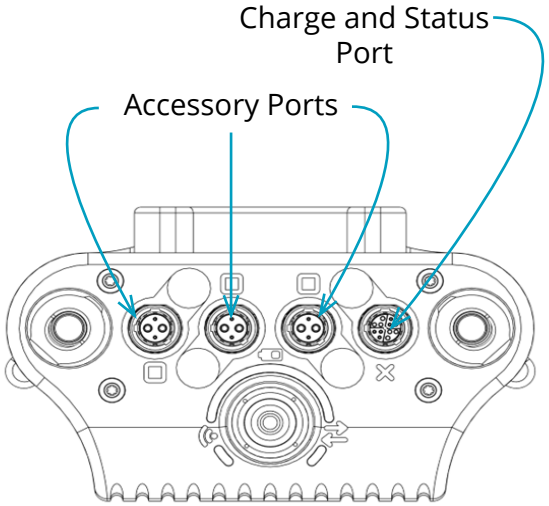
Part Number	Description
1 **110-5769**	BWR - 167235
2 110-8401	Li-Ion Battery Pack (4S1P)
3 110-5911	AFM Audio PTT Module
4 110-5813	FCM
5 110-5860	EFM Ethernet Interface Module
6 110-5941	GFM GPS Module
7 110-6279	Fischer BK4-06 to USB-C Cable
8 110-0383	GOA Series Antenna 167235-QMA
9 110-5840	BWR-K9-167235 Adapter Kit
10 110-6065	H264 USB BWC
11 110-5958	CBC
12 110-6278	USB-C 30W Compact Charger

Body Worn Radio Features

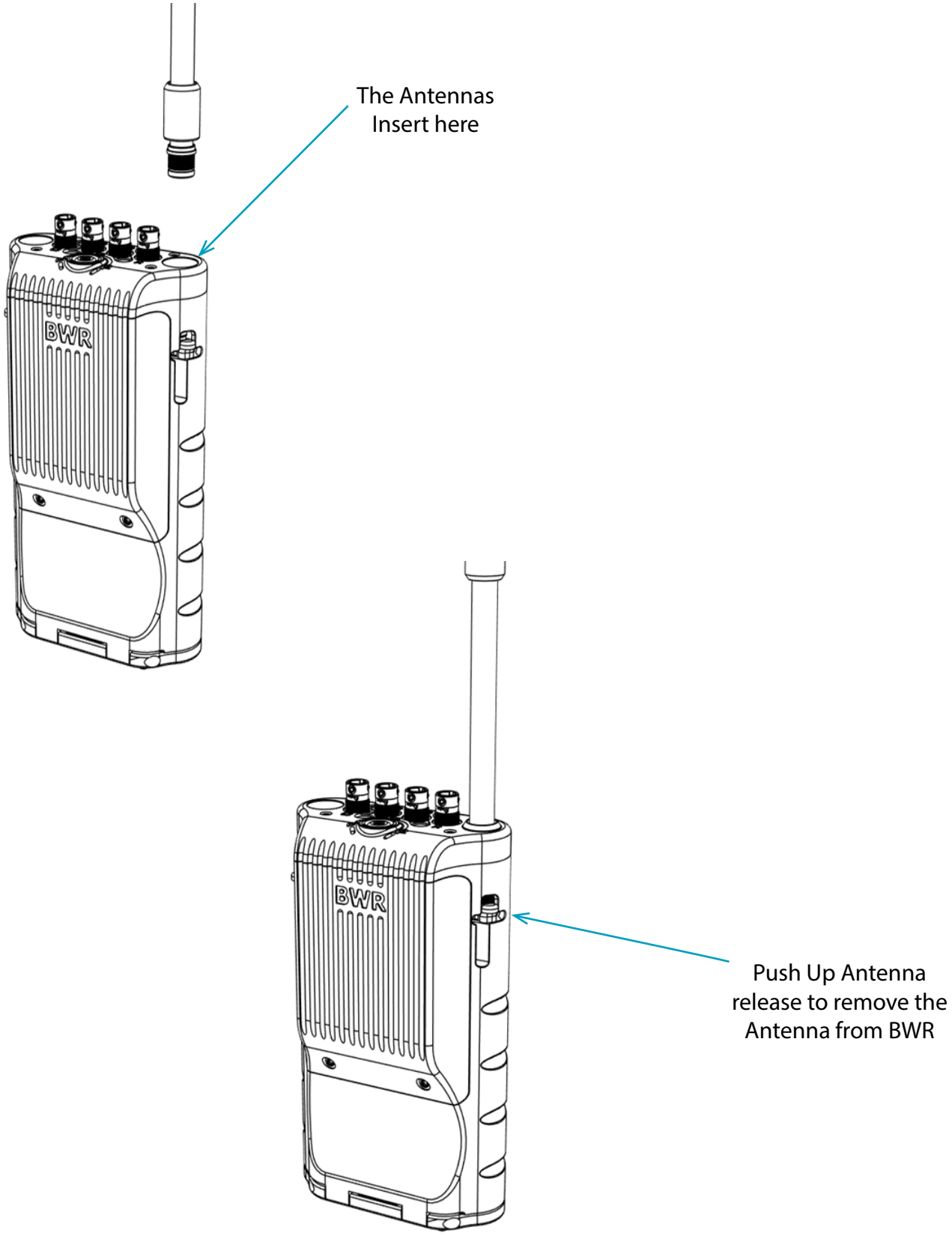








Antenna Insertion

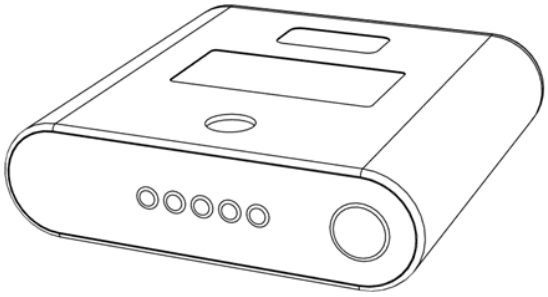


The Battery

The battery is the VE SLI-50 with a 48Wh capacity, which is used to power the BWR .It can be used in either orientation to simplify battery changes.

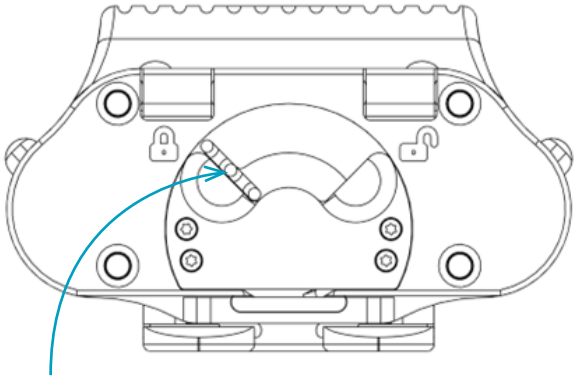
The battery incorporates a gas gauge circuit which accurately measures the power in and out of the cell, providing an accurate time remaining indicator, both under charge and discharge conditions.

To check the power remaining in the battery simply press the indicator button to get the power level to display on the LED power level meter for several seconds.



Battery Insertion

Open the battery hatch by releasing the locking mechanism as indicated in the image on the right.



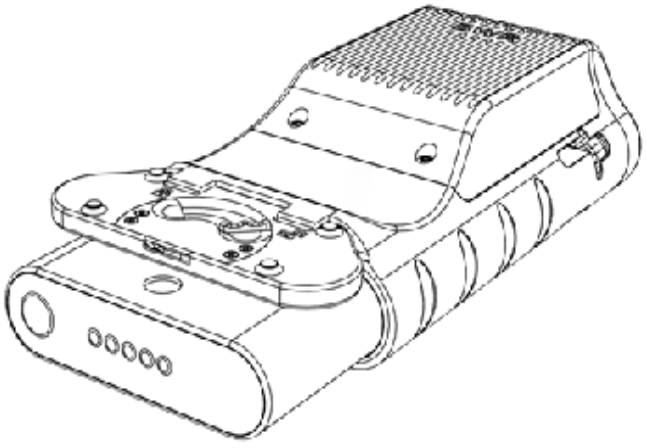
Release Battery Latch

Insert the battery into the open battery hatch with the LED indicator facing outwards, as shown.

It is possible to insert the battery in either orientation, with the indicator button on the right or the left.

Push the battery home, close the battery hatch door and secure the battery latch.

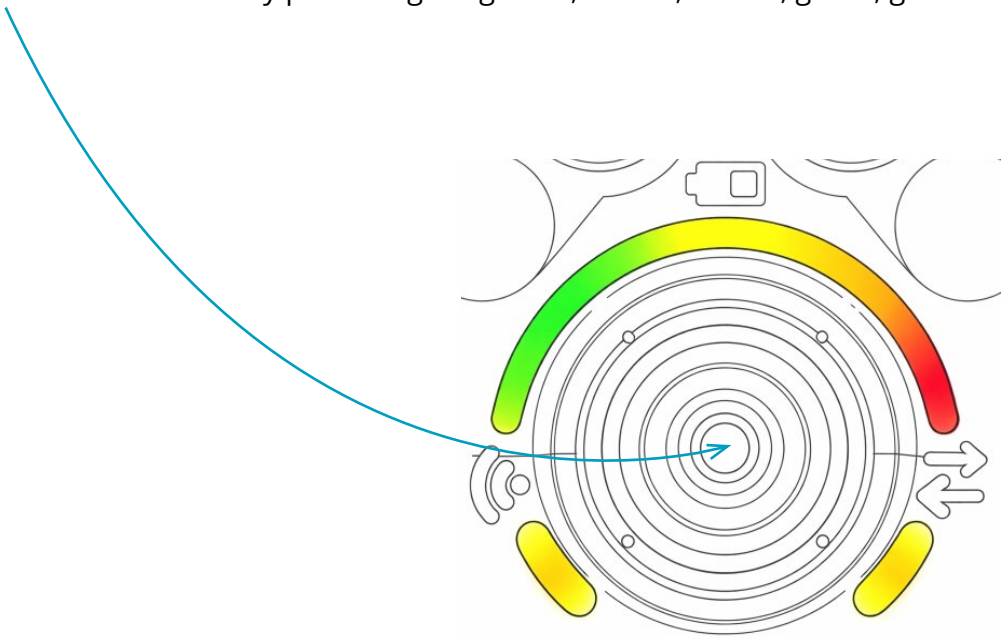
The battery being inserted on the right is showing its remaining charge on its power level meter as the indicator button has recently been pressed.



BWR Functions

Button Press

LEDs indicate battery percentage. E.g. Red, amber, amber, green, green = 100%



Battery Ring (5 LEDs)	
All 5 LEDs Red	Charging has been disabled as battery is too hot.
All 5 LEDs Blue	Charging has been disabled as battery is too cold
All 5 LEDs Red and Flashing	Charging has been disabled and battery needs to be disposed
Last LED Flashes	show that the battery is charging and what percentage it is at e.g. Red , amber, amber, green, green = 100%
LED Status	
FCM Comms (two arrows symbol)	Amber = No Comms With FCM Green = Comms with FCM
Mesh Status (Signal Symbol)	Amber = No Mesh Link Green= Mesh Lock

Web Interface

1. Connect the BWR to a PC using an Ethernet cable via the EFM module.

2. Ensure the PC network adapter is configured for a direct connection (static IP address).

If necessary, follow the instructions below to configure a static IP address. Otherwise, proceed to Step 3.

a. Click on the **Start Menu**, then **Settings.**

b. Click on **Network & Internet**, then **Advanced Network Settings**.

c. Select the network adapter in use, then click **More Adaptor Options**.

d. Select **Internet Protocol Version 4,** then click **Properties**.

e. Select **Use the following IP address**, then enter an IP address on the same subnet as the connected device.

f. Check the **Subnet Mask** is set to **255.255.255.0.**

g. Click **OK**.

3. Open the Domo Node Finder application.

4. Verify that the connected device appears in the device list.

5. Double-click the device to launch the web interface.

6. Log in using the default password "**Eastwood**". Leave the username field blank.

Device Configuration

The web interface allows for monitoring of the device status, and to perform basic configuration, including, but not limited to:

o Network Configuration (e.g. IP Address, Subnet Mask)

o Mesh Configuration (e.g. Mesh ID, Node ID, Bandwidth)

o Peripheral Configuration (e.g. Camera Settings, GPS)

For more advanced operation and configuration, please refer to the latest DTC Software Defined Radio module documentation.

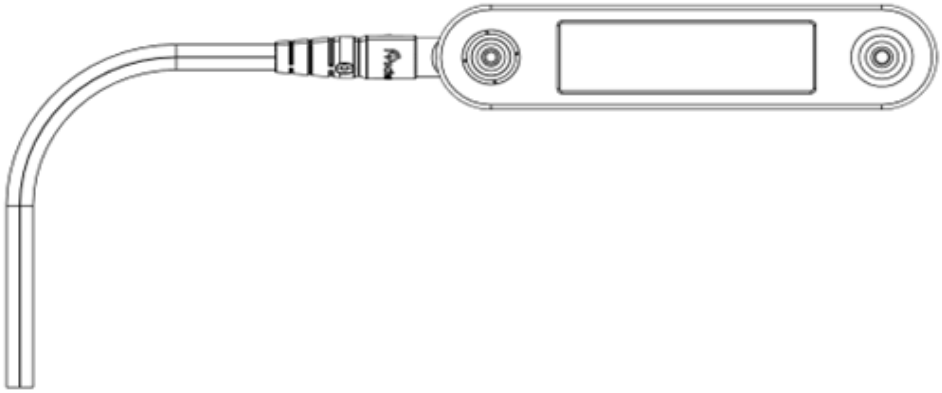
Technical Specification

Specifications			
Channel Bandwidth	1.25,1.5,1.75,2.5,3.0,3.5,4.0,5.0MHz (MeshUltra-M/-80/-X) 6.0, 7.0, 8.0, 10.0, 12.0, 14.0, 16.0, 20.0 MHz (MeshUltra-M / -80)	Connectors	- 3 x Fischer MiniMax USB Host Ports - 1 x Fischer Minimax USB peripheral Port - 2 x QMA RF Ports
Receiver Perfomrance	Sensitivity:-98dBm at 2.5MHz Bandwidth	Dimesions	151.3mm x 82.5mm x 49.75mm
Network Capacity	Throughput: Up to 87Mbps (MeshUltra)	Enclosure	Black Anodised Aluminium
Storage	Internal: 128 GB microSD	Weight	TBA
Power Input	USB-C Power Delivery (charging and bakcup power)	Operating Temprature	-20 °C to +50 °C
Power Consumption	TBA	Ingress Protections	IP67

Frequency Bands		
120170	1.20 to 1.70 GHz	2x 100 mW
167235	1.67 to 2.35 GHz	2x 200 mW
210250	2.10 to 2.50 GHz	2x 200 mW
420520	4.20 to 5.20 GHz	2x 100 mW

Available Accessories

Field Control Module



Introduction

The Field Control Module (FCM) is a compact remote control module with integrated display, designed for configuration, and status feedback of embedded DTC radio modules used within Visual Engineering products. It provides direct access to control and monitoring functions without the need for a PC or laptop, offering a convenient and efficient solution for field operations.

The FCM enables rapid configuration changes and real-time status checking, making it ideal for deployment, setup, and diagnostics in demanding environments. It can be connected briefly for quick adjustments or remain attached for continuous monitoring and frequent parameter updates during operation.

As standard, the FCM provides control of parameters such as preset selection, headphone/mic/mute levels, and monitoring of status information including battery level, mesh lock, node count, GPS statistics, and frequency.

The module can also be customised to control or monitor additional parameters where application specific functionality is required.

Technical Specification

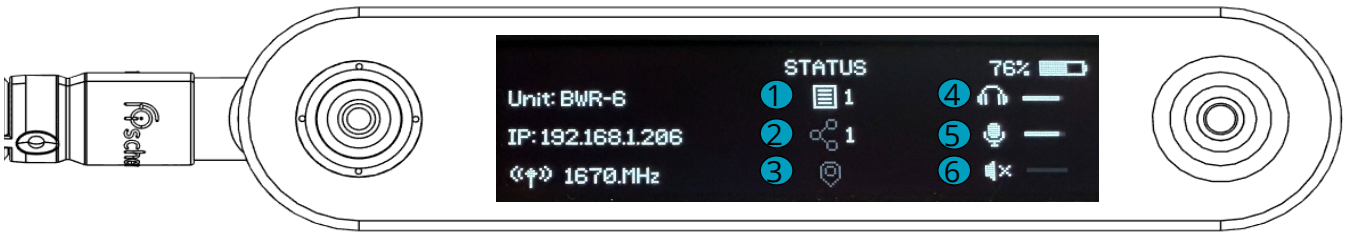
Specifications			
Display Type	2" OLED Display	**Cable Length**	500mm (Other lengths available upon request)
Resolution	256 x 64	**Dimensions**	105x23x15mm
Viewable Area	53.0 x 14.5mm	**Power**	5V USB
Environmental Protection	IP67	**Interface**	Dual USB

Status Page (Home Page)

The Status Page Provides the following information:

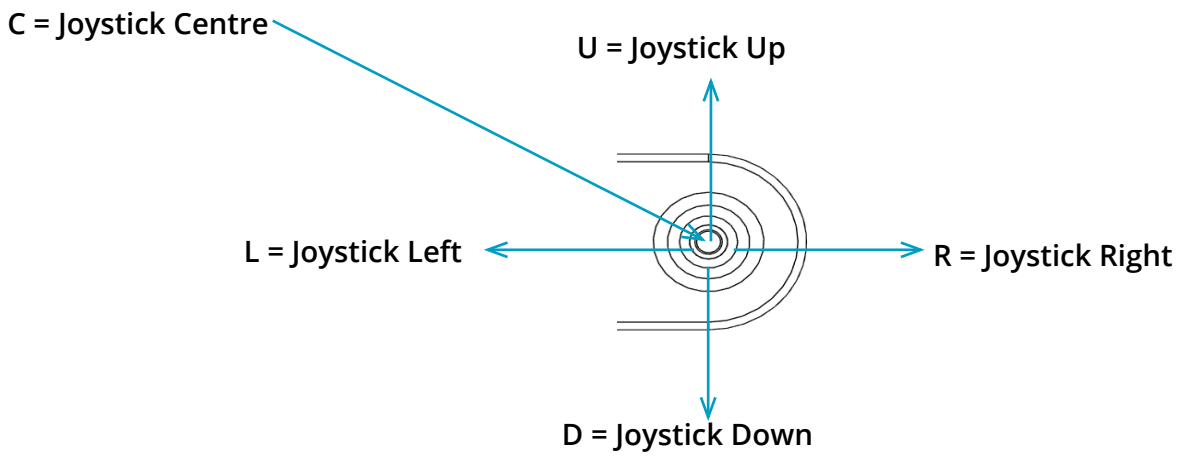
- Battery Percentage
- Unit Name
- IP Address
- Frequency
- Preset Number
- Mesh Lock Status
- Number of Active Nodes
- GPS Lock Status
- Number of Satellites
- Volume Levels
- Microphone Level
- Mute Level

Status Page Symbol



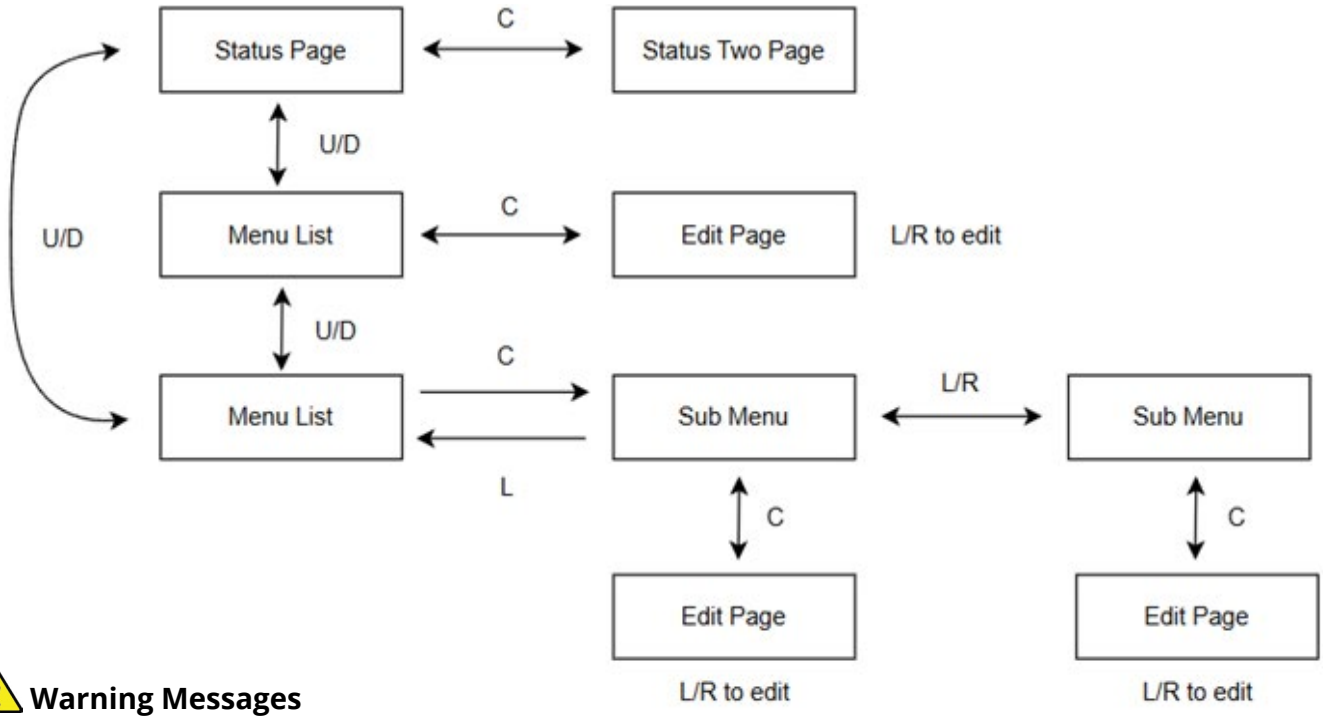
Status Page Symbols		
1	**Preset Number**	This is the preset number
2	**Mesh Link** Grey = No Mesh Lock White = Mesh Lock	Number next to the Symbol is the number of active nodes the unit can see.
3	**GPS Lock** Grey GPS = No GPS Lock White GPS = GPS Lock	Number next to the symbol is the number of satellites the unit can see.
4	**Volume Level**	Bar Next to this indicates level
5	**Microphone Level**	Bar Next to this Indicates level
6	**Mute Level**	This is the mute Level

Navigation Diagram



This diagram demonstrates how to navigate between pages, menus and edit screens using the joystick controls. Depending on the select item, a menu may either open an edit screen directly or navigate to a sub menu.

When button is pressed it always returns to Status Page.

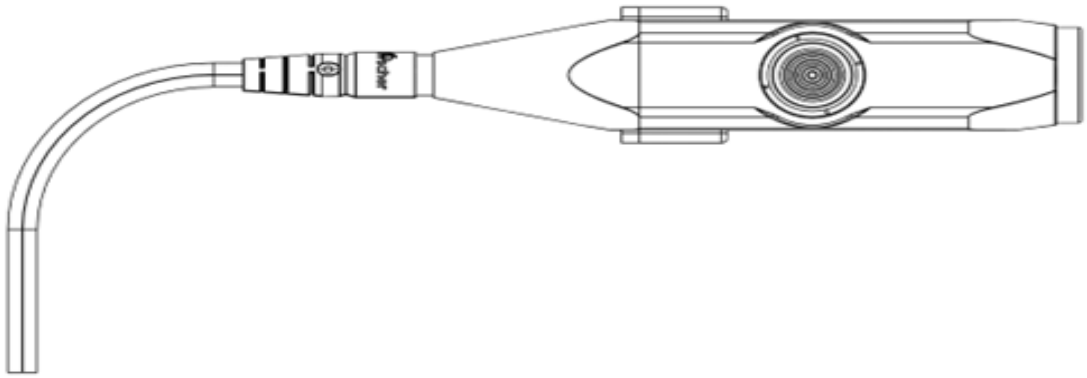


⚠ Warning Messages

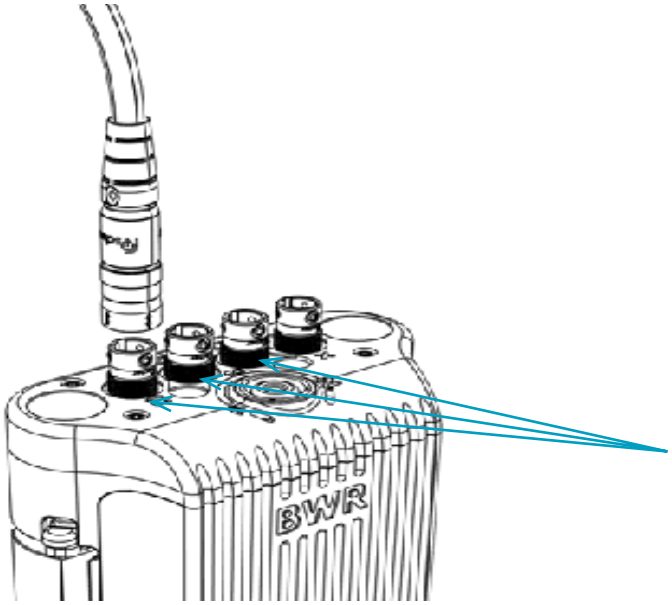
Low Battery Warning = Battery is below 20%

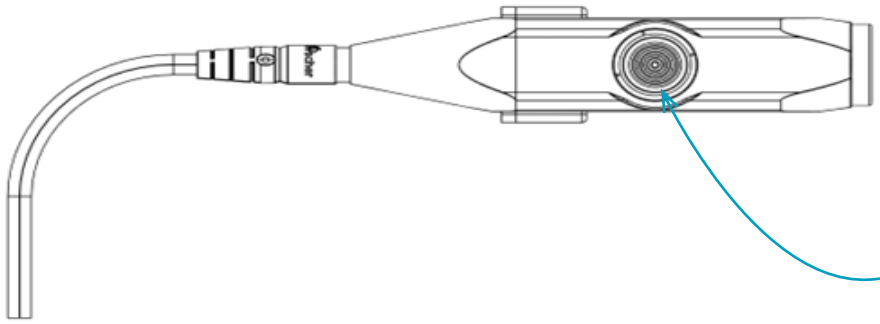
Mesh Lost Warning = Mesh Lost after having mesh Lock

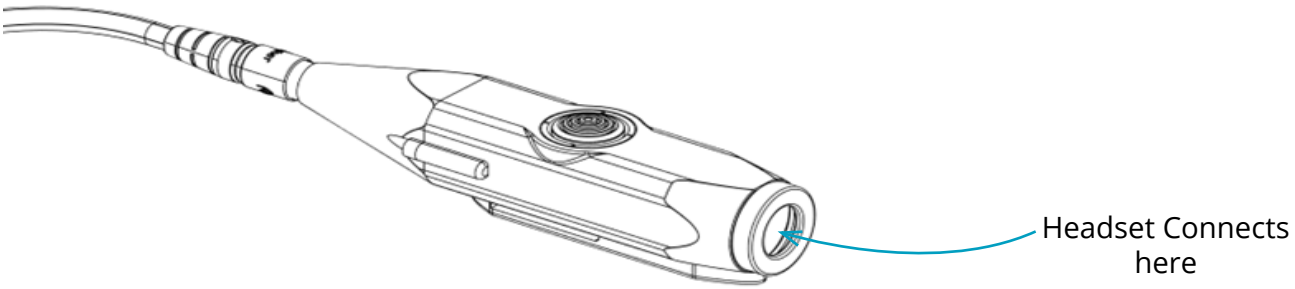
AFM Audio PTT Module



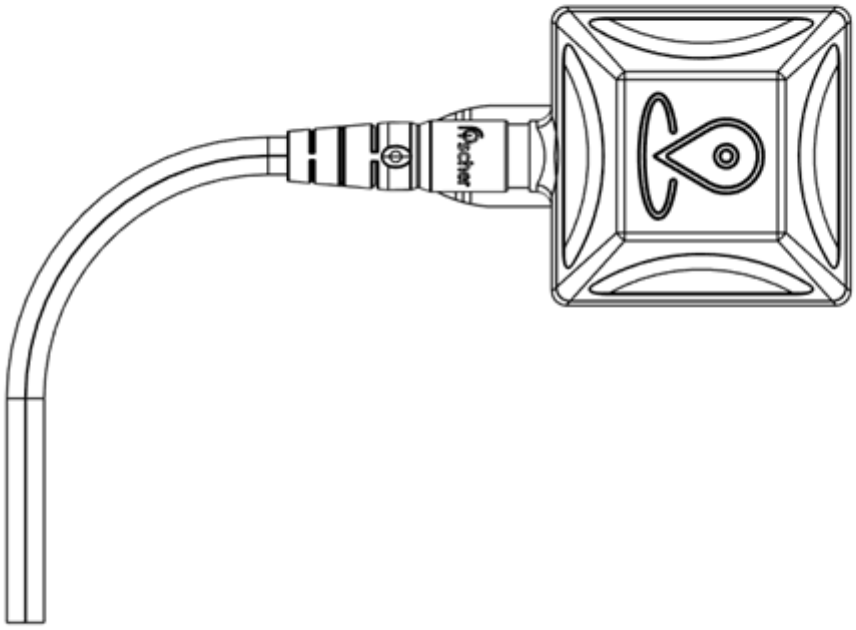
The Audio Push-to-Talk Module is designed to connect to one of the three accessory ports on the body-worn radio, allowing you to attach a headset and communicate easily at the press of a button.



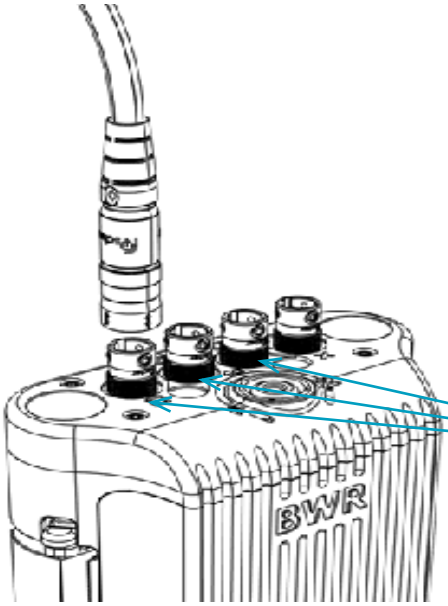




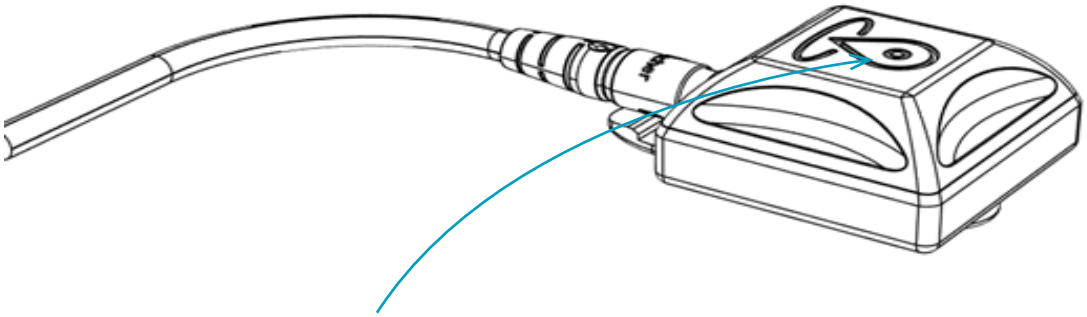
GFM GPS Module



The GFM is a lightweight, wearable GPS antenna that provides reliable positioning while allowing full mobility. It improves signal reception in challenging environments and offers a simple, hands-free solution for accurate GPS tracking.



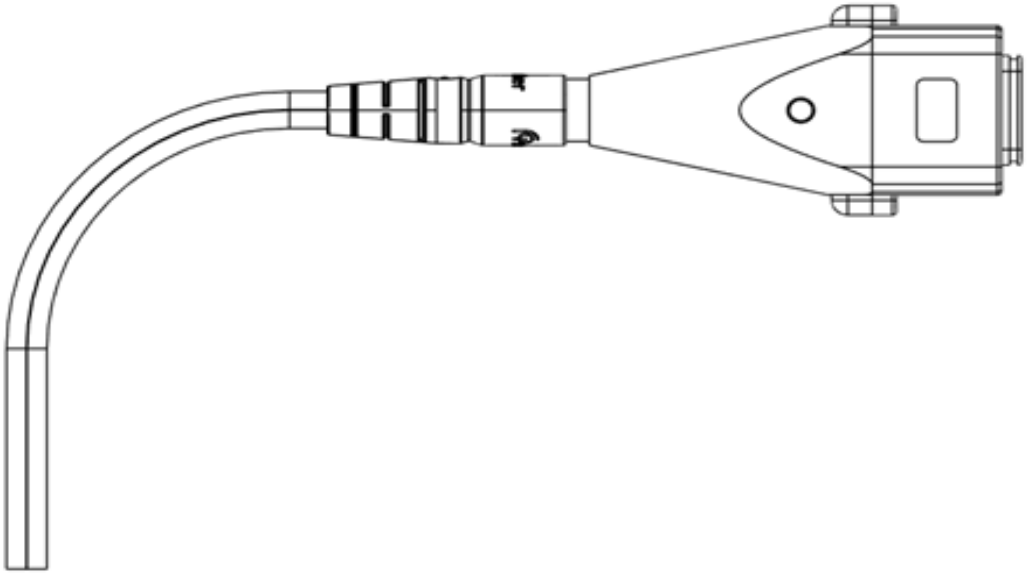
Connects to any three of the accessory ports on the BWR.



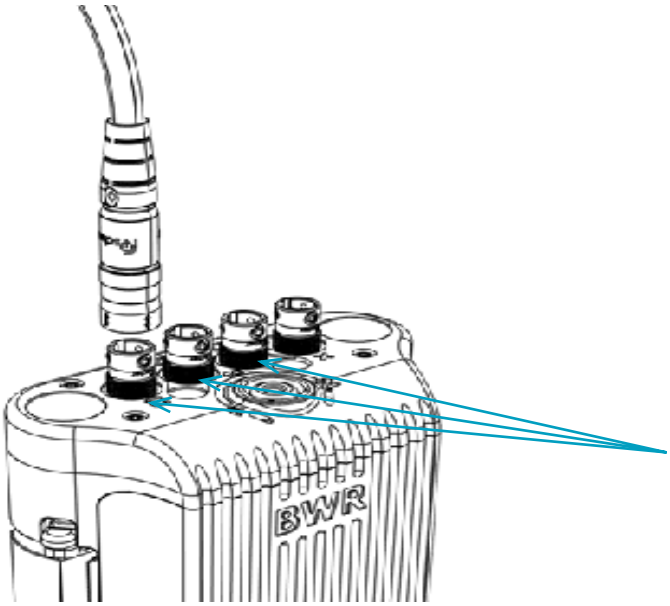
GPS Antenna

For GPS Status Configuration please use FCM or Web Interface

EFM Ethernet Interface Module



The EFM is provided to enable a secure and reliable connection between the device and a standard Ethernet network. By connecting this interface to a computer or network switch using an appropriate Ethernet cable, users can access the device via a web browser. This allows for convenient configuration, monitoring, and modification of the BWR settings through the device's web-based interface.



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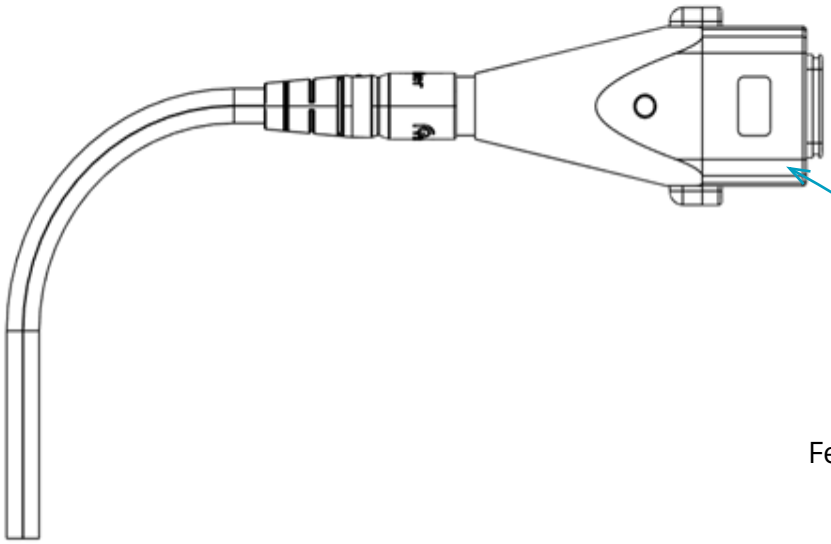

Female RJ45 Connector

Visual Engineering Technologies LTD
Kemps Farm
Stanway
Colchester
Essex
CO3 8NB
UK

British Assessment Bureau
ISO 9001
QUALITY MANAGEMENT

Product specifications subject to change without notice

Tel: +44 (0)1206 211842
Web: www.visualengineering.co.uk
Email: sales@visualengineering.co.uk