



## User guide

# Cobalt

TX-VL-11 TX-VL-14  
TX-AB-11 TX-AB-14  
RX-OB-11 RX-OB-14

Version 2.11

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## Introduction and features

Welcome to the world of digital microwave technology with the Cobalt system.

This guide will help you make the most of this revolutionary technology that is so simple to set-up and operate.

Cobalt has been designed for:

- ENG live-to-air roaming camera link
- Multi-camera production
- Digital replacement for analogue video assist
- Reality TV and portable field monitoring
- Sporting arena and events filming
- Monitor and record fixed point or body worn surveillance cameras



## Features of the Cobalt microwave system

- Simple to set-up and operate  
Simply plug in video, audio and power cables.
- Licence exempt  
Operates in the WI-FI band.
- QOS - No break-up, noise or interference  
Cobalt uses a unique bi-directional transmission system where each packet of data is acknowledged by the receiver. This function means that any lost data can be requested and resent, resulting in an extremely robust link.  
The Cobalt far exceeds any analogue microwave system with superior video and audio quality. Its unique diversity antenna receiving system reduces interference and break-up in very poor multi-pathing environments.
- Diversity antenna receiving system  
Cobalt integrates a unique diversity antenna system that minimises dead spots and dramatically increases picture stability.
- Secure transmission with point-to-point 128 bit encryption  
Traditional analogue UHF and 2.4Ghz transmission can be easily tapped into and recorded by unauthorised receivers, risking piracy. The unit provides secure transmission at all times with pre-shared key encryption.
- Six simultaneous channels  
Up to 6 individual channels can operate in the same vicinity without any interference.
- MPEG-2 compression  
The Cobalt system uses MPEG-2 technology to ensure full SD quality delivering full frame rate (720x480 NTSC 720x576 PAL, 50/60 interlaced fields).
- Two channels of digital audio  
The Cobalt system has 2 channels of broadcast quality audio that can be used for stereo audio feeds live to air, camera feeds or a combination of audio and timecode.
- Operates without interference to or from Wi-Fi a.b.g, cordless or mobile telephones and household appliances  
The Cobalt automatically scans the entire licence exempt frequency band and selects a clear channel each time you set-up.
- SDI and composite video (component video on certain units)

## Specifications

### Video

Video	MPEG-2 SD resolution at full frame rate 720x480i NTSC. 720x576i PAL SDI ,composite and component video
Audio	Stereo (L + R)
Standard	NTSC/PAL auto select
Latency	465 ms

### FR Information

Frequency	5GHz 802.11a Wi-Fi / 2.4GHz 802.11g Wi-Fi
Range	2500 feet (750 metres) clear line of sight Normal indoor range with walls 150 feet (50 metres)
Security	Pre-shared key encrypted 128bit
Channel select	Automatic / Manual via RS232 interface Up to 6 simultaneous usable channels

### Other

Unit weight	TX-VL-02YRB 600 grams TX-AB-02YRB 600 grams RX-OB-02YRB 1.1 kg
Dimensions	TX-VL-02YRB 221mm x 65mm x 60mm TX-AB-02YRB 180mm x 55mm x 95mm RX-OB-01YRB 214mm x 68mm x 110mm
Power	8-36V DC 400mA
Temperature range	-5 to 45 C – operating
Humidity	5 to 85% typical

## Before using the Cobalt system

Before using the Cobalt system for the first time, please check the following to ensure the unit hasn't been damaged during shipping.

1. Visually inspect outer casing, plugs and cables to ensure there is no damage.
2. Slowly rotate the unit to ensure all components are in place and nothing is loose inside the casing.

If you require assistance or are concerned about the working condition of the Cobalt system, please email our Service team [sales@boxx.tv](mailto:sales@boxx.tv) or call +44(0)845 643 2874.

## Safety instructions

The system complies with Part 15, of the FCC Rules, which declares;

*Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

The Cobalt system has been engineered to ensure a safe working environment for the operator at all times. With safety in mind, we have tested and will continue retesting the Cobalt system to ensure we provide the safest system on the market.

Follow these safety precautions when using the Cobalt system:

- Do NOT power on the units without antennas connected to both antenna ports.
- Keep all ventilation holes clear and unblocked. Ensure that proper ventilation is provided at all times when in use.
- Use anti-static packing materials when transporting the unit. Standard packing materials may damage the units if used.
- Do NOT insert objects of any kind into the ventilation holes as this may result in damage to the unit
- Do NOT use when wet and provide adequate cover when using in the rain.
- Do NOT use liquid cleaners or aerosol cleaners on the unit. Use a damp cloth for cleaning.
- Do NOT disassemble this product. If service or repair is required, contact our Service team [sales@boxx.tv](mailto:sales@boxx.tv) or call +44(0)845 643 2874.

## Using the system

The Cobalt system has been designed so that it is as compact and light as possible for the operator to use. The casing of the Cobalt system is durable and constructed to last, but care should be taken to avoid damaging the sensitive circuit board inside. Do not attempt to open or service the unit yourself.

The internal circuit and antennas are highly tuned and tampering with them will damage the unit. Use anti-static packing materials when transporting the unit. Standard packing materials may damage the units.

The correct choice of antennas and placement of these antennas is the key to a reliable system. Keeping as much as possible in 'line of sight' between the cameraman and the receiver will also increase your range. (see antenna manual)

The Cobalt system's unique transmission system is specifically designed to transmit broadcast quality video through walls and floors from a moving camera. However, all microwave transmission systems will have their range dramatically reduced when attempting to transmit through objects such as concrete, steel, glass, water and the human body. These obstacles will decrease the range but not the reliability of the link.

## Transmitter setup

For antenna choice, please see the Boxx.TV antenna manual.

1. Place the transmitter on the back of the camera.



2. Screw the antennas on using adaptors if needed.

Note: One of the most common problems is cross threading the antennas with the antennas ports. Please ensure they are on correctly. Do not force the threads.



3. Using a BNC cable, connect the video out of the camera to the transmitter.

If using composite, you must use **video out**.

**Do not use test out** as this may cause video flashing on the link.



Composite - Black

Component - Yellow Red Blue.

SDI - Blue

If your camera and transmitter have component video, we recommend using this over composite. This increases the picture quality.



If using a DSR-500/570, use our 26way cable CBL601.

SDI will deliver the best picture quality.



4. Select what audio cable you are going to use.

CBL105 – 5pin XLR. Digibeta, IMX, XDCAM or HD

CBL104 – 3.5mm headphone output

CBL110 – 2 x 3pin XLR

CBL106 – 2 x RCA for DSR500/570



The Mini 5pin XLR will plug into the transmitter, with the black button facing down. The other end will plug into camera audio output.

If using the headphone output of the camera, turn the headphone volume to 80%. Select channel 1,2 or a mix depending on what audio you want to send.



Note: The input to the transmitter is set to -10dB. If making your own cables, you may need to supply 15dB of attenuation. Cables supplied by Boxx have this built into the cable itself where needed. For more information contact Boxx.tv



5. Clip the camera battery on the back of the transmitter. This will power both the camera and transmitter.



6. Leave the camera turned off.

7. On the transmitter, **pull the locking toggle switch up** to unlock it and turn the unit on to the desired frequency range.



We recommend 5GHz for most environments. You will need different antennas to work in each frequency band. (Note: 2.4Ghz has been phased out in newer versions.)

The LED will turn **RED** and then flash **RED**. This indicates that the transmitter is searching for its paired receiver.

## Receiver set up

For antenna choice, please see the Boxx antenna manual.

1. Supply the receiver with 9-36v DC from a battery or power supply via the 4 pin XLR. Pin 4 is positive. Pin 1 is negative.



2. Plug in the video BNC.

Composite - Black

SDI - Blue

Component - Yellow Red Blue.



3. Use 3pin XLR cables for audio left and right. There are 2 trim pots on the back of the receiver that will adjust the audio output. These are factory set to a level of +4dB. In most situations these should not be changed.



4. Use the locking toggle switch to turn the unit to the desired frequency range. **Pull the lever out to unlock it.** Centre is off. If the unit is not labelled, it will only work in 5GHz.

We recommend 5GHz for most environments. You will need different antennas to work in each frequency band. (Note: 2.4Ghz has been phased out in newer versions.)



Once on, the LED indicator will turn **RED** and then flash **RED**. The units are now searching for each other.

Once the units are locked, both the transmitter and receiver will have a very quick **GREEN** blink. This indicates that the system is working but no video is being received by the transmitter.

When using more than one system in close proximity, ensure the distance between the receivers exceeds 15 feet (5 metres), as the receivers could interfere with one another.



## Testing system and Systems status indicator

1. Turn the camera on. The LED will flash **GREEN**.  
The faster the flashing **GREEN** LED the higher the quality of the link. There are 3 steps (Slow/Mid/Fast)  
See table on next page.



The Cobalt system has a unique function that allows the cameraman to know the status of the link when shooting by using this cable attach to the viewfinder.

2. Attach to the CBL115 viewfinder LED cable to the view finder using the Velcro strap. The other end plugs into the 12way connector on the side of the transmitter.



3. If you are not getting a high data rate, try moving the receiver antennas to a more suitable location to increase 'line of site'.

The viewfinder LED is **RED** but displays the same data rate as the **GREEN** LED on the transmitter and receiver. (Red is used as it is more visible in daylight).

The same viewfinder LED that is used on the transmitter, can be used on the receiver to indicate data rate, just plug it into the 12pin connector.



**The table below shows the LED indicators on the Cobalt.**

If the LED is flashing slowly, do not attempt to go live-to-air as the link is not guaranteed

LED	Status
<b>RED</b>	Initialising - wait 3 seconds.
<b>RED flash</b>	Signal survey /searching (this can take up to 60 sec in heavy RF traffic).
<b>GREEN flashing</b>  <b>Fast GREEN blink</b>  <b>Viewfinder cable RED flashing on</b>  <b>Viewfinder cable Fast RED blink</b>	Transmitting – flash speed indicates data rate slow (4 MB) / mid (8 MB)/ fast (14 MB).  Transmitter and receiver locked and ok although no video signal detected at transmitter.  Transmitting – flash speed indicates data rate slow (4 MB) / mid (8 MB)/ fast (14 MB).  Transmitter and receiver locked and ok although no video signal detected at transmitter.

## FAQs

### Q. What do I do if the picture starts to break-up?

A. Turn both the receiver and the transmitter off and on again. This will reset the units and allow it to select a different channel to use.

### Q. What do I do if I only need to use one antenna when using the system?

A. Always use an antenna on both antenna ports on the transmitter and receiver. Using only one antenna, you will damage the unit and void warranty.

### Q. What if the LED indicators flash RED on the transmitter or receiver?

A. Make sure that the TX and RX are on matching frequency bands (both 2.4GHz or 5Ghz). Check that you are supplying 8 – 18 volts DC to the unit. Reduce the distance and turn the units off and on again. It can take up to 1 min for the TX and RX to lock. Note the viewfinder data rate indicator flashes red to display the data rate.

### Q. What if the LED indicator is blinking GREEN but I am not sending any video or audio?

A. If the LED indicator has a quick GREEN blink, the Cobalt systems is transmitting information and is working correctly. The GREEN blinking indicates there is no video at the TX side. Check cable connections between the transmitter and the camera, and the monitor and the receiver.

Composite - Black  
SDI - Blue  
Component - Yellow Red Blue.

### Q. What if I am using the system within recommended distance guidelines and it is not working properly?

A. Always maintain a clear line of sight between the transmitter and receiver wherever possible as microwave transmission doesn't work well through walls or structures. For best results mount the receiver as high as possible internally or externally with a clear line of sight to the cameraman. Solid walls like brick, concrete, steel and insulated walls dramatically reduce the range of the system.

The use of antenna splitters and high gain antennas can increase your coverage. If you would like to discuss your environment, please contact our Sales team on [sales@boxx.tv](mailto:sales@boxx.tv), or call +44(0)845 643 2874.

### Q. Can I configure the Cobalt so it can be viewed on multiple receivers at once?

A. No. The Cobalt system will only work with a single paired transmitter and receiver at one time. You can however use up to 6 distinct sets of transmitters and receivers in the same area without interference. Please contact our Sales team on [sales@boxx.tv](mailto:sales@boxx.tv), or call +44(0)845 643 2874 for more info.

### Q. Does the Cobalt system interfere with WiFi 802.11 A, B or G?

A. No. The system automatically scans the frequency spectrum and avoids any channels occupied by other networks. When using more than one system in a small vicinity ensure the distance between the receivers exceeds 15 feet (5 metres), as the receivers could interfere with one another.

**Q. Will the Cobalt system work with High Definition cameras?**

A. Yes. Use a down convertor to convert High Definition and HDSDI signal into a SDDSI, component or composite video. Your broadcast facilities supplier will be able to provide specific models to suit your camera.

**Q. How do I ensure audio and visual are synchronised when using a separate audio source?**

A. Due to the systems error-correcting technology you will experience 465ms of delay. To correct this, simply delay your audio source at the same time as the video output.

We recommend the BEHRINGER SHARK DSP110.

[www.behringer.com/DSP110/index.cfm?lang=ENG](http://www.behringer.com/DSP110/index.cfm?lang=ENG)

This delay unit will allow you to sync your audio feed with the pictures being transmitted by the system, is inexpensive and user friendly.

**Q. What do I do if the unit becomes wet during use?**

A. Disconnect power supply immediately. Dry the unit with a cloth to remove excess water and leave to dry completely for 24 hours before attempting to re-use.

**Q. Can I transport the system easily?**

A. Yes. Always use non-static packing materials on the transmitter and receiver. Standard packing materials may generate high levels of static electricity and may damage the system's circuitry. Boxx.TV supplies hard cases built to transport safely. They are specifically designed to protect your system at all times. Contact us at [sales@boxx.tv](mailto:sales@boxx.tv) or call on +44(0)845 643 2874 for further information and pricing of this product.

## Warranty

The system is sold with a limited warranty of 12 months (Warranty term) by Boxx.TV Ltd (Manufacturer). Specific advice, repairs and replacement options are available to the original purchaser in the event the Cobalt system fails to conform to this warranty.

The Manufacturer shall not be responsible for product damages caused by natural disasters, fire, static discharge, misuse, abuse, neglect, improper handling, unauthorised repair, alteration or accident.

The Manufacturer shall not be liable for any special, incidental or consequential damages, even if informed of the possibility thereof in advance. You must inform your place of purchase within 28 days of detecting a defect in material or workmanship not conforming to the specifications (see Specifications section of this guide) of the Cobalt system.

During the Warranty term, the Manufacturer will, at its discretion and without extra charge, as your exclusive remedy, repair or replace the products that do not comply with this warranty; or failing this, will reimburse the purchase price of the system. This amount will be based on length of ownership and may be reduced in accordance with general accounting principles.

## How to use your warranty

You must present receipt of purchase or any other proof of purchase bearing the date of purchase and the product serial number. The Manufacturer reserves the right to refuse free-of-charge warranty service if the requested documentation cannot be presented or if the information is incomplete or incompatible with the Reseller's records. Repair, at the Manufacturer's option, includes replacement of boards or parts with new or functionally equivalent reconditioned parts or boards. The Manufacturer does not warrant the installation, maintenance or service of the system, parts or accessories.

## What is not covered by the warranty?

The warranty is not valid in the following instances;

- the system has been powered without two antennas connected.
- defects due to damage, from misuse, tampering, neglect or lack of care and in case of alterations or repair carried out by unauthorised persons.
- defects or damage caused by misuse, connection to incompatible sources, accident or neglect.
- defect or damage was caused by improper or unauthorised testing, operation, maintenance, installation, adjustment or any alteration or modification of any kind.
- the unit has been disassembled or repaired by persons other than the Manufacturer
- defect or damage has been caused by moisture, liquid or food spills.
- all casing and other externally exposed parts that have been scratched or damaged due to normal customer wear and tear.
- periodic maintenance and replacement of parts due to normal wear and tear.
- the system has been packed and transported using standard packing materials. The Manufacturer recommends non-static materials such as non-static bubble wrap is used at all times.

## Out of warranty repairs

If you request the Manufacturer repair the product at any time after the Warranty term, or where the warranty does not apply due to the nature of the defect, the Manufacturer may at its discretion carry out such repairs. This will be subject to you paying the Manufacturer fees for such repairs that will be agreed prior to commencement of repairs. The Manufacturer may also refer you to an authorised third party to carry out repairs.