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**RADIOCONTACT**  
LIMITED



**WIRELESS TRANSMISSION  
PRODUCTS  
INSTALLATION GUIDE**

**DIGILINK 5.8  
5.8GHz WIRELESS TRANSMISSION SYSTEM**

## CONTENTS

|   |           |
|---|-----------|
| <b>SECTION 1</b>                                | <b>3</b>  |
| 1.1 General                                     | 3         |
| 1.2 Field Trials                                | 3         |
| 1.3 Antenna Mounting                            | 4         |
| 1.4 Power Supplies                              | 6         |
| 1.5 Safety                                      | 7         |
| <b>SECTION 2</b>                                | <b>8</b>  |
| 1.6 Introduction                                | 8         |
| <b>SECTION 3</b>                                | <b>11</b> |
| 1.7 Digilink 5.8 Connection and Setup Procedure | 11        |
| 1.8 Pairing Procedure                           | 11        |
| 1.9 Digilink 5.8 Tx Connection                  | 12        |
| 1.10 Digilink 5.8 Rx Connection                 | 14        |
| 1.11 Digilink 5.8 Final Assembly                | 15        |
| 1.12 General Troubleshooting Guidelines         | 17        |
| 1.13 Summary                                    | 20        |
| 1.14 Disposal Instructions                      | 22        |

## FIGURES

|                            |   |
|----------------------------|---|
| Figure 1: Antenna Mounting | 5 |
|----------------------------|---|

## SECTION 1

### 1.1 General

Prior to any purchase of RF equipment a site survey should take place to determine if the equipment selected is suitable to the job in hand. During this visit particular attention should be paid to the mounting locations of the transmitter and receiver equipment. An estimate of transmission range should be made taking into consideration the height of the Rx/Tx equipment and its location to ensure direct line of site between Rx and Tx antennas.

It is important that before purchasing RF modems or video transmission equipment that the installation, application and specification documentation of the third party equipment to be integrated be carefully studied to ensure compatibility in terms of data rate, data protocol and video levels. Radiocontact Ltd cannot be held responsible for systems failing to operate correctly due to compatibility problems.

Before taking equipment to the customers site for installation ensure sufficient lab testing has been carried out to be familiar with the equipment and to confirm correct operation of all equipment to be installed, including third party equipment.

### 1.2 Field Trials

**Before mounting the RF equipment permanently a Field Trial should be carried out to ensure the equipment will function satisfactorily at the site.** This is particularly important in areas where there are steel structures, buildings, moving vehicles such as cars, cranes, trains etc. Checks should be made to ensure the required transmission range can be achieved and that there is no degradation of video picture quality or corruption of transmitted data due to other localised transmission equipment radiating on or near your selected frequency. Should interference be detected then it will be necessary to change transmission channel to avoid the interference. However should this not be possible then alternatives should be considered such as changing the polarisation of the antenna from vertical to horizontal.

### 1.3 Antenna Mounting

It is essential that all antennas should be mounted as high as possible from the ground. Ideally there should be no obstructions such as trees, buildings or cranes that could interfere with the direct line of sight, however the diversity reception features of this Digilink 5.8 ease this problem by working off the best received signal whether it is reflected off buildings or direct.

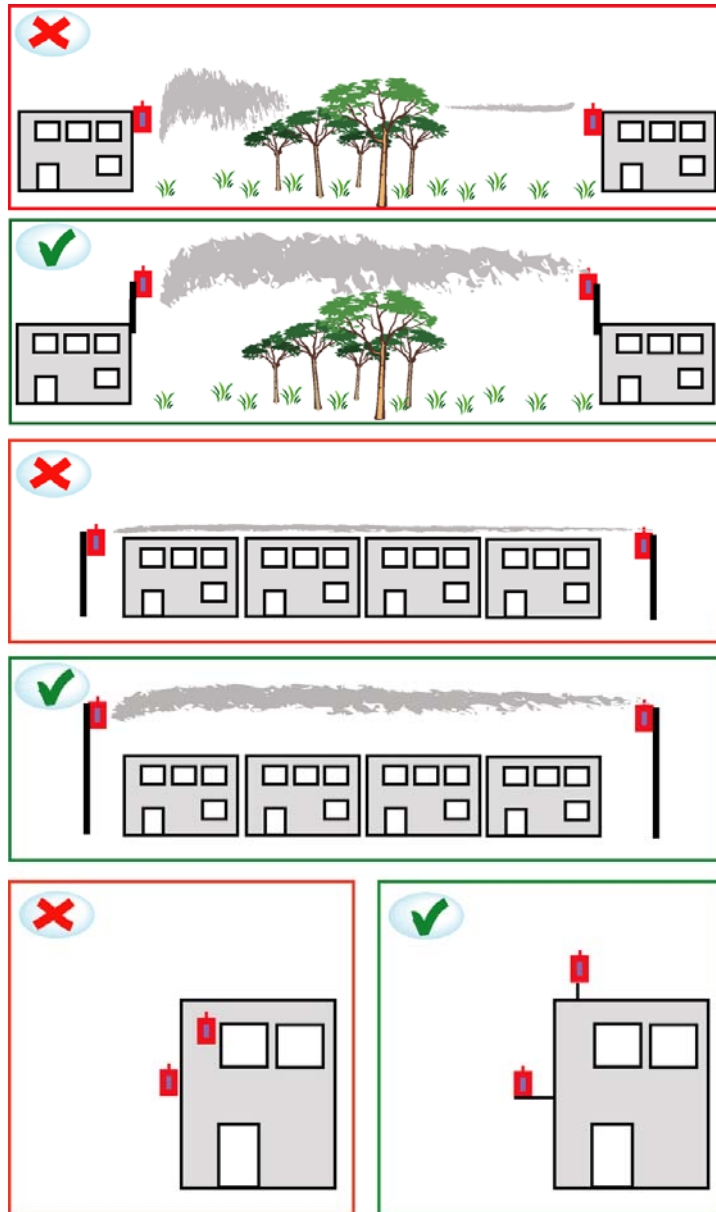
Equipment fitted with built-in stub antennas should be mounted with the antenna vertical. Sufficient space should be left between the antenna and the mounting pole or wall not to distort the RF signal. Normally a clearance space of 20 cm is required. This is to ensure maximum gain from the antenna. Buildings usually absorb some of the radiated energy while metal poles and towers can generate reflections producing “ghosting” on video systems and loss of data on telemetry systems. See Figure 1 for optimum mounting positions.

The maximum range of some Radiocontact systems can be increased using high gain directional antennas at the receiver. However it is important to ensure these are mounted as high as possible and aligned towards the transmitter antenna. These antennas can only be used on the Receivers. *It is illegal to fit these high gain antennas to Radiocontact transmitters as this will compromise the requirements of the License Exempt regulations to which the equipment has been Type Approved and could cause serious interference to other users.*

In cases where multiple antennas are required to be mounted on the same mast, then a separation distance of approximately 1m should be maintained between antennas. This is to avoid interference problems between the various receiver or transmitter local oscillator and sub-harmonic frequencies.

It should be noted that accurate antenna alignment cannot be carried out until the equipment is permanently installed. It may be necessary to move either the Tx or Rx antenna to optimise video picture or data quality. Small movements of up to  $\frac{1}{4}$  wavelength can mean the difference between poor signal and good signal. A  $\frac{1}{4}$  wavelength at 5.8GHz is 13mm.

Figure 1: Antenna Mounting



## **1.4 Power Supplies**

### **1.4.1 Only use analogue Power supplies**

All Power Supplies used with Radiocontact RF modems and Video Transmission equipment **MUST** be analogue and **NOT** Switch Mode. Switch Mode power supplies generate and radiate a high level of switching noise at a frequency of around 150 – 200KHz. This can cause interference lines on video transmission equipment and corrupt data bits on RF modems.

It should also be noted that Radiocontact RF equipment operates from 12V DC. A normal tolerance on this voltage would be  $\pm 0.5V$ , therefore regulated power supplies are required. Unregulated 12V power supplies can produce voltages of 18-19V until the full supply current is taken. This can cause the internal surface mount fuse to blow due to the high surge current.

### **1.4.2 Do not use Power supplies designed for charging batteries**

It is NOT advisable to operate this equipment from 12V rechargeable batteries as the output voltage from batteries of this type can be as high as 13.6V, un-filtered and can damage equipment. Should it be necessary to operate equipment from this type of battery charger then a suitable 12V DC regulator should be employed.

### **1.4.3 Do not share Power supplies with other equipment**

Should it be necessary to power up several RF modems or video transmitters at the same location then separate analogue power supplies must be used. This is to prevent interference and crosstalk between the different systems.

#### 1.4.4 Confirm 12V at the equipment end

All power supplies should be mounted as close as possible to the equipment. In situations where this may not be possible care should be taken to ensure that suitable low resistance cable is used for power connections. This is to minimise voltage drop along the power cable. When installation is complete it is necessary to measure the 12V DC supply AT THE EQUIPMENT END not the power supply to ensure it is within the  $\pm 0.5V$  recommended limit, or within the voltage range specified on the equipment datasheet.

### 1.5 Safety

The installation of RF and CCTV equipment involves the equipment being installed at considerable heights outside buildings or on masts. It is essential that **ALL** Health and Safety Regulations are adhered to regarding the wearing of safety equipment.

## SECTION 2

### 1.6 Introduction

This section describes the specification and features of Radiocontact 4.9 ~ 5.9 GHz Digilink Wireless Audio/ Video Transmitter and Receiver.

#### 1.6.1 Features

- a) Supports 4.9GHz ~5.9GHz frequency band.
- b) Dynamic frequency selection for resisting interferences to WLAN networks at 5GHz.
- c) Close-Loop RF power control.
- d) Auto detection of NTSC and PAL.
- e) MPEG-2(D1) standard video compression.
- f) Hardware AES(Advance Encryption Security )
- g) MIMO technology.
- h) Composite, S-video inputs.
- i) Stereo audio inputs.



1.6.2 Specifications

|                        |                               |   |
|------------------------|-------------------------------|---|
| <b>Transmitter I/O</b> | Input                         | DC POWER JACK: 5.5mm φ<br>ANT type :omni-direction 5dBi<br>Antenna*2<br>Video :CVBS(composite) / S-Video<br>Audio :Stereo<br>Pair switch :TACT SW |
|                        | Output                        | ANT type :Patch 14dBi Antenna*1<br>LED indicate :Pairing / Link / Power   |
| <b>Receiver I/O</b>    | Input                         | DC POWER JACK: 5.5mm φ<br>ANT type :omni-direction 5dBi<br>Antenna*2<br>Pair switch : TACT SW   |
|                        | Output                        | ANT type :omni-direction 5dBi<br>Antenna*1<br>Video :CVBS(composite) / S-Video<br>Audio : Stereo<br>LED indicate :Pairing / Link / Power          |
| <b>Video System</b>    | Input connector (Transmitter) | RCA /S-Video  |
|                        | Output connector (Receiver)   | RCA /S-Video  |
|                        | Standard                      | Composite for NTSC / PAL  |
|                        | Input detect                  | Auto detect video standard(NTSC / PAL)  |
|                        | Encoding format               | MPEG-2 (D1)   |
| <b>Audio System</b>    | Input connector (Transmitter) | L/R RCA   |
|                        | Output connector (Receiver)   | L/R RCA   |
|                        | Encoding format               | MPEG-1  |

**Radiocontact Ltd – Proprietary Information**

|                             |                       |   |
|-----------------------------|-----------------------|---|
| <b>Network Transmission</b> | Frequency             | 4.9GHz ~5.9GHz,(Dynamic)                                    |
|                             | Transmission Power    | Up to 26dBm, (dynamic)                                      |
|                             | Receiver sensitivity  | -85dBm  |
|                             | Media stream          | Video bit Rate is 6Mbps (Typical)                           |
|                             |                       | Latency time is around 0.5 sec                              |
|                             | Encryption            | Hardware AES  |
|                             | System security       | The transmitter and receiver must be paired to matching ID. |
|                             | Application Modes     | Peer to Peer / Broadcasting                                 |
|                             | QoS                   | Yes at Peer to Peer Mode                                    |
|                             | Modulation            | OFDM  |
|                             | Range (line of sight) | Up to 1000M   |
| <b>GENERAL</b>              | Operating voltage     | 8 ~ 28 VDC  |
|                             | Power consumption     | TX :1600mA / RX :1000mA                                     |
|                             | Operating Temperature | 0 ~ 50 <sup>0</sup>   |
|                             | Storage Temperature   | -20 <sup>0</sup> ~ 70 <sup>0</sup>                          |
|                             | Dimension             | TX : 180 x 32.5 x 156 mm                                    |
| RX : 180 x 32.5 x 156 mm    |                       |   |

## SECTION 3

### 1.7 Digilink 5.8 Connection and Setup Procedure

The Digilink 5.8 video transmission system is RF equipment therefore the installation guidelines detailed in Section 1 apply and should be thoroughly read and understood.

This equipment is capable of transmitting stereo audio and digital video over a range of up to 1000m, assuming a clear Line Of Sight with no obstructions and proper installation. However due to Digilinks unique utilisation of diversity reception reasonable range may be achieved through/around some obstructions due to the ability of the system to operate with signals reflected from buildings etc.

This unit comes in its packaging with the front panel antenna disconnected from the rear panel. Both stub antennae are also disconnected. This is to avoid potential damage when unpacking. It is important that the SMA connector at the end of the antenna cable is attached to the antenna, and that the antenna is fitted to its housing with the correct polarity, i.e. vertical polarisation.

**Note:-**

***Before installation it is necessary to “pair” the Tx and Rx as operation is on a peer-to peer basis. It is strongly recommended this is done on the ground prior to installation as access the “pairing” can be difficult after installation.***

### 1.8 Pairing Procedure

Power up both transmitter and receiver units and wait for the “LINK LED” to start flashing. This will take 5-10 secs (Rx a little longer) as the system goes through an initialisation phase. Both Tx and Rx “Power LEDs” should be lit. Press the “Pairing” button on both Tx and Rx. This will cause the “Pairing LED” to flash indicating that the pairing procedure is underway. The pairing procedure should take less than 45 seconds and when complete the “Pairing LEDS” will go OFF and the “Link LEDs” will be ON continuously. The pairing procedure is now complete.

### **Radiocontact Ltd – Proprietary Information**

If the “Link LEDs” are not on continuously then the pairing procedure has failed. Both units should be switched OFF and then back ON to reset the system. Press the “Pairing” button on both Tx and Rx again as soon as the “Link” LED begins to flash and the process will repeat.

The Rx/Tx can now be installed in its final location. This procedure is only required for initial installation. Each time the Rx/Tx system is powered down and back up the Rx and Tx will link to each other automatically. It is not possible to link an Rx or Tx to more than one unit. However it is possible to have up to 20 individual sets operating on the same site without interference.

## **1.9 Digilink 5.8 Tx Connection**

### **1.9.1 Audio/Video/Power Connection**

Connect the external camera audio (Phono) and video (BNC) cables as shown in Figure 2 below. Ensure the DC Power cable is fitted to the power socket as shown and also the polarity of the DC Power connector is correct, i.e. centre positive. Connection of S-Video is via a suitable S-Video connector.

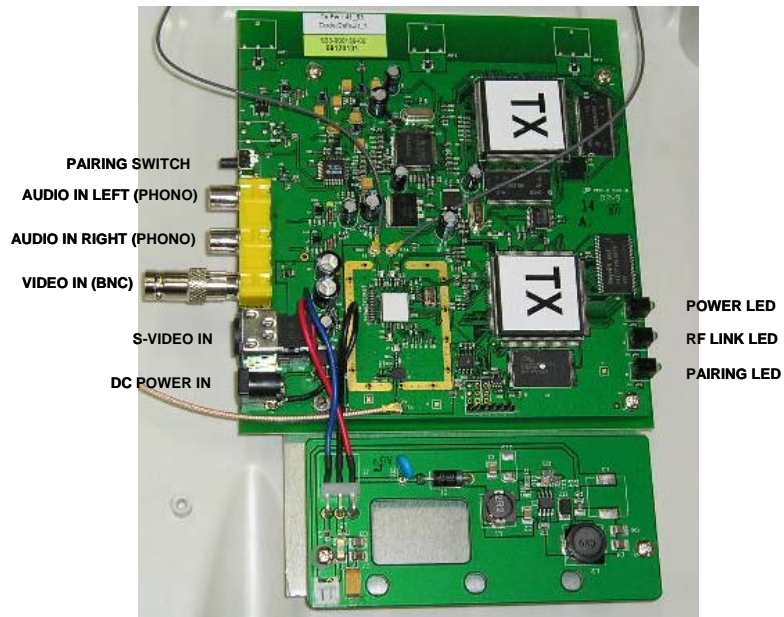


Figure 2 Digilink 5.8 Transmitter Connections

## 1.10 Digilink 5.8 Rx Connection

### 1.10.1 Audio/Video/Power Connection

Connect the external monitor/DVR audio (Phono) and video (BNC) cables as shown in Figure 3 below. Ensure the DC Power cable is fitted to the power socket as shown and also the polarity of the DC Power connector is correct, i.e. centre positive. Connection of S-Video is via a suitable S-Video connector.

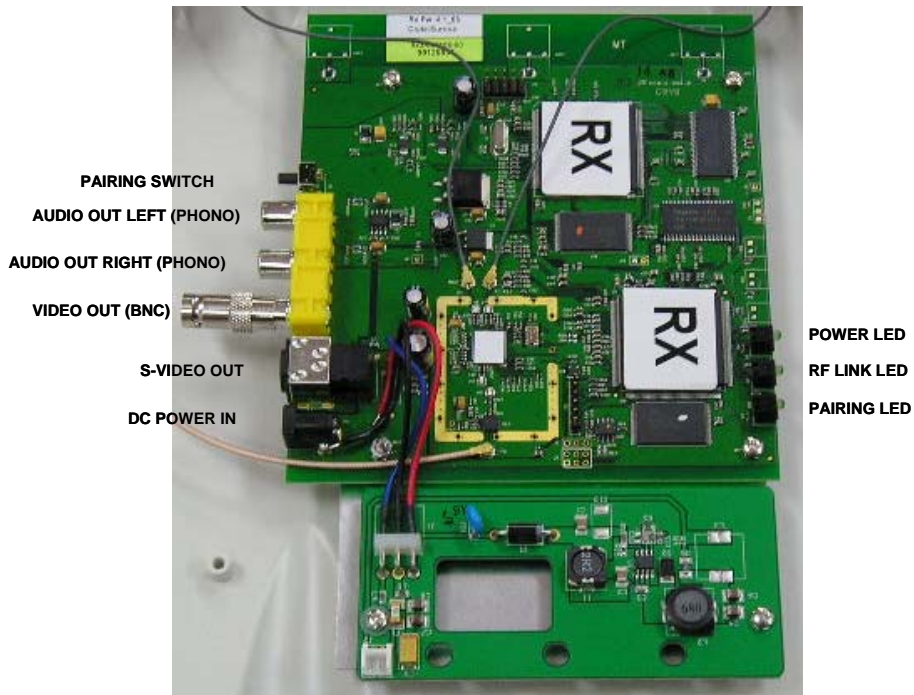


Figure 3 Digilink 5.8 Receiver Connections

## 1.11 Digilink 5.8 Final Assembly

Ensure both transmitter and receiver have been paired and are connected to the external equipment as detailed previously.

Fit the pole mounting kit to the rear enclosure, see Figure and secure to the fixing pole as required. Note that the Transmitter and Receiver units must face each other as shown in Figure 4 below otherwise transmission range will be reduced.

**Note 1:- This unit comes in its packaging with the antenna front panel disconnected from the flying SMA right angled antenna connector. This is to avoid potential damage to the antenna cable when unpacking, which is very fragile. It is important that the SMA connector at the end of the antenna cable is handled carefully and is attached to the antenna attenuator. The antenna panel should then be fitted to its housing with the correct polarity, i.e. arrows vertical for vertical polarisation. Failure to do this will significantly affect transmission range.**

**Note 2: From power ON it can take 30 – 40 seconds for the Rx and Tx to establish communication and for the video image to appear.**

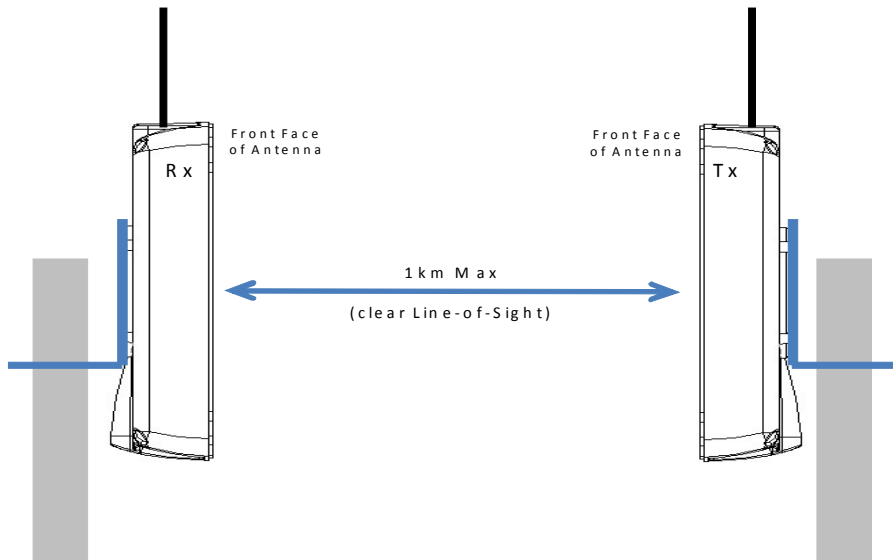


Figure 4 Antenna Orientation

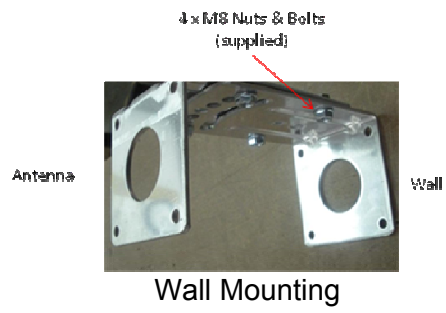


Figure 5 Antenna Mounting Options



## 1.12 General Troubleshooting Guidelines

The following section describes some of the most common problems encountered during installations of both video and telemetry equipment, and possible solutions. Frequency and data selection links should be installed after this installation manual has been thoroughly read and understood and before the equipment is installed in its final location. In the event of the system not working the first things to check are the following:

### 1.12.1 No reception of any kind

- a) Check power supply is ON, and power is being delivered to the equipment, i.e. +12V at the connector and that the green “Power On” LED is illuminated continuously.
- b) Ensure correct polarity is used at the power connector, i.e. centre pin +ve.
- c) Ensure the power supply is of the adequate rating for the equipment, i.e. 12V DC Reg. 1A for the Rx and 12V DC Reg. 1.6A for the Tx. (Note: 12V DC reg 2A would be recommended).
- d) Ensure Rx and Tx have been paired.
- e) If the “Link Status” LED is flashing on the Rx then the Tx is either OFF or not paired.

### 1.12.2 Poor reception/Poor Quality Picture or Data

Causes of this problem can be varied but generally fall into 3 categories:-

- a) Weak received signal – poor system sensitivity
- b) Same channel interference
- c) Adjacent channel interference

**1.12.2.1 Weak received signal – poor system sensitivity**

If the video picture quality or data quality is poor check the following:

- a) Transmission range is within the capabilities of the equipment used.
- b) Make sure the units are not installed near metallic surfaces.
- c) Antennas should be the correctly aligned and the same polarity for each unit.
- d) Rx/Tx equipment should be mounted as high as possible preferably with direct line of sight.
- e) Ensure equipment is mounted off the support structure as described in Section 1 as antennas mounted close to metal structures can cause signal reflections and multi-path effects which reduce the strength of the signal appearing at the receiver.
- f) Due to the nature of RF signal transmission, increases in sensitivity can be achieved by moving the position of equipment by a few centimetres. This may increase the signal strength enough to resolve the problem.
- g) Switch off the transmitter and observe output of the receiver on a suitable monitor. For analogue video systems “snow” should be seen on the monitor. If another picture or distorted image is present then the problem is due to external interference and a different channel should be selected.
- h) Note, digital systems do not display “snow” when no signal is received. A blank screen with raster scan only is usually displayed. On some systems the picture will “freeze” at the last transmitted image.

- i) Reduced sensitivity can also be caused by strong signals in the same frequency band but not on the operating frequency. This has the effect of swamping the front end of the receiver causing it to partially or fully shut down due to the operation of its internal Automatic Gain Control (AGC) circuits. This leads to a loss in sensitivity and a reduction in the strength of the signals at the receiver. This type of problem should be identified during the initial site survey. The Digilink system will recognise this and automatically switch to a clear channel within its specified band.

#### **1.12.2.2 Adjacent Channel interference**

- a) Adjacent channel interference is where another transmission system is broadcasting on one of the other channels within the band you are using. Problems of this nature normally only exist if the other transmission source is mounted too close to your receiver. The normal solution to this problem is to increase the separation distance between the two equipments concerned or to select another channel. This is not an issue for the Digilink system.
- b) If interference from an external source persists the polarisation of the antenna may be changed from vertical to horizontal. This involves removing the four fixing screws to the back panel and removing the front panel antenna, rotating through 90 degrees and securing again with the four fixing screws.
- c) Care should be taken when removing the antennas front panel so as not to break the antenna cable. There is sufficient length to allow for rotation of the antenna.

## 1.13 Summary

The following is a list of the most common video transmission problems and troubleshooting information:-

### 1.13.1 Black picture on the monitor

- Make sure both Tx/Rx are powered and on the same channel (where applicable)
- Check that a video source is connected to the input of the Tx and the output of the Rx is connected to the monitor/matrix/mux.
- Check video cables for correct connection and if necessary continuity.

### 1.13.2 Noise (Snow) on the monitor (analogue systems only)

- Make sure Tx is powered.
- Check that the Tx channel matches that of the Rx.
- Make sure the correct antennas are used and are connected properly.

### 1.13.3 Scrolling picture

- Make sure the V-Hold of the monitor is not responsible.
- If the scrolling picture is also of poor quality or dark the video level might be too low causing loss of sync pulse.
- Check terminations at both the Transmitter end (if the signal is coming from a source other than a camera) and Receiving end (check for any double terminations).
- Check the level of the video source connected to the Tx.

- Radiocontact Transmitters have an internal termination so for the correct level of 1V p-p to be transmitted the video source must be 2V p-p.

#### **1.13.4 B&W instead of colour picture on the monitor**

- Make sure the chroma control of the monitor is not responsible.
- Make sure the camera used is not B&W
- If the picture is also of poor quality the video level might be too low.
- Check terminations at both the Transmitter end (if the signal is coming from a source other than a camera) and Receiving end (check for any double terminations).
- Check the level of the video source connected to the Tx.
- Move the links up - down - left - right and watch the monitor for improved quality.
- Should the problem persist then equipment should be substituted one unit at a time until the defective item is identified.

## 1.14 Disposal Instructions



This symbol on products means that the product concerned should not be mixed with general household waste.

### **WEEE Compliance B2B Terms & Conditions**

The B2B end user is responsible for all liabilities regarding the environmentally sound disposal of this EEE when it is discarded as WEEE.

The producer may, for commercial reasons only, offer a take back option when a B2B end user is purchasing a new product, however, this will be decided on a case by case basis and may incur a charge.

For local environmental sound disposal please contact your local authority or Radiocontact Ltd Customer Services on 02890 401742.



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