# T-Link


*Telemetry RF Modems*

## T-Link Telemetry RF Modems

**Please read this carefully for optimum results**

The transmission distances stated are line of sight and are conservative providing that you and your customer adhere to the following instructions.

***Line of sight:-***

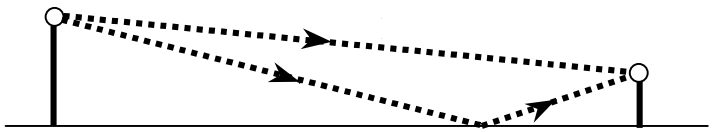
This means no obstructions should be visible along the path. If by means of a pair of field glasses you can observe the antenna of the receiving or transmitting equipment at the distant end, then you possess a clear line of sight. Trees, vehicles, houses, buildings, bodies, etc. interrupting the view, will cause various levels of attenuation. You may receive a reduced, un guaranteed performance under these conditions. Explaining this further, if you do use the link in an obstructed transmission situation, propagation may be possible through walls. The performance will depend on the number of walls and type of materials used in the construction (brick, re-inforced concrete, wood etc.) The results will differ in each case and in some instances (e.g. metallic walls) transmission will be blocked.

It is necessary to field trial any such obstructed transmission paths to ensure the results are satisfactory to you and your customer and to log the particular system or installation performance.

To ensure maximum transmission distances, mount your antennas as high above the ground as possible with no obstructions as described above. Even with a clear path reflections from intermittent traffic, pedestrians or similar, and reflections from nearby objects and the ground will occur.

Understanding of the properties of a radio point to point link on the Earth's surface at high frequencies enables a set of tests to be undertaken to help maximize the range obtained on any particular link.

There will always be vagaries of path propagation performance due to type of soil, whether the conditions are wet or dry etc. Given a standard or ideal path, a set of basic rules can be derived from theory that predict the performance. Any obstructions in the path will severely limit the performance, but if the path is short, a satisfactory result may be obtained.



On longer links, the presence of the Earth always affects the results. Figure 1. Shows the geometry of the microwave path under ideal conditions of a smooth flat Earth with a high reflectivity. D is the direct line of sight ray, R is the reflected ray. Clearly the path of the reflected ray is longer than the direct ray. Also the strength of the reflected ray will depend very strongly on the *reflectivity* of the ground at the point P. E.g. if the reflectivity is 0.5, then the reflected ray will arrive at the receiving aerial with about half the power strength of the direct ray (it will be 3 dB down).

If the path length *difference* between the direct ray and the reflected ray is 180 degrees (that is, one half of the wavelength longer) then the waves will tend to *cancel* and the signal will be small. Conversely, if the waves arrive *in phase* they will add and the presence of the Earth reflection will actually enhance the received signal strength above that on a purely line of sight single path. The much more complex fading phenomena when aerial heights bring the link below or within the field of obstacles such as trees, buildings, vehicles etc. is the basis of reflections (Rayleigh fading) and is dealt with in another Company Application Note

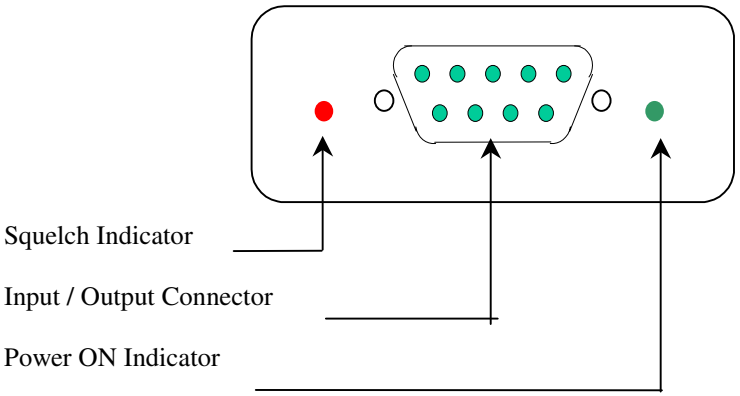
## T-Link Description

T-Link is designed and manufactured by Radiocontact for the control of Pan, Tilt, Zoom and other functions associated with the wireless transmission of Video. It has been thoroughly tested with Baxall (20mA Current Loop) and Ernitec (RS232 - RS485) Telemetry Systems.
The T-Link provides high reliability, long range and low power wireless Telemetry control utilising Frequency Modulation and is available at 433MHz and 458 MHz.

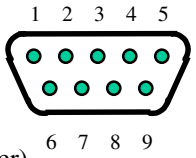
**Features:**

- 12 (458MHz) or 32 (433MHz) Channels
- Supports Data speeds up to 4800 baud
- Squelch indicator
- Sleep Mode

**Supported Protocols**: 20mA Current Loop, RS232, RS485, TTL



**Input / Output Connector**




Used for providing Power and Data connections
to the modems.
(Note: Connections are the same for both Transmitter and Receiver)

| Transmitter & Receiver | |
|---|---|
| Pin | Function |
| 1 | Not Used |
| 2 | 20mA Current Loop I+ |
| 3 | TTL |
| 4 | RS232 |
| 5 | GND |
| 6 | +12V / 300mA Reg |
| 7 | 20mA Current Loop I- |
| 8 | RS485 B |
| 9 | RS485 A |

**Power ON Indicator:**
The Green LED will be on when power is connected to the modems.
If the LED is not lit check the following:
The power supply is plugged in
If there is 12V DC on the PSU output
The correct polarity is used (The modems have reverse polarity protection so under reverse polarity condition no damage should occur)

**Squelch Indicator:**
On the Transmitter the Red LED will be ON only when data is available at the input. In the absence of data the transmitter of the modem will shut down therefore reducing power consumption when the system is not used.
On the Receiver the Red LED will be ON when a signal from the corresponding Transmitter is being received.

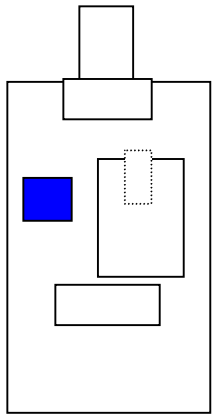
**Settings**

To access the Mode and Channel select switches remove the 4 screws on the rear panel i.e. I/O connector and the nut on the antenna connector.

**Mode Select Switch**

The Mode Switch , shown in blue, is used to select the required standard. Only one standard i.e. one switch can be on.

| Mode | Tx. | Rx |
|---|---|---|
| RS485 | 1 | 4 |
| RS232 | 2 | 3 |
| TTL | 3 | 2 |
| 20mA Current Loop | 4 | 1 |



**Channel Select Switch**

The Channel Selection switch is located on the bottom side of the board and can be seen through the cut out hole. For the links to work both Transmitter and Receiver must be set on the same frequency channel.

**458MHz**

| Ch. No. | Fo | Switch Position | | | |
|---|---|---|---|---|---|
| | MHz | 1 | 2 | 3 | 4 |
| Ch. 1 | 458.525 | On | On | On | On |
| Ch. 2 | 458.550 | Off | On | On | On |
| Ch. 3 | 458.575 | On | Off | On | On |
| Ch. 4 | 458.600 | Off | Off | On | On |
| Ch. 5 | 458.625 | On | On | Off | On |
| Ch. 6 | 458.650 | Off | On | Off | On |
| Ch. 7 | 458.675 | On | Off | Off | On |
| Ch. 8 | 458.700 | Off | Off | Off | On |
| Ch. 9 | 458.725 | On | On | On | Off |
| Ch. 10 | 458.750 | Off | On | On | Off |
| Ch. 11 | 458.775 | On | Off | On | Off |
| | | | | | |
| Ch 12 | 458.825 | Off | Off | On | Off |
| Ch 13 | 458.8375 | On | On | Off | Off |
| Ch 14 | 458.900 | Off | On | Off | Off |
| Ch 15 | 458.825 | On | Off | Off | Off |
| Ch 16 | 458.900 | Off | Off | Off | Off |

**433MHz**

| Group A | | Jumper ON | | | |
|---|---|---|---|---|---|
| Ch. No. | Fo | Switch Position | | | |
| | | LSB | | | MSB |
| | MHz | 1 | 2 | 3 | 4 |
| Ch. A1 | 433.875 | On | On | On | On |
| Ch. A2 | 433.925 | Off | On | On | On |
| Ch. A3 | 433.975 | On | Off | On | On |
| Ch. A4 | 434.025 | Off | Off | On | On |
| Ch. A5 | 434.075 | On | On | Off | On |
| Ch. A6 | 434.125 | Off | On | Off | On |
| Ch. A7 | 434.175 | On | Off | Off | On |
| Ch. A8 | 434.225 | Off | Off | Off | On |
| Ch. A9 | 434.275 | On | On | On | Off |
| Ch. A10 | 434.325 | Off | On | On | Off |
| Ch. A11 | 434.375 | On | Off | On | Off |
| Ch. A12 | 434.425 | Off | Off | On | Off |
| Ch. A13 | 434.475 | On | On | Off | Off |
| Ch. A14 | 434.525 | Off | On | Off | Off |
| Ch. A15 | 434.575 | On | Off | Off | Off |
| Ch. A16 | 434.625 | Off | Off | Off | Off |

| Group B | | Jumper OFF | | | |
|---|---|---|---|---|---|
| Ch. No. | Fo | Switch Position | | | |
| | | LSB | | | MSB |
| | MHz | 1 | 2 | 3 | 4 |
| Ch. B1 | 433.900 | On | On | On | On |
| Ch. B2 | 433.950 | Off | On | On | On |
| Ch. B3 | 434.000 | On | Off | On | On |
| Ch. B4 | 434.050 | Off | Off | On | On |
| Ch. B5 | 434.100 | On | On | Off | On |
| Ch. B6 | 434.150 | Off | On | Off | On |
| Ch. B7 | 434.200 | On | Off | Off | On |
| Ch. B8 | 434.250 | Off | Off | Off | On |
| Ch. B9 | 434.300 | On | On | On | Off |
| Ch. B10 | 434.350 | Off | On | On | Off |
| Ch. B11 | 434.400 | On | Off | On | Off |
| Ch. B12 | 434.450 | Off | Off | On | Off |
| Ch. B13 | 434.500 | On | On | Off | Off |
| Ch. B14 | 434.550 | Off | On | Off | Off |
| Ch. B15 | 434.600 | On | Off | Off | Off |
| Ch. B16 | 434.650 | Off | Off | Off | Off |

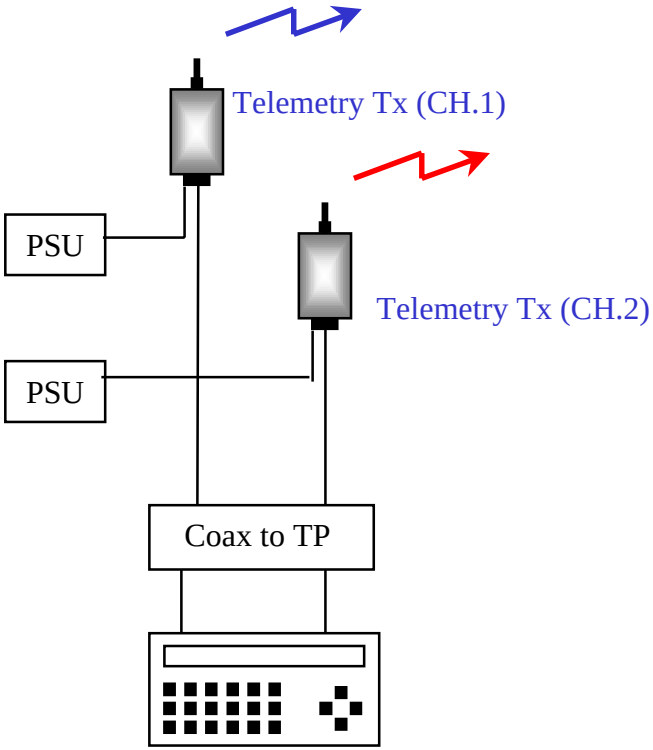
**Installation Notes:**
DC power to the links must be 12V regulated @ 500mA and not shared with other RF equipment.
Long runs of cable can reduce this voltage impairing systems performance.
Avoid long cable runs for antenna.
If installed outdoors use silicon to insulate all external connectors.
When installing the modems make sure they are at least 1m away from other RF sources e.g. Video Transmitters.

The following pages describe some of the possible configurations for the system

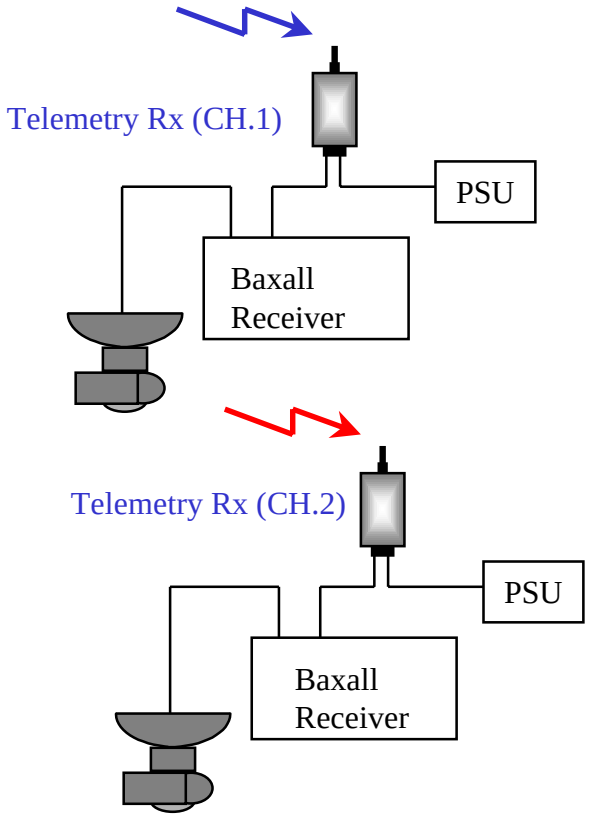
# Telemetry Connection Block Diagram.

(One to One)

For use with non addressable controllers i.e. Baxall




Baxall ZTX Telemetry Controler

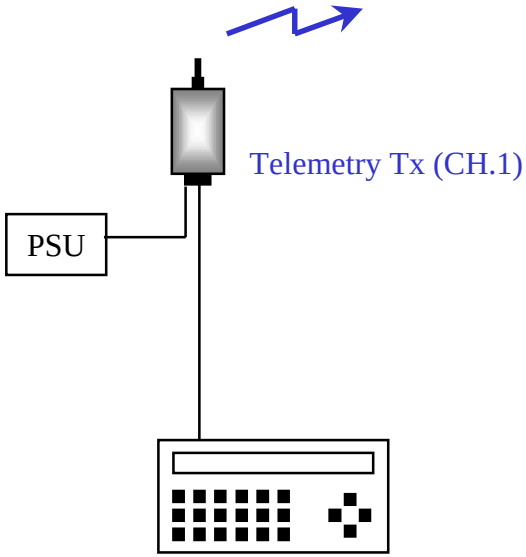



Each RF Tx is transmitting telemetry data on a separate frequency channel .
Only the RF receiver using the same frequency will receive the data and pass it on to the Baxall receivers.
Theoritical number of systems to be controlled in the same vicinity = Number of RF channels

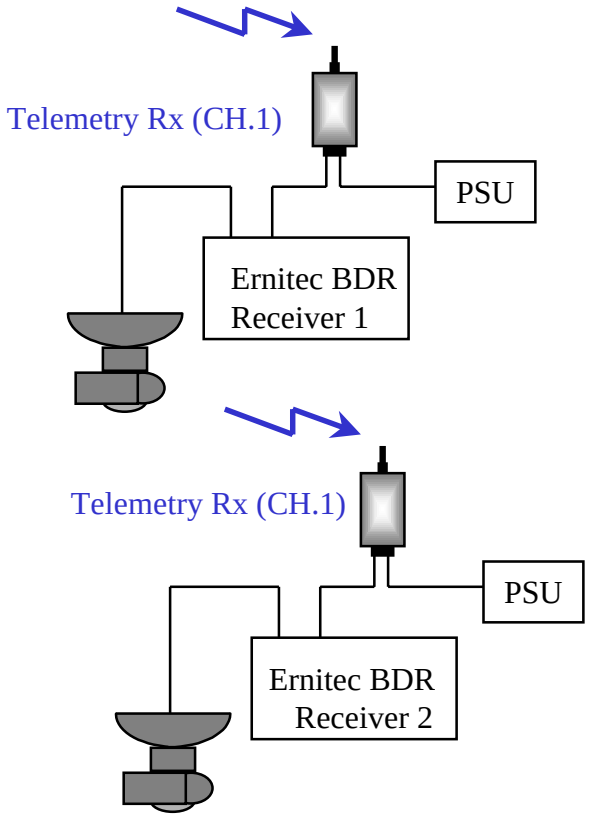
# Telemetry Connection Block Diagram.

(One to Many)

For use with addressable controllers i.e. Ernitec




Ernitec 1500M Telemetry Controler




One RF Tx utilising one only frequency transmits telemetry and address information.
All RF receivers will get the same information and pass it on to the Ernitec receivers.
Only the Ernitec receiver whose address matches the one of transmitted message will respond.
Theoritical number of systems to be controlled in the same vicinity = (Number of RF channels) x (Number of addresses)