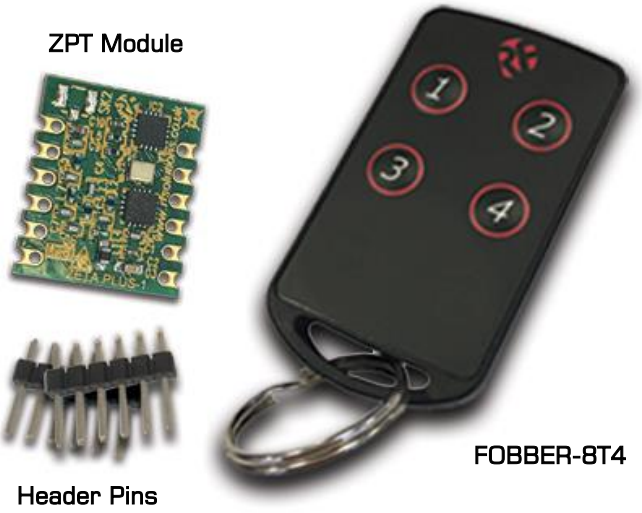
# FOBOEM Telemetry system

## Features

- Easy Embedded Remote Control
- 4 digital outputs
- Serial Data output
- Minimal external components
- Secure data protocol
- Ultra low power 1.8—3.6V
- Easy pairing process
- -121dBm Receive Sensitivity
- Range when used with:
- **FOBBER** Keyfob up to 200metres
- **TRAP** Handset up to 1000metres
- **ZPT-T** up to 2000m
- **SABRE** Handset up to 2000metres
- SMT or SIL package
- self test mode Incorporated
- CE compliant for EU licence free use




## Applications

- Remote control
- I/O Telemetry devices
- Remote switching
- Remote traffic lights

## Description

FOBOEM provides an easy “plug and Play” Remote Control.
The ZPT Receiver module is an easy design into any circuit, and requires very few additional components. When incorporated the ZPT Receiver module automatically outputs the serial data of any FOBBER Keyfob. Using the Easy LEARN Process the ZPT can be paired with many FOBER keyfobs, which, when operated will cause the ZPT Digital outputs to be activated.

## Part Numbers

| Part No | Description |
|---|---|
| FOBOEM-4S4 | 4 Switch Fob, SMT ZPT Receiver module with pins Bundled 433MHz |
| FOBOEM-8S4 | 4 Switch Fob, SMT ZPT Receiver module with pins Bundled 868MHz |

# FOBOEM Telemetry system

## Compatible Transmitters

The ZPT module can be used with the transmitters below, The transmitter handset will affect the maximum achievable range of operation.

### FOBBER Keyfob

Compact rugged handset Waterproof to IP68 1,2,3,4,6,8 button Options
Operating up to 200m



### TRAP Handset

A medium sized rugged handset available as 1,2,3,4,6,8,16 buttons
Operating up to 1000m

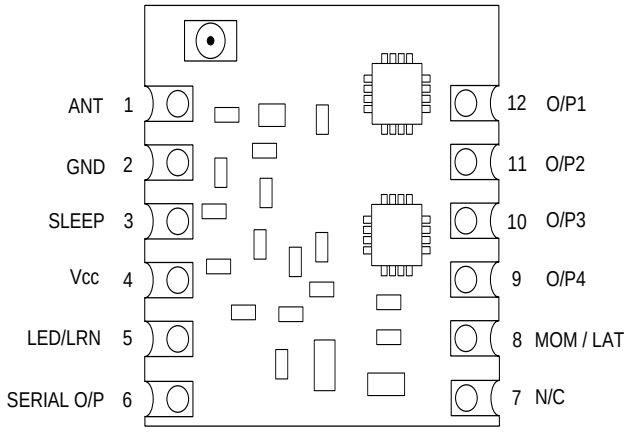


### TAURUS Handset

A rugged IP68 industrial handset
1, 2, 3, 4, 8 buttons



## Pin-out




## Pin Description

| Pin No | Name | Direction | Description |
|---|---|---|---|
| 1 | ANT | In | Antenna input/output 50ohm impedance |
| 2 | GND | In | Connect to ground |
| 3 | SLEEP | In | to GND, Module active<br>Connect to Vcc, Module Enters SLEEP |
| 4 | Vcc | In | Supply voltage |
| 5 | LED/ LRN | Out/In | Learn switch input and LED output<br>Learn switch input: normally 'high' momentarily connect to GND to enter Learn Mode. |
| 6 | SERIAL O/P | Out | Serial Data output to Host micro |
| 7 | N/C | - | No Connect |
| 8 | MOM/ LATCH | In | Set outputs as momentary or latching in operation.<br>Internally tied high.<br>Connect to GND for momentary<br>Disconnect for latching.<br>Once status has been changed, the power must be cycled in order for the change to take effect. |
| 9 | O/P4 | Out | Digital Output |
| 10 | O/P3 | Out | Digital Output |
| 11 | O/P2 | Out | Digital Output |
| 12 | O/P1 | Out | Digital Output |

### Operation

The ZPT module will remain in a low power listening mode at all times when power is present and the Sleep Input is Low. When a valid RF signal is received ZPT will wake and process the RF packet.

if the received RF Packet is from a Transmitter that has been "Paired" to the ZPT module, the Digital Telemetry outputs are asserted **accordingly.**

The RF Packet Data is always presented at the Serial data output to the host.

### Pairing Process

This process creates a paired link between an input button on a transmitter with one of the ZPT Digital Telemetry outputs. Any input from any transmitter can be paired to any output of the ZPT module.

1. Briefly GND Pin 5, the LED will flash once - this shows OP1 is selected
2. GND Pin 5 again after release the LED will flash twice to show OP2 is selected
3. Repeat above process to select OP3 or 4
4. With the desired output selected (and before a 10sec timeout)
5. Press the button or activate the input on the transmitter to be paired.
6. This will complete the pairing and the LED will flash twice to confirm

**Memory: maximum storage is 30 pairings.**

### Erase

To erase the ZPT memory and remove all stored transmitter pairings you must connect the Learn
Pin (5) to Ground for 10 seconds.
The Learn LED will illuminate while the pin is grounded and after it is disconnected will flash 3 times to Confirm memory erase has been completed.

| Mode | LED | Description |
|---|---|---|
| Normal operation | OFF | No RF data is being transmitted/received |
| | Flickering | Module is receiving data |
| Learn and erase | ON<br><br>Flashes | While input is connected to GND<br>(i.e. during button press).<br>Flashes to show output selection and paring success<br>Learn mode times out after 10 seconds |
| | Flashing twice | ZPT pairing successful |
| | Flashes three times | ERASE successful |

### Outputs

Outputs are LVTTL / LVCMOS at Vcc and are Active high.

### Momentary or Latching Function

ZPT actions transmitter button state change only, therefore momentary mode requires receipt of a "button down/input active" packet and a "button up/input not active" packet from a transmitter. In momentary mode on receiving a "button down" the ZPT will hold its output active until a "button up" is received. In latching mode ZPT must see "button down" then "button up" in order to make a state change to assert or relax an output.

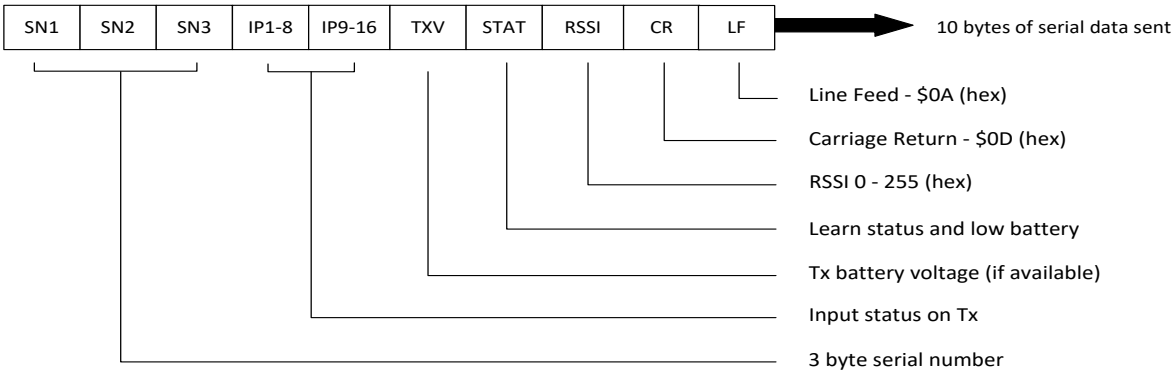
## ZPT Receiver module serial data output

The ZPT outputs the serial number, button and battery status of the transmitter encoder. This data may be fed directly to a microcontroller or RS232 type driver circuit which may then be fed directly to a PC serial port.
Serial data is output on every packet receipt - this equates to every 1/4 second whilst a button is held down/input active. This data output is valid regardless of whether the Transmitter/Encoder has been learnt or not. The serial data packet contains a learn bit to show if an encoder input is learnt.

### Serial data configuration

| | |
|---|---|
| **Baud Rate:** | 19,200 |
| **Data bits:** | 8 |
| **Parity:** | none |
| **Stop bits:** | 1 |
| **Handshaking**: | none |

### Serial data format:




### Serial number [SN1 SN2 SN3]:

Made up of three 8-bit bytes where the most significant byte is transmitted first.
Example: 12ABAA (hexadecimal) or 0001 0010 1010 1011 1010 1010 (binary)

**Tx inputs [IP1-8 IP9-16]:** made up of two 8-bit bytes.
The low order byte is sent first representing inputs 8 down to 1 where the MSB is input 8 and the LSB is input 1. The high order byte is sent next representing inputs 16 down to 9 where the MSB is input 16 and the LSB is input 9.
A bit at state 1 represents an encoder input as active.
Using this method inputs can be multiplexed giving maximum versatility.

| | | | |
|---|---|---|---|
| Example: | 00000000 | 00010000 | Shows input 13 active. |
| | 10000000 | 00000000 | Shows input 8 active |
| | 10000001 | 10000000 | Shows inputs 16, 8 and 1 active |

### Learn status and low battery:

One 8 bit byte:
Bit0 shows low battery on Tx - where 1 = Low battery
Bit1 shows learn status of Tx - where 1 = Learnt

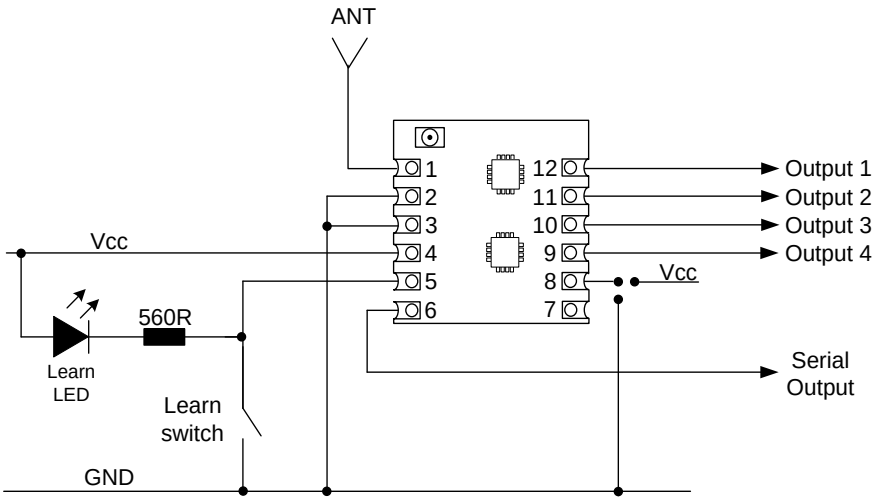
### RSSI

Received Signal Strength Indication.

### Bespoke versions

Customised versions of the all transmitters, receivers and chipsets are available to provide a bespoke remote chipset for OEM

## ZPT example application circuit

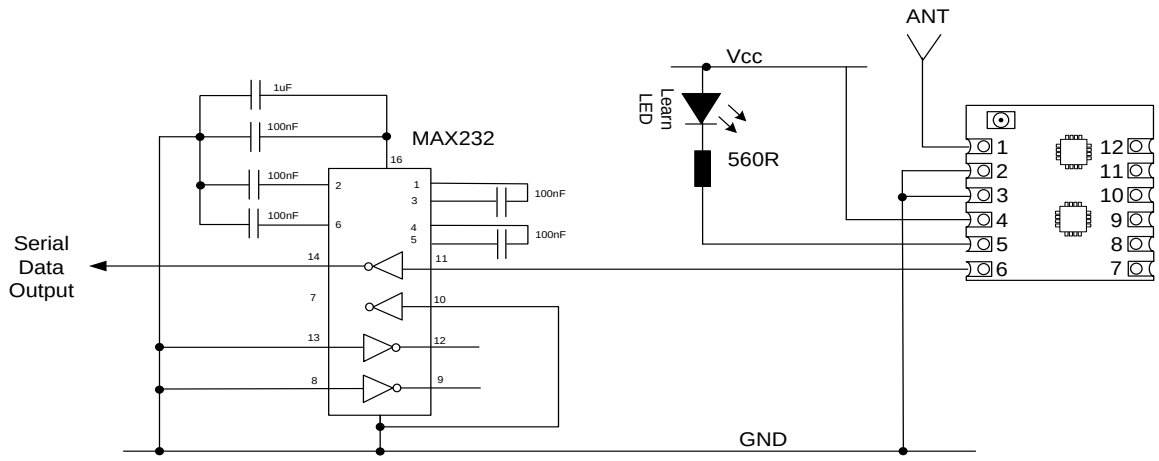



**Description:**

This example shows a ZPT module receiver with all 4 outputs connected.

**Note:** The external learn switch and learn LED are both shown connected in this example.

## ZPT connected with Serial data output via MAX232



### Self Test Mode

ZPT module incorporates a self test which is initiated by applying power with the learn button held down.
The module then performs the following functions:

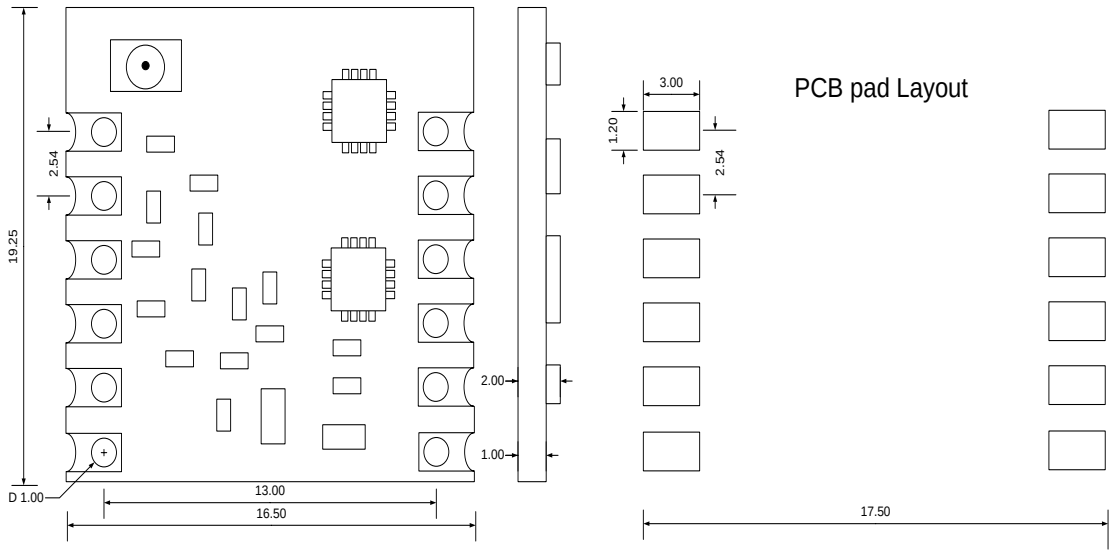
1. All outputs operate in turn ON/OFF twice
2. All outputs flash ON/OFF 5 times - 1&3 and then 2&4
3. Transmits a full power RF signal for 5 seconds while flashing the learn LED
4. Enters RSSI (Received Signal Strength Indication) mode where outputs 1-4 are activated as a bar graph type output according to the strength of a valid RF signal received (from any carrier operating at the appropriate frequency (869.50MHz). 4 Outputs on being maximum strength.
5. To exit RSSI mode cycle power to the module.
6. A power cycle reset is required to exit

### Range Considerations

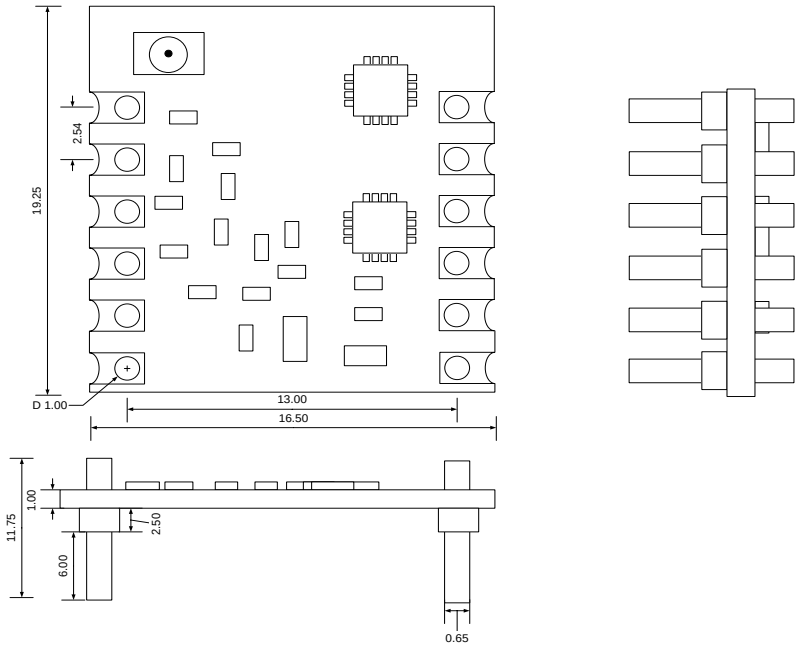
The antenna choice and position directly affects the system range, keep it clear of any large metal parts. The best position is protruding vertically from the top of the product. This is often not desirable for practical reasons and thus a compromise may be needed. Note that the space around the antenna is as important as the antenna itself. All radio systems are dependent on a radio signal being received through airspace.
The range quoted is the optimal in direct line of sight without obstacles and in good atmospheric conditions.
Range is affected by many things, for example local environmental conditions, atmospheric conditions, interference from other radio transmitters. For evaluating the local environment please see our RF Meter (DS006).
In very worse case applications the range quoted may be reduced dramatically below the optimal range stated.

## Mechanical dimensions

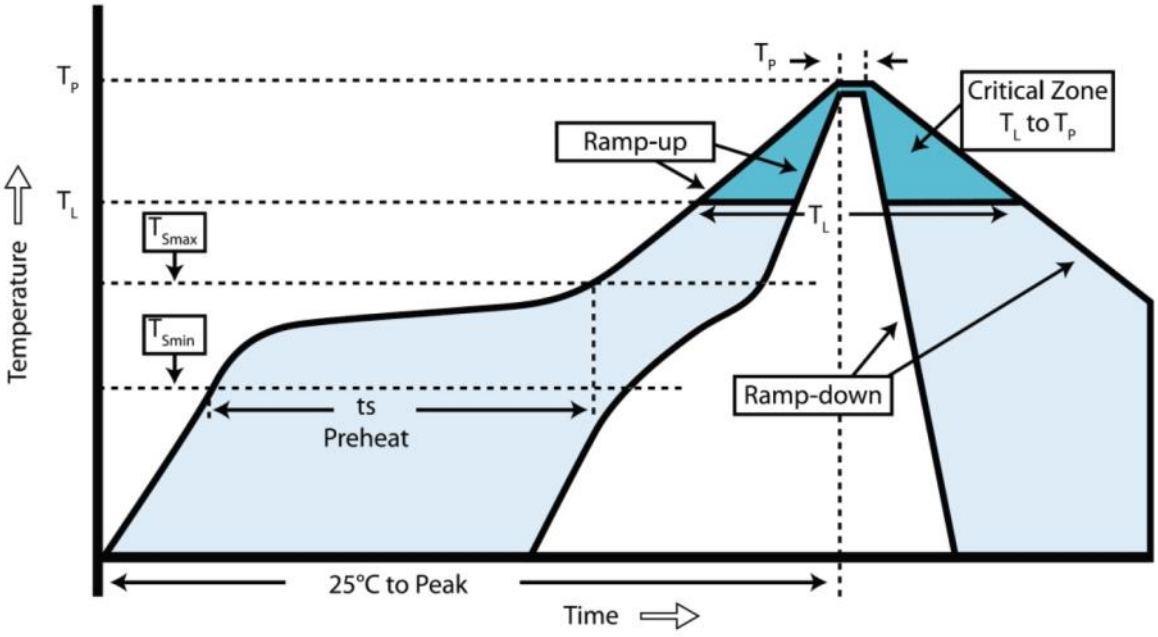
### Surface Mount Package




### D Package

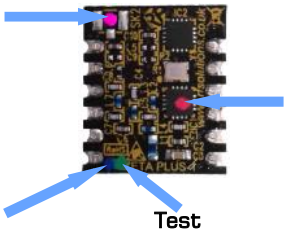


## ZPK module re-flow guide




| Profile feature | Value (lead free) |
|---|---|
| Ramp up rate | 3°C /s |
| Pre-heat temperature<br>- Temperature Min ($T_{Smin}$)<br>- Temperature Max ($T_{smax}$)<br>- Pre-heat time | <br>150°C<br>200°C<br>60-100s |
| Peak temperature ($T_P$) | 240°C |
| Time at $T_P$ | 10-20sec |
| Ramp down rate | 6°C/s |
| Time from 25°C to peak | 8 mins max. |

Zetaplus telemetry module version identifica-



Single Pink dot indicates ZPT Receiver module

**Frequency of Operation**
Red 433MHZ
Blue 868MHz
Brown 915MHz

**Test**
Green
Pass

**ZPT Firmware Version**

Brown ver 1
Red ver 2
Orange ver 3
Yell ver4
Green Ver 5
Blue ver 6
Violet ver 7
Grey ver 8
White ver 9

## Electrical Characteristics

| Parameter | Symbol | Notes | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Ambient Temperature | $T_A$ | | –20 | | 85 | °C |
| Supply Voltage | $V_{DD}$ | | 1.8 | | 3.6 | V |
| I/O Drive Voltage | $V_{GPIO}$ | | 1.8 | | 3.6 | V |
| Operating Frequency | | 868MHz version<br>915MHz version | 915.00 | 896.500 | 915.27 | MHz |
| RX Sensitivity | | | | -121 | | dBm |

## DC characteristics

| Parameter | Symbol | Test condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| Supply voltage range | $V_{cc}$ | | 1.8 | 3.3 | 3.6 | V |
| Power saving modes | $I_{Sleep}$ | Module asleep with shutdown pin active. Note all outputs are disabled | — | | <1 | uA |
| RX mode current | $I_{RX}$ | Module is in RF Data receive mode | — | 16 | — | mA |

## AC Characteristics

| Parameter | Symbol | Test Condition | Min | Typ. | Max | Unit |
|---|---|---|---|---|---|---|
| RX channel bandwidth | BW | | | 60 | | kHz |
| Image rejection | $Im_{REJ}$ | Rejection at the image frequency<br>IF = 468kHz | — | –35 | — | dB |
| Spurious emissions | $P_{OB_RX1}$ | Measured at RX pins | — | –54 | — | dBm |

# FOBOEM Telemetry system

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