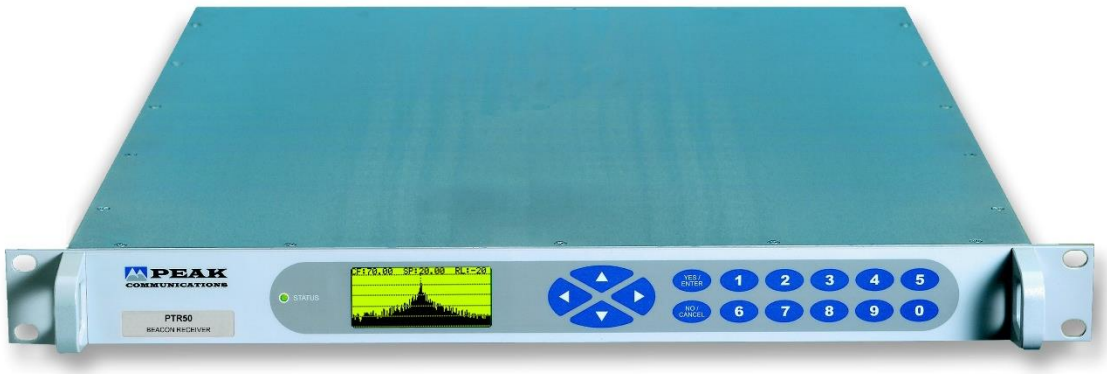
# PTR50

## ‘CW’ Tracking Receiver




The **PTR50** is a next generation beacon tracking receiver, designed specifically to track and measure CW beacons from commercial satellites. Primarily an L-Band input receiver, the unit can be provided with a range of optional SHF input modules.

The **PTR50** is designed to be used for telemetry and control, typically in earth stations using large antennae. Outdoor compact versions with fast acquisition as standard are also available for smaller antenna & SOTM /mobile applications (see RTR50).

For satellites without beacon signals (or beacon signals that are modulated), Peak can provide a CW pilot generator option which is applied to the uplink signal (after UPC compensation) and subsequently received on the downlink instead of the normal satellite beacon signal.

The receiver is designed as a versatile and easy-to-use unit utilising a graphic display module that can display a digital representation of the received beacon spectrum. This feature provides a convenient visual display of the received signal which can be used for system fault location, routine maintenance and can be an effective alternative to a fully functional spectrum analyser, which may not be necessary for these tasks.

The tracking band center frequency can be set accurately using the 1kHz step size synthesiser system. The unit uses a 300Hz /2kHz phase locked loop (PLL) system to perform signal acquisition and level measurement through coherent detection. The search facility sweeps the frequency to locate a signal in the acquisition band and if a signal is detected the frequency is locked immediately to this beacon. A secondary search is then initiated to look for a more intense signal within the search band. If one is detected then the locked tracking frequency is modified. The process repeats until the largest signal is found in the search band and the anti-sideband device is then disabled.

A log amplifier is used to provide an output voltage representing the input power in logarithmic scale, in effect making the input power to output voltage log-conformal. The sensitivity of the logarithmic output is user selectable from the front keypad menu.

The **PTR50** unit achieves lock acquisition times of typically 6s, for combinations of lower search ranges (search bandwidths) and higher sweep rate settings. It is also offered with a fast signal acquisition option achieving lock times of typically 1s, for combinations of lower search ranges (search bandwidths) and higher sweep rate settings.

For redundancy the **PTR series** units are fully compatible with the Peak **B1000L** (1+1) system.

## *Peak Features*

- Graphical display of beacon signal
- Fast signal acquisition and locking (6s typical, optionally <1s)
- Pilot ‘CW’ signal generation option for ‘self-test’ & use when no satellite CW beacon is present
- Sophisticated sideband rejection system
- Standard L-Band or SHF input options
- Logarithmic output range, user selectable

# PTR50 – Typical Specification

## L-Band Input

| | |
|---|---|
| Option 12; | Dual polarisation inputs, with local & remote user selection |
| Frequency range | 925-2,150MHz |
| Note; wider ranges to 2450MHz available (please contact factory). | |
| Connector | N-type (f), 50Ω |
| Option 4; | F-Type (f), 75Ω |
| Option 4b; | BNC (f), 75Ω |
| Option 4c; | BNC (f), 50Ω |
| Input return loss | 15dB typical |
| Beacon input level | -70dBm nom., -50dBm max. |
| Aggregate input level | -20dBm max. |
| User input level control; | 0-30dB range, 0.5dB step attenuator, to increase the above composite L-Band input levels. |

## SHF-Band Input (option 1)

| | |
|---|---|
| Input frequency options; | |
| Option 1a; | C-Band; 3.4-4.2GHz |
| Option 1b; | X-Band; 7.25-7.75GHz |
| Option 1d; | Full Ku-Band; 10.7-12.75GHz (unreferenced LNB) |
| Option 1e; | Ka-Band (consult factory for band availability). |
| Beacon input level | -90dBm nom., -70dBm max. |
| Aggregate input level | -40dBm max. |
| Option 16; | 0-30dB range, 0.5dB step attenuator, to increase the above composite SHF input levels. |

## DC Output

| | |
|---|---|
| Voltage range | ±10VDC, ±5VDC, 0 to 10VDC, -10 to 0VDC, user selectable |
| Slope settings | Logarithmic, 0.5, 1, 2, 5 & 10dB/V, user settable |
| Connector | BNC (f) |
| Impedance | 0Ω (ideal voltage source, maximum current 5mA) |
| Adjustment range | Output adjustable to 0V for input level between -60 & -100dBm |

## Auxiliary Buffered DC Output (option 13)

| | |
|---|---|
| Connector | BNC (f), 0Ω (ideal voltage source, 5mA max) |

## Transfer Characteristics

| | |
|---|---|
| Post-detection time const. | 150mS |
| Step size | 1kHz |
| Search range | ±20, ±50, ±100, ±200 & ±500kHz, user selectable |
| Sweep rate | 2.5 & 5kHz/s, user selectable |
| Option 11; | 2.5, 5, 10, 20, 40, 80, 120 & 240kHz/s |
| Level thermal stability | -0.04dB/$^0$C |

## Tracking Parameters

| | |
|---|---|
| PLL noise (IF) bandwidth | 300Hz, fixed |
| Option 11; | 2kHz, fixed |
| Threshold lock reacqu. | 35dBHz, for sweep rates ≤10kHz/s |
| Average search time | 6s, for search range ±20kHz and sweep rate 5kHz/s (see application note AN0025) |
| Option 11; | <1s, for search ranges of ≤±50kHz and sweep rates ≥80kHz/s |

## Video Section Display (Beacon frequency ±25MHz max.)

| | |
|---|---|
| Resolution bandwidth | 6kHz |
| Display | Graphical |

## Block Down Converter/ LNB Drive

Fed on L-Band input, user selectable (on/off);

| | |
|---|---|
| Range select; | DC voltage level (13-15/ 18-20VDC) |
| Power; | 500mA max. (300mA per output for option 12) |

## L-Band Monitor for SHF inputs (option 2)

| | |
|---|---|
| Connection | BNC (f), 50Ω |
| Level | -20dBc ±3dB |

## Pilot 'CW' Generator Output (option 14)

For 'self-test' & for use when satellite has no useable beacon signal

| | |
|---|---|
| Frequency range | 850-2,150MHz, user settable |
| Step size | 125kHz |
| Level | -50 to -80dBm |
| Control range | 30dB, stepped 0.5dB |
| Connector | SMA (f), 50Ω |

## Internal Reference

| | |
|---|---|
| Frequency | 10MHz |
| Adjustment | ±0.45ppm, stepped 0.01ppm |

### Stability

| | |
|---|---|
| Allan deviation | <5 x $10^{-12}$ over 1s |
| Ageing | <3 x $10^{-10}$ per day, <3 x $10^{-8}$ per year |
| Temp stability | <2 x $10^{-9}$ over -10 to 50$^0$C |

## Mechanical

| | |
|---|---|
| Width | 19", standard rack mount |
| Height | 1U (1.75") |
| Depth | 534mm (21"), plus connectors |
| Construction | Stainless steel chassis |
| Weight | Approx. 8kg (18lbs) |

## Environmental

| | |
|---|---|
| Operating temp | 0$^0$ to +50$^0$C |
| EMC | ETSI EN 301 489-1: V2.2.1 & ETSI EN 300 673: V1.2.1 |
| Safety | IEC/EN 62368-1:2014 (second edition) |

## Power Supply

| | |
|---|---|
| Voltage | 90-264VAC |
| Frequency | 47-63Hz |
| Power | 50 Watts max (configuration dependant) |
| Option 10; | Redundant PSU's with separate prime power inputs |

## Control System

| | |
|---|---|
| Remote control | RS232/RS485 port |
| Option 9; | Ethernet; embedded web server & SNMP network management support |
| Alarms | LO lock failure |
| | PSU failure |
| | External alarm inputs |
| | Summary failure relay (form C) |
| | Out of lock alarm (form C) |

# Options

| | |
|---|---|
| 1a) | C-Band beacon input. |
| 1b) | X-Band beacon input. |
| 1d) | Full Ku-Band beacon input. |
| 1e) | Ka-Band beacon input. |
| 2) | L-Band monitor (for SHF input options). |
| 4) | F-Type, 75Ω, input connection |
| 4b) | BNC, 75Ω, input connection |
| 4c) | BNC, 50Ω, input connection |
| 9) | Ethernet interface with embedded web server & SNMP |
| 10) | Redundant power supplies |
| 11) | Fast lock acquisition to <1s |
| 12) | Dual polarisation inputs |
| 13) | Auxiliary buffered receiver DC output |
| 14) | Pilot 'CW' signal output |
| 16) | SHF input level control (only valid with option 1) |

Note; the addition of options can modify the typical performance, for details please consult the factory

# Rear panel view *(sample)*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