Equipment description

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CAGEC F5491

1 PSR-500 DESCRIPTION

1.1 FUNCTIONAL DESCRIPTION

The Perimeter Surveillance Radar PSR-500 is an Ethernet powered and controlled multi-channel FMCW radar with MIMO capability, operating in the 5750MHz-5850MHz band (USA configuration).
The PSR-500 has two separate transmit channels and two receive channels and must be synchronized to the 1 PPS signal from the internal GPS receiver.

The PSR-500 transmit alternately on TX1 or TX2 RF chain. RX1 and RX2 chain are receiving permanently (§ equipment architecture)

The PSR-500 is protected from the environment by a HDPE housing sealed with a silicone rubber gasket.

Figure 1: External view of the Perimeter Surveillance Radar PSR-500

Features

- Complete 5.8 GHz MIMO FMCW radar system in a water resistant HDPE housing
- Detection range up to 800 meters, up to 100 degrees field of view depending on antenna configuration
- Gigabit Ethernet interface (GbE) for control (TCP-IP) and data-streaming (UDP)
- PoE (supply voltage 48 Volts, power consumption 7 W, IP68 connector)
- GPS synchronized radar sweeps for use of multiple systems on site
- Re-configurable internal transmit and receive antennas

RF specifications

- Start and stop frequency programmable from 5750 to 5850 MHz
- Up and down sweep time programmable from 25 µs to 10 ms
- 2 TX channels, 25.5 mm horizontal spacing, 100° typical azimuth beam-width (-3 dB), 36° typical elevation beam-width (-3 dB)
- 14 dBm max EIRP
- TX MUTE function, active during down-sweep, typical suppression is 33 dB

- MIMO TX sequence selection, TX1-TX1, TX1-TX2, TX2-TX1 or TX2-TX2
- 2 RX channels, 80.0 mm horizontal spacing, $56°_{pp}$ typical azimuth beam-width (-3 dB), $40°_{pp}$ typical elevation beam-width (-3 dB)
- 7.5 dB typical RX noise figure (@ 500 kHz beat-note frequency)
- ADCs operating at 1.953125 MHz (125/64)
- RX beat-note frequency range up to 860 kHz (@ -3 dB)
- RX beat-note frequency 2^{nd} order high-pass filter at 250 kHz (@ -3 dB)

1.2 PHYSICAL DESCRIPTION

Height	370 mm
Width	150 mm
Depth	53 mm
Weight	1.8 kg

1.3 ELECTRICAL POWER SUPPLY

The PSR-500 operates from a 48 Volts PoE nominal supply voltage (IEEE 802.3af/at standard, Class 4 device i.e. high power). Power input is 8 watts maximum (7 W nominal).

1.4 EQUIPMENT ARCHITECTURE

The block diagram below shows the four blocks inside the PSR-500:

- Back End board, containing the digital interface and pre-processing elements
- Frond End board, with the RF electronics
- Antenna board, which is a stack-up of 2 boards and a foam sheet, containing multiple configurable patch antennas
- GPS module, GPS delivering the 1 PPS synchronization signal for the PSR-500 use in multi-equipment configuration.

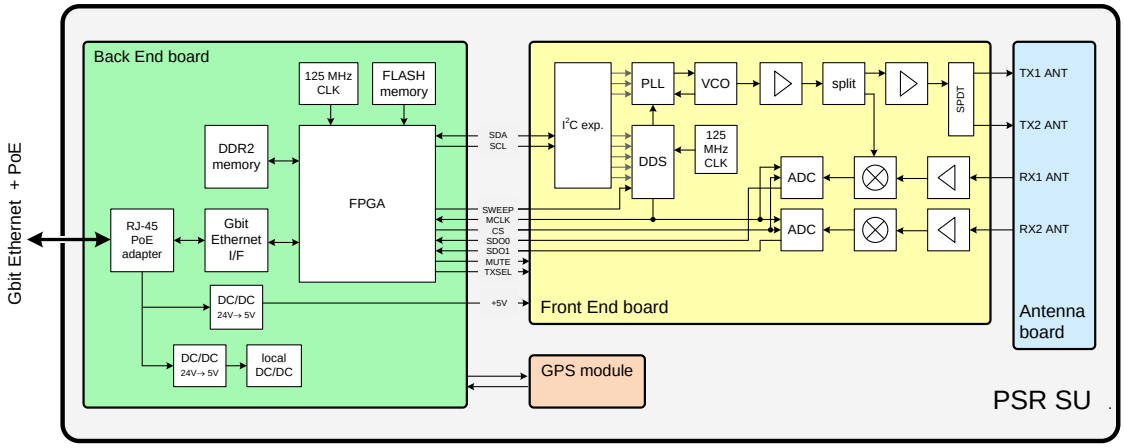

Figure 2: Block diagram

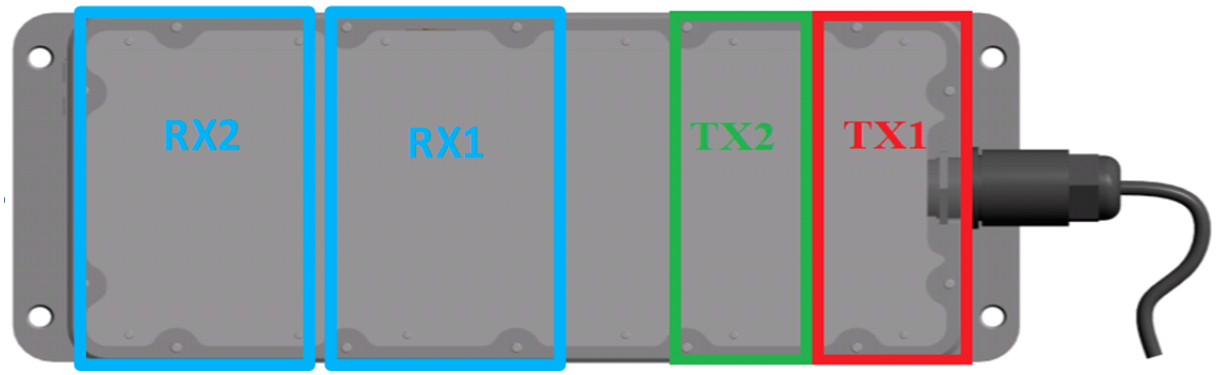

Figure 3: TX and RX location on front view