MERCURY

SOFTWARE DEFINED RADIO

The **Mercury** Software Definable Radio **(SDR)** is an ultra-compact, low-cost, endpoint radio for mission-critical data applications including industrial field area devices. The Mercury endpoint radio, with its superior receiver sensitivity and support for narrower transmit channels, ensures maximum range from an Ondas base station and support for challenging RF environments.

Mercury's low power consumption allows for deployment in Mission Critical IoT (MC-IoT) applications with battery and solar power supplies.

When connected to an Ondas base station, the Mercury radio serves as a remote Ethernet bridge with QoS support from Ondas base stations. The Mercury endpoint radio enables the deployment of low data rate, multi-protocol intelligent devices including support for SCADA RTUs, IEDs, fault circuit indicators, capacitor bank controls, and backhaul of low range sensor networks based on Wi-Fi, BLE, LoRa, Sigfox, etc. Mercury endpoint radios can be deployed at massive scale in an Ondas network with hundreds of radios operating on a single base station.

The Mercury radio operates in a wide range of licensed frequencies (70 MHz to 1 GHz) with configurable channel bandwidths between 1 kHz and 50 kHz. Mercury employs a single band AMC 1x6 sub-channel to communicate with Ondas base stations in standard narrow channel sizes.

The Mercury radio is a building block within the Ondas MC-IoT Point to Multipoint (PtMP) multicell, multisector system. It is designed to serve MC-IoT low throughput endpoints along with the Venus remote radio serving high throughput endpoints. Both types of remote radios operate simultaneously with an Ondas MC-IoT sector base station.

Key characteristics of the Ondas MC-IoT architecture:

Sector Bandwidth
The bandwidth available in the sector may consist of a contiguous band or an aggregation of multiple adjacent or nonadjacent channels, including Private Land Mobile Radio (PLMR).

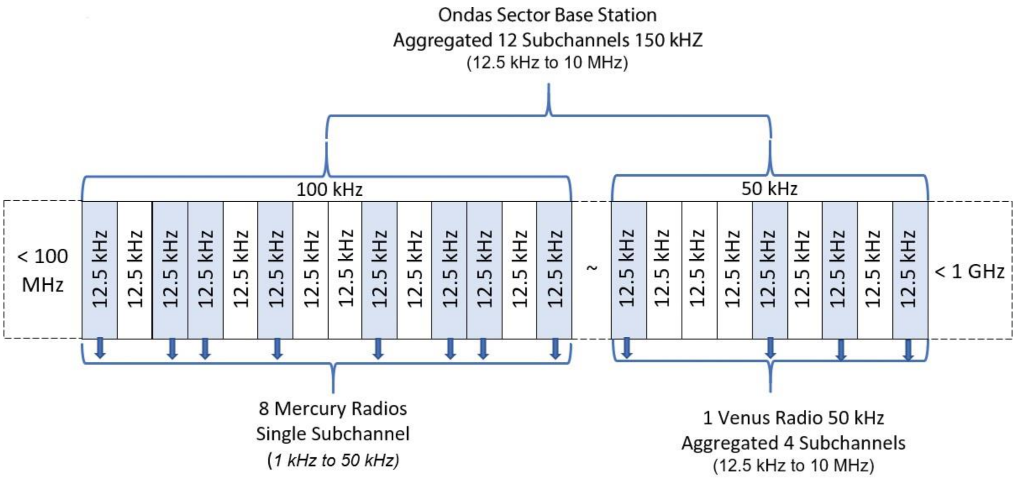


Diagram 1: Ondas MC-IoT Architecture

Sub-channels
The sector bandwidth is partitioned into multiple sub-channels. When the sector bandwidth consists of multiple adjacent or nonadjacent channels, the individual channels will be configured as sub-channels.

Aggregate
The Ondas base station will operate over the entire channel while Mercury will operate over a single sub-channel. Venus remote radios may operate over multiple sub-channels.

RADIO SPECIFICATIONS

Frequency Range	70 MHz to 1 GHz
Channel Sizes	1 kHz to 50 kHz
Throughput	Up to 150 kbps
TX Power	25 dBm @ antenna port
Rx Sensitivity	@ 12.5 kHz: -125 dBm @ 25 kHz: -122 dBm @ 50 kHz: -119 dBm
Waveform	OFDMA
Modulation	QPSK, 16-QAM, 64-QAM
FEC in Downlink Direction	Convolutional Coding (CC) with rates 1/2, 2/3, & ¾ Convolutional Turbo Coding (CTC) with rates 1/2, 2/3, 3/4, 5/6
FEC in Uplink Direction	Convolutional Coding (CC) with rates 1/2, 2/3, & ¾ Convolutional Turbo Coding (CTC) with rates 1/2, 2/3, 3/4, 5/6
Duplex Method	TDD, HD-FDD
Topology	Point to MultiPoint, Direct Peer-to-Peer
Air Interface Protocol	Band AMC 1x6 as per IEEE 802.16s for channel bandwidth > 12.5 kHz
Modulation Coding Scheme Selection	Dynamically adjusted
QOS	Best effort, real time polling service Unsolicited Grant Service (UGS)

CONNECTORS / INTERFACES

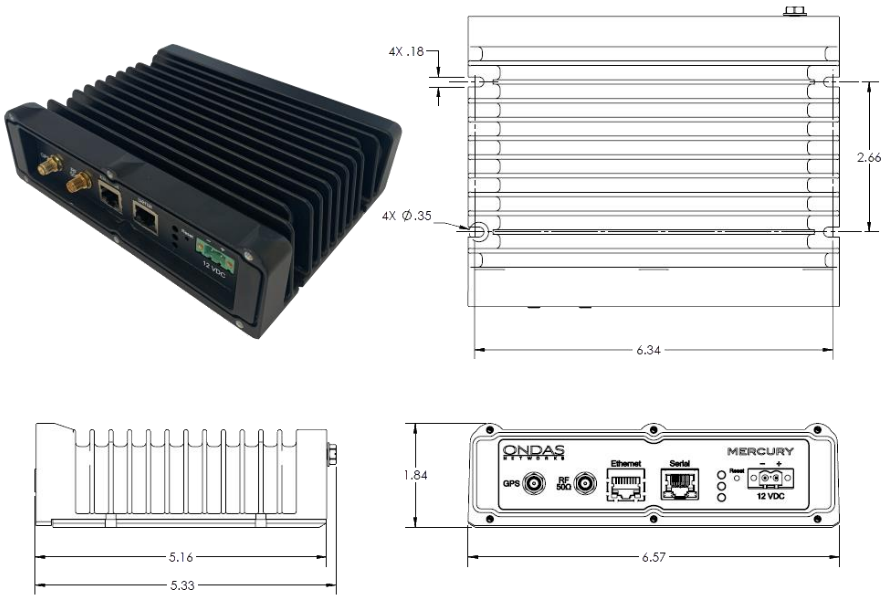
DC Input	Phoenix 1777989 Plug
Grounding Terminal	10-32 thread Screw
Serial Data	RJ45
Ethernet	RJ45 (10/100 Mb)
RF	Type N female connector (50Ω)

PHYSICAL CHARACTERISTICS

RF Antenna	50Ω
GPS Antenna	Active 3.3VDC
Power Input	12 to 13.3 VDC
Data Interface	100 Base T, RS232
Power Consumption	< 10 Watts
Indicators	Power On & Error, Link Status
Dimensions	6.6” x 4.8” x 1.6” (168mm x 122mm x 41mm)
Weight	2 lbs. 8 oz (1.14 kg)
Enclosure Protection Rating	IP 50 Standard Optional IP65 Cover (2)
Operating Temperature	-40° C to +70° C

SECURITY FEATURES

AES-256 Traffic Encryption
Three-way Handshake Over the Air Rekeying (OTAR)
EAP-TLS Based Authentication with X.509 Certificate and RSA-4096 Public Key Encryption
Hardware Based Secure Boot at the Root of the “Chain of Trust”
NIST Certified Hardware Random Number Generator
Memory Protection and Access Rights Limitation for Security Robustness
Trusted Updates: Authenticated and Validated Upgrades and Configuration Changes
Security Patch Management
Secured SNMPv3 Remote Management
SSHv2 Local Management
Security Events Monitoring, Audit Ready



Specifications subject to change.