



## ALPHA WAVE NARROWBAND RADIO MODEMS WIRELESS SOLUTIONS

# L-Band/Beacon OEM Receiver



L-Band/Beacon OEM Receiver comprises two radio sections: L-Band receiver (1518 MHz to 1559 MHz) and Marine Radiobeacon receiver (283.5 to 325 kHz).

L-Band receiver complies with INMARSAT SDM Technical Specification for narrow band point-to-multipoint receivers as defined in INMARSAT-A Mobile Earth Station Technical Bulletin, SESTB 28A, August 1993. L-Band receiver is designed for multiple applications including particularly geostationary satellite communication networks satellite services.

Potential applications are differential GPS correction parameter distribution, financial data distribution, news, weather and sport information distribution, store and forward audio distribution, facsimile and image distribution, control of remote equipment.

Marine Radiobeacon receiver (283.5 to 325 kHz) or Beacon receiver complies with Broadcast Standard for the USCG DGPS Navigation Service COMDTINST M16577.1. Beacon receiver is designed to receive pseudorange corrections transmitting by Radiobeacon stations. Maritime Radiobeacon DGNSS systems according to RTCM SC-104 version 2.3 are usually capable of broadcasting the following RTCM messages: 1, 2, 3, 5, 6, 7, 9, 15 (seldom), and 16. Radiobeacons are widely used throughout the world. DGNSS Radiobeacon transmissions meet stringent integrity and reliability requirements mandated by the International Association of Lighthouse Authorities.

# L-Band/Beacon OEM Receiver

## General Specification

- Input Voltage: 4.2 V  $\pm$  5 %
- Power Consumption: <1 W
- Operation Temperature: -40°C ... +60°C
- Storage Temperature: -40°C ... +80°C
- Dimensions: L: 80 mm x W: 46.5 mm x H: 7.6/9.5 mm
- Weight: 41 g

## Features

- DSP-Modem
- Multi-Modulation Technologies
- Zero-IF Technologies
- Up to 115200 bps Serial Interface Data Rate
- Compact Design

## Radio Technical Specifications

Component	Details
Frequency Range	1518 - 1559 MHz
Frequency Offset	$\pm$ 3 kHz ( $\sim$ 1.5 ppm)
Channel Spacing	5 kHz
User Data Rates	600, 1200, 2400, 4800 bps
High Power Channels	User defined
Low Power Channels	User defined
Service Identifier	User defined
Scrambler Vector	User defined
Tuning Mode	manual/automatic
Sensitivity	-120 dBm for <math>10^{-3}</math> BER
Dynamic Range	80 dB
Adjacent Channel Rejection	60 dB
Start Time	<1 min
Output Data Format	Row Data

## External Connectors:

**J300** Beacon/GNSS RF Input Connector / **J301** LNA Output to GNSS Board Connector / **J302** L-band/Beacon/GNSS RF Input Connector: MMCX RIGHT ANGLE PCB JACK, AMPHENOL P/N 908-24100.

Through the central pin of the connector J300/J302 the power is being supplied to the antenna LNA. The internal power supply provides 4.2 V DC and max 0.2 A. If an antenna needs another voltage, the external power supply should be connected to the pin 10 of main connector J1. If jumper R117 is installed, the antenna supply voltage through the central pin of J300/J302 is equal to the external voltage applied to this pin. The external voltage should be in range +5 ... +15 VDC and the current is less than 0.2 A.

## Main Connector

16-Lead Header Connector, ECS Corp. P/N 9616-D1-01-03

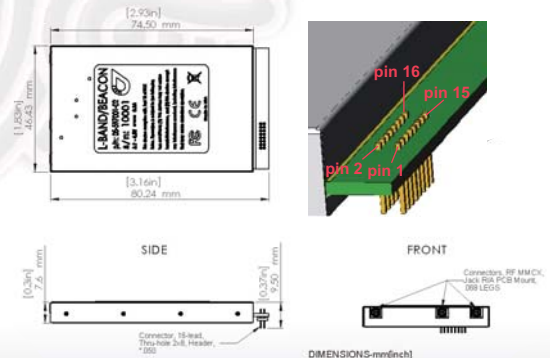
PIN #	Signal Designator	Signal name	Description	I/O	Comments
1	GND	GND	Ground	-	Signal and Chassis Ground
2	DSP UART 1	TXD	Transmitted Data	TTL Input	Serial Data Input
3	DSP UART 2	RXD	Received Data	TTL Output	Output for received serial data
4	DPORT5	DTR or DP/MP	Data Terminal Ready	TTL Input	Control line can be used as a backup method for entering Command mode: (0V to 3.3V) transition: Maintenance Mode; (3.3V to 0V) transition: Data Mode. An internal 100K pull-up enables Data Mode if this signal is left unconnected. Maintenance Mode is also accessible by transmitting an escape sequence.
5	DPORT1	CTS	Clear to Send	TTL Output	Used to control data flow from the user to the radio: (0V) – Data buffer not full, (3.3V) – Data buffer full
6	TTL1	SLEEP	Sleeps/wakes radio Receive only	TTL Input	In sleep mode, all radio functions are disabled consuming less than 50 $\mu$ A. An internal 10K pull-down wakes up the radio if this signal is left unconnected. At wake up, any user programmed configuration settings are refreshed from flash memory, clearing any temporary settings that may have been set: (3.3V) – Sleep Radio; (0V) – Wake Radio. As an option could be used as TTL Input Line 1.
7	DPORT3	DCD	Data Carrier Detect	TTL Output	Used by remotes to indicate that the remote has successfully acquired the signal from base station: (0V) – Carrier detected (synchronized); (3.3V) – No carrier detected (not synchronized)
8	DPORT4	RTS	Request to Send	TTL Input	Gates the flow of receive data from the radio to the user on or off. An internal 10K pull-down enables data receive if this signal is left unconnected. In normal operation, this signal should be asserted: (0V) – Receive data (Rx) enabled (3.3V) – Receive data (Rx) disabled
9	DPORT2	DSR	Data Set Ready	TTL Output	Used to control data flow from the user to the radio: (0V) – Receive buffer has data to transfer; (3.3V) – Receive buffer is empty
10	ANT_DC	ANT_DC	External Power for Antenna LNA	Power Input	External Power for Antenna LNA +5...+15 VDC
11	TTLO1	TTLOUT1	TTL Output Line 1	TTL Output	Reserve line
12	TTLO2	TTLOUT2	TTL Output Line 2	TTL Output	Reserve line
13	GND	GND	Ground	-	Signal and Chassis Ground
14	TTLI2	TTLIN	TTL Input line	TTL Input	An internal 100K pull-up resistor is applied.
15	VCC42	PWR	Power Supply	External	Regulated positive 4.2V DC from ext. Power Supply
16	VCC42	PWR	Power Supply	External	Regulated positive 4.2V DC from ext. Power Supply

## L-Band Receiver Specification

Component	Details
Input Impedance	50 Ohms
Max Overload Input Signal of Normal Power Level	+ 0 dBm
Satellite Symbol Ratio	1219.05, 2438.1, 4878.2, 9752.4 symbol/second
Assigned Bandwidth	2.5, 5.0, 7.5, 15.0 kHz
Modulation Type	filtered BPSK
Filtering	40% square-root raised cosine
Channel Coding	Rate 1/2 convolutional Constant K=7
Decoding Algorithm	Viterbi
Channel Scrambling	V.35 prior to FEC as defined in Inmarsat-M (Scrambler vector related to Service identifier)
Frame Length	8192 symbols
Unique Word Length	2 x 32 bits (not encoded or scrambled)
Spare Byte	8 bits (encoded but not scrambled)
$E_b/N_0$ for BER = $10^{-5}$	5.5 dB

## Beacon Receiver Specification

Component	Details
Frequency Range	283.5 - 325 kHz
Channel Spacing	500 Hz
Bit Rates	50, 100, 200 bps (manual or Auto selection)
Channels	2-channel, parallel operating
Operation Mode	manual/automatic
Adjacent Channel Rejection	65 dB $\pm$ 1 dB @ $\pm$ 400 Hz
Cold Start Time	<1 min
Warm Start Time	<2 seconds
Modulation	Minimum Shift Keying (MSK)
Sensitivity	1.5 m V/m for 6 dB SNR ( 200 bps)
Dynamic Range	100 dB
Frequency Offset	$\pm$ 0.5 Hz ( $\sim$ 1.5 ppm)
Correction Output Protocol	RTCM SC-104



Specifications are typical and subject to change without prior notice

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