

S@TELLITE MODEM™

ORBCOMM+GPS OEM Board

**Wireless communications
from anywhere to anywhere
with embedded GPS.**

Overview

The S@tellite Modem is a low-cost, low-power ORBCOMM & GPS module. It enables customers to easily monitor, track and communicate with assets using ORBCOMM's constellation of 35 Low Earth Orbit (LEO) satellites. The S@tellite Modem is designed to provide maximum flexibility to the system integrator and developer. The board comes standard with embedded GPS, configurable digital I/O, built-in functions which are user-configurable, and on-board memory allowing users to store incoming and outgoing messages from the user equipment.

ORBCOMM Serial Interface Compliant

The S@tellite Modem conforms to the most current ORBCOMM serial interface protocol. This allows for communications between the S@tellite Modem and other devices like DTEs (Data Terminal Equipment) or PCs.



Built-in Functions

The S@tellite Modem has built-in functions for monitoring and/or controlling the state of the eight on-board digital i/o lines, GPS position or movement, and communications from the Modem.

There are four function categories: scheduled transmissions, GPS, digital i/o, and listening. Each with an independent scheduler. If the unit is put into sleep mode, it will wake up as required by the schedulers. The multiple sleep schedulers allow you to maximize battery life, while still making regular checks of whatever observables you want to monitor. Examples below illustrate just a few of the capabilities of the board's built in functions*.

Scheduled Tx	Wake on schedule**, report position.
GPS	Wake on schedule**, report if moved more than Xm in T mins. Report when latitude XX.XX, or longitude YYY.YY is crossed.
Digital I/O	Wake on schedule**, report digital inputs if changed.
Listening Function	Wake on schedule**, listen for T minutes.

* A complete list and description of the built-in-functions can be found in the Reference Manual at www.magellangps.com.

** The 4 separate schedules can be defined independently.

The functions may be programmed from the serial port, or over the ORBCOMM satellite network. The modem configuration may be queried from the serial port or via the ORBCOMM satellite network.

Power control

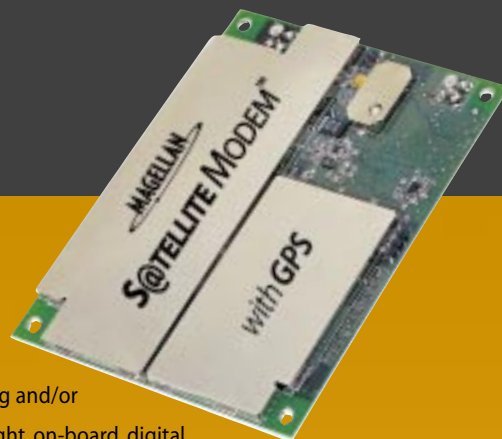
The S@tellite Modem also uses i/o lines to provide power control:

DTR	This is used as a Modem input to command low-power (sleep) mode.
DSR	This is used as a Modem output, activated when the Modem is awake.

Flow control

The S@tellite Modem senses and sets various i/o lines to control the flow of bytes. These lines are configured according to established wireless modem conventions:

RTS/CTS	Hardware flow control.
CD	Activated when the S@tellite Modem is locked onto the satellite downlink and is ready to receive or transmit.
RI	Activated when a message has been received from the satellite.



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General Specifications

- 10 channel GPS (DGPS ready)
- 8 configurable digital inputs/outputs (TTL level)

Serial Interface

- 1 bi-directional serial port (9,600 bps) for S@tellite Modem (capable of storing 350 six-byte reports)
Meets ORBCOMM Serial Interface Specifications
- 1 bi-directional serial port (4,800 bps) for GPS

Meets NMEA-0183 V2.2 Standard for data output & RTCM V2.2 Standard for DGPS input

Over-the-air Interface

Uplink = 2,400 bps / Downlink = 4,800 bps

Standard Messages

- 32 kilobytes of memory storage for incoming and outgoing messages
Meets ORBCOMM Air Interface Specifications
Store and forward Messages
- Outgoing from user to satellite — 229 bytes
- Incoming from satellite to user — 182 bytes

Maximum size defined by ORBCOMM network

Power

+12VDC regulated to +10%, -0% +5VDC regulated to ±5%

Mode	+5VDC	+12VDC
Receive	160 mA	10 mA
Transmit	180 mA	1.2A
Sleep	500 µA	20 µA
GPS	145 mA	20 µA

Standby: 2.7 - 3.0 V @ 15 µA @ 25° C

Standby voltage supports static RAM, Real Time Clock, DTR/DSR function and schedules.

Average Power: 7mW (based on 1 position report per day, provided the modem is on for 10 minutes per day, and the remaining time in standby mode.)

Environmental

Operating Temp. -40°C to +60°C

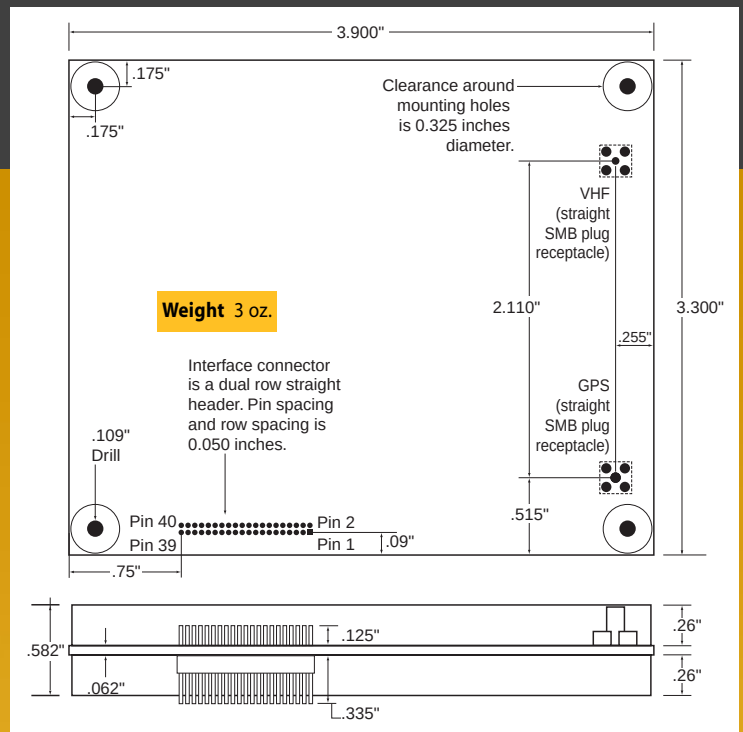
Shock and Vibration Meets SAE J1455

Regulatory

Type Approval Meets FCC/ORBCOMM Type Approval Requirements

Electromagnetic Interference Meets ETSI standard 300-832

Emissions Meets ETSI standards 300-721 and 300-722.



Interface Connector Pins Definitions

PIN #	Signal Name	Function
1,2,3,4	VR12	+12V Power Input
5,6,7,8	GNDRTN	Power Ground Returns
9,10	VR50	+5.0V Power Input
11	VSTANDBY	Standby Voltage Input
12	GNDRTN	Power Ground Returns Modem Serial Port Group
13	CTS	Clear to Send H/W Handshake, TTL Output
14	RTS	Request to Send H/W Handshake, TTL Input
15	DTR	Data Terminal Ready – Modem Power On/Off Control, TTL Input
16	RI	Unused
17	CD	Carrier Detect – Indicates Communication Link Established, TTL Output
18	DSR	Data Set Ready – Modem Powered Up Indicator, Open Collector Output
19	TXD2	Modem Port Serial Data Output (TTL Levels), TTL Output
20	RXD2	Modem Port Serial Data Input (TTL Levels), TTL Input
21	SGND	Signal Ground User I/O Group
22	SGND	Signal Ground
23	BITIO1	User Programmable I/O Line, TTL
24	BITIO0	User Programmable I/O Line, TTL
25	BITIO3	User Programmable I/O Line, TTL
26	BITIO2	User Programmable I/O Line, TTL
27	BITIO5	User Programmable I/O Line, TTL
28	BITIO4	User Programmable I/O Line, TTL
29	BITIO7	User Programmable I/O Line, TTL
30	BITIO6	User Programmable I/O Line, TTL
31	RESETN	Externally Supplied Reset, TTL Input
32	UDLN	Flash Upload Control GPS Group, TTL Input
33	RXD1	Serial Differential Data, TTL Input
34	TXD1	NMEA Data Serial Output (NMEA Levels)
35	INTANTPWR	Current Limited GPS Antenna Power
36	SGND	Signal Ground
37	EXTANTPWR	Externally Supplied GPS Antenna Power Unused PINS Group
38	CA0	Signal can provide synchronization to an external switching power supply. Normally 307.kHz. Only on when DSR is active .
39	RESERVED	Reserved by manufacturer. Make no connection to this pin.
40	MPWRN	Active high logic signal indication power is applied to modem circuitry only (excludes GPS circuitry).

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