OmniLite 132 Receiver

OmniSTAR
Omnilite 132
Fugro
Power
Data
Data
On
Off

User Manual

Issue 1.3 November 2001

The Global Positioning System

Notice to Customers

This manual has been produced to ensure the very best performance from your OmniSTAR receiver. The manual has been clearly set out with simple instructions to ensure trouble free usage of your OmniSTAR receiver.

This publication could contain technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of this publication.

Should you require further assistance please contact your local dealer or the OmniSTAR Perth office.

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OmniLite 132 RECEIVER
USER MANUAL

One-Year Limited Hardware Warranty

OmniSTAR Pty Ltd and its operating companies world-wide (OmniSTAR), warrants this product to be free from defects in workmanship and material for a period of one year from the date of original sale by OmniSTAR or its authorised dealers, to the original purchaser or end user.

OmniSTAR reserves the right to repair and/or replace, at its option, any part or parts found to be defective, provided such defects, in their opinion, are due to faulty material or workmanship and are not caused by unauthorised or improper repair or abuse, or normal wear. Purchaser shall be responsible for shipping and insurance of the returned product for repair under this warranty. OmniSTAR will pay shipping and insurance for the product's return to purchaser provided that the product returned proves to be defective under this limited warranty.

This warranty applies only to normal usage of the product. It does not apply to units or electronic circuit boards defective due to improper installation or handling. Physical damage due to lightning or other electrical discharge and units subjected to fresh or salt water contamination is not covered. OmniSTAR reserves the right not to warrant the product if, upon request, sufficient proof of recommended installation compliance as laid out in this manual is not provided. No other warranties are expressed or implied. No other warranties exist.

OmniSTAR assumes no responsibility for any consequential or incidental losses or damages of any nature with respect to the use of this product.

REVISION HISTORY		
Issue 1.0	September 1999	First Draft
Issue 1.1	January 2000	Amendments to text and layout
Issue 1.2	September 2001	Minor Changes
Issue 1.3	November 2001	Minor Changes

Manual Reference: *OmniLite Manual*

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Introduction

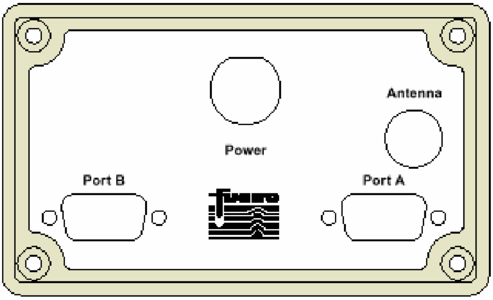
The OmniLite 132 receiver consists of both 12-channel GPS receiver and L-Band differential receiver built into a single unit. It provides differentially corrected positions at various hertz rates through two independently configurable RS-232 I/O ports. Position accuracy is typically less than one metre and the receiver is suitable for both ground and air applications. Three LED indicator lights give operational status at a quick glance. The receiver can have a one-pulse-per-second output signal synchronised to GPS time.

The OmniLite receiver is easily configured using TSIP commands. Baud rate, position update rate, common NMEA string output and binary data output are among the variables which can be controlled using the TSIP commands. More detail on these commands is provided in a later section.

Getting Started

The purpose of this section is to get you started with the OmniLite 132 as quickly as possible. The guide will address receiving the satellite data carrier, and then checking the functionality of the internal GPS engine fitted.

Generally when the receiver is supplied to you it will be configured for the mode and data link(s) you have subscribed to. In most cases to get up and running will be a case of connecting the appropriate cables and applying power to the system.



Bare Rear View of OmniLite Receiver

Initial Setup

Steps 1 through 7 pertain to all OmniSTAR receiver models.

1. Refer to the following as you will need to assemble all the required items.

    - OmniSTAR Receiver
    - Antenna
    - Antenna Cable
    - Power Cable
    - Data Port Cable
    - Power Supply

2. Connect the power cable to a suitable 10 V – 32vDC power supply being sure to check correct polarity.

    Red – Positive vDC
    Black – Negative vDC

3. The OmniLite 132 is an integrated GPS, DGPS receiver and needs only one antenna. You need to install the antenna where it has a clear 360° unobstructed view of the sky through an elevation of 10° through 90°.

4. Connect the antenna cable between the antenna and the TNC connector on rear pane.

5. Ensure the OmniSTAR power is OFF then connect the power cable into the power socket on the receiver.

6. Turn on the OmniLite and the Power LED will illuminate. Data LED's will illuminate when Data is present in the respective Data ports.

7. The GGA output message will indicate a non-corrected stand alone position with a 1 (one) after the 'E' in the message when viewed on a suitable data logging device or computer.

   A differentially corrected position is indicated by a 2 (two) directly after the 'E' in the GGA message from Port A.

Interfacing

Electrical Interface Description

The RF Connector is a standard TNC 50 Ohm female connector. There are 10vDC present when the unit is powered up to bias the LNA in the remote antenna. Care should be taken not to connect or disconnect the antenna while powered up.

The I/O cable connector is a standard DB 9 connector. The pin-out is defined below.

Pin No	Name	Description
1	Not Connected	N/A
2	Transmit	N/A
3	Receive	
4		
5	Ground	
6	Not Connected	N/A
7	Not Connected	N/A
8	Not Connected	N/A
9	Not Connected	N/A

This is the pin assignment for the OmniLite 132 communication ports. The connector type is a 9-pin female ‘D’ type.

PORT A (DCE)

1	CANL_B
2	TXDB*
3	RXDB*
4	PPS
5	GND*
6	EVENT
7	CTSB/422B In
8	RTSB/422B Out
9	CANH_B

PORT B (DCE)

1	CANL_A
2	TXDA*
3	RXDA*
4	
5	GND*
6	RTSA
7	CTSA
8	
9	CANH_A

*Indicates standard cable connections.

Warning: **Do not use standard RS 232 cables as all connections will be made to the computer and there are non standard assignations on the pins of both ports. Use the provided Data Cables.**

Power Requirements

The unit will operate on any DC Voltage between 10 V and 32vDC without interruption. When operational, the unit dissipates 7 W of power. The OmniLite 132 can also withstand voltage surges up to 85 V. The input has reverse polarity protection, however as the negative terminal pin is also attached to the housing ground, large currents may flow to any ground attachments made to the housing. Reverse polarity must therefore be avoided to prevent damage to the vehicle supply. At Voltages below 10 Volts the unit will reset itself to prevent any data loss. At Voltages below 8.5 Volts the receiver will turn off.

Mechanical Interface

Mounting of the receiver is done with a mounting brace or brackets.

Interfacing with the OmniLite Receiver

The standard configuration is:

Port A: 4 string NMEA @ 1 Hz, 9600 Baud (GGA, GSA, VTG, ZDA)
Port B: TSIP Binary @ 1 Hz, 9,600 Baud 8-O-1

The default configuration is:

The receiver will default to the below settings if the OmniLite 132 is reset to defaults.
Port A: NMEA @ 9,600 8-N-1
Port B: TSIP @ 9,600 8-O-1

The OmniLite 132 Receiver has two fully configurable RS-232 serial ports. Commands may be issued on either port and the receiver may be configured to output any of the available messages on either port. The baud rate on each port is adjustable, however the data bits, parity and stop bits are set to 8-0-1 for TSIP, Port B and may not be changed.

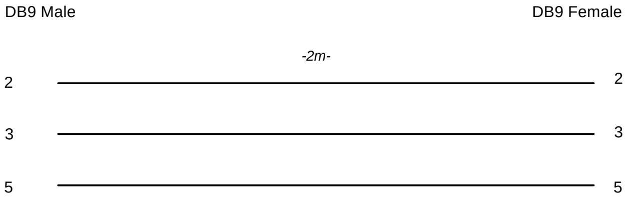
Cables

The OmniLite 132 is supplied with three cables.

ANTENNA CABLE

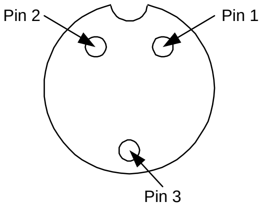
5 metre low loss RG58 Double shielding or equivalent			
TNC Male		N Type Male	
N/A	GPS/DGPS Signal	GPS/DGPS Signal	N/A

DATA CABLE



POWER CABLE

2metre Black Jacket Red & Black 2 Core Cable		
Pin #		Wire colour
1	Positive DC Voltage	Red
2	Negative DC Voltage	Black
3	Not connected	



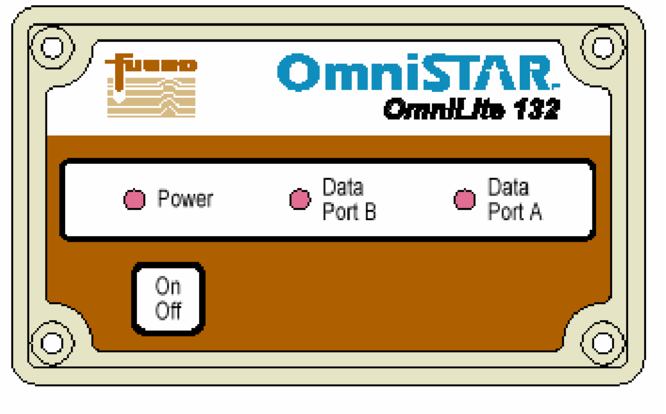
Mating end of Female Connector.
Switchcraft EN3C3F

LED Indicators

The OmniLite 132 has three LED indicator lights. These LED lights serve as status indicators.

The ‘Power’ LED indicates power to the OmniLite 132 and should remain solid once power is applied to the receiver. Both Data Port LED’s will flash as data is transmitted from the respective ports.

The LED’s will flash at the output rate of the port, one or five hertz.


Fugro
OmniSTAR
OmniLite 132
Power
Data
Port B
Data
Port A
On
Off

Installation

Installation Consideration

- Determine preferred location of each unit prior to beginning installation. Consider cable length, connector attachment space (cable bend radius), stowing excess cable, moisture, chemical corrosion, vibration and heat exposure.
- Before drilling holes, consider using existing hardware and hardware locations. Avoid drilling holes that may damage other equipment (example: structural frame members, electrical cables or fluid lines).
- High vibration and high temperature locations should be avoided whenever possible.
- In application where vibration exceeds 5 G's acceleration, shock mounts are required. Refer to Customer support for mounting recommendations.
- Vehicle primary power contains voltages that may be harmful to personnel and equipment. Detach battery cable connector from battery Negative (-) terminal before attempting connection to any power terminal

Electrical Grounding Requirements

The OmniLite 132 requires a perfect ground to vehicle structure at the negative line in the receiver power input. The L-Band Receiver should read zero Ohms to where the battery negative terminal is connected to vehicle ground.

Counter Electromagnetic Force (CEMF)

A potential problem inherent in any installation of electronic systems in a vehicle is Counter Electromagnetic Force (CEMF).

CEMF is caused when relays or solenoids connected to the common vehicle DC power bas are de-energised. The voltage produced may exceed –400 volts.

CEMF is produced by equipment such as the following:

- Electric Fan Brakes
- Air Conditioners
- Starter Relays
- Electric Pump Relays

CEMF is more than sufficient to damage, or cause erratic operation of any electronic system also connected to DC power.

CEMF can be eliminated by installing Diodes at the relays and solenoids that cause the CEMF and more importantly at the Power Supply Cable connections of the OmniLite system. A 47 V, 5 W, Zener Diode (1N5368 or equivalent) should be connected.

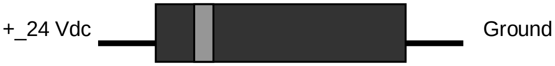


Figure 3, Zener Diode Installation.

Cable Installation Considerations

- Cables must be correctly installed for optimum system operations
- Do not route L-Band Receiver remote antenna cable with those of any other radio system cabling, as this may cause interference between both systems. If at all possible, do not run L-Band Receiver antenna cables parallel to other radio system cable closer than 30 centimetres.
- If any cables must cross; cross at a 90 degree angle. This prevents interference between systems
- Cables and I/O connectors are unique and fit only in the correct place.
- Routing cables along side power generator wires and other high noise electrical sources may cause interference.
- Do not kink or force cables into sharp bends that may damage cables and cause system failure. After installation ensure that excess cable in looped and clamped or tied safely away from any control cables, fuel lines, hydraulic lines or moving parts. When stowing over length cables, form loops not less than 150mm minimum cable bend radius.
- Cable routing must avoid high temperature exposure (example: exhaust manifold).

Antenna Location

Antenna position is critical to system performance. These conditions must be met for proper system operations:

- Antenna must be mounted at least 1.5 metres away from transmitting antennae of any frequency. Closer positioning may cause overloading of receiver RF circuits.
- The antenna should be mounted at the highest practical point that will give a good view of the horizon and be as near to level as possible.
- The antenna must be located along the vehicle centre line or at a relevant reference point on the vehicle.

APPENDIX A

Receiver Service Procedure

If an OmniSTAR Receiver unit fails to perform, contact the NCC within the region, after following the procedural checks.

We wish to hear about frequently experienced problems, and your assistance will help by copying the form on the next page, filling in the details requested and faxing or mailing the form to the NCC for on-forwarding to Product Marketing.

The most common problems are interfacing, and usually occur at installation time. If you have an interfacing connection not covered in this manual we would like to assist you and produce another technical bulletin that may assist other users in the future.

If a problem appears that you think may be caused by a system performance problem, contact the NCC in your region for any system aberrations that may have been experienced.

We are sensitive to our customers' needs and we want to assure specified system performance at all times. There could, however, be situations where conditions are below par, such as fringe area operations, radio communication disturbance etc., and, as OmniSTAR Receiver monitors the system performance continuously, these conditions would be noted.

APPENDIX B

OmniSTAR Receiver Problem Report Form

Please copy this form and report problem with as much detail as possible.

PROBLEM with: GPS Signal Y/N Manual Y/N **OmniSTAR Y/N Receiver Y/N**	**Date:**
Description of problem:	
Person Reporting:	**Contact Phone #:**
Model #:	**Serial #:**
Customer Name:	**Customer Address:**
Customer Phone #:	
Date purchased: / /	**Dealer:**
GPS Receiver used:	**Serial #:**
Area of operations:	
Symptoms from display (if any):	

APPENDIX C

OmniLite 132 - Technical Specifications

Standard Features

- Submetre differential GPS accuracy
- Satellite L-band differential capability
- 12 Channel, parallel tracking, L1 C/A code with carrier phase filtered measurements
- <2 second acquisition and reacquisition time, typical
- Two programmable Rs-232 serial ports
- RTCM SC-104 input
- NMEA-0813 output

Inputs and Outputs

Serial Ports :	Command, Data
Electrical Interface :	RS-232-C
Data Rates :	4800, 9600, 19200, 38400
Message Rate :	Typically 1-2 seconds output
Plug Types :	DB-9 connectors
RF Input to Receiver :	TNC
Power Connector :	3 pin snaplock

Optional Features

- Everest multipath reduction.
- 10Hz update rate

Technical Specifications

General	12 parallel channels Tracks up to 12 satellites, L1 GPS L-band satellite differential correction
Update Rate	1Hz standard, 10Hz optional
Differential Accuracy	Less than 1 metre horizontal RMS Assumes at least 5 satellites, PDOP less than 4 and RTCM SC-104.
Time to first fix	<30 seconds, typical
NMEA messages	ALM, GGA*, GLL, GSA*, GSV, VTG*, ZDA* * *Default Messages*
Power	5 Watts, max @ 10 to 32VDC

Physical Characteristics

Weight (approx.)	0.75kg
Display	3 LED indicators
Control	Power switch and Command Port

User Notes