



## **EQUIPMENT OPERATIONS MANUAL FOR GPS Receiver System**

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## Warranty and Service Information

UBS' standard warranty is one year from date of delivery, provided that the warranty labels have not been broken. Opening the Receiver without the expressed, written consent of UBS will automatically void the warranty.

UBS' liability for a warranty failure applies only to the equipment provided by UBS and excludes all other remedies, including, without limitation, incidental consequential damages. UBS is not responsible for any lost data, revenue, or any other consequential damages associated with a warranty or non-warranty failure.

In the event of a defect in/ or failure of the UBS product, the customer shall contact UBS regarding the warranty claim. UBS warrants to rework or repair the product at the UBS facility in Vaughan, Ontario once it has been properly returned by the customer.

To process a warranty claim or to obtain technical support, please contact UBS' Customer Service at either one of the following numbers:

**Telephone Number: 905-669-8533**

**Fax Number: 905-669-8516**

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## Product Safety

For your protection, please read and observe all safety instructions carefully. Save these instructions for future reference.

1. **Read Instructions.** All safety and operating instructions should be read before the product is operated.
2. **Follow Instructions.** All operating and user instructions should be followed.
3. **Retain Instructions.** The safety and operating instructions should be retained for future use.
4. **Heed Warnings.** All warnings on the product and in the operating instructions should be adhered to.
5. **Mounting Equipment and Accessories.** Do not place the product on an unstable cart, stand, bracket or table. The product could fall, causing serious injury to personnel, and serious damage to the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by UBS.
6. **Power Sources.** The product should be operated only from the type of power source indicated on the unit or in this document.
7. **Cleaning.** Do not use liquid cleaners or aerosol cleaners. Use damp cloth for cleaning.
8. **Object Entry.** Never push objects of any kind through openings of this product; such actions could result in fire or electric shock.
9. **Servicing.** The user should not attempt to service the product beyond those means described in the operating instructions. Refer all servicing to qualified service personnel.
10. **Damage Requiring Service.** Unplug the product from its power source and refer to service personnel under the following conditions:
  - a. When the power supply cord or plug is damaged.
  - b. If liquid has been spilled or objects have fallen into the product.
  - c. If the product does not operate normally, adjust only those controls that are covered by this document. Improper adjustment of any other controls may result in damage and will often require extensive work by qualified technician to restore the product to its normal operation.
  - d. When the product exhibits a distinct change in performance. Such a significant change indicates need of service.
11. **Replacement Parts.** When replacement parts are required, ensure that parts are specified by UBS. Unauthorized substitutions could result in improper operation or other hazards and will invalidate the warranty.

**12. Keep Away from Live Circuits.** Service personnel must at all times observe safety regulations. Do not replace components or make adjustments at all. All repairs are to be performed at UBS factory.

## **Electrostatic Sensitive Devices**

This product contains ESD (Electrostatic Discharge) sensitive devices.

**Attention!**



Proper ESD equipment should be used to prevent damage to the product. While servicing this equipment, the technician must be wearing either a wrist strap or heel strap grounded to the workstation.






## **Safety Notices**

**WARNING!** – Denotes potential hazard, if not correctly performed or adhered to, could result in injury or loss of life.

**CAUTION!** – Denotes potential hazard, if not correctly performed or adhered to, could result in damage to the equipment.

**NOTE** – Provides supplementary information for the user.

## Safety Symbols

Symbol	Meaning	Explanation
	Caution	To prevent damage to the product, the user must refer all operating instructions in the operations manual.
	Danger	Dangerous voltages.
	Attention	Presence of electrostatic discharges (ESD).
	Ground	Protective ground terminal.
	AC	Alternating Current

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# 1 System Description

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## 1.1 Overview

The GPS Receiver Unit includes a **GPS unit**, as well as a **10MHz distribution system**, to allow the synchronization of multiple units to a central, accurate and stable frequency reference.

The GPS Receiver Unit supports SNMP for remote control.

The GPS Receiver includes the **Controller module** - based on the Motorola Power PC MPC860TDB. This board provides the control interface for the GPS. The Controller communicates with the remote host via the Ethernet port.

The Unit is intended for indoor use and is built in a standard 1U EIA 19-inch rack mounting assembly.

## 1.2 Features

- ❑ Ethernet 10/100 Base T interface
- ❑ RS 232 interface for local port
- ❑ RS 485 communication interface (used for manufacturing test purposes)
- ❑ WEB GUI control interface
- ❑ GPS accurate clock reference
- ❑ Four 10 MHz clock outputs
- ❑ "1 PPS" signal output
- ❑ Compact 1U profile

### 1.2.1 Related manuals

- ❑ WEB GUI and CLI manual - p/n 10117-01-P01

## 1.2.2 Front Panel Indicators

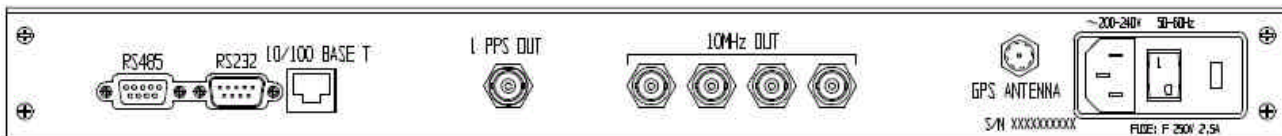


**Figure 1-1 GPS Receiver System - Front Panel**

The Front Panel of the GPS Receiver System has two LED indicators:

- ❑ Power - Green LED indicator – AC Power ON
- ❑ GPS Alarm - Red LED indicator – indicates the presence of a major GPS alarm

## 1.2.3 Rear Panel Connectors



**Figure 1-2 GPS Receiver System - Rear Panel**

The Connectors located on the rear panel of the GPS Receiver Unit are:

- AC Power - Connector and switch
- 10 MHz Out - BNC connectors –10MHz Clock Reference signal output
- RS 485 - DB9 female connector – Serial communication port
- RS 232 - DB9 male connector – Serial communication port
- Ethernet 10/100BaseT - RJ 45 connector
- 1pps Out - BNC connector – output for “1pps” signal from the GPS
- GPS antenna - F connector – input – cable from the GPS antenna

## 1.2.4 System Interface Summary

### □ GPS Antenna

Connector type: F-type female  
 Impedance: 50  $\Omega$   
 GPS antenna: Bullet III GPS antenna - Trimble model no. 41556-00

### □ 10MHz OUT

These are the 10MHz output ports, which distribute the 10MHz reference clock from the GPS.  
 Signal level: +12.5 dBm  $\pm$  2.5 dBm into 50  $\Omega$ , sinusoidal waveform  
 Connector type: BNC-type female  
 Impedance: 50  $\Omega$

### □ 1 PPS Out

This is an output port for the 10pps output signal from the GPS  
 Level: TTL into 50  $\Omega$   
 Connector type: BNC-type female  
 Impedance: 50  $\Omega$

### □ Ethernet (10/100 BaseT)

This is the Ethernet port of the GPS Receiver Unit.  
 Connector type: RJ45

### □ RS 232

This is a serial communication port of the GPS Receiver Unit used for console/debug port for the Linux shell.  
 Connector type: DB-9 male

Pin #	Description
1	DCD
2	RXD
3	TXD
4	DTR
5	Ground
6	DSR
7	RTS
8	CTS
9	NC

Table 1-1 RS-232 Connector pin-out

### □ RS 485

This is a serial communication port of the GPS Receiver Unit.  
 Connector type: DB-9 female

Pin #	Description
1	Ground
2	Not Connected
3	Not Connected
4	Rx-

5	Tx+
6	Not Connected
7	Not Connected
8	Rx+
9	Tx-

**Table 1-2 RS-485 Connector pin-out**

# 2 Installation

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## 2.1 Installation Overview

Installation of the GPS Receiver Unit will require professional and properly trained personnel to ensure it is installed to appropriate safety codes. Only individuals trained in proper installation and service of this GPS Receiver should install and service the unit.

### 2.1.1 Unpacking the Unit

Each product is completely assembled, tested and then shipped in its appropriate packaging. Carefully unpack the unit and examine all shipping containers and contents for physical damage that might have occurred during shipment. If damage occurred during shipping, please notify your freight carrier immediately. Be sure to check the package contents carefully for important documents and materials.

*Note:* Retain all shipping containers for storage or re-shipment purposes. All materials returned under warranty must be packed in their original shipping containers.



### 2.1.2 Safety Grounding

**CAUTION!** Ensure that the unit is properly grounded before turning ON the power to the GPS Receiver Unit.



**WARNING!** Any interruption of the protective conductor inside or outside the product, or disconnection of the protective earth terminal, is likely to make the product dangerous. Intentional interruption is prohibited.

### 2.1.3 Connecting the GPS Antenna

The GPS receiver requires the specific GPS antenna model:

Bullet III GPS antenna - Trimble model no. 41556-00

This antenna must be connected to the GPS Receiver Unit, on the GPS Antenna connector on the rear panel.

The antenna must be installed either on the roof or in an unobstructed location, where it can receive signal from at least three GPS satellites. The number of satellites received can be verified by the software commands – see the Control Interface document.

### 3 Specifications

Parameters	Specifications
Processor	Motorola Power PC
Memory	8 Mbyte Flash memory
GPS clock reference unit	Incorporated
Power Consumption	60 VA max
Power Requirements	100 - 240 VAC, 50-60 Hz
<b>Rear Panel Connectors:</b>	
GPS antenna IN	75 ohm F-type female
10 MHz OUT	Four - 50 ohm BNC female connectors
1PPS OUT	50 ohm BNC female
Ethernet 10/100 BaseT	RJ45
RS-232 Serial Interface	DB9 male
RS-485 Serial Interface	DB9 female
<b>Front panel Indicators</b>	
AC Power On	Green LED indicator
GPS Alarm	Red LED indicator
Operating Temperature	0 °C to +50 °C
Relative Humidity	95% non-condensing
Cooling	Temperature controlled Fans
Enclosure	1U unit
Size	1U x 13" deep
Weight	5 kg max.
Mounting Requirements	19" rack

**Table 3-1: Technical Specifications**

# 4 Abbreviations

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<b>A</b>	Ampere
<b>AC</b>	Alternating Current
<b>AWG</b>	American Wire Gauge
<b>BPF</b>	Bandpass Filter
<b>dB</b>	Decibel
<b>dBm</b>	Ratio of power to 1 milliwatt in decibels
<b>DC</b>	Direct Current
<b>ESD</b>	Electrostatic Discharge
<b>GHz</b>	Gigahertz
<b>GPS</b>	Global Positioning System
<b>IF</b>	Intermediate Frequency
<b>kg</b>	Kilogram
<b>KHz</b>	Kilohertz
<b>LO</b>	Local Oscillator
<b>MHz</b>	Megahertz
<b>ns</b>	Nanosecond
<b>OD</b>	Outdoor
<b>PCS</b>	Personal Communications Service
<b>ppm</b>	Part per million
<b>RF</b>	Radio Frequency
<b>TCXO</b>	Temperature Compensated Crystal Oscillator
<b>V</b>	Volt
<b>W</b>	Ohm
<b>°C</b>	Degree Celsius
<b>“</b>	Inch