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Ashtech XII GPS Receiver Operating Manual



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ASHTECH

ASHTECH XII

GPS Receiver
Version 7
Operating Manual

XII GPS Receiver Version 7 Operating Manual
Ashtech® Document Number 600185
Publication Date March 1993

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General Information

The ASHTECH XII GPS receiver, designed to make full use of the Navstar Global Positioning System, provides state-of-the-art precision surveying and navigation. Model XII, the most sophisticated GPS receiver available today, is the first to offer true ALL-IN-VIEW automatic tracking. With twelve independent channels, it tracks all the satellites in view automatically, erasing the need for manual, programmed or pre-programmed selection of common satellites between survey sites.

The system includes the microstrip antenna mounted on a precision machined platform for accurate positioning above the survey mark. A compass is included in the platform for accurate, easy set up and orientation.

The ASHTECH XII receiver is easy to operate. After you position your tripod, you need only turn the power on in ordinary field use. Operating controls are on the front; input and output connections on the back.

The functionality is available through several easy-to-use screens. *Information* in the title of a screen means display only. *Control* in the title indicates a screen you interact with, such as Screens 4 and 9. All screens are described in detail. Subscreens are described in the chapter on top-level screens.

Screens	Display/Function
0	Skysearch Information
1	Orbit Information
2	Navigation Information
3	Tracking Information
4	Mode Control
5	Differential Information
6	Waypoint Control
7	Satellite Selection Control
8	System Control
9	Site and Session Control
10	All-in-View Information
11	Visibility Information
12	Bar Code Control

This manual describes the features of the ASHTECH X-II GPS receiver and Software Release 7A. It tells you how to set up the receiver, how to mount the antenna, and how the receiver operates. Many useful procedures, such as kinematic surveying, are described.

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Front Panel

The receiver's front panel, figure 1, an 8-line x 40-character backlit LCD display, provides reports on satellite data and is the interactive arena for the information you enter.

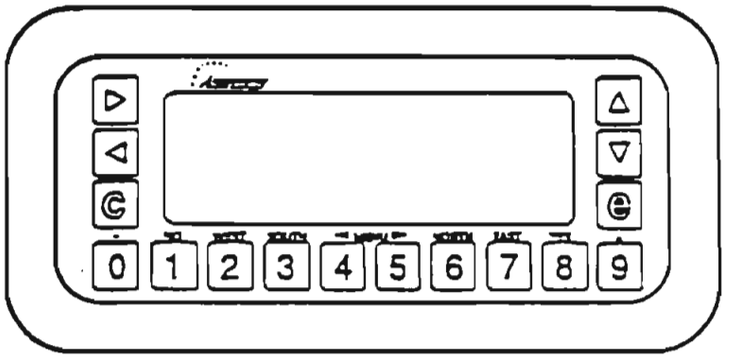


Figure 1. Front Panel of the Receiver

The keys that activate the receiver's functions are:

0 - 9 Pressing a number calls up a specific screen directly. The lower right corner of the screen displays the screen number. Whenever the manual discusses a screen, it identifies it by number (e.g., Screen 1, Orbit Information).

Within screens, the numbered keys are used to enter numeric data such as latitude or antenna height measurement, as well as alphanumeric information such as site name. Depending on the particular screen, the numbered keys may have other functions; for

example, the [8] key for 'yes'.

[ ] In this manual, square brackets indicate all receiver keys except the directional arrows.

< > In this manual, angle brackets indicate computer keys.

[c] Use the [c] key to cancel the current entry.

[e] Press the [e] key to enter data-entry mode, to save values you have entered, and to go back to higher level displays. (It functions much like the <ENTER> key on a computer.)

▸ ◂ In display mode, use the ▸ key or the ◂ key to change to the next higher or lower *numbered* screen or subscreen.

▲ ▼ are used to raise and lower the contrast when the receiver is in display mode. After two minutes of keyboard inactivity, the backlighting automatically turns off to extend the life of the battery. To restore it, push any key. We recommend [e] since it does not change the display.

▲ ▼ ▸ ◂ In data-entry mode, use the arrow keys to move the cursor: to highlight a field or to flash in a character position where your next entry will go. The ▸ key and the ◂ key move the cursor horizontally and the ▲ key and the ▼ key move it vertically.

highlight To *highlight* a parameter, use the arrow keys (▲, ▼, ▸, or ◂) to move the cursor until that field is displayed in inverse video and a character position in

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that field is flashing.

select To *select* a parameter, highlight it and press the [e] key.

toggle To *toggle* a field, highlight it and press the [+] or [-] key until it displays the setting you want. For example, below Screen 4, on the Port A/B Parameter Selection screen, you can toggle through various baud rates. Use the ▸ key to high-light the *BAUD RATE* indicator and press the [+] key or [-] key to scan through 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200 to the desired baud rate.

Back Panel

The ASHTECH X-II receiver operates with an input voltage between 10 and 32 VDC from an external power supply. Two POWER-IN sockets, figure 2, let you use two external batteries. As the first battery comes close to discharge, a continuous tone reports that the voltage has dropped below 10 volts.

You can connect the second battery to the second connector and continue recording data without interruption. Or you can connect two at once for long unattended observations; the receiver will operate from the battery with the higher charge.

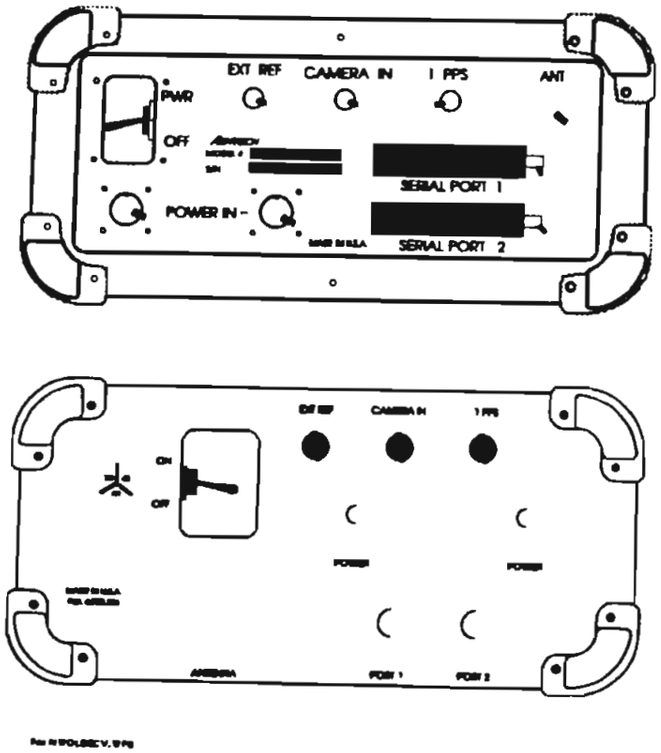


Figure 2. Back Panel, Non-Waterproof (top) and Waterproof

ON/OFF
turns the receiver on and off.

CAMERA IN
lets you record an accurate event time with a photogrammetry camera-input option and cabling.

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1 PPS accepts a BNC connector. Used when the receiver has the pulse generation option installed, it generates a one-pulse-per-second signal synchronized with GPS time.

ANT (nonwaterproof) or
ANTENNA (waterproof)
is a connector for the combined L1 and L2 antenna cable.

SERIAL PORT 1 AND 2
Two RS-232 serial ports are used for transferring recorded data from the receiver to a computer for postprocessing. The ports can also be used for other communications to and from the receiver. Note that hardware port 1 corresponds to software port A and hardware port 2 corresponds to software port B.

Caps For protection, the screw-on caps, tethered to the connectors, should be in place when the connector is idle.

Antenna Platform

A geodetic microstrip antenna, figures 3 and 4, is seated on a precision machined platform protected by a weatherproof cover. A low- noise preamplifier housed at the base of the antenna provides sufficient gain for a cable up to 30 meters long. (Cable specifications are in Appendix C.)

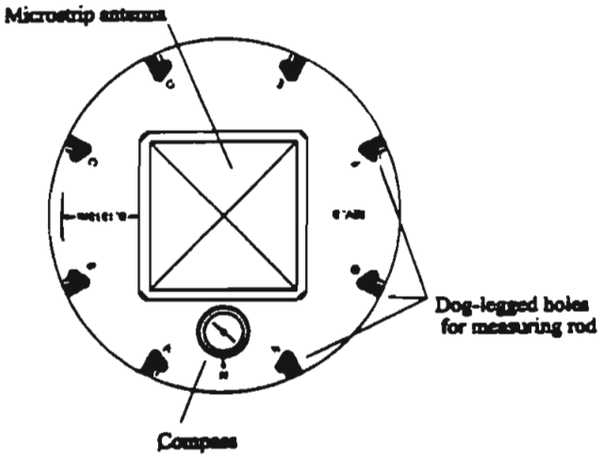


Figure 3. Precision Antenna Platform (top view)

Eight dog-legged holes, labeled A to H, in the antenna's ground plane, allow antenna height measurement. Use the special sectioned measuring rod (the HI rod for height of instrument) and measure through one of these openings. When the HI rods are used this way, the distance from the center of

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the antenna to the outside diameter of the holes is 0.1318 meter. From the center to the outside edge of the ground plane is 0.1430 meter.

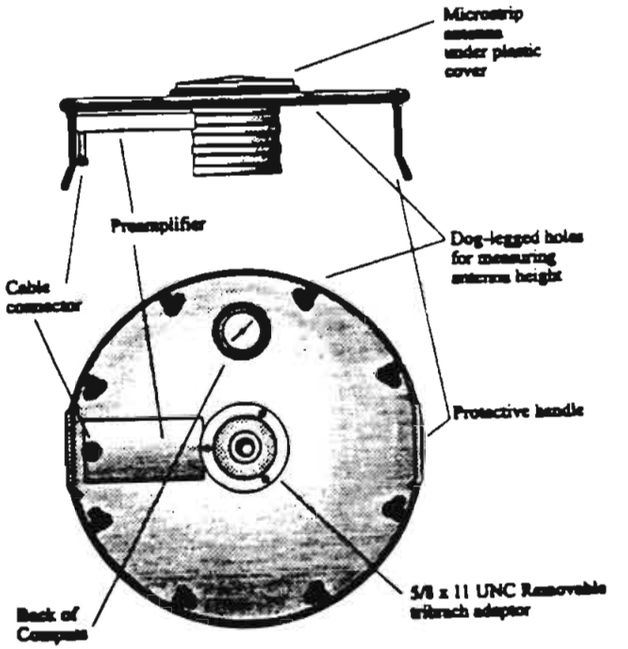


Figure 4. Antenna Platform (Side and Bottom Views)

The antenna platform can be mounted on a variety of tripods and range poles, using either a 5/8x11 threaded connector or tribrach connector. The special Ashtech GPS bipod range pole is useful for all kinematic survey use.

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