GPS 4100

INSTALLATION
AND
GENERAL INSTRUCTIONS

GPS 4100 Contents
Ag Leader Technology

Important Notices

Before beginning installation of your GPS 4100, please take the time to thoroughly read these instructions. Signal words (**CAUTION**, **IMPORTANT**, and *NOTE*) are provided to draw attention to information that is important for the safe/correct installation and operation of this product.

- **CAUTION**--will alert you to situations that will impact the physical safety of you or others.
- **IMPORTANT**—will alert you to the potential for damage to the product or loss of data.
- *NOTE*--will provide you with additional information to simplify a procedure or clarify a process.

After completing installation of the GPS 4100 we recommend that you place these instructions in the Options Section of your PF3000 or PF3000 Pro Operator's Manual to prevent their loss.

To receive upgrade/update information of this product you must send in or fax the Registration Form. Refer to the Registration Form for address and fax number.

Updating Operating Program

Your operating program version must be greater than 3.22 (greater than 3.23 for cotton mode) for the PF3000 to use the GPS 4100. The version of the monitors operating program currently installed is displayed when you turn on the PF3000.

If your version is before this, contact ***Ag Leader Technology*** at 515-232-5363 to obtain an update. You may also download the update off the Ag Leader web site at www.agleader.com.

Perform the following steps to install the new operating program:

Step	Action
1	Using a computer card reader, copy the file "upgrade.pld" to the memory card.
2	Insert the memory card in the monitor and turn on the monitor.
3	The monitor will detect a new operating program on the card. Press the SHOW FILES key. The monitor will display the version number of the current program and new program. Press ACCEPT key to install the new version.
4	The monitor will erase the old program and install the new program.
5	Check some of the field and load information and settings to double check that the new program is operating correctly

Parts, Tools for Antenna Installation

The following parts and tools are needed to install the antenna and its bracket:

- 5/16 in. self tapping bolts or 5/16 in. bolts with serrated nuts
- 1/4 in. drill bit for thin metal or 9/32 in. for thicker metal
- Antenna cable
- Three white cable tie-downs with self tapping screws
- Three white cable tie-downs
- L-bracket
- Antenna
- Marker
- Punch
- Hand drill

Installing the Antenna

The antenna magnet is very powerful and will stick securely to any metal surface. If needed, an L-bracket for mounting the antenna is provided. The L-bracket is used for mounting the antenna (especially on combines) but not necessary.

Determine a mounting location that is in the center of the swath and the highest point of the vehicle. Ensure that no part of the machine is blocking a clear view of the sky to the antenna. Ensure the antenna is mounted low enough so it won't be knocked off when pulling the vehicle into shed. Find a mounting location that if it does get struck it can slide off.

Installing with antenna magnet:

Step	Action
1	Locate a flat metal surface on the vehicle; set the antenna on it ensuring the magnet adheres securely.
2	Ensure you leave some slack in the cable between the antenna connection and first tie down. Route cable to cab using cable tie-downs every 12-18 inches to secure cable.

Installing antenna with L-bracket:

Step	Action
1	Place the top surface of the bracket 1/4-in. above the top of the highest metal surface of the vehicle. This ensures the antenna is the highest point of the vehicle and can slide off if struck.

<table>
<tr><td>2</td><td>After you determine this position, place the L-bracket against the metal surface, mark and punch the places you will be drilling.</td></tr>
<tr><td>3</td><td>Drill the holes in the surface and attach bracket as follows:
<table>
<tr><th>If the metal is …</th><th>Then use a…</th></tr>
<tr><td>Thin</td><td>1/4-in. drill bit and 5/16 in. bolts with serrated nuts.</td></tr>
<tr><td>Thick (1/8 in. or more)</td><td>9/32 in. bit and self-tapping bolt.</td></tr>
</table></td></tr>
<tr><td>4</td><td>Center the antenna on the top surface of the bracket. Place the antenna so the cable connector is pointing towards the right side of combine or vehicle.</td></tr>
<tr><td>5</td><td>Attach the cable to antenna, connecting the end with the plug to antenna.</td></tr>
<tr><td>6</td><td>Attach a white cable tie-down to metal surface 1 or 2 ft below and 6 in. to right of the L-bracket.

NOTE: You may need to increase the above distances, depending on the type of grain track extension you are using.</td></tr>
<tr><td>7</td><td>Place another white tie-down 3 to 5 ft to the right of the first tie-down.</td></tr>
<tr><td>8</td><td>Use a cable tie and attach the cable to the first white tie-down leaving some slack in cable between antenna connection and tie down to allow for strain relief if the antenna is knocked off the L-bracket.</td></tr>
<tr><td>9</td><td>Use another cable tie to attach the cable to the second tie-down.</td></tr>
<tr><td>10</td><td>Route cable to cab using cable tie-downs to secure cable.</td></tr>
</table>

Routing the Cable to the Cab

Follow these steps to route cable into the cab:

Step	Action
1	Find a place on the right side or bottom of the cab to route cable into cab (the point of entry is up to you). **IMPORTANT: The cable can be routed through windows or doors but make sure that there will be no damage to the cable.**

Step	Action
2	Attach the cable from the antenna to Port 1 of the PF3000 or AUX 1 on the PF3000 Pro without GPS. See Figures 1 and 2. *NOTE: If you are using the optional Lightbar, refer to Figures 1 and 2 for cable attachment.* *NOTE: If you are NOT using the optional Lightbar, tie the excess cable so it will not interfere with the operations inside the vehicle. The connector that attaches to the Lightbar will not be connected to anything.*

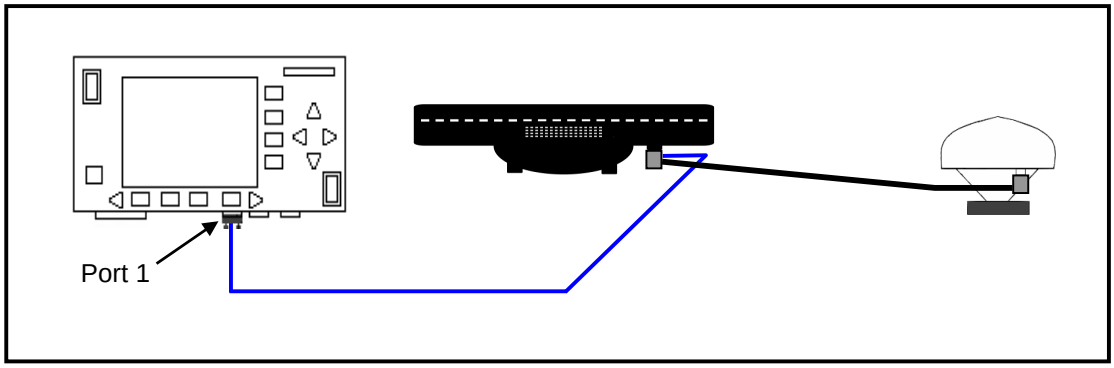

Figure 1. Cable attachment for PF3000, Optional Lightbar (if used) and GPS 4100

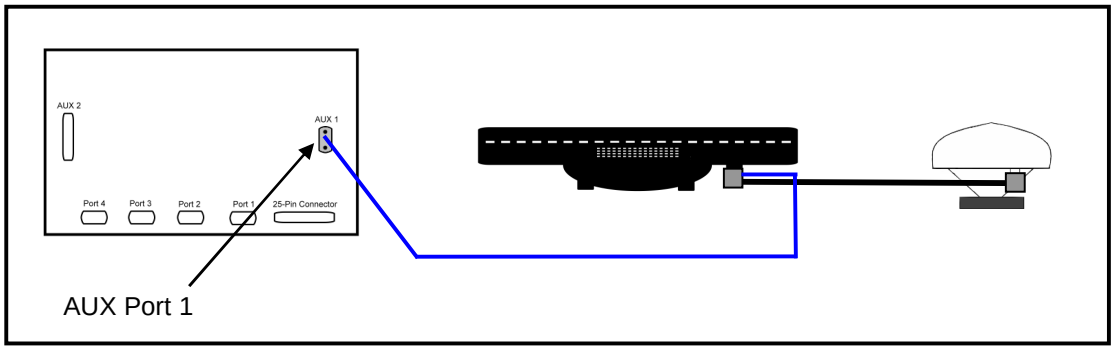

Figure 2. Cable attachment for PF3000 Pro without GPS, Optional Lightbar (if used) and GPS 4100

Overview

The GPS 4100 requires no initial setup to begin fieldwork. The PF3000 or PF3000 Pro will display a "D" or "G" on the top right hand corner of the display to indicate a GPS signal. A "D" indicates that you have a differential signal. A "G" indicates that you have a GPS signal and your GPS receiver is tracking four or more satellites (which means you can get an elevation reading). A lower case "g" indicates that you have a GPS signal but your GPS receiver is tracking only three satellites which means you can not get an elevation reading. Your GPS receiver must track four or more satellites to get an elevation reading. You may wish to use the GPS to show your ground speed, which requires changing the ground speed sensor settings. Refer to Primary and Secondary Speed Sensor under Vehicle Setup in the PF3000 or PF3000 Pro Operator's manual for instructions.

General Information

Wide Area Augmentation System (WAAS) differential correction is an alternative to subscription based satellite differential correction.

IMPORTANT: WAAS is currently free of charge, and is being funded by the Federal Aviation Administration (FAA). WAAS is currently in test mode, and Ag Leader Technology can not guarantee the availability or quality of its position signals. Only two (2) WAAS satellites are currently covering North America.

The following provides information to change factory settings on the GPS 4100.

WAAS Selection

If you are going to use the WAAS option complete the following:

Step	Action
1	Press Menu key on PF3000 until SETUP is displayed, press SETUP key.
2	Press bottom left or right arrow key until GPS is displayed and press GPS key. You should now see the screen shown in Figure 3.

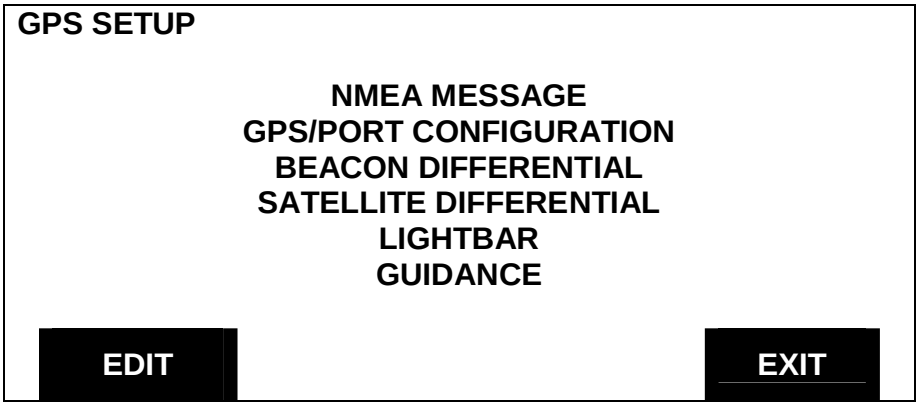

Figure 3. GPS SETUP Screen

Step	Action
3	At the GPS SETUP screen (Figure 3) scroll down to Satellite Differential Mode with down arrow key and press EDIT. You should now see the screen shown in Figure 4.

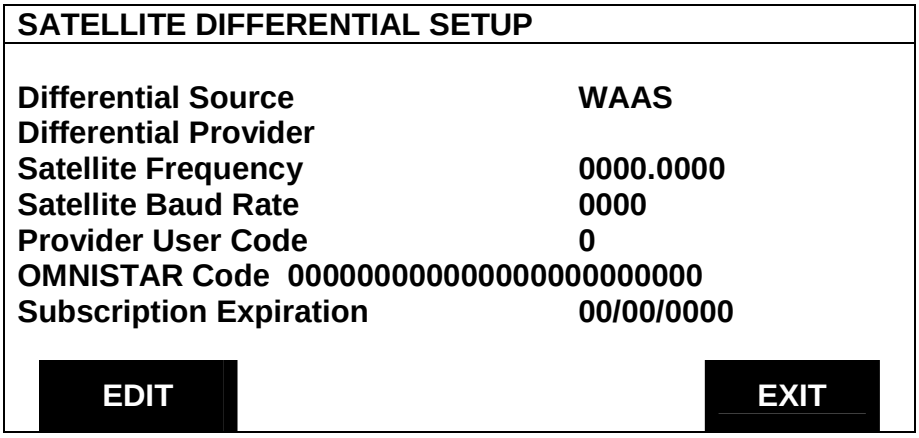

Figure 4. Satellite Differential Setup Screen

Step	Action
4	At the SATELLITE DIFFERENTIAL SETUP screen (Figure 4) Differential Source will be highlighted, press EDIT key and use UP or DOWN ARROW key until WAAS is displayed and press ACCEPT key.
5	Now press EXIT key to return to GPS SETUP screen, press EXIT key again to return to the main operating screen.

Satellite Selection

If you will be using the satellite differential option, complete the following steps depending on which service provider you select.

Step	Action
1	Press Menu key on PF3000 until SETUP is displayed, press SETUP key.
2	Press bottom left or right arrow key until GPS is displayed and press the GPS key.

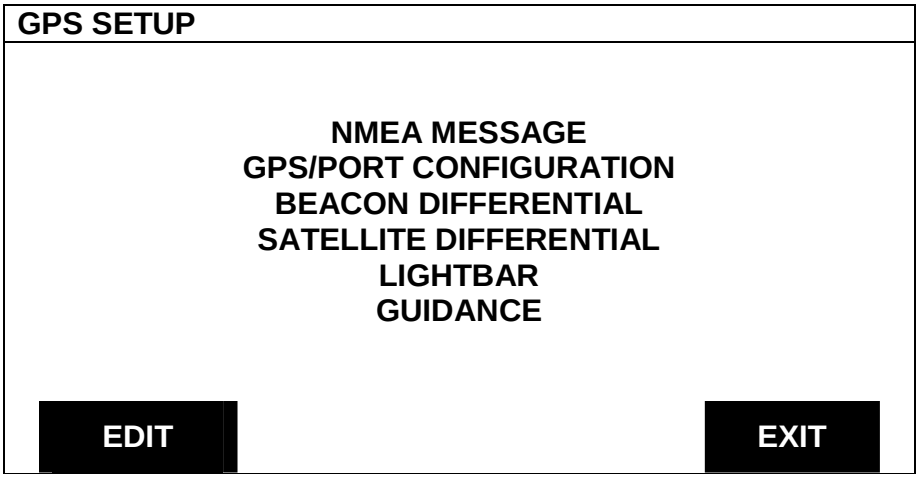

Figure 5. GPS SETUP Screen

Step	Action
3	At the GPS SETUP screen (Figure 5) scroll down to Satellite Differential Mode with down arrow key and press EDIT.

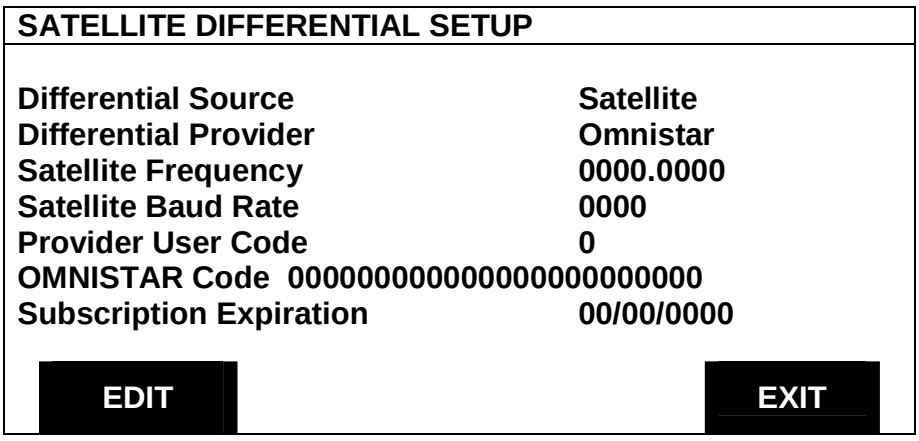

Figure 6. Satellite Differential Setup Screen

If you will be using…	Then…
Omnistar	At SATELLITE DIFFERENTIAL SETUP screen (Figure 6) Differential Source will be highlighted, press EDIT key and use up or down arrow key until Satellite is displayed and press ACCEPT key. Scroll down to Differential Provider and press EDIT key. Use the up or down arrow key until Omnistar is displayed and press ACCEPT key. Scroll down to Satellite Frequency and press EDIT key. Use the up or down arrow key to select your region (Figure 7) and press ACCEPT key. If you will be using a custom frequency (Figure 8) with this provider, scroll down to Custom (1) and push EDIT NAME key. Use the up/down and left/right arrow keys to name this frequency. Push EDIT VALUE key and use the up/down and left/right arrow keys to enter the frequency. Push ACCEPT key. Your customized frequency should appear as the Satellite Frequency.

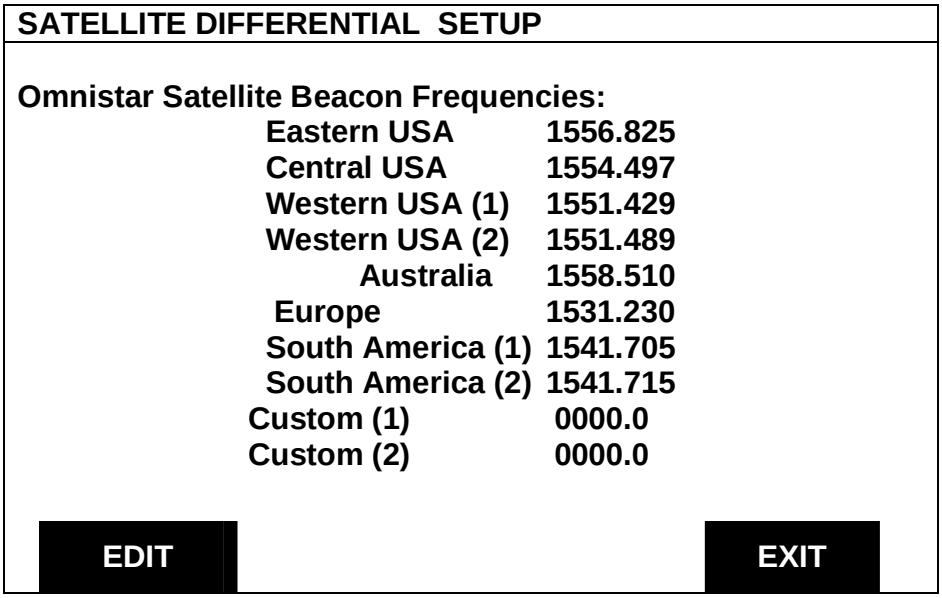

Figure 7. Omnistar Region Frequencies Screen

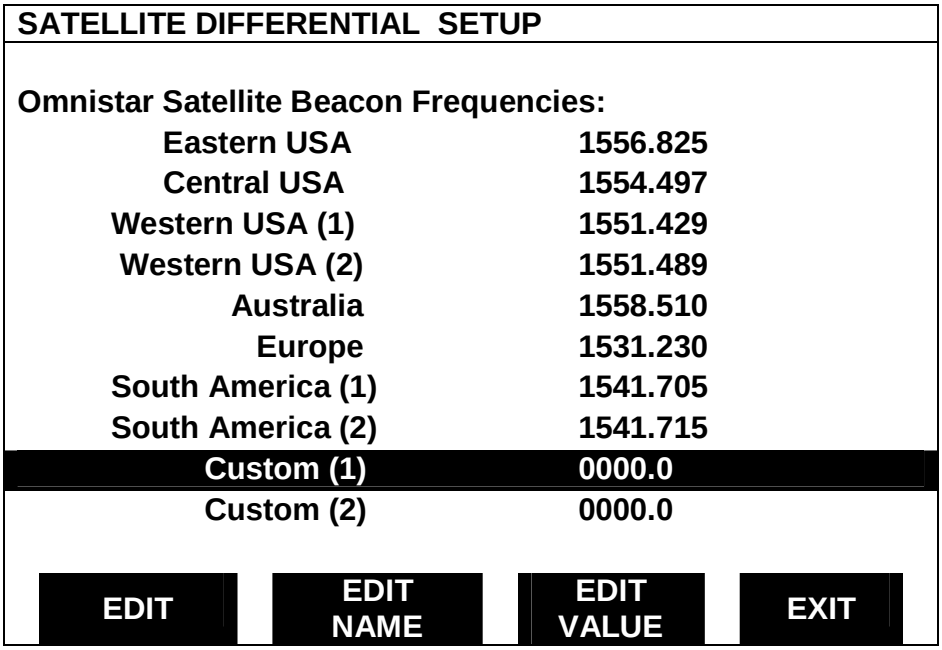

Figure 8. Custom Frequency Screen

If you will be using…	Then…
Omnistar	Before contacting Omnistar you must have the Receiver Serial Number (Found on the Add-On GPS Diagnostic screen – Press DIAG key, GPS key, Add-On GPS key) and the Provider User Code (this value will appear on screen shown on Figure 6 when Differential Provider is set to Omnistar). Call the Omnistar subscription number (1-888-666-4782 in the USA) and give them these two numbers. Omnistar will then give you a 24-digit code. Key the code into the right of Omnistar Code (See Figure 8) using up and down arrow keys. Once the code is entered, press ACCEPT key to send the code to the unit. Now press EXIT key to return to GPS SETUP screen, press exit key to return to operating screen. After 30 minutes, the receiver should start receiving corrections and display a "D" in the upper right hand corner of the PF3000.

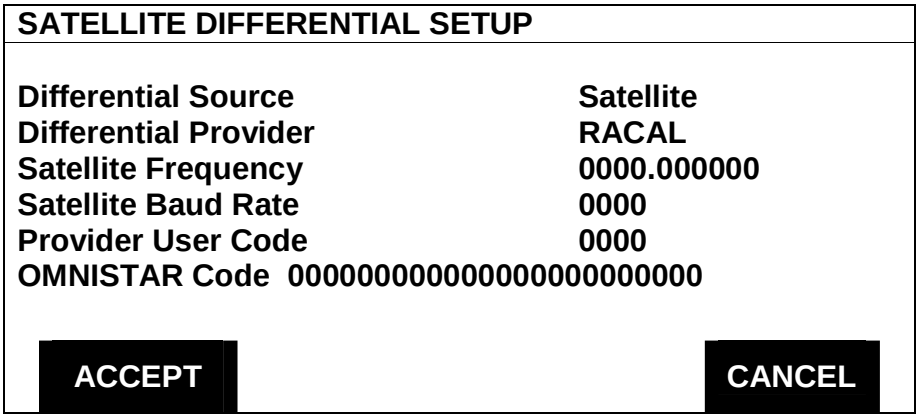

Figure 9. Satellite Differential Setup.

If you will be using RACAL…	Then…
RACAL	At SATELLITE DIFFERENTIAL SETUP screen (See Figure 9) Differential Source will be highlighted press EDIT key and use up or down arrow key until Satellite is displayed and press ACCEPT key. Scroll down to Differential Provider and press EDIT key. Use the up or down arrow key until RACAL is displayed and press ACCEPT key. Scroll down to Satellite Frequency and press EDIT key. Use the up or down arrow key to select your region (Figure 10) and press ACCEPT key. Use the up or down arrow key to select your region and press ACCEPT key. If you will be using a custom frequency (Figure 11) with this provider, scroll down to Custom (1) and push EDIT NAME key. Use the up/down and left/right arrow keys to name this frequency. Push EDIT VALUE key and use the up/down and left/right arrow keys to enter the frequency. Push ACCEPT key. Your customized frequency should appear as the Satellite Frequency.

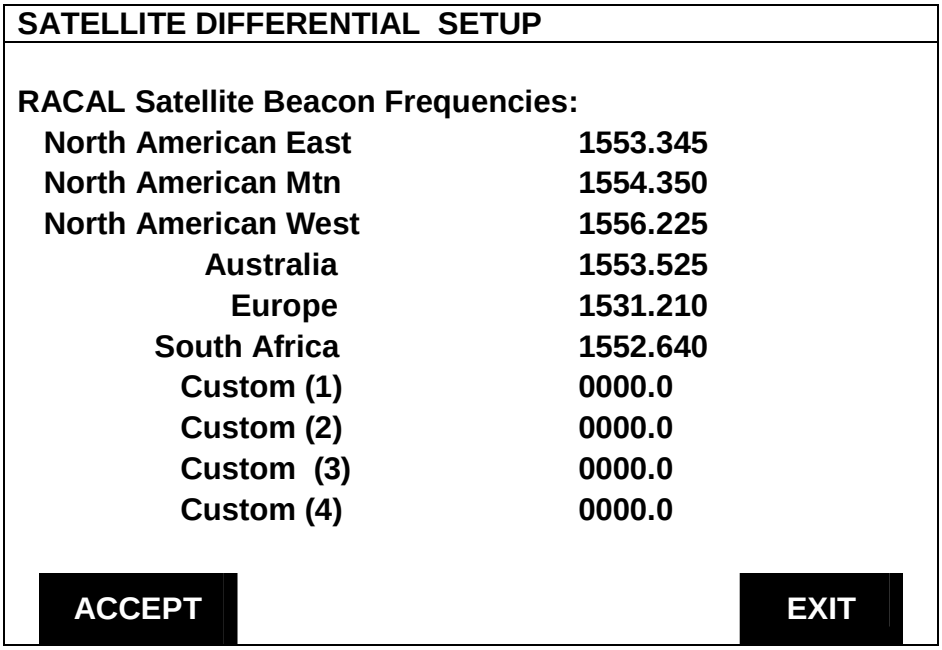

Figure 10. RACAL Region Frequencies Screen

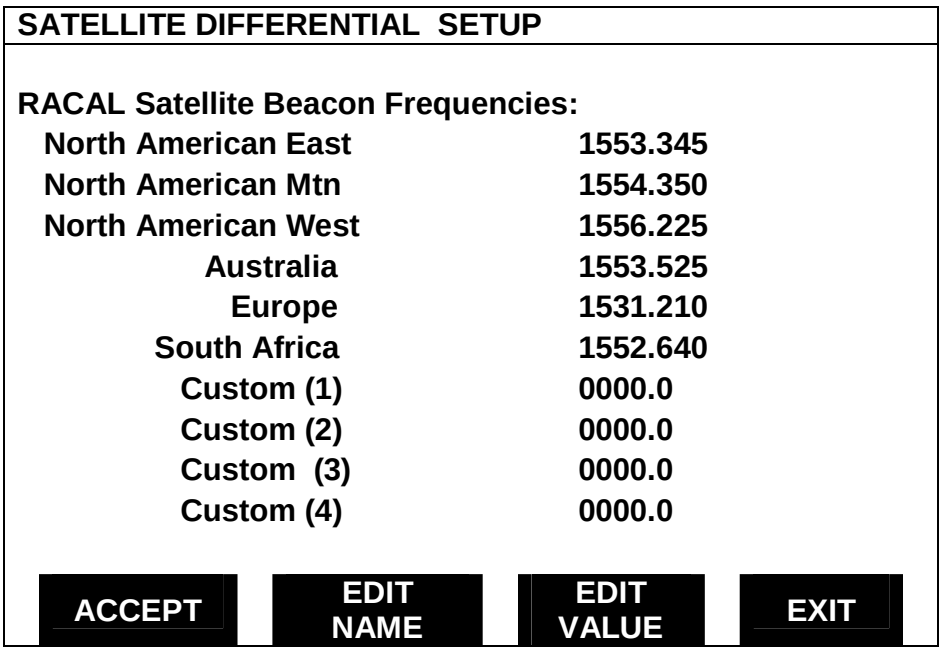

Figure 11. Custom Frequency Screen

If you will be using RACAL…	Then…
	Before contacting RACAL you must have the Receiver Serial Number (Found on the Add-On GPS Diagnostic screen – Press DIAG key, GPS key, Add-On GPS key) and the Provider User Code (this value will appear on screen shown on Figure 6 when Differential Provider is set to RACAL). Call the RACAL subscription number (1-888-434-7757 in the USA) and give them these two numbers. RACAL will activate a code for the serial number that was given. After the serial number is called in, press the EXIT key (Figure 12) to return to operating screen. A "D" should appear in the upper right hand corner of the PF3000. Within 15 to 30 minutes the receiver should start receiving corrections from RACAL.

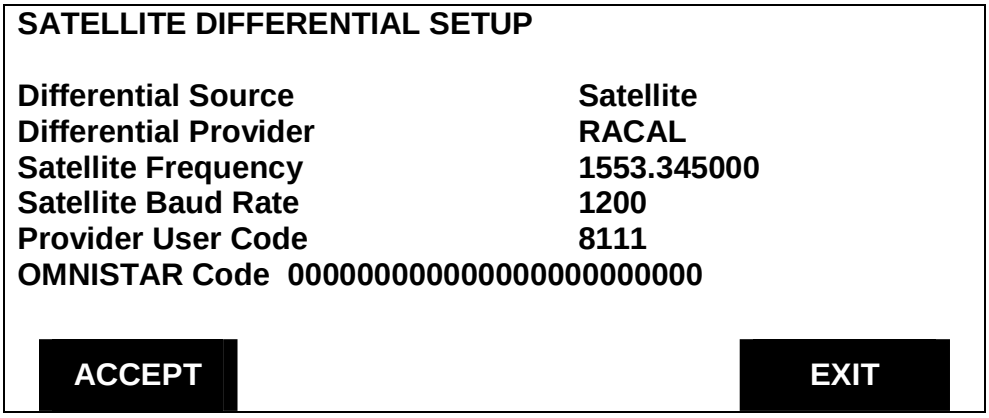

Figure 12.

Diagnostic Screen

The diagnostic screen (Figure 13) provides troubleshooting and reference information for the GPS. Provided are definitions of screen terms.

Press the DIAG key to view Figure 13. Then press the Add-On GPS key to view Figure 14.

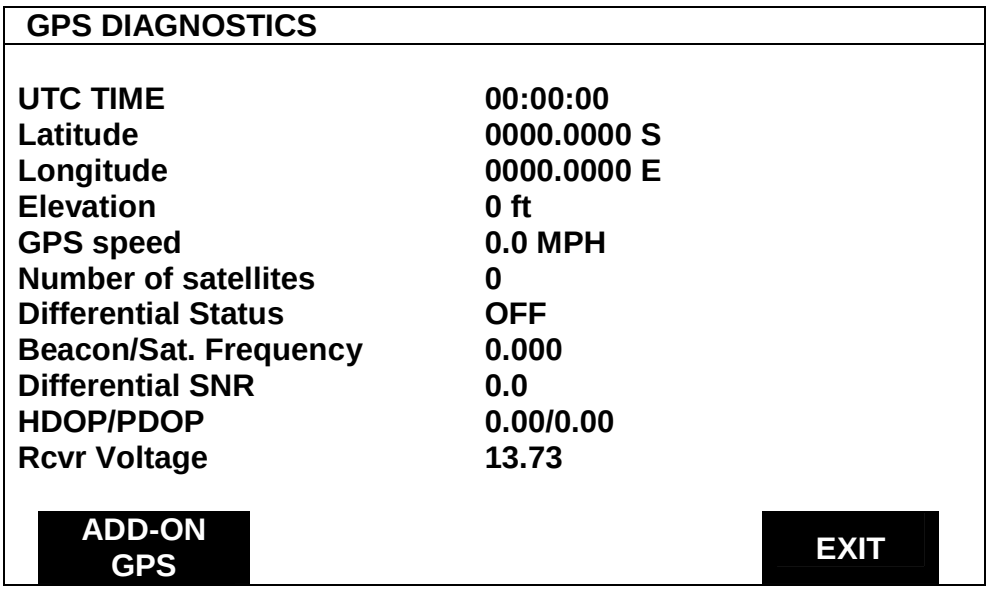

Figure 13. GPS Diagnostics Screen

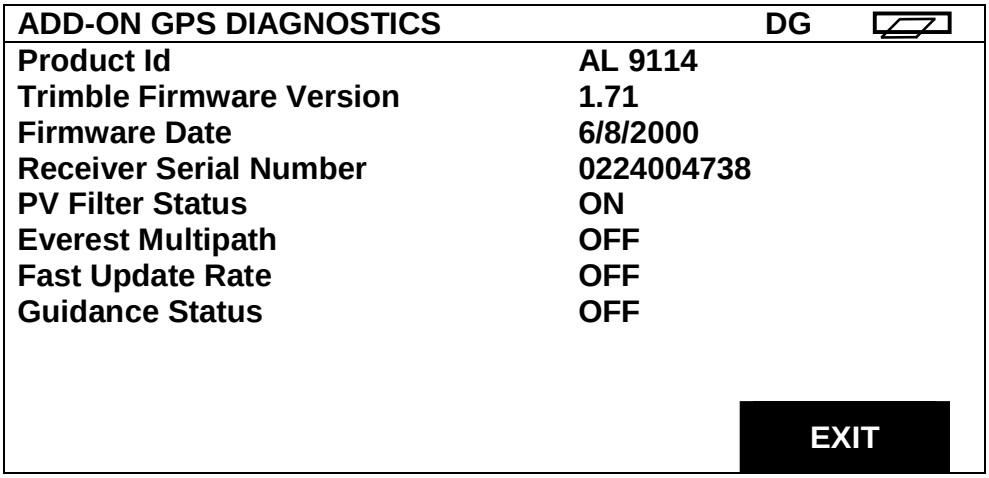

Figure 14. Add-On GPS Diagnostic Screen

UTC TIME: Greenwich Mean Time (GMT), the current time in Greenwich, England *NOTE: The US Coast Guard may also refer to GMT as "ZULU".*
Latitude: Current latitude of the receiver in degrees-minutes. fractional minutes.
Longitude: Current longitude of the receiver in degree-minutes.fraction minutes.
Elevation: Current elevation of the receiver in feet.
GPS Speed: Current speed of the receiver in miles-per-hour.
Number of Satellites: Indicates the number of satellites the unit is using. The unit can track a maximum of twelve satellites.
Differential Status: Indicates ON or OFF, telling you whether a differential signal is being used.
Beacon/Satellite Frequency: Indicates the frequency of the differential source that the GPS is using for the location of the differential source.
Differential SNR: Signal-to-noise-ratio (SNR) indicates the strength of the correction signal in relation to the amount of background noise that can interfere with signal reception. A good SNR is 10 to 18.
HDOP/PDOP: Horizontal Dilution of Precision (HDOP) indicates the quality of the horizontal GPS position. Position Dilution of Precision (PDOP) is a unitless measure indicating when the satellite geometry can provide the most accurate results. When satellites are spread around the sky, the PDOP value is low and the computed position is more accurate. When satellites are grouped close together the PDOP is high and the positions are less accurate.

NMEA Messages

The GPS unit uses Trimble TSIP to provide position information to the PF3000. This means that NMEA messages (Figure 15) do not need to be set and will not be displayed on the NMEA diagnostic screen.

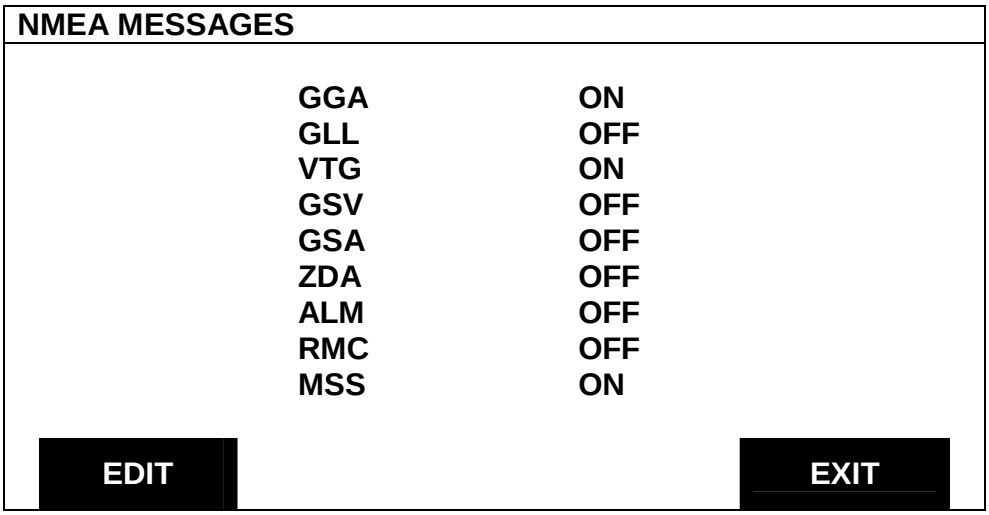

Figure 15. NMEA Messages Screen

GPS/Port Configuration

The GPS/Port Configuration screen (Figure 14) requires no adjustment at this time. This screen will be used for future options for the AUX Port of the GPS.

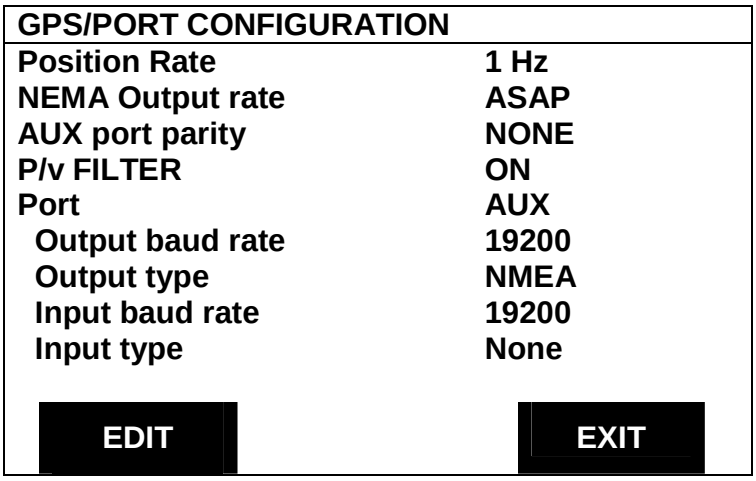

Figure 16. GPS/ Port Configuration Setup Screen

Troubleshooting

The following is a list of problems that you may encounter with the GPS 4100 and suggestions for troubleshooting. If you have a problem with the system, please review the list before calling **Ag Leader Technology**. If your troubleshooting does not solve the problem, please call Technical Support at **Ag Leader Technology (**515-232-5363).

Problem	Cause	Solution
Monitor dims when using external power source for PF3000.	• External power source for PF3000 does not provide enough power.	• New external power source is available to support GPS to PF3000.
After powering up the PF3000 you are unable to enter the GPS setup screen.	• PF3000 did not properly detect the GPS.	• Power the PF3000 down and then restart. • Ensure the connector cable between the PF300 and GPS is properly connected. • If these actions fail, please call Technical Support at 515-232-5363.
I lose "D" around buildings when using WAAS Differential	• WAAS signal isn't being transmitted. • The WAAS satellite you are using is being blocked.	• Go to Raytheons website (wwws.raytheontands.com/waas/) and check the current status of WAAS transmission. • There are only two (2) WAAS satellites that are low on the East and West horizon. Building and tree lines can easily block the signal.

Parts List—GPS 4100		
Part Name/Description	**Part Number**	**Quantity**
Manual Insert – GPS 4100	**3000368**	**1**
GPS 4100 – Antenna/Receiver	**3000332**	**1**
Antenna Bracket (L-shape)	**2000161**	**1**
Cable Kit (PF3000)	**2001252**	**1**
PF3000 to Lightbar to GPS 4100 Cable	2000978	1
Add-On GPS Cable Installation Kit	3000505	1
GPS 4100 Auxiliary Power/Data Cable (PF3000)	3000516	1
Cable Kit (PF Pro)	**2001253**	**1**
PF Pro to Lightbar to GPS 4100 Cable	2000979	1
Add-On GPS Cable Installation Kit	3000505	1
GPS 4100 Auxiliary Power/Data Cable (PF Pro)	3000517	1
Cab/Cable Install Kit	**3000505**	**1**
Cable ties—6 in. – Black	2002817-6	10
Cable ties—15 in. – Black	2002817-15	5
Alcohol Swab Pack	2002811	4
Grey Plastic Cable clamps	2002812	6

Updating GPS Firmware

As new firmware upgrades are released the GPS 4100 will need to be updated. This procedure requires a PC running the FlashLoader program. This software and an Auxiliary Power/Data Cable are included with the GPS 4100 system and are also available from *Ag Leader Technology*

Cable Attachment and Installing FlashLoader

This program is available for download from the Ag Leader web site at www.agleader.com. To install the program follow the steps below. Refer to Figure 17 for cable attachments.

Step	Action
Cable Attachment	
1	Connect the GPS 4100 Lightbar cable to the GPS 4100 receiver.
2	Attach Auxiliary Power Data cable to the GPS 4100 cable
3	Connect the GPS Power Supply to the male connector of the pigtail on the Auxiliary Power Cable.
4	Connect the remaining single 9-pin connector from the Auxiliary Power Data Cable to an open COM Port on the PC.
Install Flashloader	
1	Install Trimble Flashloader v.2.10 software on the PC.
	To start Flashloader program, click on Find Reciever.
2	Click on the check box by UPLOAD NEW FIRMWARE.
3	Select flash code file S171.TNR
4	Click PROCEED to begin the update process, when completed, click OK. **CAUTION: Any interruption during this process will leave the GPS inoperable and will require sending the receiver back for repair.**

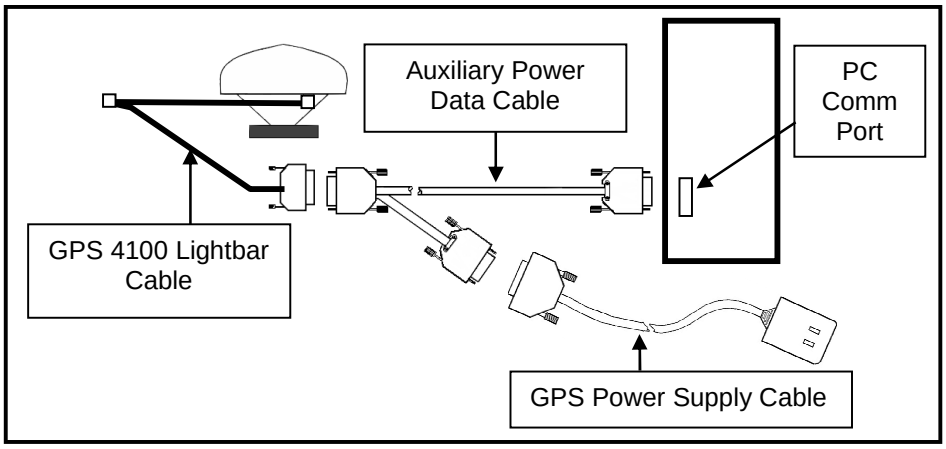

Figure 17. Antenna to PC cable connection

Installing AgRemote Software

*Ag*Remote software requires Windows 95, 98, or 2000. This program is used to Setup the GPS when you are not using the PF3000 or PF3000 Pro. If you have any questions or problems using this program contact Technical Support at 515-232-5363.

1. Download the AgRemote software from the Ag Leader web site at www.agleader.com.

2. In the file download dialog, select "Save this program to disk" and specify My Documents on your computer's harddrive.

NOTE: Download will take 5 – 30 minutes depending on your Internet connection speed.

3. Select My Documents from your computer's desktop.

4. In the My Documents window, double-click AGREMOTE.EXE.

5. Click NEXT and follow the instructions displayed by the Ag Remote setup program.

Commercial Satellite Differential Providers

OmniSTAR Contacts		Racal – LandStar Contacts	
North America	888-666-4782	North America	1-888-434-7757
Central & South America	1-713-785-5850	Central & South America	+1-713-785-5850
Europe	31-70-317 0900	Europe	(44)1224 249 700 Extn 7255
Africa	27-11-315 0420	Middle East	(9712) 554 817
Australasia	61-8-9322 5295	Africa	(27) 21 704 1600
Far East	65-542 5001		

Commercial Satellite Frequencies

OMNISTAR	
Region	**Frequency**
Eastern USA	1556.825
Central USA	1554.497
Western USA	1551.489
Europe	1531.230
Australia	1555.255
Indian Ocean	1538.050
Atlantic Ocean	1541.705 & 1541.715

RACAL	
Region	**Frequency**
USA East	1553.345
USA Mountain	1554.350
USA West	1556.255
Europe	1531.210
Australia	1555.330

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Product Registration

Ag Leader Technology stands by all new products with a 2-year limited warranty from the **warranty start date**. The **warranty start date** will initially be set to the date on which your product is shipped from ***Ag Leader Technology***.

If you return this registration/warranty card within 30 days of purchasing this product from your dealer, the **warranty start date** will be changed to the date that you purchased the product from your dealer. ***Ag Leader Technology*** reserves the right to request proof of the date of purchase stated.

Timely product registration will allow you to receive important product bulletins, upgrade information, and notice regarding product training in your area.

Register On-Line at www.agleader.com

(Click on Product Registration from the Quick Links list on the Ag Leader Home Page.)

OR

Return this sheet in the enclosed postage-paid envelope or by fax.
515-232-3595 - fax

Ag Leader Technology
2202 South Riverside Drive
P.O. Box 2348
Ames, Iowa 50010

Name: _____

Street Address: _____

City, State, ZIP: _____

Phone # (including area code): _____

Mobile Phone #: _____ Fax #: _____

Email address:_____

Ag Leader Dealer:_____

Date Purchased:_____

Monitor Serial #: _____ Flow Sensor Serial #: _____

GPS Antenna Serial #:_____ Elevator Mount Serial #:_____

Light Bar Serial #:_____ Key Pad Serial #:_____

Combine Model #: _____ Combine Serial #: _____