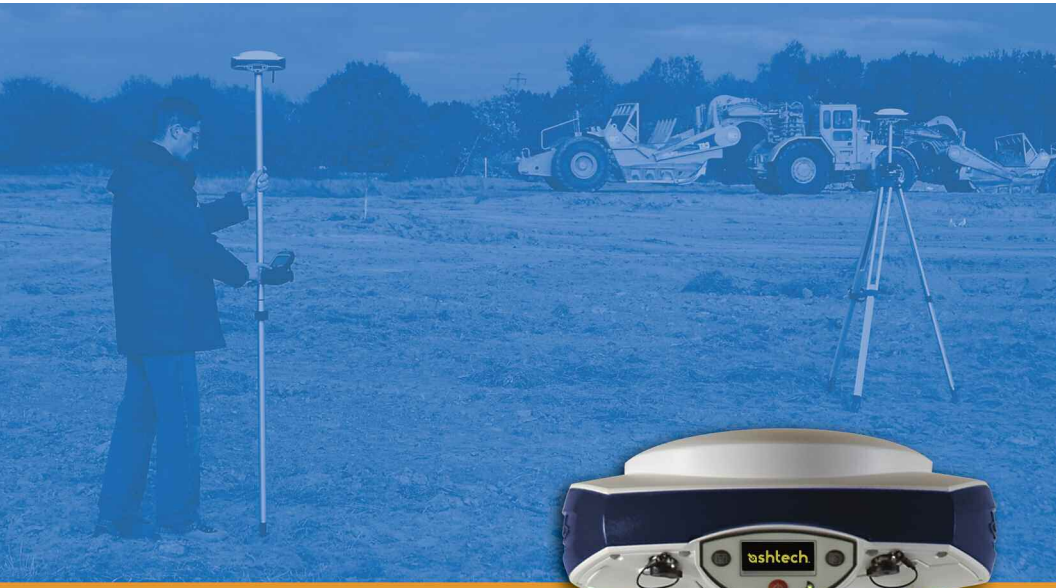
ashtech

ProMark™500



Getting Started Guide

English

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FCC Notice

ProMark 500 Receiver complies with the limits for a Class B digital device, pursuant to the Part 15 of the FCC rules when it is used in Portable Mode. See Note below related to Class B device.

Class B digital devices NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

– Reorient or locate the receiving antenna.
– Increase the separation between the equipment and receiver.
– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
– Consult the dealer or an experienced radio/TV technician for help.

When ProMark 500 is used with an external power supply or connected to an external device using the USB port, it complies with the limits for a Class A digital device, pursuant to the Part 15 of the FCC rules. See Note below related to Class A device.

Class A digital devices NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Remark: Any changes or modifications not expressly approved by Ashtech, could void the right for user to operate the equipment.

RF Safety Exposure To Radio Frequency Energy (SAR)

Radio transmitting devices radiate Radio Frequency (RF) energy during its operation. RF energy can be absorbed into the human body and potentially can cause adverse health effects if excessive levels are absorbed. The unit of measurement for human exposure to RF energy is "Specific Absorption Rate" (SAR).

The Federal Communications Commission (FCC), Industrie Canada (IC), and other agencies around the world have established limits that incorporate a substantial safety margin designed to assure the safety of all persons using this equipment. In order to certify this unit for sale in the US, Canada and Europe this unit has been tested for RF exposure compliance at a qualified test laboratory and found to comply with the regulations regarding exposure to RF Energy. SAR was measured with the unit (GSM Module) transmitting at its maximum certified RF power. Often, however, during normal operation the unit (GSM Module) will transmit much less than maximum power. Transmit power is controlled automatically and, in general is reduced as you get closer to a cellular base station. This reduction in transmit power will result in a lower RF energy exposure and resulting SAR value.

FCC and CE UHF Safety Statement

The different versions of the UHF Transmitters are FCC and CE compliant.

In order to comply with FCC and CE RF exposure safety guidelines as body-worn, normal use of unit, the following must be followed:

A distance of AT LEAST 10 feet (3 m) of separation between the users body and the unit (UHF Transmitter). This distance has been defined taken into account the FCC and CE Requirements and the worst output power configuration.

Do NOT use the device in a manner such that it is in direct contact with the body (e.g. on the lap). Such use will likely exceed FCC RF safety exposure limits. See www.fcc.gov/oet/rfsafety/ for more information on RF exposure safety.

Replacing Radio Transmitter Power Fuse

Radio transmitter P/N 800986-x0 is protected by a 4-A fuse inserted in the data/power cable. This Y-shaped cable is used to connect the transmitter to the ProMark 500 receiver via a 7-pin connector, and to the power battery.

Should you have to replace this fuse, please get a spare fuse, 4 A, fast acting, ATO type, and then do the following:

– Unplug the battery end of the data/power cable
– Open the fuse holder located along the data/power cable
– Extract the damaged fuse
– Insert the new fuse and then push the holder lid back into place
– Connect the data/power cable back to the battery.

Where to Find Information

This manual is designed to guide you through the basic ProMark 500 procedures. You can find additional information in the *ProMark 500 Reference Manual*, also provided on the ProMark 500 CD.

Warranties

Refer to the *ProMark 500 Reference Manual*.

Warning

Because Ashtech is migrating its products and publications gradually from the former to the new brand, there may still be some references to the former brand. During that transition, please keep in mind that, as from January 2010, the only valid name for our brand is “Ashtech”.

English

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Introduction

English

What is ProMark 500?

Congratulations! You have just acquired the latest dual-frequency ProMark 500 GNSS Surveying System from Ashtech!

GNSS has revolutionized control surveys, topographic data collection and construction surveying. Purchasing the right tools for a professional job is essential in today's competitive business environment. Learning to put these tools to work quickly and efficiently will be the focus of the present manual.

Compared to its predecessors, ProMark 500 is more compact and lightweight while integrating more technology, such as the exclusive BLADE™ algorithms and multi-constellation (GPS+GLONASS+SBAS) capabilities.

In addition, because it's easy to use, you will be able to focus on your job and forget almost everything about the technical aspects of your equipment. No more cables, no more clip-on modules: ProMark 500 will be the reliable tool you are expecting for all your GNSS survey operations!

Scope of this Guide

This guide is designed to help you rapidly familiarize yourself with your new equipment. For the sake of conciseness, only a selection of the many ProMark 500 and FAST Survey functions are presented in this guide.

Most notably, in the RTK surveying section, only the use of radios is fully described in the implementation of the data link. The other solutions are only outlined. For a full description of these solutions, refer to the *ProMark 500 Reference Manual*.

Likewise, in the Logging Raw Data section, the assumption is made that raw data logging takes place simultaneously with the RTK field operations, which means the setup and configuration of the equipment is as described in the RTK surveying section. In fact, post-processed surveys can be conducted with ProMark 500 using optimized setups and configurations for static, Stop&Go and kinematic surveys. These are also discussed in the *ProMark 500 Reference Manual*.

Lastly, this guide only introduces a couple of FAST Survey functions, which are "Stake Points" and "Store Points". For a detailed and comprehensive description of all the FAST Survey functions, refer to the *FAST Survey Reference Manual*.

English

System Components Overview

The tables below provide an overview of the different key items composing the ProMark 500.

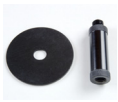
Depending on your purchase and based on the type of survey you wish to perform, you may only have some of the listed items. Please refer to the packing list for an accurate description of the equipment that has been delivered to you.

Basic Supply

Item	Part Number	Picture
ProMark 500 GNSS receiver with standard accessories	990596	
7.4 V-4.4 Ah Li-ion Battery Pack (rechargeable)	111374	
ProMark500 User Documentation CD	501503	

Accessories, General Purpose

Item	Part Number	Picture
AC/DC Power Supply Kit (includes external AC adapter, battery charger and cable extension for powering ProMark 500 directly from the AC adapter)	802064	
USB Device Cable (short). Makes ProMark 500 a USB host.	702103	
USB Host Cable (long) Makes ProMark 500 a USB device.	702104	
HI Measurement Tool	111146	

Item	Part Number	Picture
Vertical Antenna Extension	103717	
Field bag	205923	
Optional carrying case, rigid, for base/rover system	206215	 

Communication Modules and Associated Antennas

Item	Part Number	Picture
U-Link TRx, 12.5-kHz channel bandwidth	Transmitter: 802080-10 (0.5/2/4W; 410-430 MHz) 802080-30 (0.5/2/4W; 430-450 MHz) 802080-50 (0.5/2/4W; 450-470 MHz) Repeater: 802106-10 (0.5/2/4W; 410-430 MHz) 802106-30 (0.5/2/4W; 430-450 MHz) 802106-50 (0.5/2/4W; 450-470 MHz) Each P/N includes a whip antenna, and an antenna bracket. The Y-shaped power/data cable is an integral part of the transmitter (no connector).	 Picture of transmitter with its cable
Radio Transmitter, 12.5-kHz channel bandwidth	800986-10 (0.5/4W, 410-430 MHz) 800986-30 (0.5/4W, 430-450 MHz) 800986-50 (0.5/4W, 450-470 MHz) Each P/N includes a whip antenna, an antenna bracket and a Y-shaped data/power cable (P/N 730476).	 Picture of transmitter alone
Pacific Crest Transmitter, 25-kHz channel bandwidth	110972-10 (35 W, 410-430 MHz) 110972-30 (35 W, 430-450 MHz) 110972-50 (35 W, 450-470 MHz) Each P/N includes a whip antenna, an antenna bracket and an OEM Y-shaped data/power cable.	 Picture of transmitter alone

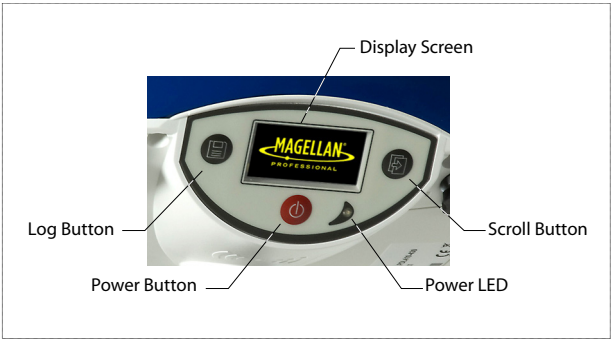
Item	Part Number	Picture
Radio receiver kit (includes radio module, whip antenna and small parts)	U-Link Rx: 802083-10 (410-430MHz, 12.5 kHz) 802083-30 (430-450 MHz, 12.5 kHz) 802083-50 (450-470 MHz, 12.5 kHz) PacCrest: 802068-10 (410-430 MHz, 12.5 kHz) 802068-15 (410-430 MHz, 25 kHz) 802068-30 (430-450 MHz, 12.5 kHz) 802068-35 (430-450 MHz, 25 kHz) 802068-50 (450-470 MHz, 12.5 kHz) 802068-55 (450-470 MHz, 25 kHz)	
Quad-band GSM antenna	111397	

Base Accessories

Item	Part Number	Picture
External DC Power Cable for Receiver (fuse included)	730477	
Transmitter Data/ Power Cable	730476	

Equipment Description & Basic Functions

Front Panel View



Indicators & Controls

Power button

To turn on the ProMark 500, hold the Power button pressed until the power LED lights up.

To turn off the ProMark 500, hold the Power button pressed until the “Magellan Professional” screen is displayed. Then release the button and wait until the ProMark 500 shuts down.

Power LED

This indicator is on when the ProMark 500 is on, and off when it is off.

Display Screen

The display consists of a 128 x 64-pixel, 1.5-inch monochrome yellow screen using organic LED technology (OLED). It is oriented slightly downwards so the screen can easily be read when the ProMark 500 is installed on top of a range pole.

Used in conjunction with the Scroll button, the display screen allows you to view different pages of information. See *Display Screens on page 10* for a detailed description of the information available from this screen.

After a few seconds of inactivity (i.e. Scroll button idle), screen luminosity turns from high to low level.

Scroll button

Press this button shortly to scroll through the different pages of information viewed on the screen.

If an alarm is reported on the display screen, a short press on the Scroll button will acknowledge the alarm. The Scroll button will recover its display scrolling function only after all the alarms have been acknowledged this way.

Another function of the Scroll button is to re-activate the screen backlight after the latter has automatically been turned off. The Scroll button is also used in the firmware update procedure.

Log Button

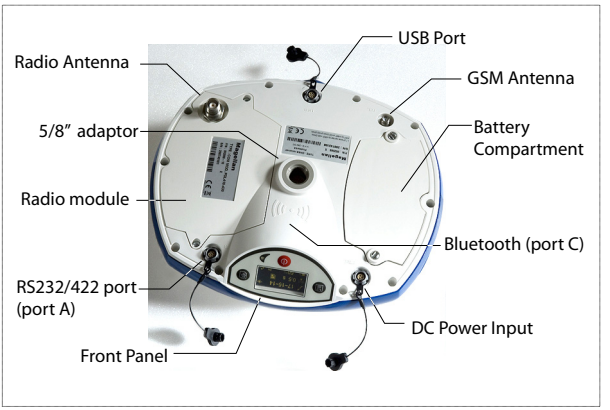
Press this button briefly to start recording raw data on the selected storage medium.

Another short press on this button will immediately stop raw data recording.

Buzzer

The internal buzzer will sound an alarm whenever a warning message is reported on the screen. The buzzer will beep until you acknowledge the warning message by pressing the Scroll button.

Bottom View



Battery, Connectors & Module

Battery Model & Battery Compartment

The battery used in the ProMark500 is a 7.4-V DC - 4400 mAh rechargeable battery. It is a standard model used in many camcorders.

The battery is housed in a battery compartment accessible from underneath the ProMark 500. The compartment door can be removed using a coin to release the two quarter-turn screws.

DC Power Input

A three-contact, female connector (Fischer type) allowing the ProMark500 to be powered from either the provided AC adapter (connect the cable extension between ProMark 500 and the end of the AC adapter output cable), or an external 9- to 28-V DC battery through cable P/N 730477 (cf. base configuration with radio).

GSM Antenna

A coaxial female connector (SMA type) allowing you to connect a GSM whip antenna to the ProMark 500.

Radio Antenna

A coaxial female connector (TNC type) allowing you to connect a radio whip antenna to the ProMark 500. This connector is available only if the ProMark 500 has been fitted with a radio module.

Radio Module

A module allowing ProMark 500 to receive and process corrections from a base. When a radio module is used, a radio antenna must be connected (see above). When no radio receiver kit is delivered, a single compartment door is provided instead, with no connector on it.

USB Port

A nine-contact female connector (Fischer type). Depending on how it is configured, the USB port can be used in two different ways:

1. For a USB host such as a mass storage device. In this case, you should use the special adaptor cable provided (P/N 702103) to attach the USB key to the ProMark 500. This configuration can be used to log raw data on the USB key or upgrade the ProMark 500 firmware from the files stored on the key.
2. For a USB device allowing ProMark 500 to be seen as a disk from the computer connected to this port. In this configuration, files can be transferred between the ProMark500's internal memory and the computer using the USB cable provided (P/N 702104).

RS232/422 Serial Port

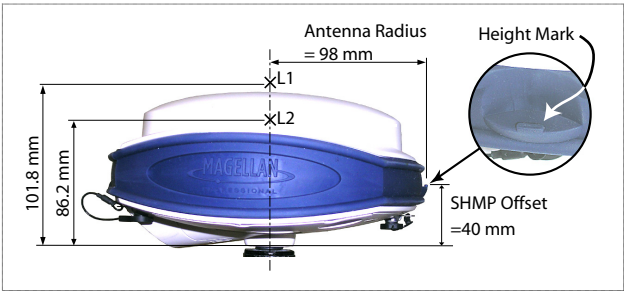
A seven-contact female connector (Fischer type) allowing you to connect the ProMark 500 to an external device via an RS232 or RS422 serial line (default: RS232), as explained in the *ProMark 500 Reference Manual.*

Bluetooth Device

An integrated Bluetooth module allowing the ProMark 500 to communicate with a Bluetooth-enabled field terminal through a wireless connection.

Antenna Characteristics

The diagram below gives the dimensional parameters of the ProMark 500 antenna required for the system to determine the true height of the antenna from the measured value obtained using one of the standard height measurement methods, i.e. slant or vertical.



The height mark allows you to hook the measure tape onto it so you can unroll the tape down to the survey mark and read the slant height measurement directly on the tape.

Special Button Combinations

- With the ProMark 500 OFF, pressing the Power, Log and Scroll buttons simultaneously for a few seconds will restore all the factory settings. **Always use this combination after changing the radio module**. This allows the receiver to recognize the new module.
- With the ProMark 500 OFF and a USB key connected, pressing the Power and Scroll buttons simultaneously for a few seconds will cause the ProMark 500 to start a firmware upload process. If there is no USB key connected or the key does not contain a firmware upgrade, then the process will abort after a few seconds.

  Because data has to be decompressed on the USB key during upgrades, the USB key must be unlocked, with at least 10 MBytes of free memory, before starting the upgrade.

These button combinations are summarized in the table below:

Button Combination	ProMark 500 State	Function
Power+Log+Scroll	OFF	Restores Factory Settings.
Power+Scroll	OFF	Initiates firmware update from USB key.

Display Screens

If you press the Scroll button several times, you will see the following displays successively.

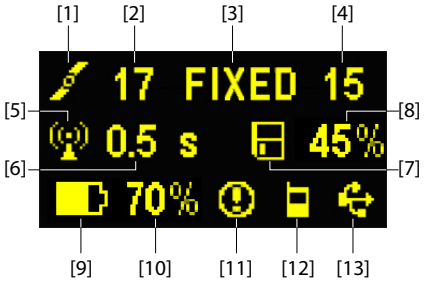
Power-On Screen

When you power on the receiver, the Magellan Professional logo appears on the screen. It is displayed until the receiver has completed its auto-test (this takes about 30 seconds).

Then the General Status screen is displayed.

General Status Screen

An example of General Status screen is shown below.



This screen displays the following information:

- : Satellite icon **[1]** (always displayed).
- Number of satellites tracked **[2]**.
- Position solution status **[3]**:
  - NONE: Position not available
  - AUTO: Autonomous GPS position
  - DGPS: Differential GPS position
  - S DGPS: SBAS Differential GPS position
  - FLOAT: Float solution
  - FIXED: Fixed solution (RTK is operational)
  - BASE: This receiver is configured as a base.

- Number of satellites used **[4]**: Number of satellites used in the position processing, regardless of the current position solution status.
-  : Data link icon **[5]**. This icon is displayed only when corrections are received and at least a float solution is available.
- Age of corrections **[6]**, in seconds. This value is displayed only when corrections are received. No age of corrections is displayed in S DGPS mode.
-  : Raw data logging icon **[7]**:
  - Animated: Raw data logging in progress
  - Fixed: No raw data logging in progress.
- Percentage of free memory in the storage medium used **[8]**.
-  : Battery icon **[9]** with visual indication of remaining charge. If an external power source is used (AC adapter or external battery), the battery icon will be animated to indicate battery charging in progress.

   is displayed when there is no battery in the compartment and the receiver is operated from an external power source.
- Power status **[10]**.

Icon	Definition
Percent value	Percentage of remaining battery. This indication will flash when the remaining energy drops below 5%.
	Replaces percentage when an external power source is used.

- Alarm status **[11]**.

Icon	Definition
	Alarm detected. Press the Scroll button to view the alarm type. Press it again to acknowledge the alarm, which then disappears from the list. Unless there is another alarm in the queue, in which case you will have to resume the acknowledge sequence, the screen then displays the memory screens.
None	No alarm detected

- GSM status **[12]**. This may be one of the following icons:

Icon	Definition
Blank	GSM module turned off.

Icon	Definition
	Blinking icon: GSM module turned on. Indicates signal strength received at current location. The higher the number of bars, the better the signal. Fixed icon: GSM module turned on and initialized (ready for a connection). Indicates signal strength received at current location.
	GSM module on line.

- [**13**]: USB status and/or Bluetooth status.

Icon	Definition
	USB port connected to active device
	Bluetooth active
	These two icons will appear successively when both the USB port and Bluetooth are active.
Blank	USB port unconnected and Bluetooth inactive.

Memory Screens

From the General Status screen, press the Scroll button to access the Memory screens. Memory screens appear successively (see examples) at a display rate of about five seconds:

Left screen:

- First line: Percentage of free space in the internal memory.
- Second line: Number of files currently stored in the internal memory.
- Third line: Percentage of free space on the USB mass storage device.
- Fourth line: Number of files currently stored on the USB mass storage device.

Right screen:

- First line: Total space occupied by the files currently stored in the internal memory.
- Second line: Nominal size of the internal memory.
- Third line: Total space occupied by the files currently stored on the USB mass storage device.

- Fourth line: Nominal size of the USB mass storage device.

About the "*" symbol:

- It can only appear at the end of the first or third line.
- Where placed, it indicates that this storage medium is used for data logging.

What if there is no USB mass storage device connected to the receiver?

- Parameters relevant to the USB key size and space used and available are void (three dots displayed instead).
- Number of files is forced to "0".

Receiver Identification Screen

From any of the two Memory screens, press the Scroll button to access the Receiver Identification screen. See example below.

- Receiver Serial Number
- Firmware Version
- Receiver Bluetooth Identifier

Position Computation Screen

From the Receiver Identification screen, press the Scroll button to access the Position Computation screen. This screen displays the three geographical coordinates of the position currently computed by the receiver. See example below.

The upper line contains the same information as in the upper line of the General Status screen. A new press on the Scroll button will take you back to the General Status screen.

Screen Backlight

The screen backlight is automatically turned off if no key is pressed for 1 minute. When the backlight is off, a short press on the Scroll button will turn it back on. The Scroll button will then recover its usual functions.

Data Transfer Screen

For more information on the screen displayed when downloading files, refer to *Downloading Raw Data on page 51*.

Charging Batteries Before Use

Make sure the battery is fully charged for each ProMark 500 you will be using in the field. Follow the instructions below to charge a battery.

Removing the Battery from the ProMark 500

Unless the battery has already been taken out, do the following:

- Put the ProMark 500 upside down.
- Remove the battery door, accessible from underneath the ProMark 500, by loosening the two quarter-turn screws (see picture) using a coin.

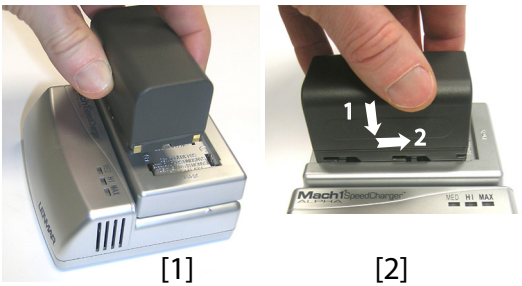
- Keeping one hand on the battery still in its compartment, put the ProMark 500 the right way up. The battery will then easily slide out of the battery compartment.

Charging the Battery

The battery charger comes with a separate universal AC adapter fitted with a 1.5-m output cable. The AC adapter includes a choice of four different, detachable plug types. Follow the instructions below to operate the charger.

- Choose the plug type that is suitable for your country.
- Secure that plug on the AC adapter by giving the plug the right orientation with respect to the adapter, then pushing and rotating it by about 10 degrees clockwise until you hear a “click”.
- Connect the cable from the AC adapter to the battery charger.
- Give the battery the right orientation with respect to the charger **[1]** (the battery terminals should come into contact with the two sets of connectors on the charger),

then push the battery against the plate and slide it forward **[2]** until it locks into place.



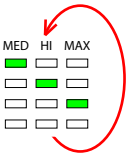
[1] [2]

- Plug the adapter into an AC outlet. Battery charging starts immediately.

  For a low battery that's being charged, you will first see the three LEDs switch on and off, one after the other, followed by a short period of time when none of the LEDs is on (see **[3]**).

  After about two hours of charging, the MED LED will stay on **[4]**. A few minutes later, the HI LED **[5]**, and then the MAX LED **[6]** will also stay on.
- When the three LEDs are on, this means the battery is fully charged and can be disconnected from the charger.

[3]



[4]

[5]

[6]

Inserting the Battery in the ProMark 500

- With the ProMark 500 upside down, insert the battery into the compartment making sure the battery has the right orientation (the battery terminals should come into contact with the two sets of connectors located at the bottom of the compartment).
- Place the battery door over the battery and tighten the two screws, using a coin. Note that, once it is properly secured, the battery door pushes the battery against the bottom of the compartment to ensure electrical connection of the battery to the ProMark 500.

RTK Base Setup

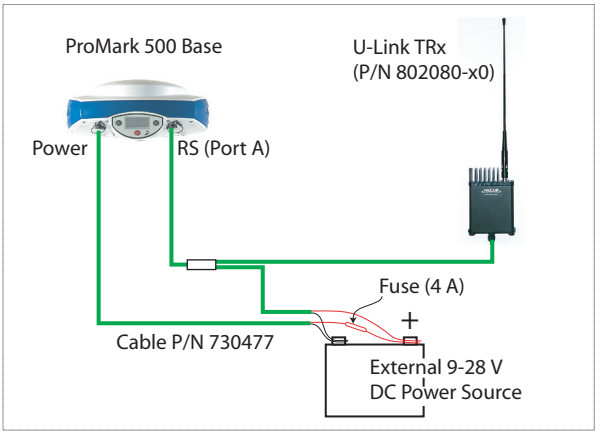
Prerequisites

- You will need a tripod and a tribrach (not provided) to install the base. The provided antenna extension pole fitted with a 5/8" male adaptor is also required in this configuration.
- For a long-range radio link, i.e. more than 1 mile or 1.6 km, for which the radio antenna should be placed as high as possible, it is good practice to install the antenna on top of an antenna pole secured on a tripod (neither of these items is provided).
- To power the radio, you need an external 9-28 V DC (U-Link TRx), 10-16 V DC (Radio P/N 800986-x0) or 9-16 V DC (Pacific Crest radio) power source. In all cases, using a standard 12-V DC battery is a convenient choice. In this configuration, the ProMark 500 can be powered either from the same power source (recommended), using cable P/N 730477, or from its internal battery.

  Powering the ProMark 500 from the external battery offers two advantages:

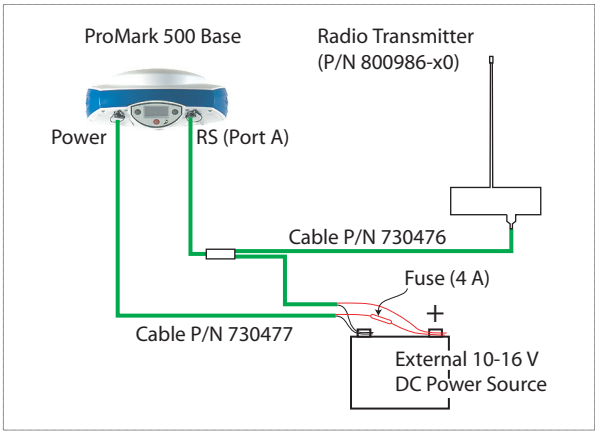
  1. Operating sessions can be extended significantly.
  2. The external battery operates as a trickle charger for the ProMark 500's internal battery.

U-Link TRx The connection diagram is as follows.



Mount the different items as shown on the picture.

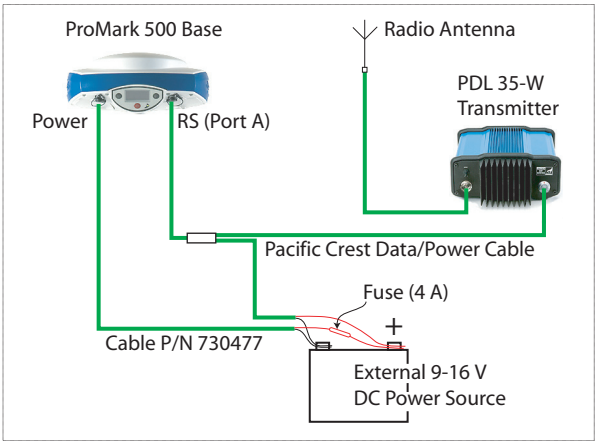
Radio P/N 800986 The connection diagram is as follows.



Mount the different items as shown on the picture.

PacCrest Radio Link

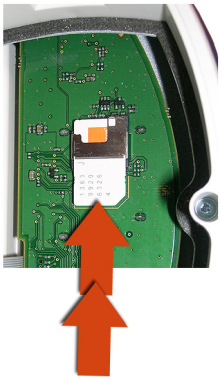
The connection diagram is as follows.



Mount the different items as shown on the picture.

RTK Rover Setup

Prerequisites



- Use a range pole fitted with a 5/8" male adaptor at the upper end (not provided).
- If a radio link is used with the base, your rover should normally have been fitted with the radio module that matches the reception band covered by the radio transmitter used at the base.
- If a GPRS connection is used, your rover should normally have been fitted with the SIM card that will allow it to perform a network connection.

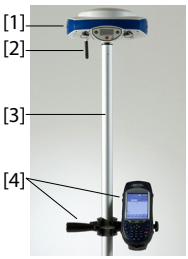
  To connect the SIM card, first use a flat screwdriver to loosen the two quarter-turn screws securing the radio module. Remove the module. This gives access to an electronic card on which you can insert the SIM card as shown on the picture.

Radio Link

Mount the different items as shown on the picture, including the ProMark 500 **[1]**, the radio antenna **[2]**, the range pole **[3]** and the field terminal with its mounting bracket **[4]**.

Caution! Use of a non-metal range pole is recommended to maintain the performance level of the radio antenna.

GSM/GPRS Connection



As a standard feature, the ProMark 500 incorporates a built-in GSM modem, which means you only have to connect the GSM antenna if you have paid for activation of the hardware. Mount the different items as shown on the picture, including the ProMark 500 **[1]**, the GSM antenna **[2]**, the range pole **[3]** and the field terminal with its mounting bracket **[4]**.

Caution! Use of a non-metal range pole is recommended to maintain the performance level of the GSM antenna.

Getting Started With FAST Survey

Registering as a FAST Survey User

The first time you start FAST Survey, you will be prompted to register your license of the software. If you do not register, FAST Survey will remain in demo mode, limiting each job file to a maximum of 30 points.

How to Register

FAST Survey registration is done via the Internet at the following address:

http://update.carlsonsw.com/decode_xml.php?reg_type=dc&prod_name=Magellan%20Fast%20Survey

Choose Yes to start the registration process. You will be required to enter the following information:

- User Name
- Company Name
- Serial Number*
- Email Address
- Phone Number
- Fax Number
- Hardware ID#1*
- Hardware ID#2*
- Reason for Install
- Registration Code*

*: Select **Equip>About Magellan Fast Survey>Change Registration** in FAST Survey to read this information.

After you submit this information, your change key will be displayed and emailed to the address that you submit. Keep this for your permanent records. You may then enter the manufacturer and model of your equipment.

If you do not have access to the Internet, you may fax the above information to (+1) 606-564-9525. Your registration information will be faxed back to you within 48 hours. During this time, you may continue to use the program without restriction. After you receive your Change Key, enter it and tap **OK**. You can then create a new FAST Survey job, as explained further.

Saving your registration in the Field Terminal

When you register FAST Survey in a MobileMapper CX, the code is automatically and safely saved at the end of the registration procedure.

With a Juniper Allegro CX, you need to perform a RAM backup or a System Save to be sure your authorization code will not be lost when you next reboot your Allegro CX. If you cannot find this option on the Allegro CX Start menu, then open the Control Panel and choose RAM backup.

Creating a New FAST Survey Job

1. Turn on the field terminal and wait until the boot sequence is complete.
2. Make sure the clock is set properly before starting FAST Survey.
3. Double-tap  to launch FAST Survey.
4. Tap the **Select New/Existing** Job button. This opens the Coordinate Files window.
5. Tap on the highlighted “crd” file name located at the bottom of the screen. This opens FAST Survey’s virtual keyboard with the file name now appearing above.
6. Using the keyboard, type in the name of the “crd” file in which FAST Survey will store the data you will collect during your job.
7. Tap ☑. This takes you back to the Coordinate Files window where your file name now appears in the **Name** field.
8. Tap ☑ again. This opens the Job Settings window, which consists of five different tabs on which you can set a large number of parameters pertaining to the job (or future jobs).

   Only the parameters that make sense with a GNSS system are presented below. All other parameters should be kept with their default settings.

   On the **System** tab:

   – **Distance**: Choose the unit in which all measured distances will be expressed (US Survey Feet, Metric or International Feet). Unless “Metric” is selected, you can also choose the units in which distances will be displayed (“Decimal feet” or “Feet and Inches”).

Warning! You cannot change this setting after creating the file!

- **Angle**: Choose the unit in which all measured angles will be expressed (degrees, minutes, seconds or grads)
- **Zero Azimuth Setting**: Choose the direction for which azimuth is arbitrarily set to 0° (North or South)
- **Projection**: Choose a projection from the combo box. To select a different projection, tap the **Edit Projection List** button. The **Add Predefined** button allows you to select an existing projection. The **Add User Defined** button allows you to create an entirely new projection. The selected or created projection will then be selectable from the combo box.

On the **Stake** tab:

- **Precision**: Choose the number of decimal places (0 to 5) used to express the three coordinates of any stakeout point. "0.000" (3 decimal places) is the best setting to fully benefit from the precision offered by your equipment.

On the **Format** tab:

- **Coordinate Display Order**: Choose the order in which you want FAST Survey to display East and North coordinates (East,North or North,East).
- **Angle Entry and Display**: Choose the type of angle FAST Survey will display (Azimuth or Bearing).

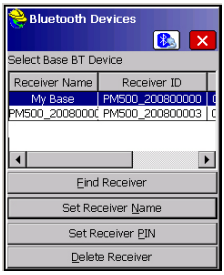
9. Tap  . This creates the file, closes the Job Settings window and takes you to the FAST Survey menu.

How FAST Survey Interfaces With Your Equipment Via Bluetooth

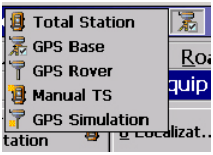
First-Time Use

Right after you start FAST Survey and create or open your first job, FAST Survey will try to activate the preset connection (default: "Cable") to the receiver. Because no cable is connected to the field terminal, a message will be displayed informing you that the connection failed.

Assuming your base and rover are nearby and powered on, follow the procedure below to perform a Bluetooth connection with the base.



- Tap **Equip>GPS Base**.
- Tap on the **Comms** tab.
- Select “Bluetooth” from the **Type** field and “Magellan BT” from the **Device** field.
- Tap on the **Configure** button. This opens the Bluetooth Devices window.
- Tap **Find Receiver**. Wait until FAST Survey lists the Bluetooth identifiers of your base and rover. The list appears in a new window.
- Highlight the Bluetooth identifier corresponding to the base. To make sure you select the right identifier, press the Scroll button on the base until you display the Receiver Identification screen. The identifier is in the lower line (after the “BT:” prefix).
- Tap . This takes you back to the previous screen where the selected Bluetooth identifier remains highlighted in the list. The following actions may be performed on the selected receiver using the following buttons:
  - **Set Receiver Name**: By default, the “Receiver Bluetooth Identifier” of the detected receiver is assigned to this parameter. You may use a more self-explanatory name to identify your base (e.g.: “MyBase”).
  - **Set Receiver PIN**: Do not use this button. In its default configuration, your equipment does not request a PIN code to allow a peripheral device to connect to it via Bluetooth.
  - **Delete Receiver**: Removes the selected receiver from the list of remote receivers detected by Bluetooth.
- Tap to connect the field terminal to the base via Bluetooth and then configure the base according to your needs (see *RTK Base Configuration on page 33*).
- Later, you will establish a Bluetooth connection with the rover. The process will start when you tap **Equip**>**GPS Rover** to configure the rover. From the **Comms** tab, you will be able to access the Bluetooth Devices window and select the rover receiver from the list of remote receivers detected by Bluetooth, in the same way as you did for the base.



Switching Between Base and Rover

During a FAST Survey session, you can quickly change the receiver you are communicating with (provided the receiver you want to communicate with is within Bluetooth range).

The icon located in the upper-right corner of the FAST Survey window allows you to change receivers. Tap on this icon and then:

- Select **GPS Base** to switch to the base,
- Or select **GPS Rover** to switch to the rover.

NOTE: If you examine more carefully this icon, you will see that it changes aspect (base or rover icon) depending on which receiver is currently communicating with FAST Survey.

In addition, on the **Equip** menu, a small check box appears in the icon inside either the **GPS Rover** or **GPS Base** button to indicate which connection is active.

Subsequent Uses

In the next sessions of FAST Survey, the software will prompt you to re-activate the Bluetooth connection you last established in the previous session, or simply work without a connection. If you choose the first option, FAST Survey will automatically re-establish the connection, provided the concerned receiver is still on and within Bluetooth range.

Running FAST Survey on a MobileMapper 6 Used as a Field Terminal

Principle

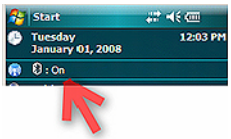
Unlike MobileMapper CX, MobileMapper 6 does not allow a Bluetooth connection to be established directly from the FAST Survey software running on this platform.

Instead you should first use MobileMapper 6's Bluetooth Manager program to associate a COM port to Bluetooth. Then, from within FAST Survey, a Bluetooth connection can be established via the selected COM port. A non-secure connection is recommended.

As is already the case with other field terminals, in the following sessions of FAST Survey and MobileMapper 6, the software will simply prompt you to re-activate the last established Bluetooth connection.

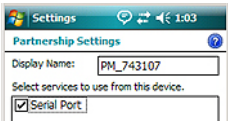
Assigning a COM Port to Bluetooth For a Given GNSS Receiver

- Turn on the GNSS receiver(s) you want to communicate with through FAST Survey.



- Turn on MobileMapper 6 by pressing the Power button located on the right side of the receiver.
- Activate Bluetooth on MobileMapper 6: On the Start screen, check to see if the Bluetooth status is “On” (read the line under the current date). If it’s already “On”, skip this step.

  If it’s “Off”, tap on the Bluetooth icon line, then tap on the Bluetooth blue button to change the status (underneath) from “off” to “on”. Tap **Done** to return to the Start screen.
- Tap **Start**>**Settings**.
- Tap on the **Connections** tab.
- Tap on the Bluetooth icon. This opens the Bluetooth Settings window.
- Tap on **Add new device**... MobileMapper 6 starts searching for the nearby Bluetooth devices. For each device MobileMapper 6 detects, the Bluetooth identifier of this device is returned in the search window (e.g. PM_743107 for a ProMark 500). The **Refresh** button can be used to resume the search if necessary.
- Tap on the Bluetooth identifier corresponding to the GNSS receiver you want to communicate with and then tap **Next**.
- Because no secure connection is required, just ignore the **Passcode** field and simply tap **Next**.
- Tap **Yes** after the MobileMapper 6 beeps and a message appears asking you to confirm you want the ProMark 500 to be added to the list of Bluetooth devices.
- Once again, the Enter Passcode screen is displayed. Tap **Cancel**. This opens the Partnership Settings window.



- Activate the Serial Port service: Check on the **Serial Port** option box and tap **Finish**.

  This takes you back to the Bluetooth Settings window where you can now see the selected receiver as a possible receiver to communicate with.
- Tap on the receiver Bluetooth identifier. This re-opens the Bluetooth service screen where you can see the option box you have just enabled.
- Tap on **Save**. This takes you back to the previous screen, with the receiver Bluetooth identifier now highlighted.
- Tap on the **Mode** tab. Make sure the two options on this tab are enabled.
- Tap on the **COM Ports** tab.

- Tap on **New Outgoing Port**. The selected Bluetooth identifier (corresponding to your GNSS receiver) now appears and is highlighted.
- Tap on the **Next** button
- Choose a COM port that will be the port used by Bluetooth to communicate with the GNSS receiver. Ports 0 and 1 are reserved. Choose any of the other ports (COM2 to COM9, except COM3).
- Clear the **Secured Connection** option.
- Tap **Finish**.
- Tap **ok**.
- Tap **Cancel** if the MobileMapper 6 asks again for a secure connection through a passcode.
- Tap  to return to the Start screen.

  For each new GNSS receiver you want to be able to communicate with, resume all the previous steps from the fourth step. **Each time select a different COM port**.

Establishing a Bluetooth Connection Through the Selected COM Port

- On MobileMapper 6, launch FAST Survey and open or create a job.
- On the **Equip** tab, tap on **GPS Rover** or **GPS Base** depending on what the GNSS receiver will be used for.
- On the **Current** tab, select “Magellan Navigation” as the manufacturer and “ProMark 500”.
- Tap on the **Comms** tab.
- In the **Type** field, select “Bluetooth”.
- In the **Device** field, select “Other”.
- In the **Port** field, select the COM port you assigned earlier for use by Bluetooth (COMx).
- Browse through the other tabs (Receiver, RTK) to set the other parameters of the receiver.
- Tap  to start the communication with the receiver. A beep can be heard in MobileMapper 6 when the Bluetooth connection has been established. The Bluetooth icon also appears on the display screen of the GNSS receiver.

Communicating With a Base/Rover System

For easy Bluetooth communication with a base-rover system from a single MobileMapper 6 running FAST Survey, you should assign a different COM port to the base and the rover.

Once the connection has been made successively for each receiver, switching from one to the other is simply done by using the icon located in the upper-right corner of the FAST Survey window, as done with other field terminals.

Changing the COM Port for a Bluetooth Connection

To change the COM port currently assigned to a receiver, do the following on MobileMapper 6:

- Tap **Start**>**Settings**.
- Tap on the **Connections** tab.
- Tap on the Bluetooth icon. This opens the Bluetooth Settings window.
- Tap on the **COM Ports** tab. This window lists the current COM port settings for the detected receivers.
- Tap on **New Outgoing Port** (and not directly on the receiver Bluetooth identifier).
- Then tap on the Bluetooth identifier of the receiver for which you want to change the COM port. Tap **Next**.
- Change the COM port number and then tap **Finish** and **ok**.

Running FAST Survey on a ProMark3 Used as a Field Terminal

Installing FAST Survey

- Insert an SD card into the card reader of a computer.
- On the FAST Survey CD, go to **\ProMark500-ProFlex500-ZMax\ProMark3 Controller\<Language>** to find the FAST Survey.CAB file corresponding to the language you want to install.
- Copy the CAB file to the root directory of the SD card.
- Remove the SD card from the card reader and then insert it into the ProMark3.
- On ProMark3, double-tap **Utilities** and run **Install FAST Survey**.
- Make sure the **FAST Survey** button is checked.
- Tap on the **Install** button and let the ProMark3 complete the installation.

Note: You can only have one version of FAST Survey installed on the ProMark3. If the FAST Survey version for ProMark3 RTK is already installed on the platform, running the above instructions will overwrite it.

Unlocking FAST Survey

Using FAST Survey on a ProMark3 platform requires that the software be installed and unlocked. Unlocking FAST Survey

is achieved by entering a product key provided by your dealer following your purchase of FAST Survey for this platform.

- On ProMark3, double-tap **Utilities** and run **Unlock FAST Survey**.
- Type in the product key.
- Tap **OK**. A message will inform you that FAST Survey has successfully been unlocked.

Establishing a Bluetooth Connection Through a COM Port

The first time you start a new session with ProMark3 and FAST Survey, do the following:

- Turn on the GNSS receiver(s) you want to communicate with through FAST Survey.
- Turn on ProMark3 by pressing the red Power button located on the front panel.
- On the workspace screen, double-tap on the **Settings** icon.
- Double-tap on the **Bluetooth Manager** icon.
- Tap on  to start searching for the nearby Bluetooth devices. An icon appears for each detected device.

  Tap on  to resume the search if no device, or not all devices were detected the first time.
- Visually identify the icon corresponding to the GNSS receiver you want ProMark3 to communicate with (e.g. “PM_743107” for a ProMark 500).
- Tap and hold this icon and select **Explore**. This opens a new list showing the services attached to the remote device. For a ProMark 500, this can only be a serial port service.
- Tap and hold the **Serial Port** icon and select **Connect**. Select a COM port that the ProMark3 will associate with Bluetooth for a connection to the GNSS receiver (three ports are available: COM7 to COM9).
- Tap **OK**. After about one second, a beep can be heard in the ProMark3 after the Bluetooth connection has been established. The Bluetooth icon also appears on the display screen of the GNSS receiver. A message is displayed indicating a successful connection with the GNSS receiver through the chosen port. (Note the presence of a plug in a green circle on the Serial Port icon showing that the connection has been made.)
- Tap **OK** to close the message window.

- To further allow you to speed up the connection phase when later starting a new working session with ProMark3 and FAST Survey, create now a shortcut to the serial port service. This is simply done by tapping again on the **Serial Port** icon and selecting **Create Shortcut**.
- Then tap **OK** to close the message window.
- Tap  to close the Bluetooth Manager window.
- Tap  again to close the settings window and return to the ProMark3 workspace screen.

Later, when you power on ProMark3 for a new working session, and before launching FAST Survey as explained below, do the following to re-establish the Bluetooth connection with your GNSS receiver(s):

- Turn on the GNSS receiver(s).
- Turn on ProMark3 by pressing the red Power button located on the front panel.
- On the workspace screen, double-tap on the **Settings** icon.
- Double-tap on the **Bluetooth Manager** icon.
- Tap on  to display the list of existing shortcuts.
- Tap on the **Serial Port** shortcut icon and then select **Connect**. This instantly re-establishes the Bluetooth connection with your GNSS receiver through the COM port defined in the previous session.

Allowing FAST Survey To Communicate Through Bluetooth

- On ProMark3, launch FAST Survey and open a job from the SD card, or create one on the SD card. Ignore the message about restoring the last Bluetooth connection (making a selection in this window will have no effect).
- On the **Equip** tab, tap on **GPS Rover** or **GPS Base** depending on what the GNSS receiver will be used for.
- On the **Current** tab, select “Magellan Navigation” as the manufacturer and “ProMark 500”.
- Tap on the **Comms** tab.
- In the **Type** field, select “Bluetooth”.
- In the **Device** field, select “Other”.
- In the **Port** field, select the COM port you assigned earlier for use by Bluetooth (COMx). See *Establishing a Bluetooth Connection Through a COM Port on page 30*.
- Browse through the other tabs (Receiver, RTK) to set the other parameters of the receiver.

- Tap  to start the communication with the receiver.

Communicating With a Base/Rover System

For easy Bluetooth communication with a base-rover system from a single ProMark3 running FAST Survey, you should assign a different COM port to the base and the rover.

Once the connection has been made successively for each receiver, switching from one to the other is simply done by using the icon located in the upper-right corner of the FAST Survey window, as is done with other field terminals.

Upload/Download Procedures

Using a single SD card, which you will successively insert in the ProMark3 and the office computer, is the easiest way to transfer files between the two systems. This requires that all the jobs created with FAST Survey in the ProMark3 be saved to the SD card as well.

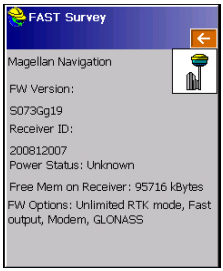
Having said that, all the download/upload procedures used with a standalone ProMark3 remains the same when using the ProMark3 as a field terminal for ProMark 500. The only difference is with raw data files. If you collect these files, remember these are found in the ProMark 500 internal memory or USB stick, and not in the ProMark3 internal memory or SD card.

RTK Base Configuration

Prerequisites

- Your base is properly set up and powered on. It is on its definitive location for the survey and the field terminal is located at less than 10 metres from the base.
- Your field terminal is on, FAST Survey is running, a Bluetooth connection has already been configured (with the base; see *How FAST Survey Interfaces With Your Equipment Via Bluetooth on page 24*) and a job file is open.
- In FAST Survey, tap on the **Equip** tab and then the **GPS Base** button. A message may appear asking you to confirm your choice of configuring a base. Tap **Yes**. This opens the **Current** tab of the GPS Base window.

Set Manufacturer & Model



- Set the **Manufacturer** (“Magellan Navigation”) and **Model** (“ProMark 500”) of the equipment used as the base.

  Note that the  button beside the **Manufacturer** field allows you to read the following information about the connected receiver:
  - Firmware version
  - Receiver ID
  - Power status
  - Free memory space
  - Firmware options installed.

  Tap on  to return to the **Current** tab.

Check/Change Bluetooth Connection

- Tap on the **Comms** tab. Since the Bluetooth connection was performed earlier, just check that FAST Survey is properly configured to communicate with the base. You should read:
  - **Type** = “Bluetooth”
  - **Device** = “Magellan BT”
  - **Instr** = should be set to the name you gave earlier to the base, as seen from FAST Survey Bluetooth.

  Note that the **Configure** button next to the **Device** field allows you to return to the Bluetooth Devices window through which you earlier configured the Bluetooth connection to the base (see *How FAST Survey Interfaces*

With Your Equipment Via Bluetooth on page 24). Changes can be made now if necessary.

Set Receiver Parameters

- Using the HI measurement tool provided, perform a slant measurement of the antenna height (recommended).
- On the field terminal, tap on the **Receiver** tab.
- Select the **Slant** option for the antenna height measurement.
- Tap within the **Antenna Height** field and enter the value you have just measured.
- Choose your preferred settings for **Elevation Mask**, **SBAS**, **GLONASS** and **Virtual Antenna**.

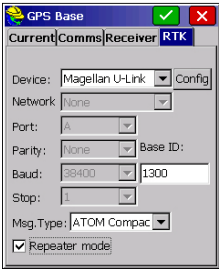
  Using SBAS and/or GLONASS satellites will help the rover maintain the availability of fixed positions in those difficult environments where GPS alone would fail to do so.

  The **Virtual Antenna** option is disabled by default. Enabling the virtual antenna, which is defined as the generic "ADVNULLANTENNA" GNSS antenna, allows all broadcast differential data and recorded raw data to be decorrelated from the GNSS antenna actually used at signal reception level. This may be useful when a rover from another manufacturer, which does not know the type of antenna used at the base, needs to receive RTK corrections from this base.

Set Data Link

- Tap on the **RTK** tab. This tab allows you to set the data link on the base side. Several configurations are possible:
  1. Using a U-Link TRx device
  2. Using radio transmitter P/N 800986-x0
  3. Using an external Pacific Crest radio.
  4. Using the internal modem in CSD mode for a "phone call" type connection (Direct Dial).
  5. Using the internal modem for a Direct IP connection to the RTDS software.
  6. Using an external device connected to ProMark 500's port A. The external device may be a radio transmitter from another manufacturer, or the local computer running the RTDS software.

Selecting Magellan Radio



The table below gives all the required settings depending on the chosen configuration.

	#1 U-Link TRx	#2 Radio P/N 800986	#3 Pacific Crest Radio	#4 Direct Dial	#5 Direct IP/GPRS - RTDS	#6 External Device
Device	Magellan U-Link	Magellan Radio	Pacific Crest	Internal GSM	Internal GSM	Cable or Generic Device
Network	[None]	[None]	[None]	Direct Dial	"TCP/IP Direct" or "UDP/IP Direct"	[None]
Port	[A]	[A]	[A]	[E]	[E]	[A]
Parity	[None]	[None]	[None]	[None]	[None]	[None]
Baud	[38400]	[19200]	9600 to 115200 User-settable	[19200]	[19200]	1200 to 115200 User-settable
Stop	[1 bit]	[1 bit]	[1 bit]	[1 bit]	[1 bit]	[1 bit]
Message Type	Choose the format used to generate base data messages: ATOM, ATOM compact, RTCM V3.0, RTCM V2.3, CMR or CMR+, (RTCM-DGPS)					
Base ID	Choose a number to identify the base. Several ranges are possible depending on the selected data format (0-4095 for RTCM 3.0, 0-1023 for RTCM 2.3, 0-31 for CMR and CMR+)					

NOTE: All parameters between square brackets [..] are software-set, they cannot be changed.

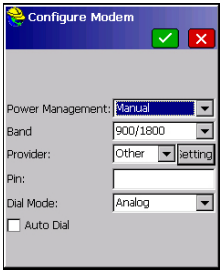
- If you want to use a radio, tap on the **Config** button next to the **Device** field to set the radio. The table below lists the required and recommended settings for the three radio models available.

Field	Model P/N 800986-x0	U-Link TRx Model	Pacific Crest Radio Model
Protocol	-	"Transparent" recommended	"Transparent" recommended
Channel	Choose channel used (channel No. - Frequency)	Choose channel used (channel No. - Frequency	Choose channel used (channel No. - Frequency)
Over the Air Baud	-	4800 Bd recommended	"9600 Bd" recommended
Scrambling	-	-	In a PacCrest radio transmitter, enables or disables scrambling in this radio. Keep disabled for other radios.
Forward Error Correction	-	-	In a PacCrest radio transmitter, enables or disables FEC in this radio. Keep disabled for other radios.

The DSNP protocol should be used for the following transmitter-receiver combinations:

Transmitter	Receiver
800986-x0	U-Link Rx
800986-x0	PDL
U-Link TRx	PDL
U-Link TRx	TDRE (Z-Max)

- If you want to use the internal modem, tap on the **Config** button next to the **Device** field to set the internal modem. The modem settings are listed in the table below:



Field	Setting
Power Management	"Automatic" is recommended. In Automatic, the modem is automatically powered when you turn on the receiver and will only be turned off when you turn off the receiver. In Manual, the modem will be powered on only when you configure the base.
Band	Select the frequency band used for GSM communications in the country where you are.
Provider	- If you choose **Network**=" TCP/IP Direct" or **Network**="UDP/IP Direct", choose the name of your mobile communication provider in this field. There are three preset providers: Cingular, T-Mobile and MoviStar. If you are using another provider, select "Other"in this field and then tap on the **Settings** button underneath to enter the parameters of your provider (APN server, APN User Name and APN Password). - If you choose **Network**="Direct Dial", ignore this field.
Pin	Enter the Pin number of the SIM card inserted in your ProMark 500.
Dial Mode	"Analog" is usually the right selection at the base. Please call your communication provider for more information.
Auto Dial	Keep this box disabled for a base.

- If you choose Network="TCP/IP DIrect" or "UDP/IP Direct", tap on the **Config** button next to the **Network** field and enter the IP address and port number allowing the connection to the RTDS software.
- If a repeater is used within your system to extend the range of the UHF radios used, enable the **Repeater Mode** check box. Enabling this option causes the output rates of all the differential messages to be changed into an even value (2 sec.) in order to make them compatible with the use of the repeater.

- Tap ☑ to load the settings to the radio or modem. This may take a few seconds. FAST Survey then returns to the GPS Base configuration window.

Load Configuration to the Base

Now that you have browsed all the tabs in the Base Configuration window and set all the parameters, just tap ☑ to connect and load the configuration to the base. This may take a few seconds.

Set Base Position

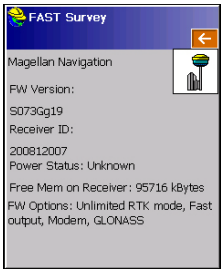
FAST Survey then asks you to set the base position. Depending on the chosen method, follow the instructions displayed on the screen to define this position. This completes the base configuration phase.

RTK Rover Configuration

Prerequisites

- Your rover is properly set up and powered on.
- Your field terminal is on, FAST Survey is running and a job file is open.
- In FAST Survey, tap on the **Equip** tab and then the **GPS Rover** button. A message may appear asking you to confirm your choice of configuring a rover. Tap **Yes**. This opens the **Current** tab of the GPS Rover window.

Set Manufacturer & Model



- Set the **Manufacturer** (“Magellan Navigation”) and **Model** (“ProMark 500”) of the equipment used as the rover.

  Note that the  button beside the **Manufacturer** field allows you to read the following information about the connected receiver:

  – Firmware version
  – Receiver ID
  – Power status
  – Free memory space
  – Firmware options installed.

  Tap on  to return to the **Current** tab.

Set Bluetooth Connection

- Tap on the **Comms** tab.
- In the **Type field**, select “Bluetooth”.
- In the **Device** field, select “Magellan BT”.
- Tap on the **Configure** button to access the Bluetooth Devices window. The window lists Bluetooth identifiers that correspond to the receivers found in the vicinity.
- Select the rover’s Bluetooth identifier from the list. To make sure you are making the right selection, press the Scroll button on your rover until you display the Receiver Identification screen. The Bluetooth identifier is shown in the lower line. This is the parameter you must select from the list.

  You may give the rover a more familiar name (e.g. “MyRover”) using the **Set Receiver Name** button.

- Tap  to connect the field terminal to the rover via Bluetooth. FAST Survey then returns to the GPS Rover configuration window.

- Check that the rover name is now selected in the **Instr** field.

Set Receiver Parameters

- Measure or read the length of the range pole on top of which the ProMark 500 is mounted.
- On the field terminal, tap on the **Receiver** tab.
- Select the **Vertical** option for the antenna height measurement.
- Tap within the **Antenna Height** field and enter the value you have just measured or read for the range pole length.
- Choose your preferred settings for **Elevation Mask**, **Ambiguity Fixing** (see table below), **SBAS**, **GLONASS** and **Virtual Antenna**.

Choice	Definition
Float	Choose this option if you only need decimeter accuracy (position status will never go to "Fixed").
95.0	95% confidence level
99.0	99% confidence level (default and recommended setting)
99.9	99.9 confidence level

Using SBAS and/or GLONASS satellites helps to maintain the availability of fixed positions in those difficult environments where GPS alone would fail to do so.

The **Virtual Antenna** option is disabled by default. Enabling the virtual antenna, which is defined as the generic "ADVNULLANTENNA" GNSS antenna, allows all collected data to be decorrelated from the GNSS antenna actually used at signal reception level. This may be useful if you wish to post-process the collected raw data using base raw data collected with a base from another manufacturer.

Set Data Link

- Tap on the **RTK** tab. This tab allows you to set the data link on the rover side, in accordance with the base or network you will be working with. Several configurations are possible:
  1. Using the internal radio receiver.
  2. Using the internal modem in CSD mode for a "phone call" type connection with the base (Direct Dial).
  3. Using the internal modem in Direct IP mode (TCP/IP or UDP/IP) to receive base data from either a third-party network or the remote RTDS software.
  4. Using the internal modem for a network connection (NTRIP or SpiderNet).

5. Using an external CDMA cell phone for a network connection (Direct IP, NTRIP or SpiderNet).
6. Using an external device (for example an external corrections receiver).

The table below gives all the required settings depending on the chosen configuration.

	#7 Internal Radio	#8 Internal Radio	#9 Direct Dial	#10 Direct IP GPRS	#11 Network, GPRS	#12 Network, CDMA	#13 External Device
Device	Magellan U-Link	Pacific Crest	Internal GSM	Internal GSM	Internal GSM	Data Collector Internet	Cable or Generic Device
Network	[None]	[None]	Direct Dial	"TCP/IP Direct", "UDP/IP Direct" or "SpiderNet"	NTRIP	"NTRIP", "TCP/IP Direct", "UDP/IP Direct" or "SpiderNet"	[None]
Port	[D]	[D]	[E]	[E]	[E]		[A]
Parity	[None]	[None]	[None]	[None]	[None]		[None]
Baud	[38400]	[38400]	[19200]	[19200]	[19200]		1200 to 115200 User-settable
Stop	[1 bit]	[1 bit]	[1 bit]	[1 bit]	[1 bit]		[1 bit]
Send Rover..	This option should be enabled only when working with networks offering VRS capability (NTRIP).						

NOTE: All parameters between square brackets [..] being software-set, they cannot be changed.

- If you want to use the internal radio, tap on the **Config** button next to the **Device** field to set the radio receiver:

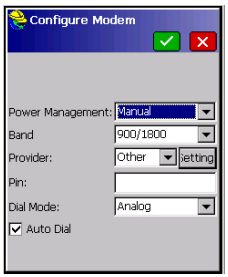
Field	Setting
Protocol	Select "DSNP" if the radio transmitter used at the base is radio model P/N 800986-x0. Select "Transparent" if it's a U-Link TRx or a Pacific Crest radio transmitter.
Power Management	"Automatic" is recommended. In Automatic, the radio module is automatically powered when you turn on the receiver and will only be turned off when you turn off the receiver. In Manual, the module will be powered on only when you configure the rover.
Channel	Choose channel used (Channel No. - Frequency)
Squelch	The factory default setting of "High" provides maximum effective sensitivity to incoming signals.This is the preferred setting. "Medium" and "Low" sensitivity settings are available for use if local electrical noise or distant radio signals falsely activate the radio receiver. Use of these settings may reduce the radio range.

Field	Setting
Over the Air Baud	Forced to “4800” with DSNP protocol; “9600 Bd” recommended with other protocols; “7600 Bd” for U-Link.
Scrambling	Relevant to Pacific Crest radios only. Set this parameter as set at the base if it uses a Pacific Crest transmitter. For another radio used at the base, keep this option disabled.
Forward Error Correction	Relevant to Pacific Crest radios only. Set this parameter as set at the base if it uses a Pacific Crest transmitter. For another radio used at the base, keep this option disabled.

Then tap ✓ to load the settings to the radio. This may take a few seconds. FAST Survey then returns to the GPS Rover configuration window.

- If you want to use the internal GSM modem, tap on the **Config** button next to the **Device** field to set the internal modem.

  The modem settings are listed in the table below:



Field	Setting
Power Management	“Automatic” is recommended. In Automatic, the modem is automatically powered when you turn on the receiver and will only be turned off when you turn off the receiver. In Manual, the modem will be powered on only when you configure the rover. “Automatic” is mandatory if “Auto Dial” is enabled.
Band	Select the frequency band used for GSM communications in the country where you are.
Provider	- Choose the name of your mobile communication provider in this field. There are three preset providers: Cingular, T-Mobile and MoviStar. If you are using another provider, select “Other”in this field and then tap on the **Settings** button underneath to enter the parameters of your provider (APN server, APN User Name and APN Password). - If you set Network=Direct Dial, ignore this field.
Pin	Enter the Pin number of the SIM card inserted in your Pro-Mark 500.
Dial Mode	Depending on the provider, this may be “Analog” or “Digital”. ”Analog” is usually the right selection. Please call your communication provider for more information
Auto Dial	Check this box when the data link is based on a GSM connection in CSD mode between the base and the rover. Check this box as well if you wish that after a power cycle, the receiver can connect automatically to the last used NTRIP mount point or last used Direct IP server.

- If you want to use a CDMA cell phone, you should first establish and then pair a Bluetooth link between that cell phone and your field terminal, using Bluetooth Manager.

Then, you should use the Network and Dial-up Connections utility in your field terminal to connect it to the Internet. The incoming corrections will be automatically transferred to the ProMark 500.

- When this button is visible, tap on the **Config** button next to the **Network** field, for additional settings. The table lists all the parameters that need to be defined, depending on the desired operating mode.

Parameter	TCP/IP Direct UDP/IP Direct	NTRIP	SpiderNet	Direct Dial (CSD mode)
Name	•	•	•	•
IP Address	•	•	•	
Port	•	•	•	
User Name		•	•	
Password		•	•	
Phone Number				•

- Tap ✓ to load the settings to the radio or modem. This may take a few seconds. FAST Survey then returns to the GPS Rover configuration window.

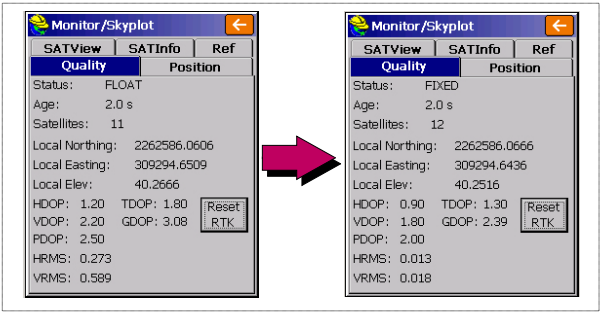
Load Configuration to the Rover

Now that you have browsed all the tabs in the Rover Configuration window and set all the parameters, just tap ✓ to connect and load the configuration to the rover.

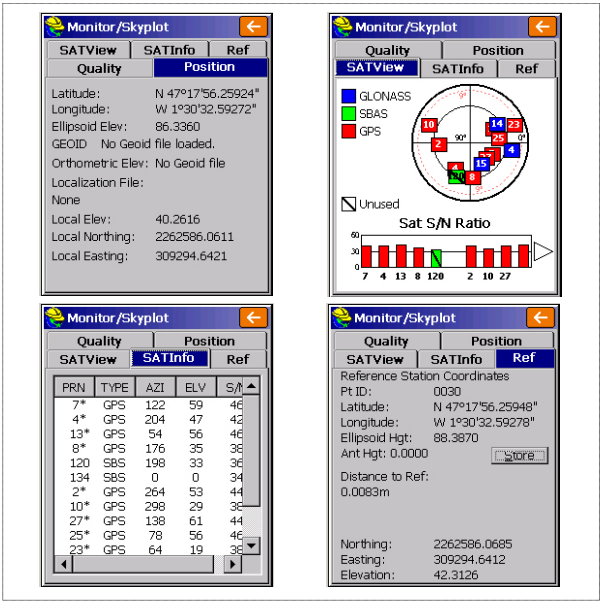
Check that a "Fixed" Solution is Now Available

The rover then starts acquiring corrections data from the selected base. Note that the rover will automatically recognize the format of the received data (ATOM, RTCM2.3, RTCM 3, CMR, CMR+, DBEN). Do the following before starting your survey:

- In the **Equip** menu, tap on the **Monitor/Skyplot** button
- Read the different parameters displayed on the screen. You should see the HRMS and VRMS rapidly decrease from a few meters to less than 10 to 20 mm, while the position status switches from "AUTO" to "FLOAT" and finally "FIXED".



Other screens are available from within the **Monitor/Skyplot** function showing the details of the constellation, of the base position and of the RTK position solution:



In NTRIP and Direct IP modes, a **Disconnect/Connect** button is available on the **Ref** tab to easily control the network connection. There is also a horizontal bar showing the GSM signal level until the modem is on-line. The bar disappears when the modem is online.

In Direct Dial mode, a **Hang up** button is available on the same tab to terminate the connection with the base.

- Tap  after you have made sure the FIXED position status is settled. This takes you back to the FAST Survey menu from which you can start your survey.

Uploading Stakeout Points to the Field Terminal

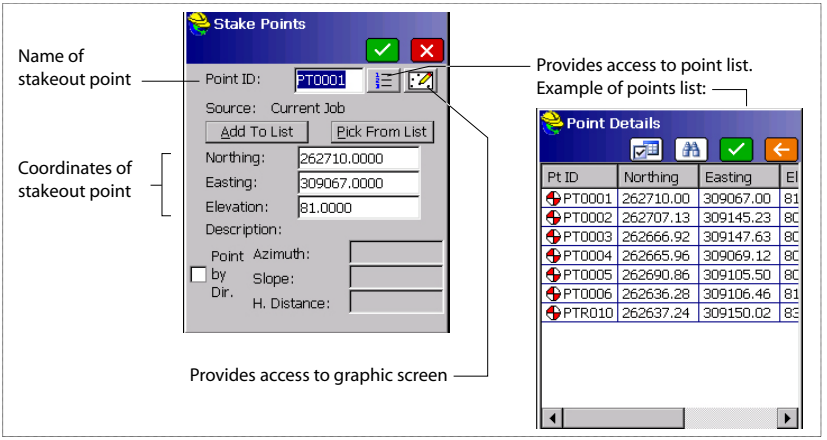
In your office, do the following:

- Connect the field terminal to your office computer using the USB data cable.
- Make sure ActiveSync is installed on your computer and is allowed to perform USB connections. If you do not have ActiveSync installed, download the latest version from the following web page:
  hhttp://www.microsoft.com/windowsmobile/activesync/default.mspx
- Run GNSS Solutions on your office computer.
- Open the project containing the stakeout points you want to transfer to the field terminal as your job.
- On the project map view, select all the reference and target points making up your job.
- Select **Project>Upload Positions to External Device..**
- Select **RTK Job** and **FAST Survey data collector**.
- Click **OK**.
- Name the job (e.g. MYJOB). Keep the **Selected Targets and References** option selected and click **OK**. This opens the Data Transfer dialog box.
- In the combo box, select **Active Sync** and keep **Automatic transfer** enabled.
- Click **OK** to establish the connection with the field terminal and upload the job (to \MyDevice\FAST Survey\Data\).
- After the job has been uploaded, turn off the field terminal, disconnect the USB cable and go to the field with your surveying equipment to stake out your points.

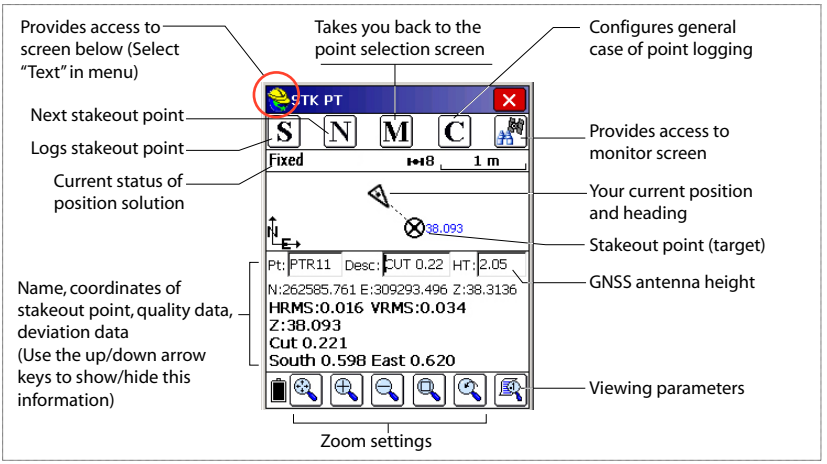
Staking Out Points

1. Run FAST Survey and open the job containing the points you want to stake out.
2. Tap on the **Survey** tab and then select **Stake Points**. The screen now displayed allows you to stake out points.
3. On this screen, FAST Survey asks you to choose the point you want to stake out. You can either type in its coordinates in the **Northing**, **Easting** and **Elevation** fields, or select a pre-defined point from the points list (see **File>List**

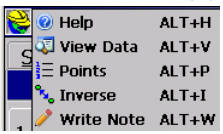
Points). You can also define graphically the point by tapping on the point on the graphic screen, or define the point according to azimuth, slope and horizontal distance.



4. Once you have chosen a point, tap  . A graphic screen is now displayed to help you head for the point.



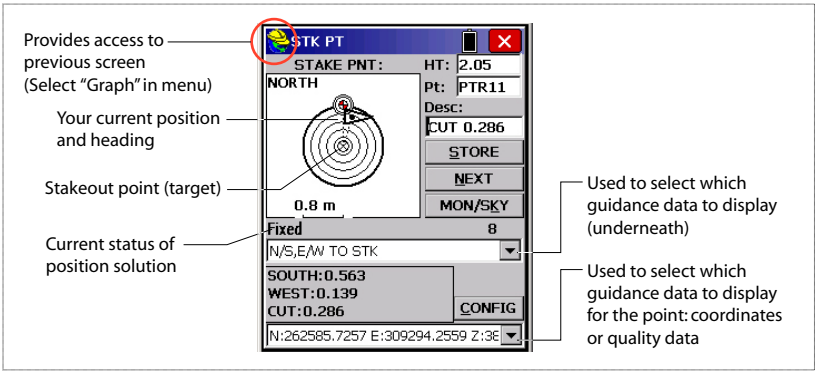
Yellow helmet gives access to Function Menu!



5. When the distance to the stakeout point is too small to be clearly seen on this screen, tap on the surveyor's helmet in the upper-left corner and select **Text** from the menu that pops up.

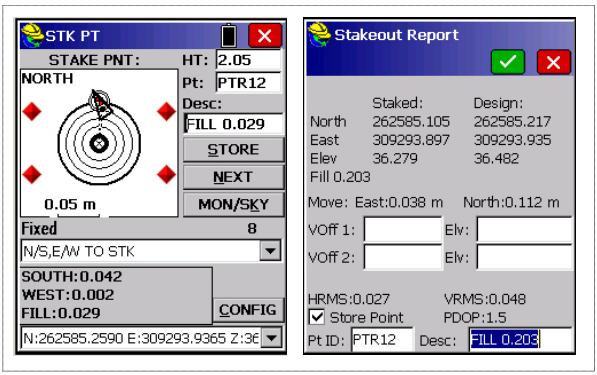
   A new screen appears giving a more accurate view of the remaining distance to the stakeout point. (If you want to

return to the previous screen, just select **Graph** in the same menu.)



When the remaining distance is within the stakeout tolerance (this parameter can be changed in **Equip**>**Tolerances**), markers appear in the four corners of the target. You can now set a stake on this point.

6. Tap on the **STORE** button if you want to store the position of this point. You will be notified if the values of HRMS and VRMS exceed the tolerances set for these two parameters in **Equip**>**Tolerances**. A new screen is then displayed showing the coordinates of both the staked and design points.

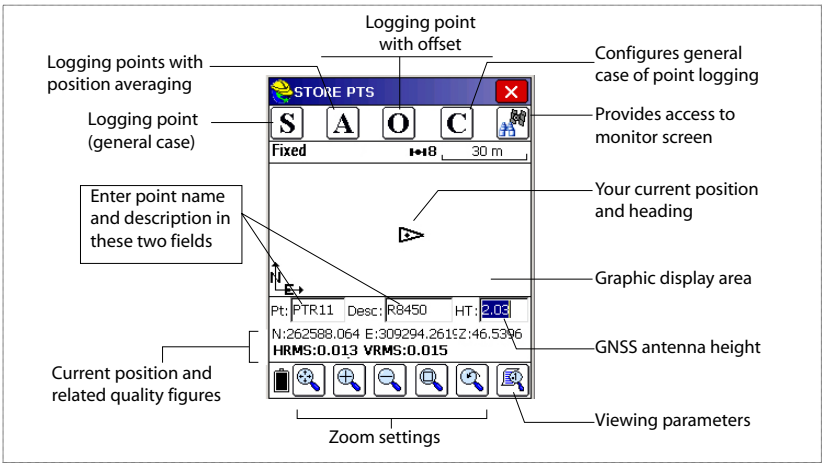


7. Tap  if you agree. The "**Point Stored**" message appears briefly. The screen then comes back to the Stake Points screen where you can choose the next point to be staked.

8. After staking out all your points, tap  in the upper-right corner of the screen to return to the menu.

Logging Points

1. Tap on the **Survey** tab and then on **Store Points**. The screen now displayed allows you to log all your points.
   The figure below summarizes all the functions available from that screen.



2. Type in the point name and description in the corresponding two fields (see above)
3. Tap on the "**A**" button
4. Enter the number of readings you want before FAST Survey is allowed to compute an average position for this point.

   For example, type in "5" and tap  .

   Messages follow successively indicating that the system is taking the five requested readings. Then FAST Survey displays the average coordinates it has determined for the point.

5. Tap  if you agree. The "**Point Stored**" message appears briefly. The screen then shows the location of the point together with its name and description.

6. After logging all your points, tap  in the upper-right corner of the screen to return to the menu.

Downloading RTK Points to GNSS Solutions

- Go back to your office and connect the field terminal to your office computer using the USB data cable.
- Run GNSS Solutions on your office computer.
- Open the project in which to add the points from the field.
- Select **Project>Download Positions from External Device..**
- Select **RTK Results** and **FAST Survey data collector**.
- Click **OK**. This opens the Data Transfer dialog box.
- In the combo box, select **ActiveSync**, enable **Automatic Transfer** and click **OK**. This opens a new window listing all the jobs stored in the field terminal.
- Select the job you want to download (e.g. “MYJOB”) and click **OK**. This starts the download process.

Vector information relative to surveyed points is available only in .rw5 files. FAST Survey saves vector information directly in this file format and so *does not* create O-files that would contain such information.

Logging Raw Data

Introduction

You can log raw data in two different ways:

- Standalone: You simply need to use the Log button to start and stop raw data logging.

  Later, you will however need to do the following manually:

  1. Downloading phase: Rename the raw data files collected on each site.
  2. Post-processing phase: Manually correct all computed elevations for the antenna height.

- Using FAST Survey: The **Survey**>**Log Raw GPS** function allows you to fully control raw data logging. Using this method offers three advantages:.

  1. *Antenna reduction* is automatically performed during post-processing because of the antenna height value (from the receiver properties) stored in the raw data files.
  2. Ability to name the raw data file and insert time tags.
  3. Ability to pause/resume data logging.

By default, raw data is logged to the receiver's internal memory.

Using FAST Survey, you can change the storage medium (internal memory or USB memory stick).

The choice of storage medium is then valid for both data logging methods (standalone and using FAST Survey). If "USB memory stick" is selected and no USB stick is connected to the receiver, then no data logging will take place.

In both data logging methods, the Raw Data Logging icon on the General Status screen will start flashing when a raw data file is open for logging.

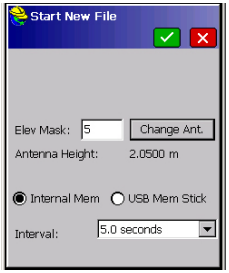
Raw Data Logging Methods

Standalone

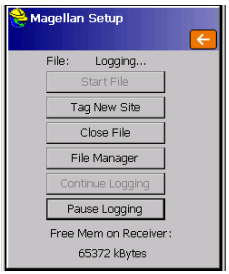
- Press the Log button to start data logging.
- Press the Log button again when it's time to stop data logging.

Using FAST Survey

- Tap **Survey**>**Log Raw GPS**.
- Tap **Start File**.



- Set the following parameters:
  - Elevation Mask in degrees.
  - Check the antenna height value. If it's wrong, tap the **Change Ant.** button to set the new value.
  - Storage medium (internal or USB memory stick). Choosing the internal memory is recommended. The use of a memory stick should be restricted to downloading raw data files.
  - Logging interval in seconds.



- Tap ✓. This starts data logging. From the screen then displayed, you can do the following:
  - Name the raw data file, mark a particular point or event (**Tag New Site**).
  - Stop data logging (**Close File**).
  - Access the File Manager window in read-only mode (**File Manager**).
  - **Continue Logging** / **Pause Logging**. Pausing data logging means closing the currently open file. Continuing data logging means opening a new file. Data logging will start immediately based on the parameters set for the previous file.

Combining the two Methods

Combining the two methods is possible.

For example, you can start data logging using FAST Survey. Then you can quit FAST Survey and turn off the field terminal without disturbing data logging. Later, you will be allowed to stop data logging by simply pressing the Log button on the receiver front panel.

Downloading Raw Data

Use a USB mass storage device as a transit storage medium to download raw data files from the receiver's internal memory to your office computer.

Important! During a download operation, files are not deleted from the receiver but simply copied to the USB mass storage device.

After downloading the files to this device, connect the USB device to your computer and use your usual browser to copy the files to the project folder.

Using a USB Mass Storage Device

- Connect the USB mass storage device to the receiver via the short USB Device cable provided (P/N 702103).

If raw data files are present in the receiver's internal memory, the following icons will automatically appear on the display screen:

- To confirm the file transfer, press the Log button. The General status screen will re-appear after the file transfer is complete.
- To cancel the file transfer, press the Scroll button.
- If you do not press any button within the next 10 seconds, the download procedure will be canceled automatically and the screen will come back to the previous display.

Using the USB Cable Provided

- Connect the USB cable provided (P/N 702104) between the office computer and the receiver's USB port. The receiver is then seen as a USB device from the office computer
- Using Windows Explorer on your office computer, browse the receiver's internal memory for the raw data files.
- Copy/paste the files to your project folder. Note that raw data files can directly be deleted from the receiver's internal memory through this connection.

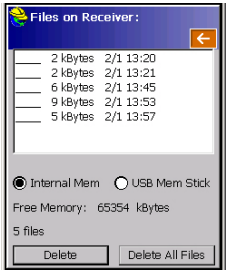
Case of Static Survey in Standalone

When static surveys are performed without the field terminal and FAST Survey, you must be careful with raw data file names. In view of the ATOM naming conventions used and the system's default settings, there is indeed every chance that the base file and the rover file have the same name. It is good practice to follow this procedure:

1. Download the raw data file from one of the receivers to the USB device.
2. Plug the USB device to the office computer, copy the raw data file to the project folder and rename the file to reflect the site where the static occupation took place (e.g. replace "G____" with "GPREF")

3. Repeat the previous two steps with the other receiver, using a different name for the file (e.g. replace “G____” with “GP100”).

Deleting Raw Data Files



Use FAST Survey to delete raw data files from the receiver internal memory.

1. Tap on the **Survey** tab and then on **Log Raw GPS**.
2. Tap on **File Manager**. The screen displays the following parameters:
   - List of raw data filenames.
   - Selected storage medium.
   - Free memory available.
   - Current number of raw data files in memory.
3. Unless already done, select **Internal Mem** to list the files stored in the internal memory.
4. To delete one file, highlight its name in the list and tap the **Delete** button. To delete all the files, tap **Delete All Files**.

   Important! When the receiver is logging raw data, the file being logged cannot be deleted. The file is protected from deletion until you close it.

Base/Rover Configuration Memo

Numbers (#) indicated in the table below refer to those used in the *RTK Base Configuration* and *RTK Rover Configuration* sections.

Base / Rover	#1 Magellan Radio	#2 Magellan U-Link	#3 Pacific Crest Radio	#4 Direct Dial	#5 Direct IP via GPRS & RTDS	#6 External Device
#7 Magellan U-Link	•	•				
#8 PacCrest Radio	•	•	•			
#9 Direct Dial				• (a)		
#10 Direct IP, GPRS					•	• (b)
#11 Network, GPRS (c)						
#12 Network, CDMA (c)						
#13 External Device	•		•			• (d)

(a) Direct Dial in CSD mode, with GSM modem only.

(b) Base connected to RTDS software through serial line.

(c) Direct IP or NTRIP mode. Third-party base or base network used.

(d) External device used at both the rover and the base to transfer correction data.

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ProMark™500

Getting Started Guide

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