LinksPoint User Guide

Serial GPS Receiver for Symbol Mobile Computers

Symbol PLUS VALIDATED

Part Number: LP11631 (Externally powered version for MC90XX and MC70)

Part Number: LP11632 (Cradle powered version for MC70 cradle with power out)

LINKSPOINT

One Selleck Street Phone 203.853.4600
Suite 330 Fax 203.838.0688
Norwalk, CT 06855 Latitude: 41.10705
www.linkspoint.com Longitude: -73.40905

Links Point, Inc.
One Selleck Street – Suite 330
Norwalk, CT 06855
United States of America
www.linkspoint.com

Revision History

September 19, 2006 edited draft

Table of Contents

Introduction

This User Guide provides information about LinksPoint's SymbolPlus validated Serial GPS receiver for mobile computers from Symbol Technologies.

The LinksPoint Serial GPS receiver collects GPS satellite data and provides it to the mobile computer through the serial port of a Symbol vehicle docking cradle. GPS information is available to the handheld computer when docked. Two versions are available. One is powered by an external 12V cigarette lighter adaptor and can be used with all MC900XX and MC70 vehicle cradles. The second version can be used with MC70 cradle versions that output power through the serial connector.

There are two versions of LinksPoint's Serial GPS receiver:

- LP11631– For use with all MC90XX and MC70 vehicle cradles. This version is powered by a 12V DC "cigarette lighter" adaptor.

- LP11632 – For use with MC70 vehicle cradle with power out through the serial connector. This version is powered through the DB9 serial connector used to connect the receiver to the cradle's serial port. In this configuration, the GPS is powered only when the mobile computer is docked in the cradle and a valid GPS com port is open in a running GPS application.

The LinksPoint Serial GPS receiver has been tested for compatibility with the following operating systems:

- Windows® Mobile 2003 – MC90XX

- Windows® Mobile 2003 Phone Edition – MC90XX
- Windows® Mobile 5.0 – MC90XX and MC70
- Windows® Mobile 5.0 Phone Edition – MC90XX and MC70(Pending)
- Windows® CE 5.0 – MC90XX

The LinksPoint Serial GPS receiver outputs GPS information as industry standard NMEA sentences which are compatible with most GPS software applications. It can also be configured to output GPS information in the SiRF Binary format.

LinksPoint's GPS receivers offer typical accuracies of 3-5 meters uncorrected, and 3 meters or better with Wide Area Augmentation System (WAAS) correction. [1] They are tested to comply with FCC and CE standards.

Symbol PLUS VALIDATED SymbolPlus product validation is reserved for "best in class" peripherals that have been tested for quality, reliability, service and system interoperability with Symbol mobile computers. The LinksPoint serial GPS receiver for Symbol mobile computers has been tested under Symbol's guidelines to ensure compliance with the SymbolPlus program.

For detailed information on the Symbol MC90XX or MC70 mobile computer, see the Quick Reference Guide or Product Reference Guide for the mobile computer, available at www.symbol.com/manuals.

Note: Screens and windows pictured in this User Guide are samples and may vary.

Connecting the LinksPoint Serial GPS Receiver External Power Version (LinksPoint Part Number LP11631) to Symbol Vehicle Cradles

The LinksPoint Serial GPS Receiver with cigarette lighter power adaptor (LinksPoint Part Number LP11631) can be used with MC90XX S (Short) and K (Brick) and MC70 vehicle cradles. Set up instructions are the same for all of these. In this installation, the GPS receiver draws power from a 12V DC "cigarette lighter" adaptor. As long as the adaptor is powered, the GPS receiver will operate. As such, the DC power jack needs to draw uninterrupted power from the vehicle for constant operation of the GPS receiver. Install the vehicle cradle before connecting the LinksPoint Serial GPS Receiver.

For detailed information on Symbol MC90XX vehicle cradles, see the Quick Reference Guide or Product Reference Guide for the vehicles cradles, available at www.symbol.com/manuals.

When attached to the vehicle dock, the Serial GPS receiver allows the mobile computer, when docked in the cradle, to capture GPS data.

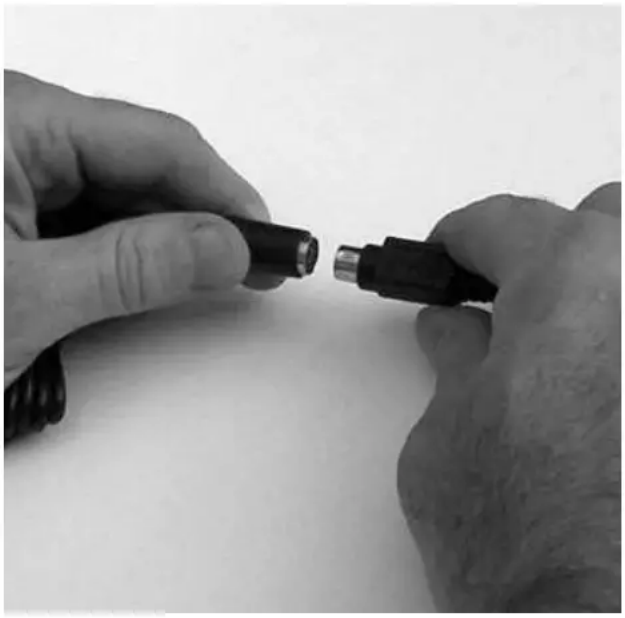
[1] *Accuracy is subject to degradation based on environmental and positional conditions. Rated accuracy provides 95% Circle Error Probability (CEP) position accuracies of <5 meters with WAAS correction and <10 meters uncorrected.

Step 1

To connect the Serial GPS to the vehicle cradle, plug the DB9 Serial connector into the serial port found on the bottom of the cradle to the left of the power cable. Tighten the DB9 serial connector with the thumbscrews to ensure a secure connection.

Step 2

Connect the longer of the two PS2 style connecters coming from the DB9 Serial connector to the PS2 connector coming from the GPS receiver.



Step 3

Connect the shorter of the two PS2 style connecters coming from the DB9 Serial connector to the PS2 connector coming from the DC power adaptor. The DC power adaptor should them be plugged into the vehicle's DC power jack.

Step 4

Position the GPS receiver where it has a clear view of the sky for optimal performance. The receiver is magnetized for use with vehicle roofs.

Connecting the LinksPoint Serial GPS Receiver Serial Powered Version (LinksPoint Part Number LP11632) to Symbol Vehicle Cradles

The serial powered version of the LinksPoint Serial GPS Receiver (LP11632) certain versions of the MC70 vehicle cradle that offer power out through the DB9 serial connector. Consult Symbol documentation to determine if you have a compatible cradle. In this configuration, the GPS receiver draws power from the MC70 mobile computer through the DB9 serial connector and requires no additional power supply. As a result, the GPS is powered only when the mobile computer is docked in the cradle and a valid GPS com port is open in a running GPS application. If the mobile computer is undocked or goes into suspend mode, power is no longer supplied to the GPS receiver. This situation may lead to slightly longer GPS start times when the mobile computer is docked or is resumed after a suspend. Install the vehicle cradle before connecting the LinksPoint Serial GPS Receiver.

For detailed information on Symbol MC70 vehicle cradles, see the Quick Reference Guide or Product Reference Guide for the vehicles cradles, available at www.symbol.com/manuals.

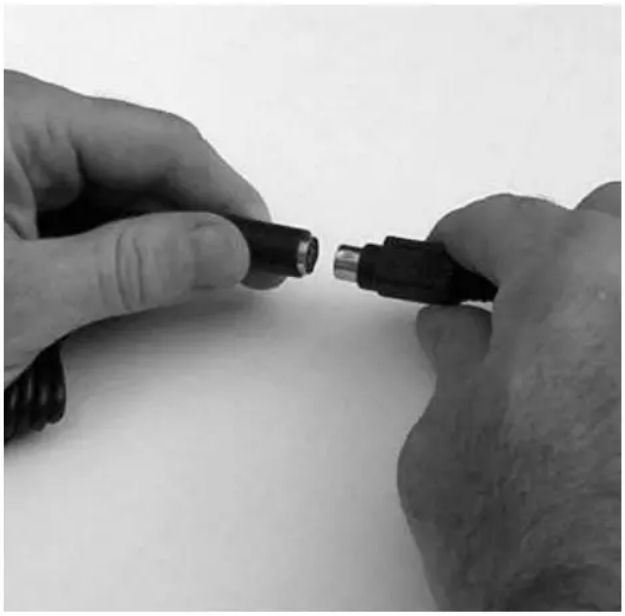
When attached to the vehicle dock, the Serial GPS receiver allows the mobile computer, when docked in the cradle, to capture GPS data.

Step 1

To connect the Serial GPS to the vehicle cradle, plug the DB9 Serial connector into the serial port found on the bottom of the cradle to the left of the power cable. Tighten the DB9 serial connector with the thumbscrews to ensure a secure connection.

Step 2

Connect PS2 style connecter coming from the DB9 Serial connector to the PS2 connector coming from the GPS receiver.



Step 3

Position the GPS receiver where it has a clear view of the sky for optimal performance. The receiver is magnetized for use with vehicle roofs.

Getting Started

Using the Serial GPS receiver with an existing GPS application

The Serial GPS receiver is designed to work "out-of-the-box" with GPS applications that accept data in the NMEA protocol format.

The National Marine Electronics Association regulates the NMEA 0183 specifications standard which defines a set of ASCII strings, called sentences, which relay GPS navigation information. This is the most commonly used standard for GPS communications.

To configure the Serial GPS receiver for use with a GPS application that supports the NMEA protocol, set the following parameters in the GPS application:

- GPS Com Port or Com Port: COM1
- Baud Rate: 4800
- Protocol: NMEA (Depending on the GPS application, you may not be asked to enter the protocol.)

Once these parameters have been set, the GPS application should begin automatically receiving GPS data from the Serial GPS receiver. Please consult the GPS application documentation for further information on how to communicate with an attached GPS receiver.

Using the Serial GPS receiver with the GlobalPoint GPS application

The GlobalPoint GPS application provides a means to confirm proper operation of the Serial GPS receiver and configure the mode of operation (NMEA or SiRF). Detailed instructions on how to use the GlobalPoint GPS application are included below.

The GlobalPoint GPS application can be downloaded at www.linkspoint.com/SerialGPS

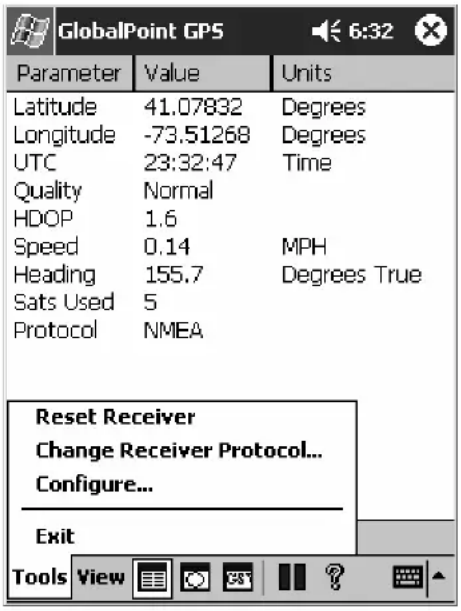
GlobalPoint GPS Software

The GlobalPoint GPS software provides a means to configure and confirm operation of the Serial GPS receiver. In the GlobalPoint GPS software you will be able to choose the mode of operation of the receiver and display positioning and performance information.

GlobalPoint GPS software can be downloaded at www.linkspoint.com/hardware.asp.

Tools Menu Options

Use the **Tools** menu to access configuration options or to exit the program.



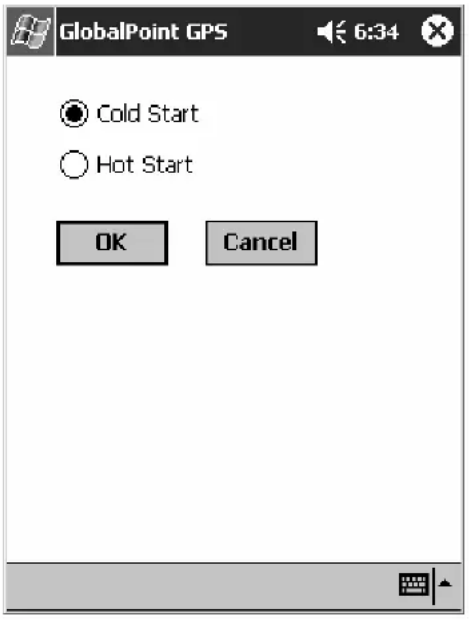
The tools menu contains the following options:

- Reset Receiver
- Change Receiver Protocol
- Configure
- Exit

Important Note: When first using the GlobalPoint GPS application, go to the ***Configure…*** option first to set up communication between the Serial GPS Receiver and Symbol mobile computer.

Reset Receiver

Use the *Reset Receiver* option to select the Start Mode and begin a new initialization of the receiver.



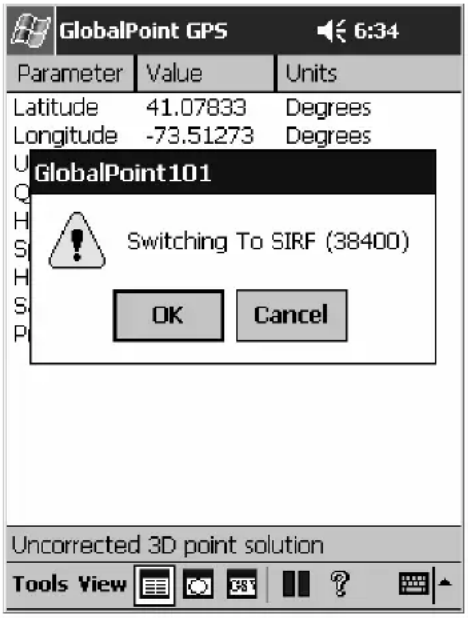
Cold Start causes the receiver to release any fix information and completely re-initialize navigation data (almanac, ephemeris, and clock). Typical “Time to First Fix” (TTFF) is 45 seconds or less.

Hot Start causes the receiver to keep existing navigation data and refresh the fix. Typical TTFF is 8 seconds or less.

Change Receiver Protocol

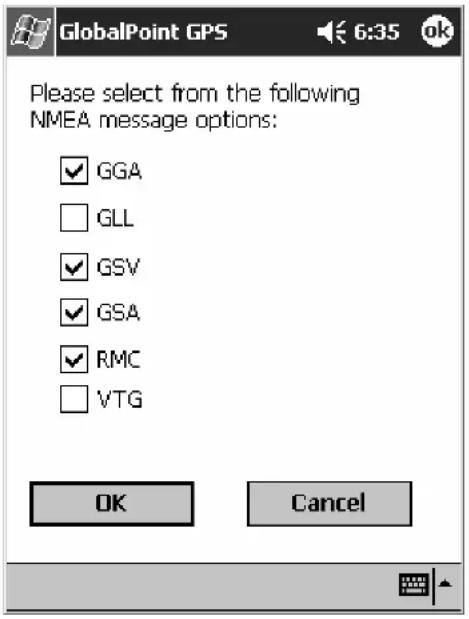
Change Receiver Protocol causes the receiver to switch between the two available modes of operation: NMEA or SiRF. NMEA is the default mode of operation for the Serial GPS Receiver for the Symbol mobile computers.

When in NMEA mode, choose this option to switch to SiRF mode.



The GlobalPoint GPS application requires the user to confirm switching the mode of operation from NMEA to SiRF. To cancel the ***Change Receiver Protocol*** command, tap on "Cancel."

When in SiRF mode, choose this option to switch to NMEA mode.



The GlobalPoint GPS application requires the user to confirm switching the mode of operation from SiRF to NMEA. To cancel the ***Change Receiver Protocol*** command, tap on "Cancel."

The ***Change Receiver Protocol*** also allows the user to choose which NMEA sentences are to be communicated from the Serial GPS receiver to the mobile computer. The following NMEA sentences are supported by the Serial GPS receiver:

GSV - Set this NMEA sentence to the update interval for the GNSS Satellites in view.

GLL - Set this NMEA sentence to the update interval for the Geographic Position: Latitude and Longitude.

RMC - Set this NMEA sentence to the update interval for the Recommended Minimum Specific GNSS Data.

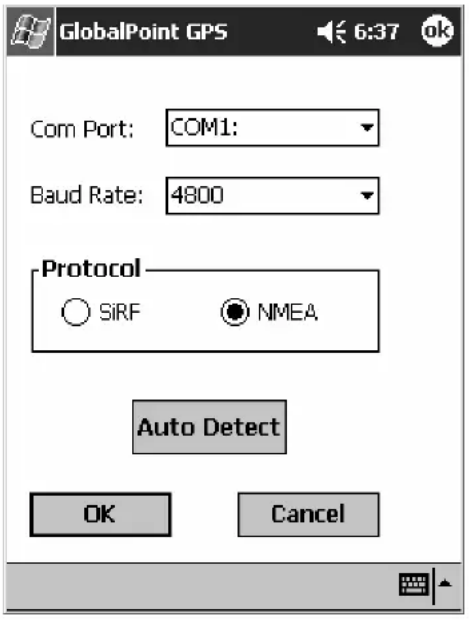
GSA - Set this NMEA sentence to the update interval for the GNSS DOP and Active Satellites.

VTG - Set this NMEA sentence to the update interval for the Course Over Ground and Ground Speed.

The default NMEA sentences for the Serial GPS receiver are GGA, GSV, GSA and RMC.

Configure

Use this option to configure the connection between the Serial GPS receiver and the Symbol mobile computer.



Com Port

This value determines the PC communications port the GPS receiver is connected to. **The default for the Serial GPS receiver is: COM1.**

Baud Rate

This value determines the Baud Rate (or data transfer rate) at which the GPS receiver communicates with the mobile computer. **The default for the Serial GPS is: 4800.**

Protocol

This value determines the mode of operation to be used by the Serial GPS receiver. **The default for the Serial GPS receiver is: NMEA**.

Auto Detect

Use this option to have the GlobalPoint GPS application automatically detect the Com Port, Baud Rate and Protocol in use by the GPS receiver attached to the mobile computer.

OK and Cancel

Select “OK” to save the settings selected or “Cancel” to disregard any changes.

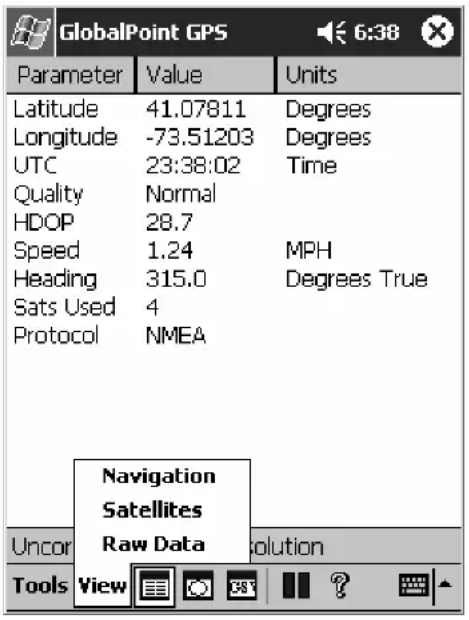
Exit

Use the ***Exit*** option to quit the GlobalPoint GPS application return to the Windows Mobile "Today" screen.

Important Note: To fully exit the GlobalPoint GPS application, the *Exit* option must be used. "Closing" the application by tapping on the "X" in the upper-right-hand portion of the screen will not exit the program, but cause it to be minimized where it will continue running in memory. If the GlobalPoint GPS application is running in memory, it will block other GPS applications from running properly on the mobile computer.

View Options

Use the **View** menu to choose how tracking information is displayed within the GlobalPoint GPS application.



The tools menu contains the following options:

- Navigation
- Satellites
- Raw Data

These options can also be selected by tapping on the following icons:

 Navigation

 Satellites

 Raw Data

Fix Description

At the lower portion of the screen, just above the **Tools** menu, the GlobalPoint GPS application displays the type of fix currently acquired by the GPS receiver. This value can change over time as the receiver's viewable sky changes, or if the receiver is re-initialized. The types of fixes are:

- Invalid unavailable solution – This signifies that not enough satellite data is available to provide a fix. This occurs as the receiver is initialized or when an insufficient number of satellites are in the viewable sky.

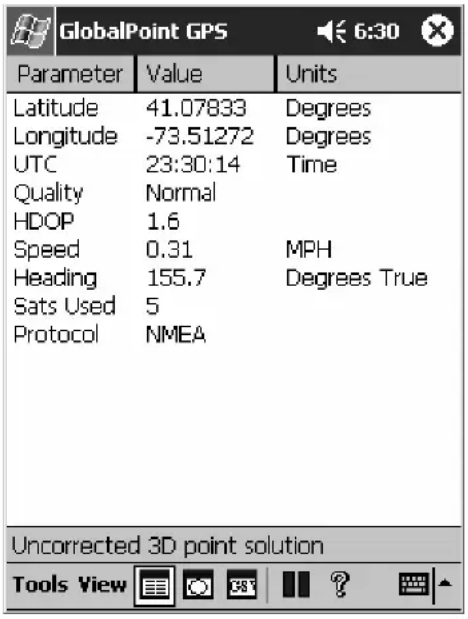
- Corrected 3D point solution – This signifies that a three-dimensional GPS fix is available and that it is corrected using WAAS.

- Uncorrected 3D point solution - This signifies that a standard three-dimensional GPS fix is available.

- Uncorrected 2D point solution – This signifies that a two-dimensional GPS fix is acquired.

Navigation View

Use the "Navigation" view to display summary data for GPS fix information communicated from the GPS receiver.



Parameters displayed in the Navigation view are:

- **Latitude –** Displays the current location on the face of the Earth north or south of the Equator. Latitude is an angular measurement ranging from 0° at the Equator to 90° at

the poles (90º N or 90º S). In the GlobalPoint GPS application, **North** is shown as a positive value and **South** is show as a negative value.

- **Longitude –** Displays the current location on the face of the Earth east or west of a north-south line called the Prime Meridian. Longitude is an angular measurement ranging from 0°at the Prime Meridian to +180°east ward and –180°westward. In the GlobalPoint GPS application, **East** is shown as a positive value and **West** is show as a negative value.

- **UTC –** "Coordinated Universal Time or UTC," is the equivalent of Greenwich Mean Time, the astronomical basis for civil time.

- **Quality –** Displays whether current fix is a "Normal" uncorrected fix or a WAAS "Corrected" fix.

- **HDOP** – "Horizontal Dilution Of Precision" is a measure of how the satellite geometry influences the latitude and longitude data accuracy. A good satellite geometry and hence a good accuracy is obtained if the satellites being tracked are located as far away from each other as possible, while the geometry is poor if the satellites are located close to each other. If the HDOP value is higher than about 10 the latitude and longitude data likely to be inaccurate.

- **Speed** – Displays the current velocity in miles per hour.

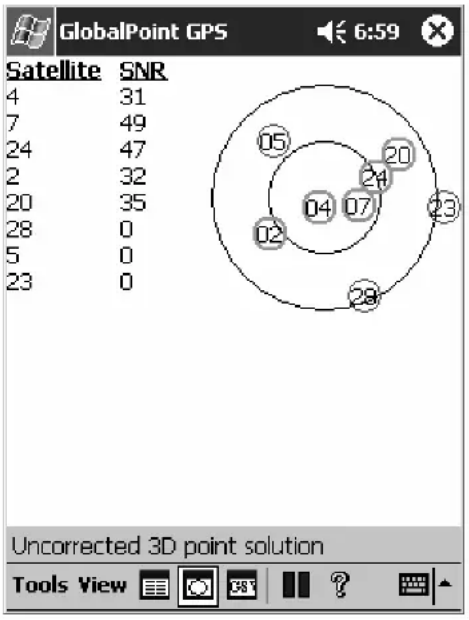
- **Heading –** Displays the current direction of travel in degrees with North being 0°.

- **Sats Used –** The number of satellites used in the current fix.

- **Protocol –** The current mode of operation. This can be SiRF or NMEA.

Satellites View

Use the “Satellite” view to display summary data about the available satellites in the viewable sky.

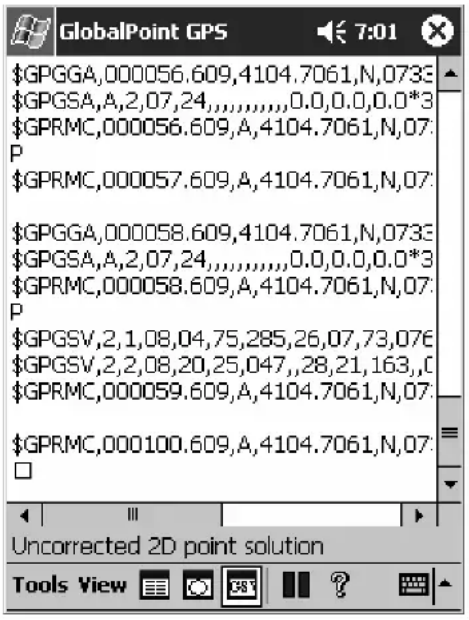


Parameters displayed in the Navigation view are:

- **Satellites –** This column displays all satellites available in the viewable sky by the identifying number of each satellite as determined by the GPS authorities.
- **SNR -** This value indicates the carrier signal to noise ratio for the signal received by the individual satellite. Typically, satellites with SNR values below 28 are not used in GPS fixes.
- **Satellite Sky Map –** This graphic image displays the relative position of the viewable satellites overhead.

Raw Data View

Use the “Raw Data” view to display raw GPS signal data being received by the GPS receiver.



Additional Options

Pause

Tapping the “Pause” icon temporarily pauses the GPS data stream being received by the GPS receiver. To resume the GPS data stream, tap on the pause icon. When active, the pause icon will have a gray background. When paused, the icon will have a white background.

 Pause Icon (unpaused)

 Pause Icon (paused)

Specifications

Supported Operating Systems

- Windows® Mobile 2003
- Windows® Mobile 2003 Phone Edition
- Windows® Mobile 5.0
- Windows® Mobile 5.0 Phone Edition (Pending)

Chipset

GPS Chipset: SiRFstar III

Chipset Processor: ARM7/TDMI – 49MHZ

Receiver

Frequency: L1, CA code

Signal Acquisition: 1920 time/frequency search channels

Channels: 20 Channels; all-in-view tracking

Max. Update Rate: 10Hz

Sensitivity: -159dBW

DGPS Source: Default: None

DGPS Programmable: WAAS/EGNOS

System Back Up: Built-in Lithium-Ion rechargeable battery

Antenna Type: Built-in Antenna (external antenna optional)

Position/Time Accuracy (without SA)

Autonomous: <10 m

WAAS <5m

Velocity: 0.1 meters/second

Time: 1 microsecond synchronized to GPS time

Datum: WGS-84

Acquisition Rate

Reacquisition: 100msec

Hot Start: <1 second

Warm Start: <38 seconds

Cold Start: <42 sec

Protocol

Default: NMEA-0183 (V2.20)- GGA(1), GSA(1), GSV(5), RMC(1)

Programmable: Additional NMEA- VTG, GLL / SiRF Binary

Power

Draw: 70mA at 3.3V; DC power adaptor

Internal Battery: 3v (for GPS module only)

Dynamic Conditions

Altitude: <18,000 meter

Velocity: < 515 meter/second

Acceleration: <4g

Environmental

Water Seal: Waterproof to 1 meter

Operating Temperature: -20℃ to +60℃

Storage Temperature: -40℃ to 70℃

Humidity: N/A

Regulatory

Marks: FCC, CE, RoHS

Physical Interface to Vehicle Cradle

Connector: DB9 with cigarette lighter power adaptor; DB9 with power on Pin9.

Dimensions

Depth: 62.0mm

Width: 46.1mm

Height: 18.0mm

Weight: 95g

Part Numbers

For MC90XX/MC70: LP11631 (with Cig. Lighter Adaptor)

For MC70 with powered serial connector: LP11632 (with Pin9 serial power cable)

Regulatory Information

Radio Frequency Interference Requirements

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 encourages to try to correct the interference by one or more of the following measures:

• Reorient or relocate 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

CAUTION: Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

CE Marking and The European Economic Area (EEA)

Links Point, Inc., hereby, declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. A

Declaration of Conformity may be obtained from http://www.linkspoint.com/ce_doc.asp

Warranty

(a) LinksPoint's hardware Products are warranted against defects in workmanship and materials for a period of twelve (12) months from the date of shipment by LinksPoint's reseller to its customer, but in no event more than fifteen (15) months from shipment of the Products by LinksPoint, unless otherwise provided by LinksPoint in writing, provided the Product remains unmodified and is operated under normal and proper conditions. Warranty provisions and durations on software, integrated installed systems, Product modified or designed to meet specific customer specifications ("Custom products"), remanufactured products, and reconditioned or upgraded products, shall be as provided in the applicable Product specification in effect at the time of purchase or in the accompanying software license; (b) Spare parts (i.e. Parts, components, or subassemblies sold by LinksPoint for use in the service and maintenance of Products) are warranted against defects in workmanship and materials for a period of thirty (30) days from the date of shipment. Spare parts may be new or originate from returned units under the conditions set forth in subsection (d) below; (c) For repairs on LinksPoint-branded hardware Products under this Agreement, including repairs covered by warranty, the repair services provided are warranted against defects in workmanship and materials on the repaired component of the Product for a period of thirty (30) days from the shipment date of the repaired Product, or until the end of the original warranty period, whichever is longer; and (d) Products may be serviced or manufactured with parts, components, or subassemblies that originate from returned products and that have been tested as meeting applicable specifications for equivalent new material and Products. The sole obligation of LinksPoint for defective hardware Products is limited to repair or replacement (at LinksPoint's option) on a "return to service depot" basis with prior LinksPoint authorization. Solution Provider is responsible for shipment to LinksPoint and assumes all costs and risks associated with this transportation; return shipment to the Solution Provider will be at LinksPoint's expense. Solution Provider shall be responsible for return shipment charges for product returned where LinksPoint determines there is no defect ("No Defect Found"), or for Product returned that LinksPoint determines is not eligible for warranty repair. No charge will be made to Solution Provider for replacement parts for warranty repairs. LinksPoint is not responsible for any damage to or loss of any software programs, data or removable data storage media, or the restoration or reinstallation of any software programs or data other than the software, if any, installed by LinksPoint during the manufacture of the Product; (e) Except for the warranty applying solely to the repaired component arising from a repair service as provided in (c) above, the aforementioned provisions do not extend the original warranty period of any Product that had either been repaired or replaced by LinksPoint; (f) The above warranty shall not apply to any Product (I) which has been repaired, tampered with, altered or modified, except by LinksPoint's authorized service personnel; or (II) in which the defects or damage to the Product result from normal wear and tear, misuse, negligence, improper storage, water or other liquids, battery leakage, use of parts or accessories not approved or supplied by LinksPoint, or failure to perform operator handling and scheduled maintenance instructions supplied by LinksPoint; (III) which has been subjected to unusual physical or electrical stress, abuse, or accident, or forces or exposure beyond normal use within the specified operational and environmental parameters set forth in the applicable Product specification; nor shall the above warranty provisions apply to any expendable or consumable items, such as batteries, supplied with Product. EXCEPT FOR THE WARRANTY OF TITLE AND THE EXPRESS WARRANTIES STATED ABOVE, LINKSPOINT DISCLAIMS ALL WARRANTIES ON PRODUCTS FURNISHED HEREUNDER INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR USE. ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY LAW ARE LIMITED IN DURATION TO THE LIMITED WARRANTY PERIOD. SOME STATES OR COUNTRIES DO NOT ALLOW A LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS OR THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR CONSUMER PRODUCTS. IN SUCH STATES OR COUNTRIES, FOR SUCH PRODUCTS, SOME EXCLUSIONS OR LIMITATIONS OF THIS LIMITED WARRANTY MAY NOT APPLY. The stated express warranties are in lieu of all obligations or liabilities on the part of LinksPoint for damages, including but not limited to, special, indirect or consequential damages arising out of or in connection with the use or performance of the Product or service. LinksPoint's liability for damages to Solution Provider or others resulting from the use of any Product or service furnished here under shall in no way exceed the purchase price of said Product or the fair market value of said service, except in instances of injury to persons or property.

To the fullest extent allowed by law, the warranties and remedies set forth in this agreement are exclusive and in lieu of all other warranties terms or conditions, express or implied, either in fact or by operation of law, statutory or otherwise, including without limitation warranties terms or conditions of/as to satisfactory quality, merchantability, fitness for a particular purpose, conformance to contract, correspondence with description and non-infringement, all of which are expressly excluded. LinksPoint's warranties herein are granted only to Distributor, and are not extended to any third parties that, for the avoidance of doubt, include any resellers, agents or dealers of Distributor.

LinksPoint neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale, installation, maintenance or use of its products, and LinksPoint provides no warranty whatsoever for any non-standard Products supplied by it hereunder.

LINKSPOINT SHALL NOT BE LIABLE UNDER THIS WARRANTY IF ITS TESTING AND EXAMINATION DISCLOSE THAT THE ALLEGED DEFECT IN THE PRODUCT DOES NOT EXIST OR WAS CAUSED BY DISTRIBUTOR'S, OR DISTRIBUTOR'S RESELLER, OR END USER'S, OR ANY THIRD PERSON'S MISUSE, NEGLIGENCE, IMPROPER INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR, OR ANY OTHER CAUSE BEYOND THE INSTALLATION OR TESTING, UNAUTHORIZED ATTEMPTS TO REPAIR, OR ANY OTHER CAUSE BEYOND THE RANGE OF THE INTENDED USE, OR BY ACCIDENT, FIRE, LIGHTNING OR OTHER HAZARD.

Service Information

Before you use the Serial GPS receiver, it must be configured to operate with our mobile computer and applications.

If you have a problem using the Serial GPS receiver, contact your facility's Technical or Systems Support. If there is a problem with the equipment, they will contact the LinksPoint Support Center:

Email: support@linkspoint.com

Telephone: +1 203.853.4600 Ext. 4

For the latest version of this guide go to http://www.linkspoint.com/GPSMC9000

Original Release - September 2006

LinksPoint
One Selleck Street – Suite 330
Norwalk, CT 06855
http://www.linkspoint.com