DSE

XH6831
DSE USB GPS Receiver

Installation Guide

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Contents

1 Introduction

Thank you for purchasing the DSE USB GPS Receiver. It is a 12-channel GPS receiver for notebook or desktop computers. It Features a USB 1.1 plug-n-play interface for easy installation, industry standard NMEA 0813 command set and built-in antenna with magnetic mount.

1.1 Package Contents

Carefully unpack and remove the contents. If any of the following items are missing or damaged, contact the Dick Smith Electronics store you purchased the device from.

- 1 x XH6831 DSE USB GPS Receiver
- 1x Installation CD
- This installation guide

1.2 Minimum System Requirements

- Pentium class computer, 200 MHz or higher (preferably 300 MHz or above)
- USB Capable computer running Windows 98SE, Me, 2000, XP, or Linux Kernel 2.4.20+

2 Features & Specifications

2.1 Features

- All-in-view 12-channel parallel processing
- Built-in active antenna
- Super-cohesive magnetic for mounting on the car
- “SiRF Star II/LP” high performance, low power consumption chipset
- High sensitivity to satellite signal
- Cold start under 45 seconds, average
- Superior urban canyon performance
- FoliageLock for weak signal tracking
- Built-in SuperCap to reserve system data for rapid satellite acquisition.
- Supports industry standard NMEA 0183 commands for widest compatibility with 3rd party software applications

2.2 Specifications

Frequency:	L1, 1575.42 MHz
C/A Code:	1.023MHz chip rate
Channels:	12
Sensitivity:	170 dBW
Accuracy - Horizontal:	15m 2D RMS (SA off)
Accuracy – Velocity:	0.1m/sec 95% (SA off),
Accuracy – Time:	1 micro-second synchronized to GPS time
Accuracy - WAAS enabled:	10m 2D RMS
DATUM:	WGS-84
Acquisition - Hot start:	8 sec., average (with ephemeris and almanac valid)
Acquisition - Warm start:	38 sec., average (with almanac but not ephemeris)
Acquisition - Cold start:	45 sec., average (neither almanac nor ephemeris)
Reacquisition:	0.1 sec. average (interruption recovery time)
GPS Protocol:	Default: NMEA 0183 (Secondary: SiRF binary)
GPS Output Data:	SiRF binary >> position, velocity, altitude, status and control NMEA 0183 MEA0183 V2.2 protocol, and supports command: GGA, GSA, GSV, RMC
GPS transfer rate:	Software command setting (Default: 4800,n,8,1 for NMEA)
Acceleration Limit:	Less than 4g
Altitude Limit:	18,000 meters (60,000 feet) max.
Velocity Limit:	515 metres/sec. (1,000 knots) max.
Jerk Limit:	20 m/sec**3
Operating Temperature:	-30°~ 80°C
Humidity:	Up to 95% non-condensing
Voltage:	5V ±5%
Current:	90mA typical
Dimensions:	2.32" x 1.85" x 0.82" (59mm x 47mm x 21mm)
USB Cable Length:	65"
Chipset:	SiRFstarIIe/LP - comprising GSP2e/LP 40MIPS processor with GRF2i/LP front end.
PC Interface:	USB 1.1
USB Identifier:	VID: 067B; PID: 2303
Operating System Support:	USB 1.1 capable Windows 98SE, Me, XP, 2000 & Linux
Bundled Software:	PCTechGuide, OpenOffice.org, Windows USB to serial drivers, Windows GPS Information tool, GPS Thing, Delphi GPS shareware applications & VCL's
Warranty:	12 Months return to Dick Smith Electronics

3 Hardware installation

The following section outlines the steps you will need to take to install the GPS receiver.

1. Make sure your computer is turned on.

2. Insert the GPS receiver into a free USB port on your computer.

LED Indicator:

LED OFF: Receiver switch off

LED ON: No fixed, Signal searching

LED Flashing: Position Fixed

4 Software installation

This section contains the installation procedures for various operating systems. Please note that the screenshots may be different to what you will see on your screen.

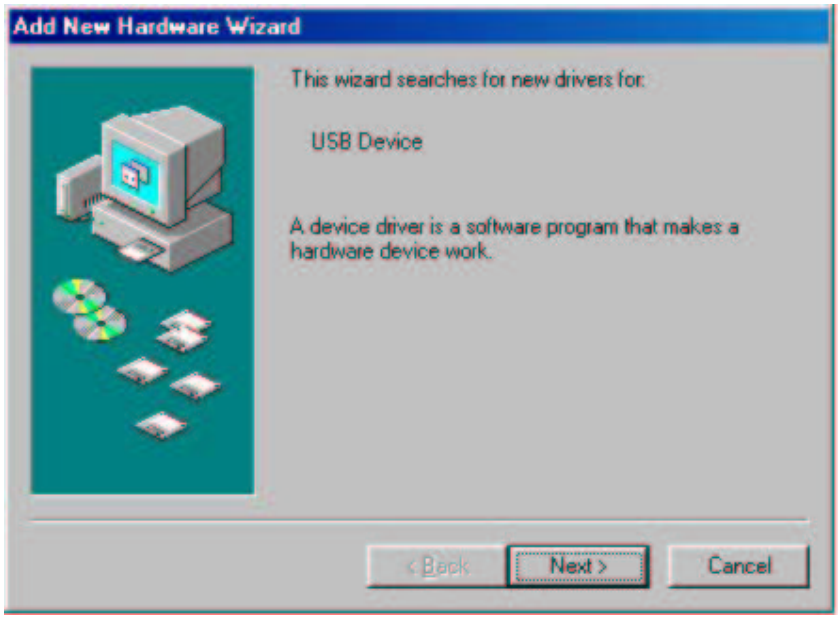
4.1 Location of driver files

The software driver files to suit your operating system can be found in the following directories on the installation CD.

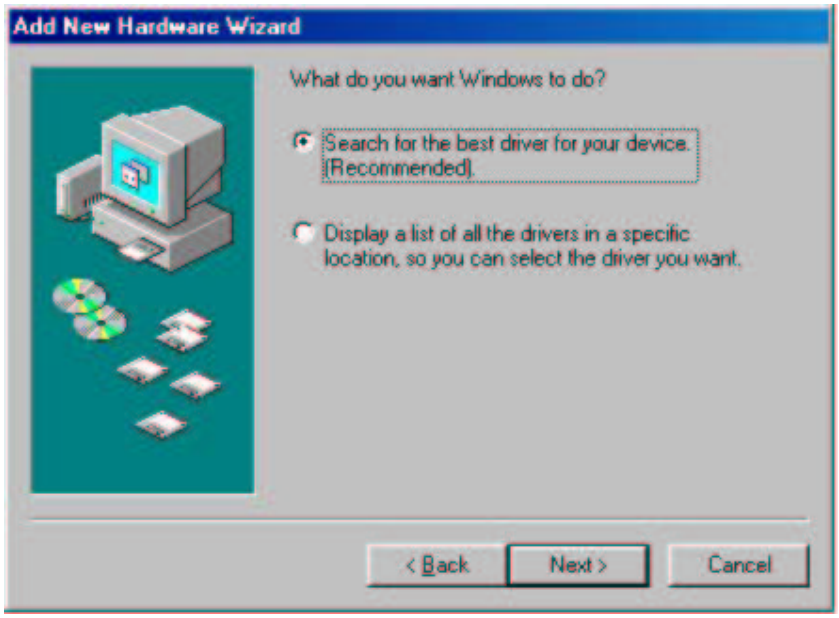
Directory	Operating System
\drivers\win98_me	Windows 98SE/Me
\drivers\win2k_xp	Windows 2000/XP
\drivers\linux	Linux Kernel 2.4.20+

4.2 Windows 98SE Driver Installation

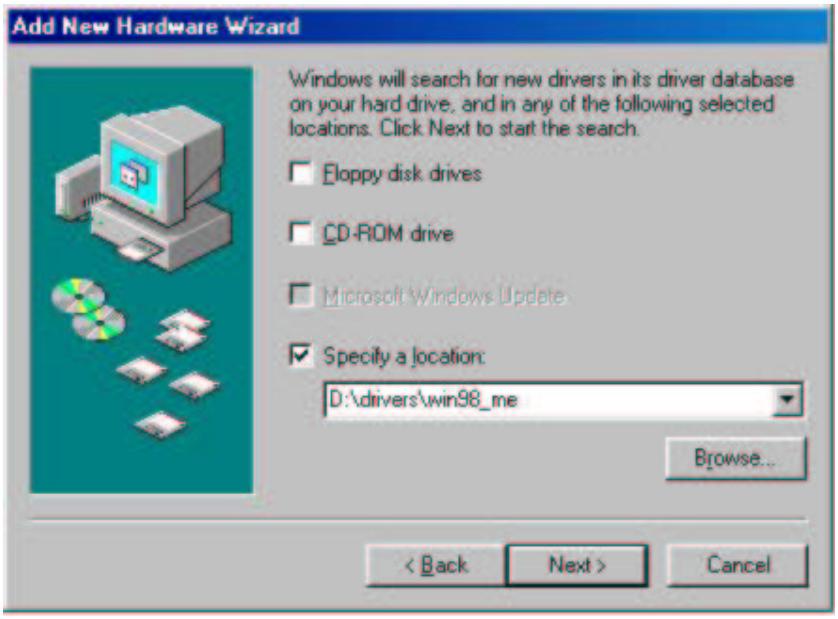
1. After you have plugged the GPS receiver in, a **Add New Hardware Wizard** dialog box will appear. Click **Next**.



2. Select **Search for the best driver for your device (Recommended).** Click **Next.**

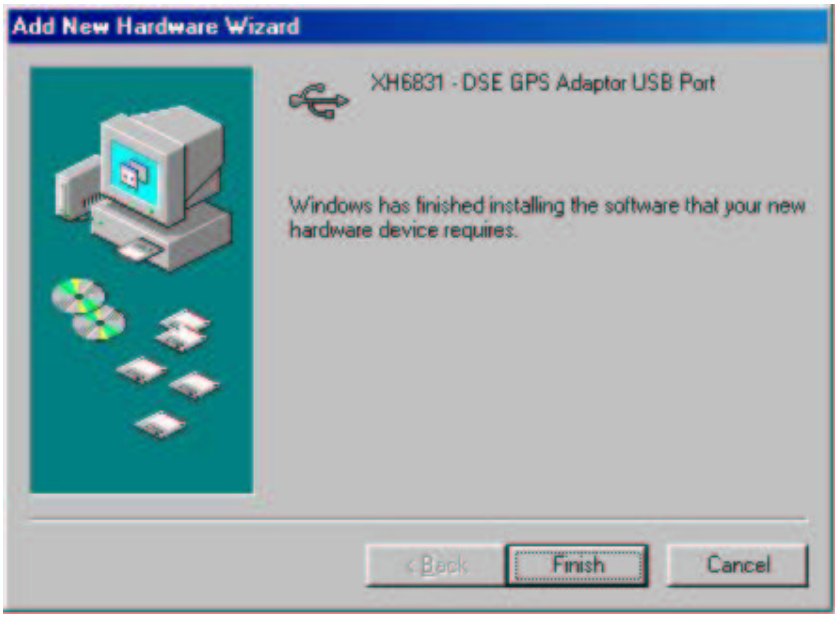


3. Make sure that the installation CD is in your CD-ROM drive. Select **Specify a location**. Click **Browse** and navigate to the **D:\drivers\win98_me** folder (where "D" is the letter of your CD-ROM drive). Click **OK**. Then click **Next.**



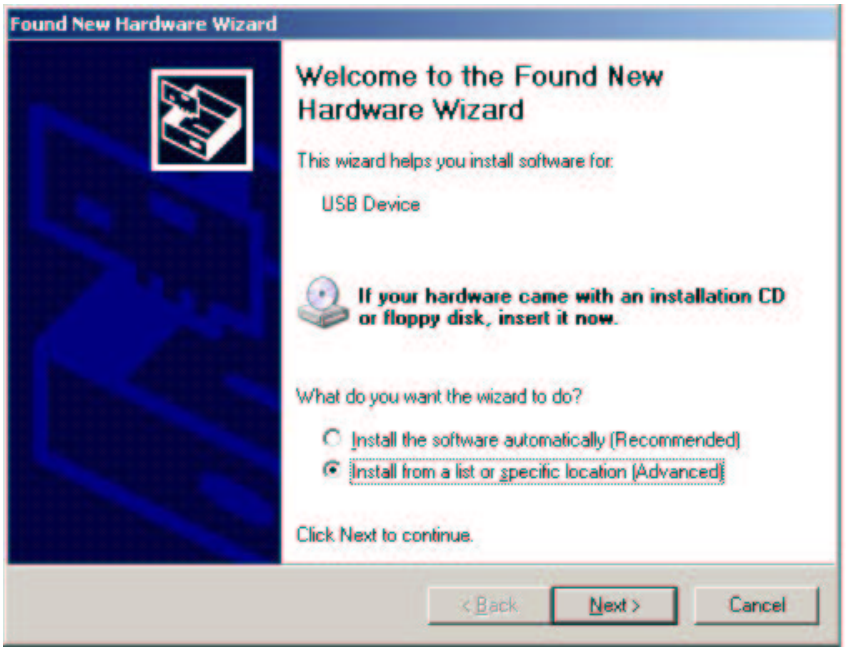
4. Windows will find the driver. Click **Next**.

5. When Windows has finished, you'll see a screen notifying you that the installation process has been completed. Click **Finish**.

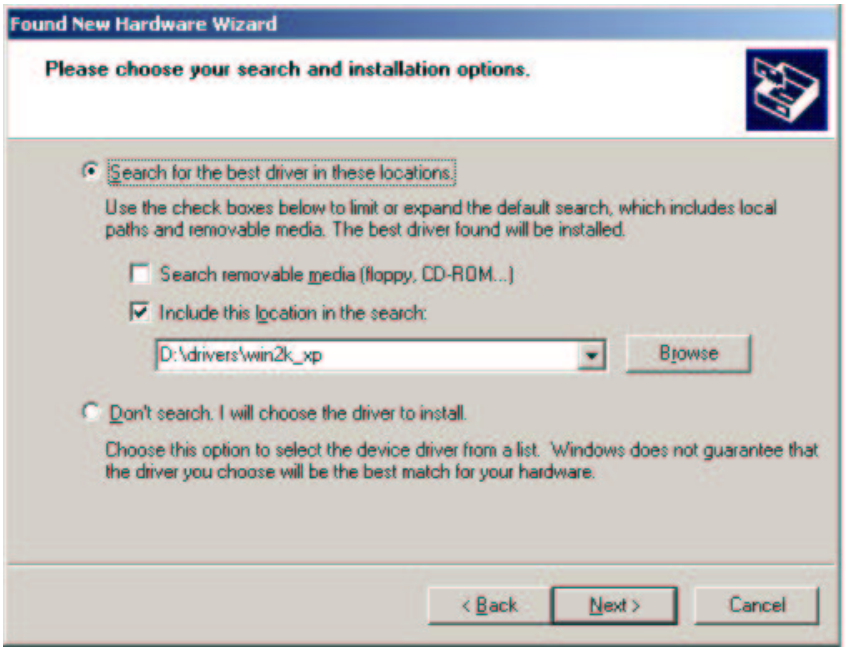


4.3 Windows 2000 and Windows XP Driver Installation

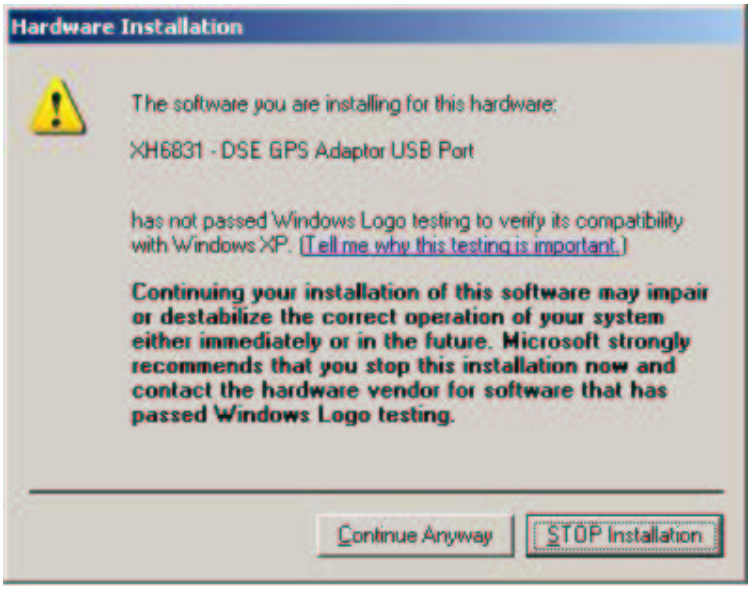
1. After you have plugged the GPS receiver in, a **Found New Hardware Wizard** dialog box will appear. Choose **Install from a list or specific location (Advanced)** and click **Next**.



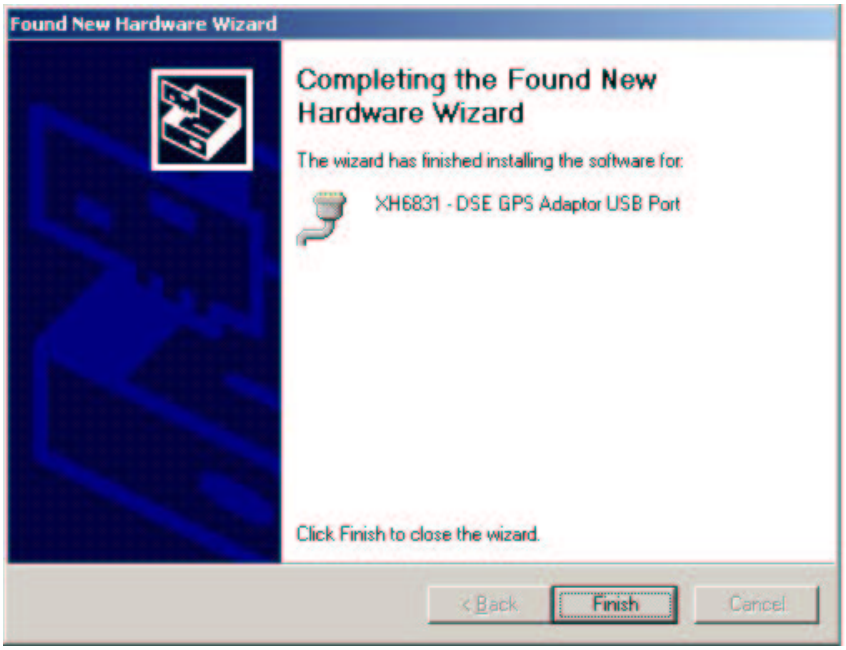
2. Make sure that the installation CD is in your CD-ROM drive. Select **Include this location in the search**. Click **Browse** and navigate to the **D:\drivers\win2k_xp** folder (where "D" is the letter of your CD-ROM drive). Click **OK**. Then click **Next.**



3. A warning message will appear. Click **Continue Anyway**.



4. When Windows has finished, you'll see a screen notifying you that the installation process has been completed. Click **Finish**.

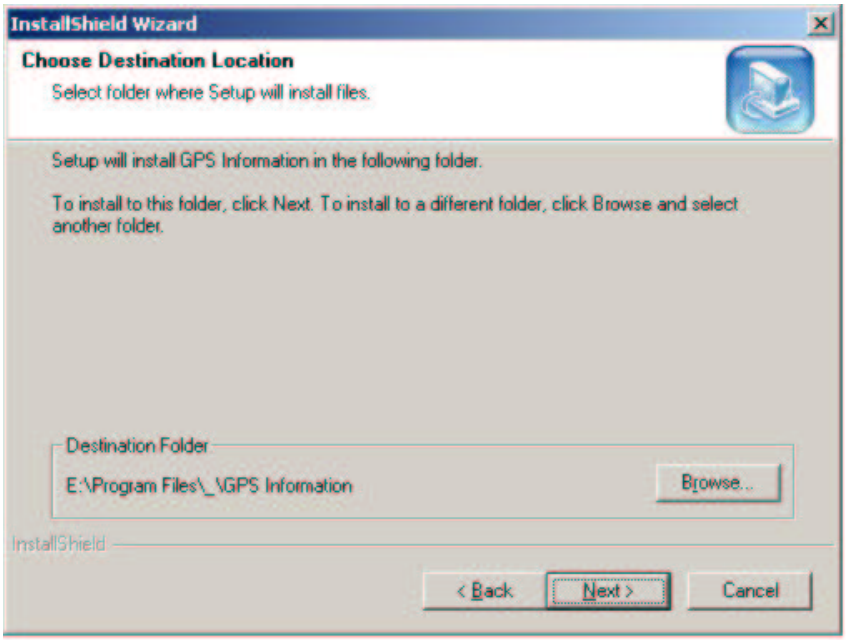


4.4 GPS Info Utility Installation

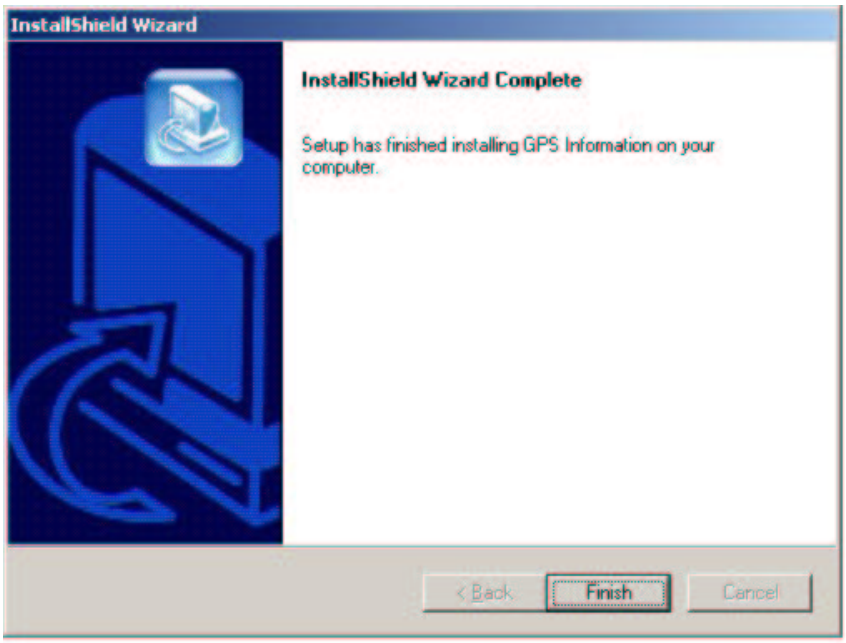
This section contains the installation procedure for the GPS software.

1. Insert the CD into your CD-ROM drive on your PC. The CD should start automatically and present you with an installation menu. If it doesn't, run **SETUP.EXE** which is located on the installation CD.

2. Click on **Install GPS Info Utility** and the next screen will appear. Click **Next**.

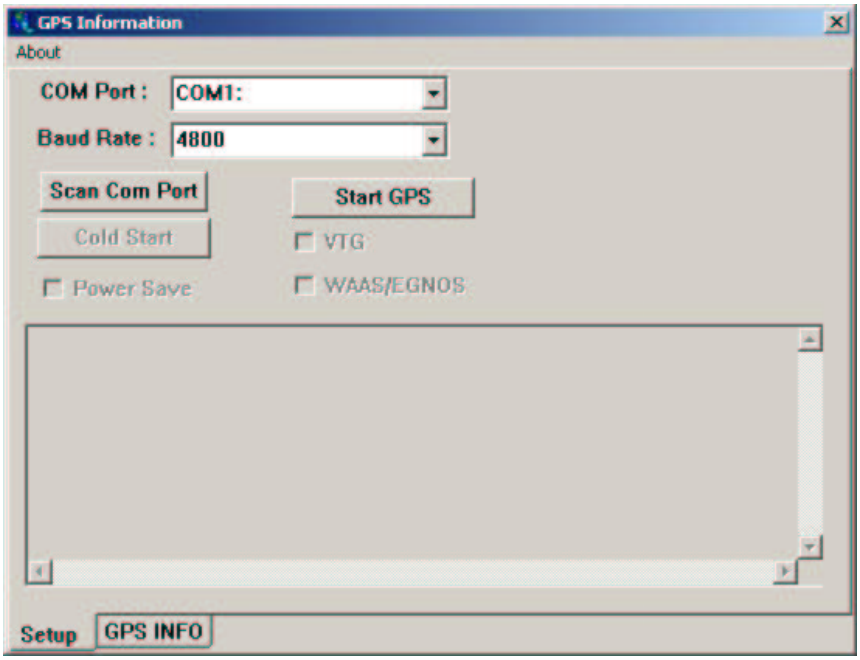


3. Click **Finish**.

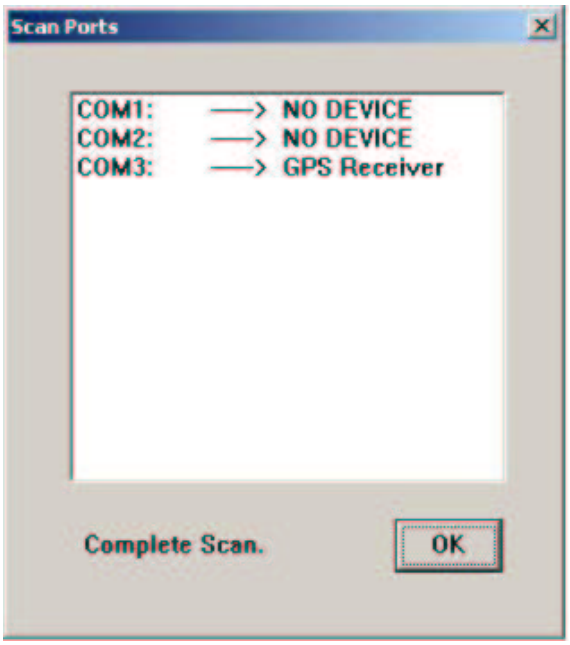


5 Using the GPS Info Utility

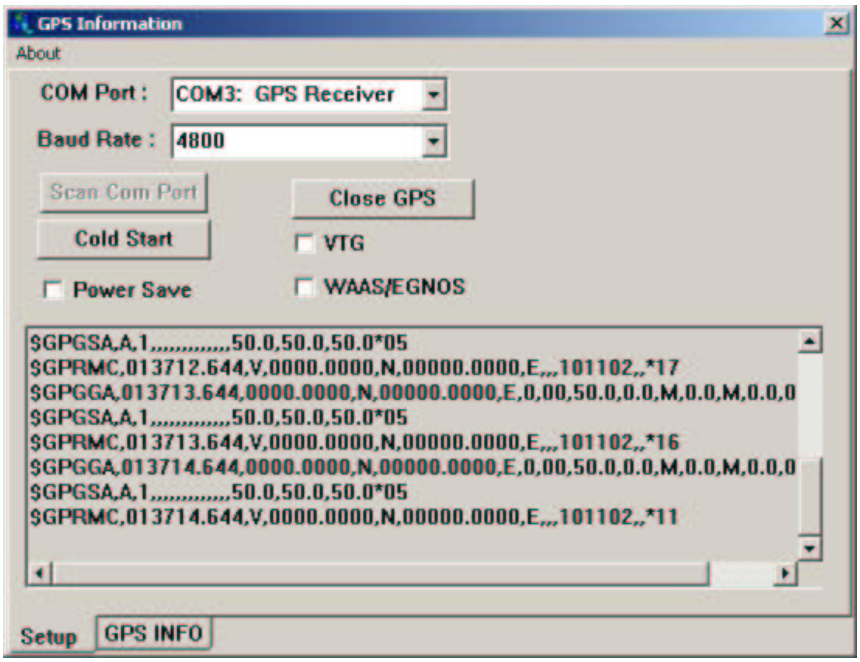
1. Click on **GPS Information** from the **Start menu** and the following screen will appear.

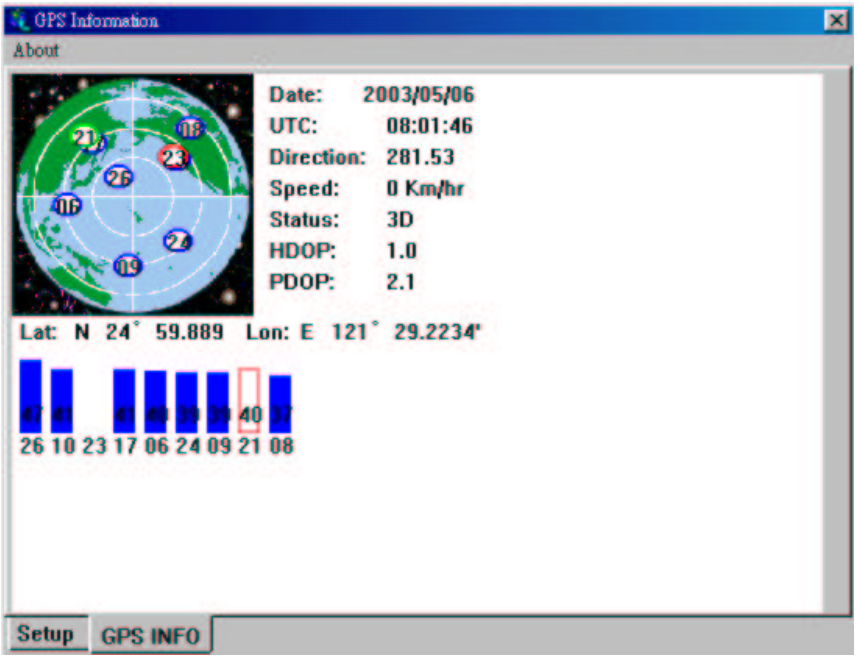


2. Click on **Scan Com Port** and click **OK** when the scan is completed.

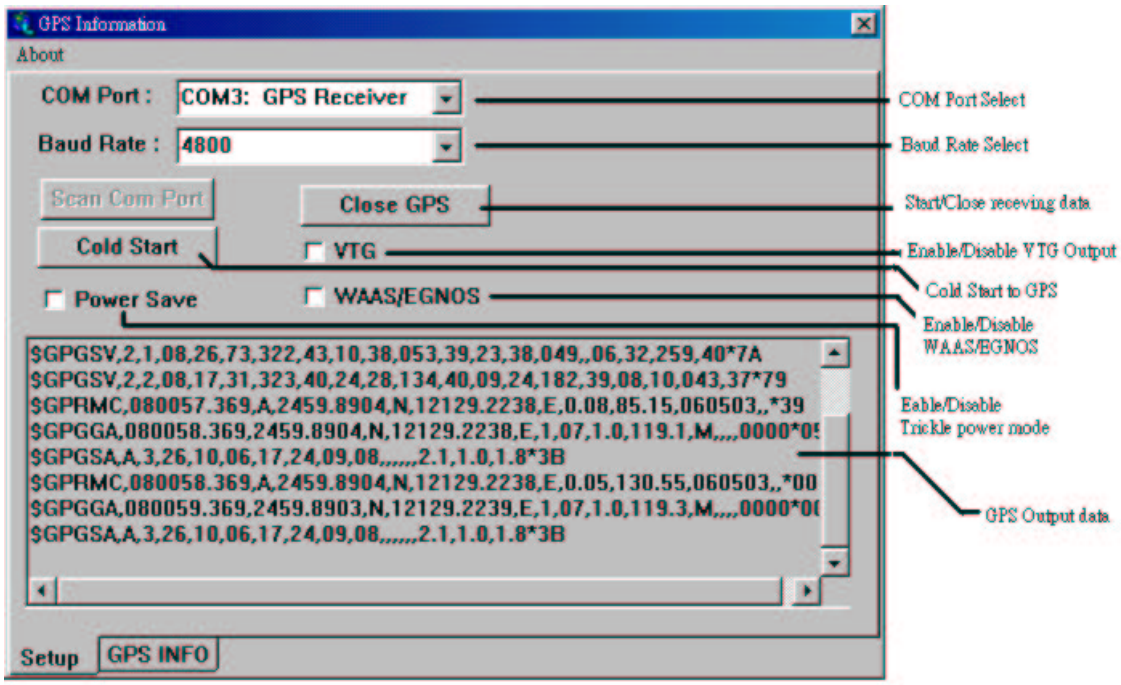


3. Back on the main window, click on **Start GPS** and the unit should start receiving data.





Please note that if you are inside a building or a house, the GPS receiver may not receive the data it needs as the roof will typically block the signal.



6 Troubleshooting

6.1 No GPS Response After Installation:

If you have followed the above installation steps but the GPS device still does not work, try exiting the software and unplugging the GPS device from the USB port and wait for at least 10 seconds, then re-connect the GPS device back into your PC. Also note that if you want to re-start your map software, you should also wait at least 10 seconds before re-opening it.

6.2 Erratic Mouse Cursor In Windows 2000:

If your mouse doesn't work properly after installation of the GPS driver, this situation is caused by a problem in Windows 2000 and is not related to the GPS device. Microsoft has acknowledged and stated that "the serial device (USB is actually converted to serial), may be detected as a serial mouse in WIN2000 O/S." To best resolve this issue, unplug the GPS device from the USB port during boot-up and only re-insert after boot-up is completed.

7 Support

Should you encounter problems with the installation of this device, please follow these steps:

1. Reread this manual and confirm you have followed all directions correctly.

2. Try another USB port

3. **Contact the DSE Support Team**
   DSE support operates during normal business hours.
   – Phone: 09-414-2836
   – email: support@dse.co.nz
   – or call into your nearest Dick Smith Electronics store

Note: Consumers are advised not to rely on our ability to provide support for Open Source, GNU, Freeware or Shareware software, as this software is often under continual development. We will however help where we can which may be limited to providing web links only. Windows software that does not fall into the categories above is supported.

Please visit our website http://www.dse.co.nz from time to time as the most up-to-date drivers and manuals will be posted there.

8 Warranty

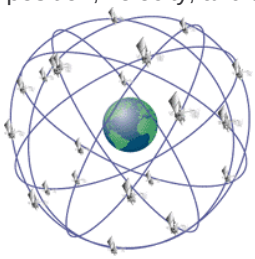
This device is supplied with a 12-month, non-transferable end user warranty. In the unlikely event that this device should fail within the warranty period, please return it, along with your purchase receipt, to your nearest Dick Smith Electronics store.

Please Note:
Damage due to misuse, abuse or electromagnetic discharge (including, but not limited to lightning, etc) is not covered by warranty.

9 Glossary of terms

Global Positioning System (GPS)

A space-based radio-navigation system consisting of a constellation of satellites and a network of ground stations used for monitoring and control. A minimum of 24 GPS satellites orbit the Earth at an altitude of approximately 11,000 miles providing users with accurate information on position, velocity, and time anywhere in the world and in all weather conditions.



GPS, formally known as the Navstar Global Positioning System, was initiated in 1973 to reduce the proliferation of navigation aids. By creating a system that overcame the limitations of many existing navigation systems, GPS became attractive to a broad spectrum of users worldwide. GPS has been successful in virtually all navigation applications, and because its capabilities are accessible using small, inexpensive equipment, GPS is being utilized in a wide variety of applications across the globe.

NMEA

The National Marine Electronics Association (NMEA) is the unifying force behind the entire marine electronics industry, bringing together all aspects of the industry for the betterment of all in our business.

10 Appendix: NMEA Sentence Types

10.1 Supported NMEA Sentence Types

The interface protocol used by the DSE GPS Receiver is based on the National Marine Electronics Association's NMEA 0183 ASCII interface specification, which is defined in NMEA 0183, Version 2.2 and the Radio Technical Commission for Maritime Services (RTCM Recommended Standards For Differential Navstar GPS Service.

The NMEA 0183 Interface Standard defines electrical signal requirements, data transmission protocol and time, and specific sentence formats for a 4800-baud serial data bus. Each bus may have only one talker but many listeners.

The NMEA 0183 standard calls for data communication in the form of coded "sentences." Each sentence begins with the character "$" and ends with a carriage return and line feed (<CR><LF>). These last two characters are "control" characters and are not normally printed (for this reason they are customarily shown enclosed in brackets). Between the beginning and end of each sentence are "fields" of data, each field separated by a comma. The first field in any sentence (field 0) begins with the two letter talker mnemonic code ("talkers" are devices that send out information, "listeners" take it in) followed by the three letter code for the sentence. Data follows in the standard format for that sentence.

The "language" of NMEA 0183 is extensive but not difficult to understand. The ground rules are these: maximum sentence length is 80 characters including the starting "$", the terminating <CR><LF>, and everything in between. Minimum number of data fields is two, including the address field (talker identifier and sentence format). If data for any field is unavailable, a "null" field, two commas with nothing between them (",,") can be sent instead.

GGA, GSA, GSV, RMC

The following information describes the NMEA-0183 sentences transmitted by the DSE GPS receiver.

- **$GPGGA** Global positioning system fixed data
- **$GPGSA** GNSS DOP and active satellites
- **$GPGSV** GNSS satellites in view
- **$GPRMC** Recommended minimum specific GNSS data

10.2 $GPGGA Sentence (Fix data)

Example (signal not acquired):

$GPGGA,235947.000,0000.0000,N,00000.0000,E,0,00,0.0,0.0,M,,,,0000*00

Example (signal acquired):

$GPGGA,092204.999,4250.5589,S,14718.5084,E,1,04,24.4,19.7,M,,,,0000*1F

Field	Example	Comments
Sentence ID	$GPGGA	
UTC Time	092204.999	hhmmss.sss
Latitude	4250.5589	ddmm.mmmm
N/S Indicator	S	N = North, S = South
Longitude	14718.5084	dddmm.mmmm
E/W Indicator	E	E = East, W = West
Position Fix	1	0 = Invalid, 1 = Valid SPS, 2 = Valid DGPS, 3 = Valid PPS
Satellites Used	04	Satellites being used (0-12)
HDOP	24.4	Horizontal dilution of precision
Altitude	19.7	Altitude in meters according to WGS-84 ellipsoid
Altitude Units	M	M = Meters
Geoid Seperation		Geoid seperation in meters according to WGS-84 ellipsoid
Seperation Units		M = Meters
DGPS Age		Age of DGPS data in seconds
DGPS Station ID	0000	
Checksum	*1F	
Terminator	CR/LF	

10.3 $GPGSA Sentence (Active satellites)

Example (signal not acquired):

$GPGSA,A,1,,,,,,,,,,,,,0.0,0.0,0.0*30

Example (signal acquired):

$GPGSA,A,3,01,20,19,13,,,,,,,,,40.4,24.4,32.2*0A

Field	Example	Comments
Sentence ID	$GPGSA	
Mode 1	A	A = Auto 2D/3D, M = Forced 2D/3D
Mode 1	3	1 = No fix, 2 = 2D, 3 = 3D
Satellite used 1	01	Satellite used on channel 1
Satellite used 2	20	Satellite used on channel 2
Satellite used 3	19	Satellite used on channel 3
Satellite used 4	13	Satellite used on channel 4
Satellite used 5		Satellite used on channel 5
Satellite used 6		Satellite used on channel 6
Satellite used 7		Satellite used on channel 7
Satellite used 8		Satellite used on channel 8
Satellite used 9		Satellite used on channel 9
Satellite used 10		Satellite used on channel 10
Satellite used 11		Satellite used on channel 11
Satellite used 12		Satellite used on channel 12
PDOP	40.4	Position dilution of precision
HDOP	24.4	Horizontal dilution of precision
VDOP	32.2	Vertical dilution of precision
Checksum	*0A	
Terminator	CR/LF	

10.4 $GPGSV Sentence (Satellites in view)

Example (signal not acquired):

$GPGSV,1,1,01,21,00,000,*4B

Example (signal acquired):

$GPGSV,3,1,10,20,78,331,45,01,59,235,47,22,41,069,,13,32,252,45*70

Field	Example	Comments
Sentence ID	$GPGSV	
Number of messages	3	Number of messages in complete message (1-3)
Sequence number	1	Sequence number of this entry (1-3)
Satellites in view	10	
Satellite ID 1	20	Range is 1-32
Elevation 1	78	Elevation in degrees (0-90)
Azimuth 1	331	Azimuth in degrees (0-359)
SNR 1	45	Signal to noise ration in dBHZ (0-99)
Satellite ID 2	01	Range is 1-32
Elevation 2	59	Elevation in degrees (0-90)
Azimuth 2	235	Azimuth in degrees (0-359)
SNR 2	47	Signal to noise ration in dBHZ (0-99)
Satellite ID 3	22	Range is 1-32
Elevation 3	41	Elevation in degrees (0-90)
Azimuth 3	069	Azimuth in degrees (0-359)
SNR 3		Signal to noise ration in dBHZ (0-99)
Satellite ID 4	13	Range is 1-32
Elevation 4	32	Elevation in degrees (0-90)
Azimuth 4	252	Azimuth in degrees (0-359)
SNR 4	45	Signal to noise ration in dBHZ (0-99)
Checksum	*70	
Terminator	CR/LF	

10.5 $GPRMC Sentence (Position and time)

Example (signal not acquired):

$GPRMC,235947.000,V,0000.0000,N,00000.0000,E,,,041299,,*1D

Example (signal acquired):

$GPRMC,092204.999,A,4250.5589,S,14718.5084,E,0.00,89.68,211200,,*25

Field	Example	Comments
Sentence ID	$GPRMC	
UTC Time	092204.999	hhmmss.sss
Status	A	A = Valid, V = Invalid
Latitude	4250.5589	ddmm.mmmm
N/S Indicator	S	N = North, S = South
Longitude	14718.5084	dddmm.mmmm
E/W Indicator	E	E = East, W = West
Speed over ground	0.00	Knots
Course over ground	0.00	Degrees
UTC Date	211200	DDMMYY
Magnetic variation		Degrees
Magnetic variation		E = East, W = West
Checksum	*25	
Terminator	CR/LF	

Please Note: The sentence types below are not supported by the DSE GPS receiver. They are described here for general information purposes.

10.6 $GPGLL Sentence (Position)

Example (signal not acquired):

$GPGLL,0000.0000,N,00000.0000,E,235947.000,V*2D

Example (signal acquired):

$GPGLL,4250.5589,S,14718.5084,E,092204.999,A*2D

Field	Example	Comments
Sentence ID	$GPGLL	
Latitude	4250.5589	ddmm.mmmm
N/S Indicator	S	N = North, S = South
Longitude	14718.5084	dddmm.mmmm
E/W Indicator	E	E = East, W = West
UTC Time	092204.999	hhmmss.sss
Status	A	A = Valid, V = Invalid
Checksum	*2D	
Terminator	CR/LF	

10.7 $GPVTG Sentence (Course over ground)

Example (signal not acquired):

$GPVTG,,T,,M,,N,,K*4E

Example (signal acquired):

$GPVTG,89.68,T,,M,0.00,N,0.0,K*5F

Field	Example	Comments
Sentence ID	$GPVTG	
Course	89.68	Course in degrees
Reference	89.68	T = True heading
Course		Course in degrees
Reference	89.68	M = Magnetic heading
Speed	0.00	Horizontal speed
Units	N	N = Knots
Speed	0.00	Horizontal speed
Units	K	K = KM/h
Checksum	*5F	
Terminator	CR/LF	

10.8 $GPALM Sentence (Almanac data)

Example:

$GPALM,1,1,15,1159,00,441d,4e,16be,fd5e,a10c9f,4a2da4,686e81,58cbe1,0a4,001*5B

Field	Example	Comments
Sentence ID	$GPALM	
Number of messages	1	Total number of messages in sequence
Sequence number	1	This is first message in sequence
Satellite PRN	15	Unique ID (PRN) of satellite message relates to
GPS week number	1159	
SV health	00	Bits 17-24 of almanac page
Eccentricity	441d	
Reference time	4e	Almanac reference time
Inclination angle	16be	
Rate of right ascension	fd5e	
Roor of semi-major axis	a10c9f	
Argument of perigee	4a2da4	
Longitude of ascension node	686e81	
Mean anomoly	58cbe1	
F0 clock parameter	0a4	
F1 clock parameter	001	
Checksum	*5B	
Terminator	CR/LF	

10.9 $GPGRS Sentence (range residuals)

Example:

$GPGRS,024603.00,1,-1.8,-2.7,0.3,,,,,,,,*6C

Field	Example	Comments
Sentence ID	$GPGRS	
UTC Time	024603.00	UTC time of associated GGA fix
Mode	1	0 = Residuals used in GGA, 1 = residuals calculated after GGA
Sat 1 residual	-1.8	Residual (meters) of satellite 1 in solution
Sat 2 residual	-2.7	The order matches the PRN numbers in the GSA sentence
Sat 3 residual	0.3	
Sat 4 residual		Unused entries are blank
Sat 5 residual		
Sat 6 residual		
Sat 7 residual		
Sat 8 residual		
Sat 9 residual		
Sat 10 residual		
Sat 11 residual		
Sat 12 residual		
Checksum	*6C	
Terminator	CR/LF	

10.10 $GPGST Sentence (pseudorange noise statistics)

Example:

$GPGST,024603.00,3.2,6.6,4.7,47.3,5.8,5.6,22.0*58

Field	Example	Comments
Sentence ID	$GPGST	
UTC Time	024603.00	UTC time of associated GGA fix
RMS deviation	3.2	Total RMS standard deviation of ranges inputs to the navigation solution
Semi-major deviation	6.6	Standard deviation (meters) of semi-major axis of error ellipse
Semi-minor deviation	4.7	Standard deviation (meters) of semi-minor axis of error ellipse
Semi-major orientation	47.3	Orientation of semi-major axis of error ellipse (true north degrees)
Latitude error deviation	5.8	Standard deviation (meters) of latitude error
Longitude error deviation	5.6	Standard deviation (meters) of longitude error
Altitude error deviation	22.0	Standard deviation (meters) of latitude error
Checksum	*58	
Terminator	CR/LF	

10.11 $GPMSS Sentence (beacon receiver status)

Example:

$GPMSS,0.0,0.0,0.0,25,2*6D

Field	Example	Comments
Sentence ID	$GPMSS	
Signal strength	0.0	Signal strength (dB 1uV)
SNR	0.0	Signal to noise ratio (dB)
Frequency	0.0	Beacon frequency (kHz)
Data rate	25	Beacon data rate (BPS)
Unknown field	2	Unknown field sent by GPS receiver used for test
Checksum	*6D	
Terminator	CR/LF	

10.12 $GPZDA Sentence (UTC and local date/time data)

Example:

$GPZDA,024611.08,25,03,2002,00,00*6A

Field	Example	Comments
Sentence ID	$GPZDA	
UTC Time	024611.08	UTC time
UTC Day	25	UTC day (01 to 31)
UTC Month	03	UTC day (01 to 12)
UTC Year	2002	UTC year (4 digit format)
Local zone hours	00	Offset to local time zone in hours (+/- 00 to +/- 59)
Local zone minutes	00	Offset to local time zone in minutes (00 to 59)
Checksum	*6A	
Terminator	CR/LF	