

Acronyms, Abbreviations, and Glossary



This appendix describes all acronyms, abbreviations, and selected terms used in this document.

2-D	Two dimensional.
3-D	Three dimensional.
A/D	Analog to Digital.
Almanac	A set of orbital parameters that allows calculation of the approximate GPS satellite positions and velocities. A GPS receiver uses the almanac as an aid to determine satellite visibility during acquisition of GPS satellite signals. The almanac is a subset of satellite ephemeris data and is updated weekly by GPS Control.
Altitude	The distance between the current position and the nearest point on WGS84 reference ellipsoid. Altitude is usually expressed in meters and is positive outside the ellipsoid. In terms of the SiRFstarI/LX Evaluation Receiver, this has no bearing on the height above mean sea level (which depends on the time and place, due to gravity of Sun, Moon, etc.). Determining height with respect to mean sea level requires making appropriate corrections to the altitude computed by the SiRFstarI/LX Evaluation Receiver.
Altitude Hold	A technique that allows navigation using measurements from three GPS satellites plus an independently obtained value of altitude.
Altitude Hold Mode	A Navigation Mode during which a value of altitude is processed by the Kalman Filter as if it were a range measurement from a satellite at the Earth's center (WGS-84 reference ellipsoid center).
Baud	(See bps.)
bps	Bits per second (also referred to as a Baud rate).
C	Celsius, a unit of temperature.
C/A Code	Coarse/Acquisition Code. A spread spectrum direct sequence code that is used primarily by commercial GPS receivers to determine the range to the transmitting GPS satellite.
CEP	Circular Error Probable. The radius of a circle, centered at the user's true location, that contains 50 percent of the individual position measurement made using a particular navigation system.
Clock Error	The uncompensated difference between synchronous GPS system time and time best known within the GPS receiver.
C/No	Carrier-to-Noise density ratio.



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Cold Start	A condition in which the GPS receiver can arrive at a navigation solution without initial position, time, current Ephemeris, and almanac data.
Control Segment	The Master Control Station and the globally dispersed Monitor Stations used to manage the GPS satellites, determine their precise orbital parameters, and synchronize their clocks.
dB	Decibel.
dBHz	Relative power in a 1Hz bandwidth.
dBic	Decibel-Isometric-Circular (measure of power relative to an isometric antenna with circular polarization).
dBm	Decibels per milliwatt.
dBW	Decibel-Watt (measure of power relative to one watt).
DC	Direct Current.
Decimal Degrees	Degrees of latitude and longitude expressed as a decimal rather than in degrees, minutes, and seconds. Decimal degrees are computed using the following formula: Decimal degrees = degrees + minutes/60 + seconds/3600. As an example, 73deg 59min 15sec is equal to 73.9875 decimal degrees.
DGPS	Differential GPS. A technique to improve GPS accuracy that uses pseudorange errors recorded at known locations to improve the measurements made by other GPS receivers within the same general geographic area.
Doppler Aiding	A signal processing strategy that uses a measured doppler shift to help a receiver smoothly track a GPS signal to allow a more precise velocity and position measurement.
DoD	Department of Defense.
DOP	Dilution of Precision (see GDOP, HDOP, PDOP, TDOP, and VDOP).
DSP	Digital Signal Processor.
DTR	Data Terminal Ready.
ECEF	Earth-Centered Earth-Fixed. A Cartesian coordinate system with its origin located at the center of the Earth. The coordinate system used by GPS to describe 3-D location. For the WGS-84 reference ellipsoid, ECEF coordinates have the Z-axis aligned with the Earth's spin axis, the X-axis through the intersection of the Prime Meridian and the Equator and the Y-axis is rotated 90 degrees East of the X-axis about the Z-axis.
EEPROM	Electrically Erasable Programmable Read Only Memory.
EHPE	Expected Horizontal Position Error.
EMC	Electromagnetic Compatibility.
EMI	Electromagnetic Interference.
Ephemeris	A set of satellite orbital parameters that is used by a GPS receiver to calculate precise GPS satellite positions and velocities. The ephemeris is used to determine the navigation solution and is updated frequently to maintain the accuracy of GPS receivers.
EPROM	Erasable Programmable Read Only Memory.
EVPE	Expected Vertical Position Error.
FP	Floating-Point mathematics, as opposed to fixed point.
FRP	Federal Radionavigation Plan. The U.S. Government document that contains the official policy on the commercial use of GPS.
GaAs	Gallium Arsenide, a semiconductor material.

GDOP	Geometric Dilution of Precision. A factor used to describe the effect of the satellite geometry on the position and time accuracy of the GPS receiver solution. The lower the value of the GDOP parameter, the less the errors in the position solution. Related indicators include PDOP, HDOP, TDOP, and VDOP.
GMT	Greenwich Mean Time.
GPS	Global Positioning System. A space-based radio positioning system that provides suitably equipped users with accurate position, velocity, and time data. GPS provides this data free of direct user charge worldwide, continuously, and under all weather conditions. The GPS constellation consists of 24 orbiting satellites, four equally spaced around each of six different orbital planes. The system is developed by the DoD under Air Force management, primarily for military purposes, but current policy calls for civil availability with degradation in system accuracy to protect U.S. national security interests.
GPS Time	The number of seconds since Saturday/Sunday Midnight UTC, with time zero being this midnight. Used with GPS Week Number to determine a specific point in GPS time.
HDOP	Horizontal Dilution of Precision. A measure of how much the geometry of the satellites affects the position estimate (computed from the satellite range measurements) in the horizontal (East, North) plane.
Held Altitude	The altitude value that is sent to the Kalman filter as a measurement when in Altitude Hold Mode. It is an Auto Hold Altitude unless an Amended Altitude is supplied by the application processor.
Hot Start	Start mode of the GPS receiver when current position, clock offset, approximate GPS time and current ephemeris data are all available.
Hz	Hertz, a unit of frequency.
I/O	Input/Output.
IF	Intermediate Frequency.
IGRF	International Geomagnetic Reference Field.
IODA	Issue of Data Ephemeris.
JPO	Joint Program Office. An office within the U.S. Air Force Systems Command, Space Systems Division. The JPO is responsible of managing the development and production aspect of the GPS system and is staffed by representatives from each branch of the U.S. military, the U.S. Department of transportation, Defense Mapping Agency, NATO member nations, and Australia.
Kalman Filter	Sequential estimation filter which combines measurements of satellite range and range rate to determine the position, velocity, and time at the GPS receiver antenna.
Km	Kilometer, 1000 meters.
L1 Band	The 1575.42 MHz GPS carrier frequency which contains the C/A code, P-code, and navigation messages used by commercial GPS receivers.
L2 Band	A secondary GPS carrier, containing only P-code, used primarily to calculate signal delays caused by the atmosphere. The L2 frequency is 1227.60 MHz.
Latitude	Halfway between the poles lies the equator. Latitude is the angular measurement of a place expressed in degrees north or south of the equator. Latitude runs from 0° at the equator to 90°N or 90°S at the poles. When not prefixed with letters N or S, it is assumed positive north of Equator and negative south of Equator. Lines of latitude run in an east-west direction. They are called parallels.

LLA	Latitude, Longitude, Altitude geographical coordinate system used for locating places on the surface of the Earth. Latitude and longitude are angular measurements, expressed as degrees of a circle measured from the center of the Earth. The Earth spins on its axis, which intersects the surface at the north and south poles. The poles are the natural starting place for the graticule, a spherical grid of latitude and longitude lines. See also Altitude.
Longitude	Lines of longitude, called meridians, run in a north-south direction from pole to pole. Longitude is the angular measurement of a place east or west of the prime meridian. This meridian is also known as the Greenwich Meridian, because it runs through the original site of the Royal Observatory, which was located at Greenwich, just outside London, England. Longitude runs from 0° at the prime meridian to 180° east or west, halfway around the globe. When not prefixed with letters E or W, it is assumed positive east of Greenwich and negative west of Greenwich. The International Date Line follows the 180° meridian, making a few jogs to avoid cutting through land areas.
LPTS	Low Power Time Source.
LSB	Least Significant Bit of a binary word.
LTP	Local Tangent Plane coordinate system. The coordinates are supplied in a North, East, Down sense. The North is in degrees or radians, East in same units and Down is height below WGS84 ellipsoid in meters.
m/sec	Meters per second (unit of velocity).
m/sec/sec	Meters per second per second (unit of acceleration).
m/sec/sec/sec	Meters per second per second per second (unit of impulse or “jerk”).
Mask Angle	The minimum GPS satellite elevation angle permitted by a particular GPS receiver design.
Measurement	The square of the standard deviation of a measurement quality. The standard deviation Error Variance is representative of the error typically expected in a measured value of the quantity.
MID	Message Identifier. In case of SiRF protocol, it is a number between 1 and 256.
MHz	Megahertz, a unit of frequency.
MSB	Most Significant Bit within a binary word or a byte.
MSL	Mean Sea Level.
MTBF	Mean Time Between Failure.
Multipath Error	GPS positioning errors caused by the interaction of the GPS satellite signal and its reflections.
mV	Millivolt.
mW	Milliwatt.
NED	North, East, Down coordinate system. See LTP.
NF	Noise Factor.
NMEA	National Marine Electronic Association. Also commonly used to refer to Standard For Interfacing Marine Electronic Devices. SiRFstar receiver supports version 2.01 of standard NMEA 0183.
NVRAM	Non-volatile RAM, portion of the SRAM that is powered by a backup battery power supply when prime power is removed. It is used to preserve important data and allow faster entry into the Navigation Mode when prime power is restored. All of the SRAM in SiRFstar receiver is powered by the backup battery power supply (sometimes also referred to as “keep-alive” SRAM).
Obscuration	Term used to describe periods of time when a GPS receiver’s line-of-sight to GPS satellites is blocked by natural or man-made objects.

OEM	Original Equipment Manufacturer.
Overdetermined Solution	The solution of a system of equations containing more equations than unknowns. The GPS receiver computers, when possible, an overdetermined solution using the measurements from five GPS satellites, instead of the four necessary for a three-dimensional position solution.
P-Code	Precision Code. A spread spectrum direct sequence code that is used primarily by military GPS receivers to determine the range to the transmitting GPS satellite.
Parallel Receiver	A receiver that monitors four or more satellites simultaneously. SiRFstar/LX Evaluation Receiver can monitor up to 12 satellites simultaneously, due to the capabilities of the SiRF chipset it uses.
PDOP	Position Dilution of Precision. A measure of how much the error in the position estimate produced from satellite range measurements is amplified by a poor arrangement of the satellites with respect to the receiver antenna.
Pi	The mathematical constant having a value of approximately 3.14159.
P-P	Peak to Peak.
PPS	Precise Positioning Service. The GPS positioning, velocity, and time service that are available on a continuous, worldwide basis to users authorized by the DoD.
PRN	Pseudorandom Noise Number. The identity of the GPS satellites as determined by a GPS receiver. Since all GPS satellites must transmit on the same frequency, they are distinguished by their pseudorandom noise codes.
Pseudorange	The calculated range from the GPS receiver to the satellite determined by measuring the phase shift of the PRN code received from the satellite with the internally generated PRN code from the receiver. Because of atmospheric and timing effects, this time is not exact. Therefore, it is called a pseudorange instead of a true range.
PVT	Position, Velocity, and Time.
RAM	Random Access Memory.
Receiver Channels	A GPS receiver specification that indicates the number of independent hardware signal processing channels included in the receiver design.
RF	Radio Frequency.
RFI	Radio Frequency Interference.
ROM	Read Only Memory.
RTCA	Radio Technical Commission of Aeronautics.
RTCM	Radio Technical Commission of Maritime Services. Also commonly used as a reference to the standard format that DGPS corrections data is distributed in <i>RTCM Recommended Standard for Differential Navstar GPS Service</i> . SiRFstar receiver supports the latest Version 2.1 of this standard.
SA	Selective Availability. The method used by the DoD to control access to the full accuracy achievable with the C/A code.
Satellite Elevation	The angle of the satellite above the horizon.
SEP	Spherical Error Probable. The radius of a sphere, centered at the user's true location, that contain 50 percent of the individual 3-D position measurements made using a particular navigation system.
Sequential Receiver	A GPS receiver in which the number of satellite signals to be tracked exceeds the number of available hardware channels. Sequential receivers periodically reassign hardware channels to particular satellite signals in a predetermined sequence.

SNR	Signal-to-Noise Ratio, often expressed in decibels.
SPS	Standard Positioning Service. A position service available to all GPS users on a continuous, worldwide basis with no direct charge. SPS uses the C/A code to provide a minimum dynamic and static positioning capability.
SRAM	Static Random Access Memory. In context of this document, see also NVRAM.
SV	Satellite Vehicle.
TDOP	Time Dilution of Precision. A measure of how much the geometry of the satellites affects the time estimate computed from the satellite range measurements.
3-D Coverage	The number of hours-per-day with four or more satellites visible. Four visible satellites are required to determine location and altitude.
3-D Navigation	Navigation Mode in which altitude and horizontal position are determined from satellite range measurements.
TTF	Time-To-First-Fix. The actual time required by a GPS receiver to achieve a position solution. This specification varies with the operating state of the receiver, the length of time since the last position fix, the location of the last fix, and the specific receiver design. See also Hot Start, Warm Start, and Cold Start mode descriptions.
2-D Coverage	The number of hours-per-day with three or more satellites visible. Three visible (hours) satellites can be used to determine location if the GPS receiver is designed to accept an external altitude input (Altitude Hold).
2-D Navigation	Navigation Mode in which a fixed value of altitude is used for one or more position calculations while horizontal (2-D) position can vary freely based on satellite range measurements.
UART	Universal Asynchronous Receiver/Transmitter that produces an electrical signal and timing for transmission of data over a communications path, and circuitry for detection and capture of such data transmitted from another UART.
UDRE	User Differential Range Error. A measure of error in range measurement to each satellite as seen by the receiver.
USERE	User Equivalent Range Error.
Update Rate	The GPS receiver specification that indicates the solution rate provided by the receiver when operating normally. It is typically once per second.
UTC	Universal Time Coordinated. This time system uses the second defined true angular rotation of the Earth measured as if the Earth rotated about its Conventional Terrestrial Pole. However, UTC is adjusted only in increments of one second. The time zone of UTC is that of Greenwich Mean Time (GMT).
VCO	Voltage Controlled Oscillator.
VDOP	Vertical Dilution of Precision. A measure of how much the geometry of the satellites affects the position estimate (computed from the satellite range measurements) in the vertical (perpendicular to the plane of the user) direction.
VSWR	Voltage Standing Wave Ratio.
Warm Start	Start mode of the GPS receiver when current position, clock offset and approximate GPS time are input by the user. Almanac is retained, but ephemeris data is cleared.
WGS-84	World Geodetic System (1984). A mathematical ellipsoid designed to fit the shape of the entire Earth. It is often used as a reference on a worldwide basis, while other ellipsoids are used locally to provide a better fit to Earth in a local region. GPS uses the center of the WGS-84 ellipsoid as the center of the GPS ECEF reference frame.



ADDITIONAL AVAILABLE PRODUCT INFORMATION

Part Number	Description
	Product Inserts
	SiRFstarIIe/LP Evaluation Kit
	SiRFstarIIe/LP System Development Kit
	Product Briefs
1055-1031	GSP2e/LP
1055-1030	GRF2i/LP
	Application Notes
APNT0003	Troubleshooting Guide
APNT0004	System RF Front-end Requirements for SiRFstar Architectures
APNT0006	PCB Design Guidelines
APNT0007	Open Short Detector
APNT0010	GRF2i QFN Introduction
APNT0015	SiRFstarII S2AR Back-up Power Operation
APNT0017	Board Level Design for GSP2e/LP
APNT0018	SiRFstarIIe Low Power Operating Modes
APNT0019	SSII CPU Clock and Hardware Detection
APNT0020	Implementing User Tasks on the SiRFstarIIe
APNT0021	S2AM Hardware Reference Design Description
APNT0023	Effect of Increasing User Task Duty Cycle on Performance
APNT0028	Battery Backed SRAM Operation at 49MHz with the GSP2e/LP
APNT0029	GSP2e and GSP2e/LP Cache
APNT0030	EHPE and EVPE Calculations

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SiRFstarIIe/LP Evaluation Kit User's Guide
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