

# RECEIVER SURVEY

**N**ow in its 18th year, the annual *GPS World* Receiver Survey provides the longest-running, most comprehensive database of GPS equipment available in one place.

With information provided by 73 manufacturers on 497 receivers, the survey assembles data on all the most important equipment features. Manufacturers are listed alphabetically. **Footnotes** and **Abbreviations** below supply additional information to guide you through the survey.

We have made every effort to present an accurate listing of receiver information, but *GPS World* cannot be held responsible for the accuracy of information supplied by the companies or the performance of any equipment listed. In some cases, data had to be abbreviated or truncated to fit the space available. Contact the manufacturers directly with questions about specific units.

To be listed in the 2010 GPS Receiver Survey, e-mail *GPS World* at [info@gpsworld.com](mailto:info@gpsworld.com).



## NOTES

<sup>1</sup> User environment and applications:

- A** = aviation
- C** = recreational
- D** = defense
- G** = survey/GIS
- H** = handheld
- L** = land
- M** = marine
- Met** = meteorology
- N** = navigation
- O** = other
- P** = other position reporting
- R** = real-time DGPS ref.
- S** = space
- T** = timing
- V** = vehicle/vessel tracking
- 1** = end-user product
- 2** = board/chipset/module for OEM apps

<sup>2</sup> Where three values appear, they refer to autonomous (code), real-time differential (code), and post-processed differential; where four values appear, they refer to autonomous (code), real-time differential (code), real-time kinematic, and post-processed differential.

<sup>3</sup> Cold start: ephemeris, almanac, and initial position and time not known.

<sup>4</sup> For a warm start, the receiver has a recent almanac, current time, and initial position, but no current ephemeris

<sup>5</sup> Reacquisition time is based on the loss of signal for at least one minute.

<sup>6</sup> **E** = provision for an external antenna  
**R** = antenna is removable

## ABBREVIATIONS

- apps:** applications
- ARINC:** Aeronautical Radio, Inc. standard
- async:** asynchronous
- bps:** bits per second
- CP:** carrier phase
- CEP:** circular error probable
- diff:** differential
- ext.:** external / int. = internal
- m, min:** minutes
- na or NA:** not applicable
- nr:** no response
- opt.:** optional
- par.:** parallel
- prog.:** programmable
- ppm:** parts per million
- RMS:** root mean square
- s:** seconds
- SBAS:** Satellite-Based Augmentation System
- typ.:** typical
- VRS:** Virtual reference station
- WP:** waterproof
- WR:** water resistant

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacquisition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
Atmel www.atmel.com	ANTARIS 4 chipset, ATR0601 RF, ATR0621, ATR0622, ATR0625 baseband chips, ATR0610 LNA	16 par.	L1, C/A code, DGPS, WAAS / EGNOS	16	CDGLHNOPTV2	RF 4 x 4 mm, baseband 8 x 8, LNA 1.6 x 2, Green	na	2.5 / <2 m / na / na CEP	50 ns (RMS)	4	34 s	33 s	< 1 s	3	serial, USB 2.0, SPI	4,800-115,200 bps	-40 to +85	ext / int	0.06	E (passive & active)	Low NF, low power, eval kit avail, automotive grade
	ANTARIS 4 single chip, ATR0635	16 par.	as above	16	CDGLHNOPTV2	7 x 10 mm BGA, Green	na	2.5 / <2 m / na / na CEP	50 ns (RMS)	4	34 s	33 s	< 1 s	3	serial, USB 2.0, SPI	4,800-115,200 bps	-40 to +85	ext / int	0.06	E (passive & active)	Low NF, low power, automotive grade
BAE Systems Rokar Intl. www.rokar.com	GPS SpaceNav	2 x 12 par.	L1 only, C/A-code	all in view	S1	2.49 x 4.33 x 8.11 in	1.4 kg	na / na / na / nr	150	1	<8 min	<50 s	2-5 s	4	RS-422	9600-38,400	-25 to +60	ext / int	5.5	patch (E)	For LEO satellites
	BP GPS	12 par.	L1 only, C/A-code	all in view	ADLNO2	4.72 x 0.63 x 4.82 in	105 g	na / na / 15 m	300	1	<2min	20 s	2-5 s	1,1	RS-422, RS-232	9,600-38,400	-40 to +85	ext	3.75	patch (E)	Smart munitions
	NT4RLG GPS	12 par.	L1 only, C/A-code	all in view	ADLNO2	4.72 x 0.63 x 4.82 in	110 g	na / na / 15 m	300	1	<2min	20 s	2-5 s	1,1	RS-422, RS-232	9,600-38,400	-40 to +85	ext	3.75	patch (E)	Inertial system integration
	GPS SWIFT-NT	12 par.	L1 only, C/A-code	all in view	ADN1	3.72 x 2.52 x 10.37 in	1.1 kg	2-5 m / na / nr	300	1	<2min	30 s	<5 s	1,1	RS-232, RS-422	300-19,200	-40 to +71	ext / int	6	patch (E)	Satellite launchers, missiles
	NAV/POD NT	12 par.	L1 only, C/A-code	all in view	ADNOR1	3.72 x 1.20 x 7.00 in	580 g	2-5 m / na / nr	300	1	<2min	30 s	<5 s	1,1	RS-232, RS-422	300-38,400	-40 to +71	ext / int	4.5	patch (E)	ACMI
	NavComp	4 x 12 par.	L1 only, C/A-code	all in view	ADNOR1	5.60 x 2.70 x 6.61 in	1.7 kg	10-15 m / na / nr	300	10	<2min	20s	<5s	1,1	RS-422, RS-232	9,600-115,200	-40 to +71	ext	14	4X patch (E)	GPS + navigation computer
	HNR-10	12 par.	L1 only, C/A-code	all in view	ADNOT2	4.80 x 0.75 x 3.66 in	150 g	10-15 m / na / nr	40	10	<2min	20s	2-5 s	1,1	RS-422, RS-232	115200	-40 to +85	ext	4.5	patch (E)	10-MHz in, 2x1PPS out
	GH-C GPS	12 par.	L1 only, C/A-code	all in view	ADNP2	2.5 in diameter	25 g	4-7 m / na / nr	300	1	<2min	13 s	3 s	2	TTL	9,600-115,200	-40 to +85	ext	1	nr	Smart munitions
GH-L GPS	12 par.	L1 only, C/A-code	all in view	ADNP2	2.3 in diameter	40 g	4-7 m / na / nr	300	1	<2min	6 s	3 s	2	TTL	9,600-115,200	-40 to +85	ext / int	3	nr	Smart munitions	
Broadcom www.broadcom.com	BCM4750 (Barracuda)	24	GPS L1, SBAS	24	NHC2	3.6 x 3.6 x 0.6 mm	<1g	2 m / na / na / na (CEP)	50	0.5	30s	30s	1s	3	I2C, SPI, UART	Up to 1/32 of reference clock	-30 to +85	1.5-3.6 V	13 mW	NA	Single-chip, single-die baseband and RF tuner
	BCM2075	24	GPS L1, SBAS	24	NHC2	4.28 mm x 4.28 mm	<1 g	2 m / na / na / na (CEP)	50	0.5	30s	30s	1s	3	UART, SDIO, SPI, I2C, PCM, I2S	UART: 4M	-30 to +85	1.2V - 5.5V	10mW	NA	Single chip, single die, GPS + Bluetooth + FM (RX/TX)
	BCM4760	24	GPS L1, SBAS	24	NHC2	13 x 13 x 1.2 mm	328 mg	2 m / na / na / na (CEP)	50	0.5	30s	30s	1s	96	GPIO (x96), HS UART (x3), SPI, I2C, SDIO/MMC (x3), PCM, I2S	UART: 4M	-40 to +85 C	Core: 1.2v, I/O: 3.3V, Audio 3V	300mW @ 700MHz	NA	Highly integrated ARM11 Apps Processor + VFPV + GPU + GPS (aka "PND on a Chip")
C-Nav World DGPS www.cnavigps.com	C-Nav3050	67 par.	L1, L2, L5, G1 & G2 carrier phase, C/A, P1, P2, L2C, L5, G1 & G2 code, C-Nav Correction Service, SBAS (WAAS, EGNOS, MSAS, GAGAN), Galileo E1, E5a (via software upgrade)	65 GNSS & 2 SBAS + C-Nav Correction Service (RTG)	ADGLMNPRTV-1	11.7 x 6.0 x 16.4 cm	0.5 kg (1.1 lbs)	Code: 7.5 cm, DGPS (RTG Dual): +10 cm (H) +15 cm (V), RTK (<40 km); +1 cm +0.5 ppm (H) +2 cm +1 ppm (V) (RMS)	13ns	100 / 50 / 25 / 10 / 5 / 1 Hz	<60s	<50s	<2s	2, 1, 1, 1, 1	RS-232, RS-422, Ethernet, USB, 1PPS, Bluetooth	9,600 - 115,200	-40 to +70	9-32 VDC, ext.	6 W	Multi-band GNSS (ER) (GPS L1, L2, L2C, L5 / Galileo E1, E5a / GLONASS G1, G2 / C-Nav Correction Service L-band and SBAS (WAAS/EGNOS/MSAS/GAGAN))	A survey-grade, high accuracy receiver that uses C-Nav's global set of corrections for precise marine/offshore positioning and navigation. Wheelmark & USCG Type Approved.
	C-Nav1010	14 par.	L1-only, C/A code, C-Nav Correction Service, SBAS (WAAS, EGNOS, MSAS, GAGAN)	12 GPS L1 & 2 SBAS + C-Nav Correction Service (RTG)	ADGLMNPRTV-1	11.9 x 6.3 x 21.1 cm	0.77 kg (1.7 lbs)	Code: 90 cm, DGPS (RTG Dual): 50 cm, RTK: na (RMS)	50 ns	10 / 5 / 1 Hz	<45s	<45s	<1s	2, 1, 1	RS-232, RS-422, 1PPS	1,200 - 115,200	-30 to +70	9-36 VDC, ext.	5 W	Patch (ER), Dual-band, (GPS L1, C-Nav Correction Service L-band and SBAS (WAAS/EGNOS/MSAS/GAGAN))	Submeter-level accuracy using C-Nav's global set of corrections for marine/offshore positioning and navigation.
	C-Nav1000	12 par.	L1 full-cycle CP, C/A code	10 GPS L1 and 2 SBAS + IALA Beacon Corrections	ADGLMNPRTV-1	CDU: 27.0 x 20.7 x 10.2 cm, GPS: 12.8 x 3.9 x 13.7 cm	CDU: 1.1 kg (2.4 lbs), GPS: 0.5 kg (1.0 lbs)	Code: 5 m, DGPS (RTG Dual): 2 m, RTK: na (2DRMS)	na	5 / 1 Hz	<60s	<60s	<2s	4	RS-422	1,200 - 115,200	CDU: -15 to +55, GPS: -30 to +70	24 VDC, ext.	CDU: 8.4 W GPS: 2.7 W	Combined Patch +, IALA (ER)	Single-frequency receiver + WAAS + IALA, Wheelmark & USCG Type Approved.
CSR www.csr.com	BC7830	All in view	L1 C/A	All in View	H, N, 2	3.2 x 3.6 x 0.6 mm	na	10 m / nr / nr / nr (95%)	nr	Variable	<38s	<36s	<3s	na	na	na	-30 to +85	Ext	nr	E	Single GPS+Bluetooth+FM chip
	GSD4t	48	L1 C/A	24	C, H, N, V, 2	3.4 x 2.7 x 0.6 mm	na	10 m / nr / nr / nr (95%)	nr	Variable	<35s	<34s	<1s	2	UART, SPI, I2C	user selectable	-40 to +85	Ext	0.008	E	Single die tracker
	GSD4e	48	L1 C/A	24	C, H, N, V, 2	3.5 x 3.2 x 0.6 mm	na	10 m / nr / nr / nr (95%)	nr	Variable	<35s	<34s	<1s	2	UART, SPI, I2C	user selectable	-40 to +85	Ext	0.008	E	Single die engine
DataGrid, Inc. www.datagridinc.com	Monitor	12	L1, C/A, SBAS, DGPS Beacon option	12	GLMNPV1	20 x 8.5 x 3.5 cm	500 g	<5m/1.5m/na/na	250	1	<150 s	45 s	1s	1	Serial	1,200-115,200 bps	-30 to +70	ext., int opt., LilonP	0.8	L1 (E), (L1/Beacon optional)	GPS receiver with DGPS, WR
	Mk1 "Crane"	12	L1, C/A-code and CP, SBAS	12	GLMNPV1	20 x 8.5 x 3.5 cm	600 g	<5m/1.5m/na/3cm	50	1, 1/5	<120 s	45 s	<1 s	1, 1, 1, 1	Serial, A/D, USB, Bluetooth	1,200-115,200 bps	-30 to +70	int., ext., LilonP	1.5	L1 (E)	GPS L1 carrierphase and data collection. WR
	Mk2	12	L1, C/A-code and CP, SBAS, DGPS beacon option	12	GLMNPV1	20 x 8.5 x 3.5 cm	600 g	<5m/1.5m/na/3cm	nr	1, 1/5	<60 s	35 s	<1 s	1, 1, 1, 1	Serial, A/D, USB, Bluetooth	1,200-115,200 bps	-30 to +70	int., ext., LilonP	2	L1 (E) (L1/Beacon optional)	as above
	Toughman	336	L1 full cycle CP, C/A-code, L2 full cycle CP, P2 or L2C code, SBAS, GLONASS L1 option	18	GLMNOVR1	20 x 8.5 x 3.5 cm	600 g	1.5m/1.1m / 1 cm/1 cm	<35	1, 1/2, 1/5, 1/10	<40 s	36 s	<1 s	1, 1, 1, 1	Serial, A/D, USB, Bluetooth	1,200-115,200 bps	-30 to +70	int., ext., LilonP	2.2	L1/L2 (E)	GPS L1/L2 carrierphase and data collection. WR
	Mk3 "Chameleon"	336	as above	20	GLMNOVRT1	27 x 8.5 x 3.5 cm	750 g	1.5m/1.1m / 1 cm/1 cm	<35	1, 1/2, 1/5, 1/10	<40 s	36 s	<1 s	2, 1, 1, 1	Serial, A/D, USB, Bluetooth	1,200-115,200 bps	-30 to +70	int., ext., LilonP	3.2	L1/L2 GNSS (E)	RTK, VRSS, Precision post-processing, Precision GIS, GSM modem opt. WR
	DGRx (OEM)	336	L1 full cycle CP, C/A-code, L2 full cycle CP, P2 or L2C code, SBAS	20	AHGLMOVRT2	90 x 60 x 12 mm	<60 g	1.5m/1.1m / 1 cm/1 cm	<35	1, 1/2, 1/5, 1/10, 1/20, standard, higher rates optional.	<40 s	<36 s	<1 s	2	Serial	1,200-115,200 bps	-40 to +85	ext.	1.5	L1/L2 (E)	Based on easy-to-upgrade/modify FPGA design
	DGRx-GNSS (OEM)	336	L1 full cycle CP, C/A-code (GPS, GLONASS), L2 full cycle CP, P2 or L2C code, SBAS	20	AHGLMOVRT2	90 x 60 x 12 mm	<60 g	1.5m/1.1m / 1 cm/1 cm	<35	as above	<40 s	<36 s	<1 s	2	Serial	1,200-115,200 bps	-40 to +85	ext.	1.5	L1/L2 GNSS (E)	as above
DeLorme www.delorme.com	Earthmate PN-60W	32 / correlators & custom Kalman filter	GPS L1 C/A code on all channels	16; 32 in future fw	CGHLMN1	2.43 x 5.25 x 1.5 in	6.70 oz. (without, batteries)	<2m (50% CEP), <15m (2DRMS) / WAAS: <0.5m (50% CEP), <3m (95% 2DRMS)	1Hz, higher rates, will be avail.	<60 s	<45 s	<1 s	1	USB 2.0	100 Kbps ARINC, 1 Mbps serial	-20 to +75	1 AA Batteries, Rechargeable Li-Ion (available from DeLorme), USB or ext DC	450mW (avg)	Custom	TFT high contrast color display, IPX-7 waterproof, impact resistant; 32GB SDHC support; Barometer; Compass/Accelerometer; Ambient Light Sensor; wireless communication with DeLorme/SPOT satellite communicator; Wireless communication with other PN-60W devices, Predicted ephemeris	
	Earthmate PN-40	as above	GPS L1 C/A code on all channels	16; 32 in future fw	CGHLMN1	2.43 x 5.25 x 1.5 in	6.70 oz. (without, batteries)	<2 m (50% CEP), <15 m (2DRMS) / WAAS: <0.5 m (50% CEP), <3 m (95% 2DRMS)	as above	<60 s	<45 s	<1 s	1	USB 2.0	100 Kbps ARINC, 1 Mbps serial	-20 to +75	2 AA Batteries, Rechargeable Li-Ion (available from DeLorme), USB or ext DC	650 mW (full); < 350mW (power save).	Custom	TFT high contrast color display, IPX-7 waterproof, impact resistant; 32GB SDHC support; Barometer; Compass/Accelerometer; Predicted GPS in future fw release	
	Earthmate PN-30	as above	GPS L1 C/A code on all channels	16; 32 in future fw	CGHLMN1	2.43 x 5.25 x 1.5 in	6.70 oz. (without, batteries)	<2 m (50% CEP), <15 m (2DRMS) / WAAS: <0.5 m (50% CEP), <3 m (95% 2DRMS)	as above	<60 s	<45 s	<1 s	1	USB 2.0	100 Kbps ARINC, 1 Mbps serial	-20 to +75	2 AA Batteries, Rechargeable Li-Ion (available from DeLorme), USB or ext DC	650 mW (full); < 350mW (power save).	Custom	TFT high contrast color display; IPX-7 waterproof, impact resistant; 32GB SDHC support; Predicted GPS in future fw release	
	Earthmate PN-20	12 / correlators & custom Kalman filter	GPS L1 C/A code on all channels	12	CGHLMN1	2.43 x 5.25 x 1.5 in	5.12 oz. (without, batteries)	<2 m (50% CEP), <15 m (2DRMS) / WAAS: <0.5 m (50% CEP), <3 m (95% 2DRMS)	1 Hz	<90 s	<40 s	<1 s	1	USB 1.1	as above	-20 to +75	as above	550 mW (full); < 400mW (power save)	Custom	TFT hi contrast color display; IPX-7 waterproof, impact resistant; 4GB SDHC support	
	Earthmate, LT-40	16 / correlators & custom Kalman filter	GPS L1 C/A code on all channels	16	GLN1	1.88 x 2.63 x 0.63 in	2.10 oz. (plus cable)	<2 m (50% CEP), <15 m (2DRMS) / WAAS: <0.5 m (50% CEP), <3 m (95% 2DRMS)	1 Hz	<40 s	<35 s	<1 s	1	USB 1.1	USB	-40 to +85	USB	450 mW (USB)	Custom	Very low cost	
	Earthmate BT-20	12 / correlators & custom Kalman filter	GPS L1 C/A code on all channels	12	GLN1	3.07 x 1.89 x 0.61 in	1.30 oz. (without, battery)	<2 m (50% CEP), <15 m (2DRMS) / WAAS: <0.5 m (50% CEP), <3 m (95% 2DRMS)	1 Hz	<90 s	<40 s	<1 s	2	Bluetooth and, USB 1.1	-20 to +70 (USB); -20 to +60 (battery)	Rechargeable Li-Ion Battery (included), USB or ext DC	450 mW (USB); 350 mW (battery)	Custom	Low cost, includes battery		
	GPS2058-10 Module	16 / correlators & custom Kalman filter	GPS L1 C/A code on all channels	16	2	0.63 x 0.63 x 0.12 in, (16 mm x 16 mm x 3.1 mm)	0.088 oz. (2.5g)	<2 m (50% CEP), <15 m (2DRMS) / WAAS: <0.5 m (50% CEP), <3 m (95% 2DRMS)	<62 ns	1Hz, higher rates, will be avail.	<40 s	<35 s	<1 s	2; add'l ports, in next fw	2 RS232; I2C & SPI, available in next fw	programmable 4800 to 115200, baud; standard, NMEA messages	-40 to +85	External 3.3VDC, optional external 1.8VDC	210mW (3.3V only); 160mW(3.3V+1.8V); <0.1mW (standby mode);	External (user provided); will support active, or passive	40-pin Quad SMD, Eval Kit and reference materials available; easy-to-integrate s/w commands; GPIO support on module.
Esterline CMC Electronics www.cmcelectronics.ca	GNSSA CMA-4124 OEM	24 par. narrow correlator	GPS L1 C/A code, 24 GPS	24	ADLMRSV2	10.2 x 1.4 x 16.82 cm	0.5 lb	<10 m LAAS: <0.5 m	<<50 ns	1 Hz ARINC	<<75 s	<20 s	<1 s	4	9 IIP, 5 OP ARINC HIL, 2 RS-232, 2 R-422 1Mbps	100 Kbps ARINC, 1 Mbps serial	-55 to +80	ext	10 W	Active, TSO-144	OEM GPS card
	GNSSU Mk-II, CMA-3024	as above	GPS L1 C/A code, 24 GPS	24	ADLMRSV1	21.6 x 6.6 x 24.1 cm	5.6 lb	<10 m LAAS: <0.5 m	<<50 ns	1 Hz ARINC	<<75 s	<20 s	<1 s	1	ARINC 429 H/L, ARINC 743A5, 1 RS-232	100 Kbps ARINC, 1 Mbps serial	-55 to +80	ext	14 W	Active, TSO-144	ARINC-743A-5 sensor
	GLSSU, CMA-5024	as above	GPS/WAAS L1 C/A code, 4 WAAS + 20 GPS	24	ADLMRSV1	21.6 x 6.6 x 24.1 cm	5.6 lb	<10 m LAAS: <0.5 m	<<50 ns	10 Hz PVT, 1 Hz ARINC plus LPV and GLS LOC/GS	<<75 s	<20 s	<1 s	2 types	ARINC 429 H/L, ARINC 743B, 1 RS-232; precision approach connector	100 Kbps ARINC, 1 Mbps serial	-55 to +80	ext	16 W	Active, TSO-144 and TSO-C190	ARINC-743B sensor, with full SBAS LPV interface, growth to GBAS
Falcom www.hetrogenous.com	STEPP-III-B1	20 par.	L1 only, C/A-code	20	ACLMPV1	85 x 80 x 25 mm	90 g	10 m/5 m/	1000	1	<35 s	<35 s	100 ms	8	RS-232	57600	-40 °C to + 85 °C	ext/internal	68 mA max	passive/active (ER)	SirStarIII, Quad-band GPS/GSM/GPRS terminal with 3 axis motion sensor.
	Bolero-LT	20 par.	L1 only, C/A-code	20	ACLMPV1	85 x 56 x 20 mm	90 g	10 m/5 m/	1000	1	<42s	<35s	100ms	2	RS-232	57600	-40 °C to + 85 °C	ext/internal	To be defined	active	as above
	FSA02	20 par.	L1 only, C/A-code	20	ACDHLMPV2	16 x 51 (23 required) x XX mm Helix diameter -13.2 mm	11 g	10 m/5 m/	1000	1	<45 s	<35 s	100ms	1	RS-232	38400	-20 to +70 °C	ext	65 mW (3.3 V) Full power 20 mW (3.3 V) Trickle power (1 sec)	passive/active (E)	High sensitivity GPS receiver based on SIRStar III - GSC3LT chip and SARANTEL quadrifilar helix antenna in a single board solution.
	JP18	20 par.	L1 only, C/A-code	20	ACDGHMNPTRV2	11 x 11 x 1.7 mm	0.5 gr	10 m/5 m/	1000	1	<35 s	<35 s	100 ms	1	RS-232	38400	-20 to +70 °C	ext	27mA	NA	GPS module. Features SIRStarIII chipset
	FOX-LT	20 par.	L1 only, C/A-code	20	ACLMPV1	172 x 39 x 56mm	229 g	10 m/5 m/													

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continued Fastrax www.fastraxgps.com	Fastrax IT310	20 par.	L1, C/A-code and CP	20	ACHLMNRTV2	13.1 x 15.9 x 2.3mm	0.9 g	as above	1us	1	32 s	32 s	<1 s	2	UART	4800,9600, 57600 configurable	-40 to +85	ext.	75 mW at 3.0 V	ext., active or passive	small, low power. SIRFstar III	
	Fastrax IT321	20 par.	L1, C/A-code and CP	20	ACHLMNRTV2	10.4 x 14 x 2.3mm	0.7 g	as above	1us	1	32 s	32 s	<1 s	1	UART	4800,9600, 57600 configurable	-40 to +85	ext.	90 mW at 3.0 V	ext., active or passive	Flash and ROM version	
	Fastrax UP300	20 par.	L1, C/A-code and CP	20	ACHLMNRTV2	19 x 27 x 7.2mm	9.1 g	as above	1us	1	32 s	32 s	<1 s	2	UART	4800,9600, 57600 configurable	-40 to +85	ext.	84 mW at 3.3 V	ext., active or passive	Sensitive patch antenna module w optional external ext antenna, SIRFstarIII	
	Fastrax UC322	20 par.	L1, C/A-code and CP	20	ACHLMNRTV2	10.4 x 30 x 2.9mm	2.0 g	as above	1us	1	32 s	32 s	<1 s	2	UART	4800,9600, 57600	-40 to +85	ext.	90 mW at 3.3 V	ext., active or passive	Sensitive chip antenna module	
	Fastrax IT03	12 par.	L1, C/A-code and CP	12	ACHLMNRTV2	22 x 2.8 x 23mm	2.7 g	as above	20	1, user def to 8 Hz	35 s	33 s	<1 s	2	UART	600 - 921600	-40 to +85	ext.	95 mW at 2.7 V	ext., active or passive	Programmable with iSuite SDK, CR output. Includes extensive expert features	
	Fastrax IT03-S	12 par.	L1, C/A-code and CP	12	ACHLMNRTV2	16 x 2.3 x 19mm	1.6 g	as above	20	1, user def to 8 Hz	35 s	33 s	<1 s	2	UART	600 - 921600	-40 to +85	ext.	95 mW at 2.7 V	ext., active or passive	ITrax MP receiver, CR output, programmable with iSuite SDK, includes extensive expert features	
	Fastrax IT03-02	12 par.	L1, C/A-code and CP	12	ACHLMNRTV2	26 x 4.7 x 26mm	4 g	as above	20	1, user def to 8 Hz	35 s	33 s	<1 s	2	UART	600 - 921600	-40 to +85	ext.	95 mW at 2.7 V	ext., active or passive	Programmable with iSuite SDK, CR output. Includes extensive expert features	
	Fastrax IT900	fully configurable	L1, C/A-code and CP	fully configurable	ACDGHLMMetNO-PRSTV2	8 x 8 x 2.2mm	1 g	as above	20	full configurability	35 s	33 s	<1 s	1	SPI	4-16 MSPS	-40 to +85	ext.	42m at 3.0 V	ext., active or passive	RF front end for Fastrax SW GPS and Accelerated SW GPS	
Fastrax SW GPS	fully configurable	L1, C/A-code and CP	fully configurable	as above	-	-	as above	20	full configurability	35 s	33 s	<1 s	fully configurable	fully configurable	fully configurable	NA	ext.	Depend on configurations	ext., active or passive	Pure SW GPS receiver with low resource requirements for MID's and digital cameras		
Fastrax Accelerated SW GPS	fully configurable	L1, C/A-code and CP	fully configurable	as above	-	-	as above	20	full configurability	35 s	33 s	<1 s	fully configurable	fully configurable	fully configurable	NA	ext.	Depend on configurations	ext., active or passive	SW GPS with HW correlators for low end CPUs		
Furuno www.furuno.com	GH84	32	L1 only, C/A-code	12	Navigation	23.7 x 7.4 x 24.7mm				1	38 s	33 s	2 s	1	NMEA or TTL (Binary)	9600	-30 to +85	ext.		Passive	antenna directly mounted, cable or direct PCB mount available	
	GN84A	32	L1 only, C/A-code	12	Navigation	22 x 22 x 3mm				1	38 s	33 s	2 s	1	NMEA or TTL (Binary)	9600	-30 to +85	ext.		Active	antenna detection circuit	
	GN8402	32	L1 only, C/A-code	12	Navigation	22 x 22 x 3mm				1	38 s	33 s	2 s	1	NMEA	9600	-30 to +85	ext.		Passive	SBAS, a-GPS	
	GT84	32	L1 only, C/A-code	12	Timing, CDMA, FEMTO	22 x 22 x 3mm				30ns	1	38 s	33 s	2 s	1	NMEA	9600	-30 to +85	ext.		Active	antenna detection circuit
	GN84E	32	L1 only, C/A-code	12	Navigation	16 x 11.35 x 1.9mm					1	38 s	33 s	2 s	1	NMEA or TTL (Binary)	9600	-30 to +85	ext.		Passive or Active	dual antenna input, selectable
	GT8031F	16	L1 only, C/A-code	12	Timing and CDMA	33.8 x 20.8 x 6.3mm				30ns	1	44.9 s	36 s	8.4 s	1	NMEA	4800	-30 to +80	ext.		Active	
	GT8036	12	L1 only, C/A-code	12	Timing and CDMA	40 x 60mm				34ns	1	52 s	37 s	9 s	1	M12 (Motorola) compatible	9600	-40 to +85	ext.		Active	direct drop-in M12 (Motorola) compatible
	GF180TC	16/par.	L1 only, C/A-code	12	T2 10MHz	x	x	as above	x	1	38 s	33 s	2 s	1	x	x	30 to +70	ext.	x	Active		
GH82	16/par.	L1 only, C/A-code	16	ACDGHLMMet-NPTV2	23.7 x 8 x 24.7mm	0.3 oz	10 m / na / na / na	na	1	52 s	37 s	3 s	1	NMEA or TTL (Binary)	4800	-30 to +80	ext.		Passive	antenna directly mounted, direct PCB mount		
Geneq, Inc. www.sxbluegps.com	SXBlue GPS	12 channel	L1 C/A code & phase, SBAS	12	DGLMNR1	8.5 x 3.5 x 11.2cm	.6 lb	2.5m / 60cm / 3cm / 1cm, 95%	na	1 to 10Hz, optional 20Hz	60s	35s	<1s	2	Bluetooth, RS-232 (all independent)	4,800 - 57,600	-40 to +70	Ext (5V, 12V or 24V)	3.2 W	L1 Active	The SXBlue series make optimal use of SBAS signals for ground users	
	SXBlue II GPS	12 channel	L1 C/A code & phase, SBAS	12	DGLMNR1	8.0 x 4.7 x 14.1cm	1 lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1 to 10Hz, optional 20Hz	60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4,800 - 57,600	-40 to +85	Integrated battery	2.0 W	L1 Active	to provide submeter realtime positioning all the time	
	SXBlue III-L GPS	12 channel	L1 C/A code & phase, SBAS, Omnistar	12	DGLMNR1	8.0 x 5.6 x 14.1cm	1 lb (w/batt.)	2.5m / 80cm / 3cm / 1cm, 95%	na	1 to 10Hz, optional 20Hz	60s	35s	<1s	3	as above	4,800 - 57,600	-40 to +85	Integrated battery	2.9 W	L1 / L-Band Active	with no need to post-process	
Geodetics, Inc. www.geodetics.com	ENPU-D	All in view	GPS L1 C/A code, 24 GPS; (L2 optional)	All in view	DGLMNRV1	127x89 x40cm	1.434 lb	< 1m CEP	15 ns	1 sec up to 5 Hz	<<34s	<33 s	<1 s	2	Serial, Ethernet, RF link TDMA	172 Kbps	-20 to +60 (battery)	ext / int (LIPO)	39ma	External (user provided); will support active or passive	Ruggedized for dismounted solder operations and low dynamic vehicle	
GEOsat www.geosat.de www.geosat.eu	GEObox	12	L1, C/A CP smoothed, SBAS	12	GHLR1	200 x 100 x 60mm	0.4 kg	3 m/0.5 m/nr/nr RMS	nr	1 Hz	40 s	15 s	2 s	2	RS-232, USB, BT	38,400	-10 to +60	ext, 12 V	0.7	L1 (E) (L1/Beacon optional)	SBAS and/or beacon and/or GSM	
	GEObox Hybrid	28	L1, C/A CP smoothed, Glonass L1, SBAS	28	GHLR1	200 x 100 x 60mm	0.35 kg	1.5 m/0.4 m/nr/nr RMS	nr	20Hz	60 s	35 s	0.5 s	2	RS-232, USB, BT	9,600 - 115,200	-40 to +85	ext, 12 V	1	L1 GNSS (E) Beacon	SBAS and/or beacon and/or GSM	
	GEOmeter MX	12	L1, C/A CP smoothed, SBAS	12	GHLR1	230 x 120 x 60mm	1.2 kg	3 m/0.5 m/nr/nr RMS	nr	1 Hz	40 s	15 s	2 s	1	RS-232, BT	38,400	-10 to +60	int., 2800mAh	0.5	L1 (E)	SBAS and/or beacon and/or GPRS, PDA-unit	
	GEObox smart	12	L1, C/A	12	NV1	120 x 60 x 40mm	0.15 kg	5 m/1 m/nr/nr CEP	nr	1 Hz	45 s	38 s	1 s	7	4 digital, 3 analog	19,200	-10 to +85	ext. 8-30 V	0.01	L1 (E)	SBAS, GPRS modem, SD card	
GlobalTop Technology www.gtop-tech.com	Gms-d1	66 Channels All in View Tracking	GPS L1 C/A code	66	ACDGHLMMetN-PRSTV2	24 x 14 x 2.1mm	Weight< 6g	1.Without aid 3.0m 2D-RMS, 2.< 3m CEP (50%) without SA (horizontal), 3.DGPS (RTCM, SBAS (WAAS, EGNOS, MSAS))2.5m	100 ns RMS	Up to 10Hz(Default: 1Hz)	<<35 s	<33 s	<1 s	1	SMD Type	4800/9600/38400/57600/115200 bps Available	-40 to +85	ext		SMD GPS Antenna	MTK Chipset Module	
	Gmm-u1	as above	GPS L1 C/A code	66	ACDGHLMMetN-PRSTV2	13 x 10 x 2.1mm	Weight< 6g	as above	100 ns RMS	Up to 10Hz(Default: 1Hz)	<<35 s	<33 s	<1 s	1	SMD Type	as above	-40 to +85	ext		ext	MTK Chipset Module	
	FGPMMOP6B	as above	GPS L1 C/A code	66	ACDGHLMMetN-PRSTV2	16 x 16 x 6mm	Weight< 6g	as above	100 ns RMS	Up to 10Hz(Default: 1Hz)	<<35 s	<33 s	<1 s	1	SMD Type	as above	-40 to +85	ext		Ceramic Patch Antenna	MTK Chipset Module	
	FGPMMOSL3	32 Channels All in View Tracking	GPS L1 C/A code	32	ACDGHLMMetN-PRSTV2	11.5 x 13 x 1.9mm	Weight< 2g	as above	100 ns RMS	Up to 5Hz(Default: 1Hz)	<<36 s	<34 s	<1 s	1	SMD Type	as above	-40 to +85	ext		ext	MTK Chipset Module	
Hemisphere GPS www.hemispheregps.com	MBX-4	2 ind.	RTCM SC-104	na	GLMNPV1	4.9 x 2.0 x 5.9in	1.4 lb	na/na/na/na	na	na	<60 s	<2 s	2 s	1	RS-232 or RS-422	4,800-9,600	-30 to +70	ext	2.5	beacon (ER) (included)	RoHS compliant beacon receiver	
	SBX-4 (OEM)	2 par.	RTCM SC-104	na	GLMNPV2	2.0 x 0.54 x 3.0in	0.06 lb	na/na/na/na	na	na	<60 s	<2 s	2 s	2	3.3 V HCMOS	4,800-57,600	-30 to +70	ext	<0.25	beacon (ER)	RoHS compliant beacon board w/ auto/ man/ database search	
	A100	12 par.	L1 only, C/A-code & CP (SBAS)	12	AGLMNPRV1	5.1d x 2.2h in	1.4 lb	1.5m/0.3m/1cm/1cm 1-sigma	50	0.05	60 s	30 s	<1 s	2	RS-232	4,800-57,600	-30 to +70	ext	<2	Integrated GPS+SBAS	GPS, WAAS, EGNOS, and MSAS positioning smart antenna	
	R100	12 par.	as above	12	AGLMNPRV1	4.5 x 1.8 x 6.3in	1.2 lb	as above	50	0.05	60 s	30 s	<1 s	3	RS-232, USB	4,800-57,600	-30 to +70	ext	<3	GPS + SBAS + LBand (ER) (inc.)	GPS and SBAS receiver	
	Crescent (OEM)	12 par.	as above	12	AGLMNPRV2	1.6 x 0.5 x 2.8in	0.06 lb	as above	50	0.05	60 s	30 s	<1 s	4	3.3 V HCMOS	4,800-57,600	-30 to +70	ext	<1.0	GPS + SBAS (ER)	GPS and SBAS receiver board	
	Crescent Vector (OEM)	12 par. (x2)	as above	12	AGLMNPRV2	2.8 x 1.1 x 4.3in	0.12 lb	as above	50	0.05	60 s	30 s	<1 s	4	3.3 V HCMOS	4,800-57,600	-30 to +70	ext	<1	GPS + SBAS (ER)	GPS compass board	
	V100	12 par. (x2)	as above	12	AGLMNPRV1	23.6 x 6.3 x 7.1in	3.30 lb	as above	50	0.05	60 s	30 s	<1 s	3	RS-232 and RS-422	4,800-57,600	-30 to +70	ext	<5	Integrated GPS + SBAS	GPS compass receiver with integrated antennas	
	LV100 (OEM)	12 par. (x2)	as above	12	AGLMNPRV2	18.0 x 4.4 x 1.4in	12.3 oz	as above	50	0.05	60 s	30 s	<1 s	3	RS-232 and RS-423	4,800-115,200	-32 to +74	ext	<5	Integrated GPS + SBAS	GPS compass board with integrated antennas	
	XF100	12 par.	as above	12	GHLMNP1	4.0 x 3.8 x 1.4in	<10.6 oz	as above	50	0.05	60 s	45 s	<1 s	1	RS-232	4,800-115,200	-30 to +60	ext	1	Integrated GPS + SBAS (ER)	GPS and SBAS Positioning modules for TDS Recon and Juniper Archer	
	VS100	12 par. (x2)	as above	12	AGLMNPRV1	4.5 x 2.8 x 7.4in	1.9 lb	as above	50	0.05	60 s	30 s	<1 s	2	RS-232	4,800-57,600	-30 to +70	ext	<5	GPS + SBAS (ER) (included)	GPS compass computes heading info w/ better than 0.1° accuracy (optional beacon differential)	
	Eclipse (OEM)	39 par.	L1/L2, C/A & P code & CP, (SBAS)	15	AGLMNPRV2	2.8 x 0.5 x 4.3in	0.12 lb	as above	50	0.05	60 s	30 s	<1 s	3	3.3 V HCMOS	4,800-115,200	-30 to +70	ext	<2.9	GPS + SBAS + LBand (ER)	L1/L2 GPS, OmniSTAR HP/XP and SBAS receiver board	
	R220	39 par.	as above	15	AGLMNPRV1	4.5 x 1.8 x 6.3in	1.2 lb	as above	50	0.05	60 s	30 s	<1 s	4	RS-232, USB	4,800-115,200	-30 to +65	ext	<5.5	GPS + SBAS + LBand (ER) (inc.)	L1/L2 GPS, OmniSTAR HP/XP and SBAS receiver	
A220	39 par.	as above	15	AGLMNPRV1	5.9h x 9.6din	4.0 lb	as above	50	0.05	60 s	30 s	<1 s	3	CAN, Serial	4,800-115,200	-30 to +70	ext	<5	Integrated GPS + SBAS + Lband	L1/L2 RTK, OmniSTAR HP/XP and SBAS smart antenna/receiver		
IFEN GmbH www.ifen.com	NavX-NSR	user-defined, Multi-correlator	GPS L1 C/A, Galileo E1	user-defined	LNP1	14.0 x 5.4 x 12.5cm	1.1 lb	-10m (95%)	<10 ns	10 Hz PVT	<45 s	<10 s	<1 s	1	1 USB 2.0	46.2 Mbps USB	0 to +55	via USB port	1.5 W	Active, external	Software receiver, Requires an external notebook	
	NavX-NTR	60 par., Narrow, correlator	GPS L1 C/A, L2 P, L2C, L5, Galileo E1, E5ab, E6, GLONASS G1 C/A & P		NP1	19" x 2HU x 33cm	19.8 lb	-10m (95%)	<10 ns	10 Hz PVT	< 60 s	< 30 s	<1 s	1	1 Ethernet	10/100 Mbps	-10 to +60	ext (AC/DC)	90 W	Active, external	Monitoring and reference station apps	
i-Lotus Corporation www.lotus.com.sg	RX Oncore	16	16	16	CHLMNOPS2	17.0 x 22.4 x 3.0mm	2.0g	< 2.5 m, 1-sigma		4Hz	<32.0s	<21.0s	<1.5s		UART, USB, SPI, CAN	115.2kbps	-40°C to +85°C	ext	75 mA @3.3V	both active and Passive		
	TX Oncore	16	16	16	CHLMNOPS2	17.0 x 22.4 x 3.0mm	2.0g	< 2.5 m, 1-sigma	22ns	1Hz	<33.0s	<21.0s	<1.5s		UART, USB, SPI, CAN	115.2kbps	-40°C to +85°C	ext	75 mA @3.3V	both active and Passive		
	FC Oncore	12	12	12	CHLMNOPS2	12.0 x 16.4 x 2.5mm	0.9g	<5 m		1Hz	45s	38s	5s		UART, SPI		-30 to +75	ext	<35mA	both active and Passive		
	M12M Navigation Oncore	12	12	12	CHLMNOPS2	60.0 x 40.0 x 30.0mm	12.5g	< 5m, 1-sigma		1Hz	150s	40s	15s		UART		-40°C to +85°C	ext	155 mW @ 3.0V	both active and Passive		
	M12M Timing Oncore	12	12	12	CHLMMetNO-PRSTV2	60.0 x 40.0 x 30.0mm	12.5g	< 5m, 1-sigma	2ns	1Hz	150s	40s										

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacqui-sition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
continued Interstate Electronics Corporation www.itech.com	TruTrak Evolution DS	24 dedicated	L1/L2 C/A and P(Y)	12	D	1.75 x 2.45in	35g	Data available upon request	Data available upon request	Data available upon request	as above	as above	as above	3	COM1 (either RS-232 or CMOS), COM2 (CMOS), DS-101/102, TOD and 1PPS	Data available upon request	Data available upon request	Input power 3.3 VDC	Data available upon request	Two active	Fully security approved configuration
	TruTrak Evolution SS	12 dedicated	L1 C/A and P(Y)	12	D	3.07 x 0.93in with tabs to 1.49in	23g	Data available upon request	as above	as above	as above	as above	as above	3	1 x RS-232 and 2 x CMOS serial ports, DS-101, TOD and 1-10PPS	as above	as above	as above	as above	Passive	as above
ITTCS www.cs.it.com	ITT GB-GRAM SSI	36 par.	L1, C/A & (P/Y); L2, (P/Y)	12	DHLMNV2	2.45 x 0.60 x 3.40in	1.76 oz	nr	nr	10	nr	<30 s	<10 s	2, 1, 1, 1, 1	CMOS, RS-232, RS-422, PTTI, HVQK	1,200-115,200	-40 to +85	ext	< 3	various (E)	Compliant to GB GRAM SSI form factor. SAASM
	Embedded GPS Receiver (EGR) Monitor Station Network Receiver	36 par. 12	L1, C/A & (P/Y); L2, (P/Y)	12	DHLMNV2	3.01 x 0.38 x 3.95in	1.84 oz	nr	nr	50	200s	<30 s	<10 s	1, 1, 1	CMOS, PTTI, HVQK	1,200-115,200	-40 to +85	ext	< 2	various (E)	"L" form factor or tailored to suit. SAASM
Jackson Labs www.jackson-labs.com	FireFly-1A 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3 x 1in	1.74 Oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	RS-232, 1 Alarm TTL	9,600 - 115,200	-20 to +85	11.0-14.0 V	<3.5W	5V	Built-In 10MHz Distribution Amplifier, 3-Axis Accelerometer, low-g option
	FireFly-1A-100MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 4 x 1in	1.8 Oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	RS-232, 1 Alarm TTL	9,600 - 115,200	-20 to +85	11.0-14.0 V	<3.5W	5V	3-Axis Accelerometer, 10MHz and 100MHz Ultra Low Phase Noise outputs, low-g option
	Fury2HS 10MHz GPSDO	12 par.	L1, C/A	12	ADLMMETNOT2	10.0 x 10.0 x 2.6cm	0.25lb	<5m RMS	<2ns RMS	1Hz	<150s	<40s	<1s	1	RS-232, 4GPIO, 1 Alarm TTL	9,600 - 115,200	-20 to +85	11.0-14.0 V	<4.5W	3.3V or 5V	Rubidium Oscillator Replacement
	Fury2LC 10MHz GPSDO	12 par.	L1, C/A	12	ADLMMETNOT2	10.0 x 10.0 x 2.6cm	0.25lb	<5m RMS	<2ns RMS	1Hz	<150s	<40s	<1s	1	RS-232, 4GPIO, 1 Alarm TTL	9,600 - 115,200	-20 to +85	11.0-14.0 V	<4.5W	3.3V or 5V	Better than 1E-012 stability
	Fury2 10MHz GPSDO	12 par.	L1, C/A	12	ADLMMETNOT2	10.0 x 10.0 x 2.6cm	0.25lb	<5m RMS	<2ns RMS	1Hz	<150s	<40s	<1s	1	RS-232, 4GPIO, 1 Alarm TTL	9,600 - 115,200	-20 to +85	11.0-14.0 V	<4.5W	3.3V or 5V	Ultra Low Phase Noise Oscillator
	FireFly-1A 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.0 x 2.5 x 0.5in	0.64 Oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	RS-232, 1 Alarm TTL	9,600 - 115,200	-20 to +85	8.0-14.0 V	<1.4W	3.3V	Ultra small and light
	FireFly-II 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3.0 x 0.8in	1.74 Oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	RS-232, 1 Alarm TTL	9,600 - 115,200	-20 to +85	11.0-14.0 V	<3.5W	3.3V	3D velocity, stability: <1E-011
FireFly-II Ruggedized, low-g 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3.0 x 0.8in	2 Oz	<2m RMS	<30ns RMS	1Hz	<45s	<1s	<1s	1	RS-232, 1 Alarm TTL	9,600 - 115,200	-20 to +85	11.0-14.0 V	<3.5W	3.3V	Mil rugged, stability <1E-011, <3E-010 per-g sensitivity	
JAVAD GNSS www.javad.com	TRIUMPH-1 G2T	216	GPS L1/L2/L5, Galileo E1, E5A, SBAS	all in view	1AGLMTNPROMet	178 x 96 x 178mm	1700 g	2m/0.5m/1 cm+1 ppm/, 0.3cm+0.5 ppm	3	100 Hz	<35 s	<5 s	<1 s	2111111	RS232, USB, Ethernet, Wi-Fi, Bluetooth, 1PPS, Event Marker	460.8kbps, 480Mbps, 10/100 Mbps, 54 Mbps, 2Mbps	-30 to +55	ext/int	4.2	IE	2048MB memory, UHF/GSM/GPRS modem
	TRIUMPH-1 G3T	216	GPS L1/L2/L5, Galileo E1/E5A, GLONASS L1/L2, SBAS	all in view	as above	178 x 96 x 178mm	1700 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111111	as above	as above	-30 to +55	ext/int	4.2	IE	2048MB memory, UHF/GSM/GPRS modem
	TRIUMPH-4X	216	GPS L1/L2/L5, Galileo E1/E5A, SBAS	all in view	1AGLMTNPROMet	178 x 93 x 178mm	1850 g	as above	3	20 Hz	<35 s	<5 s	<1 s	21111	RS232, USB, Ethernet, Wi-Fi, Bluetooth	as above	-30 to +55	ext/int	6	IE	2048MB memory, UHF/GSM/GPRS modem
	Alpha G3	216	GPS L1, Galileo E1, GLONASS L1, SBAS	all in view	1AGLMTNPROMet	148 x 85 x 35mm	430 g	as above	3	100 Hz	<35 s	<5 s	<1 s	11111	RS232, USB, Bluetooth, 1PPS, Event Marker	460.8kbps, 12 Mbps, 723 kbps	-30 to +55	ext/int	1.7	E	256MB memory, GSM/GPRS modem
	Alpha G2	216	GPS L1, Galileo E1,	all in view	1AGLMTNPROMet	148 x 85 x 35mm	415 g	as above	3	100 Hz	<35 s	<5 s	<1 s	11111	RS232, USB, Bluetooth, 1PPS, Event Marker	460.8kbps, 12 Mbps, 723 kbps	-30 to +55	ext/int	1.7	E	256MB memory, GSM/GPRS modem
	Alpha G2T	as above	GPS L1/L2/L5, Galileo E1/E5A, SBAS	all in view	1AGLMTNPROMet	148 x 85 x 35mm	435 g	as above	3	100 Hz	<35 s	<5 s	<1 s	3111222	as above	as above	-30 to +55	ext/int	2.7	E	2048MB memory
	Alpha G3T	as above	GPS L1/L2/L5, Galileo E1/E5A, GLONASS L1/L2, SBAS	all in view	1AGLMTNPROMet	148 x 85 x 35mm	448 g	as above	3	100 Hz	<35 s	<5 s	<1 s	3111222	as above	as above	-30 to +55	ext/int	3.7	E	2048MB memory
	Delta G2T	216	GPS L1/L2/L5, Galileo E1/E5A, SBAS	all in view	1AGLMTNPROMet	109 x 35 x 169mm	394 g	as above	3	100 Hz	<35 s	<5 s	<1 s	3111222	RS232, RS422, USB, Ethernet, CAN, 1PPS, Event Marker	460.8kbps, 460.8kbps, 480Mbps, 10/100 Mbps, 1Mbps	-40 to +80	ext	2.7	E	2048MB memory
	Delta G3T	as above	GPS L1/L2/L5, Galileo E1/E5A, GLONASS L1/L2, SBAS	all in view	1AGLMTNPROMet	109 x 35 x 169mm	401 g	as above	3	100 Hz	<35 s	<5 s	<1 s	3111222	as above	as above	-30 to +55	ext/int	3.7	E	2048MB memory
	Delta D-G2	as above	2x GPS L1, 2x Galileo E1, SBAS	all in view	1AGLMTNPROMet	109 x 35 x 169mm	414 g	as above	3	100 Hz	<35 s	<5 s	<1 s	3111222	as above	as above	-30 to +55	ext/int	3.2	E	2048MB memory
	Delta D-G2D	as above	2x GPS L1/L2, 2x Galileo E1, SBAS	all in view	1AGLMTNPROMet	109 x 35 x 169mm	414 g	as above	3	100 Hz	<35 s	<5 s	<1 s	3111222	as above	as above	-30 to +55	ext/int	3.2	E	2048MB memory
	Delta Q-G3D	as above	4x GPS L1/L2, 4x Galileo E1, GLONASS L1/L2, SBAS	all in view	1AGLMTNPROMet	109 x 35 x 169mm	454 g	as above	3	100 Hz	<35 s	<5 s	<1 s	3111222	as above	as above	-30 to +55	ext/int	4.7	E	2048MB memory
	Sigma G2T	216	GPS L1/L2/L5, Galileo E1/E5A, SBAS	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1270 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111222	RS232, RS422, USB, Ethernet, CAN, 1PPS, Event Marker	460.8kbps, 460.8kbps, 480Mbps, 10/100 Mbps, 1Mbps	-30 to +55	ext/int	3.2	E	2048MB memory, 2x External power, inputs, UHF/GSM/GPRS modem
	Sigma G3T	as above	GPS L1/L2/L5, Galileo E1/E5A, GLONASS L1/L2, SBAS	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1277 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111222	as above	as above	-30 to +55	ext/int	4.2	E	2048MB memory
	Sigma D-G2	as above	2x (GPS L1, Galileo E1, SBAS)	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1290 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111222	as above	as above	-30 to +55	ext/int	3.7	E	2048MB memory
	Sigma D-G2D	as above	2x (GPS L1/L2, Galileo E1, SBAS)	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1290 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111222	as above	as above	-30 to +55	ext/int	3.7	E	2048MB memory
	Sigma Q-G3D	as above	1x (GPS L1/L2, Galileo E1, GLONASS, L1/L2, SBAS)+, 3x (GPS L1/L2, Galileo E1, SBAS)	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1330 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111222	as above	as above	-30 to +55	ext/int	5.2	E	2048MB memory
	GISmore	216	GPS L1, Galileo E1, GLONASS L1	all in view	1GORPV	79 x 36 x 131mm	303 g	2m/0.5m/5 cm+1 ppm/, 5 cm+0.5 ppm	3	100 Hz	<35 s	<5 s	<1 s	1	Bluetooth	2Mbps	-30 to +55	ext/int	2	I	GSM/GPRS modem
	TR-G2	216	GPS L1, Galileo E1, SBAS	all in view	2AGLMTNPROMet	55 x 40 x 13mm	21 g	2m/0.5m/1 cm+1 ppm/, 0.3cm+0.5 ppm	3	100 Hz	<35 s	<5 s	<1 s	2111111	RS232, USB, CAN, 1PPS, Event Marker, IRIG	460.8kbps, 12 Mbps, 1Mbps	-40 to +80	ext	1.2	E	256MB memory
	TR-G3	216	GPS L1, Galileo E1, SBAS	all in view	2AGLMTNPROMet	57 x 66 x 12mm	34 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111111	RS232, RS422, USB, CAN, 1PPS, Event Marker, IRIG	460.8kbps, 460.8kbps, 12 Mbps, 1Mbps	-40 to +80	ext	1.5	E	256MB memory
TR-G2T	216	GPS L1/L2/L5, Galileo E1/E5A, SBAS	all in view	2AGLMTNPROMet	57 x 66 x 12mm	34 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111111	as above	as above	-40 to +80	ext	1.6	E	256MB memory	
TR-G3T	216	GPS L1, L2/L2C, L5, Galileo E1/E5A, GLONASS L1/L2, SBAS	all in view	2AGLMTNPROMet	57 x 88 x 12mm	47 g	as above	3	100 Hz	<35 s	<5 s	<1 s	2111111	as above	as above	-40 to +80	ext	2.5	E	256MB memory	
TRE-G2T	216	GPS L1/L2/L5, Galileo E1/E5A, SBAS	all in view	2AGLMTNPROMet	100 x 80 x 14mm	70 g	as above	3	100 Hz	<35 s	<5 s	<1 s	31122211	RS232, RS422, USB, CAN, 1PPS, Event Marker, IRIG, Ext. Reference Frequency Input	460.8kbps, 460.8kbps, 480 Mbps, 1Mbps	-40 to +80	ext	2.7	E	2048MB memory	
TRE-G3T	216	GPS L1/L2/L5, Galileo E1, E5A, GLONASS L1/L2, SBAS	all in view	2AGLMTNPROMet	100 x 80 x 14mm	77 g	as above	3	100 Hz	<35 s	<5 s	<1 s	311222111	RS232, RS422, USB, CAN, 1PPS, Event Marker, IRIG, Ethernet, Ext.Reference Frequency Input	460.8kbps, 460.8kbps, 480 Mbps, 1Mbps, 10/100 Mbps	-40 to +80	ext	3.7	E	2048MB memory	
TRE-G3TAJ	216	GPS L1/L2/L5, Galileo E1, E5A, GLONASS L1/L2, SBAS	all in view	2AGLMTNPROMet	100 x 80 x 14mm	77 g	as above	3	100 Hz	<35 s	<5 s	<1 s	311222111	RS232, RS422, USB, CAN, 1PPS, Event Marker, IRIG, Ethernet, Ext.Reference Frequency Input	as above	-40 to +80	ext	3.7	E	2048MB memory	
Duo-G2	216	2x GPS L1, 2x Galileo E1, SBAS	all in view	2AGLMTNPROMet	100 x 80 x 14mm	90 g	as above	3	100 Hz	<35 s	<5 s	<1 s	31122211	RS232, RS422, USB, CAN, 1PPS, Event Marker, IRIG, Ethernet	as above	-40 to +80	ext	3.2	E	2048MB memory	
Duo-G2D	216	2x GPS L1/L2, 2x Galileo E1, SBAS	all in view	2AGLMTNPROMet	100 x 80 x 14mm	90 g	as above	3	100 Hz	<35 s	<5 s	<1 s	31122211	RS232, RS422, USB, CAN, 1PPS, Event Marker, IRIG, Ethernet	as above	-40 to +80	ext	3.2	E	2048MB memory	
Quattro-G3D	216	4x GPS L1/L2, 4x Galileo E1, GLONASS L1/L2, SBAS	all in view	2AGLMTNPROMet	100 x 120 x 14mm	130 g	as above	3	100 Hz	<35 s	<5 s	<1 s	311222111	RS232, RS422, USB, CAN, 1PPS, Event Marker, IRIG, Ethernet, Ext.Reference Frequency Input	as above	-40 to +80	ext	4.7	E	2048MB memory	
John Deere www.JohnDeereAg.com	StarFire ITC	12 L1, 12 L2, 2 SBAS	L1 full cycle CP, C/A, P1 code; L2 full cycle CP, P2, L-Band	12 SBAS + 2 SBAS	Precision Agriculture, Construction, Forestry	22.9 x 17.8 x 17.8cm	2.27kg	2m/0.25m/1cm+1ppm/ 5mm+1ppm 95%	nr	5 Hz (10Hz capable), (0.2 sec)	<35s	<34s	<1s	3	CANRS232	Up to 115.2 k	-40 to +85	9 to 18 V DC	<12	Patented dipole	Integrated terrain compensation, proprietary RTK-Extend operating mode, compatibility with space-based differential corrections network (StarFire)
	StarFire 300	16 L1 / SBAS	L1 full cycle CP/C/A	14	as above	19.7x17x19.7cm	0.82kg	<1m 95% SBAS	nr	10Hz (0.1 sec)	<35s	<33s	<3s	3	CANRS232	Up to 115.2 k	-40 to +85	5V to 16V DC	<4	Dual-fed patch	WAAS differential correction
JRC www.jrcamerica.com	CCA-600	22 tracking	L1, GPS (C/A), SBAS	22	2	15.9x13.1x2.5mm	1.1g	3.0 (2DRMS), SBAS:2.5(2DRMS)	na	5Hz max.	<35s	<34s	<1s	1	UART	9600	-30 to +70	3.0-3.6	35mA Aqc., 25mA Tracking	E (passive & active)	For PND, Telematics and other GPS apps.
	CCA-552	13 channels, Sp. Search:1	L1, GPS (C/A), SBAS	13	2	27x19x7.5mm	11g	10.0 (2DRMS), SBAS:9.0(2DRMS)	na	1Hz	<40s	<33s	<3s	1	UART	9600	-30 to +70	3.3-5%	88mA typ.	E (active)	Surface mounted.
	CCA-512	13 channels, Sp. Search:1	L1, GPS (C/A), SBAS	13	2	24x3.8x22mm	3g	10.0 (2DRMS), SBAS:9.0(2DRMS)	na	1Hz	<40s	<33s	<3s	1	UART	9600	-30 to +70	3.3-5%	88mA typ.	E (active)	Surface mounted.
KVH Industries, Inc www.kvh.com/beropt	CNS-5000 Continuous Navigation System	L-band with RTK, DGPS, Omnistar and SBAS positioning modes	L1 and L2	32	ADGLMNPV2R1	15.24 x 16.76 x 8.89cm	5.2 lbs	CA code/RTK capable/post processing available	RTK (2 cm + 1PPM), DGPS (5 m), Single Point												

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post- processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacqui- sition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments	
Leica Geosystems AG www.leica-geosystems.com	GX1210+	16 L1 GPS, 4 SBAS	GPS: L1, C/A code and CP, P-Code, SBAS: WAAS, EGNOS, MSAS, GAGAN	20	AGLMNR1	166 x 79 x 212mm	1.2 kg	5 m/30 cm/NA/10 mm + 1 ppm	<100	0.05	45 s	35 s	1 s	4	4 RS-232, 1 Power, 1 TNC, 1 PPS Out, 2 Event-Optional	2,400-115,200	-40 to +65	ext/int	3.2	AX1201	Single frequency GPS survey receiver	
	GX1220+	16 L1, 16 L2 GPS, 4 SBAS	GPS: L1, L2 (L2C), C/A code and CP, P-Code, SBAS: WAAS, EGNOS, MSAS, GAGAN	20	AGLMNR1	166 x 79 x 212mm	1.2 kg	5 m/25 cm/NA/5 mm + 0.5 ppm	<100	0.05	45 s	35 s	1 s	4	as above	2,400-115,200	-40 to +65	ext/int	3.2	AX1203+ GNSS triple frequency or AT504 GG/ AR25 choke ring	Dual frequency geodetic GPS receiver	
	GX1220+ GNSS	Total 120 channel, L1, L2 (L2C), L5 GPS, L1, L2 GLONASS, E1/E5a/E5b/ Alt-BOC Galileo, Compass, 4 SBAS,	GPS: L1, L2 (L2C), L5, C/A code and CP, P-Code, GLONASS: L1, L2 C/A code and CP, P-Code, Galileo: E1, E5a/E5b Code and CP, Alt-BOC Code and CP, SBAS: WAAS, EGNOS, MSAS, GAGAN	48	AGLMNR1	166 x 79 x 212mm	1.2 kg	5 m/25 cm/NA/5 mm + 0.5 ppm	<100	0.05	45 s	35 s	1 s	4	as above	2,400-115,200	-40 to +65	ext/int	3.2	as above	Triple frequency geodetic GNSS receiver	
	GX1230+	16 L1, 16 L2 GPS, 4 SBAS	GPS: L1, L2 (L2C), C/A code and CP, P-Code, SBAS: WAAS, EGNOS, MSAS, GAGAN	20	AGLMNR1	166 x 79 x 212mm	1.2 kg	5m/25cm/10mm+1ppm/5mm+0.5 ppm	<100	0.05	45 s	35 s	1 s	4	as above	2,400-115,200	-40 to +65	ext/int	3.2	as above	Dual frequency geodetic and RTK GPS receiver	
	GX1230+ GNSS	Total 120 channel, L1, L2 (L2C), L5 GPS, L1, L2 GLONASS, E1/E5a/E5b/ Alt-BOC Galileo, Compass, 4 SBAS,	GPS: L1, L2 (L2C), L5, C/A code and CP, P-Code, GLONASS: L1, L2 C/A code and CP, P-Code, Galileo: E1, E5a/E5b Code and CP, Alt-BOC Code and CP, SBAS: WAAS, EGNOS, MSAS, GAGAN	48	AGLMNR1	166 x 79 x 212mm	1.2 kg	5m/25cm/10mm+1ppm/5mm+0.5ppm	<100	0.05	45 s	35 s	1 s	4	as above	2,400-115,200	-40 to +65	ext/int	3.2	as above	Triple frequency geodetic and RTK GNSS receiver	
	ATX1230 +GNSS (SmartAntenna)	as above	as above	48	AGLMNR1	D 186 x H 89mm	0.95	5m/25cm/10mm+1ppm/5mm+0.5ppm	<100	0.05	45 s	35 s	1 s	1 Hw/1 BT	Combined (RS-232, Power, USB), 1 Bluetooth	2,400-115,200	-40 to +65	ext/int	1.8	Internal	Triple frequency geodetic and RTK GNSS receiver	
	GRX1200+	16 L1, 16 L2 GPS, 4 SBAS	GPS: L1, L2 (L2C), C/A code and CP, P-Code, SBAS: WAAS, EGNOS, MSAS, GAGAN	20	AGLMetORT1	166 x 79 x 212mm	1.25 kg	5 m/25cm/NA/NA	<100	0.05	45 s	35 s	1 s	5	4 RS-232; 2 power; 1 TNC, Ethernet, PPS, ext, event	2,400-115,200	-40 to +65	ext/int	3.2	AX1203+ GNSS triple frequency or AT504GG / AR25 choke ring	Permanent dual frequency GPS receiver w/ Ethernet	
	GRX1200+ GNSS	Total 120 channel, L1, L2 (L2C), L5 GPS, L1, L2 GLONASS, E1/E5a/E5b/ Alt-BOC Galileo, Compass, 4 SBAS,	GPS: L1, L2 (L2C), L5, C/A code and CP, P-Code, GLONASS: L1, L2 C/A code and CP, P-Code, Galileo: E1, E5a/E5b Code and CP, Alt-BOC Code and CP, SBAS: WAAS, EGNOS, MSAS, GAGAN	48	AGLMetORT1	166 x 79 x 212mm	1.25 kg	5 m/25cm/NA/NA	<100	0.05	45 s	35 s	1 s	5	as above	2,400-115,200	-40 to +65	ext/int	3.2 to 4.0	AX1203+ GNSS triple frequency or AT504GG / AR25 choke ring	Permanent triple frequency GNSS receiver w/ Ethernet	
	GMX901	12 L1 (GPS)	L1, C/A code	12	MetOP1	186 x 186 x 60mm	0.7 kg	NANANANA	<100	1	<120 s*	<45 s*	<10 s	1	1 LEMO-1 connector, 8 pin	4800 - 115200	-40 to +65	ext	1.7	Integrated Leica AT501 microstrip antenna with built-in groundplane	Single frequency GPS smart antenna for structural monitoring	
	GMX902 GG	14 L1, 14 L2 (GPS), 12 L1, 12 L2 (GLONASS) (72 total)	L1, L2, C/A code and CP, P-Code	24	MetOP1	167 x 123 x 40mm	0.8 kg	NANANANA	<100	0.05	45 s	35 s		2	2 RS-232, 2 Power, 1 TNC, 1 PPS output	2,400-115,200	-40 to +65	ext	2	AX1202 GG dual frequency or AT504 GG choke ring	Dual frequency GNSS receiver for structural monitoring	
	PowerAntenna	14 L1, 14 L2 (GPS), 2 SBAS, 12 L1, 12 L2 (GLONASS) (72 total)	L1, L2 (L2C), C/A code and CP, P-Code, WAAS, EGNOS, MSAS	26	AGLMNOR1	D 186 x H 90mm	1.6 kg	5m/25cm/10mm+1ppm/5mm+0.5 ppm	<100	0.05	45 s	35 s	1 s	1	1 RS-232 / Power in, 1x RS422 / Power in, Bluetooth	2,400-115,200	-40 to +65	ext/int	3.8	Internal	Dual frequency RTK GNSS receiver for site survey and machine navigation	
	PowerBox	as above	as above	26	AGLMNOR1	190 x 159 x 82mm	2.7 kg	5m/25cm/10mm+1ppm/5mm+0.5 ppm	<100	0.05	45 s	35 s	1 s	5	2 RS-232, 1 Power/RS-232, 1 RS232/RS422, 2 CAN, 1 TNC	2,400-115,200	-40 to +65	ext	3.8	MNA1202 GG	Dual frequency RTK GNSS machine navigation receiver	
	ATX900 GG	14 L1, 14 L2 (GPS), 12 L1, 12 L2 (GLONASS) (72 total)	L1, L2, C/A code and CP, P-Code	26	AGLMNR1	D 186mm x H 89mm	0.95	5m/25cm/10mm+1ppm/5mm+0.5ppm	<100	0.2	45 s	35 s	1 s	1 Hw/1 BT	Combined (RS-232, Power, USB), 1 Bluetooth	2,400-115,200	-40 to +65	ext/int	1.8	Internal	Dual frequency geodetic and RTK GNSS receiver	
	GS09	as above	L1, L2, C/A code and CP, P-Code	26	AGLMNR1	D 186mm x H 89mm	0.95	5m/25cm/10mm+1ppm/5mm+0.5ppm	<100	0.2	45 s	35 s	1 s	1 Hw/1 BT	Combined (RS-232, Power, USB), 1 Bluetooth	2,400-115,200	-40 to +65	ext/int	1.8	Internal	Dual frequency geodetic and RTK GNSS receiver	
	GS10	Total 120 channel, L1, L2 (L2C), L5 GPS, L1, L2 GLONASS, E1/E5a/E5b/ Alt-BOC Galileo, Compass, 4 SBAS,	GPS: L1, L2 (L2C), L5, C/A code and CP, P-Code, GLONASS: L1, L2 C/A code and CP, P-Code, Galileo: E1, E5a/E5b Code and CP, Alt-BOC Code and CP, SBAS: WAAS, EGNOS, MSAS, GAGAN	60	AGLMNR1	166 x 79 x 212mm	1.18	5m/25cm/10mm+1ppm/5mm+0.5ppm	<100	0.05	45 s	35 s	1 s	4	2 RS-232, 1 Combined (RS-232, USB), 1 Power, 1 TNC, 1 Bluetooth	2,400-115,200	-40 to +65	ext/int	3.2	AS10 triple frequency or AT504GG / AR25 choke ring	Triple frequency geodetic and RTK GNSS receiver	
GS15	as above	as above	60	AGLMNR1	D 198mm x H 196mm	1.34 kg	5m/25cm/10mm+1ppm/5mm+0.5ppm	<100	0.05	45 s	35 s	1 s	4	1 RS-232, 1 combined (RS-232, Power, USB), 1 UART & USB, 1 Bluetooth	2,400-115,200	-40 to +65	ext/int	3.2	Internal	Triple frequency geodetic and RTK GNSS receiver		
Linx Technologies www.linxtechnologies.com	RXM-GPS-SG	20	GPS L1 C/A code, SBAS(WAAS, MSAS, EGNOS)	20	2	15.00 x 13.00 x 2.2	0.003 lbs	10mtr Autonomous; 5mtr SBAS		1 Hz	35	15	2s	14	pinned	UART (9,600 baud, 57600 baud max)	-30 to 85C	ext	3.3 VDC, Peak: 46ma, Acquisition: 32ma, Tracking: 28ma, Standby: 1.5ma	External active	Based on SIRFstarIII GSC33LP; Front end SAW filter & 0.9 dB Noise Figure LNA, NMEA 0183 ver 3.0, SIRF Binary	
	RXM-GPS-SR	20	as above	20	2	15.00 x 13.00 x 2.2	0.0096 lbs	as above		1 Hz	35	15	2s	4	pinned	UART (9,600 baud, 57600 baud max)	-30 to 85C	ext	3.3 VDC, Peak: 31ma, Sleep 1.5ma	Internal passive	Based on SIRFstarIII GSC33LP; Front end SAW filter & 0.9 dB Noise Figure LNA, NMEA 0183 ver 3.0, SIRF Binary	
Magellan Professional / Boards & Sensors www.promagellanGPS.com	AC12 GPS+SBAS Board	10 GPS + 2 SBAS	L1 only, C/A-code and carrier, SBAS,	12	CHLMNPTV2	1.54 x 2.36 x 0.25in (board only)	0.7 oz (board)	3 m/1 m/na	±250	1	<150 s	<45 s	<2 s	2	TTL	1200-115,200	-30 to +80	external	230 mW	Patch, active (ER)	Raw carrier-phase measurements	
	ADUS 3D Attitude Sensor	56par/2 beacon	L1 only, C/A-code and carrier, SBAS, Beacon	12GPS + 2 SBAS	ADLMN0T1	8.5 x 3.75 x 7.7in	4.125 lb	3 m/40 cm/nr		5 Hz	90 s	35 s	3 s	2	RS-232	300-115,200	-20 to +55	external	6	Patch with ground plane (ER)	Precise heading, pitch, roll, and 3D position	
	DG14 GPS+SBAS Board	12 GPS + 2 WAAS	as above	as above	ADGLMNOPRSTV2	108 x 57mm	2.3 oz	3 m/40 cm/1 cm + 1 ppm/1 cm + 1 ppm		200	20 Hz	90 s	35 s	3 s	3	RS-232	300-115,200	-30 to +70	external	1.2	Microstrip GPS/beacon	Uses SBAS signals for sub-meter differential positioning
	DG14 Sensor	12 GPS+2 WAAS	as above	as above	ADGLMNOPRTV1	95 x 42 x 168mm	19 oz	as above		200	20 Hz	90 s	35 s	3 s	3	RS-232	300-115,200	-30 to +60	external	1.3	Microstrip GPS/beacon	RAIM algorithm to detect and correct errors
	SkyNav GG12W GPS+SBAS -Avionics Certified Board	12 par.	L1 only, C/A-code and carrier (GPS and SBAS)	as above	ADNO2	4.3 x 3.3 x 0.6in	3.8 oz	3 m/1 m/nr/5 mm + 1 ppm	nr	5 Hz	nr	nr	nr	<3 s	2	RS-230	300-115,200	-30 to +70	external	3	Patch, active (ER)	For aviation; designed to FAA/RTCA specifications
	GG24-E2 GPS + GLONASS Board	24 par.	L1 only, C/A-code and carrier (GPS and GLONASS)	12 GPS, 12 GLONASS	ADGLMN PRTV2	3.9 x 0.7 x 6.6in	16.5 oz	3.2 m/40 cm/nr/1, 5 mm + 1 ppm	70	5 Hz	40 s	30 s	2 s	2	RS-232	300-115,200	-30 to +70	external	2.3	Patch, active (ER), GPS+GLONASS	Tracks negative frequency GLONASS channels	
MB 500 GPS+GLONASS+SBAS Board	75 par.	GPS L1 C/A/L1/L2 P-code, L1/L2 full wavelength carrier, GLONASS L1 C/A, L2 C/A or P-code, L1/L2 full wavelength carrier, SBAS code & carrier	12 GPS, 12 GLONASS, 3 SBAS	AGLMMetNO-PRTV2	3.9 x 3.1 x 0.5in	2.18 oz	3m/40cm/1 cm + 2 ppm/5mm + 1 ppm	nr	up to 20 Hz	90 s	35 s	3 s	3	RS-232, LV-TTL, USB 2.0	RS232 up to 460.8 kbps, LV-TTL up to 5Mbps, USB 2.0 up to 12 Mbps	-30 to +70	external	2.5 typical (10 Hz GPS+GLONASS+SBAS)	Ext. active patch (L1, L2) GPS/GLONASS	BLADE Tech inside., OTF GLONASS bias calibration, RTK + Heading + pitch or roll		
Magellan Professional / GIS www.promagellanGPS.com	MobileMapper 6	12 parallel channels	L1 only, C/A code, WAAS, EGNOS, MSAS	12	GHLMN1	5.7 x 2.5 x 1.1in	0.49 lb	7/2sub-meter	na	1	1 min	30 s	15 s	2	- Protocol: NMEA 0183 v 3.0 or SIRF	na	-20 to +60	Ext./int.	na	Patch and external	affordable and easy-to-use, GPS/GIS handheld	
	MobileMapper CX	14 parallel channels	L1 only, C/A code, WAAS, EGNOS, MSAS	14	DGHLMN1	3.5 x 7.7 x 1.8in	1.01 lb	7/submeter/ subfoot	na	1	2 min	45 s	15 s	7	- Protocol: NMEA 0183 v 3.0 - RTCM SC-104 version 2.3 (9.2 & 1.2)	na	-10 to +60	Ext./int.	na	Patch and external	easy-to-use handheld GPS for high-accuracy mapping/GIS	

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) /, real-time kinematic / post-processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacqui- sition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
Magellan Professional / Marine <a href="http://www.promagellanGPS.com">www.promagellanGPS.com</a>	ProFlex 500	75	SBAS, GPS L1 C/A, L1/L2 P-code, L2C, L1/L2 FWC, Glonass L1 C/A, L2 C/A/P-code, L1/L2 FWC	12GPS/12Glonass/3SBAS + low signal acquisition engines	MINRO1	21.5 x 20 x 7.6cm	2.1 kg	3m/0.8m/10 mm/3 mm +1ppm	nr	0.05s	90s	35s	3s	7	1 RS232/RS422, 2 RS232, USB, Bluetooth, Ethernet, GSM/GPRS, Earth terminal	RS232/422: up to 921.6 kbits/sec; USB 2.0 host & device, Bluetooth 2.0 + EDR Class 2, SPP profile	-30 to +65	Int./ext.	with UHF and GNSS antenna < 5	External antennas depending on application: Geodetic Survey Antenna, Machine, Marine AERIAL KIT, Choke Ring L2 NAP002	Flexible Rugged High-Performance GNSS Receiver
	Aquarius <sup>2</sup>	32 L1 / 24 L2	C/A, L1 phase; L2 phase, P-code, WAAS, EGNOS, MSAS as above	32	MINRO1	245 x 125 x 305mm	4.2 kg	2 m/20 cm EDGPS/ 5 mm KART or LRK	±100	50 ms	80 s	30 s LRK	nr	1,3 + AUX	RS-232,422, AUX Port PPS Out, ext event, RTCM in	1,200-115,200	-20 to +55	Ext.	12 to 25	L2 NAP002	Real-time centimeter-level accuracy and precise heading
	Aquarius	16 L1 / 12 L2	as above	16	MINRO1	245 x 125 x 305mm	4.2 kg	as above	±100	50 ms	80s	30 s LRK	nr	1,3 + AUX	RS-232,422, AUX Port PPS Out, ext event, RTCM in	1,200-115,200	-20 to +55	Ext.	10 to 21	L1 NAP001 or L2 NAP002	Fast RTK positioning and long range radio link up to 40 km
Magellan Professional / Survey <a href="http://www.promagellanGPS.com">www.promagellanGPS.com</a>	ProMark3 Survey System	14 par	L1 C/A code, L1 CP, WAAS, EGNOS, MSAS	14	HGLN1	9.0 x 19.5 x 4.6cm	0.48 kg	3 m/1m/na/0.005 m + 1 ppm	100	1	90 s	15 s	15 s	4	RS-232, 2 USB, Bluetooth	2,400-115,200	-10 to +60	Ext./int.	3	Patch internal, patch active (ER) ext.	Rugged and easy to use PP survey and mapping solution (ER) ext.
	ProFlex 500	75	SBAS, GPS L1 C/A, L1/L2 P-code, L2C, L1/L2 FWC, Glonass L1 C/A, L2 C/A/P-code, L1/L2 FWC	12GPS/12Glonass/3SBAS + low signal acquisition engines as above	GLMOPR12	21.5 x 20 x 7.6cm	2.1 kg	3m/0.8m/10 mm/3 mm +1ppm	nr	0.05s	90s	35s	3s	7	1 RS232/RS422, 2 RS232, USB, Bluetooth, Ethernet, GSM/GPRS, Earth terminal	RS232/422: up to 921.6 kbits/sec; USB 2.0 host & device, Bluetooth 2.0 + EDR Class 2, SPP profile	-30 to +65	Int./ext.	with UHF and GNSS antenna < 5	External antennas depending on application: Geodetic Survey Antenna, Machine, Marine, Choke Ring	Flexible Rugged High-Performance GNSS Receiver
	ProMark 500	75	as above	as above	GL1	22.8x18.8x8.4cm (9x7.4x3.3 in)	1.4 kg (3.1 lb)	as above	nr	0.05s	110 s	30 s	3 s	4	RS232, RS422, USB, Bluetooth	RS up to 115200	-30 to +55	Int./ext.	4.5	Internal patch active. GPS/Glo L1/L2	Enhanced RTK accuracy. Optimal use of GLONASS
	ProMark3 RTK Survey System	14 par	L1 C/A code, L1 CP, WAAS, EGNOS, MSAS	14	HGLN1	9.0 x 19.5 x 4.6cm	0.48 kg	3 m/1m/1 cm+1 ppm/0.005 m + 1 ppm	100	1	90 s	15 s	15 s	4	RS-232, 2 USB, Bluetooth	2,400-115,200	-10 to +60	Ext./int.	3	Patch internal, patch active (ER) ext.	RTK accuracy no longer means costly equipment (ER) ext.
Maxim Integrated Products <a href="http://www.maxim-ic.com">www.maxim-ic.com</a>	MAX2769	All in view	L1 GPS, Galileo, GLONASS	All in view	ACDGHLMetN-PRSTV12	5 x 0.75x 5mm	na / na / na / na	na / na / na / na	na	na	na	na	1	SPI	na	na	-40 to 85 C	ext.	0.03	L1 active/passive antenna	GPS front-end receiver. 1.4 dB Cascaded NF
Micro Modular Technologies <a href="http://www.micro-modular.com">www.micro-modular.com</a>	MN5010HS SMD Receiver Module	20	L1 only, C/A codes, SBAS (WAAS, EGNOS, MSAS, GAGAN)	12	ACDGHLMetNO-PRTV2	10 x 1.9 x 10mm	0.45 g	<2.5m (CEP) / na / na / na	200 ns	1 Hz	<35 s	<35 s	0.1 s	1	UART	1,200 - 115,200	-20 to +85	ext	<100mW	E (passive or active)	Ultra small, low power autonomous GPS receiver module, -159 dBm sensitivity
	MN5515HS SMD Receiver Module	20	as above	12	as above	15 x 2.9 x 15mm	1.2 g	<2.5m (CEP) / na / na / na	200 ns	1 Hz	<35 s	<35 s	0.1 s	2	UART	1,200 - 115,200	-40 to +85	ext	<100mW	E (passive or active)	Low cost, low power autonomous GPS receiver module, -159 dBm sensitivity
	MN5310HS SMD Receiver Module	20	as above	12	as above	25.3 x 3.26 x 25.4mm	2.8 g	<2.5m (CEP) / na / na / na	200 ns	1 Hz	<35 s	<35 s	0.1 s	2	UART	1,200 - 115,200	-30 to +85	ext	<100mW	E (passive or active)	Low power autonomous GPS receiver module, -159 dBm sensitivity
NavCom Technology, Inc. <a href="http://www.navcomtech.com">www.navcomtech.com</a>	Sapphire	66 par.	L1, L2, L5, G1 & G2 (E1, E5a ready)	66 GNSS, +1 StarFire	DAGLMNPRTV2	4.73 in x 3.94 in x 0.43in	4oz	2m / 45cm+ppm / 1cm+0.5ppm / 1cm + 0.5ppm	13ns (1PPS)	1Hz - 100Hz (user programmable)	<60 s	<50 s	<20 s	5	2 x RS232 (1 configurable to RS422); 1 x USB 2.0 (host or device); 1 x Ethernet (10T/100T); 1 x Bluetooth	RS232: 9.6kbps - 115kbps; USB: up to 12Mbps; Ethernet: up to 100Mbps; Bluetooth: up to 230.4kbps	-40 to +85	ext	6W typical	Crossed dipole (ER)	Latest generation of John Deere technology
	SF-3050M	66 par.	L1, L2, L5, G1 & G2 (E1, E5a ready)	66 GNSS, +1 StarFire	DAGLMNPRTV1	6.47in x 4.60in x 2.37in	1.1 lb	as above	13ns (1PPS)	1Hz - 100Hz (user programmable)	<60 s	<50 s	<20 s	5	as above	RS232: 9.6kbps - 115kbps; USB: up to 12Mbps; Ethernet: up to 100Mbps; Bluetooth: up to 230.4kbps	-40 to +70	ext	< 4 W	Crossed dipole (ER)	Integrated StarFire / RTK Extend multi-frequency receivers
	SF-2110M	16 par.	L1 only, C/A code	16 GPS L1/WAAS	DAGLMNPRTV1	4.94 x 2.56 x 8.11in	3.3 lb	2.5<1/na/na	50	0.1	<45 s	<45 s	<1 s	2, 1	RS-232, RS-422	1,200-115,200	-30 to +70	ext	< 5 W	patch	Modular GPS/StarFire receiver
	VueStar	26 par.	L1 full cycle CP, C/A and P1 code; L2 full cycle CP, P2 code	12 GPS + 2 SBAS	DANPTV1	5.7 x 3.1 x 8.2in	4.0 lb	20.200,010m+1/0.005+1	12.5	0.25	<60 s	<60 s	<30 s	2, 1, 1, 1	RS-232, 1PPS, Event Marker, CAN	1,200-115,200	-40 to +55	ext	< 8 W	Crossed dipole (ER)	Global decimeter StarFire service for aircraft
Navman Wireless OEM <a href="http://www.navmanwireless.com">www.navmanwireless.com</a>	J4 GPS Module	48	L1 C/A code, SBAS	48	CDHLMetNPV2	11 x 11 x 2.2 mm	1g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	3	UART, SPI, I2C	4,800 - 115,200	-40 to +85	1.8 to 5.0 V	8 mW, ATP	passive/active	J4
	J3 GPS Module	20	L1 C/A code, SBAS	20	CDHLMetNPV2	11 x 11 x 2.2 mm	1g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	2	UART	4,800 - 115,200	-40 to +85	2.75 to 3.0 V	31.6 mW, ATP, 2.75V	passive/active	J3
	J3-30 GPS Module	20	L1 C/A code, SBAS	20	CDHLMetNPV2	25.4 x 25.4 x 3 mm	2g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	2	UART	4,800 - 115,200	-40 to +85	3.0 to 3.6 V	56 mW, ATP, 3.3 V	passive/active	J3-30
	AA003051-G, GPS Module	20	L1 C/A code, SBAS	20	CDHLMetNPV2	25.4 x 25.4 x 3 mm	2g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	2	UART	4,800 - 115,200	-40 to +85	3.0 to 3.6 V	56 mW, ATP, 3.3 V	passive/active	J30xLP
	AA003255-G, GPS Module	20	L1 C/A code, SBAS	20	CDHLMetNPV2	17.0 x 15.0 x 2.7 mm	4g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	2	UART	4,800 - 115,200	-40 to +85	3.0 to 3.6 V	56 mW, ATP, 3.3 V	passive/active	J32xLP
	AA005000-G, Antenna Module	20	L1 C/A code, SBAS	20	CDHLMetNPV2	30.0 x 30.0 x 8.0 mm	16g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	2	UART	4,800 - 115,200	-10 to +60	3.0 to 3.6 V	75mW, ATP	On-Module patch	J130 w integrated Antenna and Micro Battery
	AA003264-G, Antenna Module	20	L1 C/A code, SBAS	20	CDHLMetNPV2	49.0 x 41.0 x 14.1 mm	96g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	1	RS232 (USB/RJ11)	4,800 - 115,200	-30 to +85	4.75 to 5.25 V	170mW at 5V	On-Module patch	GPS Smart Antenna, WP
	AA003041-G, GPS Module	20	L1 C/A code, SBAS	20	CDHLMetNPV2	40.6 x 71.1 x 11.5 mm	25g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	2	UART	4,800 - 115,200	-40 to +85	3.2 to 3.6 V	80 mW, ATP, 3.3 V	passive/active, external	J31
	AA003049-G, Dead Reckoning GPS Module	20	L1 C/A code	20	CDHLMetNPV2	40.6 x 71.1 x 11.5 mm	25g	2.5m/nr/nr/nr	nr	1	<33s	<31s	<1s	2	UART	4,800 - 115,200	-40 to +85	5.0 to 6.0 V	300mW at 5V	passive/active	J31DR
	NavSys Corporation <a href="http://www.navsys.com">www.navsys.com</a>	HAGR (High-gain Adv)	36	L1 C/A & PY code; L2 PY, WAAS	12	ADGLMNPRTV1	19 x 17.5 x 19in	65 lb	10m/1m0.1m/0.1m	3, 1 sig	1	15m mx	<20 s	<10 s	1	RS-232, 10/100 Base-T	9,600-28,800	+10 to +35	115 V AC	240W(2A@120V)	Up to 96 element phased array
SGR (Software Rcvr)		24	L1 C/A & PY code; L2 PY, WAAS, 900 MHz Beacons	8	ADGLMNPRTV2	Customized	nr	10m/1m0.1m/0.1m	3	1	15m mx	<20 s	<10 s	Select	RS-232, 10/100 Base-T	nr	nr	nr	nr	Selectable	
TIDGET and LocatorNet			L1 C/A, WAAS	all in view	ACDGHLMetNOP	Customized	18 g	10m/1m	100ns	On command	0	0	0	Customiz-able	Customizable	nr	-45 to + 85	int	17 mJ per fix	Selectable	LocatorNet network server performs off-board processing of TIDGET GPS snapshot
Nottingham Scientific Ltd <a href="http://www.nsl.eu.com">www.nsl.eu.com</a>	PRIMO	Arch. dependent, configurable	GPS L1 C/A code, GIOVE, Glonass and/or Compass as option	Arch. Dependent	H,N,V,2	sw baseband	na	-10 m , na, na	-50 ns	configurable, 50 Hz max	<40s	<35 s	<2 s	Arch. dependent	IP, Serial	configurable	ext	Arch. dependent	E	Software defined radio GNSS receiver, usually associated with a USB front-end.	
NovAtel <a href="http://www.novatel.com">www.novatel.com</a>	OEMV-1	36 max	L1 C/A code and CP, L-Band, Corrections and raw data available	14 GPS; 2 SBAS; 1 L-band	ADGLMmetNO-PRTV2	46 x 71 x 13mm	21.5 g	1.5m / 0.4m DGPS / 0.6m SBAS / 0.7m VBS / 0.6m CDGPS / 0.20m RT-20 / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	20 Hz standard (50Hz max)	60 s	40 s	0.5 s	3, 2, 1	LV-TTL; CAN; USB1.1	300 to 921,600 bps; 500 Kbps; 5 Mbps	-40 to +85 (operating)	3.3 V DC	1.0W (typical)	Active (E)	RoHS-compliant; RT-20, OmniSTAR VBS, and GL1DE software features available for this model
	OEMV-1G	36 max	L1 C/A code and CP, L1 GLONASS, Corrections and raw data available	14 GPS; 12 GLO; 2 SBAS	ADGLMmetNO-PRTV2	46 x 71 x 13mm	21.5 g	1.5m / 0.4m DGPS / 0.6m SBAS / 0.2m RT-20 / 0.015m + 1ppm RT-2 L1TE / 5mm + 1 ppm post processed (All values in Horiz. RMS)	20	as above	60 s	40 s	0.5 s	3, 2, 1	LV-TTL; CAN; USB1.1	300 to 921,600 bps; 500 Kbps; 5 Mbps	-40 to +85 (operating)	3.3 V DC	1.0W (GPS only), 1.2W (GPS & GLONASS)	Active (E)	RoHS-compliant; RT-20, RT-2 L1TE, GL1DE, and ALIGN software features available for this model
	OEMV-2	72 max	L1 C/A code and CP, L2 (P/Y) and L2C code and CP, L1 GLONASS, L2 GLONASS, SBAS	14 GPS; 12 GLONASS; 2 SBAS	ADGLMmetNO-PRTV2	60 x 100 x 13mm	56 g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m + 1ppm RT-2 / 5 mm + 1 ppm post processed (All values in Horiz. RMS)	20	as above	60 s	40 s	0.5 s	1, 2, 1, 1	RS-232 or RS-422, LV-TTL, CAN, USB1.1	300 to 921,600 bps; 500 Kbps; 5 Mbps	-40 to +85 (operating)	3.3 V DC	1.2 W (GPSonly), 1.6 W (GPS & GLONASS)	Active (E)	RoHS-compliant; RT-20, RT-2, GL1DE, PDP, and ALIGN software features available for this model
	OEMV-3	72 max	L1 C/A code and CP, L2 (P/Y) and L2C code, L5, and CP, L1 GLONASS, L2 GLONASS, SBAS, L-band	14 GPS; 12 GLONASS; 2 SBAS; 1 L-band	ADGLMmetNO-PRTV2	85 x 125 x 15mm	75 g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.7m VBS / 0.15m XP / 0.1m HP / 0.6m CDGPS / 0.01m + 1ppm RT-2 / 5 mm + 1 ppm post processed (All values in Horiz. RMS)	20	as above	60 s	40 s	0.5 s	1, 1, 1, 2, 1	RS-232 or RS-422; RS-232 or LV-TTL; LV-TTL; CAN, USB1.1	300 to 921,600 bps; 300 to 921,600 bps; 1 Mbps; 5 Mbps	-40 to +85 (operating)	4.5 to 18 VDC	2.1W (GPS only), 2.6W (GPS & GLONASS)	Active (E)	RoHS-compliant; RT-20, RT-2, OmniSTAR VBS/HPXP, GL1DE, PDP, and ALIGN software features available for this model
	FlexPak-V1/G	See OEMV-1/G models	See OEMV-1/OEMV-1G models	See OEMV-1/G models	ADGLMmetNO-PRTV2	45 x 147 x 123mm	307 g	See OEMV-1/G models	20	as above	60 s	40 s	0.5 s	1, 1	RS-232 or USB1.1; RS-232 or RS-422 or USB1.1	300 to 921,600 bps; 500 Kbps; 5 Mbps	-40 to +85 (operating)	6 to 18 V DC	1.4 W (typical)	Active (E)	See OEMV-1/G models
	FlexPak-V2	See OEMV-2 models	See OEMV-2 models	See OEMV-2 models	ADGLMmetNO-PRTV2	45 x 147 x 123mm	350 g	See OEMV-2 models	20	as above	60 s	40 s	0.5 s	1, 1	as above	300 to 921,600 bps; 500 Kbps; 5 Mbps	-40 to +85 (operating)	6 to 18 V DC	1.9 W (typical)	Active (E)	See OEMV-2 models
	ProPak-V3	See OEMV-3 models	See OEMV-3 models	See OEMV-3 models	ADGLMmetNO-PRTV2	185 x 160 x 71mm	1.0 kg	See OEMV-3 models	20	as above	60 s	40 s	0.5 s	1, 1, 1, 1	RS-232 or RS-422; RS-232 or RS-422, RS-232; USB1.1	300 to 921,600 bps; 300 to 921,600 bps; 1 Mbps; 5 Mbps	-40 to +75 (operating)	6 to 18 V DC, 9 to 18 V DC (SPAN)	2.8 W typical	Active (E)	See OEMV-3 models
	DL-V3	See OEMV-3 models	See OEMV-3 models	See OEMV-3 models	ADGLMmetNO-PRTV2	185 x 163 x 76mm	1.3 kg	See OEMV-3 models	20	as above	60 s	40 s	0.5 s	3 / 2 + 1, 1, 1,	RS-232 / RS-422 + RS-232; Bluetooth, USB1.1, Ethernet	300 to 921,600 bps; 1 Mbps; 5 Mbps	-40 to +75 (operating)	9 to 28 V DC	3.5 W logging	Active (E)	See OEMV-3 models
	Euro-3M-L1L2GEO	14 L1/L2 pairs, 4 SBAS	L1 C/A code and CP, L2 (P/Y) code and CP, SBAS	14 GPS; 4 SBAS	O2	160 x 100 x 16mm	150 g	1.5 m	nr	1 Hz	<100 s	nr	<5 s	3	RS-232 or RS-422	9,600 to 921,600 bps	-40 to +85 (operating)	4.5 to 18 V DC	6 W typical	Active (E)	
	Euro-3M-MEDLL	8 L1/L2 pairs, 1 SBAS	as above	8 GPS; 1 SBAS	O2	160 x 100 x 16mm	150 g	1.5 m	nr	1 Hz	<100 s	nr	<5 s	3	RS-232 or RS-422	as above	-40 to +85 (operating)	4.5 to 18 V DC	6 W typical	Active (E)	
	EuroPak-3M	See Euro-3M models	See Euro-3M models	See Euro-3M models	O12	235 x 154 x 71mm	1.2 kg	1.5 m	nr	1 Hz	<100 s	nr	<5 s	3	RS-232	as above	-40 to +60 (operating)	9 to 18 V DC	6 W typical	Active (E)	
	EuroPak-3MT	See Euro-3M models	See Euro-3M models	See Euro-3M models	OT12	235 x 154 x 71mm	1.2 kg	1.5 m	nr	1 Hz	<100 s	nr	<5 s	3	RS-232	as above	-20 to +50 (operating)	11 to 18 V DC	13 W typical	Active (E)	Internal OCXO
	EuroPak-15a	16 max	5 Galileo L1 and 5 Galileo E5a and 6 GPS L1	5 Galileo, 6 GPS	O12	235 x 154 x 71mm	1.2 kg	1.5 m	nr	1 Hz	<100 s	nr	<20 s	2	RS-232	as above	0 to +40 (operating)	9 to 18			

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post- processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacqui- sition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
continued Omnistar BV www.omnistar.nl	7300VBS	14	L1, C/A, L-band	14	AGLRV1	114.3 x 95.6mm	530 g	10m/70 cm 2DRMS/na/na	na	5 Hz 20 Hz option	<20 Min	60 Sec	0.5 Sec	3	2 x RS-232 ports+USB	115200 (300-460800)	-40° to +75°C	ext	2.5	Internal	Light weight small integrated smart antenna
	9200-G2	72	72-channel L1 C/A code, L1/L2 Full Cycle Carrier. Upgradable to L2C and GLOMSS L1/L2 Full Cycle Carrier.	24 GPS, 24 Glonass	AGLRV1	24 x 12 x 5cm, including connectors	1.55 Kg	10m/70 cm 2DRMS/10 cm/na	na	10 Hz	<20 Min	10 sec	<1 sec	6	3 x RS-232 ports, 1 USB, 1 Ethernet, 1 Bluetooth	RS232 4800-115,200	-30° to +65°C	Battery 7800 ma, 14 Hours	6	Ant-9200-00	Full Featured with internal battery and Glonass capable Receiver
ORCA Technologies, LL www.gotsync.com	GS-101	12 parallel channels	GPS L1 C/A code	12	Time, Frequency, Position - Static or Mobile	3.07 x 1.06 x 4.72in	1 lb	<9m 90%/2m CEP 50%/NA/NA	<100ns	1 second	<3 minutes	<1 minute	<1s	3	2 serial / 1 USB	9600 bps - 115200 bps	0 to 50	external	30 mw	active	Small portable GPS Receiver providing IRIG time, pulse rates, event capture and position over serial and USB ports. Can be portable with optional battery.
Oscilloquartz SA www.oscilloquartz.com	OSA Star 4+	50-channel	GPS L1 frequency, C/A Code or 1 PPS (LVCMOS)	16	T2	135 x 20 x 60mm	<300gr (<0.66lbs)	NA	± 30 ns	NA	32s	32s	1s	1	TTL or RS-232	9600	-20 to 65°C	12 VDC	power-up 12W, steady-state 6W	Active Antenna	Holdover PPS of 10 µs up to 24h
	OSA Star 4	50-channel	GPS L1 frequency, C/A Code or 1 PPS (LVCMOS)	16	T2	135 x 25 x 60mm	<300gr (<0.66lbs)	NA	± 30 ns	NA	32s	32s	1s	1	TTL or RS-232	9600	-20 to 65°C	12 VDC	power-up 12W, steady-state 6W	Active Antenna	Holdover PPS of 10 µs up to 8h
	OSA 4500	16-channel	GPS L1 frequency, C/A Code or 1 PPS (LVCMOS)	12	T2	123.4 x 23.6 or 28.6 x 98mm	<300gr (<0.66lbs)	NA	100ns	NA	45s	36s	2s	1	TTL or RS-232	9600	-5 to +55°C (-20 to +70°C in option)	12 VDC	power-up 12W, steady-state 8W	Active Antenna	Holdover PPS of 10 µs up to 24h
	OSA 4501	16-channel	GPS L1 frequency, C/A Code	12	T2	124.5 x 20.3 x 94mm	<300gr (<0.66lbs)	NA	100ns	NA	45s	36s	2s	1	TTL or RS-232	9600	-5 to +55°C	12 VDC	power-up 12W, steady-state 6W	Active Antenna	Holdover PPS of 10 µs up to 24h
	OSA 5200B	16-channel	GPS L1 frequency, C/A Code	12	T1	482.6 x 44.5 x 220mm (19"x1.75"x8.7"), or, 482.6 x 44.5 x 245mm (19"x1.75"x9.7"), (including connectors)	<2kg (<4.40lbs)	NA	100ns	NA	45s	36s	2s	1	RS-232	9600	-5 to +55°C	48 VDC	power-up 12W, steady-state 8W	Active Antenna	Holdover PPS of 10 µs up to 24h
PCTEL, Inc. www.antenana.com	5012D-CE	16 par.	L1, C/A	16	CHLMNTV2	25.5 x 7.6 x 38mm	10 g	<2m / <1m / na / na	50	1	<39 s	<2.5 s	<1 s	1	CMOS, 1PPS	4,800-115Kbps	-40 to +85	3.3 V	<85mA	Active, filtered patch antenna included	Embedded module / Flying Leads, High Sensitivity Receiver + Antenna
	5012D	16 par.	L1, C/A	16	CHLMNTV1	45 x 12 x 51mm	120 g	<2m / <1m / na / na	50	1	<39 s	<2.5 s	<1 s	1	CMOS, USB, RS232 on DB9, DB15, DB25, 1PPS	4,800-115Kbps	-40 to +85	3.3 V	<85mA	as above	IP67 Weather Proof, High Sensitivity Magnet Mount Receiver + Antenna
	5012D-PT	16 par.	L1, C/A	16	CHLMNTV1	45 x 12 x 51mm	120 g	<2m / <1m / na / na	50	1	<39 s	<2.5 s	<1 s	1	RS232 on DB9, DB15, DB25	4,800-115Kbps	-40 to +85	3.3 V	<85mA	as above	Intelligent Fleet tracking "Plug & Track" Receiver + Antenna
	5072D	16 par.	L1, C/A	16	CDLMNTV1	60 dia. x 32mm	60g	<2m / <1m / na / na	50	1	<39 s	<2.5 s	<1 s	1	CMOS, RS232 on DB9, DB15, DB25, 1PPS	4,800-115Kbps	-40 to +85	3.3 V	<85mA	as above	IP67 Industrial Weather Proof, High Sensitivity Thru-hole Mount Receiver + Antenna
	5072D-PT	16 par.	L1, C/A	16	CDLMNTV1	60 dia. x 32mm	60g	<2m / <1m / na / na	50	1	<39 s	<2.5 s	<1 s	1	CMOS, RS232 on DB9, DB15, DB25	4,800-115Kbps	-40 to +85	3.3 V	<85mA	as above	Intelligent Fleet tracking "Plug & Track" Receiver + Antenna
Position Co., Ltd. www.posit.co.jp	GSU-70	20par.	20par.	12	ACDHLMNPTV	18.0x17.0x2.8mm	<1.8g	<15m /na	1000	1Hz	40s typ.	38s typ.	<1s	1	UART	4800.9600	-30 to +80	+3.1 to +3.6V	90mw typ.	passive, active ANTexternal	very small handheld application
	GPS-72A	20par.	20par.	12	ACDHLMNPTV	20.8x23.0x7.4mm	<1 g	<15m /na	1000	1Hz	40s typ.	38s typ.	<1s	1	UART	4800.9600.12920.38400	-30 to +80	+3.1 to +3.6V	83mw typ.	patchANTinternal	
	GPS-72D	20par.	L1 C/A code, SBAS	12	ACDHLMNPTV	20.8x23.0x9.7mm	<1 g	<15m /na	1000	1Hz	40s typ.	38s typ.	<1s	1	UART	4800.9600.12920.38400	-30 to +80	+3.1 to +3.6V	83mw typ.	patchANTinternal	
	GSU-72	20par.	L1 C/A code, SBAS	12	ACDHLMNPTV	20.8x23.0x5.0mm	<10g	<15m /na	1000	1Hz	40s typ.	38s typ.	<1s	1	UART	4800.9600.12920.38400	-30 to +80	+3.1 to +3.6V	90mw typ.	active ANTexternal	
	GPS-74	20par.	L1 C/A code, SBAS	12	ACDHLMNPTV	20.8x20.8x9.2mm	<1 g	<15m /na	1000	1Hz	40s typ.	38s typ.	<1s	1	UART	4800.9600.12920.38400	-30 to +80	+3.1 to +3.6V	83mw typ.	patchANTinternal	
	GSU-74	20par.	L1 C/A code, SBAS	12	ACDHLMNPTV	20.8x20.8x5.0mm	<10g	<15m /na	1000	1Hz	40s typ.	38s typ.	<1s	1	UART	4800.9600.12920.38400	-30 to +80	+3.1 to +3.6V	90mw typ.	active ANTexternal	
	GPS-75	20par.	L1 C/A code, SBAS	12	ACDHLMNPTV	15.0x70.0x7.0mm	<11g	<15m /na	60	1Hz	40s typ.	38s typ.	<1s	1	UART	4800.9600.12920.38400	-30 to +80	+3.1 to +3.6V	100mw typ.	patch ANT internal external changeable	
	GPS-82	50par.	L1 C/A code, SBAS	12	ACDHLMNPTV	20.8x23.0x9.7mm	<1 g	<15m /na	1000	1Hz	29s typ.	29s typ.	<1s	1	UART: USB	4800.9600.138400	-30 to +80	+3.1 to +3.6V	130mw typ.	patchANTinternal	
	GSU-83	50par.	L1 C/A code, SBAS	12	LMelPTV	26.4x36.4x8.0mm	<12g	<15m /na	1000	1Hz	29s typ.	29s typ.	<1s	1	UART: USB	4800.9600.138400	-30 to +80	+3.1 to +3.6V	130mw typ.	active ANTexternal	timing application
	GSU-91	66par.	L1 C/A code, SBAS	12	ACDHLMNPTV	11.9x11.7x2.1mm	<1g	<15m /na	1000	1Hz	40s typ.	38s typ.	<1s	1	UART	4800.9600.12920.38400.57600.115200	-30 to +80	+3.1 to +3.6V to +3.3V	+1.8 90mw typ.	passive, active ANTexternal	ultra very small handheld application
Precise Time and Frequency, Inc. www.ptfinc.com	3203A GlobalTyme	12	L1, C/A	12	LOT1	19 x 1.75 x 12in	<10 lb	<25 m / nr / nr / nr	20	1	<20 min	<5 min	1 s	2	RS-232, 100baseT	1,200-57,600	0 to +50	Internal 90-264 AC	<10	35 dbi, 5 V DC	Multiple frequency outputs, IRIG B, Low phase noise
	3204A GlobalTyme	12	L1, C/A	12	LOT1	19 x 3.5 x 12in	<10 lb	<25 m / nr / nr / nr	20	1	<20 min	<5 min	1 s	2	RS-232, 100baseT	1,200-57,600	0 to +50	Internal 90-264 AC	<10	35 dbi, 5 V DC	as above
	3203AB Mobile	12	L1, C/A	12	LOT1	19 x 1.75 x 12in	<10 lb	<25 m / nr / nr / nr	60	1	<20 min	<5 min	1 s	2	RS-232, 100baseT	1,200-57,600	0 to +50	Internal 90-264 AC Internal 20 - 70VDC (optional)	<10	35 dbi, 5 V DC	Multiple frequency outputs, IRIG B, Low phase noise
	3203A SAASM	12	L1, C/A, p(y) code	12	LOT1	19 x 1.75 x 12in	<10 lb	<25 m / nr / nr / nr	40	1	<20 min	<5 min	5 s	2	RS-232, 100baseT	1,200-57,600	0 to +50	Internal 90-264 AC	<10	35 dbi, 5 V DC	Multiple frequency outputs, IRIG B, Low phase noise
	3203A Wimax	12	L1, C/A	12	LOT1	19 x 1.75 x 12in	<10 lb	<25 m / nr / nr / nr	20	1	<20 min	<5 min	1 s	2	RS-232, 100baseT	1,200-57,600	0 to +50	Internal 90-264 AC 20 - 70VDC (optional)	<10	35 dbi, 5 V DC	3x10MHz sine (low phase noise) + 3 x 1PPS TTL outputs.
	3207A GlobalTyme	12+12(optional)	L1, C/A	12+12(opt)	LOT1	19 x 1.75 x 12in	<10 lb	<25 m / nr / nr / nr	20	1	<20 min	<5 min	1 s	2	RS-232, 100baseT	1,200-57,600	0 to +50	Internal 90-264 AC	<10	35 dbi, 5 V DC	Multiple frequency outputs, IRIG B, Low phase noise, Multiple input options, dual receiver engines (optional)
	3208A GlobalTyme	12+12(optional)	L1, C/A	12+12(opt)	LOT1	19 x 3.5 x 12in	<10 lb	<25 m / nr / nr / nr	20	1	<20 min	<5 min	1 s	2	RS-232, 100baseT	1,200-57,600	0 to +50	Internal 90-264 AC	<10	35 dbi, 5 V DC	as above
	QinetiQ Ltd. www.qinetiq.com/gps	Q20 HS	12 parallel	L1, C/A	12	CDHLMN0V2	22 x 26.5 x 3.3mm	3 g	5m / na / na / na R95	25	1 Hz	<45 s	<38 s	<0.5 s	3,1	Serial, 1PPS	4800-230,400	-40 to +85	3.0 to 3.6 V	0.03 to 0.45	Ext. Active or Passive
Q20 HST		12 parallel	L1, C/A	12	T2	50 x 35 x 11mm		5m / na / na / na R95	25	1 Hz	<45 s	<38 s	<0.5 s	2,1,1,1	Serial, 1PPS, Clk in, Valid	4800-230,400	-40 to +85	3.0 to 3.6 V	<0.4	Ext. Active or Passive	High sensitivity timing
Q20 HD		12 parallel	L1, C/A	12	D2	22 x 26.5 x 3.3mm		5m / na / na / 0.4m R95	25	16 Hz	<3 s	<3 s	<0.5 s	2,1	Serial, 1PPS	4800-230,400	-40 to +85	3.0 to 3.6 V	<0.7	Ext. Active or Passive	High dynamics hybrid
Q20 GSU		12 parallel	L1, C/A	12	D2	2.263x2.302x0.5in		5m / na / na / 0.4m R95	25	16 Hz	<3 s	<3 s	<0.5 s	2,1	Serial, 1PPS	4800-230,400	-40 to +85	1.8, 3.3, 5 V	<2.5	Ext. Active or Passive	High dynamics hybrid
Q20 JGS		36 parallel	L1, C/A	12	D2	PCI Card		5m / na / na / 0.4m R95	na	16 Hz	<45 s	<38 s	<0.5 s	6	Serial	4800-230,400	-40 to +85	PCI Bus	Ext. Active	HD ground station	
Racelogic www.racelogic.co.uk	Latsat, RLLSR01	All in View	GPS L1 C/A Code	All in View	ACDGHLMN0TV1	17.0 x 12.8 x 3.8cm	750 g	1.5 m / na / na	50 ns, (RMS)	16.368 MHz	NA	NA	NA	3	2 x SMA, 1 x USB	NA	-10 to +70	8V to 30V DC	5.8W, (Max)	Active	RF Record and Replay for GPS L1 C/A Code
Raytheon www.raytheon.com	Anti-jam GPS Receiver (AGR)	24/Continuous	C/A, P(Y)	8	DO1	6.5 x 2.2 x 9.0in	4 lb	<16 m / na / na / na	<100	nr	nr	150 s	20 s	nr	nr	nr	-55 to 71	28 V DC	28 W	5 element L1/L2 CRPA	Tomahawk Block IV Anti-Jam Receiver
	Miniature Airborne GPS Receiver MAGR 2000	24/Continuous	C/A, P(Y)	All in View	AD1	3.21 x 6.78 x 12.82in	11.0 lb	<16 m / na / na / na	37	1	<6 min	24 s	1 s	2 mux, 5 serial	1553/RS-232/RS-422/ARINC429	500 kbps	-54 to 85	115 V/400 Hz	24 W	L1/L2 FRPA or CRPA	Standard GPSW aircraft receiver LRU
	RAPTOR Common Weapon Navigator	24/Continuous	C/A, P(Y)	All in View	DHLMNOPV2	3.45 x 0.59 x 3.45in	100 g	<16 m / na / na / na	<100	1	nr	60 s	10 s	3	RS-232/RS-422/CMOS	500 kbps	-32 to 70	3.3 V DC	<4.5 W max, <1 W nominal	L1/L2	Multiple Raytheon Missile System applications
	Digital Anti-jam Receiver (DAR)	24/Continuous	C/A, P(Y)	All in View	ADO1	8.6 2.27 13.0in	11.0 lb	<16 m / na / na / na	<25	1	nr	nr	nr	2 mux/serial	1553/RS-232/RS-422/ARINC429	nr	nr	115 V ac, 28 or 270 V dc	<80 W	L1/L2 CRPA	High Anti-Jam aircraft receiver system
Reelektronika www.reelektronika.nl	LORADD-SP-G	18 GPS/Galileo	L1, C/A	50	LIMIT	83x28x115	270 g	10m / 2m / na / na	50 ns	4 Hz	29	29	1	3	CMOS Serial data	up to 400k	-30 to +80	ext.	4	Patch (E)	Integrated eLORAN/GPS/Galileo receiver
	RightWay Time XL Data Logger	20	WAAS/EGNOS capable	20	ACGHLMNr1	78.6 x 55.5 x 27mm	66g		100	1	42s avg	35s avg	.1	2	Bluetooth, USB	4,800-38,400	0 to 60	Lith Ion Batt/Laptop	73mA	Ceramic patch	BT/USB GPS with Battery Bank. Logs up to 130,000 way points. 364 hours for 10sec loggin intervals
Rockwell Collins www.rockwellcollins.com/gps/	RightWay Mini-S3 Bluetooth GPS	20	WAAS/EGNOS capable	20	ACGHLMNr1	68 x 48 x 18mm	60 g	5/1/na	100	1	<30	<2	<1	1	Bluetooth	4,800-38,400	0 to 70	Int Lith Ion Batt	75mA	Ceramic patch	Typical accuracy tests indicate accuracy of <1.5 m
	MPE-S, Miniature Precision Lightweight GPS Receiver (PLGR) Engine (SAASM)	12 channels parallel, dual frequency	L1, C/A and P or Y Code/L2, P or Y Code	12	ADLMNTV2	2.45 x 0.6 x 3.4in	2.5 oz	<4 m CEP (WAGE), <2 m (SDGPS)	<100	1	<100 s typical	<60 s typical	<8 s for <10 s typical	nr	RS-232, CMOS, Crypto (DS-101 and DS-102), HVQK, 1PPS, NMEA, ant.	Variable	-40 to +85	ext	0.7 W operating, 4 mW keep-alive	active remote (E)	U.S. Army standard; GB-GRAM; backward compatible
	Polaris Link, miniature GPS receiver engine (SPS)	12 channels	L1, C/A	12	ADLMNTV2	2.45 x 0.6 x 3.4in	2.5 oz	<2 m (SDGPS)	<100	1	<100 s typical	<60 s typical	<8 s	nr	RS-232, CMOS, HVQK, 1PPS, NMEA, ant.	Variable	-40 to +85	ext	0.7 W operating, 4 mW keep-alive	active remote (E)	SPS version of MPE-S/GB-GRAM; backward compatible
	NavStorm+, Integrated GPS-AJ System w/Digital Nulling, Gun Hard, SAASM-Based	12/24 par.	L1, C/A, P or Y-code, L2, P-code or Y-code	all in view	ADLN02	2.62 Dia x 0.9in	<0.5 lb	<8 m SEP/na<16 m SEP	30	1-25 dependent on aiding	<60 s	<8 s	<15 s								

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post- processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacquisition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
continued Rockwell Collins www.rockwellcollins.com/gps/	Micro DAGR (Defense Adv. GPS Receiver) SAASM Based	12 channel, parallel	L1, C/A and P or Y code,	all in view	ADHLMNPT1	3.7x2.4x1.3	~1/3 lb. with batteries	Unverified as of this date	Unverified as of this date	1	Unverified as of this date	Unverified as of this date	Unverified as of this date	1	RS-232, crypto, USB, 1PPS, Audio	Variable	-10 to +60	Intl 2 AA batteries	Unverified as of this date	integral	SAASM-based, small, light-weight (1/3 lb), portable 12-channel all-in-view, with commercial style graphical user interface
	Polaris Guide, handheld GPS receiver (SPS) GPS Embedded Module (GEM)	12 Channel 12/24	L1, C/A, P or Y code, L2, P-code or Y-code	all in view	ADGLMNPRTV1	5.88 x 5.7 x 0.57	<0.8 lb	na/2 m typ./hr	<52 (95%)	1	<100 s	<70 s	<15 s for < 15 min	3	RS-232, RS-422, radio, HVQK, 1 PPS, 10 PPS, SINGARS, ant. RS-232, RS-422, DS-102, DS-101, HVQK, 1PPS	Variable	-32 to +70	ext 9-32 V DC / intl 4 AA batteries ext	<0.7 W tracking, <1.5 W acquisition	active integral or active remote (E) active or passive	Small, light-weight, portable 12-channel all-in-view GPS receiver GRAM-S (SEM-E) module
Rojone PL www.rojone.com.au	Genius 1- MINI	12 par.	L1 only, C/A-code	12	CDAGLNMNOPTV12	75 x 75 x 1mm	100 g	<6m CEP/nr/nr	20 us	50 s typ.	35 s	8 s	1, 2	RS-232, TTL	2,400-115,200	-40 to +85	external	0.4 W @ 12 V dc	Int. low noise passive		
	Genius 1-MAXI Genius USB	12 par. 12 par.	L1 only, C/A-code	12	CDAGLNMNOPTV12 CDAGLNMNOPTV12	132 x 132 x 22mm 75 x 75 x 18mm	300 g 100 g	<6m CEP/nr/nr <6m CEP/nr/nr	20 us 20 us	50 s typ. 50 s typ.	35 s 35 s	8 s 8 s	1, 2 1	RS-232 or TTL USB Virtual Serial Port	2,400-115,200 2,400-38,400	-40 to +85 -40 to +85	external USB	0.4 W @ 12 V dc 0.4 W @ 12 V dc	Int. / Ext. Active Int. low noise passive		
Septentrio www.septentrio.com	AsteRx3 OEM	136 par.	GPS L1, C/A L2, P-code & CP; L2C; L5 code & CP; GALILEO L1 code & CP; E5a code & CP; WAAS/EGNOS	All in View GPS + GALILEO + GALILEO	ADGLMMeNO-PRTV2	60 x 90mm	60 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	25 Hz	<45 s	<15 s (after reset)	<1 s	4, 1, 1, 2, 1	RS232, Ethernet, USB, event marker, PPS out	300-230,400; 1-2 Mbps	-40 to +70	3-5.5 V DC	2.5W typ	(E)	Triple frequency high accuracy GPS/GALILEO/GNSS receiver
	AsteRx3 HDC	136 par.	as above	as above	ADGLMMeNO-PRTV1	130 x 185 x 46mm	510 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	25 Hz	<45 s	as above	<1 s	3, 1, 1, 2, 1	as above	300-230,400; 1-2 Mbps	-40 to +70	9-30 V DC	3W typ	(E)	Triple frequency high accuracy GPS/GALILEO/GNSS receiver in a versatile waterproof high-impact plastic housing.
	AsteRx2eH OEM	272 par.	GPS+GALILEO L1, C/A and P-code & CP; L2, P-code & CP; WAAS/EGNOS	14	ADGLMMeNO-PRTV2	77 x 120mm	90 gr	1.3m/0.6m/1cm+1ppm/5mm+1ppm/0.3-0.6" per m	10	20 Hz	<45 s	as above	<1 s	4, 1, 1, 2, 1, 2	RS-232, Ethernet, USB, event marker, PPS out, Ref in/out	300-230,400, 10 Mbps	-40 to +70	5 V DC	4W typ	(E)	Single-board, dual-antenna heading GPS/GALILEO/SBAS receiver board
	AsteRx2eH PRO	272 par.	as above	14	ADGLMMeNO-PRTV1	245 x 140 x 37mm	930 gr	1.3m/0.6m/1cm+1ppm/5mm+1ppm/0.3-0.6" per m	10	20 Hz	<45 s	as above	<1 s	4, 1, 1, 2, 1, 2	as above	300-230,400, 10 Mbps	-40 to +70	9-30 V DC	5W typ	(E)	High precision dual-frequency 2-antenna GPS/GALILEO/SBAS heading receiver
	AsteRx2i OEM	136 par.	as above	All in View GPS + GALILEO	ADGLMMeNO-PRTV2	60 x 90mm	60 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	50 Hz	<45 s	as above	<1 s	4, 1, 2, 1	RS232, USB, event marker, PPS out	300-230,400; 1-2 Mbps	-40 to +70	3.3V DC	2W IMU incl	(E)	high precision IMU enhanced GPS/GALILEO Dual-frequency OEM receiver.
	AsteRx2i HDC	136 par.	as above	as above	ADGLMMeNO-PRTV1	130 x 185 x 46mm	510 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	50 Hz	<45 s	as above	<1 s	3, 1, 2, 1	as above	300-230,400; 1-2 Mbps	-40 to +70	9-30 V DC	2.5W IMU incl	(E)	high precision IMU enhanced GPS/GALILEO Dual-frequency receiver in a versatile waterproof high-impact plastic housing.
	AsteRx2e OEM	136 par.	GPS+GALILEO L1, C/A & CP; L2, P-code & CP; L2C; WAAS/EGNOS	as above	ADGLMMeNO-PRTV2	60 x 90mm	60 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	25 Hz	<45 s	as above	<1 s	2, 1, 1, 2, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Ref in	300-230,400; 1-2 Mbps	-40 to +70	3.3V DC	1.5W typ	(E)	Dual frequency high accuracy GPS/GALILEO OEM receiver.
	AsteRx2e HDC	136 par.	as above	as above	ADGLMMeNO-PRTV1	130 x 185 x 46mm	510 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	25 Hz	<45 s	as above	<1 s	2, 1, 1, 2, 1, 1	RS232, Ethernet, USB, event marker, PPS out	300-230,400; 1-2 Mbps	-40 to +70	9-30 V DC	2W typ	(E)	Dual frequency high accuracy GPS/GALILEO receiver in a versatile waterproof high-impact plastic housing.
	AsteRx1i OEM	24 par.	L1GPS, C/A-code & CP; L1BOC Galileo code & CP; WAAS/EGNOS/SBAS	All in View GPS + GALILEO + 3 SBAS	ADGLMMeNO-PRTV2	56 x 76 x 9mm	25 gr	1.5 m / 0.6 m // 5 mm + 1 ppm	10	50 Hz	<50 s	as above	0.5 s	3, 1, 2, 1	RS232, USB, event marker, PPS out	300-230,400; 1-2 Mbps	-45 to +85	3.3V DC	1.3W IMU incl	(E)	high precision IMU enhanced GPS/GALILEO single-frequency OEM receiver
	AsteRx1i HDC	24 par.	as above	as above	ADGLMMeNO-PRTV1	115 x 85 x 35mm	190 gr	1.5 m / 0.6 m // 5 mm + 1 ppm	10	50 Hz	<50 s	as above	0.5 s	3, 1, 2, 1	as above	300-230,400; 1-2 Mbps	-40 to +70	9-30 V DC	2W IMU incl	(E)	high precision IMU enhanced GPS/GALILEO single-frequency receiver in a versatile waterproof high-impact plastic housing.
	AsteRx1 OEM	24 par.	as above	as above	ADGLMMeNO-PRTV2	56 x 76 x 9mm	25 gr	1.5 m / 0.6 m // 5 mm + 1 ppm	10	50 Hz	<50 s	as above	0.5 s	3, 1, 2, 1	as above	300-230,400; 1-2 Mbps	-45 to +85	3.3V DC	<1W	(E)	Single frequency high accuracy GPS receiver with Galileo upgradability
	AsteRx1 PRO	24 par.	as above	as above	ADGLMMeNO-PRTV1	115 x 85 x 35mm	190 gr	1.5 m / 0.6 m // 5 mm + 1 ppm	10	50 Hz	<50 s	as above	0.5 s	3, 1, 2, 1	as above	300-230,400; 1-2 Mbps	-30 to +70	3.3V DC	1.2 W	(E)	Single frequency high accuracy GPS receiver with Galileo upgradability
	PolaRx3e PRO	136 par.	GPS+GALILEO L1, C/A & CP; L2, P-code & CP; L2C; WAAS/EGNOS	All in View GPS + GALILEO	ADGLMMeNO-PRTV1	280 x 140 x 37mm	930 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	20 Hz	<45 s	as above	<1 s	2, 1, 1, 2, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Ref in	300-230,400; 1-2 Mbps	-40 to +70	9-30 V DC	5W typ	(E)	Waterproof versatile high precision GPS/GALILEO receiver
	PolaRx3eTR PRO	136 par.	as above	as above	DGLMeOPRTV1	280 x 140 x 37mm	930 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	20 Hz	<45 s	as above	<1 s	2, 1, 1, 2, 1, 1, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Ref in, PPS in, Ref out	300-230,400; 1-2 Mbps	-40 to +70	9-30 V DC	5W typ	(E)	Dual-frequency GPS/GALILEO receiver for highly accurate timing and frequency transfer
PolaRx3eG PRO	136 par.	GPS L1, C/A L2, P-code & CP; L2C; L5 code & CP; GALILEO L1 code & CP; E5a code & CP; WAAS/EGNOS	All in View GPS + GALILEO	ADGLMMeNO-PRTV1	280 x 140 x 37mm	930 gr	1.5 m / 0.6 m / 1 cm + 1 ppm / 5 mm + 1 ppm	10	20 Hz	<45 s	as above	<1 s	2, 1, 1, 2, 1, 1	RS232, ethernet, USB, event marker, PPS out, Ref in	300-230,400; 1-2 Mbps	-40 to +70	9-30 V DC	5W typ	(E)	high performance dual-frequency GNSS receiver that provides access to modernized GPS and Galileo signals on L1 and L5	
PolaRx2e@ OEM	48 par.	L1, C/A and P-code & CP; L2, P-code & CP; WAAS/EGNOS	9 + 1 SBAS; 16; 12	ADGLMMeNO-PRTV2	160 x 100mm (Eurocard)	120 gr	1.5m/0.6m/1cm+1ppm/5mm+1ppm/0.3-0.6" per m	10	10 Hz	<90 s	<20 s (after reset)	<2 s	4, 1, 2, 1, 2	RS-232, Ethernet, event marker, PPS out, Ref in/out	300-230,400, 10 Mbps	-30 to +70	5 V DC	Application-dependent	(E)	Single-board, triple-antenna/altitude GPS/SBAS receiver board	
PolaRx2e@ PRO	48 par.	as above	as above	ADGLMMeNO-PRTV1	280 x 140 x 37mm	930 gr	1.5m/0.6m/1cm+1ppm/5mm+1ppm/0.3-0.6" per m	10	10 Hz	<90 s	<20 s (after reset)	<2 s	4, 1, 2, 1, 1	RS-232, Ethernet, event marker, PPS out, Ref in	300-230,400, 10 Mbps	-30 to +70	9-30 V DC	Application-dependent	(E)	Versatile and high precision altitude GPS/SBAS receiver	
SiGe Semiconductor www.sige.com	SE4100L GPS Receiver IC	NA	L1	NA	2, C, H, L, M, N, V	4 x 4 x 0.9mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-40 to +85	2.7 - 3.6 V	<30 mW	NA	Supports needs of portable and automotive GPS
	SE4110L GPS Receiver IC	NA	L1	NA	2, C, H, L, M, N, V	4 x 4 x 0.9mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-40 to +85	2.7 - 3.6 V (RF); 1.7 - 3.6 V (IO)	<30 mW	NA	For embedded, software-based GPS, and PND/PMP
	SE4110S GPS Receiver IC	NA	L1	NA	2, C, H, L, M, N, V	2.2 x 2.2 x 0.35mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-40 to +85	as above	<30mW	NA	For embedded, software-based GPS, and PND/PMP
	SE4120L Galileo / GPS Receiver IC	NA	L1	NA	2, C, H, L, M, N, V	4 x 4 x 0.9mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-40 to +85	as above	<30mW	NA	For embedded, software-based GPS, and PND/PMP
	SE4120S Galileo / GPS Receiver IC	NA	L1	NA	2, C, H, L, M, N, V	2.2 x 2.2 x 0.35mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-40 to +85	as above	<30mW	NA	For embedded, software-based GPS, and PND/PMP
	SE4150L Receiver IC	NA	L1	NA	2, C, H, L, M, N, T, V	4 x 4 x 0.9mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-40 to +85	2.7 - 3.6 V (RF); 1.7 - 3.6 V (IO)	<30mW	NA	Dual antenna input capability, integrated LNA - For embedded, software-based GPS, and PND/PMP
	SE4162T Receiver IC	NA	L1	NA	2, C, H, L, M, N, T, V	4 x 4 x 0.6mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-40 to +85	3.0 - 5.25 V (RF); 1.7 - 3.6 V (IO)	<35mW	NA	Dual antenna input capability, integrated LNA, power management - For digital cameras, software-based GPS, and PND/PMP
SE4165T Receiver IC	NA	L1	NA	2, C, H, L, M, N, T, V	4 x 4 x 0.6mm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	-40 to +85	3.0 - 5.25 V (RF); 1.7 - 3.6 V (IO)	<35mW	NA	Dual antenna input capability, integrated LNA, power management - For cellular phones and PND/PMP	
SigNav Pty. Ltd. www.signav.com	TM3-02EH	12 par.	L1, C/A	12	CHLMOT2	60 x 40 x 6mm	10g	2.5 m	10	1	<60s	<48s	<3 s	2	CMOS Serial	as above	-40 to +85	ext	0.15	ER	Indoor capable timing module with GPS-stabilised reference clock output at 10MHz or user choice
	uTevo	12 par.	L1, C/A	12	CHLMOT2	19 x 19 x 3mm	4g	2.5 m	10	1	<60s	<48s	<3 s	2	CMOS Serial	as above	-40 to +85	ext	0.15	ER	Indoor capable timing module with GPS-stabilised reference clock output at 13MHz, 19.2MHz, 26MHz or 30.72MHz
	S100	12 par.	L1, C/A	12	CHLMOT2	10 x 10 x 1.16mm	<1g	2.5 m	10	1	<60s	<48s	<3 s	2	CMOS Serial	as above	-40 to +85	ext	0.06	ER	Flip Chip Ball Grid Array (FBGA) with uTevo or TM3-02EH reference designs
SiRF Technology, a CSR plc company www.sirf.com	(SiRFstarIV) GSC4e	48	L1 only, C/A-code SBAS (WAAS, EGNOS, MSAS, GAGAN)	12		3.5 x 3.2 x 0.5mm	na		1000	1 Hz	<35 s	<35 s	0.1 s	2	UART, SPI, I2C		-40 to +85	ext/int	48 mW tracking; <100 mJ first fix		
	(SiRFstarIV) GSC4t	48	as above	12		3.4 x 2.7 x 0.68mm	na		1000	1 Hz	<35 s	<35 s	0.1 s	2	UART, SPI, I2C		-40 to +85	ext/int	48 mW tracking; <100 mJ first fix		
	SiRFstarIII (GSC3LPx)	20	L1 only, C/A-code SBAS (WAAS, EGNOS, MSAS)	12		7 x 10 x 1.5mm	na		1000	1 Hz	<35 s	<35s	0.1 s	2	UART		-40 to +85	ext/int	46 mW tracking; <100 mJ first fix		
	SiRFstarIII (GSC3LT)	20	as above	12		7 x 7 x 1.2mm	na		1000	1 Hz	<35 s	<35s	0.1 s	1	UART, SPI		-20 to +70	ext/int	50 mW tracking; <100 mJ first fix		
	SiRFfastIV	64	L1, C/A, WAAS, EGNOS	28		12 x 12 x 1.1mm	na		20	1Hz	<35s	<32s	<2s	na	na	virtual com port (all rates)	-20 to +70	ext	Variable (inquire)	passive / active	
	SiRFfastIII	28 Channel	L1, C/A, WAAS, EGNOS	28		14*14*1.2mm	na		20	1Hz	<35s	<32s	<2s	na	na	virtual com port (all rates)	-20 to +70	ext	Variable (inquire)	passive / active	
	SiRFprimal	64 hardware channels, 32 acquisition channels	L1, C/A, WAAS, EGNOS	32		16*16*1.1mm	na		20	1Hz - 5Hz	<32s	<31s	1s	na	na	virtual com port (all rates)	-45 to +85	ext	Variable (inquire)	passive / active	
SiRFstarIII (GSD3tw)	20	L1 only, C/A-code	24		4 x 4.5 x 0.68 mm	na			1 Hz	<36 s	<36s	0.1 s	1	UART, SPI		-40 to +85	na	40 mW tracking; <100 mJ first fix			
SkyTraq Technology, Inc. www.skytraq.com.tw	Venus 634LPx	65 ch	GPS L1 C/A code, 14 GPS	14	CHLMNTV2	10 x 10 x 1.1mm	0.26g	2.5m / 2.0m / NACEP	120ns	max. 10Hz PVT	29sec	28sec	<1s	2	1 UART, 1 SPI	4.8 / 9.6 / 38.4 / 115.2kbps	-40 - +85degC	2.8 - 3.6V	65mW	active or passive	low power GPS module (ROM version)
	Venus 634FLPx	65 ch	GPS L1 C/A code, 14 GPS	14	CHLMNTV2	10 x 10 x 1.1mm	0.26g	2.5m / 2.0m / NACEP	120ns	max. 10Hz PVT	29sec	28sec	<1s	2	1 UART, 1 SPI	4.8 / 9.6 / 38.4 / 115.2kbps	-40 - +85degC	2.8 - 3.6V	80mW	active or passive	low power GPS module (Flash version)
	Venus 634LPx-T	65 ch	GPS L1 C/A code, 14 GPS	14	CHLMNTV2	10 x 10 x 1.1mm	0.26g	2.5m / 2.0m / NACEP	30ns	max. 10Hz PVT	29sec	28sec	<1s	2	1 UART, 1 SPI	4.8 / 9.6 / 38.4 / 115.2kbps	-40 - +85degC	2.8 - 3.6V	80mW	active or passive	low power Timing Mode GPS module (Flash version)
	Venus 6T	65 ch	GPS L1 C/A code, 14 GPS	14	CHLMNTV2	4x4 + 7x7mm	0.1g	2.5m / 2.0m / NACEP	120ns	max. 10Hz PVT	29sec	28sec	<1s	2	1 UART, 1 SPI	4.8 / 9.6 / 38.4 / 115.2kbps	-40 - +85degC	2.7 - 3.6V	60mW	active or passive	low power GPS chipset (ROM version)

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacquisition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
continued SkyTraq Technology, Inc. www.skytraq.com.tw	Venus 6F	65 ch	GPS L1 C/A code, 14 GPS	14	CHLMNVT2	4x4 + 8x8mm	0.1g	2.5m / 2.0m / NA CEP	120ns	max. 10Hz PVT	29sec	28sec	<1s	6	4 UART, 2 SPI	4.8 / 9.6 / 38.4 / 115.2kbps	-40 ~ +85degC	2.7 ~ 3.6V	75mW	active or passive	low power GPS chipset (Flash version)
	Venus 6S	65 ch	GPS L1 C/A code, 14 GPS	14	CHLMNVT2	5 x 7mm	0.1g	2.5m / 2.0m / NA CEP	120ns	max. 10Hz PVT	29sec	28sec	<1s	2	1 UART, 1 SPI	4.8 / 9.6 / 38.4 / 115.2kbps	-40 ~ +85degC	2.8 ~ 3.6V	60mW	active or passive	low power GPS single chip (ROM version)
	Venus 6DR	65 ch	GPS L1 C/A code, 14 GPS	14	CHLMNVT2	40 x 70mm	14g	2.5m / 2.0m / NA CEP	120ns	max. 1Hz PVT	29sec	28sec	<1s	1	UART	4.8 / 9.6 / 38.4 / 115.2kbps	-40 ~ +85degC	2.8 ~ 3.6V	80mW	active	Dead Reckoning GPS module (Flash version)
Sokkia GPS / Point, Inc. www.sokkia.com	GIR1450	12 x L1 par.	L1, C/A-code	12	GLMNR1	16 x 11.4 x 4.5cm	0.54 kg	5 m / < 1m / 20 mm	nr	5 Hz	<1 min.	<40 s	2 s	4	2 RS-232, 1 Power, 1 Antenna	4,800; 9,600; 19,200	-32 to +74	ext or int	3	Ext. microstrip patch (ER)	
	GSR1700 CSX	28 universal channels	L1, C/A-code and CP; SBAS	14 GPS; 12 GLONASS all in view	GLMP1	16.7 x 10.1 (Ø) cm	0.62 kg	1.8 m / 0.45 m / 10 mm + 2 ppm (h) / 5 mm + 1 ppm (h)	nr	10 Hz	1 min	<35 s	0.5 s	2	2 RS-232, 1 Power, 2 Bluetooth	300-921,600	-40 to +55	ext or int	1.6	Int. geodetic GNSS antenna	
	GSR2650 LB	12 x L1 and 12 x L2, par.	L1, C/A-code and CP; L2, codeless and CP; OmniSTAR HP	12	AGLMNPRV1	18 x 15.4 x 7.1cm	1.1 kg	1.8 m / 0.45 m / 0.01 m / 3 mm + 1 ppm (h)	nr	20 Hz	<50 s	<40 s	0.5 s L1 / 1 s L2	5	3 RS-232, 1 Power, 1 Antenna	300-230,400	-40 to +75	ext	5	Ext. SK-600 LB with Pinwheel (ER)	
	GSR2700 ISX	72 universal	L1, C/A-code and CP; L2, codeless and CP	14 GPS; 12 GLONASS all in view	GLMNRV1	22.5 x 10.5 (Ø) cm	1.6 kg	1.5 m / 0.25 m / 0.01 m / 10 mm + 1 ppm (h) / 3 mm + 1 ppm (h)	nr	20 Hz	<50 s	<40 s	0.5 s L1 / 1 s L2	5	2 RS232, 1 USB, 2 Bluetooth	300-921,600	-40 to +65	ext or int	<5 (static data collection)	Int. Pinwheel GNSS	
Spectra Precision www.spectraprecision.com	EPOCH 10	12	L1 C/A Code, L1 full cycle CP WAAS, EGNOS	12	GHLPR1	9.5 x 4.4 x 24.2cm	0.62 kg	1.5 m/NA/NA/5 mm + 0.5 ppm	100	1hz	<90 s	<30 s	<15 s	6	RS-232 / USB / 2 Compact Flash / GPS ant / Power	115,200 bps (RS-232); USB 1 Mbps	-30 to +60	ext / int	0.6	EPOCH L1 GPS antenna (ER)	Integrated survey-grade L1 GPS receiver, rugged PDA
	EPOCH 25	24	L1 C/A Code, L2, L2C, full CP, full op P WAAS, EGNOS	12	GHLPR1	14.5 x 14.5 x 8.1cm	Base 0.93 kg; Rover 1.18 kg	1.5m / 0.25m + 0.5ppm / 2cm + 1ppm (x baseline length) / 5mm + 1ppm (x baseline length)	100	5hz	<60s	<30s	<15s	4	Base / Rover: 2 x RS232 serial ports, TNC GPS port, Rover Only: BNC Data Link	115,200 bps (RS-232)	-20 to +60	External battery for Base, Internal battery for Rover	<2.5 W, in RTK mode with internal radio	L1/L2 antenna (ER)	L1/L2 GPS receiver capable of high accuracy positioning using either RTK or post-processing techniques
	EPOCH 35	72	L1 C/A code and CP; L2 P(Y) and L2C code and CP; L1 GLONASS, L2 GLONASS, SBAS	28 L1/L2 GPS, 24 L1/L2 GLONASS, 2 SBAS	GHLPR1	19.0 x 7.0 x 20.0cm	Base - 1.0 kg; Rover 1.1 kg	1.5m / 0.45m DGPS, 0.6m SBAS / RTK: Horizontal = 10mm + 1 ppm RMS; Vertical = 20mm + 1 ppm RMS / Post: Horizontal = 5mm + 0.5 ppm RMS; Vertical = 5mm + 1 ppm RMS	20	5hz	<60s	<40s	<30s	3	Base / Rover: 2 x RS232 serial ports; 1 Bluetooth; Rover Only: BNC Data Link	115,200 bps (RS-232 and Bluetooth Serial)	-20 to +65	Internal or External for base and rover	<2.5 W, in RTK mode with internal radio	GNSS (ER)	Survey-grade GNSS receiver capable of high accuracy positioning using either RTK or post-processing techniques
Spectratime www.spectratime.com	LoNoise-1500	12	L1 only, C/A-code	nr	D, N, T, Telecom, 2	4 x 1 x 2.78in	0.49 lb	nr	1 ns (res.)	nr	nr	<4 min	nr	2	RS-232	9600	-5 to +70	ext	<25 W	Smart, active, all-weather (ER)	Smart GPS/GNSS-synchronized rubidium
	SlimLoNoise-1100	12	L1 only, C/A-code	nr	D, N, T, Telecom, 2	4 x 1 x 2.78in	0.49 lb	nr	1 ns (res.)	nr	nr	<4 min	nr	2	RS-232	9600	-5 to +70	ext	<25 W	as above	Smart GPS/GNSS-synchronized rubidium
	OEM RM-2000	12	L1 only, C/A-code	nr	D, N, T, Telecom, 2	Custom	0.59 lb	nr	1 ns (res.)	nr	nr	<4 min	nr	2	RS-232	9600	-5 to +70	ext	<25 W	as above	Smart GPS-sync rubidium
	OEM GRM-3000	12	L1 only, C/A-code	nr	D, N, T, Telecom, 2	Custom	0.79 lb	nr	1 ns (res.)	nr	nr	<5 min	nr	2	RS-232	9600	-5 to +70	ext	<30 W	as above	Int. GPS/rubidium module
	GPSR-1000 SynClock	12	L1 only, C/A-code	nr	D, N, T, Telecom, 2	3.2 x 1.6 x 5.1in	0.79 lb	nr	1 ns (res.)	nr	nr	<4/15 min	nr	2	RS-232	9600	-5 to +70	ext	<8/30 W	as above	Smart integrated GPS/rubidium
	GDK-1/2 Designer Kit	12	L1 only, C/A-code	nr	D, N, T, Telecom, 2	6.3 x 1.3 x 7.7in	0.69 lb	nr	1 ns (res.)	nr	nr	<4 min	nr	2	RS-232	9600	-5 to +70	int	<8/30 W	as above	Smart GPS/rubidium/crystal kit
	GPSReference-2000	12	L1 only, C/A-code	nr	N, T, Telecom, 1	18 x 12 x 2in	0.89 lb	nr	1 ns (res.)	nr	nr	<4 min	nr	2	RS-232	9600	-5 to +70	int	<35 W	as above	GPS/rubidium ref. source
	GPS PicoReference	12	L1 only, C/A-code	nr	N, T, Telecom, 1	18 x 12 x 2in	0.89 lb	nr	1 ns (res.)	nr	nr	<4 min	nr	2	RS-232	9600	-5 to +70	int	<35 W	as above	GPS PicoReference timing instrument
	PSRO-100	12	L1 only, C/A-code	nr	D, T, 1	10 x 12 x 13in	19 lb	nr	1 ns (res.)	nr	nr	<7min	nr	1	RS-232	9600	-20 to +50	int	<25 W	as above	PSRO-100 portable, in-field GPS/Rubidium calibration reference
	Spectrum Instruments www.spectruminstruments.com	Custom Time/Frequency Modules	12 or 16 par.	L1, C/A-code	12 or 16	ADGLMmetOPT12	Various	Various	2.5 m / 2.0 m CEP	5	1	<200 s	<50 s	<1 s	Various	sine, 1PPS, RS-232, TTL, IRIG B, NTP, various	Various	-40 to +85	ext	Various	Various
Intelligent Reference TM-4		12 par.	L1, C/A-code	12	ADGLMmetNOPT1	4.0 x 1.5 x 4.125in Rack Brax avail.	1 lb	<5 m 1 sigma	15	1	<200 s	<50 s	<1 s	2, 9	as above	1,200 - 115,200	-20 to +70	ext	3.2	Various (E,R)	Core time/frequency reference
TM-4D Distributed Time & Frequency System		12 par.	L1, C/A-code	12	DGLMetOPT1	19.0 x 1.75 x 8.0in	6.5 lb	<5 m 1 sigma	5	1	<200 s	<50 s	<1 s	24, 9	as above	1,200-115,200	-20 to +70	ext	4	Various (E,R)	Integrated digital & analog distribution amplifier
TM4-M Mobile Time & Frequency System		12 par.	L1, C/A-code	12	DGLMmetOPT1	9.5 x 1.75 x 9.0in	4 lb	<5 m 1 sigma	5	1	<200 s	<50 s	<1 s	6, 9	as above	1,200 - 115,200	-20 to +70	Universal AC	3.2	Various (E,R)	Integrated SLA battery and charger (UPS)
TM4-MR Rubidium Reference Standard		12 par.	L1, C/A-code	12	DGLMmetOPT1	9.5 x 3.5 x 12.0 in Rack Mountable	7.5 lb	<5 m 1 sigma	5	1	<200 s	<50 s	<1 s	6, 9	as above	1,200 - 115,200	0 to +70	Universal AC	< 12	Various (E,R)	Rubidium oscillator. Integrated UPS. High holdover stability
TM4-MR Series II Rubidium Reference Std.		12 par.	L1, C/A-code	12	DLmetOPT1	19.0 x 3.5 x 8.0in	6 lb	<5 m 1 sigma	5	1	<200 s	<50 s	<1 s	6, 9	as above	1,200 - 115,200	0 to +70	Universal AC	<12	Various (E,R)	Rubidium oscillator, Rack Mount, Rear Panel connectors
Phase Coherent Intelligent Reference TM-4		12 par.	L1, C/A-code	12	ADGLMmetNOPT1	4.0 x 1.75 x 4.125in	1 lb	<5 m 1 sigma	5	1	<200 s	<50 s	<1 s	2, 9	as above	1,200 - 115,200	-20 to +70	ext	3.2	Various (E,R)	Unit-to-unit phase coherency
"Rubidium Rival" Intelligent Ref. TM-4		12 par.	L1, C/A-code	12	ADGLMmetOPT1	4.0 x 1.75 x 4.125in	1 lb	<5 m 1 sigma	5	1	<200 s	<50 s	<1 s	2, 9	as above	1,200 - 115,200	-20 to +70	ext	4	Various (E,R)	Double-oven oscillator. High Holdover Stability
TM-4OEM Board-Level Module		12 par.	L1, C/A-code	12	ADGLMmetOPT2	3.875 x 1.0 x 4.00in	0.5 lb	<5 m 1 sigma	5	1	<200 s	<50 s	<1 s	various	as above	1,200 - 115,200	-20 to +70 or -40 to +85	ext	Various to under 2 W	Various (E,R)	Board level platform
TM4-PC/104		12 par.	L1, C/A-code	12	ADGLMmetOPT2	3.775 x 0.497 x 3.55in	0.5 lb	<5 m 1 sigma	5	1	<60 s	<40 s	<1 s	3, 9	10 MHz sine(x2), 1PPS, RS-232, TTL, IRIG B, NTP, various	1,200 - 115,200	-20 to +70 or -40 to +85	ext	as above	Various (E,R)	Board level platform; PC/104 compliant
TM4-S		16 par.	L1, C/A-code	16	ADGLMmetOPT2	5.1 x 1.0 x 1.6in	0.5 lb	2.5 m / 2.0 m CEP	15	1	<45 s	<38 s	<1 s	2, 5	10 MHz LVDS, 1PPS LVDS, TTL, Custom	Various	-40 to +85	ext	as above	Various (E,R)	Board level platform, small size, high sensitivity, WAAS
TM4-SN	16 par.	L1, C/A-code	16	DLNOPT2	5.1 x 1.0 x 1.6in	0.5 lb	2.5 m / 2.0 m CEP	15	1	<45 s	<38 s	<1 s	2, 5	as above	Various	-40 to +85	ext	as above	Various (E,R)	Board level platform, small size, high sensitivity, WAAS, Fully Shielded, MGRS	
SPIRIT DSP www.spiritdsp.com	Duo Star-2000	24/24 par	GPS & GLONASS, C/A, L1	All in view	ALNORTV2	40 x 30 x 6mm	10 g	3 m / 1 m (CEP)	50 (RMS)	0.2	<90 s	<50 s	<1 s	2	UART	115,200 bps max.	-40 +85	3.3 V	600 mW	E (active & passive)	SPIRIT DuoStar-2000 is a compact GPS+GLONASS OEM receiver with low BOM cost, high accuracy and sensitivity and increased reliability thanks to support of 2 global navigation systems - GPS and Russian GLONASS.
	GNS7560	42 channels	GPS L1 C/A code, SBAS	12	CHLMNPTV2	WLCSF: 3.6 x 2.4 x 0.6mm, 54 ball, 0.4mm pitch, TFBGA: 6 x 4 x 0.8mm, 54-ball, 0.65mm pitch	na	<5m RMS outdoor	<50 rms	1Hz, other rates software selectable	<38s	<38 s	<1s	3	UART, SPI	UART: up to 115,200 bps, SPI: up to 400kbps	-40 to +85	Ext.	45mW acquisition <15mW tracking	E (passive & active)	-160dBm sensitivity, A-GPS & Extended Ephemeris support. Very small, low power, low cost L1 GPS chip.
ST-Ericsson www.st-ericsson.com	CG2900		GPS L1 C/A code, SBAS		CHLMNPTV2	WLCSF: 0.4mm pitch	na	<5m RMS outdoor	<50 rms	1Hz, other rates software selectable			<1s		UART, SPI	UART: up to 115,200 bps, SPI: up to 400kbps	-40 to +85			E (passive & active)	Built in 45 nm CMOS. The CG2900 is a single-chip GPS, Bluetooth and FM Rx/Tx device
	Teseo Chipset	16	L1, C/A Code, SBAS (WAAS, EGNOS)	13	ACDGLHMNPTV2	RF 5x5mm BB 10x10mm	na	2m/1.5m/na/na	50 (rms)	1Hz	39s	34s	<1s	10	UART, SPI, I2C, USB and CAN	4800-115500	-40 to + 85	ext / int	Variable (inquire)	E (passive & active)	Embedded Flash + EMI
STMicroelectronics www.st.com/gps	Teseo MCM (STA8058)	16	as above	13	ACDGLHMNPTV2	11x7x1.4mm	na	2m/1.5m/na/na	50 (rms)	1Hz	39s	34s	<1s	9	UART, SPI, I2C, USB and CAN	4800-115500	-40 to + 85	ext / int	Variable (inquire)	E (passive & active)	Embedded Flash
	RF Front-End (STA5620)	na	L1	na	ACDGLHMNPTV2	5x5x1.0mm	na	na	na	na	na	na	na	na	na	na	-40 to + 85	2.56 - 3.3V	40mW	NA	Fully integrated RF Front-end
	RF Front-End (STA5630)	na	L1	na	ACDGLHMNPTV2	5x5x1.0mm	na	na	na	na	na	na	na	na	na	na	-40 to + 85	1.62-1.98V	29mW	NA	Low power GPS-Galileo RF Front-end
	Cartesio PLUS (STA2064)	32	L1, C/A Code, SBAS (WAAS, EGNOS)	32	ACDGLHMNPTV	15x15x1.2mm	na	2m/1.5m/na/na	<50(rms)	1Hz	35s	34s	<1s	17	UART, SPI, I2C, USB, CAN, USB, SD/MMC, I2S/TDM, SPDIF, GPIOs	4800-115500	-40 to + 85	1.25V	Variable (inquire)	E (passive & active)	Infotainment application processor with embedded GPS
	Cartesio PLUS (STA2065)	32	as above	32	ACDGLHMNPTV	16x16x1.2mm	na	2m/1.5m/na/na	<50(rms)	1Hz	35s	34s	<1s	22	UART, SPI, I2C, USB, CAN, USB, SD/MMC, I2S/TDM, SPDIF, SmartCard, GPIOs	4800-115500	-40 to + 85	1.25V	Variable (inquire)	E (passive & active)	Infotainment application processor with embedded GPS
Surrey Satellite Technology Ltd. www.sssl.co.uk	SGR-10	24	GPS L1 C/A	>12	NS1	160 x 50 x 160mm	1 kg	<10 m/-/1 m (95%)	500	1	3.5 min	60 s	nr	2	RS-422, CAN bus	9,600-38,400	-20 to +50	External	<6	2 patch + LNAs	Heritage space receiver
	SGR-20	24	GPS L1 C/A	>12	NOS1	160 x 50 x 160mm	1 kg	<10 m/-/1 m (95%)	500	1	3.5 min	60 s	nr	2	RS-422, CAN bus	9,600-38,400	-20 to +50	External	<7	4 patch + LNAs	Spacecraft alt. determ.
	SGR-07	12	GPS L1 C/A	12	NS1	120 x 47 x 76mm	450g	<10 m/-/1 m (95%)	500	1	9 m / 2 m	60 s	nr	2	RS-422, CAN bus	9,600-38,400	-20 to +50	External	<2	1 patch + LNA	Packaged SGR-05P
	SGR-05P	12	GPS L1 C/A	12	NS2	70 x 10 x 70mm	60 g	<10 m/-/1 m (95%)	500	1	9 m / 2 m	60 s	nr	2	TTL, RS422, CAN	9,600-38,400	-20 to +50	External	1.5	1 Quadrifilar / patch + LNA	Rdod-size OEM w TMR
	SGR-05U	12	GPS L1 C/A	12	NS2	70 x 10 x 45mm	30 g	<10 m/-/1 m (95%)	500	1	9 min	60 s	nr	1	UART TTL	9,600-38,400	-20 to +50	External	1	1 Quadrifilar + LNA	University-grade space OEM
	SGR-GEO	12	GPS L1 C/A	12	NS1	120 x 50 x 120mm	2.5 kg	50 m/-/10 m (95%)	1000	1	TBC	TBC	nr	2	RS-422, CAN bus	9,600-38,400	-20 to +50	External	5	High gain patch + LNA	GEO, MEO, HEO space
Surveylab USA, Inc. www.ikegps.com	ike100 Laser GPS / 3.2Mpixel	16ch	GPS L1 C/A code,	16	DGH1	280x110x60mm	1kg	2.5m Auto/ 2m WAAS DGPS / 1m post process	NA	1 Hz PVT	35s	30	1s	3	USB host / client/ RS232	na</					

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post- processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacqui- sition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
Symmetricom www.symmetricom.com	bc637PCle	8 par.	L1 only, C/A-code	8	ADLMMetNPR12 (dd)	PCI Express Low Profile	nr / nr / 25 m	nr / nr / 25 m	170	1											
	bc637PCI-V2	8 par.	L1 only, C/A-code	8	ADLMMetNPR12 (dd)	Single-width (4.2 x 6.875 in)	module = 5.8 oz	nr / nr / 25 m	170	1	20 min	2 min	2 min	na	Register-based interface	na	0 to +70	ext	5V dc 900 mA	L1 (ER/WR)	PCibus Universal signaling time/frequency processor
	GPS-PCI 2U	8 par.	L1 only, C/A-code	8	ADLMMetN12 (dd)	Single-width (4.2 x 6.875 in)	module = 5.8 oz	nr / nr / 25 m	1000	1	20 min	2 min	2 min	na	Register-based interface	na	0 to +70	ext	5V dc 900 mA	L1 (ER/WR)	PCibus Universal signaling time/frequency processor
	bc637CPCI	8 par.	L1 only, C/A-code	8	ADLMMetNPR12 (dd)	Single-width 3U (3.94 x 6.3 in)	module = 5.7 oz	nr / nr / 25 m	1000	1	20 min	2 min	2 min	na	Register-based interface	na	0 to +70	ext	+12 V DC @ 100 mA	L1 (ER/WR)	Compact PCibus GPS time/frequency processor
	bc637PMC	8 par.	L1 only, C/A-code	8	ADLMMetNPR12 (dd)	Std (2.91 x 5.86 in) height 10 mm	module = 3.4 oz	nr / nr / 25 m	1000	1	20 min	2 min	2 min	na	Register-based interface	na	0 to +70	ext	+5 V DC @ 350 mA	L1 (ER/WR)	PCI mezzanine card GPS time/frequency processor
	TTM637VME	8 par.	L1 only, C/A-code	8	ADLMMetNPR12 (dd)	6U x 160 mm (B-size; VXI C-size)	18oz B, 47.5oz C	nr / nr / 25 m	1000	1	20 min	2 min	2 min	na	Register-based interface	na	0 to +70	ext	+12 V DC @ 250 mA	L1 (ER/WR)	VMEbus GPS time/frequency processor
	XLi	12 par	L1 only, C/A-code	12	ADLMMetN1	17x1.75x15.4 in	10 lb	Autonomous	<30	1	<20 min	<2 min	<2 min	2	RS-232/RS-422 Ethernet	Selectable	0 to +50	ext	10-70 watts	L1 (ER/WR)	Modular, plug-&-play
	XL-GPS	12 par	L1 only, C/A-code	12	ADLMMetN1	17x1.75x15.4 in	8 lb	Autonomous	<30	1	<20 min	<2 min	<2 min	2	RS-232/RS-422 Ethernet	Selectable	0 to +50	ext	10-30 watts	L1 (ER/WR)	GPS time and frequency
	XLI SAASM GB-GRAM	12 par	L1/L2	12	ADLMMetN1	17x1.75x15.4 in	10 lb	Autonomous	<30	1	<20 min	<2 min	<2 min	2	RS-232/RS-422 Ethernet	Selectable	0 to +50	ext	10-70 watts	L1/L2 (ER/WR)	Modular, plug-&-play
	SyncServer S250	12 par	L1 only, C/A-code	12	ADLMMetN1	17x1.75x11.25 in	9 lb	Autonomous	<100	1	<20 min	<2 min	<2 min	3	Ethernet	na	0 to +50	ext	25-45 watts	L1 (ER/WR)	Network Time Server
SyncServer S350	12 par	L1 only, C/A-code	12	ADLMMetN1	17x1.75x11.25 in	9 lb	Autonomous	<100	1												
SyncServer S350 SAASM	12 par	L1/L2	12	ADLMMetN1	17x1.75x11.25 in	9 lb	Autonomous	<100	1												
Teletype GPS www.teletype.com	Compact Flash v 3.0	12	24	12	A L M	4.14 x 8.45 x 0.3175cm (CF slot)	2.2 oz (64 g)	WAAS	340	3 sec	60 s	38 s	0.1 s	1	serial / CF	4800	0-70	3.3 V DC	160 mA max. typ. continu- ous mode	Ext. patch via McX connector	WAAS-enabled flash receiver w/ tilted antenna
	20-channel Sirf III Bluetooth	20	24	20	A L M	72 x 44 x 21mm	2.5 oz (70 g)	WAAS	90	1 sec	40 s	35 s	0.1 s	1	Bluetooth	4800	-10 to +60	5 V	45 mA	Internal	Sirf III Bluetooth GPS
	55-hour Bluetooth GPS	20	24	20	A L M	44 x 80 x 20mm	2.4 oz	None	100	3 sec	60 s	38 s	1 s	1	Bluetooth	4800	-20 to +60	5 V	45 mA	Internal	55 hour Sirf III Bluetooth GPS
	GNSS 1000	24 par.	L1 : C/A, P or Y code, L2 : P or Y code	All in view	ADN2	149.35 x 144.65 x, 19mm	430 g	< 5 m	< 50	10 Hz	150 s	60 s	< 15 s	4, 1, 1, 1, 2	RS 422, DPRAM, DS-102, HVQK, 1PPS In/Out	19 200	-46°C to, +101°C	External	15 W		Ext. Passive, or active
GNSS 1000G	20 par.	GPS L1 C/A code and, GLONASS L1	10 GPS + 10, GLONASS	ADN2	149.35 x 144.65 x, 19mm	430 g	< 30 m	< 50	5 Hz	GPS : 200 s, GLO : 290 s	GPS : 50 s, GLO : 60 s	< 15 s	3, 1	RS 422, DPRAM	115 200	-46°C to, +92°C	External	14 W		as above	
GNSS 1000S, SAASM-Based	24 par.	L1 : C/A, P or Y code, L2 : P or Y code	All in view	ADMN2	149.35 x 144.65 x, 19mm	430 g	< 5 m	< 50	10 Hz	< 60 s	20 s	< 5 s	4, 1, 1, 1, 2	RS 422, DPRAM, DS-101, DS-102, HVQK, 1PPS, In/Out	115 200	-46°C to, +101°C	External	11 W		as above	SAASM Based, GRAM-S (SEM E), module
GNSS 100-2, SAASM-Based	24 par.	as above	All in view	ADMN1	221.5 x 162 x, 67.3mm	1.6 kg	< 5 m	< 50	10 Hz	< 60 s	20 s	< 5 s	1 or 2, 2, 1, 1, 1, 1, 2	RS 422, DPRAM, DS-101, DS-102, HVQK, 1PPS In/Out	4800, 115, 200	-46°C to, +71°C	28 V dc	< 25 W		as above	SAASM Based
GNSS 100-3	12	L1 : C/A	All in view	ADMN1	211 x 160 x 49mm	1.4 kg	< 30 m	< 50	10 Hz	< 150 s	60 s	< 15 s	4, 1, 2	RS 422, HVQK, 1PPS, In/Out	19 200	-45°C to, +82°C	28 V dc	< 20 W		as above	
TOPSTAR 200NG	12	L1 : C/A	All in view	AN1	66 x 216 x 241mm	1.6 kg	< 15 m, 5m, (SBAS), 2.5, m (GBAS)	< 50	1 Hz or 5 Hz	< 210 s	75 s	< 10s	8, 1, 3, 3	ARINC 429, RS 232, Time, Mark Pulse, discrete	100 000, 19200	-40°C to, +70°C	28 V dc	< 18 W		as above	TSO C145, certified
Topcon www.topconpositioning.com	GR-3	72 Universal Tracking channels	GPS: L1, L2, & L5 carrier; C/A L1, P L1, P L2, L2C - GLONASS: L1, L2, & L5 carrier; C/A L1, P L1, P L2, C/A L2 - Galileo: E2-L1-E1, E5	36	G, L, 1	158 x 158 x 234.5mm	1.24 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<30 s	<5 s	1 s	3	RS-232, USB, Ext Pwr	460800	-40 to +60	ext./int.	3.2	INT/EXT	Int. 2W 915 MHz Tx/Rx SpSp or DSP digital radio option
	NET-G3	as above	See above	36	G, L, R, 1	167x92x275mm	2 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<30 s	<5 s	1 s	8	4 RS-232, 1 USB, 2 Power, 1 Ethernet	460800	40 to +65C	ext	< 4	EXT	Triple constellation GNSS reference network receiver
	Hiper Ga	40 par.	L1, C/A- and P-code; L2, P-code, GPS and GLONASS	20	G, L, 1	159 x 88 x 172mm	1.65 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<60 s	<10 s	1 s	4	RS-232, USB	460800	-40 to +60	ext./int.	3.2	INT/EXT	Int 1-W/0.25-W UHF Tx/Rx radio, 20 Hz, Bluetooth
	Hiper Gb	40 par.	L1, C/A- and P-code; L2, P-code, GPS only	12	G, L, 1	159 x 88 x 172mm	1.65 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<60 s	<10 s	1 s	4	RS-232, USB	460800	-40 to +60	ext./int.	3.2	INT/EXT	as above
	Hiper Pro	40 par.	L1, C/A- and P-code; L2, P-code, GPS and GLONASS	20	G, L, 1	159 x 88 x 172mm	1.65 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<60 s	<10 s	1 s	4	RS-232, USB	460800	-40 to +60	ext./int.	3.2	INT/EXT	as above
	Hiper Lite +	40 par.	as above	20	G, L, 1	159 x 88 x 172mm	1.65 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<60 s	<10 s	1 s	4	RS-232, USB	460800	-40 to +60	ext./int.	3.2	INT/EXT	Int 2-W 915 MHz SpSp Tx/Rx radio, 20 Hz, Bluetooth
	Euro-112	40 par.	as above	20	2	112 x 15 x 100mm	nr	2-3 m /30 cm /10 mm/3 mm	10	0.05	<60 s	<10 s	1 s	4	RS-232	460800	-40 to +75	ext.	2.5	na	OEM GPS Board chipset
	Euro-160	40 par.	as above	20	2	160 x 15 x 100mm	nr	2-3 m /30 cm /10 mm/3 mm	10	0.05	<60 s	<10 s	1 s	4	RS-232, USB, Ethernet	460800	-40 to +75	ext.	3.3	na	OEM GPS Board chipset
	GB-3000	72 Universal Tracking chnls	See GR-3	36	G, L, 1	150 x 257 x 63mm	1.0 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<30 s	<5 s	1 s	4	RS-232, USB, Ethernet	460800	-20 to +55	ext./int.	3.3	EXT	Modular Recv, 20 Hz, Bluetooth, PPS out, EM, IP66 waterproof
	GB-300	72 Universal Tracking chnls	See GR-3	36	G, L, 1	150 x 257 x 63mm	1.0 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<30 s	<5 s	1 s	4	RS-232, USB	460800	-20 to +55	ext./int.	2.5	EXT	as above
	GB-3	72 Universal Tracking chnls	See GR-3	36	G, L, 1	110 x 35 x 240mm	0.6 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<30 s	<5 s	1 s	4	RS-232, USB, Ethernet	460800	-40 to +60	ext.	3.3	EXT	Modular Recv, 20 Hz, Bluetooth, PPS out, EM
	GMS-110	40 par.	L1, C/A- and P-code; L2, P-code, GPS and GLONASS	20	G, L, 1	159 x 88 x 172mm	1.65 kg	2-3 m /30 cm /10 mm/5 mm	10	0.05	<60 s	<10 s	1 s	4	RS-232, USB	460800	-40 to +60	ext./int.	3.2	EXT	Integrated SBAS VBS, CORS Beacon support, 20 Hz, Bluetooth
	GMS-200	40 par.	as above	20	G, L, 1	159 x 88 x 172mm	1.65 kg	2-3 m /30 cm /10 mm/5 mm	10	0.05	<60 s	<10 s	1 s	4	RS-232, USB	460800	-40 to +60	ext./int.	3.2	EXT	Integrated SBAS HP & VBS, CORS Beacon support, 20 Hz
	GMS-2	50 par.	L1 code & carrier, C/A, GPS, and GLONASS	25	G, H, 1	199 x 90 x 63mm	0.67 kg	2-3 m /30 cm /10 mm/5 mm	10	0.05	<60 s	<10 s	1 s	4	USB	460800	-20 to +50	int	<2.0	INT/EXT	Integrated digital camera, electronic compass
TPS Core	50 par.	as above	25	2	108 x 15 x 57mm	nr	2-3 m /30 cm/na	10	0.05	<60 s	<10 s	1 s	4	RS-232	460800	-40 to +75	ext.	1.4	na	OEM GPS Board Chipset	
GRS-1	72	GPS: L1, L2 carrier; C/A L1, P L1, P L2, L2C - GLONASS: L1, L2, carrier, C/A L1, P L1, P L2, C/A L2	36	G, H, N, L, R, 7E	199 x 90 x 63mm	0.67	2-3 m /30 cm /10 mm/3 mm	10	0.05	<30 s	<5 s	1 s	2	Mini USB, Mini Serial	460800	-40 to +60	ext./int.	3.0	INT/EXT	Internal GSM or CDMA modem; external 2W 915 MHz Tx/Rx SpSp or DSP digital radio option	
Net G3A	144	GPS: L1, L2, & L5 carrier; C/A L1, P L1, P L2, L2C - GLONASS: L1, L2, & L5 carrier; C/A L1, P L1, P L2, C/A L2 - Galileo: E2-L1-E1, E5	72	G, L, 1	158 x 158 x 234.5mm	1.24 kg	2-3 m /30 cm /10 mm/3 mm	10	0.05	<30 s	<5 s	1 s	8	4 RS-232, 1 USB, 2 Power, 1 Ethernet	460800	40 to +65C	ext.	< 4	EXT	Triple constellation GNSS reference network receiver; internal back up power (UPS); upto 5 IP addresses available; client and server functionality; HTML web interface standard	
TRAK Microwave www.trak.com	8821 Time and Frequency GPS Clock	12	L1, C/A-code	12	LT1	1.75 x 19 x 9in	<5 lb	nr	<100	1	<210 s	<65 s	< 3 s	1	RS-232	9600	-10 to +60	AC or DC line	25	Active (ER)	
	8835 Time and Frequency GPS Clock	12	L1, C/A-code	12	LT1	4 x 1.6 x 5in	<1 lb	nr	<100	1	<210 s	<65 s	< 3 s	1	RS-232 Ethernet	9600	-20 to +70	AC or DC line	10	Active (ER)	
	9000 Time and Frequency GPS Clock	12	L1, C/A-code	12	LT1	1.75 x 19 x 18in	<10 lb	nr	<100	1	<210 s	<65 s	< 3 s	2, 1	RS-232 Ethernet	9600	-10 to +60	AC or DC line	55	Active (ER)	
	9100 Redundant T&F GPS Clock	12	L1, C/A-code	12	LT1	1.75 x 19 x 18in	<20 lb	nr	<100	1	<210 s	<65 s	< 3 s	2, 1	RS-232 Ethernet	9600	-30 to +60	AC or DC line	120	Active (ER)	
	9000S SAASM Time and Freq GPS Clock	12	L1, L2 C/A-code: P(Y) code	12	LT1	1.75 x 19 x 18in	<20 lb	nr	<100	1	<210 s	<65 s	< 3 s	2, 1	RS-232 Ethernet	9600	-40 to +60	AC line	55	Active (ER)	
	Trimble www.trimble.com	Acutime Gold GPS Smart Antenna	12	L1 only, C/A-code	8	LMPST1	3.74 D, 2.85in H	5.4 oz	40 m CEP; velocity 0.25 m / s CEP	50	1	<60 s	<2 s	<2 s/	2	RS-422 / 485 or RS-232	9600	-40 to +85	ext	<1.5	Patch
Acutime Gold GPS Starter Kit		12	L1 only, C/A code	8	LMPST1	5 x 6.12in	12.8 oz	na	50	1	<60 s	<2 s	<2 s/	2	RS-422	9600	-40 to +85	ext	<1.5	Patch	
Bullet III GPS Antenna		na	L1	na	TI	3.05 x 2.61	6.0 oz	na	na	na	na	na	na	na	na	na	na	<20 mA - 3V	30 mA - 5V	na	
Lassen DR GPS module		12	L1 only, C/A code	12	LNV2	32 x 66 x 8.5mm	na	2 m	50	up to 10 Hz	50 s	38 s	<2s	1	3.3 V TTL-Gyro- speed input	9600	-40 to +85	ext	190 mW	SMB or Fakra	
Lassen IQ		12	L1 only, C/A-code	12	GLMNRSTV2	26 x 26 x 6mm	0.2 oz	10/2m	50	1	<60	<38	<2	2	TTL	9600	-40 to +85	ext	0.009	Micropatch (ER)	
Copernicus II GPS		12	L1, C/A code	12	AGHLMNETNPV	2.54 H x 19 W x 19 L	0.7 oz	3 m	50	1	38 s	35 s	2 sec	2	TTL	38400	-40 to +85	ext/int	44 mA @3.0 V	Micropatch (ER)	
Lassen-SQ		8	L1 only, C/A code	8	GLMNRSTV2	1.02x1.02x0.24in	0.2 oz	<6 m (50%)	95	1	<170s	<45 s (90%)	<2 s	1							

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) /, real-time kinematic / post-processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacquisition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
continued Trimble www.trimble.com	Thunderbolt E Disciplined Clock	12	L1 only C/A code	12	T2	5 L x 4 w x 2 h	0.628 lbs	na	<15 ns	1 Hz	na	na	na	1	RS232	9600	0 - +60	ext	na	External active 5v	
	BD970 GNSS Module	220	L1/L2/L5, GLONASS L1/L2, SBAS, GIOVE-A & GIOVE-B	44	DGLMNPRTV2	100 x 60 x 11.6mm	2.2 oz	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	50	<60 s	<30 s	<15 s	3,1,1,1	RS-232, Ethernet, USB, CAN	115,200 RS-232, 10/100Mbps Ethr as above	-40 to +75	ext	1.5W	nr	
	BD960 GNSS Module	72	L1/L2/L5, GLONASS L1/L2, L2, L2C, full CP, full op P WAAS, EGNOS	24	GLMNPRTV2	100x106.7x12.7mm	5.3 oz	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	20	<60 s	<30 s	<15 s	3,1	RS-232, Ethernet	as above	-40 to +74	ext	2.1 W	nr	
	BD950 L1/L2 GPS Module	24	L1, C/A code, L2, L2C, full CP, full op P WAAS, EGNOS	12	GLMNPRTV2	100 x 80 x 17 mm	2.3 oz	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	20	<60 s	<30 s	<15 s	4	RS-232	115200	-40 to +75	ext	1.5 W	L1/L2 GPS	
	BD950 L1 GPS Module	24	L1, C/A code, WAAS and EGNOS	12	GLMNPRTV2	100 x 80 x 17 mm	2.3 oz	<1 m DGPS, 5 mm + 1 ppm pp	100	20	<60 s	<30 s	<15 s	4	RS-232	115200	-40 to +75	ext	1.0 W	L1 GPS	
	BX960 GNSS Receiver	72	L1/L2/L5, GLONASS L1/L2, L2, L2C, full CP, full op P WAAS, EGNOS	24	DGLMNPRTV2	261 x 140 x 55 mm	1.6 kg	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	20	<60 s	<30 s	<15 s	2,1	RS-232, Ethernet	115,200 RS-232, 10/100Mbps Ethr	-40 to +74	ext	3.7 W	nr	
	BX960-2 GNSS Receiver	72 x 2	as above	24	DGLMNPRTV2	261 x 140 x 55 mm	1.9 kg	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	20	<60 s	<30 s	<15 s	3,1	RS-232, Ethernet	as above	-40 to +74	ext	8.8 W	nr	
	Trimble NetRS	36 + 3 SBAS	L1, C/A code, L2, L2C, full CP, full op P WAAS, EGNOS	12	GLMO1	22.8 x 6.5 x 14 cm	1.6 kg (3.5 lbs.)	1-5 m / NA / NA / 5 mm + 1 ppm	100	5	<2 min.	<60 sec.	<15s	4,1	RS-232, Ethernet	as above	-40 to +60	ext.	<3 NetRS/3.5 choke/4 Zephyr Geo	Zephyr Geodetic w/Stealth GP, Choke Ring	
	Trimble NetR5	72 + 4 SBAS	L1, C/A code, L2C, L1/L2/L5 Full Cycle Carrier, GLONASS L1 C/A, L1P Code, L2 P Code, L1/L2 Full Cycle Carrier, WAAS, EGNOS	24	GLMNetNVPRT1	24 x 12 x 5 cm	1.55 kg	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	20	<60 s	<30 s	<15 s	3,1,1	RS232, 1 Ethernet, USB + Bluetooth	as above	-40 to +60	ext / int	3.8W NetR5/4.4W Zephyr Geodetic 2/ 3.925W Choke Ring	Zephyr Geodetic 2, w/Stealth GP, GNSS Choke Ring	
	Trimble NetR3	72 + 4 SBAS	as above	24	GLMNetNVPRT1	24 x 12 x 5 cm	1.55 kg	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	1	<60 s	<30 s	<15 s	3,1	RS232, 1 Ethernet	as above	-40 to +60	ext / int	3.8W NetR3/4.4W Zephyr Geodetic 2/ 3.925W Choke Ring	as above	
	Trimble NetR8	72 + 4 SBAS	as above	24	GLMNetNVPRT1	24 x 12 x 5 cm	1.55 kg	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	50	<60 s	<30 s	<15 s	2,1,1	RS232, 1 Ethernet, USB + Bluetooth	as above	-40 to +60	ext / int	3.8W NetR8/4.4W Zephyr Geodetic 2/ 3.925W Choke Ring	as above	
	Trimble R3 GPS	12	L1 C/A Code, L1 Full Cycle Carrier, WAAS/EGNOS	12	GHLPT1	9.5 x 4.4 x 24.2 cm	0.62 kgs	1-5 m/NA/NA/5mm+0.5ppm	100	1 Hz	<30 s	<15 s	6	RS-232 / USB / 2 Compact Flash / GPS antenna / Power	115,200 (RS 232), USB 1Mbps	-30 to +60	ext / int	0.6 W receiver and antenna	Complete L1 GPS post-processing solution ,		
	Trimble R4 GPS	72	GPS: L1C/A, L2E (Trimble method for tracking L2P), - GLONASS: L1 C/A, L1P, L2C/A (GLONASS M only), L2P, - SBAS: L1C/A	24	GLMNVPR1	19.0 (Ø) x 11.5 cm	1.35 kg	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	1 Hz RTK	<30 s	<15 s	3,1,1	2 x RS232, Bluetooth, Radio coms	38,400 (Port 1 115,200 (Port 2)	-40 to +65	ext / int	< 3.1W in RTK mode	Internal Zephyr 2	Trimble R-Track technology for GLONASS support, Advance Maxwell survey GNSS chip	
	Trimble R5 GPS	72	GPS L1 C/A Code, L2C, L1/L2 Full Cycle Carrier, - GLONASS L1 C/A Code, L1 P Code, L2 P Code, L1/L2 Full Cycle Carrier, WAAS/EGNOS Channels	24	GLMNetNVPRT1	13.5 x 8.5 x 24 cm	1.5 kg	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	1 Hz RTK	<30 s	<15 s	3,1,1,1	RS232, radio antenna, GNSS antenna, Compact Flash, Bluetooth	115,200 (Port 1-3); USB 1 Mbps	-40 to +65	ext / int	4w Fast Static, 5.9 w/radio, BT RTK	Zephyr 2, Z Geodetic 2 w/Stealth GP, GNSS Choke Ring	as above	
	Trimble R6 GPS	72	GPS: L1C/A, L2C, L2E (Trimble method for tracking L2P), - GLONASS: L1C/A, L1P, L2C/A (GLONASS M only), L2P, - SBAS: L1C/A	24	GLMNVPR1	19.0 (Ø) x 11.5 cm	1.35 kg	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	1 Hz RTK	<30 s	<15 s	3,1,1	2 x RS232, Bluetooth, Radio coms	38,400 (Port 1 115,200 (Port 2)	-40 to +65	ext / int	< 3.1W in RTK mode	Internal Zephyr 2	as above	
	Trimble R7 GNSS	72	GPS L1 C/A Code, L2C, L1/L2/L5 Full Cycle Carrier, - GLONASS L1 C/A Code, L1 P Code, L2 P Code, L1/L2 Full Cycle Carrier, WAAS, EGNOS	24	GLMNetNVPRT1	13.5 x 8.5 x 24 cm	1.5 kg	1-5m/0.25m+1ppm/10mm+1ppm	100	1 Hz RTK	<30 s	<15 s	3,2,1,1,1,1	RS232, radio antenna, GNSS antenna, Compact Flash, Bluetooth	115,200 (Port 1-3); USB 1 Mbps	-40 to +65	ext / int	4w Fast Static, 5.9 w/radio, BT RTK	Zephyr 2, Z Geodetic 2 w/Stealth GP, GNSS Choke Ring	as above	
	Trimble R8 GNSS	220	GPS: L1C/A, L2C, L2E (Trimble method for tracking L2P), L5, - GLONASS: L1C/A, L1P, L2C/A (GLONASS M only), L2P, - SBAS: L1C/A, L5, - Galileo GIOVE-A and GIOVE-B	44	GLMNVPR1	19.0 (Ø) x 11.2 cm	1.35 kg	1-5m/0.25m+0.5ppm/10mm+1ppm	100	1 Hz RTK	<30 s	<15 s	3,1,1	2 x RS232, Bluetooth, Radio coms	38,400 (Port 1 115,200 (Port 2)	-40 to +65	ext / int	< 3.1W in RTK mode	Internal Zephyr 2	Trimble R-Track technology for GLONASS support, Galileo Support, Advance Maxwell survey GNSS chip	
	GeoXM	14 par.	L1 C/A code, SBAS	14	GHLN1	3.9 x 8.5 x 3.0 in	1.76 lb	na / 1 - 3 m / 1 - 3 m Post-proc	na	1	60 s typ.	30 s typ.	<5 s typ.	1,3,1,2	RS-232 / Integrated virtual com ports / USB (via support module) / Bluetooth	110 - 115,000	-10 to +50	int/opt ext	2.7 - 3.7	Int Patch / Opt Ext Tempest antenna	
	GeoXT	14 par.	L1 C/A code and carrier, SBAS	14	GHLN1	3.9 x 8.5 x 3.0 in	1.76 lb	na / <1 m / 50cm Post-proc (1cm with carrier)	na	1	60 s typ.	30 s typ.	<5 s typ.	1,3,1,2	as above	110 - 115,000	-10 to +50	int/opt ext	2.7 - 3.7	Int Patch / Opt Ext Tempest antenna	
	GeoXH	26 par.	L1 C/A code and carrier, L2 carrier, SBAS	14	GHLN1	3.9 x 8.5 x 3.0 in	1.79 lb	na / <1 m / 10 - 30cm / 10 - 30cm Post-proc (1cm with carrier)	na	1	60 s typ.	30 s typ.	<5 s typ.	1,3,1,2	as above	110 - 115,000	-10 to +50	int/opt ext	2.7 - 3.7	Int Patch / Opt Ext Tornado antenna	
	Nomad G Series	12 par.	L1 C/A code	12	GHLN1	3.9 x 6.9 x 2.0 in	1.23 lb	na / na / 2 - 5 m Post-proc	na	1	nr	nr	<5 s typ.	2,1,1	Bluetooth / USB / RS-232 (via separate accessory)	110 - 115,000	-30 to +60	int/opt ext	1.3 w/typical use	Int Patch	
	GPS Pathfinder ProXT	12 par.	L1 C/A code and carrier, SBAS	12	GLN1	4.2 x 5.75 x 1.6 in	1.16 lb	na / <1 m / 50 cm Post-proc (1cm with carrier)	na	1	60 s typ.	30 s typ.	<5 s typ.	2, 2	Bluetooth / RS-232	110 - 115,000	-20 to +60	int/opt ext	<1	Int Patch / Opt Ext Tempest antenna	
	GPS Pathfinder ProXH	12 par.	L1 C/A code and carrier, L2 carrier, SBAS	12	GLN1	4.2 x 5.75 x 1.6 in	1.16 lb	na / <1 m / 10-30cm Post-proc (1cm with carrier)	na	1	60 s typ.	30 s typ.	<5 s typ.	2, 2	Bluetooth / RS-232	110 - 115,000	-20 to +60	int/opt ext	<1	Int Patch / Opt Ext Tornado antenna	
	GPS Pathfinder XC	12 par.	L1 C/A code	12	GLN1	1.7 x 3.7 x 0.4 in	1.2 oz	na / na / 2 - 5 m Post-proc	na	1	60 s typ.	40 s typ.	<5 s typ.	1	CompactFlash Type I	1,200 - 57,600	-10 to +50	datalogger	<0.3	Int Patch	
	Juno SB	12 par.	L1 C/A code, SBAS	12	GHLN1	5.1 x 2.9 x 1.2 in	0.52 lb	na / 2 - 5 m / 1 - 3 m Post-proc	na	1	60 s typ.	40 s typ.	<5 s typ.	1,1	Bluetooth/ USB	110 - 115,000	+0 to +60	int/opt ext	0.2 - 0.3	Int Patch / Opt Ext Patch	
	Juno SC	12 par.	L1 C/A code, SBAS	12	GHLN1	5.1 x 2.9 x 1.2 in	0.54 lb	na / 2 - 5 m / 1 - 3 m Post-proc	na	1	60 s typ.	40 s typ.	<5 s typ.	1,1	Bluetooth/ USB	110 - 115,000	+0 to +60	int/opt ext	0.2 - 0.3 (without modem active)	Int Patch / Opt Ext Patch	
	Trimble Yuma tablet	12 par.	L1 C/A code, WAAS	12	GLN1	5.5 x 9 x 2 in	3.1 lb	na / 2 - 5 m / 1 - 3 m Post-proc	na	1	60 s typ.	40 s typ.	<5 s typ.	1,2,1,1,1	Bluetooth / USB / RS232 / ExpressCard / SDIO	110 - 115,000	-30 to +60	int/opt ext		Int Patch	
	GPS Pathfinder ProXRT	72 par.	L1/L2, GPS/ GLONASS L1/L2, Omnistar, SBAS	24	GLN1	9.4 x 4.7 x 1.9 in	3.42 lb	na / 30cm / 10cm / 10cm	na	1	60 s typ.	30 s typ.	<5 s typ.	2,2	Bluetooth / RS232	110 - 115,000	-20 to +60	int/opt ext	4.4W	Ext Tornado antenna	
	Force 22E MRU Module	24	L1, C/A, P, L2, P & Y-code (encrypted P-code)	24	ADLMNPT1	3.14 x 3.82 x 0.5 in	3.9oz	<5m	40	1	<60 s	<2 s	<2 s	3	RS-232, RS-422	variable	-40 to +85	ext	<4W	+5VDC Active L1/L2 FRPA	
	Force 524D GRAM/GASR Module	24	as above	24	ADLMNPT1	5.88 x 5.715 x 0.6 in	0.94 lb	<5m	40	1 or 10	<60 s	<2 s	<2 s	4	RS-232, RS-422, DP-RAM	variable	-54 to +85	ext	<7.5W	Various FRPA/CRPA/DAE	
	TA-24 Certified Sensor	24	as above	24	ADNPT2	5.00 x 9.50x2.10 in	3.73lb	<5m	40	1	<60 s	<2 s	<2 s	4	ARINC-429, RS-422, RS-232	variable	-20 to +55	ext	<7.5W	+5VDC Active L1/L2 FRPA	
	Placer Gold APU and DRU Plus	12	L1 only, C/A-code	12	LV1	3.1 x 1.8 x 6 in	11 oz	2.5 m (1 s)	±500	1	140 s	45 s	1 s	2	RS-232C	110-115,200	-40 to +80	ext	.66 W	Patch (E)	
	PSC 200	6 par.	L1 only, C/A-code	6	ALMV1	8.9 x 1.7 x 5.4 in	2.5 lb	2 m / 2 m / nr	na	1	2-5 min	<30 s	2 s	1, 1	RS-232, discrete I/O	300-38,400	-20 to +70	nr	2.7	Patch (E)	
	SPS351 Beacon/DGPS	36 par + 2 SBAS + 2 MSK	L1 only, C/A-code, MSK	12 GPS, 2 SBAS	MNPRTV1	9.4 in x 4.7 in x 1.9 in	2.9 lb	5 m / <1 m / na	100	1, 2, 5, 10 Hz	<60 s	<30 s	<12 s	3,1,3	RS-232, Ethernet, Bluetooth	2,400-115,200	-40 to +65	ext	4.5	GA530 GPS/MSK H-field	Beacon, SBAS, DGPS, DGPS base mode
	SPS851	72 par	L1/L2/L5, GLONASS L1/L2, Omnistar, SBAS	24	LMNPRTV1	240 x 120 x 5 mm	3.6 lb	1-5m/0.25m+0.5ppm/10mm+1ppm/5	100	20 Hz	<60 s	<30 s	<15 s	3,1,3	RS-232, Ethernet, Bluetooth	Max 115,200 RS232/10/100Mbps Ethr	-40 to +65	Internal Li-Ion and ext	6 W	Zephyr Model 2	RTK Rover and Base station. Optional internal radio
	SPS461 Heading Receiver	72 + 4 SBAS + 2 MSK	GPS L1, C/A code, L1/L2 full cycle Carrier, L1/L2 Full Cycle Carrier, Omnistar, WAAS, EGNOS	24 GPS, 2 SBAS	MNPRTV1	24 cm (9.4 in) x 12 cm (4.7 in) x 5 cm (1.9 in) including connectors	1.22 kg (2.70 lb) receiver only, 1.37 kg (3.00 lb) receiver with internal radio	1-5m/0.25m+0.5ppm/10mm+1ppm/na	100	12.5,10,20 Hz	<60 s	<30 s	<12 s	3,1,3	RS-232, Ethernet, Bluetooth	2,400-115,200	-40 to +65	ext	6.0 W in rover mode with internal receive radio	GA530 GPS/MSK H-field	Precise GPS Heading with Beacon, SBAS, DGPS rover, Location RTK and Precision RTK rover modes.
	SPS882	72 + 4 SBAS	GPS L1, C/A code, L1/L2 full cycle Carrier, GLONASS L1 C/A, L1P Code, L2 P Code, L1/L2 Full Cycle Carrier, WAAS, EGNOS	24, 2 SBAS	GLVPRT1	19.0 (Ø) x 11.2 cm	1.35 kg	1-5m/0.25m+0.5ppm/10mm+1ppm	100	12.5,10,20 Hz	<60 s	<30 s	<15 s	3,1	2 x RS232, 1int Bluetooth, Radio coms (1 ext/1 int)	38,400 (Port 1 115,200 (Port 2)	-40 to +65	ext / int	< 3.1W in RTK mode	Internal Zephyr 2	Trimble R-Track technology for GLONASS support, Advance Maxwell GNSS chip

Manufacturer	Model	Channels/ Tracking Mode	Signal Tracked	Maximum No. Satellites Tracked	User Environment and Application <sup>1</sup>	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post- processed <sup>2</sup>	Time (ns)	Position Fix Update Rate (sec)	Cold Start <sup>3</sup>	Warm Start <sup>4</sup>	Reacqui- sition <sup>5</sup>	No. of Ports	Port Type	Baud Rate	Operating Temperature (°C)	Power Source	Power Consumption (Watts)	Antenna Type <sup>6</sup>	Description or Comments
u-blox www.u-blox.com	UBX-G6010 u-blox 6 GPS IC	50 par	L1, C/A code, L1 Galileo, WAAS / EGNOS / MSAS / GAGAN	16 (GPS, GALILEO or SBAS)	CDHLMMetNPV2	8 x 8 mm	na	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	5	29 s (1 s aided)	29 s	<1 s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 115,200 bps; USB: Higher	-40 to +85	1.4 / 1.8 V	<30 mW, PSM, 1 Hz	E (passive & active)	Galileo ready, Capture & Process mode
	UBX-G6000 + UBX-G0010 u-blox 6 GPS Chipset	50 par	L1, C/A code, L1 Galileo, WAAS / EGNOS / MSAS	as above	CDHLMMetNPV2	BB: 9x9mm, RF: 4x4 mm	na	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	5	29 s (1 s aided)	29 s	<1 s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	as above	-40 to +85	1.4 / 1.8 V	<30 mW, PSM, 1 Hz	E (passive & active)	as above
	NEO-6M GPS Module	50 par	as above	as above	CDHLMMetNPV2	12.2 x 16.0 x 2.4 mm	1.6 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	5	34 s (2 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	<50 mW, PSM, 1 Hz	E (passive & active)	as above
	NEO-6Q GPS Module	50 par	as above	as above	CDHLMMetNPV2	12.2 x 16.0 x 2.4 mm	1.6 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	5	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x SPI, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	<50 mW, PSM, 1 Hz	E (passive & active)	as above
	LEA-6A GPS Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	5	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	<80 mW, PSM, 1 Hz	E (passive & active)	as above
	LEA-6H GPS Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	5	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	<80 mW, PSM, 1 Hz	E (passive & active)	as above
	LEA-6S GPS Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	5	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	<80 mW, PSM, 1 Hz	E (passive & active)	as above
	LEA-6T GPS Timing Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	5	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	<80 mW, PSM, 1 Hz	E (passive & active)	Timing receiver
	LEA-6R Dead Reckoning GPS Mod.	16 par.	L1, C/A code, DGPS, WAAS / EGNOS	16 (GPS or SBAS)	DLNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	1	34 s	33 s	<1 s	3	1 x UART, 1 x USB, 1 x SPI	as above	-40 to +85	ext. / int.	<30 mW, PSM, 1 Hz	E (passive & active)	ANTARIS 4 chipset; dead reckoning
	UBX-G5010 u-blox 5 GPS IC	50 par	L1, C/A code, L1 Galileo, WAAS / EGNOS / MSAS / GAGAN	16 (GPS, GALILEO or SBAS)	CDHLMMetNPV2	8 x 8mm	na	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	5	2 x UART, 1 x USB, 1 x SPI, 1 x I2C	as above	-40 to +85	1.4 / 1.8 V	<50 mW	E (passive & active)	Galileo ready
	UBX-G5000 + UBX-G0010 u-blox 5 GPS Chipset	50 par	L1, C/A code, L1 Galileo, WAAS / EGNOS / MSAS	as above	CDHLMMetNPV2	BB: 9x9mm, RF: 4x4 mm	na	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	as above	-40 to +85	1.4 / 1.8 V	<50 mW	E (passive & active)	Galileo ready
	AMY-5M GPS Module	50 par	as above	as above	CDHLMMetNPV2	6.5 x 8 x 1.2mm	0.8 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x SPI, 1x I2C	as above	-40 to +85	1.4 / 1.8 V	76 mW	E (passive & active)	Galileo ready
	NEO-5D GPS Module	50 par	as above	as above	CDHLMMetNPV2	12.2 x 16.0 x 2.4mm	1.6 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (2 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	1.8 V	76 mW	E (passive & active)	Galileo ready
	NEO-5G GPS Module	50 par	as above	as above	CDHLMMetNPV2	12.2 x 16.0 x 2.4mm	1.6 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x SPI, 1x I2C	as above	-40 to +85	1.8 V	76 mW	E (passive & active)	Galileo ready
	NEO-5M GPS Module	50 par	as above	as above	CDHLMMetNPV2	12.2 x 16.0 x 2.4mm	1.6 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (2 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	76 mW	E (passive & active)	Galileo ready
	NEO-5Q GPS Module	50 par	as above	as above	CDHLMMetNPV2	12.2 x 16.0 x 2.4mm	1.6 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x SPI, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	76 mW	E (passive & active)	Galileo ready
	LEA-5A GPS Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	126 mW	E (passive & active)	Galileo ready
	LEA-5H GPS Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	126 mW	E (passive & active)	Galileo ready
	LEA-5M GPS Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 2.4mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (2 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	126 mW	E (passive & active)	Galileo ready
	LEA-5Q GPS Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 2.4mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x SPI, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	126 mW	E (passive & active)	Galileo ready
	LEA-5S GPS Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	126 mW	E (passive & active)	Galileo ready
	LEA-5T GPS Timing Module	50 par	as above	as above	CDHLMMetNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	1 x USB, 1 x UART, 1x I2C	as above	-40 to +85	2.7 - 3.6 V	126 mW	E (passive & active)	Timing receiver
	TIM-5H GPS Module	50 par	L1, C/A code, DGPS, WAAS / EGNOS	as above	CDHLMMetNPV2	25.4 x 25.4 x 3mm	3.0 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	3	2 x UART	as above	-40 to +85	2.7 - 3.6 V	126 mW	E (passive & active)	Galileo ready
	PCI-5S GPS PCI express mini card	50 par	L1, C/A code, L1 Galileo, WAAS / EGNOS / MSAS	as above	CDHLMMetNPV2	50.95 x 20 x 3mm	≤ 4 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	1	1 x PCI (USB 2.0)	12 Mbit/s	-40 to +85	2.7 - 3.6 V	123 mW	E (passive & active)	Galileo ready
	PCM-5S GPS PCI express half mini card	50 par	L1, C/A code, L1 Galileo, WAAS / EGNOS / MSAS	as above	CDHLMMetNPV2	26.8 x 30 x 3mm	≤ 4 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	29 s (1 s aided)	29 s	<1 s	1	1 x PCI (USB 2.0)	12 Mbit/s	-40 to +85	2.7 - 3.6 V	123 mW	E (passive & active)	Galileo ready
	LEA-4A GPS Module	16 par.	L1, C/A code, DGPS, WAAS / EGNOS	16 (GPS or SBAS)	CDHLMPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (4 s aided)	33 s	<1 s	3	1 x USB, 2 x UART	4,800 - 115,200 bps; USB: Higher	-40 to +85	ext. / int.	35 mA (3.0 V), 34 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset; USB, ROM-based
	TIM-4A GPS Module	16 par.	as above	as above	CDHLMPV2	25.4 x 25.4 x 3mm	3.0 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	as above	33 s	<1 s	2	2 x UART	as above	-40 to +85	ext. / int.	as above	E (passive & active)	ANTARIS 4 chipset; ROM-based
	LEA-4H GPS Module	16 par.	as above	as above	CDHLMPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	as above	33 s	<1 s	2	1 x USB, 1 x UART	as above	-40 to +85	ext. / int.	39 mA (3.0 V), 38 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset
	TIM-4H GPS Module	16 par.	as above	as above	CDHLMPV2	25.4 x 25.4 x 3mm	3.0 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	as above	33 s	<1 s	2	2 x UART	as above	-40 to +85	ext. / int.	39 mA (3.0 V), 38 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset; SuperSense indoor GPS
	LEA-4P GPS Module	16 par.	as above	as above	CDHLMPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (4 s aided)	33 s	<1 s	3	1 x USB, 1 x UART, 1 x SPI	as above	-40 to +85	ext. / int.	36 mA (3.0 V), 35 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset; USB; min. 4-Mbit Flash EPROM
TIM-4P GPS Module	16 par.	as above	as above	CDHLMPV2	25.4 x 25.4 x 3mm	3.0 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (4 s aided)	33 s	<1 s	2	2 x UART	as above	-40 to +85	ext. / int.	36 mA (3.0 V), 35 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset; min. 4-Mbit Flash EPROM	
LEA-4S GPS Module	16 par.	as above	as above	CDHLMPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (4 s aided)	33 s	<1 s	3	1 x USB, 2 x UART	as above	-40 to +85	ext. / int.	37 mA (3.0 V), 36 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset; USB; SuperSense; ROM-based	
TIM-4S GPS Module	16 par.	as above	as above	CDHLMPV2	25.4 x 25.4 x 3mm	3.0 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (4 s aided)	33 s	<1 s	2	2 x UART	as above	-40 to +85	ext. / int.	37 mA (3.0 V), 36 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset; USB; SuperSense; ROM-based	
LEA-4T GPS Timing Module	16 par.	as above	as above	GLNPT2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (4 s aided)	33 s	<1 s	2	1 x USB, 1 x UART	as above	-40 to +85	ext. / int.	39 mA (3.0 V), 38 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset; USB; SuperSense	
NEO-4S GPS Module	16 par.	as above	as above	CDHLMPV2	12.2 x 16 x 2.8mm	1.6 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (4 s aided)	33 s	<1 s	3	1 x USB, 1 x UART, 1 x SPI	as above	-40 to +85	ext. / int.	37 mA (3.0 V), 36 mA (2.7 V)	E (passive & active)	ANTARIS 4 chipset; USB; SuperSense; ROM-based	
LEA-4R Dead Reckoning GPS Mod.	16 par.	as above	as above	DLNPV2	17 x 22.4 x 3mm	2.1 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	1	34 s	33 s	<1 s	3	1 x UART, 1 x USB, 1 x SPI	as above	-40 to +85	ext. / int.	48 mW (3 V), 47 mW (2.7 V)	E (passive & active)	ANTARIS 4 chipset; dead reckoning	
TIM-4R Dead Reckoning GPS Mod.	16 par.	as above	as above	DLNPV2	25.4 x 25.4 x 3mm	3 g	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	1	34 s	33 s	<1 s	3	2 x UART, 1 x SPI	4,800 - 115,200 bps	-40 to +85	ext. / int.	48 mW (3 V), 47 mW (2.7 V)	E (passive & active)	ANTARIS 4 chipset; dead reckoning	
ANTARIS 4 Chipset	16 par.	as above	as above	CDHLMPV2	RF 4 x 4 mm, BB 8 x 8 and 9 x 9 mm, LNA 1.6 x 2mm	na	<2.5 m / <2 m / na / na (CEP)	50 (RMS)	4	34 s (4 s aided)	33 s	<1 s	4	1 x USB, 2 x UART, 1 x SPI	4,800 - 115,200 bps	-40 to +85	ext. / int.	62 mW	E (passive & active)	Baseband available as 56-pin QFN and 100-pin BGA	
VGI Solutions / OnPOZ Precision Positioning www.onpoz.com	SubX	16 par.	GPS L1 C/A code and carrier-phase, SBAS	16	GIS Mapping	12 x 6.5 x 4cm	0.67 lb	2.5 m / 2 m / na / 0.01 cm (CEP)	1Hz		<<34 s	<33 s	<1 s	3	1 USB, 1 BT, 1 RS-232	57600	-20 to +50	internal battery	Internal battery last 18 to 24 hours/charge	Active, 27 db	
Vincotech GmbH www.vincotech.com/gps	A2100-A SMD Receiver Module	48 par.	L1, C/A code, SBAS	48	CLHMetNPV2	0.64 x 0.75 x 0.1in	0.042 oz.	2.5 m (CEP) / nr / nr / nr	nr	1	35 s	32 s	0.1 s	1	1xTTL UART	4,800 to 115,200	-40 to +85	ext.	58 mW	Passive	SMD SIRFstarIV receiver module with SIRFaware technology
A2110-A SMD Receiver Module	48 par.	L1, C/A code, SBAS	48	CLHMetNPV2	0.64 x 0.75 x 0.1in	0.042 oz.	2.5 m (CEP) / nr / nr / nr	nr	1	35 s	32 s	0.1 s	1	1xTTL UART	4,800 to 115,200	-40 to +85	ext.	58 mW	Passive / active	SMD SIRFstarIV receiver module with SIRFaware technology, dual antenna support, RF switch	
A1084-A SMD Receiver Module	20 par.	L1, C/A code, SBAS	20	CLMetNPV2	0.64 x 0.75 x 0.1in	0.042 oz.	2.5 m (CEP) / nr / nr / nr	nr	1	35 s	32 s	0.1 s	1	1xTTL UART	4,800 to 115,200	-40 to +85	ext.	86 mW	Active	SMD SIRFstarIII receiver with dual antenna support, RF switch	
A1084-B SMD Receiver Module	20 par.	L1, C/A code, SBAS	20	CLMetNPV2	0.6 x 0.6 x 0.1in	0.042 oz.	2.5 m (CEP) / nr / nr / nr	nr	1	35 s	32 s	0.1 s	1	1xTTL UART	4,800 to 115,200	-40 to +85	ext.	86 mW	Passive / active	SMD SIRFstarIII receiver with passive antenna support	
A1088-A SMD Receiver Module	20 par.	L1, C/A code, SBAS	20	CLMetNPV2	1.1 x 0.75 x 0.12in	0.11 oz.	2.5 m (CEP) / nr / nr / nr	nr	1	35 s	32 s	0.1 s	1	1xTTL UART	4,800 to 115,200	-40 to +85	ext.	99 mW	Active	SMD SIRFstarIII receiver with AEC-Q compliant components	
A2120-A SMD Antenna Module	48 par.	L1, C/A code, SBAS	48	CLHMetNPV2	1.2 x 0.65 x 0.2in	0.14 oz.	2.5 m (CEP) / nr / nr / nr														