GPS WORLD
GNSS POSITION NAVIGATION TIMING

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RECEIVER SURVEY 2017

Now in its 25th year, the annual *GPS World* Receiver Survey provides the longest running, most comprehensive database of GPS and GNSS equipment available in one place.

With information provided by 45 manufacturers on 468 receivers, the survey assembles data on the most important equipment features. Manufacturers are listed alphabetically. Footnotes and abbreviations (at right) 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 2018 Receiver Survey, e-mail **gpsworld@gpsworld.com**.

NOTES

1 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

2 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.

3 Cold start: ephemeris, almanac, and initial position and time not known.

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

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

6 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

A WORD FROM OUR SPONSOR

SARA MASTERSON, New Business Development Manager.

In past GNSS Receiver Surveys, we have covered a lot of material that remains relevant and is available on our website. Here's a summary of those topics:

- Absolute vs relative accuracy
- Heading and orientation determination
- Interference robustness
- Antenna selection
- Ease of Integration
- Velocity, time and orientation
- Reliability and confidence level
- Region of operation: legal, trade issues
- Configurable device vs. plug-and-play
- Chip, board or enclosed product
- Application issues: performance, size, weight, cost and power consumption.

✓ HELPFUL LINKS

Go to "Tips for Choosing a GNSS Receiver" at www.novatel.com/support/knowledge-and-learning/ to learn more.

Receiver Opportunities and Challenges in 2017

BY Sara Masterson

Technology advances continuously, and today's receiver requirements are not the same as yesterday's. Many of those challenges remain (see Sidebar), but here are further important considerations.

CORRECTIONS AVAILABILITY

GNSS users today are looking for better accuracy at a reduced overall operating cost. Advances in GNSS correction services have greatly improved the availability and performance of positioning solutions by providing globally available corrections for any level of accuracy. These correction services are typically delivered to the receiver either over L-band or the Internet. The corrections industry overall is constantly evolving and improving the available correction service options by adding different service levels and extending the types of conditions under which the service can be delivered. Today, services are available that increase the availability and robustness of a solution for customers operating at sub-meter, decimeter or even centimeter level accuracy.

NovAtel delivers highly accurate, reliable Precise Point Positioning (PPP) corrections to the GNSS industry through TerraStar correction services. The unique, global, multi-constellation and fully redundant configuration of the TerraStar network assures robustness at every point of the correction generation process. This provides application developers and system integrators with extremely high data reliability, making the TerraStar service a superior choice for safety of life and other critical applications.

Another unique factor regarding NovAtel's correction service is the "end-to-end" nature of the solution; from correction data generation through to GNSS receiver and antenna options. This ensures a seamless execution of a complex integration between the correction service, GNSS boards and positioning algorithms — to deliver the most accurate, reliable position.

Going forward into 2017, correction service providers will continue to leverage the opportunities made possible through the increasing availability of new GNSS signals from Galileo and other new constellations. Moving to multi-constellation GNSS receivers and services will improve both the performance and reliability of your positioning solution. In today's exciting market, you have the flexibility to choose the right GNSS supplier to meet the requirements of any application.

Signal Interference: Detection and Mitigation

BY Patrick Casiano

In a perfect world, the signal from a GNSS satellite arrives at the antenna with no loss of integrity for a perfect measurement. This essential over the air connection between satellite and antenna can degrade due to signal interference. Legally operated radios and other nearby electronics can interfere unintentionally. As the number of GNSS signals being tracked increases, so does the potential for interference to dismiss the performance gains of using those additional signals.

To maximize performance and efficiency, prepared PNT users need their equipment to be able to detect when interference is present and mitigate it.

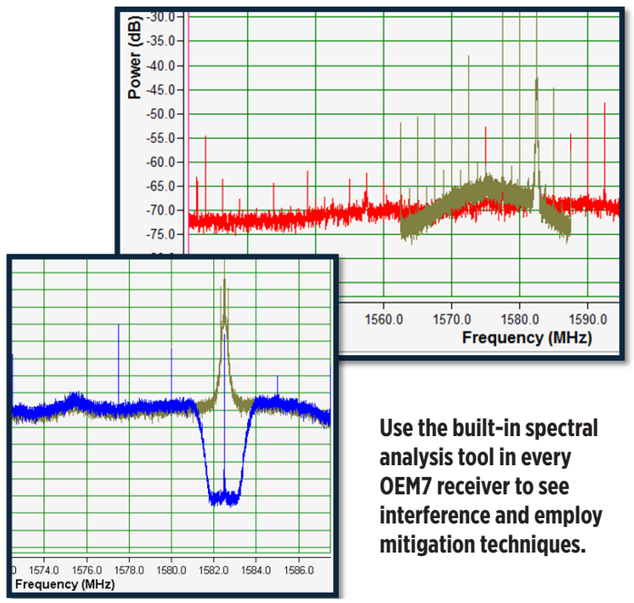
NOVATEL INTERFERENCE TOOLKIT

To combat interference, NovAtel has developed the Interference Toolkit. The OEM7 receiver will measure the RF spectrum levels and allow the user to apply mitigation tools to protect and preserve the GNSS measurement quality. This maintains high-quality multi-frequency multi-constellation positioning performance even in challenging RF environments. The tool kit makes itself an essential part of the integration journey especially during prototyping and unforeseen interference events in fielded integrated products.

The built-in spectrum analysis tool outputs data just like a spectrum analyzer. Signal level is plotted against frequency to show how much signal power is being sensed across different GNSS frequency bands. Interfering signals can be easily identified. OEM7 receivers output a string of easy-to-plot numbers for your own software interface, or NovAtel's free Connect software tool displays the spectral analysis output on a PC in real-time.

Users can deploy the OEM7's onboard signal processing and digital filtering to mitigate interference, allowing the GNSS signals to be tracked with both the receiver and the PNT user to continue to operate normally through an interference event.

PATRICK CASIANO, Applied Technology Group Lead.



Use the built-in spectral analysis tool in every OEM7 receiver to see interference and employ mitigation techniques.

RECEIVER SURVEY 2017

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2] /	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
Baseband Technologies, Inc. *www.basebandtech.com*	Snapshot Receiver	user define	GPS L1 C/A code	user define	ACDHLMNOPV12	na	na	~5m	na	varies		2ms	2ms	2ms	na	na	na	na	na	na	na	Software-based, HDL-based, Server-based, MCU-based GPS receiver
	Arduino compatible RF Shield (Eval) Kit	user define	GPS L1 C/A code	user define	ACDHLMNOPV12	na	<10g	~5m	na	varies		2ms	2ms	2ms	na	na	na	na	na	na	na	Software-based, HDL-based, Server-based, MCU-based GPS receiver
	28 Day Extended Ephemeris client	user define	GPS L1 C/A code, GLONASS & BEIDOU (TBD)	user define	ACDHLMNOPRSTV12	na	na	Day 1: 3m, Day 7: 7, Day 14: 17m, Day 4: 65m (68% SISRE)	na	na		<6s	<2s	<2s	na	na	na	na	na	na	na	Work with 28 Day Extended Epemeris service
Brandywine Communications *www.brandywinecomm.com*	NFS-220	par 16 Channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	16	T	19 x 1.75 x 7.5in (1U)	11lb typical	2.4m horizontal, 5m altitude	100ns. Absolute UTC, Std Deviation 15ns (OCXO)	na		<60s	<10s		11	1 I/P, 4 O/P BNC 10MHz, 4 O/P BNC IRIG A135 B125 E115 G145, 1 O/P DB9 IRIG A005 B005 E005 G005, 1 RS232	9600, N, 8, 1	-10 to +50	85-265VAC 50/60Hz		ext	Cost effective Multi-function Time/Frequency Reference
	NFS-220 Plus	par 16 Channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	16	T	19 x 1.75 x 9in (1U)	11lb typical	2.4m horizontal, 5m altitude	100ns. Absolute UTC, Std Deviation 15ns (OCXO)	na		<60s	<10s		11	1 I/P, 4 O/P BNC 10MHz, 4 O/P BNC IRIG A135 B125 E115 G145, 1 O/P DB9 IRIG A005 B005 E005 G005, 1 RS232	9600, N, 8, 1	-10 to +50	85-265VAC 50/60Hz		ext	Same as NFS-220, but includes LED Time Display on front
	RTG-510	12 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	12	T	19 x 1.75 x 7.5in (1U)	5lb nominal	2.4m horizontal, 5m altitude	<30ns with GPS	na		<60s	<10s		22	1 I/P GPS ANT, 1 I/P 1PPS IN, 2 I/P IRIG A200x A13x IRIG B20x B12x CF per IEEE-1344 IRIG E20x E11x IRIG G00x G14x IRIG H00x NASA 36 Have Quick	9600, N, 8, 1	-10 to +50	Single or Dual Hot-Swappable power supplies.85-264VAC 50/60Hz or -48VDC	40W per power supply	ext	Versatile unit suited for Test Ranges where multiple time code formats are required
	FRU-SAASM	par 12 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz, GPS L2 1227.60 MHz, P(Y) 1.023 MHz	12	T	19 x 1.75 x 14in (1U)		16m SEP	1 x 10-12	na			<120s with Almanac, CV loaded		11	1 I/P GPS ANT, 10 O/P 10MHz, 1 O/P 1PPS DB-15, 1 O/P HAVEQUICK DB-15, 2 I/O RJ-45 10/100BaseT Ethernet		0 to +50	90VAC to 260VAC	<15W	ext	Military Satcom Applications. Fully compliant with MIL-STD-188-164B
	PTS	par 12 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz, GPS L2 1227.60 MHz, P(Y) 1.023 MHz	12	T	9.5 x 3.47 x 15.80in (2U)	5.5lb typical	16m SEP	1 x 10-12	na			<120s with Almanac, CV loaded		11	1 I/P GPS ANT, 10 O/P 10MHz, 1 O/P 1PPS DB-15, 1 O/P HAVEQUICK DB-15, 2 I/O RJ-45 10/100BaseT Ethernet		0 to +50	90VAC to 260VAC	<15W	ext	Rugged GPS Disciplined Time and Frequency System available in C/A code and SAASM versions
	Modular Master Clock	14 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	14	T	20 x 19 x 3.47in (2U)	25lb nominal	16m SEP	15ns (1σ)	na		70 s	70 s	<5 s	na	Ports vary dependent on unit configuration		-15 to 55	90VAC to 265VAC 50/60Hz 18-36VDC		ext	Advanced Modular System with touch screen interface, advanced integrity monitoring, and expansion features
	PTP80	12 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	12	T	19 x 1.75 x 9in (1U)		2.4m horizontal, 5m altitude	<30ns with GPS	na		<60 s	<10 s		11	1 I/P GPS ANT, 4 RJ-45 PTP O/P, 6 75Ω BNC E1 O/P, 1 BNC 50Ω 10 MHZ O/P, 1 BNC50Ω 1PPS O/P, 1 RS232 NMEA GPRMC O/P	9600, N, 8, 1	0 to +50	85-265VAC 50/60Hz		ext	Cost-effective PTP Grandmaster with large no. of PTP outputs
	PTP-8080	12 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	12	T	19 x 1.75 x 9in (1U)		2.4m horizontal, 5m altitude	<30ns with GPS	na		<60s	<10s		11	1 I/P GPS ANT, 1 RJ-45 CONSOLE, 8 RJ-45 PTP O/P, 4 SFP MDI/MDIX 1000BASE-T, 1 BNC 50Ω 10 MHZ O/P, 1 BNC50Ω 1PPS O/P,		0 to +50	85-265VAC 50/60Hz		ext	PTP Boundary Clock for use in PTP time distribution
	M210	12 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	12	T	19 x 1.75 x 9in (1U)		2.4m horizontal, 5m altitude	<30ns with GPS	na		<60s	<10s		na	Ports vary dependent on unit configuration		0 to +40	85-265VAC 50/60Hz		ext	Modular Timing System with customizable output options and large no. of expansion options
	M211	12 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	12	T	19 x 3.47 x 20in (2U)		2.4m horizontal, 5m altitude	<30ns with GPS	na		<60s	<10s		na	Ports vary dependent on unit configuration		0 to +40	85-265VAC 50/60Hz		ext	Modular Timing System with customizable output options and large no. of expansion options
	PCIe-1588	12 channel	GPS L1 1575.42 MHz, C/A 1.023 MHz	12	T	Low Profile PCIe x 1 Rev 1.1		2.4m horizontal, 5m altitude	<30ns with GPS	na		<60s	<10s		3	1 I/P GPS ANT SMA, 1 RJ45 PTP, 1 MULTI-FUNCTION BREAKOUT CABLE CONNECTOR		-10 to +70	3.3V DC via PCIe bus		ext	Compact PCIe PTP Grandmaster clock, capable of broadcasting PTP over a network or synchronizing a host computer's time via PCIe bus
CHC *www.chcnav.com*	i80 GNSS Receiver	220	GPS L1C/A, L1C, L2C, L2E, L5; GLONASS L1C/A, L1P, L2C/A, L2P, L3; SBAS; Galileo E1, E5A, E5B ; BeiDou B1, B2	44	GLMNVPR1	12.4(φ) x 14cm	1.22kg	1-5m / 0.25m +1ppm / 8mm +1ppm / 3mm +0.5ppm	100	5Hz RTK		<60s	<30s	<15s	6	2*7 pin Lemo, Radio Antenna, Bluetooth, WiFi, 3.75G Cellular Moderm	9600 - 115200	-45 to +65	ext	3.2W	int	Compact GNSS receiver
	X91 +GNSS Receiver	220	GPS L1C/A, L1C, L2C, L2E, L5; GLONASS L1C/A, L1P, L2C/A, L2P, L3; SBAS; Galileo E1 E5A, E5B; Beidou B1, B2	44	GLMNVPR1	18(φ) x 8cm	1.35kg	1-5m / 0.25m +1ppm / 8mm +1ppm / 3mm +0.5ppm	100	5Hz RTK		<60s	<30s	<15s	3	RS232, Bluetooth, Radio Antenna	9600 - 115200	-40 to +65	ext	2.6W	int	Compact GNSS receiver
	X900 +GNSS Receiver	120	GPS L1, L2, L2C, L5; GLONASS L1, L2; SBAS; Galileo E1, E5A, E5B, Alt-BOC; BeiDou B1, B2,	Flexible Configuration: 120 L1, 60 L1 / L2	GLMNVPR1	19 x 20 x 8.4cm	1.4kg	2-3m / 0.25m +1ppm / 10mm +1ppm / 5mm +1ppm	20	5Hz RTK		<50s	<35s	<1s	3	RS232, Bluetooth, Radio Antenna	9600 - 115200	-40 to +65	ext	2.6W	int	Compact GNSS receiver
	P3E	220	GPS: L1C/A, L2E, L2C, L5; GLONASS: L1C/A, L1P, L2C/A, L2P, L3; BDS: B1, B2; SBAS: WAAS, EGNOS, MSAS; Galileo: L1 BOC, E5A, E5B, E5AltBOC; QZSS: L1C/A, L1SAIF, L2C, L5	44	GLMNVPR1	17.55 x 15.6 x 6.38	2kg	1-5m / 0.25m +1ppm / 8mm +1ppm / 3mm +0.5ppm	100	5Hz RTK		<60s	<30s	<15s	3	GNSS Antenna Port, LAN	9600 - 115200	-25 to +65	ext/int	4.2W	ext	GNSS Sensor with PC Control Utility and Web User Interface
	N72 GNSS Receiver	220	GPS L1C/A, L2C, L2E, L5; GLONASS L1C/A, L1P, L2C/A, L2P; SBAS; Galileo E1, E5A, E5B; BeiDou B1, B2	44	GLMNVPR1	26.5 x 14.3 x 6.8cm	2.1kg	1-5m / 0.25m +1ppm / 8mm +1ppm / 2.5mm +0.5ppm	100	Up to 50Hz		<60s	<30s	<15s	7	2*10 pin Lemo, TNC port (GNSS Antenna), BNC port (External Frequency), RJ45 Ethernet, DB9 Serial, USB	2400 - 115200	-40 to +65	ext/int	3.5W	ext	GNSS Sensor with Front Panel and Web User Interface
	X20i RTK	220	GPS L1C/A, L1C, L2C, L2E, L5; GLONASS L1C/A, L1P, L2C/A, L2P, L3; SBAS; Galileo E1 E5A, E5B; Beidou B1, B2	44	GLMNVPR1	18(φ) x 8cm	1.35kg	1-5m / 0.25m +1ppm / 8mm +1ppm / 3mm +0.5ppm	100	5Hz RTK		<60s	<30s	<15s	3	RS232, iOS Bluetooth, Radio Antenna	4800 - 115200	-40 to +65	ext	2.6W	int	Compact GNSS receiver, compatible with IOS device
	X20i DGNSS	372	GPS L1; GLONASS L1; BeiDou B1; SBAS	All in view(GPS / GLONASS / SBAS)	GLMNVPR1	17.5(φ) x 6.55cm	0.7kg	2.5m / 0.3m +2ppm / na / 5mm +1ppm	20	1Hz		<60s	<30s	<10s	2	RS232, iOS Bluetooth	9600 - 115200	-30 to +60	ext	1.8W	ext	Compact GNSS receiver, compatible with IOS device
	LT500H GNSS Handheld	120	GPS L1, L2, L2C; GLONASS L1, L2; BeiDou B1; Galileo E1; SBAS; QZSS	Flexible Configuration: 120 L1, 60 L1 / L2	GLN1	23.6 x 9.7 x 7.7cm	0.89kg	1.2m / 0.5m / 1cm +1ppm / 1cm +1ppm	na	1Hz		<50s	<35s	<1s	6	Mini USB, GPRS Antenna, 3.5G Cellular Moderm, Bluetooth, WiFi, Compact Flash	4800 - 115200	-30 to +70	ext	3W	int/ext	GNSS Handheld Receiver
	LT500T GNSS Handheld	220	GPS L1C/A; GLONASS L1C/A; BeiDou B1; Galileo E1; SBAS; QZSS	44	GLN1	23.6 x 9.7 x 7.7cm	0.89kg	2m / 0.5m / na / 1cm +1ppm	na	1Hz		<45s	<30s	<2s	6	Mini USB, GPRS Antenna, 3.5G Cellular Moderm, Bluetooth, WiFi, Compact Flash	4800 - 115200	-30 to +70	ext	2.8W	int/ext	GNSS Handheld Receiver
	LT40	72	GPS L1C/A, GLONASS L10F; BeiDou B1i; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	GPS +GLONASS or GPS +BDS, SBAS	GLN1	16.5 x 8.6 x 1.9cm	0.26kg	2-5m / 2 / na / na	na	1Hz		<27s	<1s	<1s	6	Mini USB, GPRS Antenna, 3.5G Cellular Moderm, Bluetooth, WiFi, Compact Flash	9600	-20 to +60	ext	1W	int/ext	GNSS Handheld Receiver
	LT600	72	GPS L1C/A, GLONASS L10F; BeiDou B1i; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	GPS +GLONASS +BDS Supported	GLN1	2.35 x 13.8 x 3cm	0.66	2-5m / 2 / na / na	na	1Hz		<45s	<30s	<1s	6	Mini USB, GPRS Antenna, 3.5G Cellular Moderm, Bluetooth, WiFi, Compact Flash	9600	-30 to +60	ext	4W	int/ext	GNSS Handheld Receiver
ComNav Technology Ltd. *www.comnavtech.com*	K708	496	GPS: L1 C/A, L2C, L2P, L5. BeiDou: B1, B2, B3 .GLONASS: L1CA, L1P, L2C/A, L2P. Galileo(Reserved) QZSS(Reserved); SBAS: WAAS, EGNOS, MSAS, GAGAN	All in view	ADGLMetMNOPRTV2	60 × 100 × 9mm	45g	1.5m / 0.4m / 8mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS)	20ns	50 Hz PVT 100Hz Raw data		<50s	<45s	<2s	6	3 × RS232; 1 × USB; 1 × RJ45; 1 × CAN	up to 921, 600 bps	-40 to +85	ext	1.7W	MMCX acceptable	8GB onboard memory, Eventmarkerand PPS, Triple frequency full constellation professional GNSS OEM board
	K728	404	GPS: L1 C/A, L2C, L2P. BeiDou: B1, B2.. GLONASS: L1CA, L1P, L2C/A, L2P. Galileo(Reserved), QZSS(Reserved); SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMetMNOPRTV2	60 × 100 × 9mm	45g	1.5m / 0.4m / 8mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS); Heading: (0.2 / R)°	20ns	20 Hz PVT 100Hz Raw data		<50s	<45s	<2s	4	3 × RS232; 1 × USB	up to 921, 600 bps	-40 to +85	ext	1.7W	2 × MMCX acceptable	8GB onboard memory, Eventmarkerand PPS, Dual frequency full constellation heading and position GNSS OEM board
	K706	388	GPS: L1 C/A, L2C, L2P. BeiDou: B1, B2. GLONASS: L1CA, L1P, L2C/A, L2P. Galileo(Reserved), QZSS(Reserved); SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGHLMetMNOPRTV2	45.7 × 71.1 × 10.6mm	26.6g	1.5m / 0.4m / 8mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS)	20ns	50Hz PVT 100Hz Raw data		<50s	<45s	<2s	6	3 × RS232; 1 × USB; 1 × RJ45; 1 × CAN	up to 921, 600 bps	-40 to +85	ext	1.68W	MCX acceptable	8GB onboard memory, Eventmarkerand PPS, Dual freqency full constellation smaller sized GNSS board,
	K700	200	GPS: L1 GLONASS: L1 BeiDou: B1 SBAS: WAAS, EGNOS, MSAS, GAGAN	40	ADGHLMetMNOPRTV2	40.7 × 71.1 × 10.6mm	18g	1.5m / 0.5m / 10mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS)	20ns	50Hz PVT 100Hz Raw data		<50s	<45s	<2s	3	3 × RS232	up to 921, 600 bps	-40 to +85	ext	0.6W	MCX acceptable	Single frequency with carrier phase and Code, entry level GNSS OEM Board
	K508	198	GPS: L1 C/A code, L1 / L2 P code, L5 BeiDou: B1, B2, B3 GLONASS: L1, L2 SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMetMNOPRTV2	60 × 100 × 9mm	42g	1.5m / 0.5m / 10mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	3 × RS232	up to 921, 600 bps	-40 to +85	ext	1.85W	MMCX acceptable	Triple frequency GNSS OEM Board
	K528G	198	GPS: L1 C/A code, L1 / L2 P code Glonass: L1, L2 SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMetMNOPRTV2	60 × 100 × 10.2mm	46g	1.5m / 0.5m / 10mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS)	20ns	10Hz PVT & Heading 20Hz Raw data		<50s	<45s	<2s	3	3 × RS232	up to 921, 600 bps	-40 to +80	ext	1.9W	2 × MCX acceptable	Dual frequency GNSS OEM Board for heading and positioning
	K528	198	GPS: L1 C/A code, L1 / L2 P code BeiDou: B1, B2 SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMetMNOPRTV2	60 × 100 × 10.2mm	46g	1.5m / 0.5m / 10mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS)	20ns	10Hz PVT & Heading 20Hz Raw data		<50s	<45s	<2s	3	3 × RS232	up to 921, 600 bps	-40 to +80	ext	1.85W	2 × MCX acceptable	Dual frequency GNSS OEM Board for heading and positioning
	K501G	120	GPS: L1 C/A code, L1 / L2 P code GLONASS: L1, L2 SBAS: WAAS, EGNOS, MSAS, GAGAN	40	ADGHLMetMNOPRTV2	45.7 × 71.1 × 10.6mm	24g	1.5m / 0.5m / 10mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	3 × RS232	up to 921, 600 bps	-40 to +85	ext	1.35W	MCX acceptable	Dual frequency GNSS OEM Board
	K501	120	GPS: L1 C/A code, L1 / L2 P code BeiDou: B1, B2, B3 (Optional) SBAS: WAAS, EGNOS, MSAS, GAGAN	40	ADGHLMetMNOPRTV2	45.7 × 71.1 × 10.6mm	25g	1.5m / 0.5m / 10mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<45s	<2s	3	3 × RS232	up to 921, 600 bps	-40 to +85	ext	1.45W	MCX acceptable	Dual frequency GNSS OEM Board
	T300	256	GPS: L1 C/A, L1 C, L2 P, L2C; L5 BeiDou: B1, B2, B3 GLONASS: L1 / L2 Galileo: Reserved SBAS: WAAS, EGNOS, MSAS, GAGAN	66	ADGLMetMNOPRV1	15.8 × 7.5cm (W×H)	0.95kg (Include Batteries)	1.5m / 0.5m / 8mm +1ppm / 2.5mm +0.5ppm (All values in Horiz, RMS)	20ns	10Hz PVT 20Hz Raw data		<50s	<30s	<2s	3	1 Lemo port ; 1 Bluetooth; 1 USB port	up to 921, 600 bps	-40 to +65	hot swappable batteries	2.85W	int	RTK GNSS Receiver, Small and light with Internal Tx/Rx, 3.5G
	M300Pro	496	GPS: L1 C/A, L2C, L2P, L5. BeiDou: B1, B2, B3 .GLONASS: L1CA, L1P, L2C/A, L2P. Galileo(Reserved), QZSS(Reserved); SBAS: WAAS, EGNOS, MSAS, GAGAN	All in view	ADGLMetMNOPRV1	163 × 75 x 202mm	2.4kg (Include Batteries)	1.5m / 0.5m / 8mm +1ppm / 2.5mm +0.5ppm (All values in Horiz, RMS)	20ns	50Hz PVT 100Hz Raw data		<50s	<30s	<2s	6	3 Lemo port ; 1 USB port; 1 LAN Port; 1 DB9 Port	up to 921, 600 bps	-40 to +65	int/ext	3.5W	TNC acceptable	8GB internal memory, built in webserver, CORS Receiver, ideal for Reference station
	M300	496	GPS: L1 C/A, L2C, L2P, L5.; BeiDou: B1, B2, B3 .GLONASS: L1CA, L1P, L2C/A, L2P. Galileo(Reserved), QZSS(Reserved); SBAS: WAAS, EGNOS, MSAS, GAGAN	66	ADGLMetMNOPRV1	80 x 145 × 200mm	1kg	1.5m / 0.5m / 8mm +1ppm / 2.5mm +0.5ppm (All values in Horiz, RMS)	20ns	50Hz PVT 100Hz Raw data		<50s	<30s	<2s	2	2 Lemo port ;	up to 921, 600 bps	-40 to +70	ext	2.5W	TNC acceptable	Enclosure GNSS Receiver, smart sensors for high accuracy positioning, Rugged design
	M600	404	GPS: L1 C/A, L2C, L2P. BeiDou: B1, B2. GLONASS: L1CA, L1P, L2C/A, L2P. Galileo(Reserved), QZSS(Reserved); SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMNOPRTV1	80 x 145 × 200mm	1.3kg	1.5m / 0.4m / 8mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS); Heading: (0.2 / R)°	20ns	20 Hz PVT 100Hz Raw data		<50s	<45s	<2s	2	2 Lemo ports	up to 921, 600 bps	-40 to +70	ext	2.5W	TNC acceptable	Enclosure heading and positioing GNSS Receiver, for machine control
	M300 Min	496	GPS: L1 C/A, L2C, L2P, L5. BeiDou: B1, B2, B3 .GLONASS: L1CA, L1P, L2C/A, L2P. Galileo(Reserved), QZSS(Reserved); SBAS: WAAS, EGNOS, MSAS, GAGAN	All in view	ADGLMetMNOPRV1	55 x 191 × 142mm	0.8kg	1.5m / 0.5m / 8mm +1ppm / 2.5mm +0.5ppm (All values in Horiz, RMS)	20ns	50Hz PVT 100Hz Raw data		<50s	<30s	<2s	2	2 DB9 Male ports	up to 921, 600 bps	-40 to +70	ext	2.5W	TNC acceptable	Enclosure GNSS Receiver, with 3G and UHF GNSS Sensors
	M600 Min	404	GPS: L1 C/A, L2C, L2P. BeiDou: B1, B2. GLONASS: L1CA, L1P, L2C/A, L2P. Galileo(Reserved), QZSS(Reserved); SBAS: WAAS, EGNOS, MSAS, GAGAN	60	ADGLMNOPRTV1	55 x 191 × 142mm	0.95kg	1.5m / 0.4m / 8mm +1ppm / 2.5mm +1ppm (All values in Horiz, RMS); Heading: (0.2 / R)°	20ns	20 Hz PVT 100Hz Raw data		<50s	<45s	<2s	2	2 DB9 Male ports	up to 921, 600 bps	-40 to +70	ext.	2.8W	TNC acceptable	Enclosure heading and positioing GNSS Receiver, for machine control, agriculture
DataGrid, Inc. *www.datagrid-international.com*	Colibri	336 or more depending on config	GPS: L1, L2, L2C, GLONASS: G1, G2, Galileo E1, SBAS	Flexible configuration	GLMMetNOPRTV1	Ø 17 x 10cm	~400g depending on config.	1.5m / <1m / 1cm / <1cm +1 ppm / 0.3cm +0.1 ppm (RMS)	<35	1, 1/2, 1/5, 1/10, 1/20 (user programmable)		<40s	36s	<1s	1, 1	USB, Bluetooth option	1, 200 - 115, 200 bps	-40 to +85	int, ext, LilonP	1.5 to 2	L1/L2 GNSS Internal	RTK, VRS, Precision post-proecssing, Precision GIS, GSM modem opt. WR. Fully wireless operation capable.
	Sparrow	336 or more depending on config	GPS: L1, L2, L2C, L5, GLONASS: G1, G2, Galileo E1, E5a, E5b, SBAS	Flexible configuration	GLMMetNOPRTV1	Ø 17 x 8.7cm	1.2 kg	1.5m / <1m / 1cm / <1cm +1 ppm / 0.3cm +0.1 ppm (RMS)	<35	1, 1/2, 1/5, 1/10, 1/20 (user programmable)		<40s	36s	<1s	1, 1	USB, Ethernet	1, 200 - 115, 200 bps	-40 to +85	ext	1.5 to 2	Full GNSS Internal	RTK, VRS, Precision post-proecssing, Precision GIS, GSM modem, WR.
	Gator	336 or more depending on config	GPS: L1, L2, L2C, L5, GLONASS: G1, G2, Galileo E1, E5a, E5b, SBAS	Flexible configuration	ADGLMMetNOPVRSTV1	10 x 8.4 x 3.5cm	340g	1.5m / <1m / 1cm / <1cm +1 ppm / 0.3cm +0.1 ppm (RMS)	<35	1, 1/2, 1/5, 1/10, 1/20 (user programmable)		<40s	36s	<1s	1	USB	1, 200 - 115, 200 bps	-40 to +85	ext. USB powered	1.5	L1/L2 GNSS (E)	RTK, VRS, Precision post-proecssing, Precision GIS, GSM modem opt. WR. Space qualified version available to qualifying customers.
	REX	3 x 336 or more depending on config	GPS: L1, L2, L2C, L5, GLONASS: G1, G2, Galileo E1, E5a, E5b, SBAS	Flexible configuration	ADGLMMetNOPVRTV1	26 x 15 x 6cm	1800g	1.5m / <1m / 1cm / <1cm +1 ppm / 0.3cm +0.1 ppm (RMS)	<35	1, 1/2, 1/5, 1/10, 1/20		<40s	36s	<1s	2, 1, 1	Serial, USB, Ethernet	1, 200 - 115, 200 bps	-40 to +85	ext	5	3 x L1/L2 GNSS External	Upto 3 GNSS receivers, to generate Position, heading, roll, pitch. Also available in a base station configuration.
	DGRx-GNSS 3 (OEM)	336 or more depending on config	GPS: L1, L2, L2C, GLONASS: G1, G2, Galileo E1, SBAS	Flexible configuration	ADGHLMMetOPRSTV2	90 x 60 x 12mm	~ 50g	1.5m / <1m / 1cm / <1cm +1 ppm / 0.3cm +0.1 ppm (RMS)	<35	1, 1/2, 1/5, 1/10, 1/20		<40s	<36s	<1s	2	Serial	1, 200 - 115, 200 bps	-40 to +85	ext.	1.5	L1/L2 GNSS (E)	Easy-to-upgrade/modify FPGA design with four reprogrammable sub-bands; two 1552 .. 1609 MHz and three 1166 .. 1253 MHz. Space qualified versions available to qualified customers.

RECEIVER SURVEY 2017

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	DGRx-GNSS 4 (OEM)	336 or more depending on config	GPS: L1, L2, L2C, L5, GLONASS: G1, G2, Galileo E1, E5a, E5b, SBAS	Flexible configuration	ADGHLMMetOPRTV2	60 x 45 x 10mm	~ 45g	1.5m / <1m / 1cm / <1cm +1 ppm / 0.3cm +0.1 ppm (RMS)	12	1, 1/2, 1/5, 1/10, 1/20, 1/50		<40s	<36s	<1s	2	Serial	1, 200 - 115, 200 bps	-40 to +85	ext.	2.0	L1/L2/L5 GNSS (E)	Easy-to-upgrade/modify FPGA design with five reprogrammable sub-bands; two 1552 .. 1609 MHz and three 1166 .. 1253 MHz.
Eos Positioning Systems Inc. *www.eos-gnss.com*	Arrow Lite GPS	12 par.	GPS L1 C/A & CP	12	GLMNOPR1	12.5 x 8.4 x 4.2cm	372g	1.5m / 0.3m / 1cm / 5mm 1-sigma	<<50 ns	1Hz (optional 10Hz & 20Hz)		60s	30s	<1s	2	Long-range Class 1 Bluetooth (Apple +SPP), USB 1 RS-232	4, 800 - 115, 200	-40 to +85	Integrated Battery / Opt. External	17 hrs / 1.4W	Active, L1 GPS	Single Frequency GPS. Real-time 60cm with SBAS. Universal Bluetooth compatibility with iOS, Android and Windows.
	Arrow 100 GNSS	158 par.	GPS L1 C/A & CP, GLONASS G1, BeiDou B1, Galileo E1, QZSS, SBAS, LBand opt.	52	GLMNOPR1	12.5 x 8.4 x 4.2cm	372g	1.5m / 0.3m / 1cm / 5mm 1-sigma	20ns	1Hz (optional 10Hz & 20Hz)		60s	30s	<1s	2	Long-range Class 1 Bluetooth (Apple +SPP), USB 1 RS-232	4, 800 - 230, 400	-40 to +85	Integrated Battery / Opt. External	12 hrs / 2.0W	Active, L1/G1/B1/E1/LBand	Single Frequency GNSS. 60cm SBAS, 30cm or opt. 1cm with RTK. Bluetooth compatibility iOS, Android and Windows.
	Arrow 200 GNSS	372 par.	GPS L1 / L2, C/A & P code & CP, GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5a / E5b, QZSS, Atlas LBand opt.	58	GLMNOPR1	12.5 x 8.4 x 4.2cm	372g	1.5m / 0.3m / 1cm / 5mm 1-sigma	20ns	1Hz (optional 10Hz & 20Hz)		60s	30s	<1s	2	Long-range Class 1 Bluetooth (Apple +SPP), USB 1 RS-232	4, 800 - 460, 800	-40 to +85	Integrated Battery / Opt.l External	9 +hrs / 2.5W	Active, L1/L2, G1/G2, B1/B3, E1, Lband	Multi-Freq GNSS. 7cm Worldwide w/ Atlas. 1cm RTK. Bluetooth compatibility with iOS, Android and Windows.
	Arrow Gold GNSS	372 par.	GPS L1 / L2 / L5, C/A & P code & CP, GLONASS G1 / G2 / P1 / P2, BeiDou B1 / B2 / B3, Galileo E1bc / E5a / E5b, QZSS, Atlas Lband	58	GLMNOPR1	12.5 x 8.4 x 4.2cm	372g	1.5m / 0.3m / 1cm / 5mm 1-sigma	20ns	1Hz (optional 10Hz & 20Hz)		60s	30s	<1s	2	Long-range Class 1 Bluetooth (Apple +SPP), USB 1 RS-232	4, 800 - 460, 800	-40 to +85	Integrated Battery / Opt.l External	8.5 +hrs / 2.7W	Active, L1/L2/L5, G1/G2, B1/B2/B3, E1/E5, Lband	Multi-Freq GNSS. 7cm Worldwide w/ Atlas. 1cm RTK. SafeRTK feature. Bluetooth compatibility with iOS, Android and Windows.
FOIF *www.foif.com*	A30	220	GPS: L1 C/A, L2E, L2C, L5 GLONASS: L1 C/A, L1P, L2 C/A, L2P SBAS(WAAS / EGNOS / MSAS): L1 C/A, L5 GIOVE-A: L1 BOC, E5A, E5B, E5AltBOC GIOVE-B: L1 CBOC, E5A, E5B, E5AltBOC GALILEO: L1 CBOC, E5A, E5B, E5AltBOC (Reserved) Beidou: B1, B2	26	ADLMRSV1	10.1 x 19.7 x 19.7cm	1.3kg	~10m / 25cm +1.0ppm / 8mm +1.0ppm < 0.25m	20ns	up to 50Hz		<45s	<30s	<2s	2	RS232, USB	38400	-30 to +65	int/ext	12W	G18-104A	GPS L1/L2/L5 BDS B1/B2/B3 GLONASS L1/L2 GALILEO E1/E2/E5a/E5b
ftech Radio Frequency System Corporation *www.f-tech.com.tw*	FM3311	33 tracking +99 acquisition	GPS / GLONASS L1 C/A code, SBAS	33	ACHLMNRV2	11 x 11 x 2.15mm	2g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	2	UART	4800 - 115200	-40 to +85	ext / built-in backup battery	20mA at 3.3V	active internal antenna	MT3331 chipset, GPS, GLONASS, GALILEO supported
	FMP3312-TLP	33 tracking +99 acquisition	GPS / GLONASS L1 C/A code, SBAS	33	ACHLMNRV2	26 x 26 x 11.7mm	12.5g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800 - 115200	-40 to +85	ext / built-in backup battery	20mA at 3.3V	active internal antenna	as above
	FMP3351-TLP	33 tracking +99 acquisition	GPS / GLONASS L1 C/A code, SBAS	33	ACHLMNRV2	22 x 22 x 8mm	8g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800 - 115200	-40 to +85	ext / built-in backup battery	20mA at 3.3V	active internal antenna	as above
	FM3911	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRTV2	11 x 11 x 2.15mm	2g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	2	UART	4800 - 115200	-40 to +85	ext	19mA at 3.3V	ext., active or passive	MT3339 chipset, very high senstivity at -165dBM
	FMP3906-TLP	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRV2	16 x 16 x 6.7mm	6g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800 - 115200	-40 to +85	ext	20mA at 3.3V	active internal antenna	as above
	FMP12-TLP	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRV2	26 x 26 x 11.7mm	12.5g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800 - 115200	-40 to +85	ext / built-in backup battery	20mA at 3.3V	active internal antenna	as above
	FMP51	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRV2	22 x 22 x 8mm	8g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART	4800 - 115200	-40 to +85	ext	20mA at 3.3V	active internal antenna	as above
	FMP0439-TLP	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRV2	26 x 26 x 11.7mm	12.5g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART	4800 - 115200	-40 to +85	ext / built-in backup battery	24mA at 3.3V	active internal antenna	as above
	FM3906-TLP	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRTV2	16 x 16 x 6.7mm	6g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART	4800 - 115200	-40 to +85	ext	24mA at 3.3V	active internal antenna	as above
	FM3711	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRTV2	11 x 11 x 2.15mm	2g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	2	UART	4800 - 115200	-40 to +85	ext	21mA at 3.3V	ext, active or passive	MT3337 ROM based chipset, low cost solution
	FMP31	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRV2	22 x 22 x 8mm	8g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART	4800 - 115200	-40 to +85	ext	22mA at 3.3V	active internal antenna	as above
	FMP32	22 tracking +66 acquisition	GPS L1 C/A code, SBAS	22	ACHLMNRV2	26 x 26 x 11.7mm	12.5g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART	4800 - 115200	-40 to +85	ext / built-in backup battery	22mA at 3.3V	active internal antenna	as above
	FGM-RLP	22 tracking +66 acquisition +Q14	GPS L1 C/A code, SBAS	22	ACLMNRV2	30 x 34.1 x 8mm	50g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<34s	<1s	1	UART/RS232	4800 - 115200	-40 to +85	ext / built-in backup battery	37mA at 3.3V	active internal antenna	Smart antenna model, multi type connector and various cable length availavle
	FGN-RLP	33 tracking +99 acquisition	GPS / GLONASS L1 C/A code, SBAS	33	ACHLMNRV2	30 x 34.1 x 8mm	50g	3m CEP / 1.5mCEP	10ns RMS	1Hz default, max up to 10Hz by user define		<35s	<33s	<1s	1	UART/RS232	4800 - 115200	-40 to +85	ext / built-in backup battery	37mA at 3.3V	active internal antenna	Smart antenna model, multi type connector and various cable length availavle
Furuno *www.furuno.com*	GN86	24	GPS L1 C/A, SBAS L1 C/A, GALILEO E1B / E1C, QZSS L1 C/A	12 GPS, 2 SBAS, 8 GALILEO, 2 QZSS	ALMINPV2	12.2 x 16.0 x 2.8mm			10us (Max)	1 / 2 / 5 / 10Hz		33s	30s	<1s	1	NMEA	4800 - 230400	-40 to +85	ext		Passive or Active	Active Anti-Jamming and Advanced Multipath Mitigation
	GN87	34	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, GALILEO E1B / E1C, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 8 GALILEO, 2 QZSS	ALMINPV2	12.2 x 16.0 x 2.8mm			10us (Max)	1 / 2 / 5 / 10Hz		33s	30s	<1s	1	NMEA	4800 - 230400	-40 to +85	ext		Passive or Active	Multi-GNSS, Active Anti-Jamming and Advanced Multipath Mitigation
	GV86	24	GPS L1 C/A, SBAS L1 C/A, QZSS L1 C/A	12 GPS, 2 SBAS, 2 QZSS	LNPV2	12.2 x 16.0 x 2.8mm			10us (Max)	1 / 2 / 5 / 10Hz		33s	30s	<1s	2	UART1 (for NMEA Input/Output) UART2/I2C selectable (for IMU sensor data input), Wheel tick capable	4800 - 230400	-40 to +85	ext		Passive or Active	Galileo Ready, High performance Dead Reckoning Active Anti-Jamming and Advanced Multipath Mitigation
	GV87	26	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LNPV2	12.2 x 16.0 x 2.8mm			10us (Max)	1 / 2 / 5 / 10Hz		33s	30s	<1s	2	UART1 (for NMEA Input/Output) UART2/I2C selectable (for IMU sensor data input), Wheel tick capable	4800 - 230400	-40 to +85	ext		Passive or Active	Multi-GNSS, Galileo Ready High performance Dead Reckoning Active Anti-Jamming and Advanced Multipath Mitigation
	GT86	24	GPS L1 C/A, SBAS L1 C/A, QZSS L1 C/A	12 GPS, 2 SBAS, 2 QZSS	LNTPV2	12.2 x 16.0 x 2.8mm			15ns @1 sigma	1Hz		40s	35s	<5s	1	NMEA or M12 Binary, 4-40MHz, 1PPS	4800 - 230400	-40 to +85	ext		Passive or Active	Galileo Ready, Active Anti-Jamming and Advanced Multipath Mitigation Time Pulse output (1PPS) and Clock output (configurable, e.g., 10MHz)
	GT87	34	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LNTPV2	12.2 x 16.0 x 2.8mm			15ns @1 sigma	1Hz		40s	35s	<5s	1	NMEA or M12 Binary, 4-40MHz, 1PPS	4800 - 230400	-40 to +85	ext		Passive or Active	Multi-GNSS, Galileo Ready Active Anti-Jamming and Advanced Multipath Mitigation Time Pulse output (1PPS) and Clock output (configurable, e.g. 10MHz)
	GT8736	26	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LNTPV2	40.0 x 60.0mm			15ns @1 sigma	1Hz		35s	35s	<5s	1	NMEA or M12 Binary, 1PPS	9600	-40 to +85	ext		Active	Multi-GNSS, Galileo Ready Active Anti-Jamming and Advanced Multipath Mitigation
	eRideOPUS 6	24	GPS L1 C/A, SBAS L1 C/A, GALILEO E1B / E1C, QZSS L1 C/A	12 GPS, 2 SBAS, 8 GALILEO, 2 QZSS	ALMINPTV2	7.0 x 7.0mm			15ns @1 sigma (timing software)	1 / 2 / 5 / 10Hz		33s	30s	<1s	2	NMEA or M12 Binary, 4-40MHz, 1PPS (timing software)	4800 - 230400	-40 to +85	ext		Passive or Active	Dead Reckoning or Timing software available For timing, Time Pulse output (1PPS) and Clock output (configurable, e.g., 10MHz)
	eRideOPUS 7	32	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, GALILEO E1B / E1C, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 8 GALILEO, 2 QZSS	ALMINPTV2	7.0 x 7.0mm			15ns @1 sigma (timing software)	1 / 2 / 5 / 10Hz		33s	30s	<1s	2	NMEA or M12 Binary, 4-40MHz, 1PPS (timing software)	4800 - 230400	-40 to +85	ext		Passive or Active	Multi-GNSS, Dead Reckoning or Timing software available For timing, Time Pulse output (1PPS) and Clock output (configurable, e.g. 10MHz)
	GF8557	14	GPS L1 C/A, SBAS L1 C/A	12 GPS, 2 SBAS	LT2	100 x 100 x 19.9mm	<120g		30ns @ 2 sigma	1Hz					2	10MHz, 1PPS, NMEA, TOD	38400	-20 to +80	ext	Warm up: <14W Steady state: <10W	Active	GPS Disciplined 10MHz via OXCO oscillator Hold Over: <±8usec/24h
	GF8701	26	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	34 x 27 x 11mm			15ns @1 sigma	1Hz					1	4-40MHz selectable, 1PPS, NMEA	4800 - 230400	-40 to +85	ext	Steady state: <0.6W	Active	Multi-GNSS Disciplined 10MHz via TCXO oscillator
	GF8702	26	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	34 x 27 x 15.5mm			15ns @1 sigma	1Hz					1	4-40MHz selectable, 1PPS, NMEA	4800 - 230400	-40 to +85	ext	Steady state: <1.7W	Active	Multi-GNSS Disciplined 10MHz via OXCO oscillator Hold Over: <±50usec/24h
	GF8703	26	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	34 x 27 x 20mm			15ns @1 sigma	1Hz					1	4-40MHz selectable, 1PPS, NMEA	4800 - 230400	-40 to +85	ext	Steady state: <2.2W	Active	Multi-GNSS Disciplined 10MHz via OXCO oscillator Hold Over: <±10usec/24h
	GF8704	26	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	100 x 52 x 20mm			15ns @1 sigma	1Hz					1	4-40MHz selectable, 1PPS, NMEA	4800 - 230400	-40 to +85	ext	Steady state: <2.8W	Active	Multi-GNSS Disciplined 10MHz via OXCO oscillator Hold Over: <±5usec/24h
	GF8705	26	GPS L1 C/A, SBAS L1 C/A, GLONASS L1OF, QZSS L1 C/A	12 GPS, 2 SBAS, 10 GLONASS, 2 QZSS	LT2	100 x 52 x 20mm			15ns @1 sigma	1Hz					1	4-40MHz selectable, 1PPS, NMEA	4800 - 230400	-40 to +85	ext	Steady state: <2.8W	Active	Multi-GNSS Disciplined 10MHz via OXCO oscillator Hold Over: <±1.5usec/24h
	GF8648	26	GPS L1 C/A, QZSS L1 C/A	12 GPS, 2 QZSS	LT2	480 x 600 x 149mm			15ns @1 sigma	1Hz					11	10MHz x9, 1PPS, NMEA	38400	-10to +45	ext	Warm up: <63W Steady state: <30W	Active	Digital Broadcasting Base Station Rubidium Oscillator
Galileo Satellite Navigation Ltd *www.galileo-nav.com*	GSN-7100 GNSS Software Receiver	unlimited, user defined	GPS L1 C/A code, GPS, GLONASS, BeiDou	all in view	ACDGHLMNRSTV12	not applicable for Software Receiver	not applicable for Software Receiver	3m	<<50ns	User defined - up to 1000 times in 1s		30s	2s	1s	na	defined by system designer	defined by system designer	na	na	~40mW	defined by system designer	GNSS Software Receiver can run on any DSP/ RISK (CEVA, Cadense, ARM, other). Can use any RF front end Needs about 128KB RAM and 100-150 MHz of CPU resources
Geneq inc. *www.sxbluegps.com*	SXBlue GNSS	117 channel	L1 C/A code & phase, GPS +GLONASS +GALILEO, SBAS	27	GLMNOPR1	8.5 x 3.5 x 11.2cm	.6lb	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	2	Bluetooth, RS-232 (all independent)	4, 800 - 115, 200	-40 to +85	Ext (5V, 12V or 24V)	3.2W	L1 GNSS Active	High-accuracy receiver for base station or machine control
	SXBlue II +GPS	372 channel	L1 C/A code & phase GPS, SBAS	27	GHLMNOPR1	8.0 x 4.7 x 14.1cm	1lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	1.9W	L1 GPS Active	Affordable submeter receiver for realtime positioning
	SXBlue II +GNSS	372 channel	L1 C/A code & phase, GPS +GLONASS +GALILEO, SBAS	27	GHLMNOPR1	8.0 x 4.7 x 14.1cm	1lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.3W	L1 GNSS Active	High-accuracy receiver to provide submeter realtime positioning all the time with low power consumption
	iSXBlue II +GNSS	372 channel	L1 C/A code & phase, GPS +GLONASS +GALILEO, SBAS	27	GHLMNOPR1	8.0 x 4.7 x 14.1cm	1lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.3W	L1 GNSS Active	Apple iOS Bluetooth compatible receiver for submeter applications
	SXBlue II-L GPS	372 channel	L1 C/A code & phase GPS, SBAS, OmniSTAR VBS	13	GHLMNOPR1	8.0 x 5.6 x 14.1cm	1lb (w/batt.)	2.5m / 80cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	2.9W	L1 GPS/LBand Active	Single frequency GPS receiver, Worldwide 1m accuracy with OmniSTAR VBS service
	SXBlue II-B GPS	372 channel	L1 C/A code & phase GPS, SBAS, DGPS Beacon	13	GHLMNOPR1	8.0 x 5.6 x 14.1cm	1, 2lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	2.5W	Combined L1 GPS/DGPS Beacon	Portable DGPS Beacon receiver for marine navigation
	SXBlue GNSS L1 / L2	372 channel	L1 / L2 / (L2C) C/A & P code, GPS +GLONASS +GALILEO, CP, SBAS	89	GLMNOPR1	8.5 x 3.5 x 11.2cm	.6lb	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	2	Bluetooth, RS-232 (all independent)	4, 800 - 115, 200	-40 to +85	Ext (5V, 12V or 24V)	3.3W	L1/L2 GNSS Active	Dual frequency GNSS high-accuracy receiver for base station or machine control
	SXBlue III +GNSS	372 channel	L1 / L2 / (L2C) C/A & P code, GLONASS +GALILEO, CP, SBAS	89	GHLMNOPR1	8.0 x 4.7 x 14.1cm	1lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.3W	L1/L2 GNSS Active	RTK & GNSS Dual frequency receiver with low power consumption
	iSXBlue III +GNSS	372 channel	L1 / L2 / (L2C) C/A & P code, CP, GPS +GLONASS +GALILEO, SBAS	89	GHLMNOPR1	8.0 x 4, 7 x 14.1cm	1lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.9W	L1/L2 GNSS Active	Apple iOS Bluetooth compatible receiver for centimeter applications
	SXBlue III-L GNSS	372 channel	L1 / L2 / (L2C) C/A & P code, CP, GPS +GLONASS +GALILEO, SBAS, OmniSTAR VBS / XP / HP / G2	89	GHLMNOPR1	8.0 x 5.6 x 14.1cm	1, 2lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.9W	L1/L2/LBand GNSS Active	Dual Frequency GNSS, Worldwide 10cm with OmniSTAR HP, G2 and XP services
	iSXBlue II +GPS	372 channel	L1 C/A code & phase, GPS, SBAS	27	GHLMNOPR1	8.0 x 4.7 x 14.1cm	1lb (w/batt.)	2.5m / 60cm / 3cm / 1cm, 95%	na	1Hz, optional 10 & 20Hz		60s	35s	<1s	3	Bluetooth, USB, RS-232 (all independent)	4, 800 - 115, 200	-20 to +60 (batttery)	Integrated battery	3.3W	L1 GPS Active	Apple iOS Bluetooth compatible receiver for affordable submeter applications
Geodetics Inc. *www.geodetics.com*	Geo-INAV	All in view	GPS L1 C/A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNRTV12	4.74 x 1.81 x 3.95in (tactical version)	20oz (tactical version)	< 1.5m CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40 to +85	External 10-30 VDC @2 AMPS	5 (tactical version)	ext	Fully Integrated Inertial Navigation System for Low-High Dynamic Platforms, UAV, UGV, USV
	Geo-RelNAV	All in view	GPS L1 C/A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADLMOPNRTV1	4.74 x 1.81 x 3.95in (tactical version)	20oz (tactical version)	< 1.5m CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40 to +85	External 10-30 VDC @2 AMPS	5 (tactical version)	ext	Relative navigation system for applications requiring relative platform data i.e. aerial refueling, shipboard landing
	Geo-Pointer	All in view	GPS L1 C/A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNORTV12	4.74 x 2.2 x 3.95in	1lb 7oz	< 1.5m CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.1		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40 to +85	External 10-30 VDC @2 AMPS	5 (tactical version)	ext	Dual-GPS based attitude determination system
	Geo-hNAV	All in view	GPS L1 C/A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNRTV12	4.74 x 1.81 x 3.95in (tactical version)	20oz (tactical version)	< 1.5m CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40 to +85	External 10-30 VDC @2 AMPS	5 (tactical version)	ext	Hybrid dual-GPS / IMU navigation system for stationary or slowly moving platforms i.e. aerostat
	Geo-PNT	All in view	GPS L1 C/A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNRTV12	4.74 x 2.2 x 3.95in (tactical version)	1lb 7oz (tactical version)	< 1.5m CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40 to +85	External 10-30 VDC @2 AMPS	9 (tactical version)	ext	Accurate timing, position and attitude in a single box combining a high performance, versatile, GPS master clock with an accurate inertial navigation system in a single box solution.

RECEIVER SURVEY 2017

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	Geo-MMS	All in view	GPS L1 C/A code, 24 GPS; (L2 optional, SAASM optional)	All in view	ADGLMMetNRTV12	4.74 x 3.9 x 2.2in (tactical version)	3.9 lb	< 1.5m CEP / < 5cm CEP / < 5cm CEP	15ns	1 to 0.01		50s ± 15s	30s	3s	5	Serial, Ethernet	Programmable	-40 to +85	External 10-30 VDC @2 AMPS	5 (tactical version)	ext	Fully integrated LiDAR mapping payload for integration with small unmanned vehicles. Includes an inertial navigation system coupled with a LiDAR sensor.
GEOsat *www.geosat.de www.geosat.eu*	MXbox GNSS	372 L1 GNSS (GPS, Glonass, Galileo, Beidou) code and carrier phase tracking, 3 SBAS	L1, C/A CP smoothed, Glonass L1, SBAS, Beacon	All in view	GHLR1	115 x 115 x 40mm	0.35kg	1.2m / 0.3m / nr / nr RMS	nr	1Hz		60s	30s	0.5s	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 GPRS (NTRIP)
	GEOmeter MX	372 L1 GNSS (GPS, Glonass, Galileo, Beidou) code and carrier phase tracking, 3 SBAS	L1, C/A CP smoothed, Glonass L1, SBAS, Beacon	All in view	GHLR1	180 x 100 x 40mm	1.2kg	1.2m / 0.3m / nr / nr RMS	nr	1Hz		60s	30s	2s	2	RS-232, USB, BT	38, 400	-40 to +85	ext, 12 V	1	L1 GNSS (E) Beacon	SBAS and/or beacon and/or GPRS, PDA-unit
	GEObox smart	65 L1 (GPS/Glonass)	L1, C/A	All in view	NV1	120 x 60 x 40mm	0.15kg	5m / 1m / nr / nr CEP	nr	1Hz		45s	38s	1s	7	3 digital, 1 analog	19, 200	-10 to +85	ext. 8 –30 V	0.2	L1 (E)	SBAS, GPRS modem, CAN-Interface
GlobalTop Technology *www.gtop-tech.com*	Ivory3	66 Channels All in View Tracking	GPS L1 C/A code	22	12.7 x 9 x 2.1mm	1g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C	4, 800 - 115, 200	-40 to +85	ext	13/19/24mA (Power Tracking) 6/14/18 mA (GLP mode)	ext	Ultra-low power Standalone GPS-Only Module based on MT3339
	LadyBird 1	66 Channels All in View Tracking	GPS L1 C/A code	22	16 x 16 x 4.7mm	4g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C, External Antenna	4, 800 - 115, 200	-40 to +85	ext	19/24/36mA (Power tracking) 6/14/22 mA (GLP mode)	Ceramic Patch Antenna	Advanced GPS-Only Patch Antenna Module based on MT3339
	LadyBird 3	66 Channels All in View Tracking	GPS L1 C/A code	22	16 x 16 x 6.2mm	6g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART	4, 800 - 115, 200	-40 to +85	ext	16/23/30mA	Ceramic Patch Antenna	Ultra-low power GPS-Only Patch Antenna Module based on MT3339
	Firefly X1	99 channels	GPS +Glonass, GPS +Galileo (on request), GPS +Beidou (on request)	33	9.0 x 9.5 x 2.1mm	0.7g	Without aid: 2.5m (50% CEP) DGPS: 2.0m (50% CEP) RTCM: <2.0m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C, SPI,	4, 800 - 115, 200	-40 to +85	ext	18/24/30mA	ext	Advanced Multi-GNSS, Multi-Interface Standalone Module based on MT3333
	FireFly 1	99 channels	GPS +Glonass, GPS +Galileo (on request), GPS +Beidou (on request)	33	11.5 x 13 x 2.1mm	1g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C	4, 800 - 115, 200	-40 to +85	ext	24/31/36mA	ext	Multi-GNSS Standalone Module based on MT3333
	Titan 2	99 channels	GPS +Glonass, GPS +Galileo (on request), GPS +Beidou (on request)	33	16 x 16 x 6.8mm	6g	Without aid: 3.0m (50% CEP) DGPS: 2.5m (50% CEP)	10 ns RMS	Up to 10Hz (Default: 1Hz)	<35s (<15 with AGPS)		<35s (<15 with AGPS)	<33s (<5 with AGPS)	<1s		UART, I2C	4, 800 - 115, 200	-40 to +85	ext	18/23/28mA	Ceramic Patch Antenna	Multi-GNSS Patch Antenna Module based on MT3333
Hemisphere GNSS *www.hemispheregnss.com*	Crescent P102 OEM Board	24 par	L1 only, C/A–code & CP (SBAS)	12	AGLMNPRV2	1.6 x 0.5 x 2.9in	<0.7oz	1.2m / 0.3m / 1cm / 5mm (RMS)	50	0.05		60s	30s	<10s	4	3.3 V HCMOS	4, 800 - 115, 200	-40 to +85	ext	<1.0	GPS + SBAS (ER)	GPS and SBAS receiver module
	Eclipse P206 OEM Module	162 par	L1 C/A, (SBAS), GLONASS G1, BeiDou B1, Galileo E1, and QZSS L1 C/A	27	AGLMNPRV2	1.6 x 0.5 x 2.9in	<0.8oz	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	6	3.3 V HCMOS, USB	4, 800 - 115, 200	-40 to +85	ext	<3.2	GPS + SBAS + GLONASS + Galileo + BeiDou (ER)	Single frequency GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS receiver module
	Eclipse P306 OEM Module	372 par	L1 / L2, C/A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, and QZSS L1 C/A & L2C	89	AGLMNPRV2	1.6 x 0.5 x 2.9in	<0.8oz	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	30s	<10s	6	3.3 V HCMOS, USB	4, 800 - 115, 200	-40 to +85	ext	<3.9	GPS + SBAS + GLONASS + Galileo + BeiDou (ER)	Dual / Triple frequency GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS receiver module
	Eclipse P326 OEM Module	394 par	GPS L1CA / L1P / L1C / L2P / L2C / L5, GLONASS G1 / G2, P1 / P2, BeiDou, B1 / B2 / B3 GALILEO E1BC / E5a / E5b and QZSS L1CA / L2C / L5 / L1C	89	AGLMNPRV2	1.6 x 0.5 x 2.9in	<0.8oz	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	30s	<10s	6	3.3 V HCMOS, USB	4, 800 - 115, 200	-40 to +85	ext	<3.9	GPS + SBAS + GLONASS + Galileo + BeiDou (ER)	Dual / Triple frequency GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS receiver module
	Eclipse P328 OEM Module	394 par	GPS L1CA / L1P / L1C / L2P / L2C / L5, GLONASS G1 / G2, P1 / P2, BeiDou, B1 / B2 / B3 GALILEO E1BC / E5a / E5b and QZSS L1CA / L2C / L5 / L1C	89	AGLMNPRV2	3.9 x 0.4 x 2.3in	<1.5oz	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	30s	<10s	6	3.3 V HCMOS, USB	4, 800 - 115, 200	-40 to +85	ext	<3.9	GPS + SBAS + GLONASS + Galileo + BeiDou (ER)	Dual / Triple frequency GPS, GLONASS, BeiDou, Galileo, QZSS and SBAS receiver module
	A101 Smart Antenna	24 par	L1 only, C/A–code & CP (SBAS)	12	AGLMNPRV1	5.7 x 4.1in	1.23lb	1.2m / 0.3m / 1cm / 5mm (RMS)	50	0.05		60s	30s	<10s	2	RS-232, CAN	4, 800 - 115, 200	-40 to +70	ext	<3	Integrated GPS + SBAS	GPS and SBAS smart antenna
	A325 GNSS Smart Antenna	114 par	L1 / L2, C/A & P code & CP, (SBAS), and GLONASS G1 / G2	27	AGLMNPRV1	4.1 x 5.7in	1.23lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	2	RS-232, Bluetooth, CAN	4, 800 - 115, 200	-40 to +70	ext	<4.6	Integrated GPS + SBAS + GLONASS (ER) (inc.)	L1/L2 GPS & GLONASS, SBAS and Bluetooth smart antenna
	AtlasLink / A326 GNSS Smart Antenna	372 par	L1 / L2, C/A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C/A & L2C, and L-Band	89	AGLMNPRV1	6.2 x 3.2 x 6.2in	<2.53lb	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	20s	<5s	5	RS-232, CAN, Bluetooth, Wi-Fi	4, 800 - 115, 200	-40 to +70	ext	<4.5	Integrated GPS + SBAS + GLONASS + Galileo + BeiDou (ER)	L1/L2 GPS, GLONASS G1/G2, BeiDou B1/B2/ B3, Galileo, QZSS, Atlas L-band, and SBAS Smart Antenna
	S320 GNSS Survey Receiver	114 par	L1 / L2, C/A & P code & CP, (SBAS), and GLONASS G1 / G2	27	AGLMNPRV1	4.5 x 7.8in	3.3lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	6	RS-232 (Multi-Use), RS-232, Bluetooth, USB, Bluetooth, SD, UHF, GSM	4, 800 - 38, 400	-40 to +70	iny w/ option of ext	Rover: 4.4 Base Tx UHF: 7	Integrated GPS + SBAS + GLONASS (ER)	L1/L2 GPS & GLONASS, SBAS, UHF radio, GSM, SD & USB logging, Bluetooth smart antenna
	S321 GNSS Smart Antenna	372 par	L1 / L2, C/A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C/A & L2C, and L-Band	89	AGLMNPRV1	5.5 x 5.5in	3.1lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	6	RS-232 (Multi-Use), RS-232, Bluetooth, Wi-Fi, SD, UHF, GSM	4, 800 - 38, 400	-40 to +70	iny w/ option of ext	Rover: 4.4 Base Tx UHF: 7	L1/L2 GPS + GLONASS + BeiDou + Galileo + QZSS + Lband + SBAS (ER)	L1/L2 GPS, GLONASS G1/G2, BeiDou B1/ B2/B3, Galileo, QZSS, Atlas L-band, and SBAS receiver
	R330 GNSS Receiver	372 par	L1 / L2, C/A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C/A & L2C, L-Band, and Beacon	89	AGLMNPRV1	4.7 x 1.8 x 7.0in	1.42lb	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	30s	<15s	2	RS-232	4, 800 - 115, 200	-40 to +70	ext	<4.7	L1/L2 GPS + SBAS + Lband + GLONASS (ER) (inc.) + Beacon	L1/L2 GPS, GLONASS G1/G2, BeiDou B1/B2/ B3, Galileo, QZSS, Atlas L-band, Beacon, SBAS and USB logging receiver
	Vector H200 GNSS Compass Module	108 par.	L1 C/A, (SBAS), and GLONASS G1	27	AGLMNOPRV2	2.8 x 0.2 x 4.3in	<1.8oz	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		40s	20s	<10s	6	3.3 V HCMOS, USB	4, 800 - 115, 200	-40 to +85	ext	<2.1	GPS + GLONASS + SBAS (ER)	GPS & GLONASS, SBAS compass receiver module
	Vector H321 GNSS Compass Module	744 par	L1 / L2, C/A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C/A & L2C, and L-Band	89	AGLMNOPRV2	2.8 x 0.6 x 6.0in	<3.7oz	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		60s	30s	<10s	5	3.3 V HCMOS, USB	4, 800 - 115, 200	-40 to +85	ext	<4.7	L1/L2 GPS + GLONASS + BeiDou + Galileo + QZSS + Lband + SBAS (ER)	L1/L2 GPS, GLONASS G1/G2, BeiDou B1/B2/ B3, Galileo, QZSS, Atlas L-band, and SBAS receiver module
	Vector V102 GPS Compass	48 par	L1 only, C/A–code & CP (SBAS)	12	AGLMNOPV1	6.2 x 2.7 x 16.4in	3.3lb	1.2m / 0.3m / 1cm / 5mm (RMS)	50	0.05		60s	30s	<10s	2	RS-232, NMEA2000	4, 800 - 115, 200	-40 to +70	ext	<3	Integrated GPS + SBAS	GPS and SBAS smart antenna
	Vector V103 GPS Compass	108 par.	L1 C/A, (SBAS), and GLONASS G1	27	AGLMNOPV1	8.3 x 5.8 x 26.1in	4.6lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	30s	<10s	2	RS-232, RS-422	4, 800 - 115, 200	-40 to +70	ext	<4.6	Integrated GPS + SBAS + GLONASS (optional Beacon)	GPS, GLONASS and SBAS smart antenna (optional beacon differential)
	Vector V104 GPS Compass	48 par	L1 only, C/A–code & CP (SBAS)	12	AGLMNOPV1	5.1 x 1.8 x 10.2in	0.9lb	1.2m / 0.3m / 1cm / 5mm (RMS)	50	0.05		60s	30s	<10s	2	RS-232, or NMEA2000	4, 800 - 115, 200	-40 to +70	ext	<2	Integrated GPS + SBAS	GPS and SBAS smart antenna
	Vector V320 GNSS Compass	744 par	L1 / L2, C/A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C/A & L2C, and L-Band	89	AGLMNOPV1	8.3 x 5.8 x 26.1in	4.6lb	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		40s	20s	<10s	3	RS-232, RS-422	4, 800 - 115, 200	-30 to +70	ext	<7	L1/L2 GPS + GLONASS + BeiDou + Galileo + QZSS + Lband + SBAS + Beacon (ER)	L1/L2 GPS, GLONASS, BeiDou, QZSS compass receiver with Atlas L-Band, SBAS and Beacon differential, USB logging receiver
	Vector VS131 GNSS Compass	108 par.	L1 C/A, (SBAS), GLONASS G1, and Beacon	27	AGLMNOPV1	4.7 x 3.0 x 8.0in	2.5lb	1.2m / 0.3m / 1cm / 5mm (RMS)	20	0.05		60s	20s	<10s	3	RS-232, USB	4, 800 - 115, 200	-30 to +70	ext	<5.5	GPS + SBAS + GLONASS + Beacon (ER)	GPS and GLONASS, SBAS and Beacon receiver
	Vector VS330 GNSS Compass	744 par	L1 / L2, C/A & P code & CP, (SBAS), GLONASS G1 / G2, BeiDou B1 / B2 / B3, Galileo E1 / E5b, QZSS L1 C/A & L2C, and L-Band	89	AGLMNOPV1	4.7 x 3.0 x 8.0in	2.5lb	1.2m / 0.3m / 1cm / 3mm (RMS)	20	0.05		40s	20s	<10s	3	RS-232, RS-422, USB	4, 800 - 115, 200	-30 to +70	ext	<7	L1/L2 GPS + GLONASS + BeiDou + Galileo + QZSS + Lband + SBAS + Beacon (ER)	L1/L2 GPS, GLONASS, BeiDou, QZSS compass receiver with Atlas L-Band, SBAS and Beacon differential, USB logging receiver
IFEN GmbH *www.ifen.com*	SX3	user-defined, 490 par. tested on Intel i7-4790K	up to 8 signal chains tracked in real-time GPS L1 C/A, L2 P, L2C, L5; Galileo E1, E5a, E5b, E5 AltBOC, E6; GLONASS G1 C/A, G2 C/A; BeiDou B1, B2; SBAS L1, L5; QZSS L1 C/A & SAIF, IRNSS SPS L-band, S-band	user-defined, up to 490 tested	AGLMMetNOPSTV1	13.5 x 3.5 x 20.0cm	0.9kg (+PC or notebook)	~10m (95%); Code accuracy: <20cm; Carrier accuracy: < 1mm	<10	up to 25Hz PVT		<55s	<10s	<1s	1	1 USB 3.0		-0 to +40	ext.	<20W	Active, external	Multi-frequency real-time software receiver with opt. dual antenna feature, external sensor data interface. For scientific applications, fully flexible and open system. Includes external notebook.
	NavX-NTR	120 par. Narrow correlator	GPS L1 C/A, L2 P, L2C, L5 Galileo E1, E5ab, E6 GLONASS G1 C/A & P GLONASS G2 IRNSS L +S-Band BeiDou B1, B2, SBAS	all in view	NP1	19in x 1HU x 22cm	2.5kg	~10m (95%)	<10	10Hz PVT		<60s	<30s	<1s	1	1 Ethernet		-20 to +60	ext. (AC/DC)	<30W	Active, external	Monitoring and reference station applications
Interstate Electronics Corporation *www.iechome.com*	TruTrak Munitions	12 dedicated or multiplexed	L1 / L2 C/A and P(Y)	12	D	3.42 x 3.42 x 0.495in	<0.25lb	ITAR Controlled - Data available upon request	100	0.5 or 1		120s	35s	5s	2	Serial RS-422 Serial TTL - CDU (debug)	as above	as above	ext	3 (typ)	E	
	TruTrak Evolution SS	12 dedicated	L1 C/A and P(Y)	12	D	3.07 x 0.93in with tabs to 1.49in	23g	ITAR Controlled - 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	Passive	as above
	TruTrak Type II	24 dedicated	L1 / L2 C/A and P(Y)	12	D	1.76 x 0.368 x 2.45	35g	ITAR Controlled - Data aviliable upon request	40 ns			<120s	<60	Data Avaliable on request		8 serial data ports, 2RS - 232 2 SPI (7 slaves) 2 SDLC AMRAAM IMU Ports 21 general purpose I/O Extrenal 10MHz input		- 40 to +85	3.3	1.5	Passive and Active	
	SAASM FireFly-IIA DOCXO GPSDO	12 par.	L2, L1, Y(P), C/A, SAASM	12	ADLMMETNOT2	2.85 x 2.0 x 0.5	<2.5oz	<2m RMS	<30ns RMS	1Hz		<60s	<1s	<1s	1	RS-232 NMEA-0183, SCPI, 10MHz, DS-101 KeyFill Port	9, 600 - 115, 200	-45 to +85	11V-14V	<4.0W	3.3V	Very Low Phase Noise and very good ADEV, with Small and Ultra Low Power MicroGRAM SAASM GPS with Y(P), C/A code
	Motorola / iLotus M12M / M12 +compatible GNSS Replacement Receiver Module	72	L1, C/A, GPS, GLONASS, BeiDou, QZSS, WAAS, EGNOS, SBAS	72	ADLMMETNOTV2	2.362 x 1.575 x 0.6	<2oz	<0.7m RMS	<5ns RMS quantization corrected	1Hz/5Hz		<35s	<1s	<1s	3	TTL, USB, Motorola Binary, SCPI, NMEA, Status, 10MHz, 1PPS	9, 600 - 115, 200	-40 to +85	3V/5V	180mW	3V to 5V	Form, Fit, Function compatible replacement and upgrade for Motorola/iLotus M12M and M12 +GPS receiver. Adds GLONASS, BeiDou, and SBAS capability
	HD CSAC SAASM GPSDO	12 par.	L2, L1, Y(P), C/A, SAASM	12	ADLMMETNOT2	2.85 x 2.0 x 0.5	<2oz	<2m RMS	<30ns RMS	1Hz		<60s	<1s	<1s	1	RS-232 NMEA-0183, SCPI, 10MHz, DS-101 KeyFill Port	9, 600 - 115, 200	-45 to +85	8.V-16V	<1.0W	3.3V	Ultra Small and Ultra Low Power SAASM GPS with Y(P), C/A code, and Chip Scale Cesium Atomic Clock.
	Low Noise Rubidium GNSDO	72 par.	L1, C/A, GPS, GLONASS, BeiDou, QZSS, WAAS, EGNOS, SBAS	72	ADLMMETNOTV2	3.40 x 4.4 x 1.0	<400g	<0.7m RMS	<5ns RMS	1Hz		<35s	<1s	<1s	3	RS-232, RS-422, USB, NMEA, Status, 10MHz, 1PPS	9, 600 - 115, 200	-40 to +70	8V to 36V	5.6W	5V	Ruggedized, enclosued Disciplined Rubidium Concurrent-GNSS Oscillator with ultra low Phase Noise and ADEV performance
	LTE-Lite 10 / 15.36 / 19.2 / 20 / MHz SMT Module GPSDO	65 par.	L1, C/A, GPS / QZSS, WAAS, EGNOS, SBAS	65	ADLMMETNOTV2	0.7 x 1.2 x 0.1in	0.1oz	<2m RMS	<30ns RMS	1Hz and 5Hz		<35s	<1s	<1s	2	TTL NMEA, Status, 10MHz, 1PPS	38400	-20 to +85	3.3V	<0.2W	3.3V to 5V	LTE Small Cell optimized SMT frequency/timing and GPS module, very low cost, Size, Weight, and Power,
	Low Power HD CSAC (Chip Scale Cesium Atomic Clock) SWAP optimized GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOT2	2 x 2.5 x 0.5in	<2oz	<2m RMS	<15ns RMS	1Hz		<45s	<1s	<1s	2	RS-232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85	5V	<0.45W	5V	Very Low Power Chip Scale Cesium Atomic Clock with GPS Disciplining
	FireFly-IIA 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3 x 1in	1.74oz	<2m RMS	<30ns RMS	1Hz		<45s	<1s	<1s	1	RS-232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85	11-14V	<3.5W	5V	Built-In 10MHz Distribution Amplifier, 3-Axis Accelerometer, low-g option
	FireFly-1A 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.0 x 2.5 x 0.5in	0.64oz	<2m RMS	<30ns RMS	1Hz		<45s	<1s	<1s	1	RS-232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85	8-14V	<1.4W	3.3V	Ultra small and light GPS Disciplined Oscillator
	ULN-2550 25MHz / 100MHz / 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3.5 x 0.8in	1.8oz	<2m RMS	<30ns RMS	1Hz		<45s	<1s	<1s	1	RS-232, Alarm, 10/25/50/100MHz, 1PPS	115, 200	-20 to +85	11-14V	<3.5W	5V	Adds four 25MHz LVDS outputs (50MHz option), a 100MHz output, and a 10MHz output
	Mini-JLT GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	5.05 x 1.38 x 0.7in	2oz	<2m RMS	<15ns RMS	1Hz		<45s	<1s	<1s	2	TTL/USB NMEA-0183, SCPI, 10MHz	9600bps async	-30 to +70	5V	<2.5W	3.3V/5V	Trimble Mini-T Legacy Replacement unit with improved phase noise, ADEV, and wider temp-range
	LC_XO GPSDO 10MHz	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	0.97 x 0.97 x 0.5	<1oz	<2m RMS	<30ns RMS	1Hz		<45s	<1s	<1s	1	TTL NMEA-0183, SCPI, 10MHz	9, 600 - 115, 200	-35 to +75	3.3V	<0.55W	5V	Socketable Low Cost GPSDO module with 1 inch square footprint and 10MHz output
Jackson Labs Technologies, Inc. *www.jackson-labs.com*	SAASM FireFly-IIA DOCXO GPSDO	12 par.	L2, L1, Y(P), C/A, SAASM	12	ADLMMETNOT2	2.85 x 2.0 x 0.5	<2.5oz	<2m RMS	<30ns RMS	1Hz		<60s	<1s	<1s	1	RS-232 NMEA-0183, SCPI, 10MHz, DS-101 KeyFill Port	9, 600 - 115, 200	-45 to +85	11V-14V	<4.0W	3.3V	Very Low Phase Noise and very good ADEV, with Small and Ultra Low Power MicroGRAM SAASM GPS with Y(P), C/A code
	HD CSAC SAASM GPSDO	12 par.	L2, L1, Y(P), C/A, SAASM	12	ADLMMETNOT2	2.85 x 2.0 x 0.5	<2oz	<2m RMS	<30ns RMS	1Hz		<60s	<1s	<1s	1	RS-232 NMEA-0183, SCPI, 10MHz, DS-101 KeyFill Port	9, 600 - 115, 200	-45 to +85	8.V-16V	<1.0W	3.3V	Ultra Small and Ultra Low Power SAASM GPS with Y(P), C/A code, and Chip Scale Cesium Atomic Clock.
	LTE-Lite 10 / 15.36 / 19.2 / 20 / MHz SMT Module GPSDO	65 par.	L1, C/A, GPS / QZSS, WAAS, EGNOS, SBAS	65	ADLMMETNOTV2	0.7 x 1.2 x 0.1in	0.1oz	<2m RMS	<30ns RMS	1Hz and 5Hz		<35s	<1s	<1s	2	TTL NMEA, Status, 10MHz, 1PPS	38400	-20 to +85	3.3V	<0.2W	3.3V to 5V	LTE Small Cell optimized SMT frequency/timing and GPS module, very low cost, Size, Weight, and Power,

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	Low Power HD CSAC (Chip Scale Cesium Atomic Clock) SWAP optimized GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOT2	2 x 2.5 x 0.5in	<2oz	<2m RMS	<15ns RMS	1Hz		<45s	<1s	<1s	2	RS-232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85	5V	<0.45W	5V	Very Low Power Chip Scale Cesium Atomic Clock with GPS Disciplining
	FireFly-IIA 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3 x 1in	1.74oz	<2m RMS	<30ns RMS	1Hz		<45s	<1s	<1s	1	RS-232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85	8-14V	<3.5W	5V	Built-In 10MHz Distribution Amplifier, 3-Axis Accelerometer, low-g option
	FireFly-1A 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.0 x 2.5 x 0.5in	0.64oz	<2m RMS	<30ns RMS	1Hz		<45s	<1s	<1s	1	RS-232, Alarm, 10MHz, 1PPS	9, 600 - 115, 200	-20 to +85	8-14V	<1.4W	3.3V	Ultra small and light GPS Disciplined Oscillator
	ULN-2550 25MHz / 100MHz / 10MHz GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	1.5 x 3.5 x 0.8in	1.8oz	<2m RMS	<30ns RMS	1Hz		<45s	<1s	<1s	1	RS-232, Alarm, 10/25/50/100MHz, 1PPS	115, 200	-20 to +85	11-14V	<3.5W	5V	Adds four 25MHz LVDS outputs (50MHz option), a 100MHz output, and a 10MHz output
	Mini-JLT GPSDO	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	5.05 x 1.38 x 0.7in	2oz	<2m RMS	<15ns RMS	1Hz		<45s	<1s	<1s	2	TTL/USB NMEA-0183, SCPI, 10MHz	9600bps async	-30 to +70	5V	<2.5W	3.3V/5V	Trimble Mini-T Legacy Replacement unit with improved phase noise, ADEV, and wider temp-range
	LC_XO GPSDO 10MHz	50 par.	L1, C/A, WAAS, EGNOS, SBAS	50	ADLMMETNOTV2	0.97 x 0.97 x 0.5	<1oz	<2m RMS	<30ns RMS	1Hz		<45s	<1s	<1s	1	TTL NMEA-0183, SCPI, 10MHz	9, 600 - 115, 200	-35 to +75	3.3V	<0.55W	5V	Socketable Low Cost GPSDO module with 1 inch square footprint and 10MHz output
Japan Radio Co., Ltd. *www.jrc.co.jp/eng/*	GPS9 Series: CCA-700	16 channels +search channel	GPS / QZSS / Galileo	16	CHLMNPV2	12.4 x 2.5 x 12.4mm	0.7g (approx)	2.3m typ. / 2.0m typ. / na (CEP)	na	1Hz		35s typ.	33s typ.	3s typ. (within 5s block out)	1	1 UART	480 Mbps 480 Mbps 10/100 Mbps 54 Mps 2 Mbps	-40 to +85	ext	140mW @3.3V	Active, Includes Pre-amplifier	Galileo: Hardware Ready
	GPS10Series: CCA-800	23channels +search channel	GPS / QZSS / GLONASS / BeiDou / Galileo	23	CHLMNPV2	12.4 x 2.5 x 12.4mm	0.7g (approx)	2.3m typ. / 2.0m typ. / na (CEP)	na	1Hz		35s typ.	8s typ.	2s typ.	1	1 UART	2400bps 4800bps 9600bps 19200bps 38400bps	-40 to +85	ext	150mW @3.3V	Active, Includes Pre-amplifier	
JAVAD GNSS *www.javad.com*	TRIUMPH-LS	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF; BeiDou B1 / B2	all in view	1GHLMTNPROMet	183 x 124 x 106mm	2100g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	1111111111	USB 2.0 Host USB 2.0 Device Ethernet Wi-Fi Bluetooth; 1PPS (optional) Event Marker (optional) Ext. Frq In/Out (optional)	480 Mbps; 480 Mbps; 10/100 Mbps; 65 Mps; 2 Mbps	-30 to +55	ext/int	8	int/ext	16GB internal memory, microSD card slot, UHF/FH radio, 4G/LTE card, 800x480 colour TFT LCD, J-FIELD SOFTWARE
	TRIUMPH-1M	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF; BeiDou B1 / B2	all in view	1AGLMTNPROMet	178 x 96 x 178mm	1700g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	2111111111	RS-232 USB 2.0 Ethernet Wi-Fi Bluetooth 1PPS (optional) Event Marker (optional) Ext. Ant. (optional)	480 kbps; 480 Mbps; 10/100 Mbps; 54 Mps; 2 Mbps	-40 to +60	ext/int	4.5	int/ext	16GB internal memory, microSD card slot, UHF/FH radio, 4G/LTE card
	TRIUMPH-NT	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF; BeiDou B1 / B2	all in view	1GHLMTNPROMet	176 x 126 x 62mm	1100g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	1111111	USB OTG Wi-Fi; Bluetooth; 1PPS (optional); Event Marker (optional) Ext. Freq In/Out (optional)	480 Mbps; 65 Mbps; 2 Mbps	-30 to +55	ext/int	7.5	ext	16GB internal memory, microSD card slot, UHF/FH radio, 4G/LTE card, 800x480 colour TFT LCD, J-FIELD SOFTWARE
	TRIUMPH-2	216	GPS CA / P1 / P2 / L2C; GLONASS CA / L2C / P1 / P2; SBAS L1;	all in view	1AGLMTNPROMet	85 x 61 x 132mm	560g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	111	USB; Wi-Fi; Bluetooth	12 Mbps; 54 Mps; 2 Mbps	-40 to +60	ext/int	2.5	int	2048MB memory
	OMEGA	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc / E6; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF / LEX; BeiDou B1 / B2 / B3	all in view	1AGLMTNPROMet	125 x 65 x 170mm	1300g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	222111111111	RS232; RS422; USB; Ethernet; Bluetooth; Wi-Fi; CAN; 1PPS; Event Marker; IRIG; Ext. Freq In/Out	460.8kbps; 460.8kbps; 480Mbps; 10/100 Mbps; 2 Mbps; 1Mps	-35 to +75	ext/int	9	E	16GB memory, UHF/FH radio, Cellular module, In Band Interference Rejection
	SIGMA-3	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc / E6; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF / LEX; BeiDou B1 / B2 / B3	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1270g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8kbps; 460.8kbps; 480Mbps; 10/100 Mbps; 2 Mbps, 55 Mbps; 1Mps	-35 to +75	ext/int	9	ext	16GB memory, UHF/FH radio, 4G/LTE cellular module, In Band Interference Rejection
	DELTA- 3	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc / E6; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF / LEX; BeiDou B1 / B2 / B3	all in view	1AGLMTNPROMet	109 x 35 x 160mm	420g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	32111221	RS232; RS422; USB; Ethernet; CAN (optional); 1PPS (optional); Event Marker (optional); IRIG (optional); Ext. Freq In/Out (optional)	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 1 Mps	-40 to +70	ext	8	ext	16GB memory
	TRE- 3	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc / E6; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF / LEX; BeiDou B1 / B2 / B3	all in view	1AGLMTNPROMet	100 x 80mm	87g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	32111221	RS232; RS422; USB; Ethernet; CAN (optional); 1PPS (optional); Event Marker (optional); IRIG (optional); Ext. Freq In/Out (optional)	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 1 Mps	-40 to +70	ext	8	ext	16GB memory
	SIGMA-3N	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF; BeiDou B1 / B2	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1270g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8kbps; 460.8kbps; 480Mbps; 10/100 Mbps; 2 Mbps; 1Mps	-35 to +75	ext/int	5.5	ext	16GB memory; UHF/FH radio; Cellular module; In Band Interference Rejection
	DELTA- 3N	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF; BeiDou B1 / B2	all in view	1AGLMTNPROMet	109 x 35 x 160mm	420g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	32111221	RS232; RS422; USB; Ethernet; CAN (optional); 1PPS (optional); Event Marker (optional); IRIG (optional); Ext. Freq In/Out (optional)	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 1 Mps	-40 to +70	ext	4.5	ext	16GB memory In Band Interference Rejection
	TRE- 3N	864	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A / E5B / AltBoc; GLONASS CA / L2C / P1 / P2 / L3; SBAS L1 / L5; QZSS CA / L1C / L2C / L5 / SAIF; BeiDou B1 / B2	all in view	1AGLMTNPROMet	100 x 80mm	87g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	32111221	RS232; RS422; USB; Ethernet; CAN (optional); 1PPS (optional); Event Marker (optional); IRIG (optional); Ext. Freq In/Out (optional)	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 1 Mps	-40 to +70	ext	4.5	ext	16GB memory In Band Interference Rejection
	SigmaQM	864	4x GPS CA / P1 / P2 / L2C; 4x Galileo E1; 4x Glonass CA / P1 / P2 / L2C; 4x SBAS L1; 4x QZSS CA / SAIF / L2C / L1C; 4x BeiDou B1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1330g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG	460.8 kbps; 12 Mbps; 1 Mps	-35 to +75	ext/int	8	ext	16GB memory; UHF/FH radio; Cellular module
	DELTAQM	864	4x GPS CA / P1 / P2 / L2C; 4x Galileo E1; 4x Glonass CA / P1 / P2 / L2C; 4x SBAS L1; 4x QZSS CA / SAIF / L2C / L1C; 4x BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	454g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG	460.8kbps; 460.8kbps; 480Mbps; 10/100 Mbps; 2 Mbps; 1Mps	-35 to +75	ext	7.2	ext	16GB memory
	TRE-QUATTRO	864	4x GPS CA / P1 / P2 / L2C; 4x Galileo E1; 4x Glonass CA / P1 / P2 / L2C; 4x SBAS L1; 4x QZSS CA / SAIF / L2C / L1C; 4x BeiDou E1	all in view	2AGLMTNPROMet	100 x 120 x 14mm	130g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	221222111	RS232; RS232/RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet	Up to 115.2 k	-40 to +65	ext	7.2	ext	16GB memory
	Alpha G3	216	GPS CA; Galileo E1; GLONASS CA; SBAS L1; QZSS CA / SAIF / L1C; BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	430g	<2m / <0.5m / 1.5cm +2 ppm / 0.5cm +1.5ppm	3	100Hz					11111	RS232; USB/RS232; Bluetooth; 1PPS/IRIG; Event Marker	460.8 kbps; 12 Mbps; 2 Mbps	-35 to +75	ext/int	1.8	ext	256MB memory; GSM/GPRS modem
	Alpha G2T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	435g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz					11111	RS232; USB/RS232; Bluetooth; 1PPS/IRIG; Event Marker	460.8 kbps; 12 Mbps; 2 Mbps	-35 to +75	ext/int	1.9	ext	256MB memory; GSM/GPRS modem
	Alpha G3T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; GLONASS CA / P1 / P2 / L2C; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	448g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz					11111	RS232; USB/RS232; Bluetooth; 1PPS/IRIG; Event Marker	460.8 kbps; 12 Mbps; 2 Mbps	-35 to +75	ext/int	2.6	ext	256MB memory; GSM/GPRS modem
	Alpha2-G3	216	GPS CA; Galileo E1; GLONASS CA; SBAS L1; QZSS CA / SAIF / L1C; BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	430g	<2m / <0.5m / 1.5cm +2 ppm / 0.5cm +1.5 ppm	3	100Hz					11111	RS232; USB/RS232; Bluetooth; 1PPS/IRIG; Event Marker	460.8 kbps; 12 Mbps; 2 Mbps	-35 to +75	ext	1.6	ext	256MB memory;
	Alpha2-G2	216	GPS CA; Galileo E1; SBAS L1; QZSS CA / SAIF / L1C; BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	415g	<2m / <0.5m / 1.5cm +2 ppm / 0.5cm +1.5 ppm	3	100Hz		<35s	<5s	<1s	11111	RS232; USB/RS232; Bluetooth; 1PPS/IRIG; Event Marker	460.8 kbps; 12 Mbps; 2 Mbps	-35 to +75	ext	1.4	ext	256MB memory;
	Alpha2-G2T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	435g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.5 ppm	3	100Hz					11111	RS232; USB/RS232; Bluetooth; 1PPS/IRIG; Event Marker	460.8 kbps; 460.8 kbps; 480 Mbps, 10/100 Mbps, 1 Mps	-35 to +75	ext	1.7	ext	256MB memory
	Alpha2-G3T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; GLONASS CA / P1 / P2 / L2C; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	1AGLMTNPROMet	148 x 85 x 35mm	448g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.5 ppm	3	100Hz					11111	RS232; USB/RS232; Bluetooth; 1PPS/IRIG; Event Marker	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 1 Mps	-35 to +75	ext	2.4	ext	256MB memory
	Delta G2T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	394g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 1 Mps	-35 to +75	ext	2.5	ext	2048MB memory
	Delta D-G2	216	2x GPS CA; 2x Galileo E1; 2x SBAS L1; 2x QZSS CA / SAIF / L1C; 2x BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	414g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 1 Mps	-35 to +75	ext	2.2	ext	2048MB memory
	Delta D-G2D	216	2x GPS CA / P1 / P2 / L2C; 2x Galileo E1; 2x SBAS L1; 2x QZSS CA / SAIF / L2C / L1C; 2x BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	414g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 1 Mps	-35 to +75	ext	2.2	ext	2048MB memory
	Delta D-G3D	216	2x GPS CA / P1 / P2 / L2C; 2x Galileo E1; 2x Glonass CA / P1 / P2 / L2C; 2x SBAS L1; 2x QZSS CA / SAIF / L2C / L1C; 2x BeiDou E1	all in view	1AGLMTNPROMet	109 x 35 x 169mm	414g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	31111221	RS232; RS422; USB; Ethernet; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 2 Mbps; 1 Mps	-35 to +75	ext	3.9	ext	2048MB memory
	Sigma G2T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1270g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 2 Mbps; 1 Mps	-35 to +75	ext/int	3.3	ext	2048MB memory; UHF/FH radio; Cellular module
	Sigma D-G2	216	2x GPS CA; 2x Galileo E1; 2x SBAS L1; 2x QZSS CA / SAIF / L1C; 2x BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1290g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 2 Mbps; 1 Mps	-35 to +75	ext/int	3	ext	2048MB memory; UHF/FH radio; Cellular module
	Sigma D-G2D	216	2x GPS CA / P1 / P2 / L2C; 2x Galileo E1; 2x SBAS L1; 2x QZSS CA / SAIF / L2C / L1C; 2x BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1290g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	460.8 kbps; 460.8 kbps; 480 Mbps; 10/100 Mbps; 2 Mbps; 1 Mps	-35 to +75	ext/int	3	ext	2048MB memory; UHF/FH radio; Cellular Module
	Sigma D-G3D	216	2x GPS CA / P1 / P2 / L2C; 2x Galileo E1; 2x Glonass CA / P1 / P2 / L2C; 2x SBAS L1; 2x QZSS CA / SAIF / L2C / L1C; 2x BeiDou E1	all in view	1AGLMTNPROMet	132 x 61 x 190mm	1290g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111221	RS232; RS422; USB; Ethernet; Bluetooth; CAN; 1PPS; Event Marker; IRIG/Ext. Freq In/Out	2 Mbps	-35 to +75	ext/int	4.7	ext	2048MB memory; UHF/FH radio; Cellular module
	TR-G2	216	GPS CA; Galileo E1; SBAS L1; QZSS CA / SAIF / L1C; BeiDou E1	all in view	2AGLMTNPROMet	55 x 40 x 13mm	21g	<2m / <0.5m / 1.5cm +2 ppm / 0.5cm +1.5 ppm	3	100Hz		<35s	<5s	<1s	211111	RS232; USB; CAN; 1PPS; Event Marker; IRIG	460.8 kbps; 460.8 kbps; 12 Mbps; 1 Mps	-35 to +75	ext	1.2	ext	256MB memory
	TR-G3	216	GPS CA; Galileo E1; GLONASS CA; SBAS L1; QZSS CA / SAIF / L1C; BeiDou E1	all in view	2AGLMTNPROMet	57 x 66 x 12mm	34g	<2m / <0.5m / 1.5cm +2 ppm / 0.5cm +1.5 ppm	3	100Hz		<35s	<5s	<1s	211111	RS232; RS422; USB; CAN; 1PPS; Event Marker; IRIG	460.8 kbps; 460.8 kbps; 12 Mbps; 1 Mps	-35 to +75	ext	1.4	ext	256MB memory
	TR-G2T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	2AGLMTNPROMet	57 x 66 x 12mm	34g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111	RS232; RS422; USB; CAN; 1PPS; Event Marker; IRIG	460.8 kbps; 460.8 kbps; 480 Mbps; 1 Mps; 10/100 Mbps	-35 to +75	ext	1.5	ext	256MB memory
	TR-G3T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; GLONASS CA / P1 / P2 / L2C; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	2AGLMTNPROMet	57 x 88 x 12mm	47g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	211111	RS232; RS422; USB; CAN; 1PPS; Event Marker; IRIG	460.8 kbps; 460.8 kbps; 480 Mbps; 1 Mps; 10/100 Mbps	-35 to +75	ext	2.2	ext	256MB memory
	TRE-G2T	216	GPS CA / P1 / P2 / L2C / L5; Galileo E1 / E5A; SBAS L1 / L5; QZSS CA / SAIF / L2C / L5 / L1C; BeiDou E1	all in view	2AGLMTNPROMet	100 x 80 x 14mm	70g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	22122211	RS232; RS232/RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet; Ext. Freq In/Out	460.8 kbps; 460.8 kbps; 480 Mbps; 1 Mps; 10/100 Mbps	-35 to +75	ext	2.5	ext	2048MB memory
	Duo-G2	216	2x GPS CA; 2x Galileo E1; 2x SBAS L1; 2x QZSS CA / SAIF / L1C; 2x BeiDou E1	all in view	2AGLMTNPROMet	100 x 80 x 14mm	90g	<2m / <0.5m / 1.5cm +2 ppm / 0.5cm +1.5 ppm	3	100Hz		<35s	<5s	<1s	22122211	RS232; RS232/RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet	460.8 kbps; 460.8 kbps; 480 Mbps; 1 Mps; 10/100 Mbps	-35 to +75	ext	2.2	ext	2048MB memory
	Duo-G2D	216	2x GPS CA / P1 / P2 / L2C; 2x Galileo E1; 2x SBAS L1; 2x QZSS CA / SAIF / L2C / L1C; 2x BeiDou E1	all in view	2AGLMTNPROMet	100 x 80 x 14mm	90g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	22122211	RS232; RS232/RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet	460.8 kbps; 460.8 kbps; 480 Mbps; 1 Mps; 10/100 Mbps	-35 to +75	ext	2.2	ext	2048MB memory
	Duo-G3D	216	2x GPS CA / P1 / P2 / L2C; 2x Galileo E1; 2x Glonass CA / P1 / P2 / L2C; 2x SBAS L1; 2x QZSS CA / SAIF / L2C / L1C; 2x BeiDou E1	all in view	2AGLMTNPROMet	100 x 80 x 14mm	90g	<2m / <0.5m / 1cm +1 ppm / 0.3cm +0.1 ppm	3	100Hz		<35s	<5s	<1s	22122211	RS232; RS232/RS422; USB; CAN; 1PPS; Event Marker; IRIG; Ethernet	Up to 115.2 k	-40 to +85	ext	3.9	ext	2048MB memory
John Deere *www.Deere.com*	StarFire™ 6000	255 GNSS channels includes 3 L-Band channels	GPS - L1 / L2 / L5; GLONASS - G1 / G2; Beiduo - B1 / B2; Galileo - E1 / E5a / E5b; StarFire L-Band; SBAS; QZSS	All-In-View	WP, LNOPR1, Precision Ag	22 x 18.6 x 28.5	2.8kg	SF1: -Precision: 1m 95% 2D -Pass to Pass: 15cm 95% 1D SF3: -Precision: 3cm 95% 2D -Pass to Pass: 3cm 95% 1D RTK: -Precision: 0.8cm +1ppm 68% 2D -Pass to Pass: 2.5cm 95% 1D at 20K	na	1Hz, 5Hz, 10Hz (user programmable)		70s	65s	40s	6	3 x RS232; 1 x Can Bus; 1 x USB; 1 x Ethernet; simulated ground-speed radar; 1PPS	2, 400 - 230, 400	-40 to +70	9 to 26V DC	5W	int dipole, ext	Integrated 6-axis terrain compensation, proprietary RTK Extend operating mode, compatibility with space-based differential corrections network (StarFire)

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
Leica Geosystems AG *www.leica-geosystems.com*	iCON gps 60	120	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt-BOC, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	197 x 197 x H 130mm	1.45kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		<80s	<80s	0.5s	6	1 combined RS-232/PWR in/PWR out, 1 UART &USB, 1 TNC, 1 QN; 1 USB Host; 1 UART&USB; 1 Bluetooth	2, 400 - 115, 200	-40 to +65	ext/int	6.0	int/ext (e.g., CGA60)	Triple frequency construction RTK GNSS receiver; including built in Display and Keyboard; external GNSS antenna support to be used on a construction machine
	iCON gps 80	120	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt-BOC, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNRV1	180 x 153 x 85mm	2.25kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		<80s	<80s	0.5s	8	2 CAN combined Data/PWR in; 1 combined RS-232/PWR in/t; 1 combined RS-232/PWR out; 1 Ethernet; 4 TNC; 1 USB Host; 1 UART&USB; 1 Bluetooth; 1 PPS	2, 400 - 115, 200	-40 to +65	ext	8.0	ext (e.g., CGA60)	Triple Frequency, Dual Position/Heading GNSS RTK Receiver designed for Machine Control Applications. High speed 4G modem integrated by default, built-in display and keyboard.
	Viva GS08plus	120	GPS: L1, L2, L2C, GLONASS: L1, L2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	GLMNR1	D 186mm x H 71mm	0.7kg	2-3m / 25cm / 10mm +1ppm / 3mm +0.5ppm	< 20	5Hz		50s	35s	0.5s	2	Combined (RS-232, Power, USB), 1 Bluetooth	2, 400 - 115, 200	-40 to +65	ext/int	2.0	int	Dual frequency geodetic and RTK GNSS receiver
	Viva GS10	555	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt-BOC, BeiDou B1, B2, SBAS, L-band; Software upgradeable for future signals	Up to 283	GLMNR1	166 x 79 x 212mm	1.20kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		40s	35s	0.5s	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	AR10/AS10 triple frequency or AR25/AR20 choke ring	Multi-frequency geodetic and RTK GNSS receiver
	Viva GS14	120	GPS: L1, L2, L2C, GLONASS: L1, L2, Galileo: E1, E5b, BeiDou B1, B2, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	GLMNR1	D 190mm x H 119mm	0.93kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		50s	35s	0.5s	2	1 RS-232, 1 combined (RS-232, Power, USB), 1 Bluetooth	2, 400 - 115, 200	-40 to +65	ext/int	2.0	int	Triple frequency geodetic and RTK GNSS receiver
	Viva GS15	555	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt-BOC, BeiDou B1, B2, SBAS, L-band; Software upgradeable for future signals	Up to 283	GLMNR1	D 198mm x H 196mm	1.34kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		40s	35s	0.5s	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	int	Multi-frequency geodetic and RTK GNSS receiver
	Viva GS16	555	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt-BOC, BeiDou B1, B2, SBAS, L-band; Software upgradeable for future signals	Up to 283	GLMNR1	D 198mm x H 196mm	1.34kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		40s	35s	0.5s	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	int	Multi-frequency geodetic and RTK GNSS receiver
	Viva GS25	555	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt-BOC, BeiDou B1, B2, SBAS, L-band; Software upgradeable for future signals	Up to 283	GLMNRT1	200 x 94 x 220mm	1.84kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		40s	35s	0.5s	9	2 RS-232, 1 Combined (RS-232, Power, USB), 1 UART&USB, 1 USB A, 1 Mini USB, 1 PPS, 1 Event, 1 Power, 1 TNC, 1 Bluetooth	2, 400 - 115, 200	-40 to +65	ext/int	3.4	AR10/AS10 triple frequency or AR25/AR20 choke ring	Multi-frequency geodetic and RTK GNSS receiver
	Zeno 5	48	GPS: L1, ; SBAS	48	AGHLMNR1	158 x 78 x 38mm	0.375kg	2-5m / - / - / < 2.0 m	< 20	1Hz		<120s *	<35s*	<10s	2	1 Bluetooth, 1 USB (SnapOn module)			ext/int	1.3	int	Single Frequency Handheld GPS receiver
	Zeno 20	120	GPS: L1, L2, L2C, GLONASS: L1, L2, Galileo E1, BeiDou B1, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGHLMNR1	269 x 99 x 55mm	0.88kg	2-5m / 50cm / 5cm / 10mm +2ppm	< 20	5Hz		50s	35s	0.5s	4	1 Bluetooth, Wireless LAN, Combined (MicroUSB client, Power), USB A Host	2, 400 - 115, 200	-30 to +60	ext/int	1.6	int/ext	Dual Frequency Handheld geodetic and RTK GNSS receiver
	Zeno GG03	120	GPS: L1, L2, L2C, GLONASS: L1, L2, Galileo E1, BeiDou B1, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGLMNR1	D 186mm x H 71mm	0.7kg	2-5m / 40cm / 10mm +2ppm / 10mm +2ppm	< 20	5Hz		50s	35s	0.5s	2	Combined (RS-232, Power, USB), 1 Bluetooth	100 Kbps ARINC	-55 to +80	ext/int	2.0	int	Dual frequency geodetic and RTK GNSS receiver
	Zeno CS25 GNSS	120	GPS: L1, L2, L2C, GLONASS: L1, L2, Galileo E1, BeiDou B1, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	AGHLMNR1	144 x 242 x 40mm	1.4kg	2-5m / 50cm / 10cm / 10mm +2ppm	< 20	5Hz		50s	35s	0.5s	5	2 USB, 1 RS-232, LAN, Power, 1 Bluetooth	RS232: 9.6kbps - 115kbps; USB: up to 12Mbps; Ethernet: up to 100Mbps; Bluetooth: up to 230.4kbps	-40 to +85	ext/int	7-10	int/ext	Dual Frequency Handheld geodetic and RTK GNSS receiver
	GR30	555	GPS: L1, L2P, L2C, L5; GLONASS: L1, L2P, L2C; Galileo E1, E5a, E5b, Alt-BOC; BeiDou B1, B2; QZSS L1, L2C, L5; SBAS; software upgradeable for future signals	All in view	GLMMetOPR1	190 x 78 x 210mm	1.50kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		40s	30s	< 0.5s	5	1 (2 port) power, 1 RS-232, UART, USB, TNC, Ethernet, ext oscillator	2, 400 - 115, 200	-40 to +65	ext	3.1 to 3.5	AR10/AS10 triple frequency or AR25/AR20 choke ring	Permanent multi-frequency GNSS receiver with Ethernet.
	GR50 BT	555	GPS: L1, L2P, L2C, L5; GLONASS: L1, L2P, L2C; Galileo E1, E5a, E5b, Alt-BOC; BeiDou B1, B2; QZSS L1, L2C, L5; SBAS; software upgradeable for future signals	All in view	GLMMetOPR1	190 x 78 x 210mm	1.84kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		40s	30s	0.5s	8	1 (2 port) power, 2 RS-232, 1 UART, 2 USB (client / host), 1 Ethernet with POE, 1 Bluetooth (plus TNC, PPS, Event, Oscillator)	2, 400 - 230, 400	-40 to +65	ext/int/poe	2.8 to 3.3	AR10/AS10 or AR25/AR20 choke ring triple frequency	Reference station and scientific multi-frequency GNSS receiver with Ethernet & Bluetooth
	GR50 WLAN	555	GPS: L1, L2P, L2C, L5; GLONASS: L1, L2P, L2C; Galileo E1, E5a, E5b, Alt-BOC; BeiDou B1, B2; QZSS L1, L2C, L5; SBAS; software upgradeable for future signals	All in view	GLMMetOPR1	190 x 78 x 210mm	1.84kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		40s	30s	0.5s	8	1 (2 port) power, 2 RS-232, 1 UART, 2 USB (client / host), 1 Ethernet with POE, 1 WLAN (plus TNC, PPS, Event, Oscillator)	2, 400 - 230, 400	-40 to +65	ext/int/poe	2.8 to 3.3	AR10/AS10 or AR25/AR20 choke ring triple frequency	Reference station and scientific multi-frequency GNSS receiver with Ethernet & WLAN
	GMX902 GNSS	120	GPS: L1, L2, L2C, L5, GLONASS: L1, L2, Galileo E1, E5a, E5b, Alt-BOC, BeiDou, QZSS, SBAS	Flexible configuration: 120 L1, 60 L1 / L2	MetOP1	167 x 123 x 40mm	0.8kg	2-3m / na / na / 3mm +0.5ppm	< 20	20Hz		50s	35s	0.5s	2	2 RS-232, 2 Power, 1 TNC, 1 PPS output	2, 400 - 115, 200	-40 to +65	ext	1.7	AR10/AS10 triple frequency or AR25/AR20 choke ring	Triple frequency GNSS receiver for structural monitoring
	GMX910	555	GPS: L1, L2P, L2C, L5; GLONASS: L1, L2P, L2C Beidou: B1, B2 QZSS: L1, L2C, L5	All in view	AGLMNR1	D 186mm x H 71mm	0.7kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.5ppm	< 20	10Hz		40s	30s	0.5s	1	Combined (RS-232, Power)	4, 800 - 230, 400	-40 to +65	ext	2.0	int	Single or multi- frequency geodetic and RTK GNSS SmartAntenna for structural monitoring
	GM30	555	GPS: L1, L2P, L2C, L5; GLONASS: L1, L2P, L2C; Galileo E1, E5a, E5b, Alt-BOC; BeiDou B1, B2; QZSS L1, L2C, L5; SBAS; software upgradeable for future signals	All in view	GLMMetOPR1	190 x 78 x 210mm	1.50kg	2-3m / 25cm / 8mm +1ppm / 3mm +0.1ppm	< 20	20Hz		40s	30s	0.5s	5	1 (2 port) power, 1 RS-232, UART, USB, TNC, Ethernet, ext osc	2, 400 - 115, 200	-40 to +65	ext	3.1 to 3.5	AR10/AS10 triple frequency or AR25/AR20 choke ring	Permanent multi-frequency GNSS receiver w/ Ethernet for monitoring
Microwave Photonic Systems *www.b2bphotonics.com*	OFW 3478 / GPS - RF Fiber Optic Antenna for GPS	ALL Satellites in View	GLONASS, Galileo, GPS L1C/A, L2, L5 GPS	ALL Satellites in View	ADGLMMetNPRSTV1	12 x 10 x 6in 1U x 19 x 14	=12lb	~10m / LAAS: <0.5m	<<50ns	10Hz PVT, 1Hz ARINC		<<75s	<20s	<1s	1	8 I/P, 3 O/P ARINC H/L; 1 RS-232	RS232: 9.6kbps - 115kbps; USB: up to 12Mbps; Ethernet: up to 100Mbps; Bluetooth: up to 230.4kbps	-40 to +70	ext	14W	Active, RTCA DO-228 Change 1 compliant	ARINC-743 Compliant sensor
NavCom Technology, Inc. *www.navcomtech.com*	Onyx	255 par.	L1, L2, L2C, L5, G1, G2, E1, E5a, E5b, B1, B2, B3, QZSS	252 GNSS; +3 StarFire	DAGLMNPRTV2	3.94 x 2.39 x 0.52in	1oz	2m / 45cm +ppm / 1cm +0.5ppm / 0.5cm +0.5ppm)	+/-13ns (1PPS)	1Hz – 25Hz (user programmable)		<60s	<50s	<20s	2 +SPI bus	2 x RS232	RS232: 9.6kbps - 115kbps;	-40 to +702 free-air ambient. Higher ambient temperature operation is possible if proper heat sinking is applied to ensure that no components exceed 85°C case temperature.	ext	2.6W typical	Crossed dipole (ER)	Latest generation of John Deere technology
	Sapphire	66 par.	L1, L2, L5, G1 & G2	66 GNSS; +1 StarFire	DAGLMNPRTV2	4.73 x 3.94 x 0.43in	4oz	2m / 45cm +ppm / 1cm +0.5ppm / 0.5cm +0.5ppm)	+/-13ns (1PPS)	1Hz – 100Hz (user programmable)		<60s	<50s	<20s	5	4 x RS232	RS232: 9.6kbps - 115kbps;	-40 to +85	ext	4W typical	Crossed dipole (ER)	Previous generation of John Deere technology
	SF-3050	66 par.	L1, L2, L5, G1 & G2	66 GNSS; +1 StarFire	DAGLMNPRTV1	6.47 x 4.60 x 2.37in	1.1lb	as above	+/-13ns (1PPS)	1Hz – 100Hz (user programmable)		<60s	<50s	<20s	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 +71	ext	< 6W	Crossed dipole (ER)	Integrated StarFire/RTK Extend multi-frequency receivers
	SF-3040	66 par.	L1, L2, L5, G1 & G2	66 GNSS; +1 StarFire3	DAGLMNPRTV1	8 x 4.36in	3.2lb	as above	na	1Hz – 10Hz (user programmable)		<60s	<50s	<20s	5	2 x RS232 (1 configurable to RS422); 1 x USB 2.0 (device); 1 x Bluetooth	RS232: 4.8kbps - 115kbps; USB: up to 12Mbps; Bluetooth: up to 230.4kbps	-10 to +60	hot swappable batteries	< 6W	Crossed dipole (ER)	Integrated StarFire/RTK Extend multi-frequency receivers
Nottingham Scientific Ltd *www.nsl.eu.com*	Stereo	Arch. dependent, configurable	Dual frequency: L1 / E1 / B1 / L1OC or L1OF plus L5 / E5A / B2 or E5B / L3OC or E6 / B3 or L2C / L2OC or L2OF or QZSS LEX	Arch. Dependent	HNVCMD2	12.5 x 8 x 3cm	0.15kg	~10m / na / na	~50ns	configurable, 50Hz max		<40s	<35s	<2s	Arch. dependent	IP, USB	Fully configurable		ext	Arch. dependent	ext	Dual frequency GNSS front end covering all signals and frequencies to be used with software defined radio GNSS receiver (eg GNSS-SDR and GNSS-SDRLIB).
	Detector	Arch. dependent, configurable	L1 / E1 / B1 / L1OC as standard. Configurable to E1 PRS, L5 / E5A / B2, E5B / L3OC E6 / B3, E6 PRS, L2C / L2OC, L2OF, QZSS LEX	16	DGMPT2	22 x 12 x 8cm	1kg	na	na	na		<40s	<35s	<2s	Arch. dependent	IP, USB, 3G	Fully configurable		ext	Arch. dependent	ext	GNSS signal interference detection and signal profiling receiver. Outputs interference type, characteristics and digital structure for threat analysis, impact analysis and injection into live or simulated signals.
NovAtel *www.novatel.com*	OEMStar	14	GPS: L1; GLONASS: L1; SBAS;	14 channels configurable between GPS, GLONASS & SBAS	ADGLMMetNOPRTV2	46 x 71 x 13mm	18g	1.5m / 0.5m DGPS / 0.7m SBAS	20	10Hz max		65s	35s	<1.0s	3	2 x LV-TTL; 1 x USB2.0	300 to 921, 600 bps; 300 to 230, 400 bps, ; 12 Mbps	-40 to +85	3.15 to 5.25VDC	0.36W GPS; 0.45W GLONASS	Active (E)	RoHS-compliant; GL1DE and PDP software features available
	OEM615	120	GPS: L1, L2, L2C, ; GLONASS: L1, L2; Galileo: E1; BeiDou, B1; SBAS, QZSS;	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGHLMMetNOPRTV2	46 x 71 x 11mm	24g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	50Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	6	3 x LV-TTL; 2 x CAN ; 1 x USB2.0; 1 x PPS; 2 x Event In	300 to 921, 600 bps; 1 Mbps; ; 12 Mbps	-40 to +85	3.3VDC	1W (typical)	Active (E)	RoHS-compliant; RTK, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM617	120	GPS: L1, L2, L2C, ; GLONASS: L1, L2; Galileo: E1, E5b; BeiDou, B1, B2; SBAS, QZSS;	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGHLMMetNOPRTV2	46 x 71 x 11mm	24g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	50Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	6	3 x LV-TTL; 2 x CAN ; 1 x USB2.0; 1 x PPS; 2 x Event In	300 to 921, 600 bps; 1 Mbps; ; 12 Mbps	-40 to +85	3.3VDC	1W (typical)	Active (E)	RoHS-compliant; RTK, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM617D	120	GPS: L1, L2, L2C, ; GLONASS: L1, L2; Galileo: E1, E5b; BeiDou, B1, B2; SBAS, QZSS;	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGLMMetNOPRTV2	46 x 71 x 11mm	24g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	50Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	6	3 x LV-TTL; 2 x CAN ; 1 x USB2.0; 1 x PPS; 2 x Event In	300 to 921, 600 bps; 1 Mbps; ; 12 Mbps	-40 to +85	3.3VDC	1W (typical)	Active (E)	Dual Antenna Heading/ALIGN RoHS-compliant; RTK, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM628	120	GPS: L1, L2, L2C, L5; GLONASS: L1, L2; Galileo: E1, E5a, E5b AltBOC; BeiDou, B1, B2; SBAS, QZSS; L-band	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGLMMetNOPRTV2	60 x 100 x 9.1mm	37g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	7	1 x RS-232 or RS-422; 2 x LV-TTL; 2 x CAN ; 1 x USB2.0 ; 1 x Ethernet ; 1 x PPS; 2 x Event In;	300 to 921, 600 bps; 300 to 921, 600 bps; 300 to 230, 400 bps; 12 Mbps; 5 Mbps	-40 to +85	3.3VDC	1.3W (typical)	Active (E)	RoHS-compliant; RTK, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM628E	120	GPS: L1, L2, L2C; GLONASS: L1, L2; Galileo: E1, E5b; BeiDou, B1, B2, B3; SBAS, QZSS; L-band	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGLMMetNOPRTV2	60 x 100 x 9.1mm	37g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	7	1 x RS-232 or RS-422; 2 x LV-TTL; 2 x CAN ; 1 x USB2.0 ; 1 x Ethernet ; 1 x PPS; 2 x Event In;	300 to 921, 600 bps; 300 to 921, 600 bps; 300 to 230, 400 bps; 12 Mbps; 5 Mbps	-40 to +85	3.3VDC	1.3W (typical)	Active (E)	RoHS-compliant; RTK, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM638	240	GPS: L1, L2, L2C, L5; GLONASS: L1, L2; Galileo: E1, E5a, E5b AltBOC; BeiDou B1, B2; SBAS, QZSS; L-band	Flexible configuration: ; 240 L1, 120 L1 / L2	ADGLMMetNOPRTV2	85 x 125 x 14.3mm	37g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	12	2 x RS-232 or RS-422; 3 x LV-TTL; 2 x CAN ; 2 x USB2.0; 1 x Ethernet, 1 x IMU; 1 x PPS; 4 x Event In; 7 x Event Out	300 to 921, 600 bps; 300 to 921, 600 bps; 300 to 230, 400 bps; ; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +85	3.3VDC	2.8W (typical)	Active (E)	RoHS-compliant; RTK, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	OEM625S	144	GPS SPS: L1 (C/A), L2 (semi-codeless), L2C; GLONASS: L1, L2; SBAS; GPS PPS: L1(Y), L2(Y)	Flexible configuration: ; 60 L1 / L2 SPS, 24 L2 / L2 PPS	ADGLMMetNOPRTV2	60 x 100 x 15.1mm	56g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	20Hz max		50s	35s	0.5s	5	2 x RS-232, 2 x LV-TTL, 1 x USB2.0, 1 x key fill	300 to 921, 600 bps, 12 Mbps	-40 to +85	3.3VDC	2.2W (typical)	Active (E)	RTK, RAIM, and ALIGN software features available
	OEM719	555	GPS: L1, L1C, L2, L2C, L5; GLONASS: L1, L2, L2C, L3, L5; Galileo: E1, E5a, E5b AltBOC, E6; BeiDou B1, B2, B3; SBAS L1, L5; QZSS L1, L1C, L2C, L5, L6; L-band	Flexible configuration: ; 283 Single frequency, 149 Dual, 105 Triple	ADGLMMetNOPRTV2	46 x 71 x 11mm	31g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		40s	35s	0.5s	6	3 x LVCMOS, 2 x CAN ; 1 x USB2.0; 1 x PPS; 2 x Event In; 1 x Event Out	300 to 460, 800 bps; ; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +85	3.3VDC	0.9W (typical)	Active (E)	RoHS-compliant; RTK, RTK ASSIST, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, STEADYLINE, RAIM, ALIGN, SPAN and Interference Toolkit software features available
	OEM729	555	GPS: L1, L1C, L2, L2C, L5; GLONASS: L1, L2, L2C, L3, L5; Galileo: E1, E5a, E5b AltBOC, E6; BeiDou B1, B2, B3; SBAS L1, L5; QZSS L1, L1C, L2C, L5, L6; L-band	Flexible configuration: ; 283 Single frequency, 149 Dual, 105 Triple	ADGLMMetNOPRTV2	60 x 100 x 9mm	48g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		40s	35s	0.5s	7	1 x RS-232 or RS-422; 2 x LVCMOS; 2 x CAN ; 1 x USB2.0 ; 1 x Ethernet ; 1 x PPS; 2 x Event In; 1 x Event Out	300 to 460, 800 bps; 300 to 460, 800 bps; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +85	3.3VDC	0.9W (typical)	Active (E)	RoHS-compliant; RTK, RTK ASSIST, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, STEADYLINE, RAIM, ALIGN, SPAN and Interference Toolkit software features available
	OEM7600	555	GPS: L1, L1C, L2, L2C, L5; GLONASS: L1, L2, L2C, L3, L5; Galileo: E1, E5a, E5b AltBOC; BeiDou B1, B2; SBAS L1, L5; QZSS L1, L1C, L2C, L5; L-band	Flexible configuration: ; 283 Single frequency, 149 Dual, 82 Triple	ADGLMMetNOPRTV2	35 x 55 x 11mm	20g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		40s	35s	0.5s	10	5 x LVCMOS, 2 x CAN ; 2 x USB2.0; 1 x Ethernet; 1 x PPS; 4 x Event In; 4 x Event Out	300 to 460, 800 bps; ; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +85	3.3VDC	0.9W (typical)	Active (E)	RoHS-compliant; RTK, RTK ASSIST, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, STEADYLINE, RAIM, ALIGN, SPAN and Interference Toolkit software features available
	OEM7700	555	GPS: L1, L1C, L2, L2C, L5; GLONASS: L1, L2, L2C, L3, L5; Galileo: E1, E5a, E5b AltBOC; E6; BeiDou B1, B2, B3; SBAS L1, L5; QZSS L1, L1C, L2C, L5, L6; L-band	Flexible configuration: ; 283 Single frequency, 149 Dual, 105 Triple	ADGLMMetNOPRTV2	46 x 71 x 11mm	31g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		40s	35s	0.5s	10	5 x LVCMOS, 2 x CAN ; 2 x USB2.0; 1 x Ethernet; 1 x PPS; 4 x Event In; 4 x Event Out	300 to 460, 800 bps; ; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +85	3.3VDC	0.9W (typical)	Active (E)	RoHS-compliant; RTK, RTK ASSIST, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, STEADYLINE, RAIM, ALIGN, SPAN and Interference Toolkit software features available
	OEM7720	555	GPS: L1, L1C, L2, L2C, L5; GLONASS: L1, L2, L2C, L3, L5; Galileo: E1, E5a, E5b AltBOC; E6; BeiDou B1, B2, B3; SBAS L1, L5; QZSS L1, L1C, L2C, L5, L6; L-band	Flexible configuration: ; 283 Single frequency, 149 Dual, 82 Triple	ADGLMMetNOPRTV2	46 x 71 x 11mm	35g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		40s	35s	0.5s	10	5 x LVCMOS, 2 x CAN ; 2 x USB2.0; 1 x Ethernet; 1 x PPS; 4 x Event In; 4 x Event Out	300 to 460, 800 bps; ; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +85	3.2 to 5.0VDC	1.3W (typical)	Active (E)	Dual Antenna Heading/ALIGN RoHS-compliant; RTK, RTK ASSIST, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, STEADYLINE, RAIM, ALIGN, SPAN and Interference Toolkit software features available
	ProPak6	240	GPS: L1, L2, L2C, L5; GLONASS: L1, L2, L2C; Galileo: E1, E5a, E5b AltBOC; BeiDou B1, B2; SBAS, QZSS; L-band	Flexible configuration: ; 240 L1, 120 L1 / L2	ADGLMMetNOPRTV12	190 x 185 x 75mm	1.79kg	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	7	3 x RS-232/RS-422 1 x IMU, 1 x USB 2.0 host, 1x USB 2.0 device (high speed only), 1 x Ethernet, 1x CAN Bus 2, 4 x Event input, 4 x Event output, 1 x Bluetooth, 1x Wi-Fi, 1 x Radio GPRS/HSPA (optional)	300 to 921, 600 bps; 300 to 921, 600 bps; 300 to 230, 400 bps; ; 1 Mbps; 12 Mbps; 5 Mbps	-40 to +75 (typical)	+9 to +36V DC	3.5W (typical)	Active (E)	RoHS-compliant; RTK, ; L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, RAIM, ALIGN and SPAN software features available

RECEIVER SURVEY 2017

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	FlexPak6	120	GPS: L1, L2, L2C, L5; GLONASS: L1, L2, L2C; Galileo: E1, E5a, E5b; AltBOC; BeiDou B1, B2; SBAS; L-band	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	45 x 147 x 113mm	337g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	100Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	5	1 x RS-232, 1 x RS-232 or RS-422, 1 x USB2.0, 1 x CAN, 1 x Ethernet	300 to 921, 600 bps; 300 to 230, 400 bps; 300 to 230, 400 bps; 5 Mbps, 10/100 Mbps	-40 to +75	6 to 36VDC	1.8W (typical)	Active (E)	RoHS-compliant; RTK, L-Band, TerraStar C (PPP-RTK service), GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	FlexPak6D	120	GPS: L1, L2, L2C, ; GLONASS: L1, L2; Galileo: E1, E5b; BeiDou, B1, B2; SBAS, QZSS;	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	147 x 113 x 45mm	337g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	50Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	4	1 x RS-232, 1 x RS-232 or RS-422, 1 USB port	300 to 921, 600 bps; 1 Mbps; ; 12 Mbps	-40 to +85	+6 to +36VDC	1.9 W (typical)	Active (E)	Dual Antenna Heading/ALIGN RoHS-compliant; RTK, GL1DE, PDP, RAIM, ALIGN and SPAN software features available
	FlexPak-S	120	GPS SPS: L1 (C/A), L2 (semi-codeless), L2C; GLONASS: L1, L2; SBAS; GPS PPS: L1(Y), L2(Y)	Flexible configuration: ; 60 L1 / L2 SPS, 24 L2 / L2 PPS	ADGLMMetNOPRTV12	147 × 113 × 45mm	<400g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	20Hz max		50s	35s	0.5s	4	RS-232 up to 921, 600 bps, 1 RS-232 or RS-422 up to 921, 600 bps, I/O Port (PPS, Event1, PV, VARF), DS-101 for key loading	300 to 921, 600 bps, 12 Mbps	-40 to +65	+9 to 36VDC	3.8W (typical)	Active (E)	RTK, RAIM, and ALIGN software features available
	FlexPak-G2-Star	14	GPS: L1; GLONASS: L1; SBAS;	14 channels configurable between GPS, GLONASS & SBAS	ADGLMMetNOPRTV12	45 x 147 x 113mm	313g	1.5m / 0.5m DGPS / 0.7m SBAS	20	10Hz max		65s	35s	<1.0s	3	1 x RS-232; 1 x RS-232 or RS-422, 1 x USB1.1	300 to 921, 600 bps; 300 to 230, 400 bps; 300 to 230, 400 bps; 5 Mbps	-40 to +75	6 to 18VDC	0.6W (typical);	Active (E)	RoHS-compliant; GL1DE and PDP software features available
	GPStation-6	120	GPS: L1, L2, L2C, L5; GLONASS: L1, L2; Galileo: E1, E5a, E5b; AltBOC; BeiDou; SBAS; QZSS	40 L1 / L2 / L5	ALMetOT12	235 x 154 x 71mm	1.4kg	1.2m	20	50Hz max		60s	35s	0.5s	4	3 x RS-232 or RS-422, 1 x USB2.0	300 to 230, 400 bps; ; 1 Mbps;	-40 to +70	4.5 to 18VDC	6W (typical)	Active (E)	Multi-frequency multi-constellation GNSS Ionospheric Scintillation and TEC Monitor (GISTM); receiver. Provides 50-Hz phase and amplitude scintillation measurements (S4, σϕ), TEC and TEC phase.
	AG-STAR	14	GPS: L1; GLONASS: L1; SBAS;	14 channels configurable between GPS, GLONASS & SBAS	DGLMMetNOPRTV12	155 D x 68mm H	490g	1.5m SP / 0.5m DGPS / 0.7m SBAS (All values in Horiz. RMS)	20	10Hz max		85s	55s	<1.0s	2	2 x RS-232; 1 x CAN NMEA2000; 1 x Bluetooth (optional)	300 to 230, 400 bps	-40 to +75	8 to 36VDC	2.5W (typical)	Patch	RoHS-compliant; GL1DE software feature available
	SMART6-L	120	GPS: L1, L2, L2C; GLONASS: L1, L2; Galileo: E1; Beidou: B1; SBAS; L-band	Flexible configuration: ; 120 L1, 60 L1 / L2	DGLMMetNOPRTV12	155 D x 81mm H	550g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	50Hz max		50s	35s	<1.0s	3	3 x RS-232; 1 x CAN NMEA2000; 1 x Emulated Radar	300 to 921, 600 bps	-40 to +75	8 to 36VDC	2.9W (typical)	Pinwheel	RoHS-compliant; RTK, L-Band, TerraStar C (PPP-RTK service), GLIDE, Dual Frequency GLIDE, PDP, and ALIGN software features available
	SMART6	120	GPS: L1, L2, L2C; GLONASS: L1, L2; Galileo: E1; Beidou: B1; SBAS	Flexible configuration: ; 120 L1, 60 L1 / L2	DGLMMetNOPRTV12	155 D x 81mm H	520g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	20Hz max		50s	35s	<1.0s	3	3 x RS-232; 1 x CAN NMEA2000; 1 x Emulated Radar; 1 x Bluetooth Serial Port (optional)	300 to 921, 600 bps;	-40 to +70	8 to 36VDC	3.5W (typical)	Pinwheel	RoHS-compliant; Tilt Sensor and Bluetooth options, RTK, GLIDE, Dual Frequency GLIDE, PDP, and ALIGN software features available
	SPAN-IGM-A1	120	GPS: L1, L2, L2C; GLONASS: L1, L2; SBAS;	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	152 x 142 x 51mm	515g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	20Hz max GNSS only, 200Hz max GNSS +INS		50s	35s	0.5s	4	1 x RS-232, 1 x RS-232 or RS-422, 1 x USB2.0, 1 x CAN	2400 to 921, 600 bps; 12 Mbps; 1 Mbps	-40 to +65	10 to 30VDC	4W (typical)	Active (E)	RoHS-compliant; RTK software features available
	SPAN-IGM-S1	120	GPS: L1, L2, L2C; GLONASS: L1, L2; SBAS;	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	152 x 142 x 51mm	540g	1.2m / 0.4m DGPS / 0.6m SBAS / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	20Hz max GNSS only, 125Hz max GNSS +INS		50s	35s	0.5s	4	1 x RS-232, 1 x RS-232 or RS-422, 1 x USB2.0, 1 x CAN	2400 to 921, 600 bps; 12 Mbps; 1 Mbps	-40 to +65	10 to 30VDC	6W (typical)	Active (E)	RoHS-compliant; RTK software features available
	SPAN-CPT (OEM6)	120	GPS: L1, L2, L2C; GLONASS: L1, L2 ; BeiDou: B1, B2; SBAS; L-band	Flexible configuration: ; 120 L1, 60 L1 / L2	ADGLMMetNOPRTV12	152 x 168 x 89mm	2.28kg	1.2m / 0.4m DGPS / 0.6m SBAS / 0.04m PPP / 0.01m +1ppm RTK / 5mm +1 ppm post processed (All values in Horiz. RMS)	20	20Hz max GNSS only, 100Hz max GNSS +INS		50s	35s	0.5s	4	2 x RS-232 UART COM Port; 1 x CAN; 1 x USB2.0	2400 to 921, 600 bps; 12 Mbps; 1 Mbps	-40 to +65	9 to 18VDC	16W (max)	Active (E)	RoHS-compliant; RTK, and TerraStar C (PPP-RTK service) software features available
NVS Technologies AG *www.nvs-gnss.com*	NV08C-CSM	32 par., All-in-view	GPS L1 C/A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou B1	32	ACGHLMNRTV2	20 x 26 x 2.5mm	5g	RMS: <1.5m / <1m / na	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2	2xUART; 1xSPI; 1xTWI (I2C compatible); 1PPS	9600 bps - 460800 bps	-40 to +85	ext	180mW (GNSS); 120mW (GPS); 24mW (GNSS); 18mW (GPS); 5mW (Sleep mode)	Active	Fleet mgmt, Telematics & anti-theft, in-car & PNDs, asset and personal tracking, surveillance & security/LTE, WiMAX, Wi-Fi & cell. base station timing/A-GNSS, dead reckoning, raw data output/ Flash memory +power mgmt.
	NV08C-Mini PCI-E	32 par., All-in-view	GPS L1 C/A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou B1	32	ACDGHLMNRV2	30 x 50.95 x 4.2mm	7g	RMS: <1.5m / <1m / na	15ns	1, 2, 5, 10Hz		25s	25s	<1s	1/NMEA (default) or binary protocol	PCI-Express standard bus/virtual COM port device	9600 bps - 460800 bps	-40 to +85	ext	200mW (GNSS); 140mW (GPS); 0.4mA (Sleep mode)	Active & Passive (auto-switching current detector)	Rugged notebook PCs, tablets & handheld computers. Telematics & marine navigation. Surveillance, security and public safety. GIS, survey, machine control & PrecisionAg/A-GNSS, dead reckoning, raw data output/Flash memory +power mgmt.
	NV08C-RTK	32 par., All-in-view	GPS L1 C/A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou B1	32	ACDGHLMNRV2	46 x 71 x 7.30mm	17g	RMS: <1.5m / <1m / 0.01m +1ppm	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2/NMEA 0183 v2.3; RTCM v.3.1	2xUART; 1xUSB	9600 bps - 460800 bps	-40 to +85	ext.	300mW (GNSS)	Active	Low Cost Single-Frequency GNSS RTK Receiver. Applications: UAVs; Agriculture; Autonomous cars; Robotics; Construction measurements; Surveying; Heading and attitude determination; Aerial Photogrammetry; Heading and attitude determination; Aerial Photogrammetry
	NV08C-RTK -A	2x32 par., All-in-view	GPS L1 C/A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou B1	32	ACDGHLMNRV2	46 x 71 x 7.30mm	21g	RMS: <1.5m / <1m / 0.01m +1ppm	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2/NMEA 0183 v2.3; RTCM v.3.1	2xUART; 1xUSB	9600 bps - 460800 bps	-40 to +85	ext.	480mW (GNSS)	Active	Low Cost Single-Frequency GNSS RTK +Heading Receiver. Applications: UAVs; Agriculture; Autonomous cars; Robotics; Construction measurements; Surveying; Heading and attitude determination; Aerial Photogrammetry; Heading and attitude determination; Aerial Photogrammetry
	NV08C-RTK -M	96 par., All-in-view	GPS: L1, L2 ; GLONASS: L1, L2; GALILEO E1; BeiDou: B1, B2; SBAS, QZSS	96	ACDGHLMNRV2	46 x 71 x 8.1mm	30g	RMS: <1.5m / <1m / 0.01m +1ppm	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2/NMEA 0183 v2.3; RTCM v.3.1	2xUART; 1xUSB	9600 bps - 460800 bps	-40 to +85	ext	600mW (GNSS)	Active	Low Cost Dual-Frequency GNSS RTK Receiver. Applications: UAVs; Agriculture; Autonomous cars; Robotics; Construction measurements; Surveying; Heading and attitude determination; Aerial Photogrammetry; Heading and attitude determination; Aerial Photogrammetry
	NV08C-CSM-BRD	32 par., All-in-view	GPS L1 C/A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou B1	32	ACDGHLMNRV2	35 x 50 x 7.2mm	11g	RMS: <1.5m / <1m / na	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2/ NMEA 0183 v2.3 (IEC61162-1); BINR (proprietary binary protocol); RTCM SC 104 (messages: #1, #9, #31, #34)	2xUART	9600 bps - 460800 bps	-40 to +85 °C	ext	200mW (GNSS); 150mW (GPS) 0.4mA (Sleep mode)	Active & Passive (auto-switching current detector)	Rugged notebook PCs, tablets & handheld computers. Telematics & marine navigation. Surveillance, security and public safety. GIS, survey, machine control & PrecisionAg/A-GNSS, dead reckoning, raw data output/Flash memory +power mgmt.
	NV08C-CSM-N24HS	32 par., All-in-view	GPS L1 C/A code, GLONASS L1, SBAS L1, QZSS, GALILEO E1, BeiDou B1	32	T2		20g	RMS: <1.5m / <1m / na	15ns	1, 2, 5, 10Hz		25s	25s	<1s	2/ NMEA 0183 v2.3 (IEC61162-1); BINR (proprietary binary protocol); RTCM SC 104 (messages: #1, #9, #31, #34)	2xUART	4800 bps - 460800 bps	-40 to +85 °C	ext	180mW (GNSS); 120mW (GPS) 0.1mA (Sleep mode)	Active	OEM module for precise timing and network synchronization needs.: Applications: ; WiFi, WiMAX, LTE, GSM, CDMA base station timing
ORCA Technologies, LLC *www.orcatechnologies.com*	GS-101B	12 parallel channels	GPS L1 C/A code	12	Time, Frequency, Position - Static or Mobile	4.07 x 1.06 x 4.72in	1lb	<9m 90% / 2m CEP 50% / na / na	<100ns	1s		<20min	<1min	<1s	3	2 serial/1 USB		0 to 50	ext	30mW	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.
	GS-102B	12 parallel channels	GPS L1 C/A code	12	Time, Frequency, Position - Static or Mobile	4.07 x 2.09 x 4.72in	1lb	<9m 90% / 2m CEP 50% / na / na	<100ns	1s		<20min	<1min	<1s	3	2 serial/1 USB	1, 200 - 57, 600	0 to +50	ext	30mW	active	Small portable GPS Receiver providing IRIG time, pulse rates, event capture and position over serial and USB ports. Powered by external supply or internal rechargeable battery.
	GS-102B-FPC	12 parallel channels	GPS L1 C/A code	12	Time, Frequency, Position - Static or Mobile	9.68 x 10.62 x 4.88in	3lb	<9m 90% / 2m CEP 50% / na / na	<100ns	1s		<20min	<1min	<1s	3	2 serial/1 USB	1, 200 - 57, 600	0 to +50	ext	30 mw	active	Rugged portable GPS Receiver housed in sealable watertight carrying case providing IRIG time, pulse rates, event capture and position over serial and USB ports. Powered by external supply or internal rechargeable battery.
	GS-301	12 parallel channels	GPS L1 C/A code	12	Time and Frequency - Static or Mobile	17.5 x 1.75 x 9.0in	5lb	na	<1us	na		<20min	<1min				115, 200	0 to +50	ext		active	Rack Mount GPS Receiver and IEEE-1588 PTPv2 Grandmaster (default profile) and SNTP Time Server providing IRIG time and pulse rates over serial and USB ports.
	TTGM-101	12 parallel channels	GPS L1 C/A code	12	Time and Frequency - Static or Mobile	3.07 x 1.06 x 4.72in	1lb	na	<1us	na		<20min	<1min				115, 200	0 to +50	ext	30mW	active	Small portable GPS Receiver and IEEE-1588 PTPv2 Grandmaster (default profile) and SNTP Time Server providing IRIG time and pulse rates over serial and USB ports. Can be portable with optional battery.
	TS-101	12 parallel channels	GPS L1 C/A code	12	Time and Frequency - Static or Mobile	3.07 x 2.09 x 4.72in	1lb	na	<1us	na		<20min	<1min				115, 200	0 to +50	ext		active	Small portable test set to compare external PTPv2 or IRIG time code to 1PPS generated by integrated GPS Receiver or external time source.
ORIGINGPS *www.origingps.com*	Hornet (ORG1415)	48	GPS L1 C/A code	All in View	CHNV2	17 x 17 x 4.8mm	3.5g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35s	<32s	1s	2	Uart / SPI	user selectable	-40 to 85	ext	10-70mW	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Ultra-Sensitive Hornet (ORG1418)	48	GPS L1 C/A code	All in View	CHNV2	17 x 17 x 4.8mm	4.75g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35s	<32s	1 s	2	Uart / SPI	user selectable	-40 to 85	ext	10-70mW	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Hornetella (ORG1408)	48	GPS L1 C/A code	All in View	CHNV2	17 x 17 x 2.2mm	1.4g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35s	<32s	1s	2	Uart / SPI	user selectable	-40 to 85	ext	10-66mW (during tracking)	External passive or active	modules with external antenna
	Micro Hornet (ORG1410)	48	GPS L1 C/A code	All in View	CHNV2	10 x 10 x 5.8mm	2.5g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35s	<32s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	67mW (during tracking)	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Multi Micro Hornet (ORG1510-R)	52	GPS L1 C/A code / GLONASS L1	All in View	CHNV2	10 x 10 x 5.9mm	2.36g	<3m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<27s	<26	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	4-92mW (during tracking)	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Multi Hornet (ORG1518-R)	52	GPS L1 C/A code / GLONASS L1	All in View	CHNV2	17 x 17 x 4.8mm	4.75g	<3m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<27s	<26	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	4-92mW (during tracking)	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Multi Micro Hornet (ORG1510-MK)	33	GPS L1 C/A code / GLONASS L1 / BEIDOU	All in View	CHNV2	10 x 10 x 6.1mm	2.4g	<2.5m / nr / nr / nr (95%)	nr	up to 10Hz		<31s	<29s	<3s	1	UART	user selectable	-40 to 85	ext	14.5 - 104mW (during tracking)	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Nano Hornet (ORG1411)	48	GPS L1 C/A code	All in View	CHNV2	10 x 10 x 3.8mm	1.5g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35s	<32s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	67mW (during tracking)	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Multi SISO Hornet (ORG4502)	52	GPS L1 / GLONASS L1	All in View	CHNV2	18.5 x 28.0 x 7	8g	<3m / nr / nr / nr (95%)	nr	1Hz or 5Hz		0	<26	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	65-83mW (during Tracking)	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Multi Hornetella (ORG1208)	32	GPS L1 / GLONASS L1	All in View	CHNV2	17 x 17 x 2.2	1.4g	<3m / nr / nr / nr (95%)	nr	up to 10Hz		<33	<31	1s	2	Uart / SPI	user selectable	-40 to 85	ext	115-180mW	na	modules with an external antenna
	Multi Hornet (ORG1218)	32	GPS L1 / GLONASS L1	All in View	CHNV2	17 x 17 x 6	5g	<3m / nr / nr / nr (95%)	nr	up to 10Hz		<33	<31	1s	2	Uart / SPI	user selectable	-40 to 85	ext	115-180mW	Active	GPS/GNSS Receiver Module With Integrated Antenna
	Spider (ORG4472)	48	GPS L1 C/A code	All in View	CHNV2	7 x 7 x 1.4mm	0.3g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35s	<32s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	9 - 67mW (during tracking)	na	modules with an external antenna
	Micro Spider (ORG4475)	48	GPS L1 C/A code	All in View	CHNV2	5.6 x 5.6 x 1.4mm	0.1g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35s	<32s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	59mW (during tracking)	na	modules with an external antenna
	Nano Spider (ORG4400)	48	GPS L1 C/A code	All in View	CHNV2	4.1 x 4.1 x 2.1mm	0.1g	<4m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<35 s	<32s	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	9 - 59mW (during tracking)	na	modules with an external antenna
	Multi Nano Spider (ORG4500)	52	GPS L1 / GLONASS L1	All in View	CHNV2	4.1 x 4.1 x 2.1mm	0.1g	<3m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<27s	<26	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	65-83mW (during Tracking)	na	modules with an external antenna
	Multi Micro Spider (ORG 4033)	33	GPS L1 C/A code / GLONASS L1	All in View	CHNV2	5.6 x 5.6 x 2.6mm	0.2g	<2.5m / nr / nr / nr (95%)	nr	up to 10Hz		<31s	<29s	<3s	1	UART	user selectable	-40 to 85	ext	10 - 80mW (during tracking)	na	modules with an external antenna
	Multi Spider (4572)	52	GPS L1 / GLONASS L1	All in View	CHNV2	7 x 7 x 1.4mm	0.2g	<3m / nr / nr / nr (95%)	nr	1Hz or 5Hz		<27s	<26	1s	3	UART, SPI or I2C	user selectable	-40 to 85	ext	65-83mW (during Tracking)	na	modules with an external antenna
Raytheon *www.raytheon.com*	Anti-jam GPS Receiver (AGR)	24/Continuous	L1 - C/A, P / (Y), L2 - P / (Y)	8	DO1	6.5 x 2.2 x 9.0in	4lb	<16 m / na / na / na	<100	nr		nr	150s	20s	nr	nr	nr	-55 to 71	28 VDC	28W	5 element L1/L2 CRPA	Tomahawk Block IV Anti-Jam SAASM Receiver

RECEIVER SURVEY 2017

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	Miniature Airborne GPS Receiver MAGR 2000	24/Continuous	L1 - C/A, P (Y), L2 - P / (Y)	All in View	AD1	3.21 x 6.78 x 12.82in	11.0lb	<16 m / na / na / na	37	1		<6min	24s	1s	2 mux, 5 serial	1553/RS-232/RS-422/ARINC429		-55 to 95	115 V/400Hz	19W average	L1/L2 FRPA or CRPA	Open architecture aircraft SAAASM receiver LRU, MGUE upgrade in progress
	RAPToR Common Weapon Navigator	24/Continuous	L1 - C/A, P / (Y), L2 - P / (Y)	All in View	DHLMNOPV2	3.45 x 0.59 x 3.45in	100g	<16 m / na / na / na	<100	1		nr	60s	10s	3	RS-232/RS-422/CMOS	500 kbps	-32 to 70	3.3 VDC	<4.5W max, <1W nominal	L1/L2	Multiple Raytheon Missile System SAASM applications
	Digital Anti-jam Receiver (DAR)	24/Continuous	L1 - C/A, P / (Y), L2 - P / (Y)	All in View	ADO1	8.6 x 2.27 x 13.0in	11.0lb	<16 m / na / na / na	<25	1		nr	nr	nr	2 mux/ serial	1394B, Fibre channel, RS-422	nr	nr	270 VDC	<80W	L1/L2 CRPA	High Anti-Jam aircraft SAASM receiver system
Septentrio *www.septentrio.com*	AsteRx4 OEM	544 par.	GPS L1, C/A L2, P-code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L3, P-Code; BeiDou (B1, B2, B3), IRNSS (L5) QZSS, WAAS / EGNOS	All in View GPS +GLONASS +GALILEO +BEIDOU +IRNSS	ADGLMMetNOPRTV2	77 x 100 & 61 x 82	60g	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 5mm +1 ppm	10	50Hz		<45s	<15s (after reset)	<1s	4, 1, 1, 2, 1,	RS232, Ethernet, USB, event marker, PPS out,	300 - 230, 400, 100 Mbps	-40 to +85	3–5.5 VDC	1.5W typ	(E)	Multi-constellation, dual antenna OEM receiver
	AsteRx-U	544 par.	GPS L1, C/A L2, P-code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L2CA, P-Code; BeiDou (B1, B2, B3), IRNSS (L5) QZSS, WAAS / EGNOS, L-Band (Terrastar)	All in View GPS +GLONASS +GALILEO +BEIDOU +IRNSS	ADGLMMetNOPRTV1	164 x 157 x 54mm	1.5kg	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 5mm +1 ppm	10	20Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 2, 1, 1, 1, 1,	RS232, Ethernet, USB, event marker, PPS out, Bluetooth, WIFI, cellular	300 - 230, 400, 100 Mbps	-30 to +65	9-36V	7W	ext	Multi-constellation, dual antenna receiver with integrated Cellular modem and support for TERRASTAR
	AsteRx-U UHF	544 par.	GPS L1, C/A L2, P-code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L2CA, P-Code; BeiDou (B1, B2, B3), IRNSS (L5) QZSS, WAAS / EGNOS, L-Band (Terrastar)		ADGLMMetNOPRTV1	164 x 157 x 54mm	1.5kg	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 5mm +1 ppm	10	20Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 2, 1, 1, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Bluetooth, WIFI, Cellular, UHF	300 - 230, 400, 100 Mbps	-30 to +65	9-36V	7W	ext	Multi-constellation, dual antenna receiver with integrated Cellular modem, UHF radio and support for TERRASTAR
	AsteRx-U Marine	544 par	GPS L1, C/A L2, P-code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5abAltBOC, E6 code & CP; GLONASS L1L2L2CA, P-Code; BeiDou (B1, B2, B3), IRNSS (L5) QZSS, WAAS / EGNOS, L-Band (Terrastar & Veripos)	All in View GPS +GLONASS +GALILEO +BEIDOU +IRNSS	ADGLMMetNOPRTV1	164 x 157 x 54mm	1.5kg	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 5mm +1 ppm	10	20Hz		<45s	<15s (after reset)	<1s	3, 1, 1, 2, 1, 1, 1, 1	RS232, Ethernet, USB, event marker, PPS out, Bluetooth, WIFI, Cellular, UHF	300 - 230, 400, 100 Mbps	-30 to +65	9-36V	7W	(E)	Multi-constellation, dual antenna receiver with integrated Cellular modem, UHF radio, robust L-band receiver and support for TERRASTAR and VERIPOS
	PolaRx5	544 par.	GPS (L1P, L1CA, L2, L5), GLONASS (L1, L2, L3) GALILEO (E1, E5ab, AltBoc, E6), BEIDOU (B1, B2, B3), SBAS (L1, L5), IRNSS (L5), QZSS (L1, L2, L5);	All in View	ADGHLMMetNOPRTV1	235 x 140 x 37mm	900g	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 5mm +1 ppm	5	50Hz		<45s	<15s (after reset)	<1s	4, 1, 1, 2, 1, 1	RS232, Ethernet, USB (client/host), event marker, PPS out, Ref in, Ref out	300 - 230, 400; 1 - 2 Mbps	-40 to +65	9–30 VDC, PoE	1, 8-4, 7W	ext	Multi-frequency GNSS reference receiver.
	PolaRx5TR	544 par.	GPS (L1P, L1CA, L2, L5), GLONASS (L1, L2, L3) GALILEO (E1, E5ab, AltBoc, E6), BEIDOU (B1, B2, B3), SBAS (L1, L5), IRNSS (L5), QZSS (L1, L2, L5);	All in View	ADGHLMMetNOPRTV1	235 x 140 x 37mm	940g	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 5mm +1 ppm	5	50Hz		<45s	<15s (after reset)	<1s	4, 1, 1, 2, 1, 1	RS232, Ethernet, USB (client/host), event marker, REF out, PPS out, Ref in, PPS-in	300 - 230, 400; 1 - 2 Mbps	-40 to +65	9–30 VDC, PoE	3-5W		
	PolaRx5S	544 par.	GPS (L1P, L1CA, L2, L5), GLONASS (L1, L2, L3) GALILEO (E1, E5ab, AltBoc, E6), BEIDOU (B1, B2, B3), SBAS (L1, L5), IRNSS (L5), QZSS (L1, L2, L5);	All in View	DGLMetOPRTV1	284 x 140 x 37mm	1.06Kg	1.2m (1s) / 0.4m (1s) / 1cm +1 ppm / 5mm +1 ppm	5	50Hz		<45s	<15s (after reset)	<1s	4, 1, 2, 1, 2	RS232, USB (client/host) Ethernet, event marker, PPS out, Ref out	300 - 230, 400, 10 Mbps	-30 to +65	9–30 VDC, PoE	3.5-5.7W	(E)	Scintillation monitoring receiver
	AsteRx-m OEM	132 par.	GPS +GLONASS L1, C/A and P-code & CP; L2, P-code & CP; WAAS / EGNOS / GAGAN / MSAS / SDCM	All in View GPS +GLONASS	ADGHLMMetNOPRTV2	70 x 47.5 x 3.5mm	27g	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 3mm +0.5 ppm	10	0.05s		<45s	<20s	1.2s	3, 1, 1, 1	LVTTL, USB, event marker, PPS out	300 - 230, 400; 1 - 2 Mbps	-40 to +85	3.3V DC	500mW	ext	Compact ultra low-power dual frequency GPS/ GLONASS OEM receiver
	AsteRx-m UAS	132 par.	GPS +GLONASS L1, C/A and P-code & CP; L2, P-code & CP; WAAS / EGNOS / GAGAN / MSAS / SDCM	All in View GPS +GLONASS	ADNOPV2	70 x 47.5mm	37g	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 3mm +0.5 ppm	10	0.05s		<45s	<20s	1.2s	3, 1, 1, 1	LVTTL, USB, event marker, PPS out	300 - 230, 400; 1 - 2 Mbps	-40 to +85	5V-30V	700mW	ext	Centimeter accuracy and easy integration into UAS. Accompanied with offline SW (GeoTagZ) or (SDK) solution for performing geotagging on UAS applications. Includes internal logging micro SD card and Plug_Event marker for camera shutter synchronisation and compatible with Pixhawk and Arduplot.
	Altus NR2	132 par.	GPS +GLONASS L1, C/A and P-code & CP; L2, P-code & CP; WAAS / EGNOS / GAGAN / MSAS / SDCM	All in View ; GPS +GLONASS	GLMNOPRV1	167mm (Ø) x 69mm	780 g	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 3mm +0.5 ppm	10	0.05s		<60s	<30s	1.2s	1, 2, 1, 1, 1, 1, 1	RS232 (lemo), USB (UARTs), Wi-Fi, Bluetooth, Ethernet, Cellular (IP), DynDNS	115200, 300 - 230, 400, 100 Mbps	-30 to +75	INT 2x3400mAh @ 3.6V EXT 9–30 VDC	7W	(INT): MF GPS/GLONASS	The Altus NR2 incorporates GNSS and wireless technology into a sleek and compact design. This provides an intelligent Network Rover and Base used in Survey, GIS or UAS (base) applications featuring an intuitive web server on-board configuration for full configuration, on-board GIS data collection (PinPoint-GIS) and extended operation time.
	Altus GeoPod	132 par.	GPS +GLONASS L1, C/A and P-code & CP; L2, P-code & CP; WAAS / EGNOS / GAGAN / MSAS / SDCM	All in View ; GPS +GLONASS	GLNOPRV1	110 x 78 x 35mm (160mm deep in antenna area)	200g	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 3mm +0.5 ppm	10	0.05s		<45s	<20s	1.2s	2	USB (RS232)	115200	-20 to +50	USB 2.0 - Power requirements - 5V DC, <1W	<1W	(INT): L1 GPS/GLONASS (EXT): Antenna Connector: LEMO connector	The Altus GeoPod provides a compact GNSS module designed to add high precision positioning to mobile computing platforms. With only a USB 2.0 interface, mobile platforms may add RTK precision to any on-board application (Windows, Windows Mobile or Android). PinPoint-GIS App is included allowing to run any Android app with the location provided from the GeoPod unit.
	Altus APS3G	544 par.	GPS L1, C/A L2, P-code & CP; L2C; L5 code & CP, GALILEO L1 code & CP; E5a, E5b, AltBoc, E6 code & CP; GLONASS L1L2L2CA, P-Code; BeiDou (B1, B2, B3), IRNSS (L5) QZSS, WAAS / EGNOS, L-Band (Terrastar)	All in View GPS +GLONASS +GALILEO +BEIDOU +IRNSS	GLMNOPRV1	17.8 (Ø) x 9.0cm	1.16kg	1.2m (1s) / 0.4m (1s) / 0.6cm +1 ppm / 3mm +0.5 ppm	10	0.04s		<45s	<20s	1.2s	2	2 RS-232, 1 Bluetooth, 1 UHF, 1 Cellular	1, 200 - 115, 200	-40 to +75	INT/EXT (10-30 V DC)	4W	(INT): MF/Wideband GPS/GLO/ GAL/BDS (EXT): Any	Survey grade receiver with more than 12 hours battery life, Terrastar services, RTK Rover and Base. Provides UHF, GSM and Bluetooth communication.
Sokkia *www.sokkia.com*	GRX2	226 Channels with optimized satellite tracking technology	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C/A SBAS: L1 C/A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	184 (Ø) x 95mm	1.1kg	2-3m / 50cm / 10mm / 3mm	10	0.05		<40	<20s	<1s	2	RS-232, Ext Power	2, 400 - 115, 200	-40 to +65	ext/int	4	int	Internal UHF digital radio and cellular option; Bluetooth
	GSX2	226 Channels with optimized satellite tracking technology	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C/A, L2C SBAS: L1 C/A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	150 x 150 x 64mm	0.85kg	2-3m / 40cm / 10mm / 3mm	10	0.01		<40	<20s	<1s	2	RS-232/Ext Power and mini USB	2, 400 - 115, 200	-40 to +65	ext/int	2	int	Interference-Free Data Communication Technology; Bluetooth
	GCX2	226 Channels with optimized satellite tracking technology	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C/A, L2C SBAS: L1 C/A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	47 x 184.5 x 47mm	0.375kg	2-3m / 50cm / 12mm / 4mm	10	0.01		<40	<20s	<1s	2	Shared Ext Power and USB	2, 400 - 115, 200	-40 to +85	ext/int	2	int	Interference-Free Data Communication Technology; Bluetooth
Spectra Precision *www.spectraprecision.com*	ProFlex 800	120 par.	GPS L1 C/A L1 / L2 P-code, L2 C, L5, L1 / L2 / L5 full wavelength carrier GLONASS L1 C/A and L2 C/A, L1 / L2 full wavelength carrier GALILEO E1 and E5 SBAS L1 code and carrier	12GPS / 12Glonass / 3SBAS >low signal acquisition engines	AGLMNOPR1	21.5 x 20 x 7.6cm	2.1kg	3m / 25cm +1ppm / 1cm +1ppm / 3mm +0.5ppm	nr	0.05s		90s	35s	3s	7	1 RS232/RS422, 2 RS232, USB, Bluetooth, Ethernet, 3.5G/GPRS GSM, Earth terminal	Selectable to 115, 200	-20 to +70	int/ext	with UHF and GNSS antenna < 5	External active antenna depending on application: Geodetic Survey Antenna, Machine, Marine or Choke Ring	Outstanding GNSS Performance in Ultra Rugged Design GNSS Centric Z-Blade
	SP80	240	GPS L1C/A, L1P(Y), L2P(Y), L2C, L5 GLONASS L1C/A, L2C/A, L3 BeiDou B1 (PHASE 2), B2 Galileo E1, E5A, E5B QZSS L1C/A, L2C, L1SAIF, L5 SBAS (WAAS / EGNOS / MSAS / GAGAN)	All-in-view	GLR1	22.2 x 19.4 x 7.5cm	1.17kg	3m / 25cm +1ppm / 8mm +1ppm / 3mm +0.1 ppm	100	0.05s		60s	30s	3s	5	RS232, USB, Bluetooth, WiFi, 3.5G/UMTS GSM	RS232: up to 230, 400 USB 2.0 host & device Bluetooth 2.1 +EDR Class 2, SPP profile WiFi (802.11 b/g/n)	-40 to +65	Hot swappable int/ext	3.5	Internal patch	The Most Connected GNSS Receiver
	SP60	240	GPS L1C/A, L1P(Y), L2C, L2P(Y) GLONASS L1C/A, L2C/A BeiDou B1, B2 Galileo E1, E5a, E5b QZSS L1C/A, L2C, L1SAIF, L5 SBAS L1C/A L-Band	All-in-view	GLR1	21 x 21 x 7cm	930g	3m / 25cm +1ppm / 8mm +1ppm / 3mm +0.1 ppm	100	0.05s		60s	30s	3s	3	RS232, USB, Bluetooth Long Range	RS232: up to 921600 bits/sec USB 2.0 host & device up to 12 MHz Bluetooth 2.1 +EDR Class 1, Tx Power 19 dBm, SPP profile	-40 to +65	ext./int.	2, 2 (with UHF Rx)	Internal patch	The Most Versatile GNSS Solution
Spectracom *spectracom.com*	SecureSync Time and Frequency Synchronization System	72	GPS / GLONASS / QZSS L1, BeiDou B1, Galileo E1	All in view	ADLMOT1	42.5 x 4.4 x 35.6cm	2.95kg	Autonomous	25ns	1Hz		< 15min	< 5min	< 5min	> 3	1 RS-232, 1PSS, 10 MHz, 1 Ethernet (others based on configuration)	9.6 Kbps	-20 to +65	ext	40-50W	L1 (ER/WR)	Modular, GNSS Time and Frequency Server
	SecureSync SAASM Time and Frequency Synchronization System	72	GPS L1 C/A, P; GPS L2 P & Y-code (encrypted P-code)	All in view	ADLMOT1	42.5 x 4.4 x 35.6cm	2.95kg	Autonomous	40ns	1Hz		< 20min	< 5min	< 5min	> 3	1 RS-232, 1PSS, 10 MHz, 1 Ethernet (others based on configuration)	9.6 Kbps	-20 to +65	ext	40-50W	L1/L2 (ER/WR)	Modular, SAASM GPS Time and Frequency Server
	TSync Timing Boards	72	GPS / GLONASS / QZSS L1, BeiDou B1, Galileo E1	All in view	ADLMOT1	Varied (based on form factor)	Varied (based on form factor)	Autonomous	50ns	1Hz		< 15min	< 5min	< 5min	> 14	1PPS, 10 MHz, IRIG AM/DCLS, GPIO	NA	-40 to +85	ext	Varied (based on form factor)	L1 (ER/WR)	GNSS Time Code Processor available in bus-level form factors
	VelaSync High Speed Time Server	50	GPS L1	All in view	OT1	43.7 x 4.3 x 65.0cm	10.7kg	Autonomous	50ns	1Hz		< 15min	< 5min	< 5min	5	5 Ethernet (3 x 1Gb and 2 x 10Gb)	9.6 Kbps	+10 to +35	ext	500W high-efficiency (94% +) redundant power	L1 (ER/WR)	GPS 10Gb PTP Grandmaster and NTP High Speed Time Server
	VersaSync Rugged Time and Frequency Reference System	72	GPS / GLONASS / QZSS L1, BeiDou B1, Galileo E1	All in view	ADLMOT1	14.7 x 12.8 x 63.0cm	0.91kg	Autonomous	50ns	1Hz		< 15min	< 5min	< 5min	> 11	10 MHz, Configurable (1PPS, IRIG, HAVE QUICK, ASCII ToD), 2 x 1Gb Ethernet	NA	-40 to +65	ext	10W	L1 (ER/WR)	Rugged, Low-SWAP GNSS Time and Frequency System
Spectrum Instruments *www.spectruminstruments.com*	Custom Time / Frequency Modules	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	ADGLMMetOPT12	Various	Various	2.5m / 2.0m / NA (CEP)	10	1		<35s	<38s	<1s	Various	sine, 1PPS, RS-232, TTL, IRIG B, NTP, various	Selectable to 115, 200	-20 to +70	ext	Various	ext	Customizable time/frequency platform
	TM-4	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	DGLMMetNOPT1	4.0 x 1.5 x 4.125in Rack Brax avail.	1lb	2.5m / 2.0m / NA (CEP)	15	1		<35s	<38s	<1s	2, 9	as above	Selectable to 115, 200	-20 to +70	ext	3.2	ext	Time/Frequency reference instrument. IRIG-B
	TM-4D	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	DGLMetOPT1	19.0 x 1.75 x 8.0in	6.5lb	2.5m / 2.0m / NA (CEP)	10	1		<35s	<38s	<1s	24, 9	as above	Selectable to 115, 200	0 to +70	ext	4	ext	Time/Frequency instrument with integrated Distribution Amplifier. IRIG-capable.
	TM4-M +, TM4-M / D	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	DGLMMetOPT1	9.5 x 1.75 x 9.0in	4lb	2.5m / 2.0m / NA (CEP)	10	1		<35s	<38s	<1s	6, 9	as above	Selectable to 115, 200	0 to +70	Universal AC	3.2	ext	Time/Frequency instrument with internal UPS
	TM4-MRII	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	DLMetOPT1	19.0 x 3.5 x 8.0in	6lb	2.5m / 2.0m / NA (CEP)	5	1		<35s	<38s	<1s	6, 9	as above	Selectable to 115, 200	-20 to +70 or -40 to +85	Universal AC	<12	ext	Time/Frequency instrument with Rubidium oscillator. Rack Mount
	TM-4OEM	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	ADGLMMetOPT2	3.875 x 1.0 x 4.00in	0.5lb	2.5m / 2.0m / NA (CEP)	10	1		<35s	<38s	<1s	2, 9	as above	Selectable to 115, 200	-40 to +85	ext	Various to under 2W	ext	Board level module, Time/Frequency, IRIG-B
	TM4-PC / 104	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	ADGLMMetOPT2	3.775 x 0.497 x 3.55in	0.5lb	2.5m / 2.0m / NA (CEP)	10	1		<35s	<38s	<1s	3, 9	10 MHz sine(x2), 1PPS, RS-232, TTL, IRIG B, NTP, various	Selectable to 115, 200	-20 to +70 or -40 to +85	ext	as above	ext	Board level module, Time/Frequency, IRIG-B, PC/104 compliant
	TM4-SN, TM4-S	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	ADGLMNOPT2	5.1 x 1.0 x 1.6in	0.5lb	2.5m / 2.0m / NA (CEP)	15	1		<35s	<38s	<1s	2, 5	10 MHz LVDS, 1PPS LVDS, TTL, Custom	4800 - 115200	-40 to +85	ext	as above	ext	Board level module, Time/Frequency, MGRS, WAAS, High Sensitivity, Fully Shielded
	TM5-OEM	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	ADGLMNOPT2	60 x 114 x 16mm	0.5lb	2.5m / 2.0m / NA (CEP)	10	1		<35s	<38s	<1s	2, 8	sine, 1PPS, TTL, various	4800 - 115200	-40 to +85	ext	3.2	ext	Board level module, Time/Frequency, high sensitivity, WAAS, Fully Shielded
	TM4-BB	72 par.	GPS / QZSS, GLONASS, GALILEO; SBAS: WAAS, EGNOS, MSAS, GAGAN	All in View +2 SBAS	ADGLMNOPT2	3.0 x 1.0 x 1.5 in	0.25lb	2.5m / 2.0m / NA (CEP)	10	1		<35s	<38s	<1s	2, 8	sine, 1PPS, TTL, various	4800 - 115200	-40 to +85	ext	3.2	ext	Board level module, Time/Frequency, high sensitivity, WAAS, Fully Shielded
STMicroelectronics *www.st.com/gps*	Cartesio PLUS (STA2064)	32	GPS / Galileo (L1), SBAS	32	ACDGLHMNPTV	15 x 15 x 1.2mm	na	2m / 1.5m / na / na	<50(rms)	1Hz		35s	34s	<1s	17	UART, SPI, I2C, USB, CAN, 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	GPS / Galileo (L1), SBAS	32	ACDGLHMNPTV	16 x 16 x 1.2mm	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
	Teseoll (STA8088CEXG)	32	GPS / Galileio / Glonass QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	9 x 9 x 1.2	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 1, 1, 1, 64	UART, SPI, SQI, I2C, USB, CAN, SD/MMC, I2S, FSMC, GPIOs	4800 - 115500	-40 to +85	1.2V/1.8V	Variable (inquire)	E (passive & active)	GNSS Processor
	Teseoll (STA8088CFG)	32	GPS / Galileio / Glonass QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN,, GPIOs	4800 - 115500	-40 to +85	1.2V/1.8V	Variable (inquire)	E (passive & active)	GNSS Stand-Alone Receiver
	Teseoll (STA8088GA)	32	GPS / Galileio / Glonass QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN,, GPIOs	4800 - 115500	-40 to +85	1.2V/1.8V	Variable (inquire)	E (passive & active)	Automotive GNSS Stand-Alone Receiver
	Teseoll (STA8088GAT)	32	GPS / Galileio / Glonass QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN,, GPIOs	4800 - 115500	-40 to +105	1.2V/1.8V	Variable (inquire)	E (passive & active)	AEC-Q100 Grade 2 (-40-to 105) qualified
	Teseoll (STA8088CWG)	32	GPS / Galileio / Glonass QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	4 x 4 x 0.64	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN,, GPIOs	4800 - 115500	-40 to +85	1.2V/1.8V	Variable (inquire)	E (passive & active)	GNSS Stand-Alone WL-CSP

RECEIVER SURVEY 2017

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	TeseoIII (STA8090EXG)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	9 x 9 x 1.2	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 1, 1, 64	UART, SPI, SQI, I2C, USB, CAN,, SD/MMC, I2S, GPIOs, FSMC	4800 - 115500	-40 to +85	1.6-4.3V	Variable (inquire)	E (passive & active)	GNSS Processor
	TeseoIII (STA8090FG)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	6 x 5 x 1.2	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 1, 1, 32	UART, SPI, SQI, I2C, USB, CAN,, SD/MMC, I2S, GPIOs	4800 - 115500	-40 to +85	1.6-4.3V	Variable (inquire)	E (passive & active)	GNSS Processor
	TeseoIII (STA8089FG)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, GPIOs	4800 - 115500	-40 to +85	1.2V/1.8V	Variable (inquire)	E (passive & active)	GNSS Stand-Alone Receiver
	TeseoIII (STA8089FGA)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, GPIOs	4800 - 115500	-40 to +85	1.2V/1.8V	Variable (inquire)	E (passive & active)	Automotive GNSS Stand-Alone Receiver wioth Stacked Flash
	TeseoIII (STA8090WG)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1), SBAS	all in view	ACDGLHMNPTV3	3.8x3.8x0.6	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 32	UART, SPI, SQI, I2C, USB, GPIOs	4800 - 115500	-40 to +85	1.6-4.3V	Variable (inquire)	E (passive & active)	GNSS Stand-Alone WLCSP
	TeseoIII (STA8090GA)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	8 x 8 x 0.85	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, GPIOs	4800 - 115500	-40 to +85	1.6-4.3V	Variable (inquire)	E (passive & active)	Automotive GNSS Stand-Alone Receiver
	TeseoIII (STA8089GA)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, GPIOs	4800 - 115500	-40 to +85	1.6-4.3V	Variable (inquire)	E (passive & active)	Automotive GNSS Stand-Alone Receiver
	TeseoIII (STA8089GAT)	48	GPS / Galileio / Glonass / Beidou / QZSS (L1), SBAS	all in view	ACDGLHMNPTV2	7 x 7 x 0.85	na	2m / 1.5m / na / na	<20(rms)	1Hz/5Hz/10Hz		35s	34s	<1s	3, 2, 1, 1, 1, 2, 32	UART, SPI, SQI, I2C, USB, CAN, GPIOs	4800 - 115500	-40 to +105	1.2V/1.8V	Variable (inquire)	E (passive & active)	AEC-Q100 Grade 2 (-40-to 105) qualified
	RF Front-End (STA5630)	na	L1	na	ACDGLHMNPTV2	5 x 5 x 1.0mm	na	na	na	na		na	na	na	na	na	9, 600 - 38, 400	-40 to +85	1.62-1.98V	29mW	na	Low power GPS-Galileo RF Front-end
Surrey Satellite Technology Ltd. *www.sstl.co.uk*	SGR-07	12	GPS L1 C/A	12	NS1	120 x 47 x 76mm	450g	<10m / - / - / 1m (95%)	500	1		9m/2m	60s	nr	2	RS-422, CAN bus	9, 600 - 38, 400	-20 to +50	ext	<2	1 patch + LNA	Packaged SGR-05P
	SGR-05P	12	GPS L1 C/A	12	NS2	70 x 10 x 70mm	60g	<10m / - / - / 1m (95%)	500	1		9m/2m	60s	nr	2	TTL, RS422, CAN	9, 600 - 115, 200	-20 to +50	ext	1.5	1 Quadrifilar/patch + LNA	Rdcd-size OEM w TMR
	SGR-05U	12	GPS L1 C/A	12	NS2	70 x 10 x 45mm	30g	<10m / - / - / 1m (95%)	500	1		9min	60s	nr	1	UART TTL	9, 600 - 115, 200	-20 to +50	ext	1	1 Quadrifilar/patch + LNA	University-grade space OEM
	SGR-Ligo	24	GPS, Galileo, Glonass L1 Open Services	>12	NS2	92 x 87.4 x 12mm	65 g	5m / - / - / <1m (95%)	200	1		3/2min	60s	nr	3	UART TTL, I2C, CAN	9, 600 - 115, 200	-20 to +50	ext	0.8	Flat passive patch	Cubesat compatible, dual antennas
	SGR-ReSI	16	GPS L1 C/A, L2C	>12	NS1	300 x 40 x 200mm	1kg	10m / - / - / <1m (95%)	500	1		3/2min	60s	nr	3	RS-422, CAN bus, LVDS	9, 600 - 115, 200, 10Mbps	-20 to +50	ext	5-10	Four spiral array, plus standard patches	Remote Sensing Capability (Reflection & RO)
	SGR-Axio	24	GPS L1 C/A, L2C; GLONASS L1OF, L2OF, GALILEO E1OS	>12	NS1	160 x 50 x 180mm	1kg	5m / - / - / <1m (95%)	100	1		3/2min	60s	nr	3	RS-422, CAN bus, LVDS	9, 600 - 115, 200	-20 to +50	ext	4-6	Up to 4 patches	New Generation Space Receiver
Swift Navigation *www.swiftnav.com*	Piksi Multi	Flexible FPGA based architecture	GPS L1 / L2; Hardware ready for GLONASS G1 / G2, BeiDou B1 / B2, Galileo E1 / E5b, QZSS L1 / L2, SBAS	44	CDGHLMNV2	71 x 48 x 13mm	24g	<3.0 m CEP; 1cm +1ppm	<<50ns	20Hz		<<60s	<45s	<2s	47	2 x LV-TTL / RS-232, 2 x CAN, 2 x MMCX Antenna, 1 x USB 2.0 Host, 1 x USB 2.0 Device, 1 x Ethernet, 35 x GPIO (prog.), 1 x Event Marker, 1 x PPS, 1 x SD Card	up to 921, 600 bps (UART), 480 mbps (USB), 100 mbps (Ethernet)	-40 to +85	ext; 4.5 to 15V	< 2.8W	Active (ER), 2 inputs switchable	Multi-Frequency Multi-Constellation FPGA based dual core receiver with Linux
Synergy Systems, LLC *www.synergy-gps.com*	SSR-6Tf	16 Par	GPS L1 C/A code, 16 GPS	50	ACDGHLNTV2	40 x 60 x 4.5	12g	2.5 Aut, 2.5 RTCM, <10 cm RTK	15ns	1Hz to 5Hz		26s	1s	1s	1	3.3V Logic Level	4800 - 57600	-40 to +85	ext	240mW	Passsive or Active	OEM Navigation & Timing
	SSR-M8T	16 Par	GPS L1 C/A code, 16 GPS, GLONASS, Galileo, QZSS, BeiDou	72	ACDGHLNTV2	40 x 60 x 4.5	12g	2.5 Aut, 2.5 RTCM, <10 cm RTK	15ns	1Hz to 5Hz		< 35s	3s	1s	1	3.3V Logic Level	4800 - 57600	-40 to +85	ext	240mW	Passsive or Active	OEM Navigation & Timing
Telit Communications *www.telit.com*	Jupiter JF2 Flash	48	GPS L1, SBAS, QZSS	All in view	CDLHMNPTV2	11 x 11 x 2.5mm	1g	<2.5m (CEP)	<1us	5Hz		<35s	<30s	<1s	1	UART, I2C, SPI	All standard bit rates	-40 to +85	ext. 1.75 - 1.9 VDC	67mW	ext	
	Jupiter JF2 ROM	48	GPS L1, SBAS, QZSS	All in view	CDLHMNPTV2	11 x 11 x 2.5mm	1g	<2.5m (CEP)	<1us	5Hz		<35s	<30s	<1s	1	UART, I2C, SPI	All standard bit rates	-40 to +85	ext. 1.75 - 1.9 VDC	67mW	ext	
	Jupiter JN3 Flash	48	GPS L1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1g	<2.5m (CEP)	<1us	5Hz		<35s	<30s	<1s	1	UART, I2C, SPI	All standard bit rates	-40 to +85	ext., 2.85-3.6 VDC	96mW	ext	
	Jupiter JN3 ROM	48	GPS L1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1g	<2.5m (CEP)	<1us	5Hz		<35s	<30s	<1s	1	UART, I2C, SPI	All standard bit rates	-40 to +85	ext., 2.85-3.6 VDC	96mW	ext	
	Jupiter SL869	32	GPS L1, GLONASS L1, Galileo E1, QZSS, SBAS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1g	<1.5m (CEP)	<1us	10Hz		<35s	<30s	<1s	3	2xUART, I2C, UART/USB	All standard bit rates	-40 to +85	ext., 3-3.6 VDC	126mW	ext	
	Jupiter SL869-T	32	GPS L1, GLONASS L1, Galileo E1, QZSS, SBAS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1g	<1.5 m(CEP)	3.7ns (50%)	10Hz		<35s	<30s	<1s	3	3xUART, I2C	All standard bit rates	-40 to +85	ext., 3-3.6 VDC	126mW	ext	Timing Receiver
	Jupiter SL869-V3	32	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	1.3m (CEP)	<1us	10Hz		34s	25s	1s	4	3xUART, I2C	All standard bit rates	-40 to +85	ext., 3-3.6 VDC	128mW	ext	
	Jupiter SL869-3DR	32	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	1.3m (CEP)	<1us	15Hz		35s	25s	1s	3	2xUART, I2C	All standard bit rates	-40 to +85	ext., 3-3.6 VDC	128mW	ext	Dead reckoning GNSS module with internal 7-axis MEMS sensors
	Jupiter SL869-ADR	56	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	1.3m (CEP)	<1us	15Hz		35s	25s	1s	3	2xUART, I2C	All standard bit rates	-40 to +85	ext., 3-3.6 VDC	128mW	ext	Dead reckoning GNSS module with internal 6-axis MEMS sensors with external interface (wheel tick, reverse indicator)
	Jupiter SE868-V3	56	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	11 x 11 x 2.5mm	1g	1.2m (CEP)	<1us	5Hz		27s	23s	1s	2	UART, I2C, SPI	All standard bit rates	-40 to +85	ext. 1.75-1.85 VDC	58mW	ext	
	Jupiter SE868-A	99/33	GPS L1, GLONASS L1, Galileo E1, SBAS, QZSS	All in view	CDLHMNPTV2	11 x 11 x 6.4mm	2g	2.5m (CEP)	<1us	10Hz		31s	28s	1s	2	2xUART	All standard bit rates	-40 to +85	ext., 2.8-4.3 V	72mW	embeded 9x9 mm GPS + GLO SMT	
	Jupiter SE868-AS	66/22	GPS L1, QZSS	All in view	CDLHMNPTV2	11 x 11 x 6.4mm	2g	2.5m (CEP)	<1us	5Hz		33s	32s	1s	2	2xUART	All standard bit rates	-40 to +85	ext., 2.8-4.3 V	54mW	embeded 9x9 mm GPS SMT	
	Jupiter SE873Q5	56	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	7 x 7 x 1.85mm	0.5g	1.2m (CEP)	<1us	5Hz		27s	23s	1s	2	UART, I2C, SPI	All standard bit rates	-40 to +85	ext. 1.75-1.85 V	63mW	ext	
	Jupiter SL869L-V2	99/33	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	2.5m (CEP)	<1us	10Hz		27s	24s	1s	2	2xUART, I2C	All standard bit rates	-40 to +85	ext., 2.8-4.3 V	80mW	ext	
	Jupiter SL869L-V2S	66/22	GPS L1, QZSS, DGPS	All in view	CDLHMNPTV2	16 x 12.2 x 2.4mm LLC package	1.8g	2.5m (CEP)	<1us	10Hz		33s	32s	1s	2	2xUART	All standard bit rates	-40 to +85	ext., 2.8-4.3 V	53mW	ext	
	Jupiter SL871L	99/33	GPS L1, GLONASS L1, Galileo E1, BeiDou B1, SBAS, QZSS	All in view	CDLHMNPTV2	10.1 x 9.7 x 2.4mm	1g	2.5m (CEP)	<1us	10Hz		31s	28s	1s	2	2xUART, I2C	All standard bit rates	-40 to +85	ext., 2.8-4.3 V	76mW	ext	
	Jupiter SL871L-S	66/22	GPS L1, QZSS, DGPS	All in view	CDLHMNPTV2	10.1 x 9.7 x 2.4mm	1g	2.5m (CEP)	<1us	10Hz		33s	32s	1s	2	2xUART	All standard bit rates	-40 to +85	ext., 2.8-4.3 V	44mW	ext	
THALES - Avionics Division *www.thalesgroup.com*	GNSS 1000C	12	L1: C/A	All in view	ADLMNPT2	149.35 x 144.65 x 19mm	430g	< 5m (95%)	< 50	10Hz		<60s	20s	<5s	4, 1, 1, 1, 2	RS 422, DPRAM, DS-101, DS-102, HVQK, 1PPS In/Out	115 200	-46 to +101	ext	< 10W	ext. - passive or active (E)	SPS receiver, pin to pin compatible with GNSS 1000S.
	GNSS 1000G	20 par.	GPS L1 C/A code and GLONASS L1	10 GPS +10 GLONASS	ADLMN2	149.35 x 144.65 x 19mm	430g	< 5m (95%)	< 50	5Hz		GPS: 200s GLO: 290s	GPS: 50s GLO: 60s	<15s	3, 1	RS 422, DPRAM	4800, 115 200	-46 to +71	ext	14W	ext. - passive or active (E)	
	GNSS 1000S, SAASM-Based	24 par.	L1: C/A, P or Y code L2: P or Y code	All in view	ADLMNPT2	149.35 x 144.65 x 19mm	430g	< 3m (95%)	< 50	10Hz		<60s	20s	<5s	4, 1, 1, 1, 2	RS 422, DPRAM, DS-101, DS-102, HVQK, 1PPS In/Out	115200	-45 to +82	ext	< 10W	ext. - passive or active (E)	SAASM Based, GRAM-S (SEM E) module
	GNSS 100-2, SAASM-Based	24 par.	L1: C/A, P or Y code L2: P or Y code	All in view	ADLMNPT1	221.5 x 162 x 67.3mm	1.6kg	< 3m (95%)	< 50	10Hz		<60s	20s	<5s	1 or 2, 2, 1, 1, 1, 1, 2	1553 or ARINC 429, RS422, NMEA, DS-101, DS-102, HVQK, 1PPS In/Out	100 000, 19200	-40 to +70	28VDC	< 25W	ext. - passive or active (E)	SAASM Based
	GNSS 100-3, SAASM-Based	24 par.	L1: C/A, P or Y code L2: P or Y code	All in view	ADLMNPT1	211 x 160 x 49mm	1.4kg	< 3m (95%)	< 50	10Hz		<60s	20s	<5s	4, 1, 2	RS 422, HVQK, 1PPS In/Out	460800	-30 to +70	28VDC	< 20W	ext. - passive or active (E)	SAASM Based
	TOPSTAR 200	12	L1: C/A	All in view	AN1	66 x 216 x 241mm	1.6kg	< 15m, 1m (SBAS) (95%)	< 50	1Hz or 5Hz		<210s	75s	<10s	8, 1, 3, 3	ARINC 429, RS 232, Time Mark Pulse; discrete	460800	-40 to +65	28VDC	< 18W	ext. - passive or active (E)	TSO C145c (Beta-3) and TSO C146c (Delta-4) certified
Topcon *www.topconpositioning.com*	HiPer HR	452 Channels with Universal Tracking Channel Technology	GPS: L1, L1C, L2, L2C, L5 GLONASS: L1, L2, L3 GALILEO: E1, E5a / E5b, ALTBOC, E6 BeiDou: B1, B2 QZSS: L1 C/A, L1C, L1-SAIF, L2C, L5, LEX SBAS: L1 C/A, L5, WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	115 x 132 x 115mm	1.17 kg	1.5 m / 40cm / 5mm / 3mm	10	up to 0.05		<40s	<20s	<1s	4	RS-232, USB, Ext Pwr, Ext GNSS Antenna	up to 460800	-40 to +70	ext/int	3.3	int/ext	LongLink Technology; TILT Technology; Hybrid; Cellular; Bluetooth
	GR-5	226 Channels with Universal Tracking Channel Technology	GPS: L1, L1C, L2, L2C, L5 GLONASS: L1, L2 GALILEO: E1, E5a / E5b, ALTBOC BeiDou: B1, B2 QZSS: L1 C/A, L1C, L2C, L5 SBAS: L1 C/A, L5 WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	158.1 x 253.0 x 158.1mm	1.44kg	1.2m / 40cm / 5mm / 3mm	10	up to 0.02		<60s	< 30s	< 1s	3	RS-232, USB, Ext Pwr	up to 460800	-30 to +70	ext/int	3	int.	Internal digital UHF and FH915 (SpSp) radio with cellular (HSPA/CDMA) options; Bluetooth
	HiPer V	226 Channels with Universal Tracking Channel Technology	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C/A SBAS: L1 C/A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	184 x 95mm	1.0kg	1.2m / 50cm / 5mm / 3mm	10	up t o 0.05		<60s	< 35s	<1s	2	RS-232, Ext Power	up to 115200	-40 to +65	ext/int	4	int	Internal digital UHF and FH915 (SpSp) radio with cellular (HSPA/CDMA) options; Bluetooth
	HiPer SR	226 Channels with Universal Tracking Channel Technology	GPS: L1, L2, L2C GLONASS: L1, L2 QZSS: L1 C/A, SBAS: L1 C/A WAAS, EGNOS, MSAS, GAGAN	All in view	GL1	150 x 150 x 64mm	0.85kg	1.2m / 40cm / 10mm / 3mm	10	0.1		<40s	<20s	<1s	2	RS-232/Ext Power and mini USB	up to 115200	-40 to +65	ext/int	2	int	LongLink Technology; Hybrid; Cellular; Bluetooth
	NET-G5	452 Channels with Universal Tracking Channel Technology	GPS: L1, L1C, L2, L2C, L5 GLONASS: L1, L2, L3 GALILEO: E1, E5a / E5b, ALTBOC, E6 BeiDou: B1, B2 QZSS: L1 C/A, L1C, L1-SAIF, L2C, L5, LEX SBAS: L1 C/A, L5, WAAS, EGNOS, MSAS, GAGAN	All in view	GLR1	150 x 200 x 60mm	2.0kg	1.2m / 25cm / 5mm / 3mm	10	0.01		<60s	<10s	<1s	8	2 RS-232, 1 RS-422. USB Host USB Type-A, USB Device – Mini-B, 2 Power, 1 Ethernet (PoE)	up to 460800	-40 to +80	ext	< 5.0	ext	GNSS reference network receiver; internal back up power (UPS); 1 External Frequency; 1 PPS; 1 Event Mark; UBS host and device supporting OTG functionality; Ehterne (POE class 3); Class 2 Bluetoothe +EDR; Wifi; NTRIP client, cater, and server functionality, TCP/IP and FTP with multiple address ports, Web user interface vis Ehternet and WiFi connectivity
	MR-2	226 Channels with Universal Tracking Channel Technology	GPS: L1, L1C, L2, L2C, L5 GLONASS: L1, L1P, L2, L2P, L3C Galileo: E1, E5a, E5b, E5AltBOC BeiDou: B1, B2 QZSS: L1 C/A, L1C, L2C, L5C SBAS: WAAS / MSAS / EGNOS	All in view	GLR1	172 x 49 x 166mm	0.95 kg	1.2m / 40cm / 5mm / 3mm	10	0.01		<60s	<10s	<1s	7	DEUTSCHE DTM 12 Pin Receptacle for Power and Comms, 3x Serial, CAN, PPS, Turck M12 8-pin, breaks out to RJ45 and SAE power	up to 115200	-40 to +75	ext	12W max	ext (x2)	GNSS Modular receiver with dual antenna input support for precise heading (and inclination) determination using Topcon's HD2 technology; PPS support
	B110	226 Channels with Universal Tracking Channel Technology	GPS: L1, L2, L2C GLONASS: L1, L2, L2C QZSS: L1, L2C, WAAS, EGNOS, MSAS, GAGAN L1	All in view	2	40 x 55 x 10mm	<20g	1.2m / 40cm / 5mm / 3mm	10	0.01		<60s	<35s	<1s	10	2 RS232, 4 LVTTL UART, 1 USB, 1 CAN, 1 I2C interface, 1 PPS	up to 115200	-40 to +85	ext.	1.0W	ext/int	Compact OEM L1/L2 GNSS board for high precision RTK positioning
	B111	226 Channels with Universal Tracking Channel Technology	GPS: L1, L2, L2C GLONASS: L1, L2, L2C, Galileo: E1, Beidou: B1, B2, QZSS: L1 C/A, L1C, L1-SAIF, L2C, WAAS, EGNOS, MSAS, GAGAN L1	All in view	2	40 x 55 x 10mm	<20g	1.2m / 40cm / 5mm / 3mm	10	0.01		<60s	<35s	<1s	10	2 RS232, 4 LVTTL UART, 1 USB, 1 CAN, 1 I2C interface, 1 PPS	up to 115200	-40 to +85	ext	1.0W	ext/int	Compact OEM L1/L2 GNSS board for high precision RTK positioning
	B125	226 Channels with Universal Tracking Channel Technology	GPS: L1, L2, L1C, L2C, L5 GLONASS: L1, L2, L3 Galileo: E1, E5a, E5b, AltBOC Beidou: B1, B2 SBAS: L1 L2C - L-Band (OmniStar / TerraStar)	All in view	2	40 x 55 x 10 mm	30g	1.2m / 40cm / 5mm / 3mm	10	0.01		<60s	<35s	<1s	6	2 RS232, 4 LVTTL UART, 1 USB, 1 CAN, 1 Ethernet, 1 PPS	up to 115200	-40 to +85	ext	2.0W	ext/int	Compact OEM Full Constellation GNSS board for high precision RTK positioning with Ethernet
	Euro 112 PII	144 Channels with Universal Tracking Channel Technology	GPS: L1, L2, L2C, L5 GLONASS: L1, L2 QZSS: L1 C/A, L1C, L2C, L5 SBAS: L1 C/A WAAS, EGNOS, MSAS, GAGAN	>50	2	112 x 14.7 x 100mm	na	1.2m / 30cm / 10mm / 3mm	10	0.01		<60s	<35s	<1s	8	4 RS-232, 1 Ethernet, 1 USB, 2 CAN	up to 115200	-40 to +75	ext	4.8W	ext	OEM GPS Board; USB Host and Device
Trimble *www.trimble.com*	Trimble NetR9	440	GPS: L1 C/A, L2C, L2E (Trimble method for tracking L2P), L5 GLONASS: L1 C/A and unencrypted P code, L2 C/A2 and unencrypted P code, L3 CDMA Galileo L1 CBOC, E5A, E5B & E5AltBOC BeiDou: B1, B2, B3QZSS: L1 C/A, L1C, L1 SAIF, L2C, L5, LEX SBAS: L1C/A, L5 L-Band OmniSTAR (VBS, HP and XP) +RTX Expandable for future signals pending ICD releases.	88	GLMMetNVPRT1	26.5 x 13.0 x 5.5cm	1.75kg	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	50Hz		<60s	<30s	<15s	1,1,1,1,1	D9 Serial; 7pin Lemo; Mini USB (Device and Host modes); RJ45 Ethernet: TCP/IP, UDP, HTTP, HTTPS, FTP, NTRIP Caster, NTRIP Client, NTRIP Server; NTP; Bluetooth	2400 - 460800	38,400 (Port 1 115,200 (Port 2)	–40 to +65	3.8W (setting dependent)	Zephyr Geodetic II GNSS Choke Ring GNSS-Ti Choke Ring	Full GNSS CORS featuring advanced data logging and power parameters, 8GB internal memory, global RTX correction capability, secure Web User Interface with Position Monitoring.
	Nomad 900G Series	12 par.	L1 C/A code, SBAS	12		3.9 x 6.9 x 2.0in	1.23lb	na/2 - 5m/1 - 3m Post-proc	na	1		60s typ.	40s typ.	<5s typ.	2,1,1	RS-232/Bluetooth/USB (selected model or via separate accessory)	110 - 115,000	-20 to +60	int/opt ext	1.3 w/typical use	Int Patch	Ultra rugged handheld available in a number of configurations (camera, barcode scanner, cellular data).
	Trimble Nomad 1050 Series	nr	L1 C/A code, SBAS	nr	GHLMNOV1	17.6 x 10 x 5.0cm	596g including rechargeable battery	nr/2-4m/nr	nr	nr		nr	nr	nr	1,1,1,1	Serial/WiFi/Bluetooth/USB	nr	-30 °C to 60 °C	ext/int	nr	Internal	Ultra rugged handheld available in a number of configurations (camera, barcode scanner, cellular data).

RECEIVER SURVEY 2017

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	Trimble R1	44	L1/G1 GPS, GLONASS, Galileo, Beidou, QZSS, L1 SBAS, ViewPoint RTX	Unrestricted	GHLMNOV1	11.2cm x 6.8cm x 2.6cm	0.19kg	nr/75cm+1ppm HRMS/nr	nr	1Hz		nr	nr	nr	1,1	USB,Bluetooth	nr	-20 to +60	int	nr	Internal	Higher-accuracy GNSS for mobile devices, Trimble ViewPoint RTX
	Trimble R2	220	L1/L2 (GPS, GLONASS, Galileo, BeiDou, QZSS), MSS (RTX), L1 SBAS	Unrestricted	GLMNOPRV1	14.0cm (Ø) x 11.4cm	1.08kg	1-5m/0.25m+1ppm,0.50m+1ppm/3mm+0.5 ppm,5mm+0.5ppm	nr	1Hz		nr	nr	nr	1,1,1,1	USB,Bluetooth,WiFi,Radio	nr	-20 to +55	int/ext	< 3.7W in RTK mode	Internal	Advanced Trimble Maxwell 6 custom GNSS Survey chip, Trimble EVEREST™ multipath signal rejection, Trimble CenterPoint RTX
	Trimble R8s	440	Satellite signals tracked simultaneously: - GPS: L1C/A, L1C, L2C, L2E, L5 - GLONASS: L1C/A, L1P, L2C/A, L2P, L3 - SBAS: L1C/A, L5 (for SBAS satellites that support L5) - Galileo: E1, E5A, E5B - BeiDou: B1, B2 - SBAS: QZSS, WAAS, EGNOS, GAGAN	Unrestricted	GLMNOPRV1	19.0cm (Ø) x 10.4cm	1.52kg	1-5m/0.25m+1ppm,0.50m+1ppm/3mm+0.5 ppm,5mm+0.5ppm	100	1,2,5,10,20Hz		<60s	<30s	<15s	3,1,1	2 x RS232, Bluetooth, Radio coms	38,400 (Port 1) 115,200 (Port 2)	-40 to +65	int/ext	< 3.2W in RTK mode	Internal Zephyr 2	Advanced Trimble Maxwell 6 custom GNSS Survey chips, Trimble 360 Technology
	Trimble R9s	440	Satellite signals tracked simultaneously: - GPS: L1C/A, L1C, L2C, L2E, L5 - GLONASS: L1C/A, L1P, L2C/A, L2P, L3 - SBAS: L1C/A, L5 (for SBAS satellites that support L5) - Galileo: E1, E5a, E5B - BeiDou: B1, B2 - CenterPoint RTX, OmniSTAR VBS, HP, XP, G2, VBS positioning - SBAS: QZSS, WAAS, EGNOS, GAGAN	Unrestricted	GLMNOPRV1	24.0cm × 12.0cm × 5.0cm	1.65kg	1-5m/0.25m+1ppm,0.50m+1ppm/3mm+0.5 ppm,5mm+0.5ppm	100	1,2,5,10,20Hz		<60s	<30s	<12s	3,1,3	RS-232, Ethernet, Bluetooth	110 - 115,000	-20 to +60	int/ext	< 6W in RTK mode	Zephyr Model 2	Advanced Trimble Maxwell 6 custom GNSS Survey chips, Trimble 360 Technology, Trimble CenterPoint RTX. The modular GNSS receiver design allows maximum flexibility for use as a base station or rover. The modular receiver can be located in a safe location while the external antenna can be placed for maximum usability.
	Trimble R10	440	Satellite signals tracked simultaneously: - GPS: L1C/A, L1C, L2C, L2E, L5 - GLONASS: L1C/A, L1P, L2C/A, L2P, L3 - SBAS: L1C/A, L5 (for SBAS satellites that support L5) - Galileo: E1, E5a, E5B - BeiDou: B1, B2 - CenterPoint RTX, OmniSTAR VBS, HP, XP, G2, VBS positioning - SBAS: QZSS, WAAS, EGNOS, GAGAN	Unrestricted	GLMNOPRV1	11.9cm (Ø) x 13.6cm	1.12kg	1-5m/0.25m+1ppm,0.50m+1ppm/3mm+0.5 ppm,5mm+0.5ppm	100	1,2,5,10,20Hz		<60s	<30s	<15s	1,1,1,1,1,1	USB, RS232, Bluetooth, WiFi, Radio antenna, 3.5G UMTS Cellular Modem	38,400 (Port 1) 115,200 (Port 2)	-40 to +65	int/ext	< 5.1W in RTK mode	Internal Zephyr 2	Advanced Trimble Maxwell 6 custom GNSS Survey chips, Trimble 360 Technology, HD-GNSS processing Technology, xFill Technology, SurePoint Technology with Full Tilt Compensation, Trimble CenterPoint RTX
	Geo7X with Trimble Access	220	- GPS: L1C/A, L2C, L2E – GLONASS: L1C/A, L1P, L2C/A, L2P – SBAS (WAAS/EGNOS/ MSAS): L1C/A	44	GHLN1	9.9 x 23.4 x 5.6cm	0.925kg	1–5m/0.25m+1ppm,0.50m+1ppm/13mm+1 ppm/5mm+0.5ppm	100	1Hz RTK		<60s	<30s	<15s	1,1,1,1	USB, Bluetooth, WiFi, 3.5G	USB 2.0, Bluetooth 2.1 +EDR, WiFi 802.11b/g, UMTS/HSDPA 800 / 850 / 900 / 1900 / 2100 MHz, GPRS/ EDGE 850/900/1800/1900 MHz, CDMA/EV-DO Rev. A 800 / 1900 MHz (Verizon certified)	–20 to +50	ext/int	2.7W - 3.7W	Internal L1/L2 and external Zephyr 2 antenna	Trimble R-Track Technology, Advanced Maxwell Survey GNSS chip
	GPS Pathfinder ProXRT	440	L1 / L2, GPS / GLONASS L1 / L2, Omnistar, SBAS	88	GLN1	9.4 x 4.7 x 1.9in	3.42lb	na / 30cm / 10cm / 10cm	na	1		60s typ	30s typ.	<5s typ	2,2	Bluetooth / RS232	110 - 115,000	-20 to +60	int / opt. ext	4.4W	Ext antenna	Flexible GNSS receiver with real-time decimeter accuracy
	Trimble Geo 7X	220	GPS: L1C/A, L2C, L2E GLONASS: L1C, L2P Galileo: E1 QZSS: L1C/A, L2C, L1-SAIF BeiDou: B1 SBAS: WAAS/EGNOS/MSAS/ GAGAN (L1C/A)	44	GHLN1	234 x 99 x 56mm (9.2 x 3.9 x 2.2in)	1080g	2-5m/75cm/10cm/10cm (1cm with carrier)	na	1Hz		<60s	<30s	<5s	1,3,1,2	RS-232 (via cable adapter) /Integrated virtual com ports/USB/Bluetooth	110 - 115,000	-30 to +60 C	external/internal	<4.5W (typ)	Internal or external L1/L2 antenna	Includes cellular data capability, Trimble Floodlight Technology and laser rangefinder module.
	Bison	32	L1, C/A code GPS +GLONASS	32	AGHLMMETNPV2	19 x 19 x 2.54mm	1.74g	<1.5	50	5 - 20Hz		38s	35s	2s	1	serial	115200	–40 to +85	ext	45mA @ 3V typical	supports active/passive	Dead reckoning position when connected to vehicle speed. Onboard gyro and accel.
	Bison3	32	L1, C/A code GPS +GLONASS or GPS +Beidou	33	AGHLMMETNPV3	19 x 19 x 3.05mm	1.80g	<1.5	50	5 - 20Hz		38s	35s	2s	2	serial, CAN	115200	–40 to +85	ext	55mA @ 3V typical, tracking	supports active/passive	Dead reckoning position when connected to vehicle speed and driection. Onboard gyro. Onboard accel optional.
	Aardvark	22	L1, C/A code	22	AGHLMMETNPV2	19 x 19 x 2.54mm	0.544g	<2.5		1, 5, 10Hz		38s	35s	2s	1 +1	serial & usb	38400	–40 to +85	ext	<37 mA typical 20-C	supports active/passive	Dead reckoning position when connected to vehicle speed. Onboard gyro.
	A3000	22	L1, C/A code	22	LV1	115 x 78 x 26mm	100g	<2.5		1, 5, 10Hz		38s	35s	2s	1 +1	serial	9600 or higher	–40 to +85	ext/int battery	<40 mA typical, 9 - 30 VDC	external active 3.3v	Dead reckoning position when connected to vehicle speed. Onboard gyro. IP54 packaging, onboard battery and charger
	Copernicus II GPS	12	L1, C/A code	12	AGHLMMETNPV2	2.54 x 19 x 19	0.7oz	3m	50	1		38s	35s	2s	2	TTL		–40 to +85	ext/int	44 mA @3.0 V	Micropatch (ER)	
	Condor C1011	22	L1, C/A code	22	AGHLMMETNPV2	10 x 10 x 2mm	0.364g	<2.5		1Hz		38s	35s	2s	1	serial		–40 to +85		<37 mA typical 20-C		
	Condor C1216	22	L1, C/A code	22	AGHLMMETNPV2	16 x 12.2 x 2.13mm	0.544g	<2.5		1Hz		38s	35s	2s	1 +1	serial & usb		–40 to +85		<37 mA typical 20-C		
	Condor C1722	22	L1, C/A code	22	AGHLMMETNPV2	17 x 22.4 x 2.13mm	0.953g	<2.5		1Hz		38s	35s	2s	1	serial & usb		–40 to +85		<37 mA typical 20-C		
	Condor C1919	22	L1, C/A code	22	AGHLMMETNPV2	19 x 19 x 2.54mm	1.74g	<2.5		1Hz		38s	35s	2s	1	serial	9600	–40 to +85		<37 mA typical 20-C		
	Condor C2626	22	L1, C/A code	22	AGHLMMETNPV2	26 x 26 x 6mm	6.486g	<2.5		1Hz		38s	35s	2s	1	serial	9600	–40 to +85		<37 mA typical 20-C		
	Trimble AP10 Board Set	220	GPS L1/L2, GLONASS L1/L2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	167 x 100 x 45Hmm (including IMU)	0.28kg (including IMU)	1.5 – 3m/0.25- 1m/0.02 - 0.05m /0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1,4,1,5	Ethernet, RS232, 1PPS, Event	2,400–115,200	-40 to +75	ext	< 20W (incl IMU and ant)	MMCX receptacle	GNSS +Inertial for continuous positioning during satellite blockage
	Trimble APX-15 UAV	220	GPS L1/L2/L5, GLONASS L1/L2, BeiDou B1/ B2, Galileo, QZSS, SBAS		ACGNOPR2	67 x 60 x 15Hmm (including IMU)	60 grams	1.5 - 3m/0.5 - 2m/0.02 - 0.05m/0.02 - 0.05m	100	200Hz		<60s	<30s	<15s		Ethernet, RS232, 1PPS, Event	2,400–115,200	-40 to +75	ext	~3.5W at room temperature	MMCX receptacle	Small lightweight high accuracy GNSS +Inertial solution for direct georeferencing of unmanned aerial vehicles and sensors
	Trimble AP15 Board Set	220	GPS L1/L2, GLONASS L1/L2, BeiDou B1/B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.28kg (not including IMU)	1.5 – 3m/0.25- 1m/0.02 - 0.05m /0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1,4,1,5	Ethernet, RS232, 1PPS, Event	2,400–115,200	-40 to +75	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS +Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	Trimble AP20 Board Set	220	GPS L1/L2, GLONASS L1/L2, BeiDou B1/B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.68kg (not including IMU)	1.5 – 3m/0.5 - 2m/0.02 - 0.05m /0.02 - 0.05m	100	100Hz		<60s	<30s	<15s	1,4,1,5	Ethernet, RS232, 1PPS, Event	2,400–115,200	-40 to +75	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS +Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	Trimble AP40 Board Set	220	GPS L1/L2, GLONASS L1/L2, BeiDou B1/B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.68kg (not including IMU)	1.5 – 3m/0.5 - 2m/0.02 - 0.05m /0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1,4,1,5	Ethernet, RS232, 1PPS, Event	2,400–115,200	-40 to +75	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS +Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	Trimble AP50 Board Set	220	GPS L1/L2, GLONASS L1/L2, BeiDou B1/B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.68kg (not including IMU)	1.5 – 3m/0.5 - 2m/0.02 - 0.05m /0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1,4,1,5	Ethernet, RS232, 1PPS, Event	115,200 RS-232, 10/100Mbps Ethr	-40 to +85	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS +Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	Trimble AP60 Board Set	220	GPS L1/L2, GLONASS L1/L2, BeiDou B1/B2, SBAS, QZSS, GALILEO, OmniSTAR	24	ADGLMNOPR2	130 x 100 x 39Hmm (not including IMU)	0.68kg (not including IMU)	1.5 – 3m/0.5 - 2m/0.02 - 0.05m /0.02 - 0.05m	100	200Hz		<60s	<30s	<15s	1,4,1,5	Ethernet, RS232, 1PPS, Event	115,200 RS-232, 10/100Mbps Ethr	-40 to +85	ext	<20W (incl ant, not incl IMU)	MMCX receptacle	GNSS +Inertial for continuous positioning during satellite blockage and high accuracy orientation for mobile mapping
	BD910 GNSS Receiver	220	GPS L1/L2, GLONASS L1/L2, SBAS, QZSS, GALILEO, BeiDou B1/B2	44	DGLMNPRTV2	41 x 41 x 7mm	0.7oz	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	20		<45s	<30s	<2s	4,1,1	RS-232, Ethernet, USB	115,200 RS-232, 10/100Mbps Ethr	-40 to +85	ext	1.1W	MCXX receptacle	
	BD920 GNSS Receiver	220	GPS L1/L2, GLONASS L1/L2, SBAS, QZSS, GALILEO, BeiDou B1/B2	44	DGLMNPRTV2	51 x 41 x 7mm	0.85oz	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	20		<45s	<30s	<2s	4,1,2	RS-232, Ethernet, USB	460,800 RS-232, 10/100Mbps Ethr	-40 to +75	ext	1.3W	MCXX receptacle	
	BD920 -W3G GNSS Receiver	220	GPS L1/L2, GLONASS L1/L2, SBAS, QZSS, GALILEO, BeiDou B1/B2	44	DGLMNPRTV2	50 x 62 x 14mm	54oz	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	20		<45s	<30s	<2s	4,1,2	RS-232, Ethernet, USB	115,200 RS-232, 10/100Mbps Ethr	-40 to +75	ext	1.3W	MMCX receptacle, 44-pin header	GNSS receiver with integrated Bluetooth and WiFi wireless communications
	BD930 GNSS Receiver	220	GPS L1/L2/L5, GLONASS L1/L2/L2L3, SBAS, QZSS, GALILEO, BeiDou B1/B2	44	DGLMNPRTV2	51 x 41 x 7mm	1.06oz	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	20		<45s	<30s	<2s	4,1,1	RS-232, Ethernet, USB	115,200 RS-232, 10/100Mbps Ethr	-40 to +80	ext	1.7W	MCXX receptacle	
	BD930-UHF GNSS Receiver	220	GPS L1/L2/L5, GLONASS L1/L2/L2L3, SBAS, QZSS, GALILEO, BeiDou B1/B2	44	DGLMNPRTV2	60 x 55 x 15mm	2.12oz	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	20		<45s	<30s	<2s	3,1,1	RS-232, Ethernet, USB	115,200 RS-232, 10/100Mbps Ethr	-40 to +80	ext	2.0W	MCXX receptacle	GNSS receiver with integrated UHF wireless communications
	BD982 GNSS Heading Receiver	220 x 2	GPS L1/L2, GLONASS L1/L2, SBAS, QZSS, GALILEO, VECTOR Antenna -GPS, GLONASS	44	DGLMNPRTV2	100 x 84.9 x 11.6mm	3.2oz	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	50		<45s	<30s	<2s	4,1,1,1	RS-232, Ethernet, USB, CAN	460,800 RS-232, 10/100Mbps Ethr	-40 to +75	ext	2.1 W	MCXX receptacle	
	BD970 GNSS Receiver	220	GPS L1/L2, GLONASS L1/L2, SBAS, QZSS, GALILEO, BeiDou B1/B2	44	DGLMNPRTV2	100 x 60 x 11.6mm	2.2oz	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	50		<45s	<30s	<2s	3,1,1,1	RS-232, Ethernet, USB, CAN	38400	-40 to +85	ext	1.5W	MCXX receptacle	
	BX982 GNSS Heading Receiver	220 x 2	GPS L1/L2, GLONASS L1/L2, SBAS, QZSS, GALILEO, VECTOR Antenna -GPS, GLONASS	44	DGLMNPRTV2	262 x 140 x 55mm	1.6kg	1–5m/0.25m+0.5ppm/8mm+1ppm/3 mm+0.1 ppm	100	50		<45s	<30s	<2s	3,1,1,1	RS-232, Ethernet, USB, CAN	57600	–40 to +85	ext	4.1 W	TNC	
	Trimble BD935-INS Receiver with IMU	336	GPS L1/L2/L5, GLONASS L1/L2/L3, BeiDou B1/B2, Galileo E1/E5A/E5B, QZSS, SBAS		ACGNOPR2	67 x 60 x 15Hmm (including IMU)	60 grams	1.5 - 3m/0.5 - 2m/0.02 - 0.05m/0.02 - 0.05m	100	100Hz		<45s	<30s	<2s	4	Ethernet, 2x RS232, USB	2,400–115,200	-40 to +75	ext	~3.5W at room temperature	MMCX receptacle	Small lightweight high accuracy GNSS +integrated Inertial navigation system for precision guidance and control applications
	Trimble BX935-INS Enclosed Receiver with IMU	336	GPS L1/L2/L5, GLONASS L1/L2/L3, BeiDou B1/B2, Galileo E1/E5A/E5B, QZSS, SBAS		ACGNOPR2	149 x 93 x 43Hmm	660 grams	1.5 - 3m/0.5 - 2m/0.02 - 0.05m/0.02 - 0.05m	100	100Hz		<45s	<30s	<2s	4	Ethernet, 2x RS232, USB	2,400–115,200	-40 to +75	ext	~3.5W at room temperature	TNC	Small lightweight high accuracy GNSS +integrated Inertial navigation system for precision guidance and control applications
	Trimble MB-Two Receiver	240	GPS L1/L2/L5, GLONASS L1/L2, BeiDou B1/ B2, Galileo, QZSS, SBAS		DGLMNPRTV2	71 x 46 x 11Hmm	24 grams	1.5 - 3m/0.5 - 2m/0.02 - 0.05m/0.02 - 0.05m	100	50Hz		<60s	<45s	<2s	5	Ethernet, 3x Serial, USB, CAN, 1PPS, Event	2,400–921,600	-40 to +85	ext	~3.5W at room temperature	MMCX receptacle	Small lightweight high accuracy GNSS with high performance RTX, Heading and Attitude
	Trimble SPS985 GNSS Smart Antenna	440	L1/L2/L5,GLONASS L1/L2, Galileo, BeiDou, SBAS, OmniSTAR, QZSS	Unrestricted	GLVPRT1	12 × 13cm (4.7 x 5.1 in)	1.55kg (3.42lb) receiver only including radio and battery	1–5m/0.25m+1ppm/8mm+1ppm/3m m+0.1ppm	100	1,2,5,10,20Hz		<60s	<30s	<12s	1	Wi-Fi, USB/RS-232, Bluetooth	up to 115,000	-30 to +60	Removable Li-Ion and ext	< 3.7W in RTK mode	Smart Antenna Precise	The Trimble SPS985 GNSS Smart Antenna has an ultra-rugged GNSS smart antenna design with integrated wireless communications. It is ideal for construction applications such as grade checking, construction site surveying, site supervision, and as a temporary base station with traditional radio or Wi-Fi communications.
	Trimble SPS855 GNSS Modular Receiver	440	L1/L2/L5,GLONASS L1/L2, Galileo, BeiDou, SBAS, OmniSTAR, QZSS	Unrestricted	LMNPRTV1	24 × 12 × 5cm (9.4 x 4.7 x 1.9in)	1.65kg (3.64lb) receiver with internal battery and radio	1–5m/0.25m+1ppm/8mm+1ppm/3m m+0.1ppm	100	1,2,5,10,20Hz		<60s	<30s	<12s	3,1,3	RS-232, Ethernet, Bluetooth	110 - 115,000	-20 to +60	Internal Li-Ion and ext	6 W	Zephyr Model 2	The Trimble SPS855 GNSS Modular Receiver allows maximum flexibility for use as a base station or rover. The modular receiver can be located in a safe location while the external antenna can be placed for maximum usability.
	Trimble SPS585 GNSS Smart Antenna	220	L1/L2 (GPS, GLONASS, Galileo, BeiDou, QZSS), MSS (RTX), L1 SBAS	Unrestricted	LMNOPRV1	11.7cm (4.6") Diameter x 10.0cm (3.9") High	0.733 kg (1.62 lb)	"1–5m/ 0.25m+1ppm,0.50m+1ppm/ 10mm+1ppm,20mm+1ppm/nr"	nr	1Hz RTK		nr	nr	nr	1,1,1	USB,Bluetooth,WiFi	nr	–20 °C to +55 °C (–4 °F to +131 °F)	9000 mA-hr Li-ION battery/ ext USB	3.5W at 18 V, in rover mode. 10W when charging	Internal	Advanced Trimble Maxwell 6 custom GNSS chip, Trimble EVEREST™ multipath signal rejection, CenterPoint RTX
	Force 22E MRU Module	24	L1, C/A, P & Y-code (encrypted P-code); L2, P & Y-code	12	ADLMNOPT2	3.14 x 3.82 x 0.5in	3.9oz	<5m	40	1		<60s	<2s	<2s	3	RS-232, RS-422	variable	–40 to +85	ext	<4W	+ 5VDC Active L1/L2 FRPA	SAASM Compliant
	Force 27 SEGR	24	L1, C/A, P & Y-code (encrypted P-code); L2, P & Y-code	12	ADLMNOPT2	3.92 x 4.92 x 0.6in	0.5lb	<5m	40	1 to 10		<60s	<2s	<2s	3	RS-232, RS-422	variable	-54 to +85	ext	<6W	Various FRPA/CRPA/DAE	SAASM Compliant
	Force 27 SPS	12	L1, C/A code	12	ADLMNOPT2	3.92 x 4.92 x 0.6in	0.5lb	<5m	40	1 to 10		<60s	<2s	<2s	3	RS-232, RS-422	variable	-54 to +85	ext	<6W	Various FRPA/CRPA	
	Force 524D GRAM/GASR Module	24	L1, C/A, P & Y-code (encrypted P-code); L2, P & Y-code	12	ADLMNOPT2	5.88 x 5.715 x 0.6in	0.94lb	<5m	40	1 to 10		<60s	<2s	<2s	4	RS-232, RS-422, DP-RAM	variable	-54 to +85	ext	<7.5W	Various FRPA/CRPA/DAE	SAASM Compliant
	Force 524 SPS	12	L1, C/A code	12	ADLMNOPT2	5.88 x 5.715 x 0.6in	0.94lb	<5m	40	1 to 10		<60s	<2s	<2s	4	RS-232, RS-422, DP-RAM	variable	-54 to +85	ext	<7.5W	Various FRPA/CRPA	
	Force 524D VMEA	24	L1, C/A, P & Y-code (encrypted P-code); L2, P & Y-code	12	ADLMNOPT2	6U VME, Single-Height	2.5lb	<5m	40	1 to 10		<60s	<2s	<2s	4	RS-232, RS-422, A24 and A32 VME	4,800 - 115,200 bps; USB: 12 Mb/s	-40 to +85	ext	<7.5W	Various FRPA/CRPA/DAE	SAASM Compliant
	TA–24 Certified Sensor	24	L1, C/A, P & Y-code (encrypted P-code); L2, P & Y-code	12	ADNOPT1	5.00 x 9.50 x 2.10in	3.73lb	<5m	40	1		<60s	<2s	<2s	4	ARINC-429, RS-422, RS-232	4,800 - 115,200 bps; USB: 12 Mb/s	-40 to +55	ext	<15W	+ 5VDC Active L1/L2 FRPA	SAASM Compliant
	Acufirme 360 Mulit-GNSS Smart Antenna	32	GPS: L1, GLONASS: L1C, Galileo: E1, BeiDou: B1	32	TI	3.74 D, 2.85in H	5.4oz	40m CEP; velocity 0.25m/s CEP	15	1Hz		<60s	<2s	<2s	2	RS-422/485 or RS-232	11500	–40 to +85	ext	<1.0	Patch	
	Bullet III GPS Antenna	na	L1	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	–40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Bullet GG (GPS & GLONASS) Antenna	na	GPS: L1 & GLONASS: L1C	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	–40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Bullet L1 L2 Antenna	na	L1 & L2 C/A Code GPS	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	–40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	

RECEIVER SURVEY 2017

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Manufacturer	Model	Channels / tracking mode	Signal tracked	Maximum number of satellites tracked	User environment and application[1]	Size (W x H x D)	Weight	Position: autonomous (code) / real-time differential (code) / real-time kinematic / post-processed[2]	Time (nanosec)	Position fix update rate (sec)		Cold start[3]	Warm Start[4]	Reacquisition[5]	No. of ports	Port type	Baud rate	Operating temperature (degrees Celsius)	Power source	Power consumption (Watts)	Antenna type[6]	Description or Comments
	Bullet 360 Antenna	na	GPS: L1, GLONASS: L1C, Galileo: E1, BeiDou: B1	na	TI	3.05 x 2.61	6.0oz	na	na	na		na	na	na	na	na	9600	–40 to +85	ext	<20 mA - 3V 30 mA - 5V	na	
	Resolution SMT 360 Multi-GNSSTiming Module	32	GPS L1, C/A, GLONASS L1C, BeiDou B1 and Galileo E1 ready	32	T2	19 x 19 x 2.54mm	1.7g	na	15ns	1Hz		na	na	na	2	TTL	11500	–40 to +85	ext	250 mW	Active/external	
	Resolution SMT 360 Multi-GNSSTiming Module	32	GPS L1, C/A, GLONASS L1C, BeiDou B1 and Galileo E1 ready	32	T2	17 x 22 x 2.54mm	1.8g	na	15ns	1Hz		na	na	na	2	TTL	11500	–40 to +85	ext	250 mW	Active/external	
	ICM SMT 360 Multi-GNSSTiming Module	32	GPS L1, C/A, GLONASS L1C, BeiDou B1 and Galileo E1 ready	32	T2	19 x 19 x 2.54mm	1.7g	na	15ns	1Hz		na	na	na	2	TTL	11500	–40 to +85	ext	250 mW	Active/external	
	Mini-T GG Multi–GNSS Disciplined Clock	32	GPS: L1 & GLONASS: L1C	32	T2	70x76x16	53g	na	15ns	1Hz		na	na	na	2	TTL	11500	–40 to +85	ext	<6W	Active/external	
	Thunderbolt E Disciplined Clock	12	L1 only C/A code	12	T2	4 x 2 x 5	0.628lb	na	<15ns	1Hz		na	na	na	1	RS232	115,200 (RS 232); USB 1Mbp	–30 to +60	ext	na	External active 5v	
u-blox ***www.u-blox.com***	UBX-M8030-KA-DR, u-blox M8 3D Dead Reckoning GNSS single chip; Automotive Grade, QFN40 package	72 par	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		5.0 x 5.0 x 0.59mm	na	"Horizontal pos. accuracy Autonomous: 2.5m CEP SBAS: 1.5m CEP GPS/GLONASS: 4.0 m CEP"	30 (RMS)	Up to 20Hz		26s (DR immediately)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +105	1.4 – 3.6V	"18mA @ 3.0V (single GNSS, continuous mode) 22mA @ 3.0V (concurrent GNSS, continuous mode)"	E (passive & active)	u-blox M8 GNSS chip, Automotive Dead Reckoning
	UBX-M8030-KT-DR, u-blox M8 3D Dead Reckoning GNSS single chip; Professional Grade QFN40 package	72 par	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		5.0 x 5.0 x 0.59mm	na	"Horizontal pos. accuracy Autonomous: 2.5m CEP SBAS: 1.5m CEP GPS/GLONASS: 4.0 m CEP"	30 (RMS)	Up to 20Hz		26s (DR immediately)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	1.4 – 3.6V	"18mA @ 3.0V (single GNSS, continuous mode) 22mA @ 3.0V (concurrent GNSS, continuous mode)"	E (passive & active)	u-blox M8 GNSS chip, Automotive Dead Reckoning
	LEA-M8T, NEO-M8T u-blox M8 GNSS Timing modules, 28 pin LCC (LEA), 24 pin LCC (NEO), Professional Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		17.0 x 22.4 x 2.4mm; 12.2 x 16.0 x 2.4mm	2.6g, 1.6g	Horizontal pos. accuracy; Autonomous: 2.5m CEP; SBAS: 2.0m CEP; GPS/ GLONASS: 4.0 m CEP	<20 (RMS)	4Hz		25s (2s aided)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	2.7 – 3.6V	30mA @ 3.0V (continuous)	E (passive & active)	u-blox M8 GNSS module, Timing
	LEA-M8F, u-blox M8 GNSS Time and Frequency reference module, 28 pin LCC, Professional Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		17.0 x 22.4 x 3.5mm	2.6g	Horizontal pos. accuracy; Autonomous: 2.5m CEP; SBAS: 2.0m CEP; GPS/ GLONASS: 4.0 m CEP	<20 (RMS)	1 Hz		26s (2s aided)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	3.0 – 3.6V	41mA @ 3.3V (continuous)	E (passive & active)	u-blox M8 GNSS module, Timing
	EVA-M8E, u-blox M8 Miniature Untethered Dead Reckoning GNSS Module, 43 pin LGA, Professional Grade	72 par.	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		7.0 x 7.0 x 1.1mm	0.13g	Horizontal pos. accuracy; Autonomous: 2.5m CEP; SBAS: 2.0m CEP; GPS/ GLONASS: 4.0 m CEP	30 (RMS)	Up to 20Hz		26s (DR immediately)	2s	<1s	5	1 x UART, 1 x USB, 1 x SPI, 1 x I2C, 1 SQI interface (For Flash update)	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	2.7 – 3.6V	29mA @ 3.0V (continuous)	E (passive & active)	u-blox M8 GNSS module, Untethered Dead Reckoning, external Flash and sensor
	NEO-M8U, u-blox M8 Untethered Dead Reckoning GNSS Module, 24 pin LCC, Professional Grade	72 par.	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		12.2 x 16.0 x 2.4mm	1.6g	Horizontal pos. accuracy; Autonomous: 2.5m CEP; SBAS: 2.0m CEP; GPS/ GLONASS: 4.0 m CEP	30 (RMS)	Up to 20Hz		26s (DR immediately)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	2.7 – 3.6V	29mA @ 3.0V (continuous)	E (passive & active)	u-blox M8 GNSS module, Untethered Dead Reckoning, onboard sensor
	NEO-M8L, u-blox M8 Dead Reckoning GNSS Module, 24 pin LCC, Professional Grade	72 par.	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		12.2 x 16.0 x 2.4mm	1.6g	Horizontal pos. accuracy; Autonomous: 2.5m CEP; SBAS: 1.5m CEP; GPS/ GLONASS: 4.0 m CEP	30 (RMS)	Up to 20Hz		26s (DR immediately)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	2.7 – 3.6V	29mA @ 3.0V (continuous)	E (passive & active)	u-blox M8 GNSS module, Automotive Dead Reckoning, onboard sensor
	NEO-M8L-01A, u-blox M8 Dead Reckoning GNSS Module, 24 pin LCC, Automotive Grade	72 par.	GPS/QZSS L1 C/A, GLONASS L10F, BeiDou B1I, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		12.2 x 16.0 x 2.4mm	1.6g	Horizontal pos. accuracy; Autonomous: 2.5m CEP; SBAS: 1.5m CEP; GPS/ GLONASS: 4.0 m CEP	30 (RMS)	Up to 20Hz		26s (DR immediately)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	3.0 – 3.6V	29mA @ 3.0V (continuous)	E (passive & active)	u-blox M8 GNSS module, Automotive Dead Reckoning, onboard sensor
	NEO-M8P, u-blox M8 High Precision GNSS modules, 24 pin LCC, Professional Grade	72 par.	GPS L1 C/A, GLONASS L1OF, BeiDou B1I	30 in parallel		12.2 x 16.0 x 2.4mm	1.6g	Standalone 2.5m CEP RTK 0.025m +1 ppm CEP	30 (RMS)	RTK up to 8Hz		26s	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	2.7 – 3.6V	25mA @ 3.0V (continuous, GPS only)	E (passive & active)	u-blox M8 High Precision GNSS module
	NEO-7P, u-blox 7 Precise Point Positioning GNSS module, 24 pin LCC, Professional Grade	56 par.	GPS/QZSS L1 C/A, GLONASS L10F, SBAS L1 C/A: WAAS, EGNOS, MSAS	32 in parallel		12.2 x 16.0 x 2.4 mm	1.6g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP SBAS+PPP: < 1m CEP	30 (RMS)	Up to 10Hz		30s (GPS)	5s (GPS)	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	2.7 – 3.6V	22mA @ 3.0V (continuous, GPS only)	E (passive & active)	u-blox 7 High Precision GNSS module
	UBX-G8020-KT, u-blox 8 Single GNSS chip, QFN40, Professional Grade	72 par.	GPS/QZSS L1 C/A, GLONASS L10F, SBAS L1 C/A: WAAS, EGNOS, MSAS	32 in parallel		QFN: 5.0 x 5.0 x 0.59mm	na	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Up to 18Hz		29s (GPS, TCXO)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	1.4 – 3.6V	16mA @ 3.0V (continuous mode), 3.7mA @ 3.0V (PSM, 1 Hz)	E (passive & active)	u-blox 8 Standard Precision GNSS chip
	MAX-8 series, u-blox 8 Single GNSS modules, 18 pin LCC, Professional Grade	72 par.	GPS/QZSS L1 C/A, GLONASS L10F, SBAS L1 C/A: WAAS, EGNOS, MSAS	32 in parallel		9.7 x 10.1 x 2.5mm	0.6 g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Up to 18Hz		29s (GPS, MAX-8Q)	2s (MAX-8Q)	<1s	2	1 x UART, 1 x I2C	4,800 - 460,800 bps	-40 to +85	MAX-8C: 1.65–3.6V; MAX-8Q: 2.7-3.6V	16mA @ 3.0V (continuous), 3.8mA @ 3.0V (PSM, 1 Hz)	E (passive & active)	u-blox 8 Standard Precision GNSS module
	EVA-8M, u-blox 8 Single GNSS module, 43 pin LGA, Professional Grade	72 par.	GPS/QZSS L1 C/A, GLONASS L10F, SBAS L1 C/A: WAAS, EGNOS, MSAS	32 in parallel		7.0 x 7.0 x 1.1 mm	0.13g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Up to 18Hz		30s (GPS)	3s (GPS)	<1s	5	1 x UART, 1 x USB, 1 x SPI, 1 x I2C, 1 SQI interface (For optional external Flash)	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	1.65 – 3.6V	16mA @ 3.0V (continuous mode), 3.7mA @ 3.0V (PSM, 1 Hz)	E (passive & active)	u-blox 8 Standard Precision GNSS module
	NEO-8Q, u-blox 8 Single GNSS module, 24 pin LCC, Professional Grade	72 par.	GPS/QZSS L1 C/A, GLONASS L10F, SBAS L1 C/A: WAAS, EGNOS, MSAS	32 in parallel		12.2 x 16.0 x 2.4mm	1.6g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Up to 18Hz		29s (GPS)	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	2.7 – 3.6V	22mA @ 3.0V (continuous), 10mA @ 3.0V (PSM, 1 Hz)	E (passive & active)	u-blox 8 Standard Precision GNSS module
	u-blox M8 Concurrent GNSS chips: UBX-M8030-KT (QFN40, Professional grade); UBX-M8030-KA (QFN40, Automotive grade); UBX-M8030-CT (CSP, Standard grade)	72 par.	GPS/QZSS L1 C/A, GLONASS L10F; BeiDou B1I, Galileo E1B/C; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		QFN: 5.0 x 5.0 x 0.59mm; CSP: 2.99 x 3.21 x 0.36mm	na	2.0m CEP, For default mode: GPS / SBAS / QZSS+GLONASS with TCXO	30 (RMS)	Single GNSS, up to 18Hz (ROM); Concurrent GNSS, up to 10Hz (ROM)		Cold start: 26s	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85 (Professinal grade); -40 to +105 (automotive grade); -20 to +70 (Standard grade)	1.4 – 3.6 V	For 2 GNSS concurrently:- 21mA @ 3.0V (continuous) ; 5.3mA @ 3.0V (PSM, 1 Hz)	E (passive & active)	u-blox M8 GNSS Standard Precision GNSS chips
	MAX-M8 series, u-blox M8 Concurrent GNSS Modules, 18 pin LCC, Professional Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F; BeiDou B1I, Galileo E1B/C; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		9.7 x 10.1 x 2.5mm	0.6g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Single GNSS, up to 18Hz (ROM); Concurrent GNSS, up to 10Hz (ROM)		Cold start: 26s	MAX-M8Q/W: 2s; ;	<1s	2	1 x UART, 1 x I2C	4,800 - 460,800 bps	-40 to +85	MAX-M8C: 1.65 – 3.6V; MAX-M8Q/W: 2.7 - 3.6V	MAX-M8C, GPS/SBAS/ QZSS+GLONASS (default mode):; 23mA @ 3V (continuous); 5.4mA @ 3V power Save mode (1 Hz)	E (passive & active)	u-blox M8 Standard Precision GNSS modules
	EVA-M8 Series, u-blox M8 Concurrent GNSS Modules, 43 pin LGA, Professional Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F; BeiDou B1I, Galileo E1B/C; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		7.0 x 7.0 x 1.1mm	0.13g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Single GNSS, up to 18Hz (ROM); Concurrent GNSS, up to 10Hz (ROM)		Cold start: 26s	EVA-M8M: 3s; EVA-M8Q: 2s;	<1s	5	1 x UART; 1 x USB; 1 x SPI (Optional); 1 x DDC (I2C compliant); 1 x SQI interface (For Flash update)	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	1.65 - 3.6V	EVA-M8M-0 default mode: GPS/SBAS/ QZSS+GLONASS:; 22mA @ 3V (continuous); 5.3mA @ 3V power save mode (1 Hz)	E (passive & active)	u-blox M8 Standard Precision GNSS module
	LEA-M8S, u-blox M8 Concurrent GNSS module, 28 pin LCC, Professional Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F; BeiDou B1I, Galileo E1B/C; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		17.0 x 22.4 x 2.4mm	2.1 g	Position: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Single GNSS, up to 18Hz; Concurrent GNSS, up to 10Hz		Cold start: 26s	2s	<1s	3	1 x UART; 1 x USB; 1 x DDC (I2C compliant)	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85	2.7 - 3.6V	22mA @ 3V (continuous); 6.2mA @ 3V (power save mode, 1 Hz)	E (passive & active)	u-blox M8 Standard Precision GNSS module
	NEO-M8 series, u-blox M8 Concurrent GNSS module, 24 pin LCC, Professional Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F; BeiDou B1I, Galileo E1B/C; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		12.2 x 16.0 x 2.4mm	1.6g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Single GNSS, up to 18Hz (ROM); Concurrent GNSS, up to 10Hz (ROM)		26s	NEO-M8Q/N : 2s; NEO-M8M: 3s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +85;	1.65 – 3.6V (NEO-M8M); 2.7 – 3.6V (NEO-M8N/Q)	NEO-M8M default mode: 21mA @ 3.0V (continuous); 5.3mA @ 3.0V (PSM, 1 Hz)	E (passive & active)	u-blox M8 Standard Precision GNSS modules
	NEO-M8Q-01A, u-blox M8 Concurrent GNSS module, 24 pin LCC, Automotive Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F; BeiDou B1I, Galileo E1B/C; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		12.2 x 16.0 x 2.4mm	1.6g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Single GNSS, up to 18Hz; Concurrent GNSS, up to 10Hz		26s	2s	<1s	4	1 x UART, 1 x USB, 1 x SPI, 1 x I2C	4,800 - 460,800 bps; USB: 12 Mb/s	-40 to +105	2.7 – 3.6V	22mA @ 3.0V (continuous); 6.3mA @ 3.0V (PSM, 1 Hz)	E (passive & active)	u-blox M8 Standard Precision GNSS module
	SAM-M8Q, u-blox M8 GNSS antenna module, 20 pin LGA, Standard Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F, Galileo E1B/C, SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		15.5 x 15.5 x 6.3mm	6g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Single GNSS, up to 18Hz; Concurrent GNSS, up to 10Hz		26s	2s	<1s	2	1 x UART, 1 x I2C	4,800 - 460,800 bps	-40 to +85	2.7 – 3.3V	28mA @ 3.0V (continuous), 11.5mA @ 3.0V (PSM, 1 Hz)	Integrated patch antenna	u-blox M8 Standard Precision GNSS module
	CAM-M8 series, u-blox M8 Concurrent GNSS antenna modules, 31 pin LCC, Professional Grade	72 par	GPS/QZSS L1 C/A, GLONASS L10F; BeiDou B1I, Galileo E1B/C; SBAS L1 C/A: WAAS, EGNOS, MSAS, GAGAN	32 in parallel		9.6 x 14.0 x 1.95mm	0.5g	Autonomous: 2.5m CEP; SBAS: 2.0m CEP	30 (RMS)	Single GNSS, up to 18Hz; Concurrent GNSS, up to 10Hz		26s	2s (CAM-M8Q)	<1s	3	1 x UART, 1 x SPI, 1 x I2C	4,800 - 460,800 bps	-40 to +85;	CAM-M8C: 1.65 – 3.6V; CAM-M8Q: 2.7 – 3.6V	28mA @ 3.0V (continuous), 10.1mA @ 3.0V (PSM, 1 Hz)	Integrated chip antenna, or external antenna	u-blox M8 Standard Precision GNSS module
Unicore Communications ***www.unicorecomm.com***	UB380	384 channel	GPS L1/L2/L5,GLONASS L1/L2,BDS B1/B2/B3	112	AGLMMetNOPRTV2	100 x 60 x 11.4mm	42g	1.5m/0.4m DGPS/0.6m SBAS/0.01m+1ppm/2.5mm+1ppm post processed(All values in Horiz. RMS)	<20	20Hz		50s	/	<1s	8	1xLAN, 1xUART(RS-232), 2xUART(LVTTL),1xUSB; 1*1PPS; 1*EVENT; 1*Ext. OSC.	2,400-921600	-40 to +85	3.3V +5%/-3% DC	2.6W(typical)	Active, GPS L1/L2/L5, GLONASS L1/L2 and BDS B1/B2/B3	BDS/GPS/GLONASS Tri-System Octa-Frequency High Precision Board,CE, FCC compliant
	UM332/UM4B0	432 channel	GPS L1/L2/L5 +BDS B1/B2/B3 +GLONASS L1/ L2+GALILEO E1E5a/E5b*	152	AGHLMMetNOPRTV2	40 x 30 x 4mm	1.6g	1.5m/0.4m DGPS/0.6m SBAS/0.01m+1ppm/2.5mm+1ppm post processed(All values in Horiz. RMS)	<20	20Hz		<45s	/	<1s	7	3xUART, 1x1PPS,1xEvent, 1xI2C, 1xSPI	9600-460800	-40 to +85	3.3V +3.6V DC	1.8W(typical)	Active, GPS L1/L2/L5 + BDS B1/B2/B3 + GLONASS L1/L2+ GALILEO E1/E5a/E5b*	BDS/GPS/GLONASS/GALILEO multi-system high precision module; Small lightweight high accuracy GNSS +integrated Inertial navigation system,support RTK/Heading
	UB352	384 channel	GPS L1/L2 +GLONASS L1/L2 +BDS B1	70	AGHLMMetNOPRTV2	46 x 71 x 13mm	38g	1.5m/0.4m DGPS/0.6m SBAS/0.01m+1ppm/2.5mm+1ppm post processed(All values in Horiz. RMS)	<20	20Hz		50s	/	<1s	4	3xUART, 1x1PPS	2,400-921600	-40 to +85	3.3V +5%/-3% DC	1.3W(typical)	Active, GPS L1/L2 + GLONASS L1/ L2 + BDS B1	Compatible with main stream GNSS OEM boards in dimension; Support GPS L1/L2 +GLONASS L1/L2 +BDS B1
	UB282	384 channel	GPS L1/L2 + GLONASS L1/L2	56	AGHLMMetNOPRTV2	100 x 60 x 11.4mm	40g	1.5m/0.4m DGPS/0.6m SBAS/0.01m+1ppm/2.5mm+0ppm post processed(All values in Horiz. RMS)	<22	10Hz		50s	/	<1s	7	1xLAN, 1xUART(RS-232); 2xUART(LVTTL),1*1PPS; 1*EVENT	2,400-921601	-40 to +85	3.3V +5%/-3% DC	2.8W(typical)	Active, GPS L1/L2 + GLONASS L1/L2	Dual Antanna
	UR380	384 channel	GPS L1/L2, BDS B1/B3, GLONASS L1/ L2,BDS B1/B2/B3	112	AGLMMetNOPRTV1	222 x 164 x 79mm	1.8kg	1.5m/0.4m DGPS/0.6m SBAS/0.01m+1ppm/2.5mm+1ppm post processed(All values in Horiz. RMS)	<20	20Hz		50s	/	<1s	11	1*RS-232(DB9),1*RS232(LEMO),1*RS232/485 (LEMO),1*LAN(RJ45),1*USB(LEMO),WiFi, BT, WCDMA; 1*1PPS; 1*EVENT; 1*Ext. OSC.	2,400-921600	-40 to +85	9-18V DC	4.8W(typical)	Active, GPS L1/L2/L5, GLONASS L1/L2 and BDS B1/B2/B3	BDS/GPS/GLONASS Tri-System Octa-Frequency High Precision Receiver,CE, FCC compliant
	UM220-III NV	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	16.0 x 12.2 x 2.4mm	1.6g	2.5m CEP,Velocity:0.1m/s RMS	na	1Hz		Cold start 30s, Hot start <1s	/	<1s	4	1xUART, 1x1SPI, 1x2C, 1x4Event, 1x1PPS	4,800-115,200	-40 to +85	2.7~3.6V	120mW	Passive & Active	BDS/GPS dual-system module designed for In-dash automotive applications
	UM220-III NL	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	16.0 x 12.2 x 2.4mm	1.6g	2.5m CEP,Velocity:0.1m/s RMS	na	1Hz		Cold start 30s, Hot start <1s	/	<1s	2	1xUART, 1x1PPS	4,800-115,200	-30 to +70	2.7~3.6V	120mW	Passive & Active	BDS/GPS dual-system module designed for automotive applications, handheld devices
	UM220-III L	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	22.4 x 17 × 2.4mm	3g	2.5m CEP,Velocity:0.1m/s RMS	20	1Hz		Cold start 30s, Hot start <1s	/	<1s	2	2xUART, 1x0PPS	4,800-115,200	-30 to +70	2.7~3.6V	120mW	Passive & Active	BDS/GPS dual-system module designed for precise timing of electrical power/ telecommunication
	UM220-INS N	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	16.0 x 12.2 x 2.4mm	1.6g	2.5m CEP,Velocity:0.1m/s RMS	na	1-5Hz		Cold start 30s, Hot start <1s	/	<1s	6	2xUART, 1x1PPS,1xSpeed,1xFWD,1xEvent	4,800-115,200	-40 to +85	2.7~3.6V	150mW	Passive & Active	BDS/GPS+MEMS dual-system module designed for In-dash automotive navigation and high-end navigation
	UC221	64	GPS L1, BDS B1	64	CDHLMMetNPTV2	6 x 6 x 1.2mm	0.4g	2.5m CEP,Velocity:0.1m/s RMS,with TCXO	20	1Hz		Cold start 32s, Hot start <1s	/	<1s	4	2xUART, 1xSPI, 1x I2C	4,800-115,200	-40 to +85	Core:1.1V ~ 1.3V,I/O:1.7V ~ 1.9V	60mW@1.8V	Passive & Active	GPS/BDS high performance low-power GNSS SoC, which features single chip architecture(RF+BB) to provide users with low power consumption, high-performance


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