

TW5398 Datasheet

Preliminary



TW5398 Smart GNSS Antenna: Full Band u-blox ZED-X20P

Overview

The TW5398 is a multi-band (L1/L2/L5/L6), multi-constellation integrated GNSS receiver/antenna with RTK, PointPerfect®-Flex (PPP-RTK) augmentation. The TW5398 is capable of providing sub 1.2 meter accuracy stand-alone, sub 6 cm accuracy with PPP-RTK and sub 1 cm with RTK corrections (service or localized). TW5398 also authenticates Galileo OSNMA anti-spoofing messages. TW5398 can be configured to act as a base or rover for RTK operation.

Full band Accutenna®: Interference Resilience via XF®

The incorporated GNSS antenna technology is based on the Calian TW3990XF full band Accutenna® antenna. Calian's eXtended Filtering mitigates out-of-band signal interference (LTE, WIFI, BlueTooth, Ligado) by employing multi-stage precipitous filtering, offering > 60 dB protection. The stacked, precision tuned, dual-feed ceramic patch increases multi-path resiliency by attenuating first order reflections. The Accutenna patch has linear phase response and tight phase-center variation for better accuracy and excellent axial ratio.

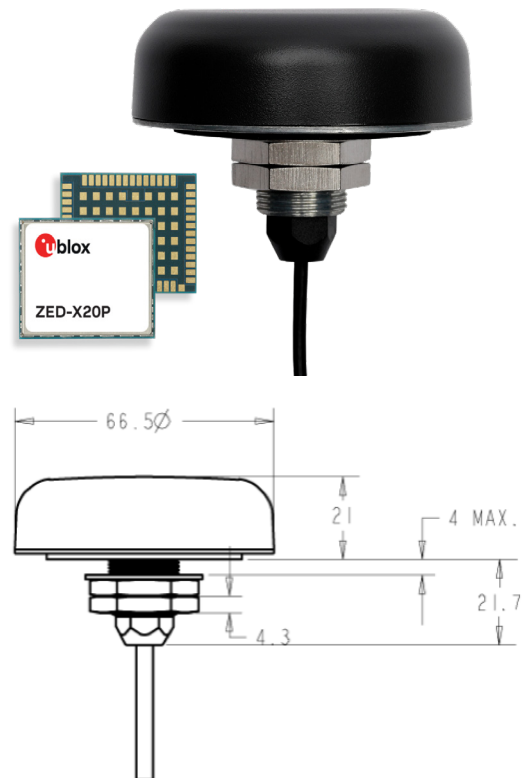
Integrated u-blox ZED-X20P Receiver: Plug & Play

TW5398 integrates u-blox's latest generation full-band ZED-X20P GNSS receiver. TW5398 supports GPS, BeiDou, Galileo satellites plus SBAS, NavIC and QZSS (configurable) across L1/L2/L5/L6 including L-Band. Integrated RTK support attains sub 1 cm precision with fast convergence times and high dynamic update rates (to 25 Hz).

Integrating the GNSS receiver on the TW5398 with a short, deterministic signal path mitigates RF interference that can be induced between the antenna and the receiver, both from the external environment as well as high speed busses and other noise sources collocated in a host application. The ZED-X20P digital interface is presented to host systems via RS-232 or RS-422, allowing long cable lengths resistant to noise; alleviating design constraints and promoting plug and play, future-proof designs. Upgrade PNT sub-system capabilities by plugging in the next generation Smart GNSS antenna solution.

GNSS Over The Air signal integrity & monitoring

TW5398 includes jamming/interference and spoofing detection and monitoring. The device may be configured to generate event messages to alert the host system. In addition the TW5398 may be configured to support Galileo Open Service Navigation Message Authentication (OSNMA) offering enhanced detection of complex spoofing and delayed attacks, also known as meaconing or record-and-replay.



Mechanical Dimensions (mm)

Features

- Full Band L1/L2/L5/L6 support with OSNMA
- Excellent axial ratio & multi-path resiliency with dual feed Accutenna®
- Enhanced impairment mitigation by integrating antenna and receiver
- Multi-band GNSS receiver offers inherent improvement via ionospheric error mitigation
- Improved multi-path and code accuracy with enhanced L5 service signal
- Improved jamming resilience with additional active constellations
- RTK Base/Rover configurations
- Compatible with PointPerfect-Flex PPP-RTK - SPARTN
- Compatible with RTK services such as Point One Navigation Polaris RTK and Swift Navigation Skylark Cx and Nx RTK
- Fast update times (25 Hz)
- Industrial grade IP69K enclosure
- Roadmap support for Galileo High Accuracy Service (HAS) and PointPerfect Global PPP (PPP-AR)

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Specifications

Antenna		Environmental	
Architecture.....	Multi-band (L1/L2/L5/L6 L-band) Ceramic patch	Operating Temperature.....	-40°C to +85°C
Axial Ratio at Zenith	≤ 1.0 dB (GPS); ≤ 1.5 dB (Galileo, BeiDou, NavIC, QZSS)	Storage Temperature.....	-40°C to +85°C
PCV.....	± 8mm	Weatherproof	IP69K
Frequencies.....	GPS/QZSS: L1 C/A, L2C, L5 (QZSS-L6); GAL: E1 B/C, E5a; E6; BDS: B1I, B1C, B3I; NavIC: L1-SPS Data, L5-SPS; SBAS L1C/A	Shock.....	Vertical axis 50G, other axis 30G 3 axis sweep – 15 min
SBAS	WAAS, EGNOS, MSAS, GAGAN, BDSBAS	Vibration.....	10-200 Hz log sweep 3G
Channels.....	672-channel u-blox x20 engine	Sensitivity (GPS+GAL+BDS)	
Anti-jamming	Active Continuous Wave detection	Tracking & Nav	-167 dBm
Interface		Reacquisition	-160 dBm
Pwr, Gnd		Hot starts	-157 dBm
TW5398-09.....	Data, Timepulse (TimeP): RS-422	Cold starts	-148 dBm
TW5398-69.....	Data, TX2/RX2: RS-232; TimeP: RS-422	Acquisition	
Connector	RJ45	Cold start	25 sec
Serial Protocol		Aided start	2 sec
Output.....	NMEA 4.11, UBX Binary, RTCM v3.4, SPARTN v2.0.2	Reacquisition	2 sec
Baud Rate.....	Configurable	Position and Velocity Accuracy (GPS+GAL+BDS)	
Update Rate (nav: RTK, PVT, RAW).....	25 Hz	Horizontal PVT/SBAS/RTK (CEP)	1.2m/ 0.6m/ 0.006m+1ppm
Mechanical		Vertical PVT/SBAS/RTK (Median).....	2.0m/ 1.0m/ 0.01m+1ppm
Dimensions	66.5 mm dia. x 21 mm H	Horizontal PointPerfect-Flex (CEP)	<0.06m SPARTN
Weight.....	135 g	Vertical PointPerfect-Flex (Median).....	<0.10m SPARTN
Mounting Method	Industrial Grade Fixed Mount	Typical Convergence.....	<7s RTK; <40s SPARTN;
Cable Length.....	5m standard, 15m & 25m options. RJ45	Velocity accuracy.....	0.05m/s (50% at 30 m/s dynamic)
Electrical		Heading	
Voltages	5 VDC	Dynamic Heading Accuracy	0.3°
Power	Typical 400 mW measured at 5V	Timing	
		Time Pulse Accuracy.....	20 ns RMS; 99% 60 ns

Ordering Information:

33-TW5398-09-yy-05-PC0 (RJ45; Data and Timepulse: RS-422; PC0 = NMEA out, no adaptor cable.)
33-TW5398-69-yy-05-PC0 (RJ45; Data Tx1/Rx1, Tx2/Rx2: RS-232, TimePulse: RS-422; PC0 = NMEA out, no adaptor cable.)

yy = Radome (00=grey conical, 10=grey low profile, 01=white conical, 11=white low profile, 12=black low profile)
zz = Cable length in meters. Standard is 5m. (15m and 25m are special order only)

33-TW5398-09-yy-05-PC0 SDK Test Adaptor required for programming **33-0095-11 (5V RS-422)**
33-TW5398-69-yy-05-PC0 SDK Test Adaptor required for programming **33-0095-16 (5V RS-232)**

About Calian GNSS: With global headquarters and manufacturing in Ottawa, Canada, Calian GNSS is a leading manufacturer of high-precision antennas and components for Global Navigation Satellite System (GNSS) applications. Calian GNSS' mission is to support the needs of a new generation of positioning systems by delivering unprecedented antenna precision at competitive prices. Learn more at www.calian.com/GNSS

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