z150 Series

GNSS Multi Receivers Platform for Timing and Navigation Applications

Front View

Rear View

Commercial and Industrial Applications

Model		Type of application		Output
P200	GPS	Position, Velocity, Time	Static & Mobile	1 Port RS232 1PPS-out
P300	GPS	Position, Velocity, Time	Static & Mobile	1 Port RS232 + 1 Port USB 1PPS-out
P400	GPS GLONASS GALILEO BEIDOU	Position, Velocity, Time	Static & Mobile	1 Port RS232 + 1 Port USB 1PPS-out
T500	GPS GLONASS GALILEO BEIDOU	Multi-GNSS Timing module ideal for low signal environment	Stationary	1 Port RS232 + 1 Port USB 1PPS-out

Revision 8

ZTI Communications offers a complete low-cost configurable platform "z150 Series" with a large choice of GPS receivers (TRIMBLE Condor+™, Copernicus II™, RES SMT 360™, and NAVIS NV08C-CSM™), ports configuration (RS232, RS422 or USB), and multi 1PPS outputs (TTL, LV-TTL, RS232, USB or RS422 levels).

Based on latest GPS receivers generation (sensitivity @ -160dBm), the z150 Series fulfills many customers' applications. Thanks to its robust power supply (9-60 Volts AEC-Q100 Automotive grade 1 qualified, powering is also possible directly through DB9 connectors). GPS RF signal through a FAKRA Blue connector, Industrial extended temperature qualified (-30°C to +85°C without Super Cap) the z150 Series is ideally suited for Timing and Embedded/Navigation applications.

z150 Series can also be declined in TIMING versions with dedicated features such as TRAIM and Self-Survey, and 1PPS (up to 15ns accuracy depending of the GNSS receiver) through rears SMA connectors.

If you are looking for a very accurate 1PPS to synchronize your systems, z150 Series corresponds to your needs, mechanically ready to use in an anodized enclosure, flanges for a robust fixing are supplied on request.

z150 Series is simply the best choice for your commercial or industrial application.

Ordering Information for z150 Series

Part Number	Receiver	GNSS	Port A	Port B	1PPS RS232	1PPS USB	1PPS-Out SMA	TRAIM Self-Survey
Type of application: Position, Velocity, Time / Static & Mobile								
P200	Trimble C1919C	GPS	RS232	-	✓	-	✓ TTL	-
P300	Trimble Copernicus II	GPS	RS232 (1)	USB	✓	✓	✓ TTL	✓ (not configurable)
P400 (4)	NV08C-CSM	GPS, Glonass Galileo, Beidou	RS232	USB	✓	✓	✓ TTL	✓ (2)
Type of application: Multi-GNSS Timing Module / Stationary								
T500 (3) (4)	Trimble RES SMT 360	GPS, Glonass Galileo, Beidou	RS232	USB	✓	✓	✓ TTL	✓

(1) RS422 on request.
(2) Only usable in static mode for timing applications.
(3) Simultaneous GPS/GLONASS or GPS/Beidou tracking. Ideal for populated urban and indoor environments with limited sky-view. Well-suited for timing applications in **static** mode.
(4) Available on request and per quantity.

Note: the datasheets of the four GNSS receivers are included at the end of this document.

1PPS One Pulse Per Second
TRAIM Time-Receiver Autonomous Integrity Monitoring algorithm (on clock and frequency) which automatically detects and rejects faulty satellites from the solution.
TRAIM assures high PPS integrity.
Self-Survey The receiver enters automatic Self-Survey mode on power-up during a period of time (10 or 20 minutes depending on the receiver) to ensure accurate reference position for improved timing accuracy. When the self-survey is complete, the receiver outputs PPS with only one satellite being tracked.

TSS-P

Option for z150 Series: **TSS-P** for Windows **P**latforms.
Time **S**ervice **S**oftware (TSS-P) updates PC clock with a guaranteed accuracy of 1(one) millisecond by using a GNSS receiver on a com port providing 1PPS and NMEA messages. The software includes specialized algorithms developed by ZTI Communications to guaranty the accuracy.

zti Communications — Timing & Navigation

GNSS z150 Series
Platform for PVT Applications

PVT = Position - Velocity - Time

Static & Mobile

GNSS z150 Series Product Line Feature Set	Model P200	Model P300	Model P400	Model T500
Type of application	*Static & Mobile / PVT Applications*	*Static & Mobile / PVT Applications*	*Static & Mobile / PVT Applications*	*Stationary / Precise Time Applications*
Chipset Manufacturer	Trimble C1919C	Trimble Copernicus II	Navis NV08C-CSM	Trimble RES SMT 360
GPS Performance Specifications				
General	L1 Frequency, C/A code (SPS) **22-channel**	L1 Frequency, C/A code, **12-channel**	GPS, GLONASS, GALILEO, BEIDOU, SBAS L1 signals, **32-channel**	GPS L1, GLONASS G1, GALILEO, BEIDOU B1, QZSS **32-channel**
Sensitivity	Tracking: -160 dBm Acquisition: -146 dBm	Tracking: -160 dBm Acquisition (High Sensitivity Mode): -148 dBm	Tracking & Reacquisition: -160 dBm Acquisition (autonomous): -143 dBm	Tracking & Reacquisition: -160 dBm Acquisition (autonomous): -148 dBm
PPS Accuraccy to UTC (one sigma) (Ultra-precise 1 PPS output)	±25 ns	±60 ns	±40 ns	< 15ns (1 σ) when operating in over-determined timing mode
Data Output Rate	1 Hz (default) Up to 5Hz	1 Hz	1,2, 5, 10 Hz	1 Hz
Start-up Time	Reacquisition 2s Hot Start 2s Warm Start <35s Cold Start <38s	Reacquisition 2s Hot Start 3s Warm Start 35s Cold Start 38s	Reacquisition < 1s Hot Start < 3s Warm Start 30s Cold Start 30s	Reacquisition <2s (90%) Hot Start 2s (90%) Warm Start - Cold Start 46s (50%) 50s (90%)
Navigation Accuracy	Horizontal < 2.5m (without SBAS) < 2m (with SBAS) Altitude < 5m (without SBAS) < 3m (with SBAS) Velocity 0.06 m/s	Horizontal < 2.5m (without SBAS) < 2m (with SBAS) Altitude < 5m (without SBAS) < 3m (with SBAS) Velocity 0.06 m/s	Horizontal 2.5m (differential 1m) (without SBAS) 1m (with SBAS) Altitude 3m Velocity 0.05 m/s	Horizontal - Altitude - Velocity -
Protocols	NMEA 0183	NMEA 0183 TSIP TAIP	IEC1162 (NMEA 0183) BINR (proprietary) RTCM SC 104 v2.2	NMEA 0183 TSIP
Special Features	SBAS capable (WAAS, EGNOS, MSAS) A-GPS Flash programmable (after eight times, need to reflash)	TRAIM / Self-Survey (not configurable) SBAS capable (WAAS, EGNOS, MSAS) A-GPS Dynamic modes: Land, Sea and Air Flash programmable	TRAIM / Self-survey 4 MB Flash for FW upgrade and User's data storage.	TRAIM / Self-Survey A-GPS Flash programmable
Front Panel	Port A: RS232 with 1PPS Fakra Blue Connector for the cable antenna	Port A: RS232 with 1PPS (RS422 on request) Port B: USB 2.0 with 1PPS Fakra Blue Connector for the cable antenna	Port A: RS232 with 1PPS Port B: USB 2.0 with 1PPS Fakra Blue Connector for the cable antenna	Port A: RS232 with 1PPS Port B: USB 2.0 with 1PPS Fakra Blue Connector for the cable antenna
Baud Rate	4800, 9600, 19200, 38400, 57600, 115200 bit/s	2400, 4800, 9600, 19200, 38400, 57600, 115200 bit/s	up to 230,400 bit/s	4800, 9600, 19200, 38400, 57600, 115200 bit/s
Baud Rate Factoty Settings	Port A: 38400, 8, N, 1 (NMEA protocol)	Port A: 38400, 8, N, 1 (TSIP protocol) Port B: 38400, 8, N, 1 (NMEA protocol)	Port A: 115200, 8, O, 1 (NMEA protocol) Port B: 115200, 8, O, 1 (BINR protocol)	Port A: 115200, 8, N, 1 (TSIP protocol) Port B: 115200, 8, N, 1 (NMEA protocol)
Rear Panel	PPS-Out SMA-F Connector: 1PPS TTL Power input: Molex connector Micro-Fit	PPS-Out SMA-F Connector: 1PPS TTL Power input: Molex connector Micro-Fit	PPS-Out SMA-F Connector: 1PPS TTL Power input: Molex connector Micro-Fit	PPS-Out SMA-F Connector: 1PPS TTL Power input: Molex connector Micro-Fit

IMPORTANT: PPS accuracy is given at the level of the GNSS receiver chipset. Please note that the accuracy of the 1PPS signal through a serial port (RS232 or USB) depends on the target OS.

zti Timing & Navigation
Communications

GNSS z150 Series
Platform for PVT Applications

PVT = Position - Velocity - Time

Static & Mobile

GNSS z150 Series Product Line Feature Set	Model P200	Model P300	Model P400	Model T500
Operational Limits	Altitude <18,000m (60,000 ft) or velocity <515m/s (1,151 mph). Either limit may be exceeded but not both (COCOM limit)	Altitude <18,000m (60,000 ft) or velocity <515m/s (1,151 mph). Either limit may be exceeded but not both (COCOM limit)	Altitude <18,000m (60,000 ft) & Velocity <500m/s	Altitude -400m to 10,000m Mean Sea Level
Dynamics	2g	2g	5g	4g
Environmental				
Operating Temperature	-30℃ to + 85℃	-30℃ to + 85℃	-30℃ to + 85℃	-30℃ to + 85℃
Storage Temperature	-40℃ to + 85℃	-40℃ to + 85℃	-40℃ to + 85℃	-30℃ to + 85℃
GPS antenna	Indoor or Outdoor (recommended) / Active 5V or 3V (default)	Indoor or Outdoor / Active 5V or 3V (default)	Indoor or Outdoor / Active 5V or 3V (default)	Indoor or Outdoor (recommended) / Active 5V or 3V (default)
Mechanical	112 x 105 x 30 mm (without flanges)			
Power Input	9 to 60VDC (absolute maximum rating +75VDC)			
Flash programmable	Yes (need to reflash after 8 times)	Yes	The Vbat of the Back-up RAM is provided by a capacitor allowing at least 2 hours autonomy.	Yes

Power Consumption

z150 Series – Power Consumption Comparison

Consumption (mA)

- Copernicus II and C1919C
- NV08C-CSM
- RES SMT 360
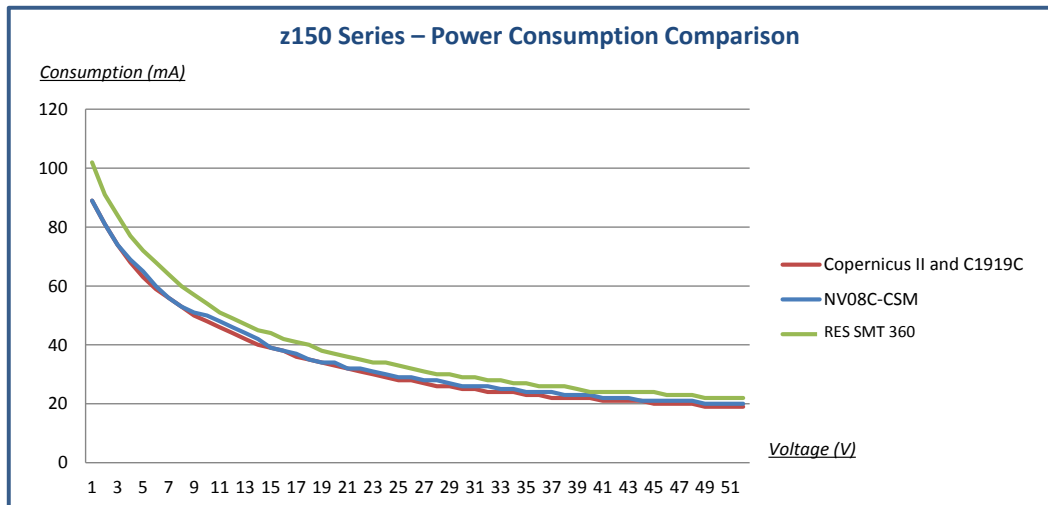
Voltage (V)

Consumption was measured:
- with antenna output voltage @ 3Volts
  Trimble 3V GPS antenna connected BLE (P/N: 66800-52).
- with Port A = RS232 and Port B = USB

Connectors Pin out

Pin DB9	RS-232	RS-422
1	Ground	TX+
2	TX	TX-
3	RX	RX-
4	NC	RX+
5	Ground	Ground
6	Optional External Power	Optional External Power
7	NC	NC
8	PPS (RS-232 Level)	PPS+
9	Ground	PPS-

Note: PPS is also available through USB connector on CTS signal for models with USB port.

Power Supply

- Molex connector Micro-Fit is a unique connector system that incorporates many of the features previously found only on large power connectors (locking type).
- 9 to 60V (absolute maximum ratings +75V)

GPS Antenna connector

FAKRA Blue Code C. Antenna voltage is configurable on request (3V or 5V). Default setting voltage output is 3.3V.

ZTI Communications supplies on request a FAKRA adaptor (FAKRA Blue / SMA Female) in order to plug a SMA Male GPS antenna.
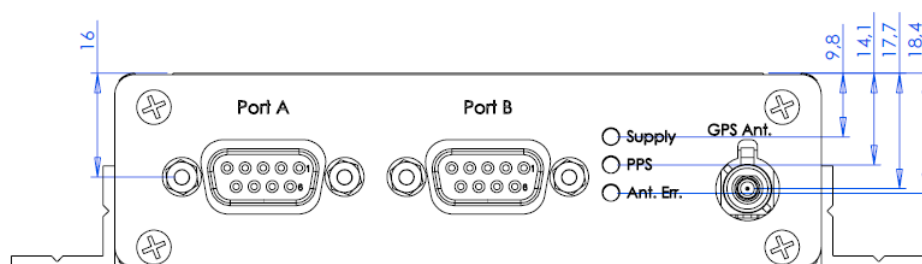
LED Status

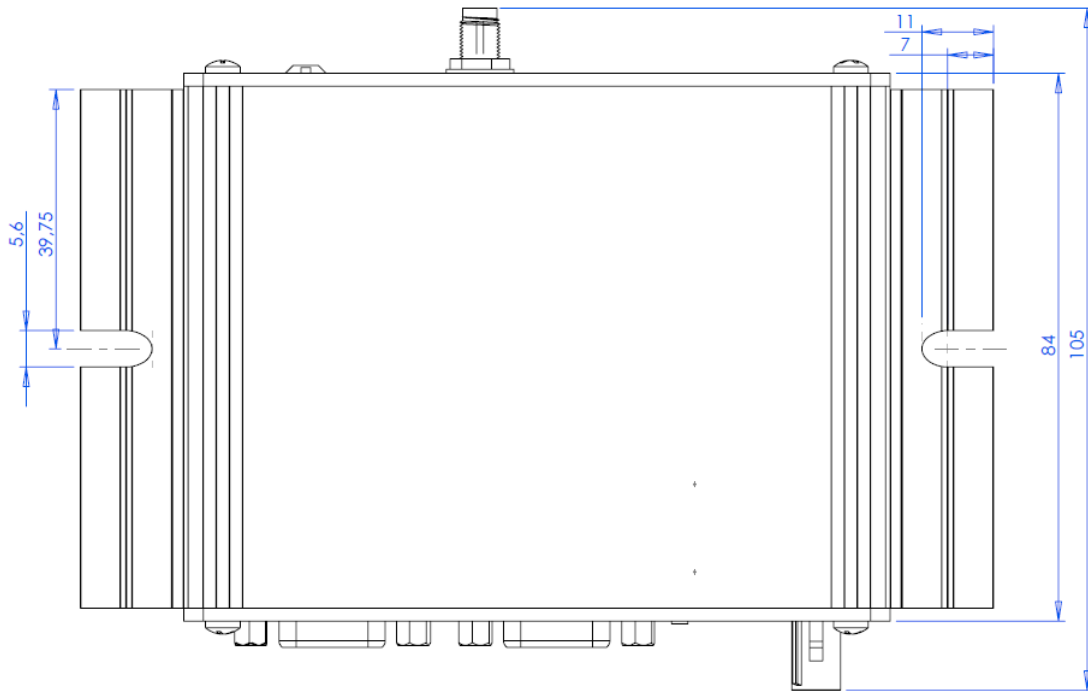Three LEDs on the front panel indicate the status of the unit:
- Power: green if ON
- PPS: 1PPS is available, must be configured in 3D Fix mode (Orange blinking)
- Ant. Err. (Antenna Error): Antenna status, disconnected or in short-circuit (Red)
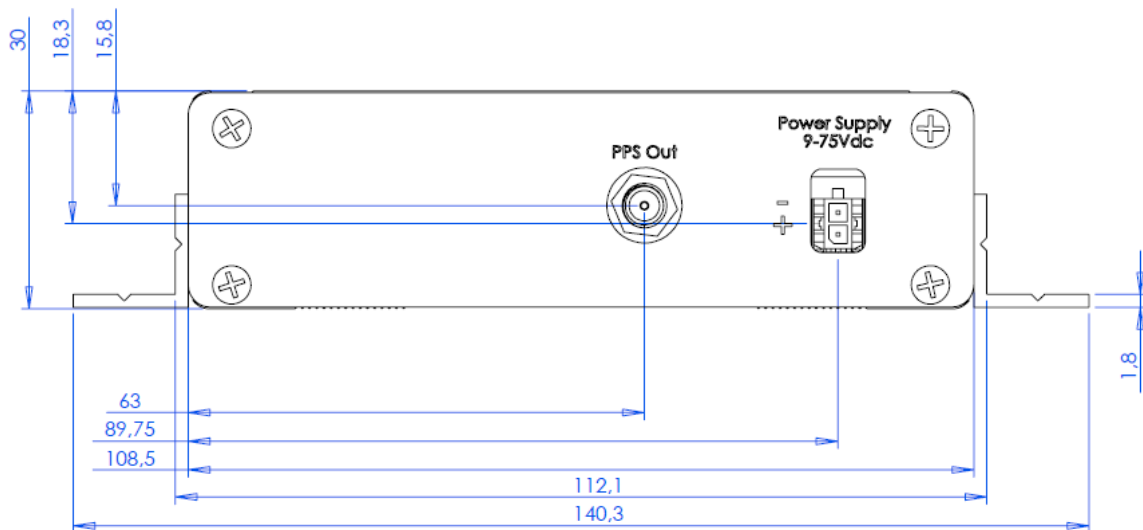
Mechanicals Drawings

Front View:

Top view (with flanges):

Rear view

CONDOR GPS MODULE FAMILY

KEY BENEFITS

- Cost-competitive to chipset implementations with all costs considered.

- Lowers development risk, cost and time

- Custom form factors to suit specific integration requirements

- Shortens time-to-market for new navigation products

THE SMART ALTERNATIVE TO A GPS CHIPSET

Trimble's Condor family of GPS modules represents the smart alternative to GPS chipsets for many consumer and commercial positioning applications. Trimble offers Condor modules in multiple form factors and flexible interface options. The modules in the Condor family share several common characteristics: top-tier positioning performance, the best components, and the highest production quality standards.

On the surface, a chipset implementation may appear to be the optimal choice for a GPS positioning solution. However, GPS chipset implementations are fraught with risk, can delay time-to-market (TTM) and can have significant hidden costs beyond just the bill of material.

Chipset implementations typically require multiple design iterations to achieve maximum performance under all operating conditions. In the production environment, chipset implementations accrue costs associated with testing, yield, re-work and warranty.

Condor GPS modules help you bring innovative products to market faster to capture greater market share. As a completely qualified positioning solution with full warranty, Condor modules harbor none of the development risk or hidden costs associated with GPS chipset implementations. Select a Condor GPS module and leverage Trimble's 30+ years of experience in positioning solutions.

C1011

At 10 mm x 11 mm, the diminutive Condor C1011 packs powerful positioning performance in a size well-suited to portable navigation products.

C1722

The Condor C1722 is a full-featured module in the 17 mm x 22 mm form factor. It offers a USB interface, antenna open and short detection, and support for both passive and active antennas.

C1216

The Condor C1216 packs a lot of functionality into its 12 mm x 16 mm form factor.

C1919A

The Condor C1919 has the 19 mm x 19 mm SMT format common with the Copernicus II GPS modules from Trimble.

C2626

Continuing Trimble's tradition of advancing technology while preserving our customer's investment, the C2626 copies the popular Lassen iQ form factor.

CONDOR GPS MODULE FAMILY

The Condor GPS family includes multiple modules with different form factors and interface options. All the modules in the family offer top tier positioning performance. The features and specifications listed below are typical for all Condor GPS modules in the family.

KEY FEATURES
- GPS L1 Frequency C/A code receiver
- NMEA output and input
- SBAS (WAAS, EGNOS, MSAS) capable
- aGPS capable
- Update rate up to 5 Hz
- PPS timing output
- Multiple form factors and interface options

PERFORMANCE SPECIFICATIONS
GPS performance statistics are clear view, stationary, autonomous (no aiding), 50% figures. Sensitivity based on signals measured at the antenna.
Update Rate . . . . 1 Hz (default), up to 5 Hz
Accuracy
  Position . . . . 2 m
  Altitude . . . . <3 m
  PPS . . . . ±25 ns
Acquisition
  Re-Acquisition . . . . 2 s
  Hot Start . . . . 2 s
  Warm Start . . . . 35 s
  Cold Start . . . . 38 s
Sensitivity
  Tracking . . . . –160 dBm
  Acquisition . . . . –146 dBm
Dynamics
  Acceleration . . . . .2 g
  Velocity . . . . 515 m/s (COCOM Limit)

ELECTRICAL INTERFACE CHARACTERISTICS
Serial Interface
  UART . . . . 2.8 V TTL level
  Protocol . . . . NMEA
  Messages . . . . GGA, GSA, GSV, RMC (default)
  Baud Rate 9600, 8-N-1
PPS Interface
  Level . . . . 2.8 V TTL level
  Pulse Width . . . . Configurable 4 μs
Main Power
  DC Levels . . . . 3.0 V to 3.6 V
  Consumption . . . . <37 mA typical @ 20 °C
Backup Power
  DC Levels . . . . 2.0 V to 3.6 V
  Consumption . . . . .5 μA typical @ 20 °C

ENVIRONMENTAL SPECIFICATIONS
Temperature
  Operating . . . . –40 °C to + 85 °C
  Storage . . . . –55 °C to +105 °C
Humidity . . . . 5% to 95% non-condensing @ 60 °C
Vibration
  5 Hz to 20 Hz . . . . .0.008 g^3/Hz
  20 Hz to 100 Hz . . . . .0.05 g^3/Hz
  100 Hz to 900 Hz . . . . –3 dB/octave

PHYSICAL CHARACTERISTICS
Dimensions
  C1011 . . . . 10 mm x 11 mm x 2 mm
  C1216 . . . . 16 mm x 12.2 mm x 2.13 mm
  C1722 . . . . 17 mm x 22.4 mm x 2.13 mm
  C1919 . . . . .19 mm x 19 mm x 2.54 mm
  C2626 . . . . 26 mm x 26 mm x 6 mm
Connectors
  C1011 . . . . .38-pad surface-mount LGA
  C1216 . . . . .24-pin surface-mounted edge castellations
  C1722 . . . . .28-pin surface-mounted edge castellations
  C1919 . . . . .28-pin surface-mount edge castellations
  C2626 . . . . .8-pin interface header
                             H.FL antenna connector

ORDERING INFORMATION

Model	Part Number	LNA	RTC	USB	Antenna Detection	Packaging Options	Starter Kit Part Number
C1011	68674-00					20-piece tray 100-piece reel 500-piece reel	70897-05
C1216	68676-10	✓	✓	✓	✓	50-piece tray 500-piece reel	N/A
C1722	68675-00	✓	✓	✓	✓	36-piece tray 500-piece reel	N/A
C1919A	67650-10	✓	✓			20-piece tray 100-piece reel 500-piece reel	70291-10
C1919B	67650-00	✓				20-piece tray 100-piece reel 500-piece reel	70291-10
C1919C	67650-20	✓	✓		✓	20-piece tray 100-piece reel 500-piece reel	70291-10
C2626	70896-00	✓	✓		✓	250-piece box	70897-05

LNA: An onboard LNA compatible with both active and passive antenna implementations.
RTC: Includes an onboard 32 kHz crystal for the RTC. Modules without an onboard crystal support either an off-board crystal or a connection to the host RTC crystal.
Antenna Detection: Capable of reporting antenna faults (open or short conditions) when integrated with an active antenna.

Starter Kit: This kit includes all the tools necessary to test and evaluate the Condor GPS receiver, including: Condor GPS receiver in a rugged enclosure suitable for testing and data collection; a GPS antenna. Software Tool Kit is available from the Trimble Support page.

Specifications subject to change without notice.

RoHS
2002/95/EC

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COPERNICUS II GPS RECEIVER

KEY FEATURES

- 2.54 mm T x 19 mm W x 19 mm L

- -160 dBm tracking sensitivity

- 132 mW typical continuous tracking

- Fast TTFF (cold start): 38 sec

- Supports SBAS (WAAS, EGNOS)

- Active or passive antennas

- NMEA, TSIP, TAIP protocols

- RoHS-Compliant (Pb-free)

- 2G dynamics

- Stable indoor PPS in Stationary Mode

ULTRA-THIN, LOW POWER, SURFACE MOUNT GPS MODULE

Drop-in Performance

The Trimble® Copernicus® II GPS receiver delivers proven performance and Trimble quality for a new generation of position-enabled products. It features the TrimCore™ navigation software for extremely fast startup times and high performance in foliage canopy and urban canyon environments.

The Copernicus II is fully compatible with all applications using previous generation of Copernicus module. The Copernicus II module is a complete 12-channel GPS receiver in a 19 mm × 19 mm × 2.54 mm thumbnail-sized module. The module is packaged in tape and reel for high speed pick-and-place manufacturing processes; 28 edge castellations provide RF and I/O interface without the need for connectors. Each module is manufactured and tested to Trimble's highest quality standards.

The sensitive Copernicus II GPS receiver can autonomously acquire GPS satellite signals and quickly generate reliable position fixes in extremely challenging environments and under poor signal conditions. The unit also accepts aided GPS (A-GPS) data for faster startups in very weak conditions.

In Stationary Mode the Copernicus II GPS receiver can produce an accurate and stable PPS with an indoor antenna

Features include:
- Self survey
- TRAIM on clock and frequency
- Noise filter to reduce PPS variance

The Copernicus II GPS module is a complete drop-in, ready-to-go receiver that provides position, velocity, and time data in a user's choice of three protocols. Trimble's powerful TSIP protocol offers complete control over receiver operation and provides detailed satellite information. The TAIP protocol is an easy-to-use ASCII protocol designed specifically for track and trace applications. The bi-directional NMEA 0183 v3.0 protocol offers industry-standard data messages and a command set for easy interface to mapping software.

Applications

Compatible with active or passive antennas, the Copernicus II GPS receiver is perfect for portable hand-held, battery-powered applications. The receiver's small size and low power requirement make it ideal for use in portable appliances, sport accessories, personal navigators, cameras, computer, and communication peripherals, as well as vehicle tracking, navigation, and security applications.

COPERNICUS II GPS RECEIVER

PERFORMANCE SPECIFICATIONS

Accuracy (24 hr static)
Horizontal . . . . <2.5 m 50%, <5 m 90%
SBAS . . . . <2.0 m 50%, <4 m 90%
Altitude . . . . <5 m 50%, <8 m 90%
SBAS . . . . <3 m 50%, <5 m 90%
Velocity . . . . 0.06 m/sec
Static PPs . . . . +/- 60ns RMS
PPS (Stationary Mode "indoor" @ -145dBm) . . . . +/-350ns

Acquisition (Autonomous, -130dBm, 50%)
Reacquisition . . . . 2 s
Hot Start . . . . 3 s
Hot Start without battery backup . . . . 8 s*
Warm Start . . . . 35 s
Cold Start . . . . 38 s

Sensitivity (unaided)
Tracking . . . .-160 dBm
Acquisition . . . .-148** dBm

Receiver Dynamics 2G

Ephemeris not older than 4 hours.
***For hot start with emphemeris otherwise -144 dBm*

INTERFACE CHARACTERISTICS

Connections . . . . 28 surface-mount edge castellations
Serial Port . . . . .2 serial ports
PPS . . . . .3.0 V CMOS-compatible pulse, once per second
Protocols . . . . TSIP, TAIP, NMEA 0183 v3.0
Bi-directional NMEA messages
Messages selectable by NMEA commands
Selection stored in flash memory

ELECTRICAL CHARACTERISTICS

Prime Power . . . . +2.7 V DC to 3.3 V DC
Power Consumption . . . .(typ.) 44 mA (132 mW) @ 3.0 V
Backup Power . . . . +2.7 V DC to +3.3 V DC
Ripple Noise . . . . .Max 50 mV, peak-to-peak from 1 Hz to 1 MHz

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature . . . .–40 °C to +85 °C
Storage Temperature . . . .–55 °C to +105 °C
Vibration   0.008 g2/Hz . . . . 5 Hz to 20 Hz
                          0.05 g2/Hz . . . . 20 Hz to 100 Hz
                          –3 dB/octave . . . 100 Hz to 900 Hz
Operating Humidity . . . . 5% to 95% R.H. non-condensing, at +60 °C

PHYSICAL CHARACTERISTICS

Enclosure . . . . Metal shield
Dimensions . . . . .19 mm W × 19 mm L × 2.54 mm H
(0.75" W × 0.75" L × 0.1" H)
Weight . . . . <2 grams (0.07 ounce) including shield

PINOUT ASSIGNMENTS

Pin	Name		Pin	Name
1	GND		28	GND
2	GND		27	GND
3	RF-IN		26	Reserved
4	GND		25	Reserved
5	LNA		24	TXD-B
6	VBAT		23	TXD-A
7	Open		22	Reserved
8	Short		21	RXD-A
9	Reserved		20	RXD-B
10	Reserved		19	PPS
11	Xreset		18	Reserved
12	Vcc		17	Reserved
13	GND		16	Xstandby
14	GND		15	GND

ORDERING INFORMATION & ACCESSORIES

Module . . . . available as 20 piece module package for evaluation
Tape on reel (100 pieces)
Tape on reel (500 pieces)
Reference Board . . . . Copernicus GPS module mounted on a carrier
board with I/O and RF connectors, including the
RF circuitry with the antenna open detection, as
well as antenna short detection and protection.
Starter Kit . . . . Includes Copernicus Reference Board mounted on
interface motherboard in a durable metal enclosure,
AC/DC power converter, compact magnetic-mount
GPS antenna, ultra-compact embedded antenna,
USB interface cable, cigarette lighter adapter, TSIP,
NMEA, and TAIP protocols. Software Tool Kit is available
from the Trimble Support page.
Ultra-Compact Embedded Antenna . . . .
3.3 V active miniature unpackaged antenna
Cable length: 8 cm
Connector: HFL

Compact Magnetic-Mount Antenna, MCX or SMA . . . .
3V active micropatch antenna with magnetic mount
Cable length: 5 m
Connectors: MCX or SMA

Parts of this product are patent protected.

Trimble has relied on representations made by its suppliers in certifying this product as RoHS compliant.

Specifications subject to change without notice.

Trimble Navigation Limited is not responsible for the operation or failure of operation of GPS satellites or the availability of GPS satellite signals.

RoHS

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NVS TECHNOLOGIES AG
NV08C Series

- GPS, GLONASS, GALILEO, COMPASS, SBAS L1 signals
- Compact LGA 20x26x2.5 mm design for SMT assembly
- Navigation and Time synchronization applications
- 32 GNSS tracking channels
- Assisted GNSS option supported
- Various Dead Reckoning options
- 200K correlators ensures small TTFF and high signal sensitivity
- 4 MB SPI FLASH for FW upgrade and User's data storage
- RAIM support
- NMEA 0183 (IEC 1162), BINR, RTCM SC 104 data protocols
- 24 mW @ Low Power Time-to-Time Fix (TTTF) Mode
- Extended operating temperature –40 to +85°C

NV08C-CSM
GPS/GLONASS/GALILEO/COMPASS RECEIVER

The NV08C-CSM is an integrated satellite navigation receiver. The device's key feature is its ability to work with global navigation satellite systems (GNSS) that have been deployed so far in the world – GPS and GLONASS. The GALILELO and COMPASS as well as SBAS systems are also fully supported.

The NV08C-CSM was developed for use in various LBS and M2M applications demanding low cost, low power consumption and uncompromised performance:

fleet management

in-car and handheld personal navigation

asset and personal tracking

anti theft systems

surveillance and security systems

WiFi, WiMAX, GSM, CDMA base station time synchronization

The receiver offers high sensitivity and high performance of GNSS signal acquisition and tracking combined with low power consumption and small size. The assisted GNSS option and advanced power saving modes are supported.

Separate GPS and GLONASS RF channels and 3-stage filtration provide better noise immunity in urban and industrial environment, railway stations and other places with high interference level. Multiple satellites available from GNSS constellations ensure higher availability of navigation signal in urban canyons compared to any single constellation solution.

For system integrator the NV08C-CSM provides a variety of interfaces, flexible power supply options, power supply for optional active antenna. A very compact and complete GNSS receiver can be integrated on a low cost 2 or 4-layer PCB with a minimal number of external passive parts.

NVS TECHNOLOGIES AG

iNVS
NV08C-CSM
R01.12.2009

Navigation Features

- **Number of channels:** 32
- **Satellite access mode:** All-in-view
- **GPS/GALILEO/COMPASS/SBAS:** L1 1575.42 MHz
- **GLONASS:** L1 1597.5-1609.5 MHz
- **Accuracy (RMS)***
  horizontal
    autonomous mode   2.5 m
    differential mode   1 m
  height   3 m
  velocities   0.05 m/s
  time (1PPS)   ±40 ns
- **Time to First Fix***
    reacquisition   <1 s
    hot start   <3 s
    cold & warm start   30 s
- **Sensitivity:**
    tracking and reacquisition   –160 dBm
    acquisition   –143 dBm
- **Supported vehicle dynamics**
    velocity   500 m/s
    acceleration   5g
    altitude   18000 m
- **Coordinate system**   WGS-84, PZ-90
  SK-42, SK-95

* typical values

Data Interface

- **Data update/output rate**   1, 2, 5, 10 Hz
- **Data output rate in TTTF mode** $(1\text{-}60 \text{ s})^{-1}$
- **Supported protocols**
  IEC1162 (NMEA 0183)
  BINR (proprietary)
  RTCM SC 104 v2.2
- **Host data interface**
  2x UART (1.8...3.3V CMOS-level)
  SPI
  TWI (I^2C compatible)
  1PPS output (CMOS level)
- **Data exchange rate**   up to 230'400 bit/s

RF functionality

- **LNA**   Built-In (SW controlled for power saving)
- **RF structure**   Two RF FE chains:
  GPS/GALILEO/COMPASS/SBAS L1
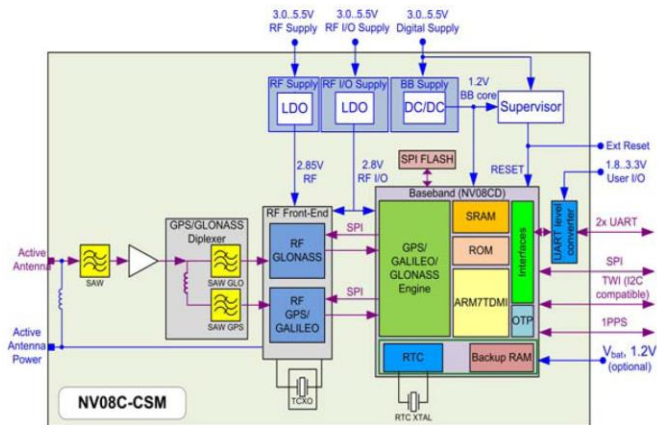 GLONASS L1
- **Antenna type**   Active[1]
- **Internal Clock**   26 MHz TCXO

1 - Recommended active antenna: GPS\GLONASS L1, 35MHz Bandwidth, 20dB Gain, NF < 2dB, Attenuation 35dB @ fc±70MHz

Electrical specification

- **Power supply voltage**   3.0…5.5V
- **Digital I/O voltage level (nominal)**   1.8…3.3V
- **Backup supply**   1.2V, 4 µA
- **Power consumption**
  GPS only time-to-time fix mode @ 1s*   18 mW
  GNSS time-to-time fix mode @ 1s*   24 mW
  GPS only tracking&navigation mode*   < 120 mW
  GNSS tracking&navigation mode*   < 180 mW

* average values

Environmental data

- **Operating temperature**   –40 to +85°C
- **Maximum operating humidity**   98% @ 40°C

Data Sheet

Transforming the Way the World Works

RES SMT 360™
Multi-GNSS Timing Module

KEY FEATURES

- Multi-Constellation

- Simultaneous GPS / GLONASS or GPS / Beidou tracking

- Ideal for populated urban and indoor environments with limited sky-view

- PPS and PP2S outputs, synchronized to GNSS / UTC within 15ns (1 sigma)

- Extended temperature range (-40°C / +85°C)

Miniature Multi-GNSS Timing Module with Super-Sized Features

Ideal for Low Signal Environment

Trimble® designed the RES SMT 360™ Timing Module to work in the most demanding weak signal environments, including femtocells and in-building systems.

With its robust performance in low signal environments, users can save on expensive cabling and externally mounted antennas. In addition, the RES SMT 360™ timing module accepts aiding data for environments requiring the highest levels of enhanced sensitivity.

Timing Signal Outputs

The RES SMT 360™ timing module outputs a precise1 pulse-per-second (1PPS) and an even second pulse to maximize your network performance and synchronize systems at a global level.

Custom frequencies are also available for volume sale.

Standard Timing Features

The RES SMT 360™ timing module includes many of Trimble's standard timing features, including Time-Receiver Autonomous Integrity Monitoring (T-RAIM) algorithm, automatic self-survey, and GNSS disciplining of the oscillator to provide an accurate frequency reference

Carrier Board and Starter Kit Options

The RES SMT 360™ timing module can be loaded directly onto the customer's application board.

The Starter Kit provides everything you need to evaluate the RES SMT 360™ timing module, including the RES SMT 360™ on a carrier board, AC/DC power converter, antenna and USB interface cable.

Trimble.

RES SMT 360™ Multi-GNSS TIMING MODULE

GENERAL SPECIFIATIONS

Receiving Signal...............GPS, GLONASS, Galileo, Beidou
   Supports GNSS incl.   ....SBAS, QZSS
Positioning System..SPS, Timing
1 PPS Timing Accuracy ....15 ηs (1 sigma)
Update Rate...1 Hz
Typical Min Acq Sensitivity...................-148dBm cold start
Typical Min Tracking Sensitivity .... -160dBm
Time to First Fix............<46s (50%), <50s (90%) cold start
Typical Time to Re-acquisition........................... <2s (90%)

INTERFACE CHARACTERISTICS

Connections. . . . . . . .28 surface-mount edge castellations
Serial Port...2 serial port
PPS / Even Second..................................CMOS-compatible
   LVTTL-level pulse, once per second
Protocols...TSIP, NMEA 0183

PINOUT ASSIGNMENTS

RES SMT 360 PINOUTS

GND	1	28	GND
GND	2	27	VCC
RFIN	3	26	GND
GND	4	25	RESET
OPEN	5	24	GND
SHORT	6	23	RESERVED
RESERVED	7	22	TXDB
RESERVED	8	21	RXDB
RESERVED	9	20	GND
RESERVED	10	19	PPS
RESERVED	11	18	GND
RESERVED	12	17	TXDA
RESERVED	13	16	RXDA
GND	14	15	GND

PHYSICAL CHARACTERISTICS

Enclosure...Metal Shield
Dimensions ....19 mm W x 19 mm L x 2.54 mm H
   (0.75" W x 0.75" L x 0.1" H)
Weight.................1.8 grams (0.06 ounce) including shield

ELECTRICAL CHARACTERISTICS

Supply Voltage Range................................3.3VDC to ±5%
Power Consumption...0.5W max.

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature.................................-40°C to +85°C
Operating Humidity.....5%-95% RH non-condensing (+60°C)
Storage Temperature....................................-50°C to +105°C

GENERAL INFORMATION & ACCESSORIES

Module............available in 20 piece trays for evaluation
   Production quantities on tape on reel (500 pieces)
Reference Board..........GNSS module mounted on a
   carrier board with I/O and RF connectors,
   including RF circuitry with the antenna open
   detection, as well as antenna short detection
   and protection.
Starter Kit ....Includes Reference Board mounted
   on interface motherboard in a durable metal
   enclosure, AC/DC power converter, Bullet 360
   antenna, USB interface cable, TSIP and NMEA
   protocols
Antenna.. Bullet 360

Visit *www.trimble.com/timing* **for part numbers
and information about where to buy.**

Parts of the product are patent protected.

Trimble has relied on representations made by its suppliers in certifying this product
as RoHS-II compliant.

Specifications subject to change without notice.

www.trimble.com