



SkyNav GG12 GPS Board

GPS+GLONASS ALL-IN-VIEW POSITIONING SINGLE RECEIVER SOLUTION

With over 10 years of experience in high-precision receiver design, we have developed an OEM GPS and GPS+GLONASS™ receiver explicitly for the aviation industry.

While many of our previous designs were successful with aircraft manufacturers and aircraft systems manufacturers for test-flight applications, the SkyNav® GG12™ from Thales is ideally suited to integration within Technical Standard Order (TSO) Flight Management Systems (FMS), ground-based reference stations for GPS aircraft landing systems (SCAT I and LAAS) and other avionics. In addition to traditional GPS receiver design and ISO 9001 engineering practices, the GG12 design team adhered to FAA/RTCA design criteria.

CERTIFICATION

The SkyNav GG12 from Thales software has been developed in accordance with the requirements for RTCA DO-178B Level 'B' (Software Considerations in Airborne Systems and Equipment Certification). The hardware has been developed to conform to the RTCA DO-208 (MOPS for Airborne Supplemental Navigation Equipment Using GPS) requirements. The hardware and navigational accuracy has been developed in accordance with RTCA DO-217 (MASPS DGNSS Instrument Approach System: SCAT-I) requirements.

The receiver capably operates in autonomous or differential mode, making it ideal for all phases of flight, including precision approach. It also provides code and carrier data for ground reference station operation.

ANTI-JAMMING

The SkyNav GG12 receiver features extensive anti-jam capabilities in the RF hardware.

GPS Only Configuration:

The receiver meets the CWI (Continuous Wave Interference) specification from RTCA DO-208 and DO-229 (WAAS MOPS).



GPS+GLONASS Configuration:

The GPS and GLONASS RF sections are independent, so that in-band CWI jamming on GLONASS frequencies will not affect GPS, and vice-versa. The GPS component of the receiver meets the CWI specification from RTCA DO-208 and DO-229. The GLONASS portion of the receiver satisfies a similar CWI specification. Both the GPS and GLONASS receiver portions meet DO-235 (RF interference to the GNSS environment).

12 PARALLEL CHANNEL RECEIVER

The SkyNav GG12 GPS board is capable of tracking negative frequency GLONASS channels and incorporates all-in-view tracking of up to 12 satellites with a "loss of lock" re-acquisition time of less than 3 seconds. The channels may be dynamically assigned to GPS or GLONASS. The user may specify which channels track which system, or the receiver can perform this task automatically. In automatic mode, the user may define a primary system; the receiver tracks as many satellites of the primary system as possible, and uses the remaining channels to track

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satellites from the secondary system. The GPS+GLONASS receiver may be commanded to become a GPS-only receiver, or a GLONASS-only receiver.

WINDOWS EVALUATION SOFTWARE

Evaluate™ software is available with the SkyNav GG12 and provides visual displays of satellite information (e.g., azimuth, elevation, SNR),

receiver position and velocity, as well as data logging and analysis. It also allows direct communication with the receiver. Compatible with most Thales receivers, the software runs on Windows® version 3.x, Windows 95/98, NT, 2000, and XP platforms.

TECHNICAL SPECIFICATIONS

Standard Features

- 12 channels L1 C/A code & carrier
- Available in GPS-only and GPS+GLONASS configurations
- 2 Hz and 5 Hz position update rates
- Position Latency¹: < 70 ms
- Raw data output (code and carrier)
- Standard NMEA-0183 V2.3 output
- Differential remote RTCA DO-217
- Position latency output
- Differential diagnostics output
- Geoid and Magnetic Variation models

Real-Time Position Accuracy²

Autonomous^{3,4}

CEP: 3.3 m (10.83 ft)

Differential

CEP: 40.0 cm (15.75 ft)

Velocity Accuracy (knots)²

0.1 (95%)

Time To First Fix²

Re-acquisition

- < 3 sec if blockage is less than 10 sec
- < 5 sec if blockage is 10–60 sec

95%

Hot Start 16 sec
Warm Start 45 sec
Cold Start 90 sec

Dynamics

- Acceleration: 10 g
- Speed⁵: 514 m/sec (1,000 knots)
- Altitude⁵: 18287 m (60,000 ft)
- Vibration: MIL-STD 810E / RTCA DO-160C

Physical & Environmental

- Size: 108 mm x 82.5 mm 19.5 mm (4.275 in x 3.25 in x 0.77 in)
- Weight: 108 gr (3.8 ounces)
- Input voltage: 5VDC ± 5%
50mV p-p ripple
- Power Consumption: < 3 W (Receiver)
< 0.3 W (Antenna)
- Operation Temp: –30°C to +70°C
(–22°F to 158°F)
- Storage Temp: –40°C to +85°C
(–40°F to 185°F)

Mounting

One mounting hole is located in each corner; the center of each hole is 0.15" from each edge.

Connectors

32 pin straight header (pins 1–30 compatible with G12™; pins 1–20 compatible with G12 and Sensor II™).

The SkyNav GG12 connector is a Samtec TSW-116-07-G-D. The mating Samtec cable with 2 connectors would be IDSD-16-D-xx, where xx is the length in inches. The mating board-to-board connector would be SSW-116-01-G-D.

Most socket strips made for .025" square pins on 0.100" centers with 2 rows of 16 pins will fit.

Communications

2 bi-directional RS232 serial ports up to 115,200 baud.

Antenna

The GPS+GLONASS configuration uses one antenna to receive both GPS and GLONASS signals. The antenna connects through a single antenna port on the SkyNav GG12 receiver.

Development Kit

The SkyNav GG12 Development Kit, which includes the SkyNav GG12 and all necessary components, enables you to perform a comprehensive test-drive. The kit contains a SkyNav GG12 GPS receiver, the Evaluate software, power supply, ready-made interface cables, antenna, and manuals.

¹ The time delay from the instant a message is time tagged to when the receiver finishes its transmission @ 115,200 baud. Latency specification is for certain messages. Latency of other messages under different conditions may yield different results.

² Accuracy and TTFF specs. based on tests conducted in California. Differential tests performed using Z-Sensor™ base station with Geodetic antenna and SkyNav GG12 GPS Board remote with Geodetic antenna (Marine IV antenna for TTFF). Antenna benchmark locations determined using CORS sites Point Blunt (PBL1) and Pigeon Point (PPT1). Tests at different locations under different conditions may produce different results.

Position accuracy specifications are for horizontal positioning. Vertical error is typically <2 times horizontal error.

³ Real-time position accuracies obtained with SA off. With SA on, accuracy of autonomous positioning may degrade up to 100 meters (95%) as specified by the U.S. Department of Defense.

⁴ Conforms to RTCA DO-217 (Minimum Aviation System Performance Standards—Instrument Approach System SCAT-I).

⁵ Higher altitudes and speeds are available under validated export license.

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