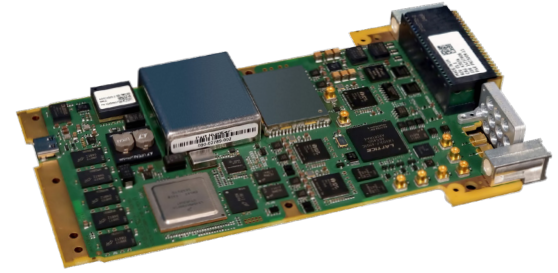


Preliminary

Abaco proprietary information



PNT500

3U VPX Assured Position Navigation and Timing (A-PNT), Aligned to SOSA

The PNT500 from Abaco Systems provides high precision position, navigation and timing information, even in highly contested environments, providing vital situational awareness.

Positioning

Across most platforms, knowing, with certainty and precision, is critical for the mission's success. From navigation, to situational awareness, to identification of friend & foe, it is imperative to have high confidence in the vehicle's position. Such is the importance of this; it is a key part of an adversary's tactics to disrupt and confuse in order to gain an advantage.

Featuring QinetiQ's Q40, the PNT500 solves several key pieces of this challenge, giving confidence in the location information available. Rather than rely on a single Global Navigation Satellite System (GNSS) source, such as GPS, PNT500 can use multiple sources of positioning data from different GNSS constellations. It obtains the frequency bands independently so even if GPS L1 is jammed it still provides a PNT output. This provides a more robust operation to resist efforts to jam or spoof satellite signals, and to detect when an attack is in progress.

Timing

The root of a SOSA aligned system requires highly precise timing circuitry for other modules in the system and to other computing systems.

Non-GNSS build variants are available for solutions that either have an existing receiver or those that only require a local timing reference.

1PPS System Level Synchronization

The card operates as an IEEE 1588, Precision Time Protocol (PTP) Grandmaster, producing a one pulse per second (1PPS) signal. The 1PPS signal is synchronised and disciplined by the GNSS receiver, allowing all other modules to synchronize to the PNT500 ensuring uniform timing throughout the system. When GNSS lock is lost or disrupted, a chip-scale atomic clock (CSAC) build option maintains the accuracy of the 1PPS signal.

The PNT500 allows use of an active or passive antenna, with an option of providing power over the RF line.

100 MHz Reference Clock

Timing of boards and peripherals across the system is also enhanced by a common reference clock, which runs at frequencies including 100, 50 or 25 MHz and supports SOSA requirements.

Software

The PNT500 is delivered with its operational software, providing both PTP Grandmaster capability and distributed position and navigation data.

The PTP server exchanges messages across Ethernet to remote computing modules to establish best master clock status, and to synchronize the time on those modules.

Regular field-loadable software updates and patches are available to address ongoing security threats.

FEATURES:

- Single slot 3U VPX
- SOSA-aligned PNT pinout
- Backplane I/O via coaxial inserts
- Support for multiple GNSS constellations
- Independent acquisition of the frequency bands on multiple constellations
- On-board chip-scale atomic clock (CSAC) – build option
- Radial 1PPS AUX_CLK clock outputs
- Radial 100MHz REF_CLK outputs
- IEEE 1588 PTP Grandmaster
- VPX/SOSA profile SLT3x-TIM-2S1U22S1U2U1H-14.9.2-n
- Developed as part of MOD programme to meet assured PNT requirements
- Not subject to ITAR Controls

PNT500 Rugged 3U VPX Assured Position, Navigation & Timing

Specifications

GNSS

- Multi-constellation receiver
- GPS, Galileo (future support includes GLONASS and BeiDou via software update - contact factory for latest constellation support)
- All-in-view tracking (256 parallel tracking channels)
- Onboard MEMS to support enhanced anti-jamming

Assurance

- Advanced adaptive filtering
- Interference rejection
- Anti-spoofing
- GNSS denied holdover for output clocks and 1PPS supported by CSAC or OCXO

Precision Timing

- High accuracy timing: <10ns RMS
- 1PPS (pulse per second)
- CSAC synchronized to GNSS, when locked
- Optional chip-scale atomic clock for timing holdup on GNSS loss
- 1PPS AUX_CLK distributed to backplane
- 11x radial AUX_CLK on differential pairs
- 1x coaxial AUX_CLK output
- 1x radial AUX_CLK input
- 1x coaxial AUX_CLK input

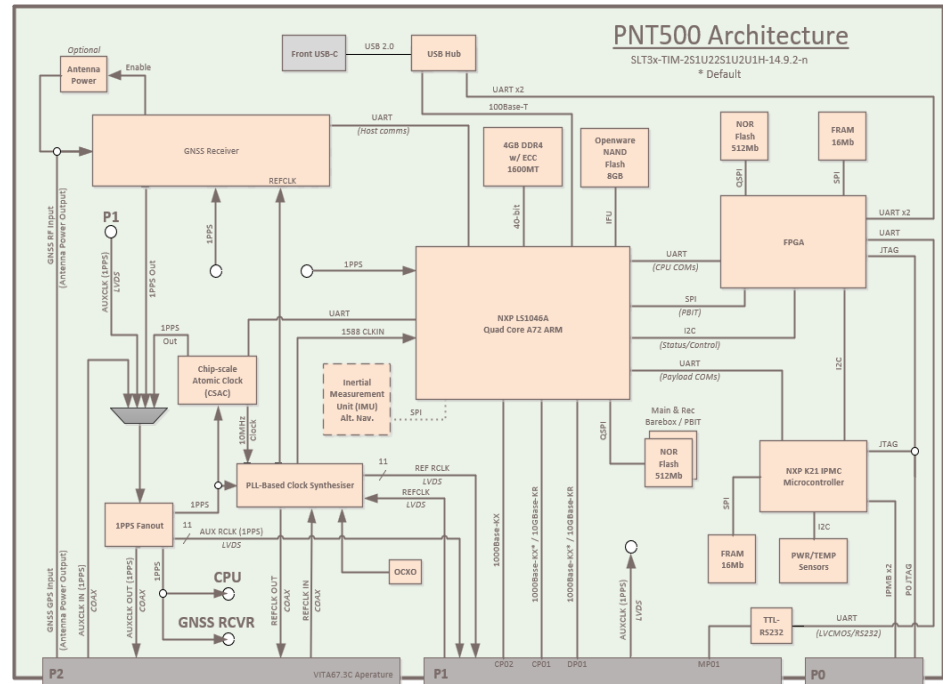
Reference Clock

- High accuracy 100MHz reference clock for system coherence
- 11x radial REF_CLK on differential pairs
- 1x coaxial REF_CLK output
- 1x radial REF_CLK input 1x coaxial REF_CLK input

External Interfaces

- 2x 1GBASE-KX (Control plane)
- 1x 1GBASE-KX (Data plane)
- 1x RS232/LVCMOS (serial console)
- 2x IPMB (board management)
- 2x GNSS antenna (coaxial), 3V power option
- 1x USB-C (dual UART and Ethernet)

Block diagram



VPX/SOSA Profiles

- SLT3x-TIM-2S1U22S1U2U1H-14.9.2-1 (contact factory for other profiles)

Software

- Configuration of Q40 PNT programmable parameters at system startup
- PTP Grandmaster
- Optional DDS published data (contact factory for support)
- Optional NMEA data stream (contact factory for support)

Environmental

- Air-cooled (level 1):
 - Operating temperature: 0°C to +70°C
- Conduction-cooled (level 5/E):
 - Operating temperature: -40°C to +85°C without CSAC (level 5)
 - Operating temperature: -40°C to +75°C with CSAC (level E)
 - Random vibration: 0.1g²/Hz
 - Shock: 40g