TIME & FREQUENCY SOLUTIONS

BY BRANDYWINE COMMUNICATIONS

VPX Timing Card

Ruggedized Timing Solution for VPX Backplanes

Key Features:

- SOSA Aligned
- 3U VPX Form-Factor
- Reduced SWaP applications
- Ruggedization Level 200
- 11 Radial Clock Outputs
- OpenVPX Backplane support for 1000BASE-KX or 10GBASE-KR
- Optional Chip Scale Atomic Clock (CSAC) Holdover
- Optional Low Phase Noise (LPN) Analog output
- Optional secure GPS (M-code)
- Optional Timecode I/O

The VPX Timing Card offers a complete solution set for all PNT needs. This highly ruggedized conduction cooled unit provides a versatile multifunction clock references for any environment.

This fully defined, backplane-centric VPX module optionally supports either commercial GNSS receivers (i.e. U-Blox), or secure SAASM M-Code GPS receiver data along with external 1PPS UTC rollover references, reference clocks of up to 100MHz, as well as Amplitude Modulated (AM) or DC Level Shifted AM (DCLS) IRIG inputs as means of synchronization via the VITA 67.3C backplane RF connector.

The VPX Timing Card provides three (3) 1000BASE-KX Ethernet ports, with optional software upgrade for faster 10GBASE-KR.

The module provides PTP (IEEE 1588-2008) and NTP functionality (RFC 5905) with both server and client capabilities.

In its default configuration, the VPX Time Card employs a highly stable VCOCXO to serve the backplane with multiple (11+11) coherent disciplined clocks aligned with PPS pairs. This oscillator can be upgraded with an ultra-low phase noise option for best-in-class short term stability.

25 Eastways, Witham, Essex, CM8 3AL UK | Tel: +44 (0) 1376 514114
E-mail: sales@timefreq.com | Web: www.timefreq.com

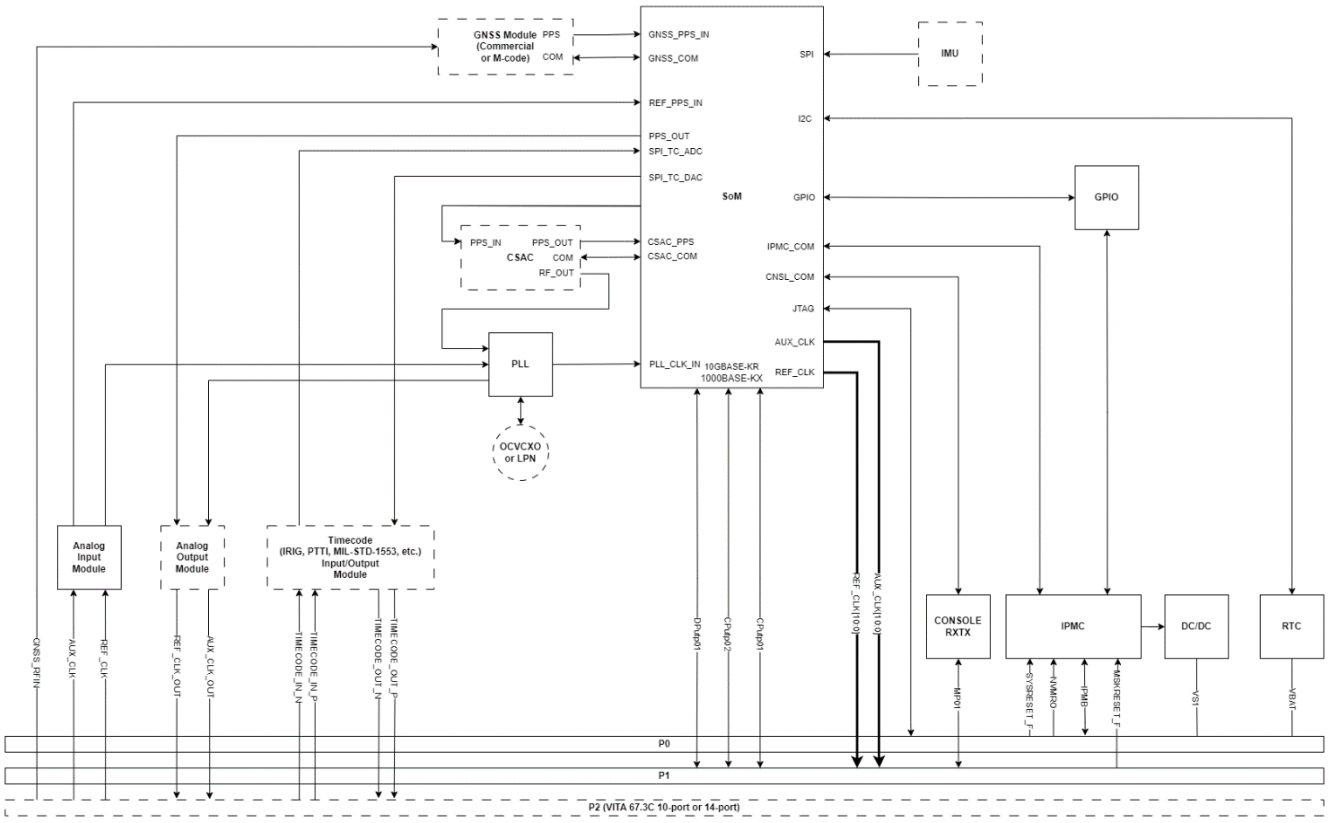
The radial clocks have a maximum group skew of ±25 picosecond between pairs, while the PPS inputs to outputs phase alignment is maintained within ±10ns. Furthermore, each clock phase can be further tuned within ±25 picoseconds to calibrate module radial clock routing.

The module can be optionally configured with a CSAC for enhanced holdover accuracy while operating in reference-denied environments. As an added feature the raw GNSS data can be distributed via multicast from the module for downstream processing.

The module can be optionally configured with a timecode I/O module. Developed variants include: IRIG-AM, IRIG-DCLS, BCD (24-bit and 40-bit), NMEA, and MIL-STD-1553.

To facilitate higher level integration, selected 3rd party source code is available to build status and control applications software on platforms running almost any operating system. e.g. Single Board Computer (SBC). Applications connect using gRPC over HTTP via Ethernet or even locally using RS-232 console access via localhost.

To Illustrate the Functionality of the VPX Timing Card, a Block Diagram is provided below for illustrative purposes:



Specifications

Input Specifications

1PPS stability to GNSS RF	± 30ns
1PPS stability to external PPS	± 10ns
Frequency Stability (CSAC)	3x10-10
Phase Accuracy, 100MHz to 1PPS	± 10ns
Holdover	± 26µs over 24 hours
Long Term Oscillator Aging without GPS	Aging, monthly: <3x10-10
Aging, yearly:	<1x10-9
Serial SAASM GPS Interface (optional)	RS-232
SAASM Key-Zeroize	Software Command
GPS Antenna	Active 3.3V Antenna, L1 and L2, Maxtenna
GNSS Receiver – SAASM GPS (optional)	12 channels, L1 and L2, SAASM, DS101 Key and zeroize

Output Specifications

P2 (VITA 67.3C) Analog Sine Output	10 MHz (optional 100 MHz)
P1 Radial Clocks	11 programmable output clocks sets
P1 Radial Clock REF_CLK Frequency Range	3-3000 MHz
P1 Radial Clock REF_CLK output	CML, LVDS, LVPECL
P1 Radial Clock AUX_CLK output	LVDS, LVPECL

Mechanical & Environmental

Size	3U VPX
Pitch	1”
Warm Up Time	< 4 minutes
Power Consumption, Typical	10.9 W
Power Consumption, CSAC, Maximum	0.14 W
Power Consumption, GPS M-Code, Maximum	0.8 W
Power Consumption, LPN Oscillator, Maximum	3.5 W
Operating Temperature	-40°C to +85°C
Cooling	Conduction or Air
SOSA Timing Slot Profiles	SLT3x-TIM-2S1U22S1U2U1H-14.9.2-X
SOSA Timing Module Profiles	MOD3x-TIM-2S1U22S1U2U1H-16.9.2-X