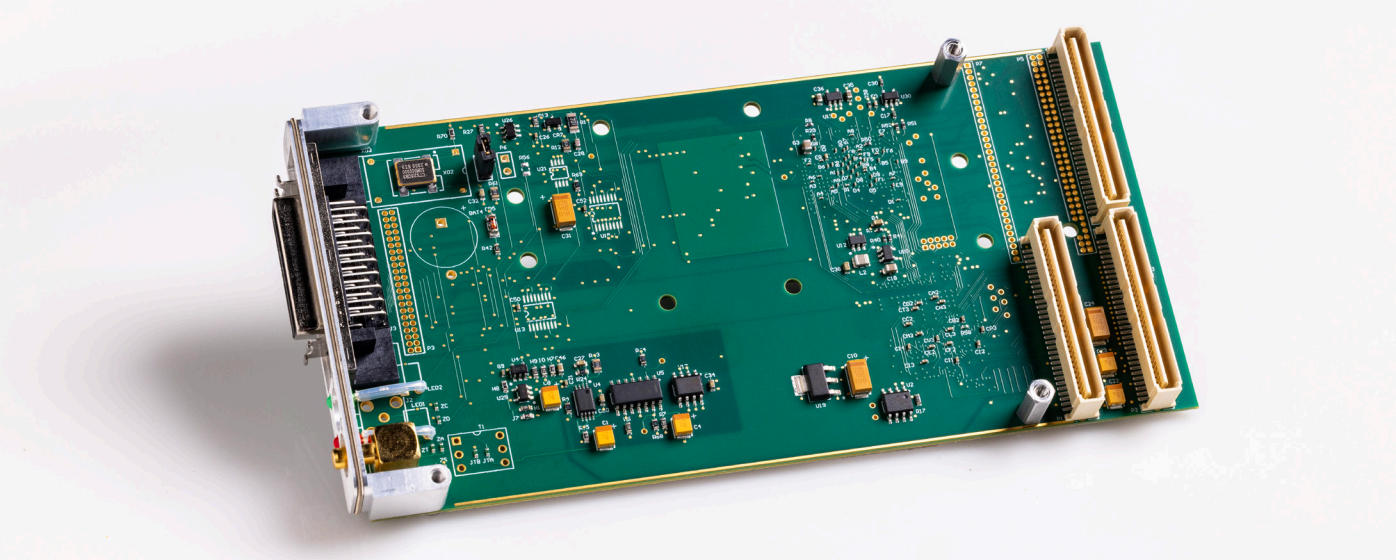
TIME & FREQUENCY SOLUTIONS

BY BRANDYWINE COMMUNICATIONS

PMC-SyncClock32 TURBO

PCI Mezzanine Card Timing Board



The PMC-SyncClock32-TURBO from Brandywine Communications is a PCI Mezzanine Card (PMC) module. Both 3.3V and 5V PCI signaling are supported. Precision time is provided to the host computer with zero latency. The on-board microprocessor automatically synchronizes the clock to reference signal inputs. The reference signal inputs handled by the PMC in its standard configuration are IRIG's B AM and 1 PPS. Alternatively, the clock in the PMC can be set using commands from host computer and free run using its on-board oscillator as the time base.

When synchronizing to time codes or 1 PPS the microprocessor constantly measures the time error between the on-board clock and the reference input code and adjusts the error measurement for propagation delay. The measured error is used to adjust time counter time in 100ns steps for the next second. If the disciplined VCTCXO option is selected the residual error is used in an adaptive gain loop to adjust the frequency of the 10 MHz oscillator for minimum error. Before being used as the time reference, the input code reference is checked (to code carrier resolution) for consistency with itself. If the incoming code is missing or corrupted by noise, the on-board clock is updated by the fly wheeling frequency correction. When the input code is again usable the correction loop is smoothly closed.

FEATURES

- **IRIG B AM and 1 PPS inputs standard**
- **Propagation delay compensation**
- **Zero latency time reads**
- **Match Time output**
- **Programmable heartbeat output and two other pulse rates**
- **Interrupts for External events, heartbeat, match time**
- **IRIG B AM or DC time code output option**
- **External Event time tag, Option for 8 inputs with 1024 deep event FIFO and FIFO interrupts**
- **TCXO or disciplined VCTCXO options**
- **-40°C to +85°C operating temperature range**
- **HAVE QUICK input or output options**

58 bits of BCD time are available to the host computer using two zero latency time reads. The time message contains units of microseconds through units of years. A status word is available using an additional read. Binary data format option is available.

The time-of-occurrence of external events may be captured (time-tagged) by using the Event Time input. When the event input is sensed the current time is saved in a buffer for later interrogation by the host. The resolution of the time tag is 100 nanoseconds. There are options for 8 external time tag events and 1024 deep event FIFO buffer for event bursts.

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Specifications

Input Specifications

AM Input Codes	IRIG B120..B127
Input Amplitude	.25 to 10 Vpp
Input Impedance	>10k Ohms
Ratio	2:1 to 4:1
Frequency Error	100 PPM maximum
Code Sync Accuracy	One microsecond
1 PPS input	TTL, positive edge
1 PPS Sync Accuracy	300 nanoseconds
External Event Resolution	100 nanoseconds
Min. event spacing	None. See FIFO option for burst support.
Connectors	SMB for time code input, output (option) high density IEEE–1284 36 pin, PMC P4

Output Specifications

Clock Input	2–65,535
Hi rate clock out	TTL, negative going
Hi rate clock divisor	2–65,535. Default divisor 3000
Hi rate clock divider in	3M PPS
Hi rate clock default output	1000 PPS
Heartbeat clock out	TTL, negative going
Heartbeat divisor	2–65,535 dividing 100 or 3M PPS
BCD Time	Zero latency 58 bits in two 32 bit words Microseconds–unit year on demand,
BWC word format (2words)	Lo: SSuuuuuu Hi: Y0 DDDHHMM

Indicators

Status word	8 bits including: Sync OK, Heartbeat, Match, Command Response, External event captured
Status LED (red)	Flashes pattern for status: Synchronized, input AM code, 1PPS input, major time initialized, year initialized
Interrupts	External Event, FIFO(option), Heartbeat, Match time

Reliability

MTBF	141,000 hours per Mil-217-F, Notice 2, 25°C, ground benign

Power

+5 VDC ±5%,	150 mA maximum
+3.3 VDC ±5%,	250 mA maximum
+12 VDC ±5%,	60 mA maximum
-12 VDC ±5%,	25 mA maximum

Environmental

Operating Temperature	0°C to +70°C (-40°C to +85°C option)
Storage Temperature	-50°C to +100°C
Humidity	To 95% without condensation

Physical

Size	74mm X 149mm single CMC
Type	Single-slot 32 bit 3.3V or 5V PCI Signaling

Options

Industrial temperature range	-40°C to +85°C operating range
Input Code Isolation	Transformer coupling
Input Codes	IRIG G DC, IRIG-G AM
Output Codes	IRIG B AM. IRIG-B DC, IRIG-DC
More external events	Up to 8 external events. FIFO option for event bursts.
Have Quick Output	Per ICD–GPS–060
Binary Time Words	37 bit usec of day. 9 bit day-of-year. 8 bit year instead of BCD format

Other SyncClock Modules

CCPMC-GPSCLK-TURBO	Conduction cooled PMC with optional on-board GPS. Air cooled bezel option for standard PMC
Pciex-SYNCCLOCK32	PCIe bus full height
PcieLP-SYNCCLOCK32	PCIe bus 1/2 height
PCI-SYNCCLOCK32-TURBO	PCI bus
cPCI3U-SYNCCLOCK32-TURBO	cPCI bus 3U format
MiniPCIe-SYNCCLOCK32	MiniPCIe bus
PC104PLUS-SYNCCLOCK-TURBO	PC104PLUS bus
PCIe104-SYNCCLOCK32	PCIe104 bus

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