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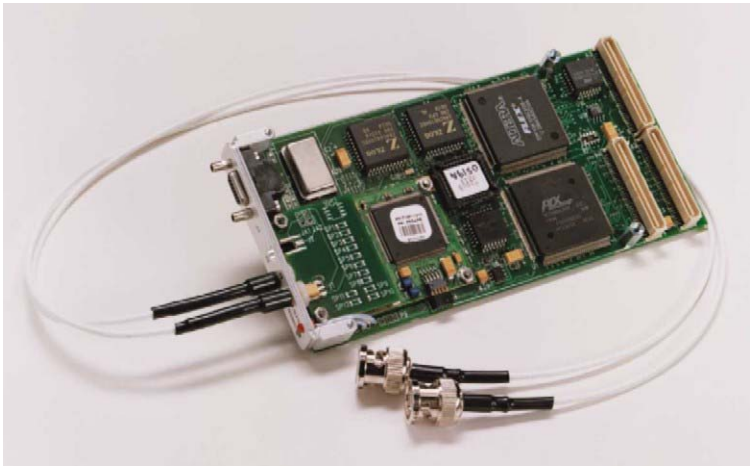
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brandywine communications

PMC-SyncClock32
with On-board GPS

- GPS Synchronization standard
- Propagation delay compensation
- Zero latency time reads
- Match Time output
- IRIG B time code output
- External Event time tags
- Three user programmable rates



The PMC-SyncClock32(GPS) from Brandywine Communications is an advanced Mezzanine Card (PMC) module featuring an on-board GPS receiver. Precision time is provided to the host computer with zero latency. The on-board microprocessor automatically synchronizes the clock to the GPS input signal. The PMC will also synchronize to an external 1PPS reference signal. 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 GPS or the 1 PPS input the microprocessor constantly measures the time error between the on-board clock and the GPS reference input and adjusts the error measurement for propagation delay. When the disciplined TCXO 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 GPS receiver must be locked to the GPS input. If the incoming GPS fails or is corrupted by noise the on-board clock is updated by the 10 MHz oscillator. When the GPS input signal is again useable the correction loop is smoothly closed.

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.

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.

The Match Time feature may be used to automatically initiate or terminate an external process. The resolution of the Match Time comparison is one microsecond. The Match Time output is asserted when the time of the internal clock matches that of the user input start time. The Match Time output may be terminated by a user command or when the previously set stop time is encountered.

Three user programmable pulse rates are provided. Two pulse rates, Clock Low and Clock High, are available on the multi-pin connector. The third pulse rate provides heartbeat timing to the host computer and is also available on the multi-pin connector. The divider for each of the three pulse rate generators is programmable by the host computer over the range 2–65,535. The inputs to the rate generators are 3 MHz or 100 Hz for the heartbeat, 100 PPS for Clock Low and 3 MHz for Clock High.

The GPS synchronization feature offers worldwide time transfer capability to the PMC-SyncClock32. Very precise synchronization, automatic leap year and leap second correction, plus accurate position information are additional benefits provided by the GPS option.

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PMC-SyncClock32 with on-board GPS Specifications

General Input Specifications

GPS Synchronization	C/A code
Sync Accuracy	100 nanoseconds
Position Accuracy	25 meters SEP
Tracking	12 parallel channels
Antenna*	L1, 25' lead-in cable
Fixed or Dynamic	Operating mode selected at time of order
1 PPS Sync Input	RS-422 or TTL, positive edge
1 PPS sync accuracy	300 nanoseconds
External Event	
Resolution	100 nanoseconds–units year
Min. event spacing	None

General Output Specifications

IRIG B DC Shift	TTL
Match Pulse	TTL level at Start–Stop time
Resolution	Microseconds–eight milliseconds
Clock Low	TTL, negative going
Clock divisor	2–65,535
Clock input	100 PPS
Default output	1 PPS
Clock High	TTL, negative going
Clock divisor	2–65,535
Clock input	3 MPPS
Default output	76.923 kPPS
Heartbeat Rate	Interrupt, flag, TTL, negative going
Clock Divisor	2–65,535
Clock Input	100 PPS or 3 MPPS
Default output	1 kPPS
BCD Time	Microseconds–unit year on demand, zero latency 58 bits in two 32 bit words
Status word	8 bits
Status LED	Flashes coded patterns
Interrupts	External Event, Heartbeat, Match Time
Flags	Dual Port RAM data ready, In sync, Heartbeat, Match Time, External Event
Connectors	High density IEEE–1284 BNC adapters for GPS and 1PPS included
MTBF	141,000 hours per Mil-217-F, Notice 2, 25° C, ground benign

Mechanical & Environmental

Size	74mm X 149mm single CMC
Type	Single-slot 32 bit 5V PCI
Power	
+ 5 Vdc	±5%,150 mA maximum
+12 Vdc	±5%, 60 mA maximum
-12 Vdc	±5%, 25 mA maximum
Operating Temperature	0°C to +55°C
Storage Temperature	-40°C to +85°C
Humidity	To 95% without condensation

Options

Antenna Options*	
Mast mount antenna	Includes 100 feet of coax cable
Low loss cable & amplifiers	
Fiber Optics	Fiber Tx/Rx pair for long runs or secure environments
FAA certified antennas	For aircraft
Differential GPS Inputs	Per RTCM 104
IRIG B Modulated Output	2.5 Vpp into 600 Ohms
Input Code Isolation	Transformer coupling
Input Codes	IRIG G, XR3, 2137, IRIG E, 109-60
Output Codes	IRIG A, NASA 36, IRIG G
Eight External Event Inputs	TTL, positive or negative edge
FIFO	For External Events
Have Quick Output	Per ICD–GPS–060
Binary Time Words	Replaces BCD
Oscillator Upgrades	Disciplined TCXO, 1 PPM

*Consult factory for cable length choice

Other brandywine communications products

Video Character Inserters
Time-Message Displays
VME, PMC, PC/104,PCI, CPCI (3U and 6U), ISA, PCIX and Conduction-Cooled PMC form factors available
Network Time Servers
Frequency Generation and Distribution Instruments
Dual & Triple Redundant Systems

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