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VME-SyncClock32 with P(Y) Code Receiver

- 12 Channel GPS P(Y) Code Receiver
- KYK-13 Cryptovariable Loading
- 6U, 32 bit VME module
- IRIG A, B, NASA 36, 1PPS sync inputs
- Propagation delay correction
- Zero latency time reads
- Match Time output
- IRIG-B time code output
- External Event time tag input
- Three user programmable pulse rates

The VME-SyncClock32 with P(Y) code receiver from Brandywine Communications provides precision time to the host computer over the VME bus with zero latency. The on-board microprocessor automatically synchronizes the clock to the input reference signal. The reference signal inputs can be GPS, 1 PPS or time codes. The 1PPS or time code inputs will become the reference input should the GPS input fail. The clock can free run and be set by commands from the host over the VME bus.

The on-board clock also accepts an IRIG A, IRIG B, or NASA 36 synchronization input and user input signal delay compensation information. An optional IRIG B code generator is also available.

The advanced microprocessor on the VME-SyncClock32 module constantly measures the time error between the on-board clock and the reference signal input and adjusts the error measurement for propagation delay. In units with disciplined TCXO or OCXO oscillators the residual error is used in an adaptive gain loop to adjust the frequency of the 10 MHz oscillator for minimum error with respect to the reference input. If the incoming reference is missing or corrupted by noise the on-board clock is updated using the disciplined 10 MHz oscillator. When the reference input is again useable the correction loop is smoothly closed.

58 bits of BCD time data 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 random 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.

Internal or external processes may be automatically initiated or terminated by using the Match Time feature. This feature asserts an output when the user input start time matches the time in the internal clock. The output is terminated under user control or when the pre-programmed stop time is encountered. The resolution of the Match Time comparison is one microsecond.

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

The GPS synchronization feature ensures worldwide time transfer capability that can be traced to the U.S. Government standard UTC-USNO. Very precise synchronization, automatic leap year and leap second correction, and accurate position information are additional benefits provided by the GPS option.

A software package for VxWorks is optionally available. C language sample programs are supplied with the VME-SyncClock32.

In addition to the comprehensive set of standard capabilities offered by the VME-SyncClock32, a wide range of optional features may be specified. These options allow the user to customize the VME-SyncClock32 to fit almost any application.

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VME-SyncClock32 Specifications

General Input Specifications

Input Codes	IRIG A and B, NASA 36
Input Amplitude	.25 Vpp to 10 Vpp
Input Impedance	>10k Ohms
Ratio	2:1 to 4:1
Frequency Error	100 PPM maximum
Code Sync Accuracy	One microsecond
1PPS input	TTL, positive edge
1PPS Sync Accuracy	One microsecond
External Event	TTL, positive or negative edge
Resolution	100 nanoseconds–unit year
Min. event spacing	None

General Output Specifications

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 and flag and TTL level that is negative going
Clock Divisor	2–65,535
Clock Input	100 PPS or 3 MPPS
Default Output	1k PPS
BCD Time	Microseconds–unit year on demand, zero latency, 58 bits in two 32 bit words
Status Word	Eight 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	BNC, high density DB-26

Mechanical & Environmental

Size	160 mm X 233 mm
Type	Double-slot 32 bit VME
Power	
+5 Vdc	±5%, 400 mA maximum
+12 Vdc	±5%, 100 mA maximum
-12 Vdc	±5%, 50 mA maximum
Operating Temperature	0˚C to +55°C
Storage Temperature	-40°C to +85°C
Humidity	To 95% without condensation

GPS Input

GPS Sync Input	P(Y) code
Sync Accuracy	300 nanoseconds
Position Accuracy	12 meters SEP
Tracking	Twelve parallel channels
Antenna	L1, mast mount, 25' cable

Options

Antenna	L1-L2, mast mount, 100' cable
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
Extended Temperature Range	Contact Factory
Have Quick Output	Per ICD-060
IRIG B DC Shift	TTL
Oscillator Upgrades	Disciplined TCXO, 1 PPM Disciplined OCXO, .01 PPM
1 PPS 10 Vdc input	Sync input, +10 Vdc, 50 Ohms
Sixteen External Event Inputs	TTL, positive or negative edge
Software Packages	VxWorks

Other brandywine communications Products

- Video Character Inserters
- Time-Message Displays
- PCI, PMC, PC/104, CPCI and ISA Computer Clock Synchronization Boards
- Network Time Servers
- Frequency Generation and Distribution Instruments
- Dual & Triple Redundant Systems
- Rack mount time and frequency instruments

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