# MINI PCIE SYNCCLOCK32

- **Single-slot 32 bit PCI Express module**
- **IRIG A, B, NASA 36, 1 PPS sync inputs**
- **HaveQuick sync input option**
- **Propagation delay correction**
- **Zero latency time reads**
- **Match Time status / interrupt**
- **IRIG-B time code output (option)**
- **External Event time tag**
- **User programmable heartbeat rate interrupt**

The Mini PCIe SyncClock32 from Brandywine Communications provides precision time with zero latency to the host computer using one Mini-PCIe slot. An on-board microprocessor automatically synchronizes the clock to reference signal inputs. The reference signal inputs can be 1 PPS, IRIG or NASA time codes and optionally, HaveQuick. The clock can free run and be set by user commands.

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

The advanced microprocessor on the Mini PCIe SyncClock32 module constantly measures the time error between the on-board clock and the reference input code and adjusts the error measurement for propagation delay. In units with a disciplined TCXO option the residual error is used in an adaptive gain loop to adjust the frequency of the oscillator for minimum error. If the incoming time code is missing, or corrupted by noise, the on-board clock is updated using the disciplined oscillator. When the input code 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 byte is available using an additional read.
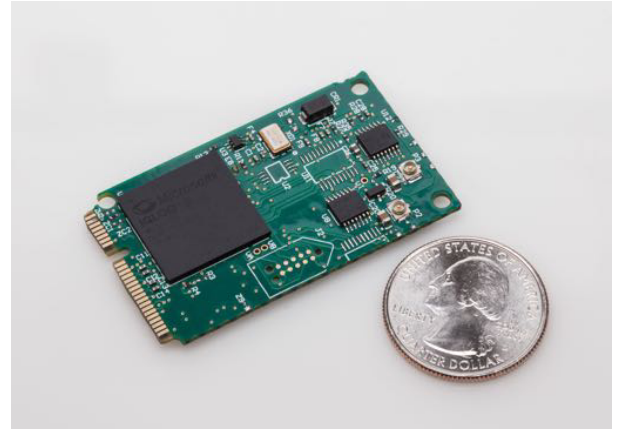
The exact time-of-occurrence of random external events may be captured by using the Event Time input. When the event input is sensed the current time is saved in a buffer for later interrogation by the host. The resolution of the time tag is 100 nanoseconds.

Internal or external processes may be automatically initiated or terminated by using the Match Time feature. This feature asserts Match Ready status when the clock's time matches that of the user input start time. 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.

A user programmable generator provides heartbeat timing to the host. The divider for heartbeat generators is programmable by the host over the range 2–65,535. Heartbeat generator divider is user selectable 10 MHz or 100 Hz.

Software packages for Windows and Linux are available. C language samples are supplied with the Mini PCIe SyncClock32.

In addition to the comprehensive set of standard capabilities of the Mini PCIe SyncClock32, Brandywine Communications offers a wide range of options that may be specified. These options allow the user to customize the Mini PCIe SyncClock32 to fit almost any application.

Specifications

General Input Specifications

Input Codes	IRIG A & B, NASA 36 (1kHz Carrier)
Input Amplitude	.25 to 10 Vpp
Input Impedance	>10k Ohms
Ratio	2:1 to 6:1
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–units of year
Min. event spacing	None
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, RAM FIFO, Heartbeat, Match Time
Flags	Dual Port RAM data ready, FIFO data ready, In sync, Heartbeat, Match Time, External Event
Connectors	U.FL micro coax
MTBF	1,904,342 Hours Per MIL 217 F, Notice 2, at 30°C

Mechanical & Environmental

Size	30.5 mm x 51.2 mm
Type	Mini PCIe
Power	3.3V and 1.5V
Operating Temperature	0°C to +70°C (-ITR option -40/+85C)
Storage Temperature	-40°C to +85°C
Humidity	To 95% without condensation

Options

STANAG 4430	Time code sync input
STANAG 4430	Time code output
IRIG B D.C. shift time code	TTL
Software packages	Windows, Linux

Other brandywine communications products

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