

AMC-SyncClock32

- IRIG A & B/IEEE-1344, and NASA 36 inputs standard
- HaveQuick sync option
- Propagation delay compensation
- Zero latency time reads
- Match Time output (P4)
- IRIG B time code output option
- External Event time tag (P4)
- Three user programmable rates
- Ruggedization option
- Multi-pin Front Panel P4 I/O option



The AMC-SyncClock32 from Brandywine Communications is an Advanced Mezzanine Card (AMC) module. 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 AMC in its standard configuration are IRIG's A, B/IEEE-1344, and NASA 36. Alternatively, the clock in the AMC can be set using commands from host computer and free run using its on-board oscillator as the time base.

When synchronizing to time reference the micro-processor constantly measures the time error between the on-board clock and the 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 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 10 MHz oscillator. When the input code 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 digits. 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 (P4). 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 P4 connector option. The third pulse rate provides heartbeat timing to the host computer and is also available on the multi-pin P4 connector option. 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 Ruggedization option provides electronic grade RTV staking of BGAs and acrylic conformal coating qualified to MIL-I-46058C.

AMC-SyncClock32 Specifications

Options requiring front panel multipin P4 connector have "(P4)" note

General Input Specifications

Input Codes	IRIG A & B, NASA 36, IEEE-1344
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	RS-422 or TTL, positive edge
1 PPS Sync Accuracy	300 nanoseconds
External Event (P4)	
Resolution	100 nanoseconds–units year
Min. event spacing	None

Standards

AMC Type:	AMC.1
Module Management:	IPMI Version 2.0

General Output Specifications

IRIG B DC Shift (P4)	TTL
Match Pulse	TTL (P4) level at Start–Stop time
Resolution	Microseconds–eight millisecond digits
Clock Low Rate (P4)	TTL, negative going
Clock Divisor	2–65,535
Clock Input	100 PPS
Default output	1 PPS
Clock High Rate (P4)	TTL, negative going
Clock Divisor	2–65,535
Clock Input	3 MPPS
Default output	76.923 kPPS
Heartbeat Rate	Interrupt, flag, TTL(P4), negative going
Clock Divisor	2–65,535
Clock Input	100 PPS or 3 MPPS
Default output	1 kPPS
BCD Time	Microseconds–unit year digits 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 (P4)
Connectors	SMB, 25 pin micro D-sub (P4)

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

Mechanical & Environmental & Fabric

Size	Single wide compact AMC
Fabric	PCle
Payload Power	
+12 Vdc	±5%, 400 mA maximum
Operating Temperature	-20°C to +70°C
Storage Temperature	-40°C to +85°C
Humidity	To 95% without condensation

Options

Ruggedization	BGAs and inductors staked with Electronics grade RTV and Conformally coated with acrylic coating qualified to MIL-I-46058C
---------------	--

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(P4)	TTL, positive or negative edge
Have Quick Input (P4)	Per ICD–GPS–060
Have Quick Output (P4)	Per ICD–GPS–060
Binary Time Words	Replaces BCD
Oscillator Upgrades	Disciplined TCXO, 1 PPM
1 PPS 10 Vdc input (P4)	Sync input, +10 Vdc, 50 Ohms

*consult factory for cable length options

Other Products

Video Character Inserters
Time-Message Displays
VME, PMC, Conduction Cooled PMC, PC/104,PCI, CPCI,PC104PLUS
SYNCCLOCK Computer Time Boards
Synchronization Boards
Network Time Servers
Frequency Generation and Distribution Instruments
Dual & Triple Redundant Systems

© Brandywine Communications 2013

4/19/2004