

PC104-SG

- Single PC/104 module
- IRIG A, B, NASA 36, 1 PPS sync inputs
- GPS synchronization option
- Have Quick sync input option
- Propagation delay correction
- Zero latency time reads
- Match Time output
- IRIG-B DC time code output
- External Event time tag input
- Three user programmable pulse rates



The PC104-SG from Brandywine Communications provides precision time with zero latency to the host computer over the PC/104 bus. An on-board microprocessor automatically synchronizes the clock on the PC104-SG to reference signal inputs. The clock can free run and be preset by commands from the host over the PC/104 bus.

The on-board clock accepts IRIG A, IRIG B, or NASA 36 synchronization inputs and user input signal delay compensation information. GPS and Have Quick sync inputs are optionally available. An IRIG B DC shift code generator is included as a standard feature.

The advanced microprocessor on the PC104-SG 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 supplied with the disciplined TCXO oscillator option the residual error is used in an adaptive gain loop to adjust the frequency of the 10 MHz oscillator for minimum error. If the incoming time code is missing or corrupted by noise the on-board clock is updated using the disciplined 10 MHz oscillator. When the input code is again useable the correction loop is smoothly closed.

BCD time data is available to the host computer using zero latency time reads. The time message contains units of microseconds through tens 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. These pulse rates, Clock Low, Clock High and Heartbeat, are output at the multi-pin connector. 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 for the Heartbeat and Clock High and 100 Hz for Clock Low. The Heartbeat is also available as an interrupt.

The GPS synchronization option adds 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.

To facilitate software development, C language sample programs are supplied with the PC104-SG.

In addition to the impressive set of standard capabilities offered by the PC104-SG, a wide range of optional features may be specified. These options allow the user to customize the PC104-SG to fit almost any application.

PC104-SG 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 edge, PW 20nS minimum
Resolution	100 nanoseconds–Hundreds of days*
Min. event spacing	None in interrupt mode

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	76.923k PPS
Heartbeat Rate	Interrupt and flag
	TTL, negative going
Clock Divisor	2–65,535
Clock Input	3 MPPS
Default Output	10k PPS
BCD Time	Microseconds–Days* on demand, No latency, 58 bits in nine 8 bit words
Status LED	Flashes coded patterns
Interrupts	External Event, Heartbeat, Match Time
Status Word Flags	FIFO Data Ready, In Sync, Heartbeat, Match Time, External Event, Three Interrupt Enables
Connectors	
Reference Inputs	5 Pin right angle
TTL Inputs & Outputs	10 Pin right angle
Bus	Per PC/104 specification

* Years input by user

Mechanical & Environmental

Size	3.550" X 3.775" (PC/104)
Power	
+5 Vdc	±5%, 150 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

Options

GPS Synchronization Input	Request SatPak104-LPD data sheet
IRIG B Modulated Output	2.5 Vpp into 600 Ohms
Input Code Isolation	Transformer coupling
Input Codes	IRIG G, XR3, 2137, IRIG E
Output Codes	IRIG A, NASA 36
Add Two External Event Inputs	TTL, positive edge
Extended Temperature Range	-40°C to +85°C
Have Quick Output	Per ICD-GPS-060
Have Quick Input	Per ICD-GPS-060
1PPS Sync Input	+10 Vdc, 50 Ohms
Oscillator Upgrades	Disciplined TCXO, 1 PPM
Video Character Inserter	

Other brandywine communications products

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