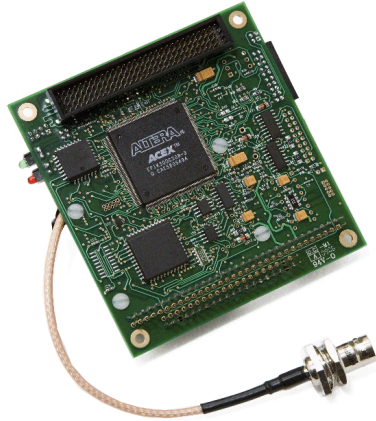


# PC104 Plus-SG Bus-Level Timing Board

The PC104Plus-SG Bus Level Timing Board provides precision time with zero latency to the host computer over the PC/104 bus.



## Features

- Single slot 32 bit PC104/Plus module
- 3.3V or 5V signalling levels
- 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

## Key Benefits

An on-board microprocessor automatically synchronizes the clock on the PC104/Plus to reference signal inputs.

The clock can free run and be preset by commands from the host over the PC/104 bus.

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 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 resolution of the Match Time comparison is one microsecond.

The advanced microprocessor on the PC104/Plus 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.

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.

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 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.

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.

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

In addition to the impressive set of standard capabilities offered by the PC/104Plus, a wide range of optional features may be specified. These options allow the user to customize the PC104/Plus to fit almost any application.



# PC104Plus-SG Specifications

## General Input Specifications

Input Codes	IRIG A & B, NASA 36
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 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	Microsecond-eight milliseconds	
Clock Low	TTL, negative going	Clock
Divisor	2–65,535	
Clock Input	100 PPS	
Default output	1 PPS	
Clock High Rate	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, zero latency 58 bits in nine 8-bit words	
Status LED	Flashes coded patterns	
Interrupts	External Event, Heartbeat, Match Time	
Flags	Dual Port RAM data ready, FIFO data ready, In sync, Heartbeat, Match Time, External Event	
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	

## MTBF

155,000 Hours  
Per MIL 217 F, Notice 2, at 25°C

## Mechanical & Environmental

Size	Per PC/104 Plus 2.0 Nov. 2003
Type	Single-slot 32 bit 3.3V or 5V PCI
Power	
+3.3Vdc	±5%, 120 mA maximum
+5Vdc	±5%, 150 mA maximum
+12 Vdc	±5%, 100 mA maximum
-12Vdc	±5%, 60 mA maximum
Operating Temperature	0°C to +70°C
Storage Temperature	-40°C to +85°C
Humidity	To 95% without condensation

## Options

GPS Sync Input	No additional card slot required
Sync Accuracy	C/A code, 100 nanoseconds
Position Accuracy	25 meters SEP
Tracking	Eight parallel channels
Antenna	L1 magnetic mount, 25' cable
Antenna Options	
Hi-gain	L1, mast mount, 100' cable
Fiber Optic Kit	Fiber optic transmitter-receiver pair for long antenna cable runs
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
Extended Temperature Range	-40°C to +85°C
Have Quick Output	Per ICD–GPS–060
Have Quick Input	Per ICD–GPS–060
Binary Time Words	Replaces BCD
Oscillator Upgrades	Disciplined TCXO, 1 PPM
Industrial Temperature Range	-20°C to +85°C
1PPS 10 Vdc Input	Sync input, +10 Vdc, 50 Ohms
STANAG 4430	Time code sync input
STANAG 4430	Time code output
IRIG B D.C. shift time code	In or out, single-ended or balanced
Software packages	Windows XP, NT, 2000 Windows 95/98, Linux