

bc637PCI-V2

GPS Synchronized, PCI Time & Frequency Processor

KEY FEATURES

- GPS synchronized with 170 nanosecond RMS accuracy to UTC
- IRIG A, B, G, E, IEEE 1344, NASA 36, XR3 & 2137 Time Code Inputs and Outputs
- Simultaneous AM or DCLS Time Code Inputs
- Simultaneous AM and DCLS Time Code Outputs
- 100-nanosecond clock resolution for time of day requests
- Programmable <<1 PPS to 100 MPPS DDS Rate Synthesizer Output/Interrupt
- 1, 5, or 10 MHz Rate Generator Output
- 1 PPS or 10 MHz Inputs
- External Event Time Capture/Interrupt
- Programmable Time Compare Output/Interrupt
- Zero Latency Time Reads
- Battery Backed Real Time Clock (RTC)
- PCI Local Bus Operation
- Universal Signaling (3.3V or 5.0V Bus)
- CE(RoHS) Compliant
- Linux, Solaris & Windows Software Drivers/SDKs available
- Optional OCXO Upgrade

Symmetricom's GPS referenced bc637PCI-V2 timing module provides precise time and frequency to the host computer and peripheral data acquisition systems. Precise time is acquired from the GPS satellite system or from time code signals. GPS synchronization provides 170 nanosecond RMS accurate time to UTC (USNO) and enables the bc637PCI-V2 to be an ideal master clock for precisely synchronizing multiple computers to UTC.

Central to the operation of the module is a disciplined 10 MHz oscillator that is either an on-board TCXO (or optional OCXO) or an off-board External oscillator that can provide the timing module's 100-nanosecond clock. Current time (days to 100 nanoseconds) can be accessed across the PCI bus with no PCI bus wait states, which allows for very high-speed time requests. The selected on-board or off-board 10 MHz oscillator drives the module's frequency and time code generator circuitry. If the input reference is lost, the module will continue to maintain time (flywheel) based on the selected 10 MHz oscillator's drift rate. The optional OCXO oscillator improves flywheel drift performance over the standard TCXO. If power is lost, a battery-backed real time clock (RTC) is available to maintain time.

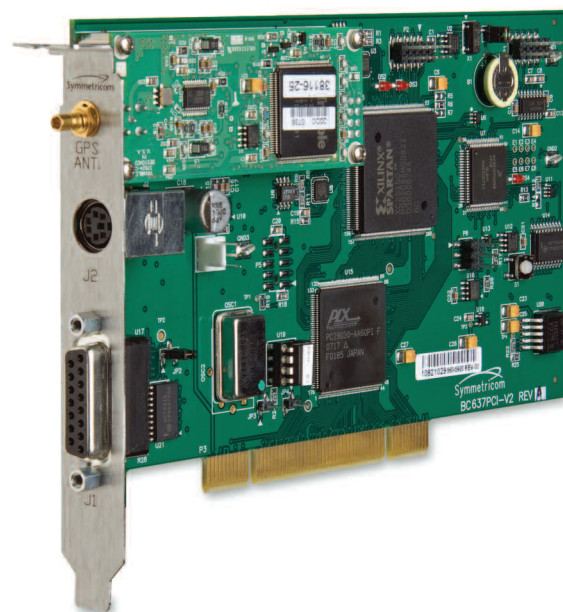
Extensive time code generation and translation are supported. The generator outputs either IRIG A, B, G, E, IEEE 1344, NASA 36, XR3 or 2137 in both amplitude modulated (AM) and DC level shift (DCLS) formats. The translator reads and may be used to discipline the 10 MHz oscillator to either the AM or DCLS format of IRIG A, B, G, E, IEEE 1344, NASA 36, XR3 or 2137 time codes.

The module also has a state-of-the-art DDS rate synthesizer capable of 0.0000001 PPS to 100 MPPS. The module may also be programmed to generate a single interrupt at a predetermined time based on a time compare (Strobe). An Event Time Capture feature provides a means of latching time of an external event.

A key feature of the bc637PCI-V2 is the ability to generate interrupts on the PCI bus at programmable rates. These interrupts can be used to synchronize applications on the host computer as well as signal specific events.

The external frequency input is a unique feature allowing the time and frequency of the bc637PCI-V2 to be derived from an external oscillator that may also be disciplined (DAC voltage controlled) based on the selected input reference. The module may be operated in generator (undisciplined) mode where an external 10 MHz from a Cesium or Rubidium standard is used as the frequency reference. This creates an extremely stable PCI based clock for all bc637PCI-V2 timing functions.

The bc637PCI-V2 automatically supports both 3.3V and 5.0V signaling of the PCI bus. Integration of the module is easily facilitated with optional drivers for Windows 2000/XP, Linux, or Solaris.



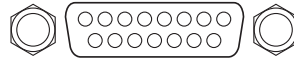
bc637PCI-V2 GPS Synchronized, Time & Frequency Processor.

bc637PCI-V2 Specifications

ELECTRICAL SPECIFICATIONS

- GPS Receiver/Antenna
 - 12 channel parallel receiver
 - GPS time traceable to UTC(USNO)
 - Accuracy: 170 ns RMS, 1 μ Sec peak to peak to UTC(USNO), at stable temperature and ≥ 4 satellites tracked.
 - Maximum Belden 9104 cable length: 150' (45 m). For longer cable runs see Options.
- Real Time Clock
 - Bus request resolution: 100 nanoseconds BCD
 - Latency: Zero
 - Major time format: Binary or BCD
 - Minor time format: Binary 1 μ S to 999.999 mS
- Synchronization sources: GPS, Time code, 1 PPS
- Time code translator (inputs)
 - Time code formats: IRIG A, B, E, G, IEEE 1344, NASA 36, XR3, 2137
 - Time accuracy: <5 μ S (AM carrier frequencies 1 kHz or greater) <1 μ S (DCLS)
 - AM ratio range: 2:1 to 4:1
 - AM Input amplitude: 1 to 8V p-p
 - AM Input impedance: >5k Ω
 - DCLS Input: 5V HCMOS >2V high, <0.8V low, 270 Ω
- Time code generator (outputs)
 - Time code format: IRIG A, B, E, G, IEEE 1344, NASA 36, XR3, 2137
 - AM ratio: 3:1 +/- 10%
 - AM amplitude: 3.5V p-p +/- 0.5V into 50 Ω
 - DCLS amplitude: 5V HCMOS, >2V high, <0.8V low into 50 Ω
- Timing functions (outputs are rising edge on time)
 - DDS rate synthesizer
 - Frequency range: 0.0000001 PPS to 100 MPPS
 - Output amplitude: 5V HCMOS, >2V high, <0.8V low into 50 Ω , square wave
 - Jitter: <2 ns p-p
 - Legacy pulse rate synthesizer (Heartbeat, aka Periodic)
 - Frequency range: <1 Hz to 250 kHz
 - Output amplitude: 5V HCMOS, >2V high, <0.8V low into 50 Ω , square wave
 - Time compare (Strobe)
 - Compare range: 1 μ S through days
 - Output amplitude: 5V HCMOS, >2V high, <0.8V low into 50 Ω , 1 μ S pulse
 - 1 PPS Output: 5V HCMOS, >2V high, <0.8V low into 50 Ω , 60 μ S pulse
 - 1 PPS Input: 5V HCMOS, >2V high, <0.8V low, 270 Ω
 - External Event Input: 5V HCMOS, >2V high, <0.8V low, 270 Ω , zero latency
 - External 10 MHz oscillator: Digital 40% to 60% or sine wave, 0.5 to 8Vp-p, >10k Ω
 - Oscillator Control Voltage: Jumper selectable 0-5VDC or 0-10VDC into 1k Ω
- On-board disciplined oscillator
 - Frequency: 10 MHz
 - 1, 5, or 10 MHz output: 5V HCMOS, >2V high, <0.8V low into 50 Ω
 - Stability:
 - Standard TCXO: 5.0E-8 short term 'tracking' 5.0E-7/day long term 'flywheeling'
 - Optional OCXO: 2.0E-9 short term 'tracking' 5.0E-8 /day long term 'flywheeling'
- Real-time clock (RTC)
 - Battery backed time and year information
- PCI local bus™
 - Specification: 2.2 compliant 2.3 compatible PCI-X compatible
 - Size: Single-width (4.2" x 6.875")
 - Device type: PCI Target, 32 bit, universal signaling
 - Data transfer: 8-bit, 32-bit
 - Interrupt levels: Automatically Assigned (PnP)
 - Power:
 - TCXO: +5V @ 800 mA
 - OCXO: +5V @ 900 mA, 1.2 A at start-up +12V @ 50 mA

- Connectors
 - GPS Antenna: SMB socket
 - Firmware update port: 6 pin, PS2 mini-DIN J2
 - Timing I/O: 15-pin 'DS' J1



Pin	Direction	Signal
1	input	External 10 MHz
2		Ground
3	output	Strobe
4	output	1 PPS
5	output	Time Code (AM)
6	input	External Event
7	input	Time Code (AM)
8		Ground
9	output	Oscillator Control Voltage
10	input	Time Code (DCLS)
11	output	Time Code (DCLS)
12		Ground
13	output	1, 5, 10 MHz
14	input	External 1 PPS
15	output	Heartbeat/DDS

- Complete specifications can be found in the manual located at <http://www.symmetricom.com>

ENVIRONMENTAL SPECIFICATIONS

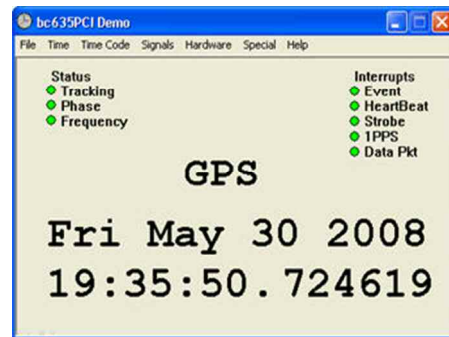
- Environment

	Module	GPS Antenna
Temperature:		
Operating:	0°C to 70°C	-40°C to 70°C
Storage:	-30°C to 85°C	-55°C to 85°C
Humidity:		
Operating:	5% to 95% non-condensing	100% condensing
Operating altitude:	Up to 18,000 meters MSL	
- Certifications: FCC, CE(RoHS)

SOFTWARE

- The bc637PCI-V2 includes the Symmetricom bc635pcidemo and bc637PCI GPS Demo application programs for Windows 2000/XP. Using this program you can review the bc637PCI-V2 card status and adjust board configuration and output parameters. Bc637pcidemo provides direct access to the GPS receiver used on the bc637PCI-V2 board. An additional clock utility program, TrayTime, is provided that can be used to update the Host computer's clock.

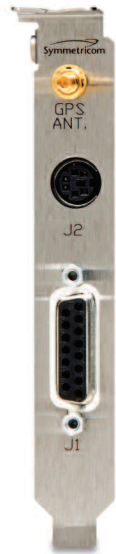
PRODUCT INCLUDES



- bc637PCI-V2 GPS synchronized Time & Frequency Processor board, L1 GPS antenna, 50' (15 m) Belden 9104 coaxial cable, 1 ft. antenna mounting mast (30 cm) with two clamps, one year warranty, PCI User's Guide CD, Windows software CD.

OPTIONS

- OCXO (oven controlled crystal oscillator) for extended holdover
- D' connector (J1) to BNC adapter
- SDK (Software Development Kit) for: Windows 2000/XP, Linux, Solaris (Contact factory for additional drivers)
- GPS antenna in-line amplifier for cable runs to 300' (90 m)
- GPS antenna down/up converter for cable runs to 1500' (457 m)
- Lightning arrestor



SYMMETRICOM, INC.
 2300 Orchard Parkway
 San Jose, California
 95131-1017
 tel: 408.433.0910
 fax: 408.428.7896
 info@symmetricom.com
 www.symmetricom.com