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Model GPS-VME

GPS Synchronized VME Plug-In Card

The Model GPS-VME is a 6U, VME compatible circuit card that supplies precise time to a VME-based computer. The GPS-VME operates as a stand-alone generator or it may be synchronized to either the GPS system or an external IRIG reference. BCD time, microseconds through years, is supplied to the computer bus. In the stand-alone mode, the generator time can be preset by the user and started and stopped under software control.

GPS time information and status is available to the VME computer bus in five, packed, 16-bit BCD words. Since no time ready flags must be set before time information can be read, the time data is available with zero latency. On-board DIP switches select the memory address space where the board resides.

Two independent time-freeze registers provide time on request from the VME bus, or in response to an externally generated pulse. The rate generator can be configured to output a pulse and produce interrupts at selected intervals. Four independently programmable interrupts are available and each has software selectable priority. The dual time compare feature can generate output pulses and interrupts with microsecond resolution. In the stand-alone mode, generator time is preset, started and stopped under software control.

The IRIG B code generator provides the capability to generate and output both 1 kHz amplitude modulated IRIG B and IRIG B using RS-422 levels. The code generator feature enables the GPS-VME to provide time code for remote displays, tape recorders, and other time code equipment in locations where IRIG B is not otherwise available.

The front panel display option provides time, date, position and operational status to the user. The display consists of four lines of high-intensity LED alphanumeric characters and a push-button select switch.

In a master/slave configuration IRIG B with RS-422 levels can be used to transfer time. The RS-422 format is useful when long cable runs and/or precise time transfer are required.

Specifications GPS-VME

GPS Synchronized Mode

Timing Accuracy: Less than 1 microsecond to UTC

Position Accuracy: 25 meters (without SA)

Receiver Input: 1575 MHz L1 C/A code

Tracking: 6 parallel channels

Internal Oscillator: $1x10^{-6}$, 0°C to +50°C

Aquisition Time: <20 minutes per initial aquisition, 5 minutes thereafter

Local Offset: ±12 hours

Antenna: A-1575MS-DSK. 1575 MHz, microstrip with 40 dB gain. All-weather, outdoor mounting. 100' cable supplied.

Synchronized Generator Mode

Analog Input Code: IRIG B

Ratio: 2:1 to 5:1
Amplitude: 0.1 to 10 Vpp
Impedence: 10k ohms to GND; DC shift (RS-422)
Timing Accuracy: 1 microsecond
Connector: BNC or P2

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RS-422 Input Code: IRIG B
Timing Accuracy: 500 nanoseconds
Connector: P2

Error Bypass: 3 frames

Stand-Alone Generator Mode

Generator time may be started, stopped, and preset to within 1 millisecond.

General Specifications

IRIG B Serial-Code Output (Analog):
Amplitude: Adjustable 0 V to 10 Vpp
Impedence: 10k ohms to ground
Ratio: Adjustable 2:1 to 5:1
Connector: Front panel BNC, P2

IRIG B Serial Code Outputs, Level Shift:
DC Shift: 0 V, 5 V @ ±6 mA
RS-422: RS-422, TTL levels
Connector: Both signals on P2 connector

Oscillator:
Accuracy: Disciplines to input code to $1x10^{-8}$
Stability: 1 PPM, 0°C to +50°C

1 PPS Pulse Rate:
Level: 0 V, 5 V @ ±6 mA
Timing: Positive going on time
Duty Cycle: 20%

Leap Year: Calculated automatically using year information

Programmable Pulse Rate Output:
Rates: Configured to produce interrupt and freeze time at selected rates (1 PPS, 10 PPS, 100 PPS, 1 kPPS, 10 kPPS)
Timing: Positive going
Level: 0 V, 5 V @ ±6 mA
Connector: P2

External Event Input:
Edge: Selectable rising or falling
Input Voltage: 0 V low, 2.5<5 Vdc high
Input Impedence: 4.7k ohms to 5 Vdc
Connector: BNC or P2
Resolution: Days through microseconds

External Generator Start Input:
Timing: Selectable positive or negative edge
Level: 0 V, 5 Vdc
Impedence: 4.7k ohms
Connector: P2

Dual Time Compare Output:
Outputs a pulse at the programmed compare time #1
Outputs a pulse at the programmed compare time #2
Resolution: Days through microseconds
Pulse Width: Two milliseconds
Compare Mask: Days through milliseconds
Outputs: On P2 connector
Level: Positive going at the respective compare time

Controls

The GPS-VME is configured as an A16/D16 slave board responding to the Address Modifier codes hex 29 (short nonprivileged) and hex 2D (short supervisory). The GPS-VME can be memory mapped on any 256-byte boundary of the VME bus short address space using the eight position DIP switch located on the board.

All controls are software selectable via the VME bus.

Data Format: Time of year and status are supplied to the VME bus in five packed, 16-bit, BCD words as follows:

Word 1 - Umsec	Husec	Tusec	Uusec
Word 2 - Tsec	Usec	Hmsec	Tmsec
Word 3 - Thours	Uhours	Tmin	Umin
Word 4 - Status	Hdays	Tdays	Udays
Word 5 - THyear	Hyear	Tyear	Uyear

Access Time: Falling edge of /DSA to falling edge of /DTAK is 400 ns

Interrupts: Each of the four independent interrupts can be configured to any of the seven priority levels. Available interrupt sources are:
INT0 - External event
INT1 - Programmed rate generator
INT2 - Programmed compare time #1
INT3 - Programmed compare time #2

Indicator LEDs: Phase lock and error status 1 PPS and power.

Environmental & Mechanical

Operating Temperature: 0°C to +50°C

Storage Temperature: -17°C to +85°C

MTBF: >23,000 hours (per MIL-HDBK-217-E)

Humidity: To 95%, noncondensing

Power: 5 V @ 1A (1.2 A with optional display)
12 V @ 50 mA
-12 V @ 50 mA

Size: Standard VME single-wide board (6U)

Antenna:
Mounting: 3/4" NPT pipe
Operating Temperature: -40°C to +70°C
Storage Temperature: -55°C to +85°C
Size: 2.6" x 1.5"
Weight: 1 lb. (.48 kg)

Options

- Optional LED Display: 4 lines, 16 characters. Time of year, date, mode, sync status, and self-test. Increases size to double-wide.
- VXI Converter Option: A VME-to-VXI adapter permits the VME-SG 2 to operate in a VXI environment. Full control of the VME-SG 2 is available, including access to the P2 connector signals. Please consult the factory for details.
- Input Codes: Various input formats such as IRIG A and MILA

Several other bus-level products meet a wide array of input and output code requirements. Contact TrueTime to identify the most appropriate product for your needs.

Specifications subject to change without notice.

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