Symmetricom

XL-DC/Mark V Options

You can customize the XL-DC and Mark V products by selecting option cards that suit your specific application needs. The matrix to the right identifies the major options that are available for each of these products. Additional minor options can be added. Contact Symmetricom for details.

	XL-DC	Mark V
Network Time Server	✓	✓
Telecommunications Interface	✓	✓
Frequency Measurement	✓	STD
Time Interval/Event Timing	✓	STD
FTM III Frequency & Time Monitor	✓	✓
Multicode Output	✓	✓
1, 5, 10 MHz/MPPS	✓	✓
PTTI Interface	✓	✓
Low Phase Noise Output	✓	✓
Network Interface	✓	✓
Loss of Lock Alarm	✓	STD
Programmable Pulse Output	✓	✓
Slow Code Output	✓	✓
Differential GPS	✓	✓
Video Time Inserter	✓	✓
N8 Frequency Synthesizer	✓	✓
IEEE-488 Interface	✓	✓
Parallel BCD (millisecond resolution)	✓	✓
Parallel BCD (microsecond resolution)	✓	✓
Have Quick II	✓	✓

Network Time Server
For XL-DC and Mark V

- Synchronize computer clocks over a network
- 1-10 millisecond typical client accuracy
- Time referenced to XL-DC or Mark V GPS clock
- SNMP Enterprise MIB support
- MD5 Security Protocol

Symmetricom's NTS Network Time Server distributes time to precisely synchronize client computer clocks over a network. Time is acquired from the host XL-DC/Mark V and distributed over the network using the Network Time Protocol (NTP). Client computer clocks can be synchronized to 1 to 10 milliseconds. Information on the health and status of the NTP server and the primary time synchronization source is available by using the SNMP protocol Enterprise MIB. Also, MD5 security protocol is included to authenticate NTP client-server communication.

The module shown above fits directly into the rear of the GPS-based XL-DC and Mark V and supports a 15-pin AUI network connector. Initialization of the NTS card is done via the standard RS-232 port or via the front panel keypad.

Specifications

NETWORK PROTOCOLS

- Network time protocol:
  - NTP (RFC 1305)
  - SNTP (RFC 1361)
  - TIME (RFC 868)
  - MD5 (RFC 1321)
  - SNMP v1 Enterprise MIB II
- Network transport protocol: UDP/IP
- Simple Network Management (SNMP): SNMP provides the network administrator with the NTP Time Server Protocol, network status, and statistics. This feature implements SNMP version 1 and Management Information Base (MIB) II.
- Network interface: UDP/IP (TCP/IP) Ethernet or IEEE 802.3; 15-pin AUI connector. Optional MAUs for 10Base-T and 10Base-2 support. The AUI supports 1640' connections while the 10Base-T and 10Base-2 support 328' and 607' respectively.
- Timing accuracy
  - Network: 1 to 10 milliseconds typical
  - GPS: <1 microsecond to UTC
- Internal oscillator: 10 MHz VCXO
  - Accuracy: Function of input synchronization source
  - Stability: 25 x10^{-6} over 0° C to +50° C when not externally synchronized

CLIENT SOFTWARE

- An NTP client/daemon is required for client-side synchronization with any network time server. Visit http://www.symmetricom.com for an extensive list of software time clients for various operating systems.

Telecommunications Interface
For XL-DC and Mark V

- Provides T1, E1 and status alarm outputs for network synchronization
- Composite clock, logic level, RS-422, and sine wave formats available.*

Specifications

FRAMED OUTPUTS

- Quantity 2 T1 or 2 E1s (specify at time of order).

  DS1 (T1): 1.544 Mbps framed all ones Superframe (D4) or Extended Superframe (ESF) user-selectable (D4 is the default).
  AMI (Alternating Mark Inversion) using B8ZS (Bipolar Eight Zero Substitution).
  Balanced 100Ω on wire-wrap pins.
  Alarm Indication Signal (AIS) is output as a function of the Major Alarm status.

  E1: 2.048 Mbps framed all ones output. 16-frame multiframe.
  AMI using HDB3 (High-Density Bipolar 3rd Order).
  Single-ended 75Ω on BNC, or 120Ω balanced on wirewrap pins.
  Alarm Indication Signal (AIS) can be enabled as a function of the Major Alarm status and user-selectable jumper.

- Logic level

  Number of drivers: Four (must specify at time of order)
  1, 5, 10 Mbps; 8, 64 kbps; 1.544/2.048 Mbps
  (1.544/2.048 Mbps is a function of T1/E1 option selection.)
  Balanced 100Ω RS-422 on wire-wrap pins or single-ended TTL into 50Ω on BNC.
  Outputs can be disabled as a function of the Major Alarm status and user-selectable switch.

- Analog sine wave: Four drivers (must be specified at time of order).
  1, 5, 10 MHz, 1.544/2.048 MHz (1.544/2.048 MHz is a function of T1/E1 option selection.)
  Single-ended 50 or 75Ω on BNC or 120Ω balanced on wirewrap pins.
  Outputs can be disabled as a function of the Major Alarm status and user-selectable switch.

- Composite clock: 64 kbps and 8 kbps
  Bipolar return to zero (BRTZ). Balanced 135Ω on wirewrap pins.
  Outputs can be disabled as a function of the Major
  Alarm status and user-selectable jumper.
  Adding the Composite Clock option reduces the Logic Level/Analog Drivers to three.

- Status: RS-232 I/O
- Alarms: Major and minor, 2A Form C relay contacts on wirewrap pins.

* Formats must be specified at time of order.

Frequency Measurement
For XL-DC and Mark V

The Frequency Measurement option provides the ability to precisely measure the frequency of an externally applied 1, 5, or 10 MHz signal. Measurement resolution to UTC is better than 6 x 10^{-11} with only a 1-second averaging time. It supports a periodic, zero dead-time mode of operation as well as a single-shot, measurement-on-demand mode. The measurement interval can be specified in integer seconds over the range of 1 to 100,000 seconds. Frequency measurement results appear on the front panel display and are output via the communication port.

Specifications

INPUT FREQUENCIES

- Keypad selectable frequencies of 1, 5, 10 MHz.

  Input Level: 1.0 to 10 Vpp
  Input Impedance: 1kΩ, jumper selectable to 50Ω
  Measurement Range: ±1 x 10^{-5} maximum offset; compares the external frequency under test directly to the clock's disciplined oscillator
  Resolution: 1 MHz, 5 MHz, 10 MHz

  $6x10^{-11}$ at 1 second
  $6x10^{-13}$ at 100 seconds
  $6x10^{-14}$ at 1000 seconds

- Accuracy: These specifications are subject to change depending on the specific oscillator installed in the GPS receiver.*

  TCXO

  $1x10^{-9}$ at 1 second
  $3x10^{-10}$ at 100 seconds
  $1x10^{-12}$ at 1 day

  Ovenized quartz

  $1x10^{-10}$ at 1 second
  $3x10^{-10}$ at 100 seconds
  $1x10^{-12}$ at 1 day

  High-stability quartz

  $1x10^{-11}$ at 1 second
  $1x10^{-11}$ at 100 seconds
  $1x10^{-12}$ at 1 day

  Rubidium

  $3x10^{-11}$ at 1 second
  $1x10^{-11}$ at 100 seconds
  $1x10^{-12}$ at 1 day

Time Interval/Event Timing
For XL-DC and Mark V

TIME INTERVAL

The Time Interval function provides the user with the ability to precisely measure the interval between the time of occurrence of the clock-derived 1 Hz reference pulse and the rising edge of the user-supplied 1 Hz pulse.

EVENT TIMING

The Event Timing feature offers the capability of locating the time of occurrence of the rising edge of the applied pulse with respect to the time of year. Continuous timing of up to approximately 100 events per second is available in the "burst" mode. The collected data is available via the RS-232 port.

Specifications

INPUT REQUIREMENTS

- Rate: 1 PPS
- Amplitude: TTL low–TTL high
- Active edge: Rising
- Pulse width: 100 nanoseconds minimum
- Input impedance: >1kΩ, jumper selectable to 50Ω

TIME INTERVAL FEATURE

- Measurement

  Rate: 1 per second
  Resolution: 30 nanoseconds
  Accuracy: ±30 nanoseconds (+ clock accuracy**)
  Range: 0.0 to 0.999, 999, 99

- Display: Time into the second, updated once per second, is displayed to the nanosecond until another event occurs or until the "TIME", "STATUS", or "POSITION" push-button is pressed.

EVENT TIMING FEATURE

- Measurement

  Rate: 10/second or 100/second burst
  Resolution: 30 nanoseconds
  Accuracy: ±30 nanoseconds (+ clock accuracy**)
  Range: 0.0 to 1 year in 30-nanosecond increments

- Display: Event Time occurrence, hundreds of days through nanoseconds, is displayed until another event occurs or until the "TIME", "STATUS", or "POSITION" push-button is pressed.

* For oscillator information, refer to Symmetricom's oscillator datasheet.

** For clock accuracy see accuracy of host unit.

FTM III Frequency & Time Monitor

For XL-DC and Mark V

This plug-in card meets the specific needs of the electrical power industry. It provides a digital display and computer-compatible outputs of the following parameters:

- Frequency Deviation – The instantaneous difference between the locally generated frequency (typically 50 or 60 Hz) and the precision frequency of the host Synchronized Clock.
- System Frequency – The user's locally generated frequency.
- Time Deviation – The accumulated difference in time between a clock locked to the locally generated frequency and the precise time of the Synchronized Clock.
- System Time – (Hours, minutes and seconds) as defined by a clock running off the user's locally generated frequency.
- Local Time – Local corrected UTC time seconds through days.

Both the display port and the communication port have user-selectable baud rates, parity and the number of data bits and stop bits.

The monitored frequency and time deviation values are available via the front panel display(s), the communication port, and the remote display driver RS-422 port.

Displays for XL-FTM III

MODEL	SIZE	DISPLAY DATA*
820-247	RD-2	Local Time HH:MM:SS
820-240	RD-4	System Frequency
820-258	RD-4	Delta Frequency
820-259	RD-4	Delta Time
820-260	RD-4	System Time
820-261	RD-4	Local Time
820-251	RD-1	Delta Time
820-251-1	RD-1	Delta Frequency
820-251-2	RD-1	System Frequency

Specifications

GENERAL SPECIFICATIONS

- Measurement input: 95–260 Vac, 40–70 Hz; user-selectable 50 or 60 Hz operation.
- Signal conditioning: RFI input filter; multistage low-pass filter. Line fused; varistor protected 2500 Vac rms isolation. Transformer coupled.
- Remote display port: RS-422. Each output term has individual address codes.

FREQUENCY DEVIATION

- Current deviation of the measurement input frequency from the nominal frequency (50 or 60 Hz).Measurement Sample Rate: 1 sample per second

  Range: ±9.999 Hz
  Measurement resolution: 30 µHz
  Output data resolution: Resolution to 1 mHz

TIME DEVIATION

- Accumulated time drift due to user's local frequency difference as compared to the host clock. The user can enter an initial time offset.

  Measurement sample rate: 1 sample per second
  Range: ±99.999 seconds
  Measurement resolution: 500 nanoseconds
  Output data resolution: 1 millisecond
  Time offset input: ±99.999 seconds maximum. Entry via keypad or communication port.

SYSTEM FREQUENCY

- Current measurement of input reference frequency.

  Range: 50 Hz nominal, 40.000 Hz to 59.999 Hz
  60 Hz nominal, 50.000 Hz to 69.999 Hz

  Measurement Resolution: 30 µHz
  Output Data Resolution: 1 mHz

SYSTEM TIME

- Arithmetic value calculated from local time, plus user-entered offset, plus time deviation.

OPTIONS

- Analog output: Current time deviation and frequency deviation in analog output format. ±5 V or 0–10 V full scale. Data ranges are user selectable.
- Parallel output: Time deviation and frequency deviation. Local time (UTC time).

* Input to displays are from FTM III serial display port. FTM displays are not driven from time codes such as IRIG B, etc.

Multicode Output
For XL-DC and Mark V

- Programmable formats
- Up to four carrier outputs
- Carrier outputs can be time codes or sine waves
- Up to four DC shift outputs
- DC shift outputs can be pulse rates or time codes
- Optional synchronized generator code input

Select the various time code formats by using the front panel keypad and display (XL and Mark V units). The currently available time code format menu contains IRIGs A, B, E, G, H, XR3/2137 and NASA 36. Sine waves of 100 kHz, 10 kHz, 1 kHz, 250 Hz and 100 Hz can replace the modulated time codes. The DC Shift code outputs can be replaced by pulse rates of 1 kPPS, 100 PPS, 10 PPS and 1 PPS.

An optional input port allows the host clock to operate in the synchronized generator mode using IRIG-B as the reference code input.

Specifications

- Amplitude modulated carrier and DC Shift outputs are paired:
  Amplitude into 600Ω: 0 V to 10 Vpp
  Amplitude into 50Ω: 0 V to 3 Vpp (3 Vpp as shipped)
  Ratio: 2:1 to 5:1 (3:1 as shipped)
  Connector: BNC
  DC shift code outputs and pulse rate: RS-422 0 V to >+2.5 Vdc into 100Ω.
  Can be used as single-ended TTL. Pulse rates have 50% duty cycles.
  Connector: DB9 or BNC or TRIAX (optional, two card slot solution).

AVAILABLE PULSE RATE OUTPUTS

- 1 kPPS, 100 PPS, 10 PPS, 1 PPS (A pulse rate replaces a DC Shift code output and the respective carrier output is zero.)

AVAILABLE FREQUENCY OUTPUTS

- 100 kHz, 10 kHz, 1 kHz, 250 Hz, 100 Hz (A reference frequency output replaces a modulated carrier output and the respective DC Shift output is set to zero.)

XL-DC AND MARK V CONFIGURATIONS

- Standard configuration: Occupies one card slot. Four modulated carrier outputs.
- Option 1: Occupies one card slot. Two modulated carrier outputs. Four DC Shift outputs on DB9.
- Option 2: Occupies two card slots. Four modulated carrier outputs. Four DC Shift outputs on BNC connector.
- Option 3: Occupies two card slots. Four modulated carrier outputs. Four DC Shift outputs on triax connectors.

OPTIONS

- DC shift outputs can be specified to be single-ended, >2.5 Vdc into 50Ω. For other output combinations, consult factory.
- IRIG B synchronized generator code input

1, 5, 10 MHz/MPPS
For XL-DC and Mark V

The 1, 5, 10 MHz/MPPS Output option* provides you with three precise sine wave or square wave outputs. These outputs are phase locked to the host receiver's disciplined reference oscillator. They are automatically enabled upon power-up with no configuration setup required.

Specifications

1 MHz, 5 MHz OUTPUTS
- Amplitude: 1 Vrms into 50Ω
- Harmonic distortion: -50dBc
- Accuracy: The accuracy of the host's reference oscillator
- Connector: BNC

10 MHz OUTPUTS
- Amplitude: 1 Vrms into 50Ω
- Harmonic distortion: -40dBc
- Accuracy: The accuracy of the host's reference oscillator
- Connector: BNC

1 MPPS, 5 MPPS, 10 MPPS OUTPUTS
- Amplitude: TTL into 50Ω
- Duty cycle: 50%
- Accuracy: The accuracy of the host's reference oscillator
- Connector: BNC

* User specifies at time of order either MHz outputs or MPPS outputs

PTTI Interface
For XL-DC and Mark V

This option provides a precise BCD time code output and both 1 PPS and 1 PPM outputs.

The BCD code contains 40 bits of UTC time of day plus the TFOM (Time Figure of Merit). For compatibility with older equipment, a jumper may be placed to remove the TFOM and day of year information.

A second, identical PTTI port, including its companion 1 PPS and 1 PPM pulse rate outputs, may be added as an extra-cost option at the time of order.

Applications include military timing and communications systems.

Specifications

BCD TIME CODE
- Data: 40-bit serial BCD output containing seconds through days data plus TFOM. The TFOM and day of year information may be deleted using a jumper. The data and TFOM formats conform to ICD-GPS-060.
- Output: ±5 V differential. Complies with ICD-GPS-060 and MIL-STD-188-114A, Type I generator. Can be configured as a Type II generator at the time of order.
  Connector: MS3470L8-33S

1 PPS TIME ROLLOVER PULSE
- Output: 10 Vdc, ±1 V into 50Ω
- Pulse width: 20 microseconds, ±1 microsecond
- Rise time: <20 nanoseconds
- Fall time: <1 microsecond
- Connector: BNC

1 PPM TIME SYNCHRONIZATION SIGNAL
- Output: 10 Vdc, ±1 V into 50Ω
- Pulse width: 20 microseconds, ±1 microsecond
- Rise time: <20 nanoseconds
- Fall time: <1 microsecond
- Connector: BNC

MECHANICAL
- Panel space: Requires two vertical slots in XL-DC and Mark V chassis for 2 PTTI channels.

Low Phase Noise Output
For XL-DC and Mark V

This option provides three or four* isolated, 50 ohm frequency output signals with exceptional spectral purity. Isolation from the receiver's internal digital signal noise and power supply noise enables the same high-performance phase noise and spurious noise characteristics as the oscillator source.

Oscillator selection for the XL-DC or Mark V Receivers can include the Symmetricom Standard Quartz, High-Stability Quartz, Rubidium, or a user-supplied external oscillator.

Contact Symmetricom for specific oscillator performance characteristics.

Specifications

LEVEL
- 1 Vrms ±10% into 50Ω

CONNECTOR*
- Rear panel BNC. Three or four connectors for 5 MHz or 10 MHz output*; three connectors for 1, 5, 10 MHz output.

WAVEFORM
- Sine, harmonics <-30dBc

OPTIONS
- Low phase noise option (5 MHz or 10 MHz):

SSB Phase Noise: f	Standard Quartz Osc. £(f)	High-Stability Quartz Osc. £(f)	Rubidium Oscillator £(f)
1 Hz	-80dBc	-90dBc	-85dBc
10 Hz	-110dBc	-120dBc	-105dBc
100 Hz	-125dBc	-140dBc	-130dBc
1000 Hz	-130dBc	-145dBc	-135dBc
10000 Hz	-130dBc	-145dBc	-140dBc

All specifications are measured at the Low Phase Noise Option card output.

- Spurious:

30 Hz <f<300 Hz	-100dBc	-115dBc	-110dBc
300 Hz <f<3000 Hz	-90dBc	-125dBc	-125dBc
3000 Hz <f<25000 Hz	-90dBc	-100dBc	-90dBc

* Connector quantity; 10 MHz output or 1, 5, & 10 MHz outputs and oscillator selection must be specified at time of order.

Network Interface
For XL-DC and Mark V

- Remote control of XL-DC/Mark V over a local network or the Internet
- Telnet protocol

The Network Interface provides remote control of the XL-DC or Mark V over a local network or the Internet. Supported protocols include Telnet and DHCP. The plug-in card supports an autodetecting 10/100 Base-T Ethernet connection and an RS-232 port.

Using Telnet, users can remotely check the status and/or configure the XL-DC/Mark V receiver over a network. This capability can be a tremendous time–and labor–saving resource when the receiver is not readily accessible or when it is inconvenient to attach a computer for local RS-232 operation. Most operations possible via the standard XL-DC/Mark V RS-232 port are also available via Telnet. Command syntax is the same for both interface modes. Password protection is provided to maintain secure access to the unit.

DHCP (Dynamic Host Control Protocol) is built into the Network Interface Card. An XL-DC or Mark V equipped with the Network Interface card can automatically be configured with network address information when connected to a network that has a DHCP server in operation.

The Network Interface option is installed at time of order and replaces the standard RS-232 port on the XL-DC/Mark V. Due to the nature of the interface, the precision RS-232 time strings are disabled. Time to the second is still available via RS-232 or Telnet.

Specifications

NETWORK INTERFACE
- Autodetecting: 10/100Base-T (Ethernet, TCP/IP)
- Network protocols: Telnet, DHCP
- Serial I/O: Bidirectional RS-232, 9600, N, 8, 1

Loss of Lock Alarm
For XL-DC and Mark V

The Loss of Lock Alarm output provides a signal to external monitoring equipment when the receiver has lost lock on the GPS system. Corrective action can then take place whether it is automatic or manual in nature. Two versions of the option are available. The first provides an open collector type impedance output and is supplied via a rear panel BNC. The second provides relay contact outputs and is supplied via a plug-in option card.

Specifications

OPEN COLLECTOR ALARM

- Normal operation: Low impedance
- Fault condition: High impedance
- Max voltage: 25 Vdc
- Max current: 50 mA
- Connector: BNC

RELAY CONTACT ALARM

- Contact ratings
  - Max Resisting Load: 60 VA
  - Max Switching Voltage: 150 Vdc
  - Max Switching Current: 2.0 A
  - Max Carry Current: 2.0 A
- Connector: NO, NC and COM provided on barrier strip
- Physical: One slot plug in card for XL-DC/Mark V chassis only

Programmable Pulse Output
For XL-DC and Mark V

The Programmable Pulse Output option is a software option that provides a user configurable HCMOS pulse output that can be used to supply a precisely synchronized "trigger" pulse at specific times or provide periodic pulse outputs. The rising edge of the trigger output may be programmed with millisecond resolution for fine control. The periodic pulse rates achievable are 1 PPS, 1 PP 10 SEC, 1 PPM, 1 PP 10 MIN, 1 PPH, 1 PP 10 HR, 1 PPD, 1 PP 10 DAYS or 1 PP 100 DAYS. The pulse width is also adjustable. The pulse amplitude is TTL levels into 100 ohms and is supplied via a rear panel BNC.

Video Time Inserter
For XL-DC and Mark V

The Video Time Inserter option allows you to easily super-impose time of year data (down to the millisecond) on the input composite video signal. Up to three independent channels are supported by a single circuit board. An on-screen video menu allows you to adjust the various features such as character size, position and intensity. An optional input port allows the host instrument to operate in the synchronized generator mode using IRIG B as the reference code input.

Specifications

VIDEO TIME INSERTER (EACH CHANNEL)
- Format: Composite video, RS-170/A
- Input connector(s): SMB or SMC
- Output connector(s): SMB or SMC
- Input impedance: 75Ω or 75kΩ (selectable)
- Output impedance: 75Ω
- Input level: 1 Vpp into 75Ω
- Output level: 1 Vpp into 75Ω (2 Vpp into open)

OPN-SCREEN MENUS
- Video channel select
- Video output(s): On/Off
- Interlaced: Odd/Even
- Character intensity: White to black
- Video background: White to black
- Days digits: On/Off
- Fractional seconds: One-tenths-hundredths-milliseconds
- Character Size: 18-36-54-72 lines
- Horizontal position
- Vertical position

CONTROLS
- Keypad and arrow keys on the XL-DC/Mark V

SIZE
- Standard 160 mm Eurocard using 62-pin DIN connector

PANEL SPACE
- Requires one vertical slot in XL-DC or Mark V chassis for one VTI channel.
- Uses two vertical slots for two or three VTI channels.
- XL-DC or Mark V supports 3 VTI cards, 9 VTI channels total in a 3.5-inch chassis.

OPTIONS
- IRIG B synchronized generator code input

IEEE-488 Interface
For XL-DC and Mark V

The IEEE-488 Interface option is a versatile byte-wide communication port that provides precise time on demand and remote control of most clock functions. This option is electrically and mechanically compatible with the IEEE-488 Standard 488-1978.

The IEEE-488 interface codes listed below fully define the interface capabilities. Full descriptions of these functions are included in the IEEE Standard 488-1978.

Interface Codes

SH1	Source Handshake	Full capability
AH1	Acceptor Handshake	Full capability
T8	Talker	Basic talker, serial poll unaddress if MLA (My Listen Address)
L4	Listener	Basic listener, unaddress if MTA (My Talk Address)
SR1	Service Request	Full capability
RL0	Remote Local	No capability
PP2	Parallel Poll	Local configuration
DC1	Device Clear	Full capability
DT1	Device Trigger	Full capability
C0	Controller	No capability
E1	Driver Electronics	Open collector

Specifications

NETWORK PROTOCOLS

- The time output format is as follows:

  <SOH>DDD:HH:MM:SS.tttQ<CR><LF>

DDD	Day of year (three digits)
HH	Hours (two digits)
MM	Minutes (two digits)
SS	Seconds (two digits)
ttt	Milliseconds (three digits)
Q	Time quality (one digit); estimate of time base drift after loss of signal lock. Specific trip points are user configurable.

  <CR> and <LF> are ASCII control characters.
  <SOH> is an ASCII start of header.
  ":" and "." are ASCII delimiters.
- You can address additional functions using a simple command syntax of the form:

  F<xx><data><CR><LF>
  F<xx> "F" followed by the function number
  <data> You can enter data to modify a function value. If you do not enter data, the current function value is returned.
  <CR> and <LF> are ASCII control characters.
- Data transfer rate: Maximum transfer rate for a 19-character string (such as the Time string) is 1 millisecond.
- Command functions: Bidirectional control of all applicable receiver functions.
- Software input time freeze: Time resolution is to 1 millisecond.
- Hardware input time freeze: TTL level, positive edge causes the time to be latched. Input is latched until time transfer is completed. Time resolution is to 1 microsecond. BNC input connector on rear panel of IEEE option plug-in.

Slow Code Output
For XL-DC and Mark V

The Slow Code Output option provides up to three pulse outputs primarily for initiating timing marks for drum or strip chart recorders. The available output pulses are 1 PPM, 1 PPH, 1 PPD. Each pulse's rising edge is aligned to within a few nanoseconds of the receiver's 1 PPS signal. The output levels are TTL levels into 100 ohms via a rear panel BNC. The pulse widths can be adjusted from 1 to 59 seconds.

Differential GPS
For XL-DC and Mark V

The Differential GPS option is an upgrade to the internal GPS receiver that allows it to utilize external differential GPS input (data format is RTCM-104) in order to augment its GPS solution. The RTCM-104 data is transmitted to the receiver via the unit's RS-232 interface.

Specifications

OPEN COLLECTOR ALARM

- Baud rate: 19200, 9600, 4800, 2400, 1200, 600 or 300
- Data bits: 7 or 8
- Parity: Even, odd or non
- Stop bits: 1 or 2
- Connector: 9-pin D-subminiature*

N8 Frequency Synthesizer
For XL-DC and Mark V

The N8 Frequency Synthesizer provides pulse rates from 8 kPPS through 8192 kPPS in 8 kPPS steps, with the output frequency locked to the system oscillator. This option card offers four independently programmable frequency synthesizers that provide pulse rates from 8 kPPS through 8192 kPPS in 8 kPPS steps.

Specifications

- Channels per PCB: 4, independently programmable
- Input reference frequency: System 1 MPPS
- Output pulse rates: 8 kPPS through 8192 kPPS in 8 kPPS steps
- Output drive: RS-422 or single ended TTL into 50Ω (factory set)
- Wave form: Square wave
- Jitter cycle-to-cycle <10ns
- Output connector Options: Triax, Wire-wrap, 9 pin-D, BNC

Parallel BCD

Millisecond and Microsecond Resolution

The parallel BCD time output option provides an interface to synchronize external pieces of equipment. There are two versions of this option. The first version provides 42 output lines with hundreds of days through units of milliseconds. In addition it provides four time quality lines and two data valid strobes.

The second version provides 12 additional lines to cover hundreds of days through units of microseconds. It also provides one additional data valid strobe.

The millisecond resolution version requires one XL-DC/Mark V option card slot, while the microsecond version requires two slots.

Specifications

OUTPUTS

- Millisecond version: ms through day-of-year, (4) time quality bits, 1 PPS strobe and 1 kPPS strobe.
- Microsecond version: µs through day-of-year, (4) time quality bits, 1 PPS strobe, 1 kPPS strobe and 1 MPPS strobe.
- Drive: +5 Vdc at HCMOS levels

PHYSICAL

- Millisecond version: 1-slot card with 50-pin D connector. Mating connector provided.
- Microsecond version: 2-slot card with 50-pin D connector and 25 pin D connector. Mating connector provided.

Have Quick II

The Have Quick II option provides time of day, day of year and year in the Have Quick II format conforming to ICD-GPS-060. Have Quick II output is used to synchronize military radio systems.

Specifications

- Format: Have Quick II (ICD-GPS-060)
- Bit period: 600µs ±10µs
- Bit rate: Approximately 1667 BPS
- Output level: HCMOS (standard) on RS-422 (optional)
- Frame rate: 1 frame/second
- Frame length: 504 Bits
- Accuracy: First bit starts within 10 µs of leading edge of 1 PPS
- Connector: Isolated female BNC

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