StarSync 5850

GPS Stratum 1 DS1 Primary Timing Reference Source

Highlights

- **Can be used as a Stratum 1 Primary Reference Source in front of existing BITS (Building Integrated Timing System) clocks already deployed in the network**
- **Uses a GPS constellation to synthesize accurate DS1 references for use by existing BITS clock systems, SONET Network Elements (NEs), Intelligent Multiplexers, Personal Communications Service (PCS) System, and other equipment requiring synchronization**
- **Quartz or rubidium reference oscillator for removal of Selective Availability (S/A) and Jitter from outputs**
- **Outputs:**
  (4) DS1 outputs
  Synchronization Status Messaging per GR-378
  D4 or ESF Framing
  (4) RS-422 1.544MHz Square wave
  (2) Sine wave outputs, 5 or 10MHz
  (2) 2.048MHz Square wave
  (2) 64Kbps Composite Clock (CC)
  (1) 1 PPS (one pulse per second)
  (1) Time of Day Output
  (10) IRIG-B (Optional, see Specifications)
- **Antenna, 50 feet of coax to receiver (with built-in Low Noise Amplifier (LNA) included**
- **RS-232D and Ethernet Information Management Ports**
- **Performance or monitoring through TL-1 or menu**
- **Local indicators and pushbuttons for operational verification**
- **24/48 VDC A & B power inputs, + or - ground**
- **19-inch (48.3cm) or 23-inch (58.4cm) Rack mount**
- **Ethernet TCP/IP Interface**

The CXR Larus StarSync 5850™ Stratum 1 DS1 GPS Primary Timing Reference Source receiver represents an optimal solution to the problem of local synchronization for the new distributed network. By utilizing GPS Universal Time Coordinated (UTC) information to measure an ultra stable ovenized reference oscillator, or the optional rubidium reference oscillator, the information derived by Least Means Squares Estimation (LMSE) and Kalman filtering is used to develop a frequency connection by means of a 48 bit Direct Digital Frequency Synthesizer (DDFS). The outputs have less than 150nS of Maximum Time Interval Error (MTIE) over 1000 seconds for the crystal based reference and less than 5nS of MTIE over 1000 seconds for the rubidium based receiver. All outputs comply with Bellcore Technical Reference GR-2830-CORE and ANSI T.101/1997.

The StarSync 5850 is fully connectorized so that removal and replacement may be accomplished in minutes. Ethernet and RS-232D interfaces allows for network management, as well as local troubleshooting and performance information gathering. Outputs are used to time BITS clocks, SONET NEs or other equipment requiring synchronization.

Benefit: ***PRC performance at a greatly reduced cost over a Cesium Beam Reference***

Specifications

PHYSICAL

Nominal Input Power:	24/48 VDC, +/- ground
Input Voltage Power:	±20 VDC to ±57 VDC
Dimensions (W x D x H):	17-in (43.2cm) X 10-in (25.4cm) X 3.5-in (8.9 cm)
Weight:	10 lbs (4.54 kg)
Standards:	Meets Bellcore NEBS TR-EOP-000063 and 1089
Connectors:	Output connections on 25-pair telco style ribbon connector

ENVIRONMENTAL

Operating Temperature:	32° to 131°F (0° to 55°C) Slew rate not to exceed 8°C per hour
Storage Temperature:	-40° to 167°F (-40° to 75°C)

RELATIVE HUMIDITY

Humidity:	0% to 95%, noncondensing

BRIDGING (HOLDOVER) OSCILLATOR (Stratum 2)

Rubidium Oscillator:	Exceeds ANSI T.101/1997 and Bellcore GR-2830 specs
Holdover Drift (after 1 month stabilization):	$<7.50 \times 10^{-11}$ in one day over ±5°C temperature range $<1 \times 10^{-10}$ in one month over ±5°C temperature range
Traceability:	$<1 \times 10^{-11}$

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BRIDGING (HOLDOVER) OSCILLATOR (Stratum 3E)

Ovenized Crystal Oscillator: Exceeds ANSI T.101/1997 and Bellcore GR-2830 specs
Holdover Drift: <5 x 10^{-9} in one day over 50°F (±10°C) temperature range

ALPHANUMERIC DISPLAY
Scrolls alarm status, when no alarms, displays date and time

ALARM REPORTING
Autonomous alarm reports when selected thresholds are exceeded
LED indicators for thresholds exceeded
Local alarm contacts (major/minor)
Through TCP/IP Interface

COMMUNICATION PORTS
EIA RS-232D for local access by a terminal
EIA RS-232D for remote access, supporting standard modem control leads
Ethernet: 10Base-T, TCP/IP Protocol

Message formats (either of the following):
Lists 7, 11 and 15 Menu Screens
Lists 6, 10 and 14 Transaction Language 1 (TL-1)

ALARM OUTPUTS
Four floating relay contact closures (form A) for summary major, minor, audible, and visual alarms
Major alarms: GPS unacceptable
> 2 weeks for TNC unacceptable
> 24 hours for LNC

OR Clock loss of output
OR Outputs in alarm

Minor alarms: GPS degraded or unacceptable

ALARM RELAY CONTACT RATINGS
1 A @ 220 VAC or VDC max

CONTROLS
ACO push-button: Disables audible alarm relays but not front indicators. Auto reset on next alarm.

OUTPUTS
(4) DS1 Drivers- **(ALL MODELS)**
Output Signals: DS1 framed all ones, D4 or ESF framing

Output Load Impedance: 100 ohms, resistive
Output Pulse Amplitude: 3 V ±0.3 V peak; AT&T CB-119 and CCITT G.703 requirements

Synchronization Status Messaging (SSM) per GR-378

(4) RS-422 DRIVERS- **(5850- 6 thru -11 ONLY)**
Output Signals: 1.544MHz square wave, true and complement
Output Load Impedance: 100 ohms, nominal
Output Pulse Amplitude: EIA RS-422 specifications

(2) SINE WAVE (BNC conn [female])-- **(ALL MODELS)**
5MHz sine wave: 1 volt Rms ±10%, 50 ohms,
OR
10MHz sine wave: 1 volt Rms ±10%, 50 ohms

(2) COMPOSITE CLOCK- **(5850- 6 thru -11 ONLY)**
64Kbps 5/8 duty cycle pulses, Waveform meets CCITT G.703 Standard
Outputs are synchronized with DS1 output training
Output Load Impedance is 133 ohms, ±5%

(2) 2.048MHz SQ WAVE- **(5850-6 thru-11 ONLY)**
Meets CCITT G.703 Standard
Output Load Impedance is 120 ohms, ±5%

ONE PULSE PER SECOND OUTPUT- **(ALL MODELS)**
Pulse leading edge to correlated UTC to 1ms
Exceeds the Bellcore GR-2861 specification
TTL output to BNC connector

TIME OF DAY OUTPUT- **(ALL MODELS)**
RS-232 level, ASCII, 9600 Baud, 8 bits, no parity, one stop bit RJ-11 Connector. Issued every 10 sec. 1ms accuracy to UTC

(10) IRIG-B OUTPUTS- **(5850-14 and -15 ONLY)**
Meets IRIG Standard 205-87
Output connector is standard 50 pin telco.
Optional adapters are availble (contact factory)

CERTIFICATION (COMPLIANCE/REGULATORY)
FCC Part 15 Class A, UL 1459, NEBS Level 3 Certified, GR-63,1089, Bellcore GR-2830

Ordering Configurations:

Model	Description
5850-6	GPS DS1 Primary Reference Source with Stratum 2 Bridging, TL-1, (Rubidium oscillator)
5850-7	GPS DS1 Primary Reference Source with Stratum 2 Bridging, Menu, (Rubidium oscillator)
5850-10	GPS DS1 Primary Reference Source with Stratum 3E Bridging, TL-1, (OCXO)
5850-11	GPS DS1 Primary Reference Source with Stratum 3E Bridging, Menu, (OCXO)
5850-14	GPS DS1 PRS with Stratum 2 Bridging, TL-1, 10 IRIG-B outputs (Rubidium oscillator)
5850-15	GPS DS1 PRS with Stratum 2 Bridging, Menu, 10 IRIG-B outputs (Rubidium oscillator)