



# 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 1.544 MHz Square wave
  - (2) Sine wave outputs, 5 or 10MHz
  - (2) 2.048 MHz Square wave
  - (2) 64/8 Kbps Composite Clock (CC)
  - (1) 1 PPS (one pulse per second)
  - (1) Time of Day Output
- Antenna, 50 feet of coax to receiver (with built-in Low Noise Amplifier (LNA) included
- RS-232 and Ethernet Information Management Ports
- Performance or monitoring through TL-1 or Menu, software selectable. Now both available in one version!
- 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

The CXR Larus StarSync 5850™ Stratum 1 DS1 GPS Primary Timing Reference Source 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.

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The StarSync 5850 is fully connectorized so that removal and replacement may be accomplished in minutes. Ethernet and RS-232 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.

### The Benefit:

*“True 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
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#### BRIDGING (HOLDOVER) OSCILLATOR (Stratum 2)

Rubidium Oscillator:	Exceeds ANSI T.101/1997 and Bellcore GR-2830 specs
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Holdover Drift (after 1 month stabilization):	<7.50 x 10 <sup>-11</sup> in one day over ±5°C temperature range
	<1 x 10 <sup>-10</sup> in one month over ±5°C temperature range

Traceability:	<1 x 10 <sup>-11</sup>
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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 <sup>-9</sup> in one day over 50°F (±10°C) temperature range

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# CXR Larus StarSync 5850

## 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-232 for local access by a terminal

EIA RS-232 for remote access, supporting standard modem control leads

Ethernet: 10Base-T, TCP/IP Protocol

Message formats (Software selectable): Menu or TL1

## 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-

Output Signals: DS1 framed all ones, D4 or ESF framing. SSM available on ESF format only

Output Load Impedance: 100 ohms, resistive

Output Pulse Amplitude: 3 V  $\pm$ 0.3 V peak; AT&T CB-119 and CCITT G.703 requirements

Synchronization Status Messaging (SSM) per GR-378

(4) RS-422 DRIVERS-

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])--

5MHz sine wave: 1 volt Rms  $\pm$ 10%, 50 ohms,

OR

10MHz sine wave: 1 volt Rms  $\pm$ 10%, 50 ohms

(2) COMPOSITE CLOCK-

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,  $\pm$ 5%

(2) 2.048MHz SQ WAVE-

Meets CCITT G.703 Standard

Output Load Impedance is 120 ohms,  $\pm$ 5%

ONE PULSE PER SECOND OUTPUT-

Pulse leading edge to correlated UTC to 1ms

Exceeds the Bellcore GR-2861 specification

TTL output to BNC connector

TIME OF DAY OUTPUT-

RS-232 level, ASCII, 9600 Baud, 8 bits, no parity, one stop bit, RJ-45 Connector. Issued every 10 sec. 1ms accuracy to UTC

## CERTIFICATION (COMPLIANCE/REGULATORY)

FCC Part 15 Class A, UL 1459, NEBS Level 3

Certified, GR-63,1089, Bellcore GR-2830

## Ordering Configurations:

Model	Description
5850-21	GPS DS1 Primary Reference Source with Stratum 2 Bridging, (Rubidium oscillator)
5850-23	GPS DS1 Primary Reference Source with Stratum 3E Bridging, (OCXO)