



StarClock TiemPo 6400

NextGen Synchronization Timing System

The New Standard for the Converged Network

VoIP TDM IPTV SONET SDH PSTN



Phone shown for size comparison only

Product Highlights

- Highest output port density per rack space of any BITS Clock of its size. The TiemPo is only 2U high (3.5 in, 89 mm) for the ANSI version Master shelf
- Accepts up to 2 software configurable synchronization inputs of T1, Composite Clock (CC), E1, or 2.048 MHz squarewave, or (1) 5/10 MHz Sinewave
- Stratum 1/Primary Reference Clock (PRC) with, Stratum 2E/Transit Node Clock (TNC), or Stratum 3E/Local Node Clock (LNC) holdover options, or as Clock Distributor only
- Monitors performance of all 5 inputs with optional Synchronization Monitor Module
- Can be configured with redundant integrated GPS RF reference inputs
- Up to 64 outputs (32 1:1 protected) from Master shelf, up to a maximum of 576 outputs (288 1:1 protected) with the addition of 4 Expansion Shelves.
- Universal output card providing 8 DS1, Composite Clock (CC), E1, and 2.048MHz Square Wave, software programmable for output type per port. Synchronization Status Messages (SSM) meet Bellcore GR-378 and ANSI T1X1.3 TR-33
- Additional output cards available for 5/10 MHz sinewave, 1.544 MHz or 8 KHz RS-422, IRIG-B, 1 PPS, 1PPM or 1PPH Time Code
- Retiming Timing Insertion Unit (RTIU) option for re-timing 2 DS1 signals, up to 8 RTIUs per Master shelf (up to 16 re-timed DS1s)
- Redundant power feeds, +/- 24 / 48Vdc nominal.
- Fully Network Equipment-Building System (NEBS) Level 3 compliant: GR 63, 78, 1089 CORE, 19 in. ANSI or ETSI rack mounting. (23 in. optional)
- Wide Temperature range of -25°C to +50°C
- Ethernet TCP/IP and craft RS-232 ports for remote system configuration and reporting, with optional SNMP (V2c).
- CXRLive™ TL1 configuration software available
- SNTP available for precise network timing
- Future option for PTP per IEEE-1588V2

time (tīm) v; to regulate or set the time of.
TiemPo; Time Redefined.

The CXR Larus StarClock TiemPo™ is a totally integrated and modular system for use in T1, E1, 2.048MHz, CC, 5 and 10MHz, and Next Generation network packet synchronization applications. The TiemPo system provides flexible and cost effective solutions to Stratum 1/PRC, 2E, 2/TNC, and 3E/LNC digital and packet transmission timing and synchronization applications. The system can be utilized in either DS1 or E1 environments simply by selecting the appropriate software menu selections, port by port.

The TiemPo circuit card provisioning settings and operating functions are software generated, affording both speed and flexibility in system application changes, testing, and monitoring. Each of the output cards provides 8 outputs and the Master shelf can accommodate up to 8 output cards. The maximum number of outputs per Master shelf is 64, and can be incorporated into 1:1 protected outputs via software control.

The optional Expansion shelf provides up to an additional 128 outputs (or 64 1:1 protected), for a total of 192 outputs (96 1:1 protected). A total of 4 expansion shelves can be combined to provide up to 576 total outputs (288 1:1 protected).

Optional RF input modules include a choice of single or redundant GPS receivers for ultra precise network timing requirements.

The TiemPo is designed to provide timing for transmultiplexers, DACS, SONET equipment, digital switches, VoIP media gateways, softswitches, DWDM equipment, vocoders, and channel banks.

The TiemPo offers internal system monitoring and performance measurement combined with remote and local reporting in TL1 format or pull down menu. Also available is an Element Management System (StarLink EMS) for complete network control, or a simple to use TL1 Interface, CXRLive.



CXR Larus StarClock TiemPo 6400

Specifications:

Physical:

Dimensions, Weight: (W x D x H):

17 in. (432 mm) x 10 in. (254 mm) x 3.5 in. (89 mm)

10 lbs (4.54 kg) nominal, fully loaded

System Supply Voltage

-40 to -60 Vdc, or +20 to +28Vdc, 35 W nominal, 75 watts maximum

Environmental:

Operating Temp: -25°C to 50°C, slew rate not to exceed 8°C per hour

Storage Temp: -40°C to 75°C

Relative humidity: 0-95%, non condensing

Reference Inputs:

(5) DS1/E1/CC/2.048 Square Wave, software selectable
Selectable framing and line coding. DA-15 Male Connector
(Note: 2 used for tracking, all 5 can be monitored by SMU, if equipped)

(1) 5 or 10 MHz Sinewave, BNC Female Connector

(2) GPS RF Input Modules (Optional)

RF Input Module:

Stratum 1 GPS-	Accuracy to UTC	30ns
	Sensitivity	-138 dBm
	Parallel Rx Channels	16
	Connector :	TNC Female

GPS Track Accuracy:

< 1 x 10⁻¹¹ For observation period greater than 72 days

Pull In Range:

Rubidium versions-	1.544 MHz ± 1.6 X 10 ⁻⁸ (± 0.0247 Hz)
	2.048 MHz ± 1.6 X 10 ⁻⁸ (± 0.032Hz)
Crystal versions-	1.544 MHz ± 4.6 X 10 ⁻⁶ (± 7.1 Hz)
	2.048 MHz ± 4.6 X 10 ⁻⁶ (± 9.4 Hz)

Stratum 1 GPS Locked Accuracy/Stability:

1 X 10⁻¹² (typical, all versions)

Holdover Drift:

All versions: Exceeds Bellcore GR-1244-CORE specifications

Outputs:

T1/E1/CC/2.048 Square Wave, 1.544 MHz /8KHz
RS-422, 5/10 MHz, 1PPS/1PPM/1PPH Time Code, IRIG-B (200-98)
Main Shelf- 64, (32 with 1:1 protection)
Expansion Shelf- 128, (64 with 1:1 protection)
Connector : DB-25F
Optional wirewrap panel, RJ-45 or BNC connectorized Y-adapters

Retiming Timing Insertion Unit (RTIU)

Main Shelf 16 Retimed DS1 Outputs, with fully loaded shelf
Expansion Shelf 32 Retimed DS1 Outputs, with fully loaded shelf

Simple Network Time Protocol (SNTP): SNTP Version 4, per RFC 4330, Jack: RJ-45. **Clients must be on same subnet as the TiemPo**

Accuracy to UTC: 2 ms. Throughput: 2,000 packets per second
Also available is a second NTP output through TCP-IP RJ-45 Jack

Timing over Packet (ToP): Reserved for future PTP/ IEEE-1588V2
Jack: RJ-45

Alarm Contact Relay Ratings:

Switching power, 30 W maximum @220 Vdc or Vac, 1A

SNMP (Optional), Supports V2c with MIB table

Applicable Standards:

Bellcore GR-1244; Meets Bellcore NEBS GR-63, GR-1089, TR-78, TA-TSY-00378, TA-NPL-00436, TR-NWT-000499, GR-2830, AT&T PUB 60110, ANSI T1.101-1994, IEEE-802.3, ITU G.703, G.811, G.812, IRIG 200-98, RFC 4330, RFC 1901/1908 (SNMP V2c) RoHS and WEEE Compliant. Supports IPv4, (Future: IPv6) Future: IEEE-1588V2

Ordering Information:

Factory Installed Options:

Basic shelves:

6400A-00 ANSI, includes Input and Control Card, Power Supply

6400E-00 ETSI, includes Input and Control Card, Power Supply

Clock Module Options (When ordered separately):

-00 Basic shelf, clock distributor only, no holdover

OPT-A1 One Rubidium (Rb) Clock Module, STR 2E Holdover

OPT-A2 Two Rb Clock Modules, Redundant STR 2E Holdover

OPT-C1 One Ovenized Crystal Oscillator Module, (OCXO),STR3E/LNC Holdover

OPT-C2 Two OCXO Clock Modules, Redundant STR3E/LNC Holdover

OPT-B3 One Rb Clock, (STR 2E), and One OCXO Clock (STR3E/LNC)

Shelves with Preconfigured Clock Options:

6400A-A1 ANSI, -00 with OPT -A1 as single ordering option

6400A-A2 ANSI, -00 with OPT -A2 as single ordering option

6400A-C1 ANSI, -00 with OPT -C1 as single ordering option

6400A-C2 ANSI, -00 with OPT- C2 as single ordering option

6400A-B3 ANSI, -00 with OPT -B3 as single ordering option

Other Options:

OPT-SM Sync Monitoring Module

OPT-SN Simple Network Management Protocol (SNMP V2c) capability

OPT-NT Network Time Server capability (SNTP V4)

OPT-2NT Dual Network Time Server Capability, (SNTP V4)

OPT-TP Timing over Packet Module (PTP/IEEE-1588V2) (**Future Option**)

Customer Installed Options:

RF Input Module:

6401-1 Str 1/PRC GPS Receiver Module

Output / Retimer Modules:

6410-0 5/10 MHz Sinewave Output Driver, 8 ports

6411-0 IRIG-B Output Driver, 8 ports

6412-0 Time Code Output Driver, 1PPS, 1PPM, or 1PPH, 8 ports

6413-0 DS1/E1/CC/2.048 Square Wave Output Driver, 8 ports

6414-0 Retimer Timing Insertion Unit (RTIU), 2 DS1s per card

6415-0 1.544 MHz / 8KHz RS-422 Output Driver, 8 ports

Other Options:

6400AX-00 Expansion Shelf, 16 slot, ANSI

6400EX-00 Expansion Shelf, 16 slot, ETSI

6420-00 External Wirewrap panel, 1U, 64 outputs, .045 Sq Pins

CXRLive System Configuration TL1 Software

007-02319-004 DUC Down/Up Converter Ant Kit, w / up to 1500 ft RG-58 cable

007-02737-000 DUC Down/Up Converter Ant Kit, Fiber Optic

007-02319-000 GPS Ant Kit, Standard, with hardware, 50 ft RG58 cable*

007-02534-000 Lightning Protection Kit, with hardware, cable

011-02646-001 Mounting Ears for 23 in. ANSI rack mounting, pair

011-02706-001 Mounting Ears for 23 in. ETSI rack mounting, pair

011-02653-001 Blank Panel, Output Driver Slots

011-02654-002 Blank Panel, RF Input Module Slots

041-02609-000 Cable, Octopus Adapter, (8) BNC Female Connectors, 2 ft.

041-02610-000 Cable, Octopus Adapter, (8) RJ-45 Female Connectors, 2 ft.

041-02608-000 Cable, Expansion Shelf bus, 4 ft

041-02736-000 Cable, Shelf to 6420 wirewrap panel, 2 ft, DB-25 to DB-25

041-02738-000 Cable, Y adapter, 1:1 protection, all ports DB-25

565-00400-000 Cable, DB-9 to DB-9 serial port, for PC to Craft Interface

041-02749-000 Cable, RTIU, DB-25 to 8 ea RJ-45

CXR Larus also has various GPS antenna and connector options available-
Contact the factory for specific information

* The 007-02319-000 Antenna kit is included free with any system installed with the optional 6401-1 GPS card