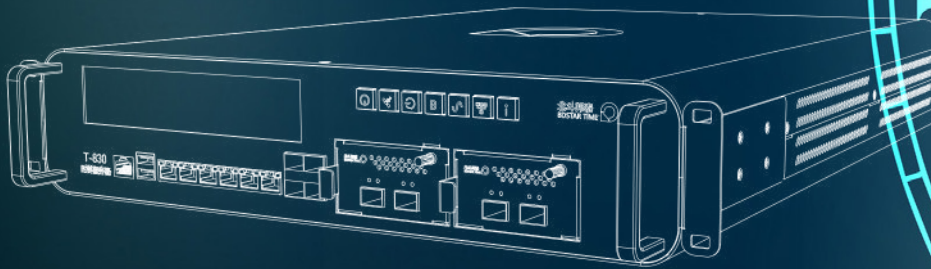


Modular Redundancy

GNSS PTP Master

ePRTC NTP



T830

High performance clock server

BDPNT.COM



Resilient Time and Frequency Synchronization Platform ePRTC



Feature

- + Modular, redundant, large capacity and high performance clock
- + Unique flexibility and versatility
Modular scalable design can be configured as ePRTC, PRTC PTP GM clock, APTS, boundary clock and transparent clock, as well as NTP server
- + Advanced anti-jamming and anti-spoofing detection algorithms
- + Enable or disable security management, encryption, authentication and authorization, and timing protocols
- + Built-in high-performance rubidium atomic clock and ultra-high stability low phase noise crystal oscillator optional
- + Highly sensitive GNSS concurrent reception to adapt to the harsh global environment
- + Supports Full GNSS (GPS, Beidou, Galileo, GLONASS)
- + Timekeeping unit support is optional: when satellite loss of lock, Built-in high-performance rubidium atomic clock, 24-hour deviation of 200 ns; Built-in high-performance OCXO, 24-hour deviation of 10 s.
- + 6 x 1Gbit/s port,RJ45; 4x 1Gbit/s optical port,SFP; support 10Gbit/s optical port expansion,SFP+.
- + Support external 10MHz, IRIG-B code input
- + Relative to UTC time accuracy reaches nanosecond level
- + MTBF > 100000 hours

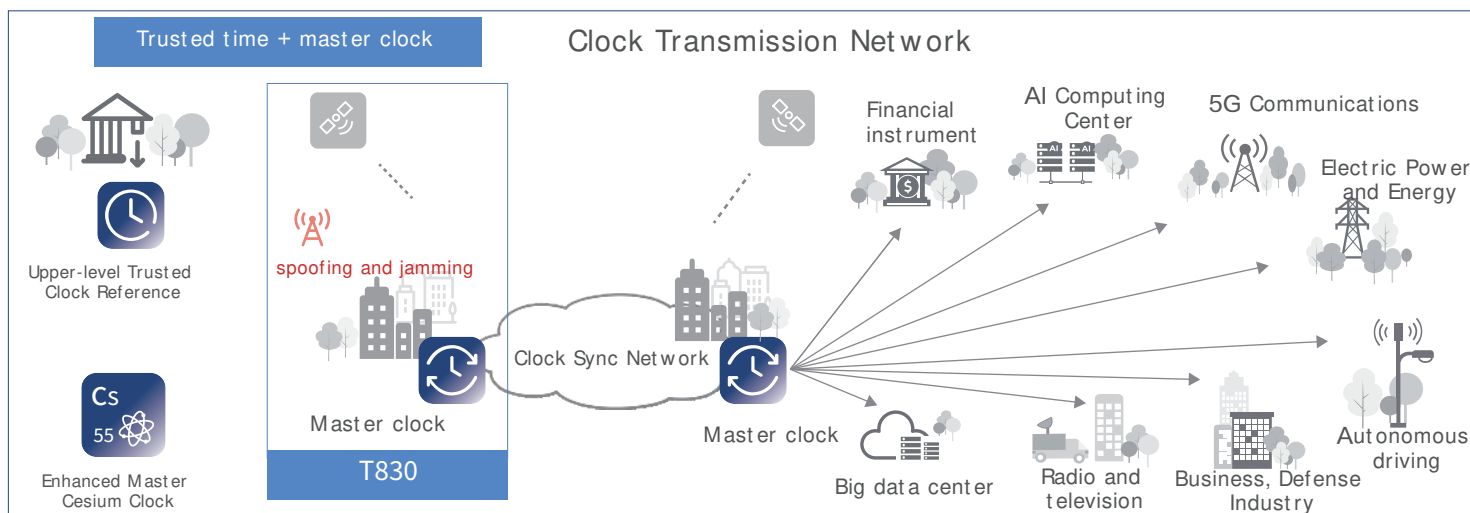
Application

- + Applied in finance, high-frequency trading, AI computing centers, defense and military industries, and big data centers.

Overview

The T830 high-precision clock server is designed to meet the high-frequency trading and strict timing requirements of the financial, securities, and futures industries. To address user demands for high precision, security, complex network deployments, and strict regulatory compliance, the device is equipped with a highly sensitive, anti-interference, and anti-spoofing domestic BeiDou receiver. It supports external cesium clock ePRTC time-keeping functions, utilizes a fully domestic information technology innovation platform architecture, and supports multiple reference inputs including BeiDou, IRIG-B, PTP, 1PPS+TOD, and other reference inputs, and supports 10Gbit/s and 1Gbit/s fiber optic interfaces while simultaneously providing PTP/NTP timing services.

The device's motherboard features a domestically produced Haiguang Series 3 processor, with two channels and four memory slots supporting up to 256GB of RAM. It comes standard with 6GbE LAN and 4GbE SFP ports, and supports expandable, hot-swappable network modules with speeds of 10G, 25G, 40G, 100G, and 200G. It is equipped with a dedicated SATA storage slot, facilitating the secure recovery of confidential data. Comprehensive device health monitoring supports real-time display and alerts for redundant hot-swappable power supply status, satellite status, external reference status, ePRTC status, synchronization service status, and spoofing/interference status.



Technical specifications

Product Overview :

Local clock: OCXO, DCXO, rubidium atomic clock, cesium clock optional

PTP/NTP ports: up to 18

The BITS output port has a maximum of 4 ports

Supports up to 8 clock ports

The PSU hot-plug power supply has a maximum of 2 channels

Main applications

Enhanced master clock (ePRTC)

Master clocks (PRTC A and PRTC B)

1588v2 Main clock (unlimited multicast, supports up to 2048 PTP clients in unicast mode, 128 pps/CSM)

1588v2 PTP Boundary Clock (unlimited multicast, supports up to 2048 PTP clients in unicast mode, 128 pps/CSM), G.8273.2 BC Type D

1588v2 Subordinate input (as a backup for GNSS) –APTS GNSS, receiver and PRC/PRTC, including a distributed function synchronous supply unit (SSU) with multiple physical synchronization output interfaces and a composite clock generator

NTP, server

Synchronous probe—Syncprobe™ monitoring and assurance

NTP function

GNSS reference level 1 clock server

NTP v1, v2, v3, and v4 over IPv4 and IPv6

NTP Unicast/Multicast/Broadcast

Symmetric Keys and Automatic Key Authentication

TIME&DAYTIME Agreement

NTP peering (Peer-to-peer Protocol)

NTP Optional time standard (UTC/GNSS/ Local)

Hardware timestamps with nanosecond-level precision

When locked to GNSS, the NTP server's accuracy is within ± 100 ns of UTC

Simultaneous support for PTP and NTP on the same Ethernet port

PTP to NTP Conversion

PTP Network Functions

Support for PTP profiles:

ITU-T G.8265.1 Frequency Transfer Profile (IP Unicast, for IPv4/IPv6)

ITU-T G.8275.1 Time/Phase Transfer Profile (Full Clock Support – Ethernet Multicast)

ITU-T G.8275.2 Time/Phase Transfer Profile (Partial Time Support

Hardware unit

Clock Host:

The device host includes a main control unit, a high-definition touchscreen display, and status indicators and function buttons, including power, satellite, IEEE 1588v2BC, ePRTC, synchronization service, and spoofing/jamming status.

Equipped with 6x 1 Gbit/s RJ45 and 4x 1 Gbit/s SFP ports, supporting hardware-based timestamping (PTP and NTP). All fiber ports support single-mode/multi-mode, colored/uncolored, dual-fiber/single-fiber SFP/SFP+ modules, as well as copper SFP modules.

Clock Module:

GNSS Antenna Input: BNC, 1 channel, 5V

1PPS Pulse Output: BNC, 1 channel, TTL level, 50Ω

Synchronization Accuracy: Better than 20 ns

Pulse Width: 100 ms

Rise Time: <10 ns

Jitter: <1 ns

When the external reference is locked, the second pulse is synchronized with the external reference

When the external reference is lost, the local clock maintains the signal

10 MHz Output: BNC, 1 channel, sine wave, amplitude 12 ± 1 dBm, 50 Ω

Clock Accuracy: $\leq 1E-12$, 24-hour average accuracy after 48 hours of operation, in GNSS locked state

Short-term Stability:

<3E-12/1s

<3E-12/10s

<1E-12/100s

<1E-12/day (GNSS locked)

Phase noise:

≤ -95 dBc/Hz @1Hz

≤ -130 dBc/Hz @10Hz

≤ -145 dBc/Hz @100Hz

≤ -155 dBc/Hz @1kHz

≤ -158 dBc/Hz @10kHz

Distortion:

Harmonic: ≤ -45 dBc

Non-harmonic: ≤ -80 dBc

Options:

ePRTC Reference Input: BNC, 2 channels, 10 MHz/5 MHz sine wave, amplitude greater than 5 dBm, 50 Ω impedance matched.



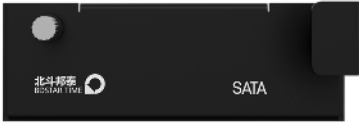
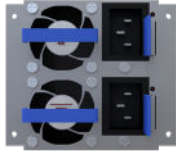
IRIG-B Input: BNC, 1 channel, DC

IRIG-B Output: BNC, 1 channel, DC, synchronization accuracy better than 10 ns

1 MHz Output: BNC, 1 channel, square wave, TTL, 50 Ω, accuracy same as 10 MHz

Hard Drive Module: SATA hot-swappable solid-state drive, expandable up to 4 TB

Power Supply: Hot-swappable, modular, with 90

	Clock Module	Network Expansion Module
		
Function	Antenna, 1PPS, 10MHz, Optional extensions: ePRTC, 1MHz, IRIG-B input/output	Optional expansion: 2 ports of 10G/25G/40G/100G/ 200G, support NTP and PTP simultaneously
	Storage Module	Power-supply module
		
Function	SATA Solid-state drive	Dual-path redundant AC/DC

Time-keeping performance

Clock	Aging/day (after 30 days)	Temperature stability
Opt-OCXO	$\pm 3 \times 10^{-10}$	$\pm 3 \times 10^{-10}$
Opt-DOCXO	$\pm 2 \times 10^{-10}$	$\pm 1 \times 10^{-10}$
Opt-RB	$\pm 1 \times 10^{-12}$	$\pm 3 \times 10^{-11}$

Note: After the device has been powered on for 72 hours and synchronized with GNSS for 24 hours, the effective daily aging (time drift) over the next 72 hours

	200ns	400ns	1.1us	1.5us	5us	10us
Opt-OCXO	4hour	6 hours	10hours	15 hours	20 hours	1.5 days
Opt-DOCXO	8hours	10hours	15 hours	20days	1days	2 days
Opt-RB	1 day	1.8 days	3.5 days	4 days	8 days	12 days

Note: The data in the chart represents typical values (1σ), measured after the device has been powered on for 7 days and synchronized with GNSS for 72 hours.

Synchronous Signal Conversion

Input/ Output	SyncE Tx	BITS/CC OUT	CLIK OUT(10Mhz)	PTP	NTP	1PPS OUT	ToD
GNSS	✓	✓	✓	✓	✓	✓	✓
SyncE Rx	✓	✓	✓	✓	×	freq.	×
BITS IN	✓	✓	✓	✓	×	freq.	×
CLIK IN	✓	✓	✓	✓	×	freq.	×
PSS IN	✓	✓	✓	✓	✓	✓	✓
PTP	✓	✓	✓	✓	✓	✓	✓

Assured PNT(aPNT) Solution

Multiple redundant GNSS references, including PTP, SyncE, CLIK, BITS, and local oscillators
ePRTC automatically selects among three available reference inputs.

Improved holdover time via a single or dual temperature-compensated crystal oscillators (OCXOs) or a rubidium atomic oscillator; automatically switches when interference or spoofing is detected.

ePRTC combines GNSS/PTP/PPS+ToD with a cesium clock to improve accuracy in lock mode and extend holdover time during satellite outages.

Syncprobe™ Monitoring and Assurance Tool**1. Clock Accuracy Monitoring**

Supports up to two clock probes to calculate the Time Error (TE), Time Interval Error (TIE), and Maximum Time Interval Error (MTIE) of the physical clock

Calculates maximum, constant, and dynamic Time Error, Time Interval Error, and Maximum Time Interval Error

Programmable source and reference signals: SyncE, BITS, PPS, BeiDou, CLIK

SNMP-based events and alarms for Maximum Time Interval Error (MTIE) masks and time error thresholds

Collection and export of raw time error and time interval error data to a server

Daily performance reports for Maximum Time Interval Error and time error

2. PTP Clock Probe Analysis

Supports up to 4 PTP clock probes for analyzing time error, interval error, and maximum interval error

Supports active and passive probe modes

Programmable reference signals: SyncE, BITS, PPS, BeiDou, CLIK

SNMP-based events, Maximum Interval Error (MTIE) masks, and time error threshold alarms

Collection and export of raw time error and time interval error data to a server

Daily Maximum Time Interval Error (MTIE) and Time Error

Performance Test Reports

Calculation of maximum, constant, and dynamic time errors, time interval errors, and maximum time interval errors for PTP packets

3. PTP Network Analysis

Includes PTP network probes

Performance statistics for packet delay and packet delay variation
Delay asymmetry

Network availability

Statistics: Statistics based on the G.8261.1 standard (FPP)

Packet loss statistics

Programmable reference signals: SyncE, BITS, PPS, BeiDou, CLIK

Enhanced synchronization assurance statistics and performance monitoring: Provides 15-minute and 24-hour monitoring data, including data export, threshold violation alarms, and SNMP events
User-configurable maximum time interval error mask

Remote Configuration

Text-based Configuration Files
 Copying Configuration Files via FTP/SFTP/SCP
 Remote Software Updates

Management and Security**Local Management**

RS232 serial port via RJ45 connection

Remote Management

Any local LAN port, using CLI, SNMP, or web interface
 Supports IPv4 and IPv6
 Maintenance of VLAN-based management tunnels
 Configurable static routes and default gateways
 Comprehensive management, control, and GNSS support

Management Agreement

Telnet, SSH(v1/v2)
 HTTP/HTTPS(TLS 1.2) SNMP(v1/v2C/v3)

Security Management

Configure database backup and recovery
 Download system software via FTP, HTTPS, SFP, or SCP (dual backup) Remote authentication via RADIUS/TACACS+
 SNMPv3 authentication and encryption
 Access Control Lists (ACLs)
 ICMP filtering and rate limiting
 Automatic certificate registration, fully integrated into the Public Key Infrastructure (PKI)

IP Network

DHCP v4 and v6
 ARP Access Control List(ACL)
 IPv4 RIPv2 and static routing IPv6 的 RIPng
 ICMP

System Logging

rSyslog, alarm logs, audit logs, and security logs
 Configurable system time sources—local/NTP/PTP/PRTC (GNSS)
 User-configurable time zones and Daylight Saving Time (DST))

Compliant with standards

ITU-T G.8261, G.8261.1, G.8262, G.8264, G.703, G.704, G.781, G.812, G.811
 ITU-T G.8272.1, G.8272, G.8273.2
 ITU-T G.8265.1, G.8275.1, G.8275.2
 IEEE 1588v2 (PTP), 802.1Q (VLAN), 802.1ad, 802.1p(priority), 802.3ae (10G)
 RFC 2863 (IF-MIB), RFC 2865 (RADIUS), RFC 2819(RMON), RFC 2460 (IPv6)
 RFC 1059 (NTPv1), RFC 1119 (NTPv2), RFC 1305 (NTPv3), RFC 5905 (NTPv4), RFC 4330 (SNTPv4), RFC868 (TIME), RFC867(DAYTIME), RFC 1321(autokey)

Regulatory Compliance

ICE Compliance
 RoHS Compliant
 American National Standards Institute (ANSI C84.1-1989)
 Safety: EN 60950-1, 21 CFR 1040.10, EN 60825 EMI: European Standard EN 55022:2010 Class A

Power Supply

Hot-swappable, modular, 90V