

Industrial NTP Time Server — Bid Technical Proposal

Item	Content
Model	SY-1231-BG-T-S
Document	Bid Technical Proposal
Version	1.0

Fill before submission:

Tender / project name: _____
Tender No.: _____
Bidder: _____
Date: _____

1. Purpose and Basis

1.1 Purpose

This document responds to tender requirements for a **LAN time server / GNSS-synchronized clock / NTP stratum-1 appliance**, covering architecture, performance claims, interfaces, deployment, and acceptance recommendations for technical evaluation.

1.2 Basis

- Purchaser’s tender documents (controlling text)
- Shipping Product Specification Product Specification (Shipping)
- One-pager Reference · Serve Policy · Capacity Selection Sheet (Reference · Policy · Capacity)
- Bid-sanitized User Guide 用户指南（标书脱敏版）（**do not** attach the shipping edition that contains factory credentials)
- Industrial Interface Protocol 工业接口协议附件
- NTP RFC 5905 (server-side common subset as implemented)
- Modbus RTU industrial practice (9600 8N1 slave)

1.3 Response Principles

1. **Per-channel claims:** NTP, RS-485 Modbus, TTL 1PPS, and PULSE PPM metrics are **independent** and must not be cross-applied.
2. **Testable:** Contracted metrics should map to practical acceptance methods (Section 6).
3. **Clear exclusions:** Capabilities not implemented (PTP/IEEE 1588, dual-port redundancy, IPv6, NTS, etc.) are **not** claimed.

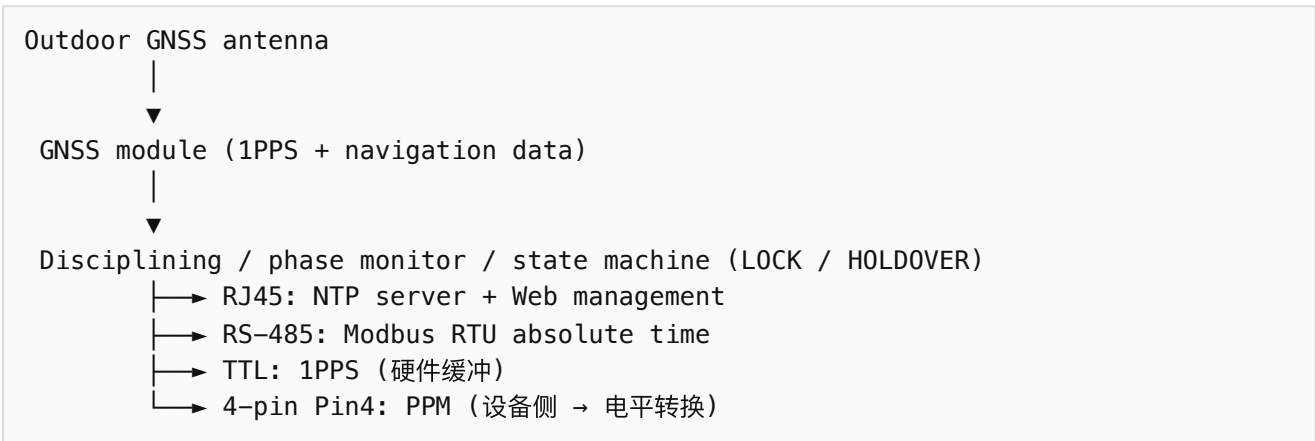
2. Understanding and Overall Solution

2.1 Typical Needs

Consumer	Typical need	Channel
Servers / PCs / NVR / switches	LAN NTP	RJ45 NTP
PLC / SCADA / HMI	Absolute time stamps	RS-485 Modbus
DAQ / scopes / sync nodes	Hardware second edge	TTL 1PPS (硬件缓冲)
PLC interval / PPM	Minute pulse	4-pin Pin4 PULSE

2.2 Technical Approach

GNSS 1PPS + local oscillator disciplining + RTC holdover + parallel multi-channel outputs:



After **LOCK**, the unit operates as an **NTP Stratum 1** server. Brief GNSS loss enters **Holdover** with degrading quality over time (see Product Spec).

2.3 Evaluation Highlights

Point	Description
Primary reference	GNSS-based; not dependent on an upstream NTP server
IT + OT in one box	NTP plus Modbus / PPS / PULSE
Operability	Web Dashboard, LCD, event & 24h quality CSV export
Traceability	Factory SETID; firmware Build ID
Compliant wording	Accuracy stated per interface — no “10 ns over Ethernet” claim

3. Scope of Supply

3.1 Hardware

No.	Item	Notes
1	SY-1231-BG-T-S time server	Ethernet, RS-485, 1PPS (hardware fan-out), PULSE PPM; no IRIG
2	GNSS antenna & cable (per contract)	Outdoor, clear sky view
3	Power (single path -S, per contract / nameplate)	One inlet at a time: (1) AC 220 V IEC 3-pin (onboard AC module); or (2) DC-IN (DC050-T) + external adapter (12-24 V DC). Never both; not dual-redundant -D
4	Shipping documents	User guide, spec, protocol, wiring pack

Cabinet, switches, client software, and PLC engineering are by others unless contracted.

3.2 Firmware / Software

- Factory firmware (version per nameplate / Web)
- Built-in HTTP UI (Basic Auth)
- NTP at boot; Modbus / 1PPS / PULSE per SKU

4. Key Technical Responses

4.1 Basics

Common tender item	Response
Product class	GNSS-disciplined LAN NTP time server
Model	SY-1231-BG-T-S
Constellation / Osc / Power	BG (BeiDou+GPS) / T (TCXO) / S (single supply)
Protocol	NTP v3/v4, UDP 123
Network	1x RJ45, 10/100M (single port; not dual-port HA)
Default IP	192.168.1.123/24, gw 192.168.1.1 (configurable)
Management	Web + front LCD
Time reference	GNSS 1PPS + TCXO discipline; industrial RTC holdover (temperature-compensated)

4.2 Accuracy (Per Channel, after LOCK)

Channel	Typical claim	Acceptance
Internal / GNSS 1PPS reference	Short-term typically ≤ 10 ns RMS (see validation report)	Lab / factory
TTL 1PPS out	GNSS second edge via hardware buffer	Scope / TIC
RS-485 Modbus	1 ms resolution (UTC incl. ms)	PLC register compare
Ethernet NTP	Lab clause: LOCK + low LAN RTT $\rightarrow$ ms-class offset reachable (see report); no arbitrary-field guarantee	ntpq / chronyc / client logs
Holdover	Continues after brief GNSS loss; error grows with time	Antenna-pull soak

Contract note: Internal “10 ns RMS” **must not** be equated to “10 ns NTP at the client” or “nanosecond Modbus.” Specify acceptance **per interface**.

4.3 NTP Capacity

Item	Nominal	Range	Method
Role	NTP server; typically Stratum 1 after LOCK	—	—
Accuracy (network NTP)	$\pm 1\text{--}5$ ms	lab typical	LOCK; same LAN; software stamp; $\neq$ 1PPS
Performance	Up to 3840 NTP requests per second	sustained 3840	LOCKED; lab full load. Short peaks are not the specification
Planning	$(N=R/f_{\{ \}})$	—	from client poll interval
Global replies	Adaptive rate limit	—	further derated during large Web exports
Per-source IP	$\leq 8/s$	—	—
ACL	Optional NTP source whitelist	—	—
Warm-up policy	May reply Stratum 2 per Web policy	—	factory default: reply when locked

4.4 Industrial Interfaces

Interface	Response
RS-485	Modbus RTU slave, 9600 8N1 , ID 0x01 ; FC 0x03/0x04; UTC with ms
1PPS OUT	硬件缓冲 GNSS second-edge fan-out (3.3 V); MCU does not drive

Interface	Response
PULSE PPM	4-pin Pin4: 200 ms at UTC minute after LOCK (5 V via level shifter)

Register map and bring-up: Industrial Interface Protocol.

4.5 Management & Logs

Item	Response
Web	Dashboard / Network; HTTP Basic Auth
SNMP	Read-only SNMPv2c / UDP 161 (b140+); no HTTPS / SNMPv3
Event log	event_log.csv (~2048-entry ring; default export ~latest 1024); Dashboard → Diagnostics → Export
24h quality	quality_24h.csv; hourly rows; samples=0 = no GNSS-disciplined samples that hour
LCD	Inspection / decision / diagnosis / asset pages

4.6 Explicit Exclusions

Not in standard scope (unless a separate solution is bid):

- PTP / IEEE 1588 and plant-wide sub- μ s Ethernet timing
- **OCXO** (this SKU **-T-** is **TCXO**; holdover is industrial RTC holdover, ppm-class)
- NTS, IPv6, NTP broadcast/multicast server
- Dual Ethernet redundancy / failover
- Nanosecond fieldbus timing
- **IRIG-B** timecode (removed on this respin; select another SKU if required)
- **HTTPS**, SNMPv3, SNMP write (on-device SNMP is v2c **read-only** only)

5. Integration Outline

5.1 IT (Network)

1. Connect to LAN (prefer management VLAN).
2. Set static IP; ensure UDP **123** reachability.
3. Point clients to device IP (iburst recommended).
4. Optional NTP source whitelist.

5.2 OT (Industrial)

1. RS-485 wiring per practice (120 Ω termination, common ground).
2. PLC/SCADA poll calendar registers (suggest ≥ 1 Hz) via FC03.
3. Edge sync → TTL 1PPS; minute pulse → 4-pin Pin4. **No IRIG** on this SKU.

5.3 Antenna

Outdoor clear sky; quality feedline; treat LOCK as prerequisite for official timing use.

5.4 Responsibility Split

Party	Scope
Bidder (supply)	Device, factory config, docs, training (per contract)
Integrator	Rack power, network design, PLC, bulk client config
End user	Patrol, antenna care, accounts / ACL

6. Suggested Acceptance

6.1 Incoming

Model, SETID, firmware Build vs packing list; power-on Web/LCD; SN visible.

6.2 Functional (suggested)

No.	Item	Method	Pass (suggested)
1	GNSS lock	Antenna OK; LCD/Web	LOCK / Stratum 1
2	NTP	Same-subnet client	Stable ms-class offset (site network dependent)
3	Modbus	Master reads Y/M/D h:m:s.ms	Matches reference within 1 ms resolution
4	1PPS	Oscilloscope	Stable second pulse
5	PULSE	Scope on 4-pin Pin4	~200 ms at UTC minute after LOCK; mute when unlocked
6	Logs	Download event_log / quality_24h from Dashboard Diagnostics	Readable; quality includes hourly rows (incl. samples=0)

6.3 Accuracy Wording

Contract must name the **acceptance interface**. Do not apply internal 10 ns figures to NTP client tests.

1PPS: scope the **1PPS jack (1PPS 输出座)**, probe the panel 1PPS jack only.

PULSE: scope **4-pin Pin4**; ~200 ms at UTC minute after LOCK; mute if unlocked. See protocol annex §3.3.

7. Reliability & Operations

State machine visible on LCD/Web; Ethernet soft recovery paths and external-watchdog power-cycle strategy for hard faults (firmware policy); CSV logs for support; Web-configurable IP / NTP policy / ACL (see User Guide).

8. Implementation Schedule (Template)

Phase	Work	Suggested duration
T0	Kickoff, IP/antenna plan	3–5 working days
T1	Delivery & incoming inspection	Per contract
T2	Install, power, cabling	1–2 days / site
T3	Integration (NTP / PLC / PULSE)	1–3 days / site
T4	Training & handover	0.5–1 day
T5	Trial run & final acceptance	Per tender

9. Training & Warranty (Template)

Training: install notes, Web/LCD patrol, NTP & Modbus bring-up, log export + SETID/Build for support tickets.

Item	Fill per commercial terms
Warranty	____ years
Support	Phone / remote / on-site
Spares	_____

10. Clause-by-Clause Response Matrix (Template)

No.	Tender clause (summary)	Bid response	Status	Evidence
1	NTP server	UDP 123; Stratum 1 after LOCK	Full	Spec §5
2	GNSS timing	GNSS 1PPS discipline	Full	Spec §1
3	Web management	HTTP Basic Auth	Full	User Guide
4	RS-485 absolute time	Modbus RTU, 1 ms	Full	Protocol annex
5	1PPS output	TTL 1PPS	Full	Spec §7
6	IRIG-B	Not provided on this respin	Deviation / N/A	Spec §7
7	Dual-port redundancy	Single port	Deviation / N/A	§4.6

No.	Tender clause (summary)	Bid response	Status	Evidence
8	PTP/1588	Not included	Deviation / N/A	§4.6
9	...	...	...	...

11. Deviation Statement (If Required)

For each deviation: clause ID, actual capability, mitigation/impact, and whether it is material (legal/commercial review).

Common proactive statement: This product is a **single-port** industrial NTP appliance and is **not** bid as a PTP plant-wide sub-μs solution. If PTP is mandatory, use a dedicated PTP design or consortium bid.

12. Attachment List

No.	Attachment	Format	Notes
A1	Product Specification (Shipping) ZH	PDF	Product Specification (Shipping, ZH)
A2	Product Specification (Shipping) EN	PDF	Product Specification (Shipping)
A3	Reference · Serve Policy · Capacity (One Page)	PDF	Selection Sheet (Reference · Policy · Capacity)
A4	User Guide (bid-sanitized)	PDF	用户指南（标书脱敏版）（not the shipping edition with factory password）
A5	Industrial Interface Protocol	PDF	工业接口协议附件
A6	This Bid Technical Proposal	PDF	Bid Technical Proposal
A6	Datasheet / photos	optional	Commercial pack
A7	Test / factory reports	optional	Per contract

Packaging: Tender ZIP must contain **only** files from this public technical package. Do **not** include the shipping User Guide (factory credentials), internal unpublished technical materials.

13. Closing

SY-1231-BG-T-S addresses common industrial, security, office, and metering-assist needs for a **local GNSS authority with multi-channel timing**. The bidder affirms consistency with the shipping specification and protocol annex; acceptance is **per channel**; exclusions in §4.6 are not falsely claimed.

Commercial terms (price, delivery, warranty) are governed by the commercial bid volume.