Advanced SyncPro: IEC 61850-3 HV Certified NTP Server & IEEE 1588 PTP Grandmaster

v1.0, updated in Jan., 2026

Advanced SyncPro: NTS8600 Series

IEC 61850-3 HV & IEEE 1613 Certified
Industrial Grandmaster Clock

NTS8600I Series Front Side
NTS8600I-AC Back Side
NTS8600I-DC Back Side

Economical Prices
- Non-compromised Quality
- Feature-Rich Design
- No Extra SW License Fees

Compact Design

Durability
• -40 to +85°C Operating Temperature • IP 30 & 5100M Operating Altitude • Certified for IEC 61850-3 & IEEE1613 • MIL-STD 810 Military Grade Reliability • 20 Years MTBF and 5/10 Year Warranty

Reliability
• Seamless Device Redundancy • DC/AC Power Redundancy • Network Link Redundancy • SFP & Copper Auto-Failover

Accuracy
• Proven PRTC-B (<40ns) • PTP < 40 ns & NTP < 50 µs accuracy • IRIG-B Demodulated ±40 ns • Holdover < 2 µs / 72 hours (OCXO)

Signal Resilience
• IP69K High-Gain Low Noise Antenna • Support Multiple Constellations • Jamming and Spoofing Detection • Selectable Advanced Surge Protector

Synchronization
• 2 x 100/1000 RJ45/SFP Combo Port for PTP & NTP • 1 x 10/100 RJ45 for NTP & MGT • Up to 6 Configurable Sync-Outs • IRIG-B AM /TTL, 10MHZ or PPS Outs

Applicability
• Power Industries • Telecommunication & Enterprise 5G • Automation - TSN • Enterprise

Advanced SyncPro: NTS8610 Series

IEC 61850-3 HV & IEEE 1613 Certified
Industrial Grandmaster Clock

NTS8610 Series Front Side
NTS8610-S2 Back Side
NTS8610-S3 Back Side

Standard 1U Design

Power Industry Focus

LCD & Rear Pannel I/O

Cost-Efficient Prices
- Non-compromised Quality
- Feature-Rich Design
- No Extra SW License Fees

Durability
• -40 to +85°C Operating Temperature • IP 40 & 5100M Operating Altitude • Certified for IEC 61850-3 & IEEE1613 • MIL-STD 810 Military Grade Reliability • 20 Years MTBF and 5/10 Year Warranty

Reliability
• Seamless Device Redundancy • Dual AC/DC Hot Pluggable Modules • Network Link Redundancy • SFP & Copper Auto-Failover

Accuracy
• Proven PRTC-B (<40ns) • PTP < 40 ns & NTP < 50 µs accuracy • IRIG-B Demodulated ±40 ns • Holdover < 2 µs / 72 hours (OCXO)

Signal Resilience
• IP69K High-Gain Low Noise Antenna • Support Multiple Constellations • Selectable Multiband GNSS • Jamming and Spoofing Detection • Selectable Advanced Surge Protector

Synchronization
• 2 x 100/1000 RJ45/SFP Combo Port for PTP & NTP • 2 x 10/100 RJ45 for NTP & MGT • Up to 6/7 Configurable Sync In/Outs • IRIG-B AM /TTL,PPS In/Outs

Applicability
• Power Industries Focus • Telecommunication & Enterprise 5G • Automation - TSN • Enterprise

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GMC Selection Made Easy:
Find the Model That Fits Your Needs

Key Differences at a Glance

Features	NTS8600	NTS8610
Dimension	1/2U+	1U
Installation	Rack-Mount or DIN-Rail	Rack-Mount
IP Rating	IP30	IP40
Pannel I/O	Front & Rear	Rear
LCD & Key Pad	N/A	Display & Configuration
GNSS	Single Band only	Single Band or Multi-Bands (NTS8610M Model)
Concurrent Constellations	Up to 3	Up to 3 (NTS8610) or Up to 4 (NTS8610M)
Ethernet Ports	2 x 100/1000 RJ45/SFP combo ports and 1 x 10/100 RJ45 port	2 x 100/1000 RJ45/SFP combo ports and 2 x 10/100 RJ45
Power Redundancy	DC version or AC (with External Adapters)	Dual Hot Swappable AC/DC Modules
IRIG-B DCLS/PPS Cascading	Recommend only on IRIG-B RS-485 Channel	Yes
10 MHZ	YES	NO
Legacy Timig Input	No	Yes (NTS8610-S3 or NTS8610M-S3)
TTL Driving Capacity	Up to 20mA per Channel	Up to 125mA per Channel
Relay Alarm	1 (Normal Open) , 24 VDC	1 (Normal Open & Normal Close) , 24 ~ 250 VDC

Application-Based Quick Selection Guides & Model Comparison

Industries	GMC Time-Sync Applications	PTP Precision Requirement	Legacy Timing Necessity	Power Supply Availability	Suggested Product Model	Key Decision Logic
Power Utility	Substation Master Sync	High	Medium	Critical	NTS8610-S2	Central timing source for the entire substation; requires high availability, dual hot-swappable power, and stable PTP performance.
	Event & Fault Recorder	High	Medium	Critical	NTS8610-S2	Reliable and consistent time stamping is essential for SOE and fault analysis; high availability power is mandatory to avoid data gaps.
	Line Differential Protection	High	High	Critical	NTS8610-S2	Protection accuracy depends on precise and stable timing; high power reliability, legacy timing support, and cascading capability are critical.
	PMU / Synchrophasor	High	Medium	Critical	NTS8610-S2	Requires stable sub-microsecond PTP accuracy and continuous operation to ensure reliable phasor measurement and system visibility
	IEC 61850 Process Bus	High	Low	Critical	NTS8610	PTP is the primary timing method; precision must meet Process Bus requirements, with interoperability with IEDs as the key focus.
	Traveling-Wave Fault Location	Ultra-High	Low	Critical	NTS8610M	Ultra-high timing precision is mandatory; multi-band GNSS and maximum timing stability are critical for accurate fault location.
	Feeder Automation	Medium	High	Low	NTS8600-DC/AC NTS8600I-DC/AC	Sub-millisecond-level timing is sufficient; cost efficiency. compact size and basic time synchronization are the main considerations.
	Legacy Timing Input & Conversion	Low	High	Medium	NTS8610-S3	Designed to support legacy IEDs requiring IRIG-B or discrete timing signals; conversion capability is the key requirement.

Industries	GMC Time-Sync Applications	PTP Precision Requirement	Legacy Timing Required	Power Supply Availability	Suggested Product Model	Key Decision Logic
Telecom	5G NR TDD Phase Sync	Ultra-High	SyncE	Critical	NTS8610M	Ultra-high phase accuracy is mandatory for 5G TDD; multi-band GNSS and PTP phase performance are the key requirements.
	Telecom Core / Backhaul Master	High	1PPS/ToD T1/E1 2.048/1.544 MHZ SyncE	Critical	Not Supported if T1/E1 and 2.048/1.544 MHz are required	The NTS86X0 series is designed for packet-based timing using PTP, 1PPS/ToD, and SyncE where applicable.
	Central Office (Legacy BITS)	High	1PPS/ToD T1/E1 2.048/1.544 MHZ SyncE	Critical		Requires legacy BITS interfaces (T1/E1 and 2.048/1.544 MHz), which are not supported by NTS8600/NTS8610.
	Physical Layer Sync (Frequency)	Medium	10 MHZ SyncE	Medium	NTS8600-DC NTS8600-AC	Provides dedicated frequency synchronization through 10 MHz and SyncE, ensuring stable physical-layer timing for telecom equipment.
	O-RAN Distributed Unit (DU)	High	SyncE 1PPS	Critical	NTS8600-DC NTS8600-AC	Tailored for O-RAN DU deployment, combining SyncE and 1PPS support to deliver reliable and cost-effective timing for open RAN architectures.
	Small Cell / Street Furniture	High	SyncE	Medium	NTS8600-DC NTS8600-AC	Compact and cost-efficient timing solution leveraging SyncE-based frequency synchronization, ideal for dense small cell and outdoor deployments.

Industries	GMC Time-Sync Applications	PTP Precision Requirement	Legacy Timing Required	Power Supply Availability	Suggested Product Model	Key Decision Logic
Automation	Motion Control & Robotics	High	1PPS (Optional)	Medium	NTS8600-DC	Provides robust and cost-efficient time alignment for coordinated motion and robotics, ensuring consistent synchronization across controllers without legacy timing complexity.
	Industrial Ethernet (TSN)	Ultra-High	N/A	Medium	NTS8610M	Delivers ultra-high precision timing for TSN networks, enabling deterministic traffic control with a robust and scalable synchronization architecture.
	Machine Vision & Inspection	High	1PPS (Optional)	Medium	NTS8600-DC	Ensures reliable and cost-efficient synchronization across multiple cameras and inspection systems, supporting precise trigger alignment and event correlation.
	High-Speed DAQ & Test Systems	High	10 MHZ (Optional)	Medium	NTS8600-DC	Offers a robust common time reference for distributed DAQ systems, enabling accurate high-speed data correlation while keeping system integration cost-efficient.
	Distributed PLC Synchronization	Medium	N/A	Critical	NTS8600-DC	Provides a reliable external time reference when multiple PLC systems or domains require consistent plant-wide time alignment beyond local controller synchronization.
Enterprise	High-Frequency Trading (HFT)	Ultra-High	N/A	Critical	NTS8610M	Provides robust and deterministic timing to support fair order sequencing and accurate timestamps, meeting latency-sensitive trading requirements cost-effectively.
	Financial Transaction Timestamping (MiFID II Compliance)	Medium	N/A	Critical	NTS8600-DC	Delivers traceable and reliable timestamps for regulatory compliance, offering a robust and cost-efficient solution for audit-ready transaction logging.
	Private 5G	High	N/A	Medium	NTS8600-DC	Provides stable and precise PTP timing for private 5G deployments, supporting reliable radio synchronization and scalable enterprise network rollout without telecom-grade complexity.

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NTS8600 Series Specifications & Capabilities

General Information	NTS8600			
Model Number	NTS8600-DC	NTS8600-AC	NTS8600I-DC	NTS8600I-AC
Design & Manufacture	Taiwan			
Harsh Environment Readiness				
Operating & Storage Temperature	-40 to +85°C (-40°F to 185°F)			
EMC Compliance	Industrial Grade EMC with IEC 61850-3 HV & IEEE 1613 Certified			
Safety	UL 62368-1 , CB IEC62368-1/EN62368-1			
Ruggedness	Military Grade MIL-STD 810F			
Operating Altitude	5100m			
Reliability - MTBF	20 Years			
Warranty Period	Standard: 5 years / Optional: 10 years (paid upgrade)			
Mechancial Specification				
Housing	Metal Housing with SPCC w/Zinc Plated Body + Aluminum cover			
Installation	1U Rack-mount			
Panel I/O	Front & Rear			
IP Rating	IP30			
Dimensions (L x W x H) mm	252.8 x 220 x 44			
Power Range & Inputs				
Input Voltage Range	19 – 66 VDC	85 – 264 VAC / 88 – 300 VDC	19 – 66 VDC	85 – 264 VAC / 88 – 300 VDC
Total Power Inputs	2	1	2	1
Relay Alarm	1 (Normal Open) , 24VDC ,1A , Pickup time: 2.5ms, Turn-off time: 1ms			
Network Connectivity & Management				
Total Ethernet Ports	Total 3 (2 x 100/1000 RJ45/SFP combo ports and 1 x 10/100 RJ45 port)			
PTP Capable Ports	2 x 100/1000 RJ45/SFP combo ports			
NTP Capable Ports	2 x 100/1000 RJ45/SFP combo ports and 1 x 10/100 RJ45 port			
Management Ports	1 x 10/100 RJ45 port			
Console Ports	1 RS-232 DB9 Console Port			
Support for SyncE Standard				
ITUT-G.8261	Yes			
ITUT-G.8262	Yes			
ESMC G.8264	Yes			
GNSS Receiver Specification				
Receiver Bands	Single Band			
GNSS Suppoted Systems	GPS, Galileo, GLONASS, BeiDou			
Constellation Support	Up to 3 Concurrent			
Legacy Time Synchronization Features				
Total Time Sync Channels	2 (2 x BNC)		6 (5 x BNC + 1 x TB3)	
Configurable Sync-Out Signals	1 PPS / 10MHZ / IRIG-B TTL		1 PPS / 10MHZ / IRIG-B TTL / IRIG-B AM / IRIG-B RS-485	
Configurable Sync-In Signals	N/A			
TTL Drive Level per Sync-Out Interface	5VDC 20mA TTL Compliant Per Channel			
Max. PPS Out and In Channels	Output: 2 Input: 0		Output: 5 Input: 0	
Max. IRIG-B TTL Out and In Channels	Output: 2 Input: 0		Output: 5 Input: 0	
Max. IRIG-B AM Out and In Channels	0		Output: 3 (Shared configuration) Input: 0	
Max. IRIG-B RS-485 Out and In Channels	0		Output: 1 Input: 0	
Time Accuracy				
PPS Accuracy	< 40ns			
PTP Accuract	±40 ns			
NTP Accuracy	±50 us Peak			
Holdover Accuracy	< 2 µs / 24 hours			
PTP Profiles				
Power Profiles	IEC/IEEE61850-9-3-2016 & IEEE C37.238-2011 & IEEE C37.238-2017			
Telecom Profiles	ITUT-G.8265.1 Frequency & ITUT-G.8275.1 Phase/Time & ITUT-G.8275.2 Phase/Time			
Automation Profiles	802.1AS			
Media Broadcast	SMPTE ST 2059-2 & AES67 Media Profile			
Enterprise	Enterprise			
Depth of Redundancy				
Power Redundancy	•		•	
SFP & Copper Auto Failover	•	•	•	•
Device Clustering (NTP)	•	•	•	•
PTP Over PRP	•	•	•	•
NTP Over PRP	•	•	•	•
NTP Over Bonding	•	•	•	•
Display Interface				
LED Status Indicator	3 x 3 Grid - Front Pannel LED Indicators			
LCD Display	N/A			
Storage Interface				
Micro SD Slot	1x micro-SD slot for Log ,FW and Configuration Backup & Restore			

NTS8610 Series Specifications & Capabilities

General Information	NTS8610					
Model Number	NTS8610	NTS8610M	NTS8610-S2	NTS8610M-S2	NTS8610-S3	NTS8610M-S3
Design & Manufacture	Taiwan					

Harsh Environment Readiness - Grandmaster						
Operating & Storage Temperature	-40 to +85°C (-40°F to 185°F)					
EMC Compliance	Industrial Grade EMC with IEC 61850-3 HV & IEEE 1613 Certified					
Safety	LVD IEC62368-1/EN62368-1					
Ruggedness	Military Grade MIL-STD 810F					
Operating Altitude	5100m					
Reliability - MTBF	20 Years					
Warranty Period	Standard: 5 years / Optional: 10 years (paid upgrade)					

Mechancial Specification						
Housing	Metal Housing with SPCC w/Zinc Plated Body + Aluminum cover					
Installation	1U Rack-mount					
Panel I/O	Rear					
IP Rating	IP40					
Dimensions (L x W x H) mm	440 x 300 x 44					

Power Range & Inputs						
Input Voltage Range	AC Power Module: 85−264 VAC or 88−300 VDC DC Power Module: ±20 to ±66 VDC					
Total Power Inputs	Supports up to 2 hot-swappable power modules					
Relay Alarm	1 (Normal Open & Normal Close) , 24 - 250 VDC ,75VA , Pickup time: <8 ms, Turn-off time: <6 ms					

Network Connectivity & Management						
Total Ethernet Ports	Total 4 (2 x 100/1000 RJ45/SFP combo ports and 2 x 10/100 RJ45 port)					
PTP Capable Ports	2 x 100/1000 RJ45/SFP combo ports					
NTP Capable Ports	2 x 100/1000 RJ45/SFP combo ports and 2 x 10/100 RJ45 port					
Management Ports	2 x 10/100 RJ45 port					
Console Ports	1 RS-232 DB9 Console Port					

Support for SyncE Standard						
ITUT-G.8261	Yes					
ITUT-G.8262	Yes					
ESMC G.8264	Yes					

GNSS Receiver Specification						
Receiver Bands	Single Band	Multiple Bands	Single Band	Multiple Bands	Single Band	Multiple Bands
GNSS Suppoted Systems	GPS, Galileo, GLONASS, BeiDou	GPS, Galileo, GLONASS, BeiDou, NavIC	GPS, Galileo, GLONASS, BeiDou	GPS, Galileo, GLONASS, BeiDou, NavIC	GPS, Galileo, GLONASS, BeiDou	GPS, Galileo, GLONASS, BeiDou, NavIC
Constellation Support	Up to 3 Concurrent	Up to 4 Concurrent	Up to 3 Concurrent	Up to 4 Concurrent	Up to 3 Concurrent	Up to 4 Concurrent

Legacy Time Synchronization Features						
Total Time Sync Channels	2 (2 x BNC)		6 (5 x BNC + 1 x TB3)		7 (5 x BNC + 1 x TB3 +1 x Fiber ST)	
Configurable Sync-Out Signals	1 PPS / IRIG-B TTL / AFNOR		1 PPS / IRIG-B TTL / IRIG-B AM / IRIG-B RS-485			
Configurable Sync-In Signals	N/A				1 PPS / IRIG-B TTL / IRIG-B AM IRIG-B RS-485	
TTL Drive Level per Sync-Out Interface	5VDC 125mA TTL Compliant					
Max. PPS Out and In Channels	Output: 2 Input: 0		Output: 5 Input: 0		Output: 4 Input: 1	
Max. IRIG-B TTL Out and In Channels	Output: 2 Input: 0		Output: 5 Input: 0		Output: 4 Input: 1	
Max. IRIG-B AM Out and In Channels	0		Output: 3 (Shared configuration) Input: 0		Output: 1 Input: 1	
Max. IRIG-B RS-485 Out and In Channels	0		Output: 1 Input: 0		1 (Output or Input)	

Time Accuracy						
PPS Accuracy	< 40ns					
PTP Accuract	±40 ns					
NTP Accuracy	±50 us Peak					
Holdover Accuracy	< 2 μs / 24 hours					

PTP Profiles						
Power Profiles	IEC/IEEE61850-9-3-2016 & IEEE C37.238-2011 & IEEE C37.238-2017					
Telecom Profiles	ITUT-G.8265.1 Frequency & ITUT-G.8275.1 Phase/Time & ITUT-G.8275.2 Phase/Time					
Automation Profiles	802.1AS					
Media Broadcast	SMPTE ST 2059-2 & AES67 Media Profile					
Enterprise	Enterprise					

Depth of Redundancy						
Power Redundancy	•	•	•	•	•	•
SFP & Copper Auto Failover	•	•	•	•	•	•
Device Clustering (NTP)	•	•	•	•	•	•
PTP Over PRP	•	•	•	•	•	•
NTP Over PRP	•	•	•	•	•	•
NTP Over Bonding	•	•	•	•	•	•

Display Interface						
LED Status Indicator	3 Front-Panel LED Groups and 1 Rear-Panel Power LED					
LCD Display	40×2 Character LCD for Status and Configuration					

Storage Interface						
Micro SD Slot	1x micro-SD slot for Log ,FW and Configuration Backup & Restore					

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