NTS8610 Series

Advanced SyncPro: IEC61850-3 HV & IEEE 1613 Certified NTP Server & IEEE 1588 PTP Grandmaster

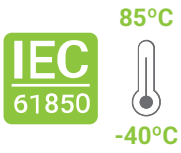
FEATURED HIGHLIGHTS

- IEC61850-3 HV & IEEE 1613 Certified NTP Server & IEEE 1588 PTP Grandmaster
- -40 to +85 °C Operating Temperature, IP40 Protection, and Up to 5100 m Altitude
- MIL-STD-810F Certified for Environmental and Transportation Reliability
- Dual Hot Swappable Power Modules with Wide Power Input Voltage Range
- Full Redundancy Across Power, System, Network, and Link Layers
- <40 ns PRTC-B/PTP, <50 µs NTP Accuracy, Calnex Verified
- Excellent Holdover Performance: <0.5 µs/8 Hours / <72 µs/7 Days
- Supports Power, Telecom, AVBTSN and Enterprise Profiles
- Four Ethernet Ports: Two PTP-Capable Combo Ports, All Four NTP-Capable
- Dual Media Combo Ports Enable Cost-Effective Copper/Fiber Deployment
- Supports Multi-Constellation GNSS with Anti-Jamming and Anti-Spoofing
- Optional Multi-Band GNSS SKU with OSNMA and Up to 4 Concurrent Constellations
- Antenna Fault Detection and Protection: Short Circuit and Disconnection
- Configurable IRIG-B (TTL, Fiber, AM, RS-485), and PPS Outputs
- Built-in 40×2 LCM for Display and Configuration
- Streamlined Cable Management with Rear-Facing Connections
- Standard 5-Year Warranty, Upgradeable to 10 Years

PRODUCT DESCRIPTION

IEC 61850-3 HV & IEEE 1613 Certified NTP/PTP Grandmaster with -40 to +85 °C Operating Temperature

With an operating temperature range of -40 to +85 °C, and IEC 61850-3 HV and IEEE 1613 offering up to four times the EMC protection compared to rugged industrial-grade standards, the NTS8610 is engineered to operate reliably in environments exposed to electrical noise, temperature extremes, and radiated disturbances—ensuring uninterrupted performance and high system availability. The NTS8610 NTP Server and IEEE 1588 PTP Grandmaster is the world's first solution fully certified to both IEC 61850-3 HV and IEEE 1613 standards, delivering exceptional resilience and precision in demanding applications such as power substations, telecommunications networks, automation systems, and enterprise infrastructure.



High Precision Timing

Rigorously tested by Calnex Solutions, a leader in network synchronization testing, the NTS8610 series delivers exceptional time precision, ensuring your power applications' synchronization needs are met with the highest standards of accuracy. Featuring proven PRTC-B accuracy within 40 ns, IEEE 1588 PTP accuracy within 40 ns, and NTP accuracy within 50 µs, this Grandmaster guarantees precise time distribution across your network.

Superior Holdover Performance

Holdover performance is critical to ensure uninterrupted and accurate time synchronization during loss of the primary time source. The NTS8610 series offers exceptional holdover stability, with a drift of less than 0.5 µs over 8 hours, and approximately 72 µs over 7 days, as validated by Calnex Solutions. When entering holdover mode, the system intelligently adjusts protocol attributes according to the active time profile (e.g., Power, Telecom), and proactively issues notifications via alarms and syslog to alert operators.

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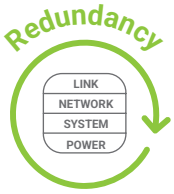
Versatile Profile Support

The Grandmaster supports a wide range of IEEE 1588 PTP profiles, making it suitable for deployment in power, telecom, AVB/TSN, and enterprise networks. For power utilities, it complies with IEEE C37.238-2011, C37.238-2017, and IEC/IEEE 61850-9-3:2016. Telecom synchronization is supported through ITU-T G.8265.1, G.8275.1, and G.8275.2 profiles. IEEE 802.1AS is also supported for time-sensitive networking in industrial and media environments. The Enterprise profile ensures interoperability across standard IT infrastructures. In addition, the Grandmaster supports SyncE for enhanced frequency stability in telecom applications.

GNSS Vulnerability Mitigation and Antenna Protection

NTS8610 offers enhanced robustness and resilience against jamming and spoofing attacks. By receiving signals from multiple constellations on single or multiple bands for cross-verification, the system can detect spoofing attempts and switch to holdover mode if necessary. The Grandmaster also features comprehensive antenna vulnerability mitigation, detecting short and disconnected antennas to maintain system integrity. For added protection, a surge protector is available for purchase, safeguarding your equipment from electrical surges and ensuring the reliability of your timing infrastructure.

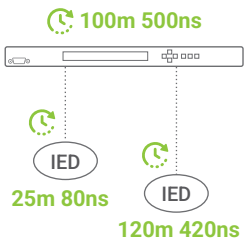


Comprehensive Redundancy

System redundancy is ensured through clustering, featuring IEC 62439-3 Parallel Redundancy Protocol (PRP) to provide network redundancy without data loss or downtime. Link redundancy is achieved via bonding and auto-failover functionality of combo ports, delivering resilient connectivity. Additionally, the NTS8610 series offers power redundancy with dual hot-swappable, detectable power modules supporting a wide input voltage range to safeguard against power failures.

Flexible Timing Input/Output

Modulated IRIG-B is ideal for long-distance transmission due to its resistance to signal degradation and compatibility with legacy equipment. Demodulated IRIG-B, available in TTL or RS-485 formats, offers higher precision, with IRIG-B RS-485 supporting distances up to 1200 meters. PPS outputs are crucial timing signals in modern IEC 61850 power applications, providing precise synchronization essential for various grid operations. The NTS8610 series supports up to two selectable synchronization modules, offering options such as IRIG-B (TTL, AM, Fiber, RS-485) and 1-PPS waveform input or output, with up to seven configurable channels. Additionally, IRIG-B RS-485 can be extended over long distances using the ATOP SF63 serial-to-fiber converter via fiber-optic cable.



Ensuring Precision with Comprehensive Delay Compensation

Compensation for antenna delay is essential because long antenna cables can introduce timing errors that affect the accuracy of synchronized operations. Similarly, output delay compensation for signals such as IRIG-B and PPS is vital, especially in systems with multiple IEDs connected. It is much easier and more efficient to compensate for cable delays at the Grandmaster level rather than at each individual IED, as not all IEDs support delay compensation. Handling these adjustments centrally at the Grandmaster guarantees that all connected devices operate in perfect sync, optimizing the performance and coordination of critical substation operations.

Trusted GNSS Timing with OSNMA

NTS8610M supports Galileo OSNMA, a feature that helps verify whether received Galileo navigation messages are genuine. In simple terms, it helps the device check that the GNSS timing data comes from a real source and has not been tampered with. This helps detect possible spoofing attempts and improves the trust, reliability, and integrity of time synchronization for critical infrastructure applications.

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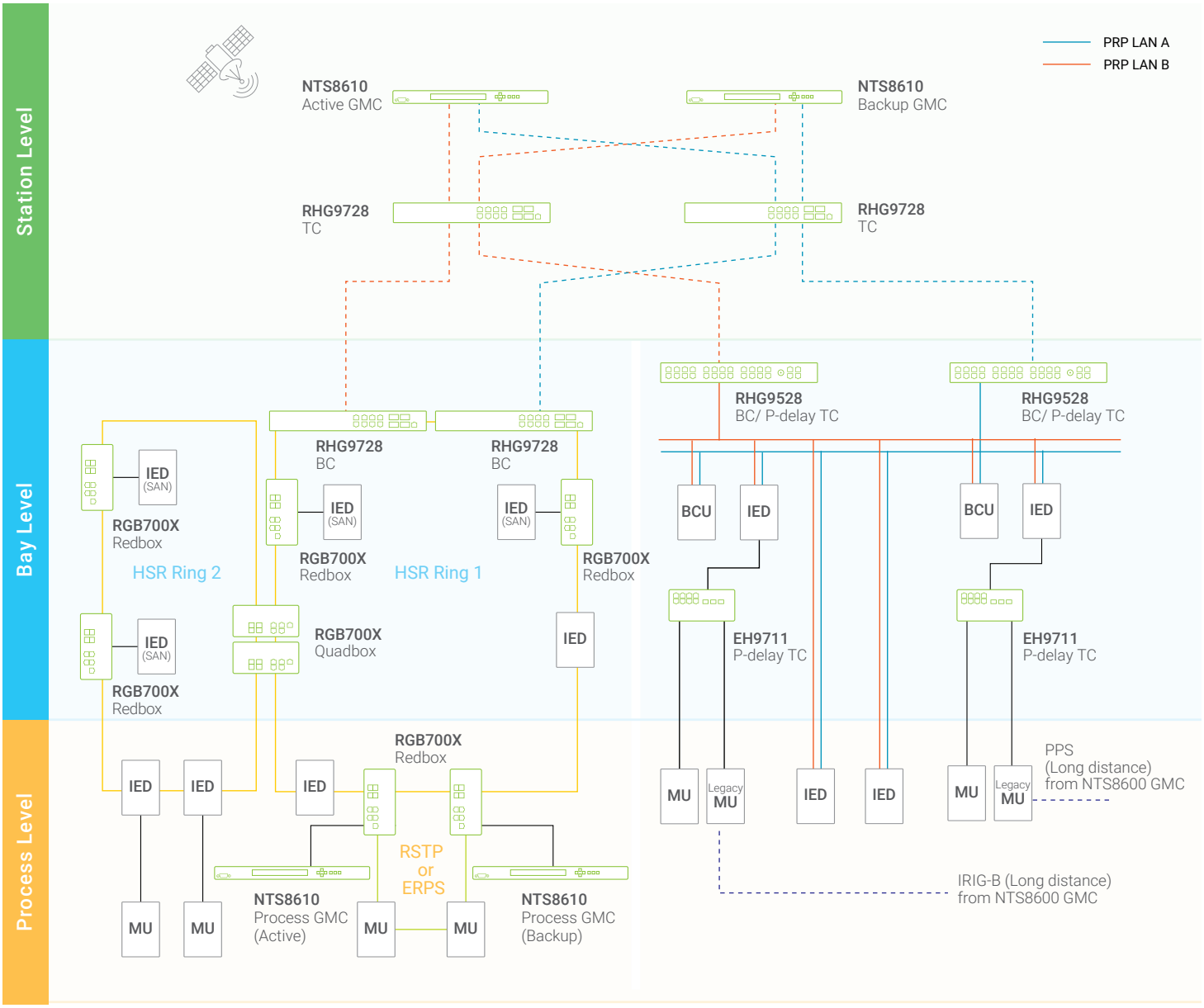
APPLICATION CASE

IEEE 1588 in Power Networks: Precision Time Synchronization and Time Redundancy

Two NTS8610 units in the station layer determine the Active and Backup GMC through BMCA. The Active GMC synchronizes to both GPS and GNSS satellite systems and transmits via IEC 62439-3 PRP to two power domains composed of PRP and HSR networks. According to IEC 61850-9-3 and IEEE C37.238-2017, the total end-to-end budget is 1us, with GMC being 250ns. The NTS8610 achieves superior accuracy of <40ns, reserving more budget for other devices. For early MU devices that rely on 1PPS or IRIG-B for synchronization, the NTS8610 offers 1PPS, IRIG-TTL, IRIG-B AM, IRIG-B RS-485, and RS-485 to fiber-optics by SF-63 for long-distance transmission and delay compensation.

The HSR network provides zero-packet-loss redundancy but also increases latency. Devices in the process layer require more precise timing. When the end-to-end budget cannot be met, a GMC must be deployed to aid in accurate timing for critical devices. The NTS8610, certified to IEC61850-3 HV & IEEE 1613, operates reliably in harsh process layer environments, providing precise synchronization.

In addition to the NTS8610, our timing solution for power substations also includes BC or TC of RHG9728 and RHG9528, P-Delay TC of EH9711, HSR Redbox, and Quadbox of RGB700X. Check our website for more detailed information on these products.



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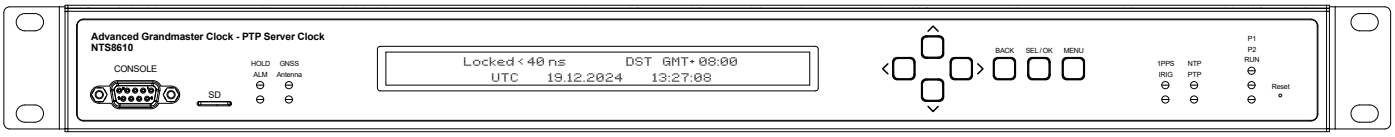
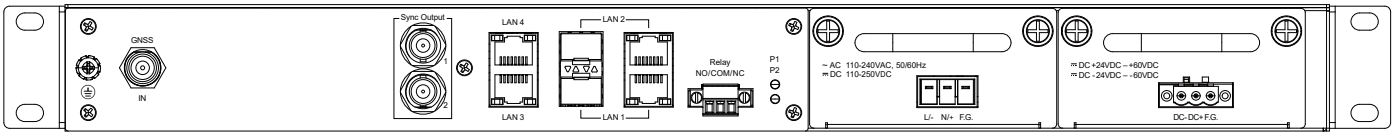
CONNECTORS

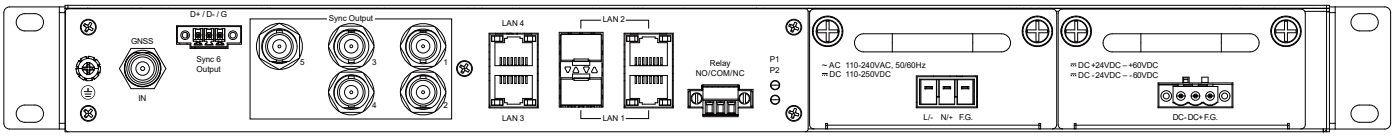
Front View – NTS8610 (All models)



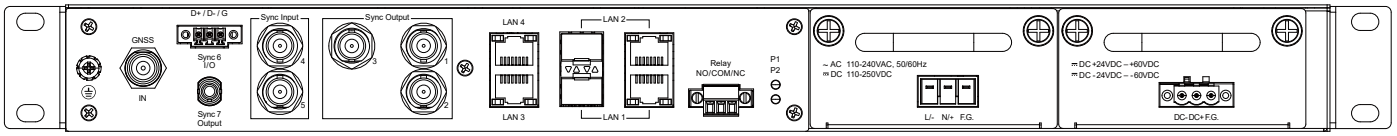
Back View - NTS8610 & NTS8610M



Back View - NTS8610-S2 & NTS8610M-S2

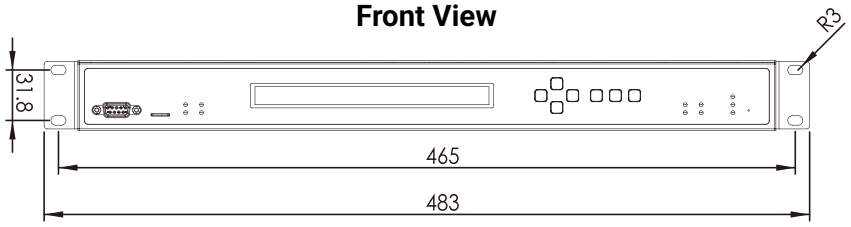


Back View - NTS8610-S3 & NTS8610M-S3

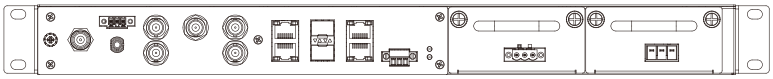


DIMENSIONS & LAYOUT

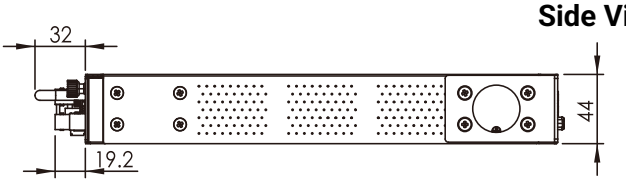
Front View

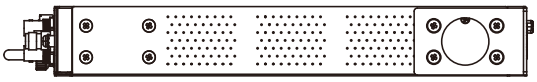


Back View

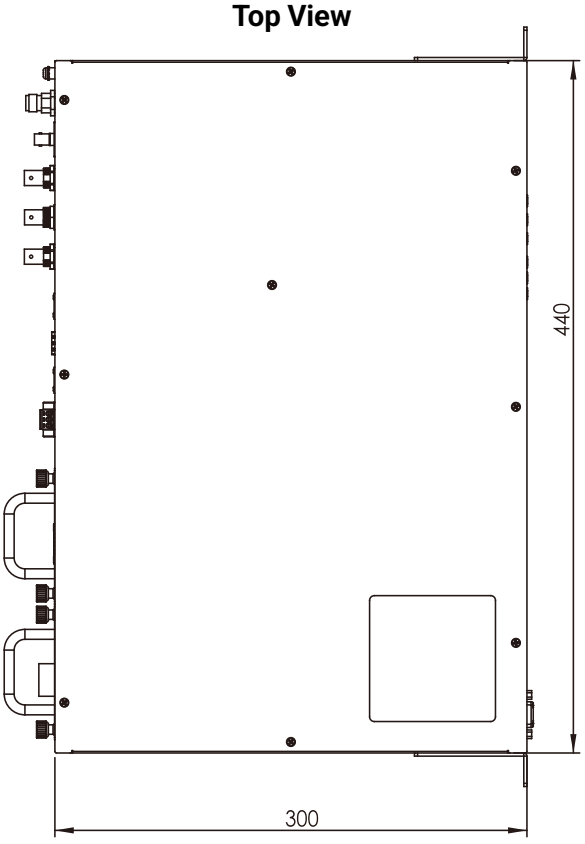


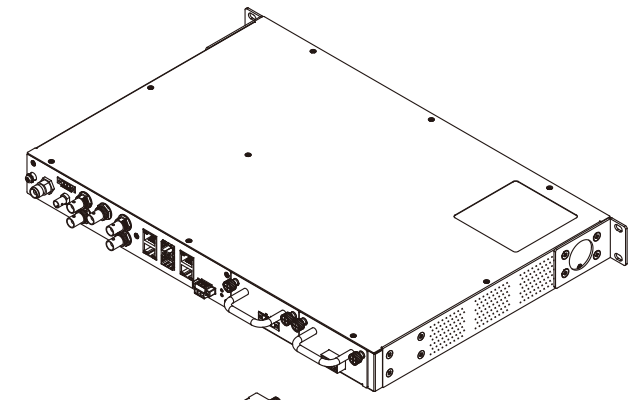
Side View

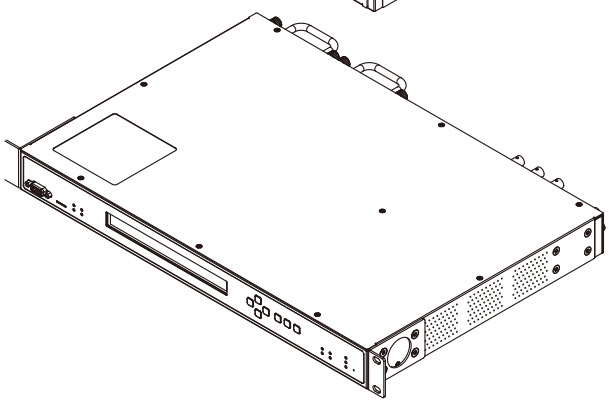




Top View







unit: mm

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SPECIFICATIONS

Technical Specifications		
Model Name	NTS8610 & NTS8610M Series (See ordering information)	
Single Band (NTS8610 Series) - GNSS Receiver Specifications		
GNSS Input Ports	1x GNSS Input; TNC (F) - active Antenna	
GNSS Module Specific Information	Multi-Constellation Supported: GPS L1, GLONASS L1, BeiDou B1, Galileo E1 Maximum Concurrent Constellations: 3 Leap Second: Supported Sensitivity for GPS: • Tracking: -166 dBm • Reacquisition: -160 dBm • Cold Start: -148 dBm • Hot Start: -160 dBm	
Acquisition Times	Cold Start: < 45 seconds Warm Start: < 7 seconds	
Antenna Requirements	3.3 V < 50 mA Minimum gain = 5dB; Maximum gain + Cable Attenuation ≤ 40dB	
GNSS Vulnerability Mitigation	Jamming	Support Detection, Warning and Switch to OCXO Holdover
	Spoofing	Support Detection, Warning and Switch to OCXO Holdover (GNSS Antenna Only)
Antenna Vulnerability Mitigation	Antenna Cable Short	Support Detection, Warning and Switch to OCXO Holdover Mode
	Antenna Disconnection	Support Detection, Warning and Switch to OCXO Holdover Mode
Multiple Band (NTS8610M Series) - GNSS Receiver Specifications		
GNSS Input Ports	1x GNSS Input; TNC (F) - active Antenna	
GNSS Module Specific Information	Multi-Constellation Supported: GPS: L1C/A, L2C or L5 Galileo: E1, E5a or E5b BeiDou: B1I, B2I or B2a GLONASS: L1OF NavIC: L5 Maximum Concurrent Constellation: 4 Leap Second: Supported Sensitivity for GPS + GLONASS + Galieo + BeiDou • Tracking: -167 dBm • Reacquisition: -160 dBm • Cold Start: -148 dBm • Hot Start: -157 dBm	
Acquisition Times	Cold Start: < 24 seconds Warm Start: < 2 seconds	
Antenna Requirements	3.3 V < 50 mA Minimum gain = 6dB; Maximum gain + Cable Attenuation ≤ 30dB	
GNSS Vulnerability Mitigation	Jamming	Support Detection, Warning and Switch to OCXO Holdover
	Spoofing	Support Detection, Warning and Switch to OCXO Holdover (GNSS Antenna Only)
Antenna Vulnerability Mitigation	Antenna Cable Short	Support Detection, Warning and Switch to OCXO Holdover Mode
	Antenna Disconnection	Support Detection, Warning and Switch to OCXO Holdover Mode

Antenna Specification (Accessories)	
GNSS Antenna (59902521G)	GNSS Receiver: GPS L1, GLONASS L1, BeiDou B1, Galileo E1 LNA Gain: 40dB min Weather-Proof Housing: IP69K Operating and Storage Temperature: -40°C - 85°C ESD: ±15KV Air Discharge Mechanical Size: 66.5 mm dia. x 21 mm H MIL-STD-810F Supply Voltage Range: 2.5 to 16VDC
GPS Antenna (59902531G)	GNSS receiver: GPS L1, Galileo E1 LNA Gain: 40dB min Weather-Proof Housing: IP69K Operating and Storage Temperature: -40°C - 85°C ESD: ±15KV Air Discharge Mechanical size: 66.5 mm dia. x 21 mm H MIL-STD-810F Supply Voltage Range: 2.5 to 16VDC
Anti-Jamming GNSS Antenna (59902661G)	GNSS Receiver: GPS L1, GLONASS L1, BeiDou B1, Galileo E1 LNA Gain: 40dB typ. Weather-Proof Housing: IPX7 Operating and Storage Temperature: -40°C - 85°C ESD: ±15KV Air Discharge Mechanical Size: 100 mm dia. x 102 mm H MIL-STD-810F Supply Voltage Range: 2.5 to 16VDC
Dual-band GNSS Antenna (59903031G) For NTS8610M series	Supports the most widely used L1 + L5 bands, providing a cost-effective option GNSS Receiver: GPS: L1C/A or L5 Galileo: E1, E5a or E5b BeiDou: B1I or B2a GLONASS: L1OF NavIC: L5 LNA Gain: 40 dB min Weather-Proof Housing: IP69K Operating and Storage Temperature: -40°C - 85°C ESD: ±15KV Air Discharge Mechanical Size: 66.5 mm dia. x 21 mm H MIL-STD-810F Supply Voltage Range: 2.5 to 16VDC
Multi-band GNSS Antenna (59902851G) For NTS8610M series	Suitable for full-band applications or projects requiring L2/L5 flexibility. GNSS Receiver: GPS: L1C/A, L2C or L5 Galileo: E1, E5a or E5b BeiDou: B1I, B2I or B2a GLONASS: L1OF NavIC: L5 LNA Gain: 37dB min Weather-Proof Housing: IP69K Operating and Storage Temperature: -40°C - 85°C ESD: ±15KV Air Discharge Mechanical Size: 66.5 mm dia. x 21 mm H MIL-STD-810F Supply Voltage Range: 2.5 to 16VDC

Anti-Jamming Multi-band GNSS Antenna (59903021G) For NTS8610M series	GNSS Receiver: GPS: L1C/A, L2C or L5 Galileo: E1 or E5b BeiDou: B1I, B2I or B2a GLONASS: L1OF NavIC: L5 LNA Gain: 40dB min Weather-Proof Housing: IPX9K Operating and Storage Temperature: -40°C - 85°C ESD: ±15KV Air Discharge Mechanical Size: 90 mm dia. x 180 mm H MIL-STD-810F Supply Voltage Range: 2.5 to 16VDC
Maximum Antenna Cable Length	Antenna cable: Without amplifier: LMR-400: 150M CFD-240: 100M CFD-200: 50M RG58A/U: 25M With Amplifier: LMR-400: 250M CFD-240: 100M CFD-200: 80M RG58A/U: 50M
Maximum Sync-Out Cable Length	RG58 A/U Sync-Out cable: 1PPS, IRIG-B TTL: 150M IRIG-B AM: 150M @ 1K impedance, 300M @ 10K impedance IRIG-B RS485: 1200M IRIG-B Fiber TTL: 1500M IRIG-B RS-485 with SF63 Fiber optic 2KM
Proven Clock Accuracy (Relative to UTC)	
1PPS	±40 ns Peak *1
Demodulated IRIG-B	±40 ns Peak *1
Modulated IRIG-B AM	±1 µs Peak *1
RS-485 IRIG-B	±100 ns Peak *1
PTP Timestamp	±40 ns Peak *1
NTP Timestamp	±50 us Peak, ±40 us Average *1
Holdover accuracy - OCXO	< 0.5 us / 8 hours / < 72 us / 7 days *2
	*1. Device locked to satellites for at least 24 hours. *2. Device locked to satellites for at least 48 hours before holdover
Network Interface	
Ethernet Standards	IEEE 802.3 10BaseT IEEE 802.3u 100BaseT(X) IEEE 802.3ab for 1000BaseT(X) IEEE 802.3u for 100Base-FX IEEE 802.3z for 1000Base-X
Gigabit Ethernet Ports	Two Combo ports, 2x 10/100/1000BASE-T(X) RJ45 or 2x 100/1000 Base-X SFP Support Synchronous Ethernet (SyncE) per ITU-T G.8261 ITU-T, G.8262 and G.8264 ESMC), PTP-Capable and NTP-Capable
Fast Ethernet Ports	2 x 10/100 BASE-T(X) RJ45, NTP-Capable
LCD Display & Control Buttons	
LCD Spec	Character Display LCD 40x2 5x8 Dots Includes Cursor LCD Operating Temperature Range: -20°C to 70°C LCD Over-Temperature Protection
Control Buttons	Up, Down, Left, Right, Menu, Enter, Back
I/O	
Console	1x DB9 Serial Console Port
SD slot	1x micro-SD slot

Relay - Alarm Contact	Three Pins Relay with NC, NO and GND. Rated Operational Voltage: 24-250 VDC Continuous carrier: 3 A max. 75VA max Dropout Time: ≤ 6 ms typical Pickup time: ≤ 8 ms
Sync Module – S1 (Applied for NTS8610 & NTS8610M)	
Sync1 ~ Sync2	Two configurable output channels (coaxial BNC (F) connector): 1. 1PPS/PPM/PPH Output (Square Wave, configurable pulse width) 2. IRIG-B TTL Output (Support IEEE 1344 and C37.118.1) 3. AFNOR French Time Code Output 4. ASCII Timestamp Output*
Sync Module – S2 (Applied for NTS8610-S2 & NTS8610M-S2)	
Sync1 ~ Sync2	Two configurable output channels (coaxial BNC (F) connector): 1. 1PPS/PPM/PPH Output (Square Wave, configurable pulse width) 2. IRIG-B TTL Output (Support IEEE 1344 and C37.118.1) 3. AFNOR French Time Code Output 4. ASCII Timestamp Output*
Sync3 ~ Sync5	Three configurable output channels (Sync 3 - Sync 5, coaxial BNC (F) connector): 1. 1PPS/PPM/PPH Output (Square Wave, configurable pulse width 2. IRIG-B TTL B000~B007 Output (Support IEEE 1344 and C37.118.1) 3. IRIG-B AM B120~B127 Output (Support IEEE 1344 and C37.118.1) 4. AFNOR French Time Code 5. ASCII Timestamp Output*
Sync6	One configurable output channel (Sync 6, TB3 connector): 1. IRIG-B RS-485 B000~B007 Output (Support IEEE 1344 and C37.118.1) 2. AFNOR French Time Code Output
Sync Module – S3 (Applied for NTS8610-S3 & NTS8610M-S3)	
Sync1 ~ Sync2	Two configurable output channels (coaxial BNC (F) connector): 1. 1PPS/PPM/PPH Output (Square Wave, configurable pulse width) 2. IRIG-B TTL Output (Support IEEE 1344 and C37.118.1) 3. AFNOR French Time Code Output 4. ASCII Timestamp Output*
Sync3	One configurable output channel (Sync 3, coaxial BNC (F) connector): 1. 1PPS/PPM/PPH Output (Square Wave, configurable pulse width) 2. IRIG-B TTL B000~B007 Output (Support IEEE 1344 and C37.118.1) 3. IRIG-B AM B120~B127 Output (Support IEEE 1344 and C37.118.1) 4. AFNOR French Time Code 5. ASCII Timestamp Output*
Sync4	One configurable input channel (coaxial BNC (F) connector): 1. IRIG-B TTL B000~B007 Input (Support IEEE 1344 and C37.118.1) 2. 1PPS input 3. AFNOR French Time Code TTL Input
Sync5	One configurable modulated input channel (coaxial BNC (F) connector): 1. IRIG-B AM B120~B127 Input (Support IEEE 1344 and C37.118.1) 2. Modulated AFNOR French Time Code Input
Sync6	One configurable input/output channel (Sync 6, TB3 connector): 1. IRIG-B RS-485 B000~B007 Input (Support IEEE 1344 and C37.118.1) 2. IRIG-B RS-485 B000~B007 Output (Support IEEE 1344 and C37.118.1) 3. AFNOR French Time Code RS-485 Input 4. AFNOR French Time Code RS-485 Output
Sync7	One configurable output channel (ST (F) connector): 1. 1PPS/PPM/PPH Output (Square Wave, configurable pulse width) 2. IRIG-B TTL Output (Support IEEE 1344 and C37.118.1) 3. AFNOR French Time Code Output 4. ASCII Timestamp Output*

* Upon customer request

Electrical Input/Output Drive Levels	
1PPS/IRIG-B TTL Output	5VDC 125 mA TTL compliant
Modulated IRIG-B Output	5Vp-p, 3.3:1 ratio, AM, Sinewave
1PPS/IRIG-B TTL Input	5VDC HCMOS, > 2.0V High <0.8V Low
Modulated IRIG-B Input	1Vp-p to 8 Vp-p, ratio 3.3:1, AM
IRIG-B Fiber TTL	820nm, Different fiber size: 50/125um, 62.5/125um, Output Driver Typ. 13.1uW
IRIG-B RS485 Input/Output	±5 VDC IRIG-B Half-Duplex; 32 Transceivers Max. a bus
Frequency	
Oscillator	Advanced managed OCXO, with temperature drifting compensation
IEEE1588 Profiles	
Default	IEEE 1588V2 (PTPv2) Default UDP (IEEE 1588-2008 Annex D and J) Default 802.3 (IEEE 1588-2008 Annex F and J)
Power	IEC/IEEE 61850-9-3-2016 Power Utility Profile IEEE C37.238-2011 Power Profile, with VLAN support IEEE C37.238-2017 Power Profile, with VLAN support
Telecom	ITUT-G.8265.1 Frequency ITUT-G.8275.1 Phase/Time ITUT-G.8275.2 Phase/Time
AVBTSN	802.1AS Profile
Enterprise	Enterprise Profile
Media Broadcast	AES67 Media Profile (Ready) SMPTE ST 2059-2 (In Development Plan)
System Modes	
GNSS Locked Mode	Synchronizes time with GNSS signals for high accuracy
Holdover Mode	Maintains time using the OCXO clock after GNSS is unavailable
Free Run Mode	Operates independently using RTC as the time source along with the OCXO clock
Boundary Clock Mode	Synchronizes to an upstream PTP master and distributes PTP time downstream.
APTS Mode	Provides alternate PTP time-source support when GNSS is unavailable. S3 models can also use external timing inputs such as IRIG-B and PPS.

Functions & Protocols		
Protocols	Network Synchronization	RFC 1119 (NTPv2) Server RFC 1305 (NTPv3) Server RFC 5905 (NTPv4) Server RFC 1769 (SNTPv3) Server RFC 2030 (SNTPv4) Server
	Network Protocols	VLAN (IEEE 802.1q) filtering/tagging IEEE 802.1p QoS DSCP IPv4, IPv6 TCP, UDP DHCP Client TACAS+/RADIUS
	Redundancy	Devices Clustering (NTP Only) PRP (IEC 62439-3) Bonding – Active & Backup Bonding – LACP Combo Ports
	Management	HTTP, HTTPS SNMP v1/v2,v3 SSH/Telnet (CLI), could be enabled/disabled Console CLI Estimated Time Accuracy GNSS Status Power Status PTP & NTP Status SD/MMC Backup & Restore
	Event & Alarm	Event Log Syslog Relay & Alarm Management SNMP Trap
Physical Characteristics		
Housing Dimension (W x H x D) Weight Installation	SPCC w/Zinc Plated Body + Aluminum cover IP40 Metal Housing 440 x 300 x 44 Chassis made of 1 mm SECC Sheet 3.9 KG Max 1U Rackmount	
Power Supply Module		
DC Module	Rated Supply Voltage: ±24 – ±60 VDC Input Voltage Range: ±20 – ±66 VDC	
AC Module	Rated Supply Voltage: 110 – 240 VAC, 50/60 HZ 110 – 250 VDC Input Voltage Range: 85 – 264 VAC, 50/60 HZ 88 – 300 VDC	
Power Consumption	Approximately 15 W (Typical) Approximately 20 W (Max)	
Environmental Limits		
Operating Temperature Storage Temperature Operating Altitude Ambient Relative Humidity	-40°C to +85°C (-40°F to 185°F) -40°C to +85°C (-40°F to 185°F) 5100m 5% to 95% (Non-condensing)	

REGULATORY APPROVALS

Regulatory Approvals				
Safety	UL 62368-1, CB IEC62368-1/EN62368-1 (Certified Operating Temperature: 75°C), IEC 60255-5			
EMC	FCC(EMI): FCC Part 15, Subpart B, Class A CE(EMI): EN 55032, EN 61000-6-4, Class A EN 61000-3-2 (Current Harmonics) EN 61000-3-3 (Voltage Flicker) CE(EMS): EN 55035, EN 61000-6-2 CE(GNSS): EN 303 413. EN 301 489-19 IEC 60255-25, IEC 60255-22-1			
Power Automation	IEC 61850-3, IEEE 1613			
Test	**Item**		**Value**	**Level**
IEC 61000-4-2	ESD	Contact Discharge Air Discharge	±8 KV ±15 KV	4 4
IEC 61000-4-3	RS	Enclosure Port	10 (V/m), 80-3000 MHz 20 (V/m), 80-1000 MHz	3
IEC 61000-4-4	EFT	AC Power Port DC Power Port Signal Port	±4.0 kV ±4.0 kV ±4.0 kV	4 4 Special
IEC 61000-4-5	Surge	AC Power Port AC Power Port DC Power Port DC Power Port Signal Port	Line-to Line±2.0 kV Line-to Earth±4.0 kV Line-to Line±1.0 kV Line-to Earth±2.0 kV Line-to Earth±4.0 kV	4 4 4 3 4
IEC 61000-4-6	CS	0.15-80 MHz	10V rms 0.15-80 MHz, 80% AM	3
IEC 61000-4-8	PFMF	(Enclosure)	100 A/m continuous, 1000 A/m (3s)	5
IEC 61000-4-11	DIP	AC Power Port	30% Reduction (Voltage Dips), 1 Period 60% Reduction (Voltage Dips), 50 Period 100%, Reduction (Voltage Interruptions), 5 Period 100% Reduction (Voltage Interruptions), 50 Period	-
IEC 61000-4-12	Ring wave immunity	AC Power Port AC Power Port DC Power Port DC Power Port Signal Port	Line-to Line±1.0 kV Line-to Earth±2.0 kV Line-to Line±1.0 kV Line-to Earth±2.0 kV Line-to Earth±4.0 kV	3 3 3 3 3
IEC 61000-4-16	Main Frequency Voltage	DC Input Port Signal Port	30 V Continuous, 300 V 1s 30 V Continuous, 300 V 1s	4 4
IEC 61000-4-17	Ripple	DC Input Port	10% of Unit	3
IEC 61000-4-18	Damped Oscillatory	AC Power Port	2.5 kV common, 1 kV differential mode @ 1 MHz	3
		Signal Port Telecommunication Port	2.5 kV common, 1 kV differential mode @ 1 MHz	3

IEC 61000-4-29	DC Voltage Dips & Interruptions	DC Input Port	30% Reduction (Voltage Dips): 0.1 sec 60% Reduction (Voltage Dips): 0.1 sec 100% Reduction (Voltage Interruption): 0.05 sec	
IEC 60255-22-1	1 MHz burst immunity	AC Power Port AC Power Port DC Power Port DC Power Port Signal Port	Line-to Line±1.0 kV Line-to Earth±2.5 kV Line-to Line±1.0 kV Line-to Earth±2.5 kV Line-to Earth±1.0 kV	
Shock Drop Vibration	MIL-STD-810G Method 516.5 MIL-STD-810F Method 516.5 MIL-STD-810F Method 514.5 C-1 & C-2			
RoHS2	Yes			
MTBF	20 years			
Warranty	5 years / Upgradable to 10 years			

ORDERING INFORMATION

Main core and Modules

Model Name	Part Number	GNSS Capability	Sync Module	Power Modules
NTS8610	1P1NTS86100001G	Single Band & Multi-Constellation	S1	Support Two Hot Swappable Power Modules. 2x NTS8610-AC or 2x NTS8610-DC or 1x NTS8610-DC + 1x NTS8610-AC
NTS8610-S2	1P1NTS86100002G		S2	
NTS8610-S3	1P1NTS86100003G		S3	
NTS8610M	1P1NTS8610M001G	Multi-Bands & Multi-Constellation	S1	
NTS8610M-S2	1P1NTS8610M002G		S2	
NTS8610M-S3	1P1NTS8610M003G		S3	
NTS8610M (OSNMA)	1P1NTS8610M004G	Multi-Bands & Multi-Constellation Galileo OSNMA supported*	S1	
NTS8610M-S2 (OSNMA)	1P1NTS8610M005G		S2	
NTS8610M-S3 (OSNMA)	1P1NTS8610M006G		S3	

* GLONASS not supported on OSNMA models

• Refer to the NTS86X0 Selection Guide for product differences.

Power Modules

Model Name	Part Number	Description
NTS8610-DC	1P1NTS8610DC01G	Rated Supply Voltage: ±24 – ±60 VDC Input Voltage Range: ±20 – ±66 VDC
NTS8610-AC	1P1NTS8610AC01G	Rated Supply Voltage: 110 – 240 VAC, 50/60 Hz 110 – 250 VDC Input Voltage Range: 85 – 264 VAC, 50/60 Hz 88 – 300 VDC

Optional Accessories – Antenna, Amplifier, Surge Protector and Mounting Kits

Model name	Part Number	Description
Single Band GNSS Antenna	59902521G	High Gain Multi-Constellation & Single Band TNC-Female Antenna (See the Antenna Specifications section above for a spec summary)
Single Band GPS Antenna	59902531G	High Gain GPS L1 TNC-Female Antenna (See the Antenna Specifications section above for a spec summary)
Anti-Jamming GNSS Antenna	59902661G	High Gain Anti-Jamming Multi-Constellation & Single Band TNC-Female Antenna (See the Antenna Specifications section above for a spec summary)
Multi Band GNSS Antenna	59902851G	High Gain Multi-Constellation and Triple-bands TNC-Female Antenna (See the Antenna Specifications section above for a spec summary)
Dual Band GNSS Antenna	59903031G	High Gain Multi-Constellation and Dual-bands TNC-Female Antenna (See the Antenna Specifications section above for a spec summary)
Multi Band Anti-Jamming GNSS Antenna	59903021G	High Gain Anti-Jamming Multi-Constellation and Triple-bands TNC-Female Antenna (See the Antenna Specifications section above for a spec summary)
RF Amplifier	70100000000092G	Inline TNC-Female RF (1559-1610MHz) Amplifier 25dB with Supply Volts 3-10 VDC and 10 mA including One TNC Male to TNC Male adapter
Surge Protector	70100000000093G	SOCAA 4LTJ10TP001 – TNC-Female 10 kA Surge protection device including One TNC Female to TNC Female adapter

Advanced Surge Protector	70100000000094G	Phoenix Contact CN-UB-280DC-BB – N-Type 20 KA Surge protection device including Two N-type Male to TNC Female
Mounting Kits	70100000000095G	The Antenna Mounting Kit Includes an L-bracket, Mount Adapter and Ground Plane. (See NTS8610 User Manual for More Details)
TNC M to M Adaptor	59902971G	TNC Male to Male Adaptor
TNC F to F Adaptor	59902981G	TNC Female to Female Adaptor

Optional Accessories – Antenna and Sync-Out Cables

Model name	Part Number	Description
Antenna Cable RG58	Made to Order	TNC-Male to TNC-Male RG58 Antenna Cable. Maximum RG58 Antenna Cable Length: 25m
Antenna Cable CFD-200	Made to Order	TNC-Male to TNC-Male CFD-200 Antenna Cable. Maximum CFD-200 Antenna Cable Length: 50m
Antenna Cable CFD-240	Made to Order	TNC-Male to TNC-Male CFD-240 Antenna Cable. Maximum CFD-240 Antenna Cable Length: 100m
Antenna Cable LMR-400	Made to Order	TNC-Male to TNC-Male LMR-400 Antenna Cable. Maximum LMR-400 Antenna Cable Length: 150m Maximum LMR-400 Antenna Cable Length with RF Amplifier: 250m
Sync-Out Cable (IRIG-B/PPS TTL)	Made to Order	BNC-Male to BNC-Male Custom-Length RG58 A/U Antenna Cable. Specify desired length when ordering. Supports up to 150 m.

Optional Accessories – SFP Modules

Model name	Part Number	Description
AXFD-1314-0523	522AXFD1314001G	SFP Transceiver, 155 Mbps, 1310 nm, multi-mode, 2 km, -40°C to +85°C, DDMI
AXFD-1314-0553	522AXFD1314011G	SFP Transceiver, 155 Mbps, 1310 nm, single-mode, 30 km, -40°C to +85°C, DDMI
AXGD-5854-0513	522AXGD5854001G	SFP Transceiver, 1250 Mbps, 850 nm, multi-mode, 550 m, 3.3V, -40°C to +85°C, DDMI
AXGD-1354-0523	522AXGD1354001G	SFP Transceiver, 1250 Mbps, 1310 nm, multi-mode, 2 km, 3.3V, -40°C to +85°C, DDMI
AXGD-1354-0533	522AXGD1354011G	SFP Transceiver, 1250 Mbps, 1310 nm, single-mode, 10 km, 3.3V, -40°C to +85°C, DDMI
AXGD-3354-0593	522AXGD3354001G	SFP Transceiver, 1250 Mbps, 1310 nm, single-mode, 40 km, 3.3V, -40°C to +85°C, DDMI

Optional Accessories – External Power Adapter and Converter

Model name	Part Number	Description
SDR-75-24	505007522400001G	Din-rail Power Supply/T; 88 - 264 VAC/124 - 370 VDC to 24 VDC 3.2 A; 75W
SF63 Series	See ATOP SF63 Datasheet	Industrial Serial to Fiber Media Converter for Long Distance Transmission