SyncServer S350 SAASM

Ultra Precise & Versatile GB-GRAM SAASM Network Time Server

KEY FEATURES

- SAASM GB-GRAM PPS Receiver with RAIM
- Military Signal P(Y) Code SAASM GPS Receiver and Civil Signal C/A-Code GPS Receiver
- Ultra High-Bandwidth NTP Time Server
- Stratum 1 Operation via GPS Satellites
- Gigabit Ethernet port plus 3 additional Independent 10/100Base-T Ports
- Independent Time References: GPS, Timecodes, 1PPS, 10 MHz
- Versatile Timing Outputs: IRIG A/B/E/G/NASA36/XR3/2137 AM or DCLS, 1PPS, 10 MHz, Sysplex
- Stratum 2 Operation via NTP Servers
- RADIUS, NTPv4 Autokey, MD5 Authentication
- Secure Web-Based Management
- SSH, SSL, SCP, SNMP, Custom MIB, HTTPS, Telnet, and More
- IPv6 and IPv4 Compatible
- Nanosecond Time Accuracy to UTC
- Hot Start Ready via DAGR/PLGR
- Alarm Relays
- Rubidium & OCXO Oscillator Upgrades

KEY BENEFITS

- Synchronize Thousands of Client, Server & Workstation Clocks
- Very Reliable and Secure Source of Time for Your Network
- Multiple NTP Ports for Easy Network Configuration and Adaptation
- Extremely Accurate Time Source for Network Synchronization
- Enhanced Network & Security Features
- User Prioritized Reference Selection between, GPS, Timecode, 1PPS and 10 MHz
- Intuitive Web Interface for Easy Control & Maintenance
- Compliant with DoD mandate to use GPS SAASM PPS receivers

Setting new standards for security, reliability, redundancy and versatility in network time servers, the SyncServer® S350 SAASM Network Time Server is the solution for synchronizing the time on servers, workstations and network elements for DoD networks. Accurately synchronized clocks are critical for network log file accuracy, security, electronic transactions, database integrity, communications, and many other essential DoD applications.

The S350 continues the SyncServer legacy of being the easiest to set up and maintain network time servers in the world. The front panel is designed to quickly bring the server online with a few front panel keystrokes or DHCP. To fully configure the unit, use the very intuitive web interface or the step-by-step web-based wizards for the most common operations.

Once online, the S350 provides very reliable and secure network synchronization technology by combining multi-port network interfaces with multiple time reference technology and enhanced security protocols. Support of essential security and network protocols provide for easy management and seamless integration into existing and future networks. The S350 is the only time server available with a Gigabit Ethernet port plus three additional 10/100Base-T ports. This translates into high availability and throughput to support hundreds of thousands of network clients while maintaining microsecond caliber NTP timestamp accuracy. These four completely independent ports provide the flexibility needed to easily adapt to different and changing network topologies and security requirements.

The Stratum 1 S350 SAASM with a secure, Selective Availability Anti-Spoofing Module (SAASM) based GB-GRAM compliant GPS receiver will automatically synchronize to GPS, IRIG, 1PPS, and 10 MHz sources. Users can set the priority and the S350 will smoothly transition from one reference to the next if the higher priority signal is lost or regained. The S350 can also revert to a Stratum 2 mode and retrieve time from other user-designated time servers. Similarly the S350 generates many timecodes, 1PPS and 10 MHz outputs and can be upgraded to an internal Rubidium atomic oscillator that keeps the S350 accurate to microseconds per day in holdover.

The SyncServer S350 SAASM is the answer to bringing the ultimate in NTP timing to your network – securely, reliably and easily – and for many years to come.

S350 NETWORKING EXCELLENCE

Gigabit Ethernet for Unmatched High Performance with Unparalleled Flexibility

The S350 has four dedicated and isolated Ethernet ports, one of which is Gigabit Ethernet. These are connected to a very high-speed microprocessor and a 50 nanosecond accurate clock to assure unparalleled high bandwidth NTP performance. This more than meets the need of servicing 7000 NTP requests per second while maintaining microsecond caliber timestamp accuracy.

Four network ports (including Gigabit) provide network configuration flexibility and enhanced security. "Multiple" isolated and synchronized time servers can also be configured.

Four Ports for Flexibility and Security

Multiple ports provide the flexibility to adapt to different network topologies as networks grow and change. An S350 can be the single time source to synchronize clients that are on different subnets and different physical networks. It is also an ideal solution for synchronized time on in-band and out-of band networks. Since each port is independent,

BEST PRACTICES

- Always configure time clients to reference at least two time servers.
- Two time servers provide redundant time source protection for time clients.
- Peering between time servers assures time continuity to time clients if other time sources are not available.
- Increase network security by serving time via ports GbE, 2 and 3 and reserving port 1 for management only.

it can appear as though there are four clocks available, even though there is only a single time reference. In security sensitive networks we suggest using one port for maintenance and control functions and the other three ports for NTP timing functions only. This way the control port IP address information can be kept private and not distributed with the NTP addresses. IP address access control lists for each port also add enhanced security.

Extensive Protocol Support for Secure and Easy Network Integration and Management

All of the expected network management and monitoring protocols are standard in the S350. Secure access protocols such as RADIUS, SSL, HTTPS, SSH, along with legacy protocols such as DHCP and Telnet are included to provide you a choice in server management. SNMP v3 with a custom MIB allows you to automatically monitor the S350 and be advised of any important status changes. Any of these protocols can be quickly and easily disabled via the web based management interface.

Futureproof Your Network

The S350 supports both IPv4 and IPv6. The S350 works whether you are using IPv4, IPv4/IPv6 mixed-mode, or the IPv6 environment. This means your S350 can scale with your network operations and provide value for many years to come.

Automatic Software Upgrade Availability Notification

The S350 can periodically check the Symmetricom web site for newer versions of firmware. If a newer version is available, an informational SNMP trap or email is sent along with a status message in the web interface.

Point & Click Software Upgrades

Upgrading the firmware in the S350 is easy. Just browse to identify the firmware file and click the upload button. It is just as simple to backup and restore the server configuration files. This intuitive approach simplifies server management.
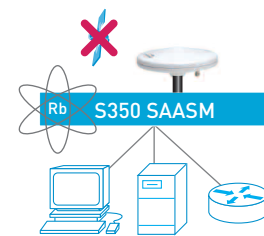
Time Server Log Files

A running log of activity and server configuration changes is maintained for later reference.
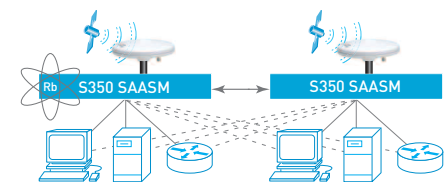
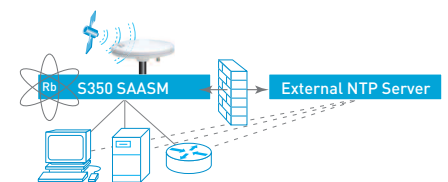### Examples of Network Timing Configurations

Basic configuration

Resilient configuration incorporating a Rubidium Oscillator for improved holdover performance.
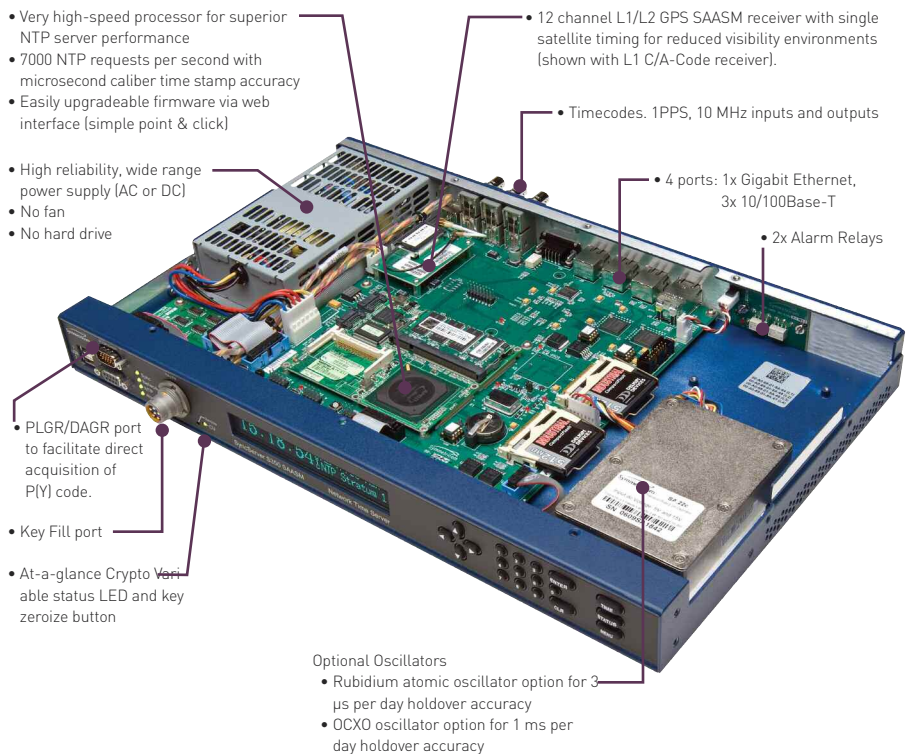

Redundant, resilient and secure configuration incorporating a Rubidium Oscillator in the primary server and peering to another server for backup redundancy.

Resilient internal configuration. However, security, accuracy and reliability risks exist when peering with an external time server through the firewall.

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S350 SAASM ADVANCED AND FUNCTIONAL DESIGN

- Very high-speed processor for superior NTP server performance
- 7000 NTP requests per second with microsecond caliber time stamp accuracy
- Easily upgradeable firmware via web interface (simple point & click)

- High reliability, wide range power supply (AC or DC)
- No fan
- No hard drive

- PLGR/DAGR port to facilitate direct acquisition of P(Y) code.
- Key Fill port
- At-a-glance Crypto Variable status LED and key zeroize button

- 12 channel L1/L2 GPS SAASM receiver with single satellite timing for reduced visibility environments (shown with L1 C/A-Code receiver).

- Timecodes. 1PPS, 10 MHz inputs and outputs

- 4 ports: 1x Gigabit Ethernet, 3x 10/100Base-T

- 2x Alarm Relays

Optional Oscillators
- Rubidium atomic oscillator option for 3 µs per day holdover accuracy
- OCXO oscillator option for 1 ms per day holdover accuracy

Control at Your Finger Tips

The interface on the S350 has been developed and tested from a user perspective. Keypad operation is quick and easy when using the full numeric keypad and control keys. You can cycle through different time formats by pressing the [TIME] key or get detailed status information by pressing the [STATUS] key. The S350 offers front panel menu control via the [MENU] button.

Quick and Easy Installation

The S350 has been optimized for quick setup via the keypad, requiring a minimum number of keystrokes. Just enter the basic network parameters or select DHCP and the unit is online. Once online,

The full numeric keypad is the most efficient way to navigate a menu driven interface. The [TIME] & [STATUS] buttons quickly display the most critical information.

the web interface is the best and easiest way to customize the time server.

Primary configuration and management of the S350 is done via the intuitive and easy-to-use web interface. It is the first time server that offers wizards to streamline common setup and management tasks. No other time server is available with such an effortless interface that provides intuitive navigation and depth of control.

Crisp, Bright Display and LEDs

Whether you need to view time information close-up or far away, the 256x32 high-resolution, variable intensity vacuum fluorescent display provides high visibility time and status in a variety of user selectable formats. The 1, 2 or 4 line display of data makes for a crystal clear time display along with an informative presentation of important configuration information. The five LEDs provide at-a-glance status of the current time reference, network connection, NTP operational, request activity, any existing alarm situation, and crypto variable status.

Alarm Relays for Monitoring Systems

The S350 features in-depth internal monitoring, very flexible configurations, and external alarming. Alarm relays are one of several ways the unit can report alarm conditions to an alarm monitoring system. One relay is activated if power to the server is ever lost. The other relay is user configurable to activate if there is any major alarm, or any major/minor alarm.

User configurable alarm relays for major/minor alarms as well loss-of-power alarm relay.

Crisp and bright vacuum fluorescent display offers high readability both near and far. Characters can be large, medium or small. Intensity is user adjustable.

Informative Status LEDs provide at-a-glance health of the network time server. The USB ports add flexibility in back-up, restore and upgrade operations. PLGR/DAGR port for hot-start scenarios.
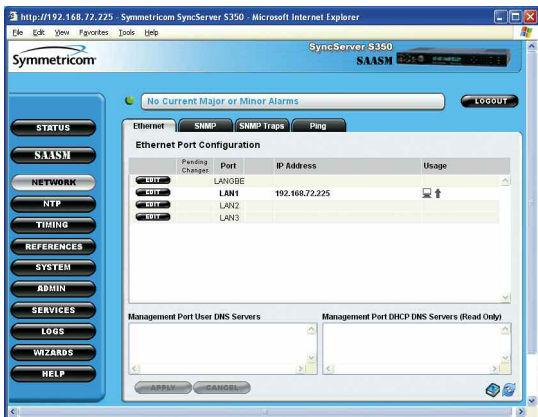
BEST PRACTICES

- A full numeric keypad with a display makes for quick initial setup and installation.

- Most interactions with a time server are remote and are best served with a full featured web interface and good SNMP monitoring.

S350 SAASM FULL-FEATURED WEB INTERFACE

Intuitive, Easy-to-Use and Secure

The S350 is designed to have the web interface be the primary status and control console. It is organized into logical groupings such as Status, Network, Timing, etc. The tabbed panels offer easy exploration of features and easy

configuration of the server. Typical web interface conventions are followed so that operation is quickly mastered. Server access is password protected, with a choice of RADIUS authentication and SSL encryption for maximum security. The web interface is enabled only through Port 1 so that the user may choose to keep that port IP address exclusive and secure while serving time protocols only from Ports 2, 3 and/or GbE.

Wizards Speed Routine Server Configuration Tasks

The S350 includes wizards to guide you step-by-step through the more frequent or expected operations. From experience we know there are certain configuration activities that most customers will, at some point, want to perform with the

server. These include initial set-up, configuring time source behaviors, back-up and restore operations, firmware upgrades, and more. The wizards make these operations very easy. Like all systems that include wizards, you can use the detailed configuration pages elsewhere in the web interface for custom configuration of the server.

Built-in Help System

The complete S350 manual is built into the web interface. The manual opens in a separate browser window. It is organized to match the control buttons and tabs so that information is quickly and easily found. On most pages there is a link directly to the manual page for that panel. In addition there are context sensitive rollover descriptors of various features and tabs on any given panel.

Full System Status and Log Files

An essential part of a time server is knowing the system status when you need to. The S350 provides a semi-customizable green/red/orange light status with system messages for quick, at-a-glance information. Detailed status information is available on all of the major subsystems of the server via the tabbed panels in the Status section.
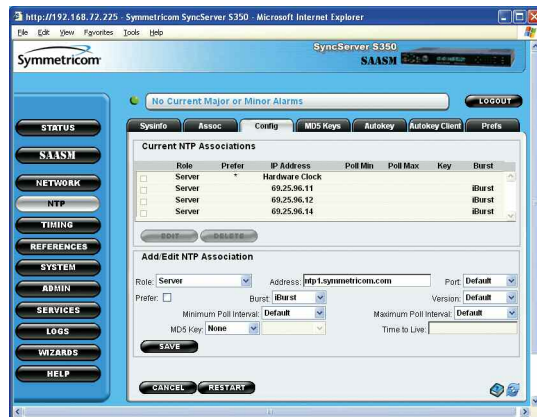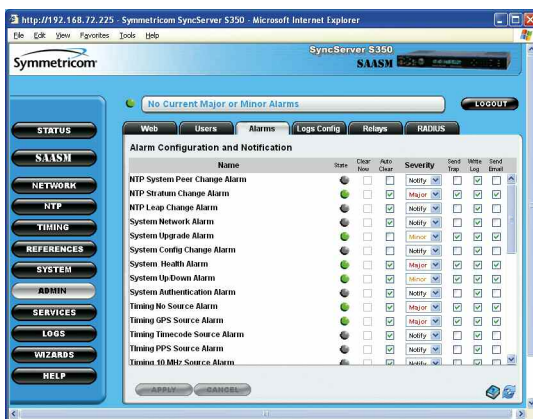
Any alarms or critical alerts are quickly found on the Alarm panel. To examine operational events, the Log section of the web interface provides detailed listings of System, NTP, SNMP, HTTP, and Event activities.

BEST PRACTICES

• Configuring a time server is generally done once and seldom repeated. For that reason it should be easy to configure and maintain.

• Consider the importance of quick and easy configuration back-up and restore operations, as well as the simplicity of firmware upgrades.

• Web based wizards save time and eliminate configuration conflicts. Easy configuration of advanced features is also important.

• Turning on the auto-notification of firmware update availability assures awareness of current firmware revisions.

S350 SAASM GPS TECHNOLOGY

Precise Positioning Service

Powerful, accurate and versatile, this Precise Positioning Service (PPS) GPS instrument authenticates satellite signals (when keyed) with anti-spoofing (A-S) technology and corrects for Selective Availability (SA) if enabled. With the dual frequency S350 SAASM, the P(Y) code is received on both the L1 and L2 bands.

If the user has not keyed the S350 for PPS/SAASM operation the internal GPS receiver uses the Standard Positioning Service (SPS) civilian C/A-Code positioning signal on the L1 band. All SyncServer features and behaviors are fully operational except those specifically related to PPS/SAASM GPS technology.

GB-GRAM Compliant

The S350 SAASM's GB-GRAM receiver is a third-generation GPS PPS, 12-channel receiver supporting Direct Y and unclassified (controlled) Black keys. The internal Ground-Based GPS Receiver Application Module (GB-GRAM) complies with the U.S. Government's GB-GRAM program that fulfills a GPS Wing initiative to migrate to a defined, open system architecture for ground-based embedded military applications. GB-GRAM incorporates the SAASM security device and is a secure, jam resistant standardized GPS solution used in communications and weapons platforms across the military.

The SyncServer S350 SAASM uses the Precise Positioning Service (PPS) dual frequency L1 and L2 signals for overall improved timing accuracy and operation in hostile environments. It also can use the Standard Positioning Service (SPS) C/A-code L1 signal widely deployed in civilian applications.

Dedicated GPS/SAASM related connections and controls provide easy front panel access to essential ports and at-a-glance status of key SAASM variables.

GPS SAASM Mandate Compliant

Compliant with the Joint Chiefs of Staff mandate that all newly fielded DoD systems using GPS shall use SAASM PPS devices after 1 October 2006 (unless waivered), the S350 SAASM provides the highest immunity to jamming plus time and frequency precision and versatility. The S350 is ideal in networked systems for Military users and supports a wide range of outputs/inputs needed for time and frequency applications.

Versatile Timing Modes

The S350 SAASM offers three primary timing modes to best suit the operational environment. For fixed base operations the Survey mode provides the highest timing precision and accuracy possible. If the SyncServer is deployed on a moving platform such as vehicle or ship, the Dynamic mode provides the best possible accuracy for those conditions. In cases where there is limited view of the sky, the Position Hold mode offers the best timing accuracy possible even if tracking as few as a single intermittent GPS satellite.

Easy Access To Key Zeroization

The secure cryptographic keys stored in the GPS SAASM module may at times need to be erased (called "zeroize"). The S350 SAASM provides several ways to zeroize ranging from the single front panel recessed-button press, keypad controls or via the remote web interface. In all cases, feedback is imediately provided that the key has been cleared.

Hot Start Ready

The dedicated PLGR/DAGR port on the front panel of the S350 SAASM supports a hot start from a PLGR or DAGR handheld GPS receiver. Hot Starting facilitates direct acquisition of the P(Y) code in a hostile environment where C/A code is denied or jammed and rapidly speeds the startup time of the S350 SAASM to serve time and provide precise time and frequency outputs.
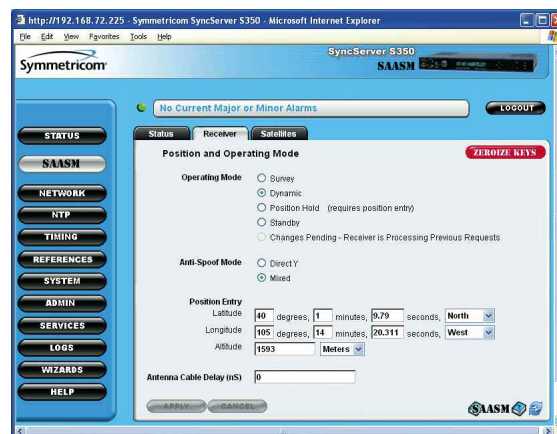
S350 SAASM PERFECT TIMING

Best-in-Class Timing Accuracy
The Stratum 1 level S350 SAASM derives nanosecond accurate time directly from the atomic clocks aboard the GPS satellite system. By using an integrated, 12-channel L1/L2 GB-GRAM SAASM GPS receiver, every visible satellite can be tracked and used to maintain accurate and reliable time. While tracking GPS the S350 is accurate to better than 50 nanoseconds to UTC. Beyond accurate NTP time stamping, this precision is excellent for generating the standard timecodes, 1PPS, and 10 MHz outputs. Time code inputs/outputs include IRIG A/B/E/G/NASA36/XR3/2137 in AM and DCLS formats.

Ultra High Performance NTP
The very high speed S350 NTP processor effortlessly supports hundreds of thousands of network clients while maintaining microsecond caliber NTP timestamp accuracy. NTP request throughput rates exceed 7000 requests/ second while maintaining NTP timestamp accuracy. This easily translates into 0.5-2 ms typical client synchronization accuracy on a LAN.

Versatile Timing Configurations
The S350 automatically synchronizes to GPS, Timecodes, 1PPS, and 10 MHz in a user specified priority. It smoothly transitions from one reference to the

next one available if the higher priority signal is lost or regained. This is perfect for operating with different backup time or frequency sources. A Rubidium
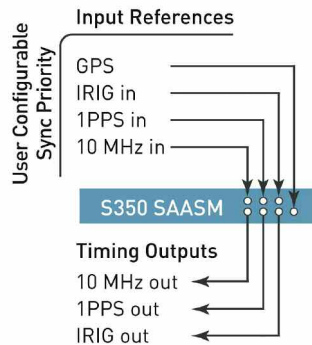
or Cesium atomic frequency reference is often desired as a back-up to GPS. With the optional Rubidium oscillator, the S350 will discipline the Rubidium and lock to it if other references are lost. Similarly, the S350 will seamlessly lock to the 10 MHz output of an external Cesium standard. Alternative timing configurations include peering the S350 to other user designated time servers as fallback time references.

Time Cross-Checking for Peace of Mind Reliability
The S350 can time cross-check all reference time sources against at least two other time servers. This protects against an improperly operating reference that can subtly corrupt the time.

Flexible Control Over System Timing Inputs and Outputs
By protocol definition, the S350 serves NTP in the UTC timescale (or optionally in GPS timescale). However, the S350 can display local time rather than UTC on the front panel. The time can also be set manually with an override on the NTP alarms so that it behaves as though it is tracking a legitimate time source, even though it is actually in holdover.

Sysplex Timer for Mainframe Sync
A dedicated Sysplex timer port outputs serial time strings for IBM mainframe Sysplex systems. The Sysplex Timer provides a common time reference across all the members of an IBM Sysplex. The Sysplex Timer is a key component when systems on multiple CPCs share access to the same data.

### Oscillator Upgrades Improve Holdover Accuracy and Save You Valuable Time
The standard S350 is equipped with a temperature compensated crystal oscillator (TCXO) that keeps the S350 accurate to nanoseconds when tracking GPS. However, if all time references are lost, thereby placing the server in holdover, the TCXO will soon drift away from perfect. Upgrading the oscillator improves the holdover accuracy significantly. For example, consider the drift rates below:

Oscillator	Holdover Drift
TCXO	18 milliseconds per day
OCXO	1 millisecond per day
Rubidium	3 microseconds per day

The value of the upgraded oscillator is that if the time references are lost, the S350 can continue to serve very accurate NTP time and maintain the output timing signals. This provides the IT staff plenty of time to correct the problem with no degradation or disruption in network time synchronization accuracy.
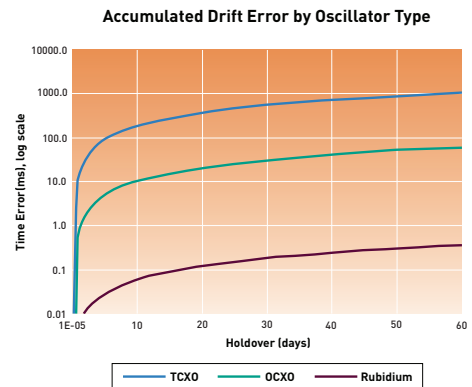

Plot of time error in milliseconds accumulated during holdover for different oscillator types. Note log scale of Y-axis.

S350 UNRIVALED SECURITY

A Security Architecture
The S350 is carefully architected for security via the multiport configuration. The web-based management interface is enabled only through Port 1 so that the administrator may choose to keep that port IP address private and secure. Only the time protocols can be served via Port 2, 3 and/or GbE. Time can also be served from Port 1.
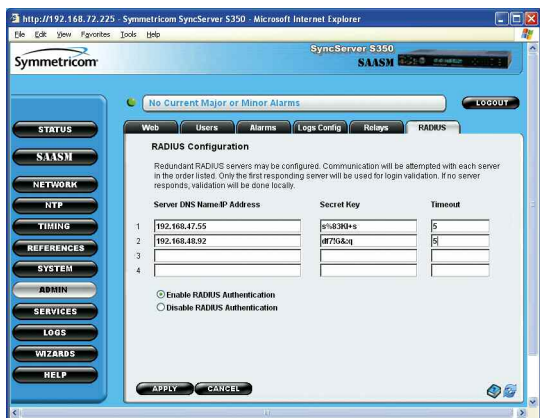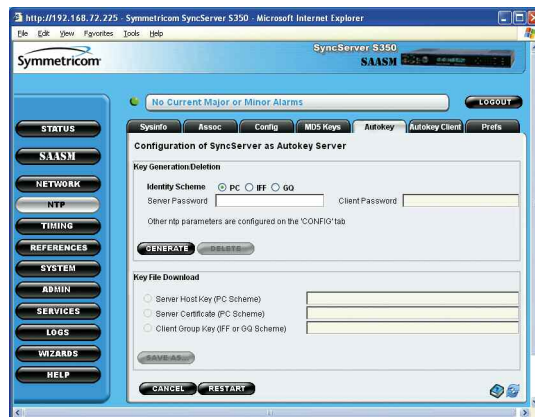

Management Access Security
Access to the web interface can be configured to pass through a variety of security measures including access control lists, passwords, RADIUS authentication, and SSL encryption for maximum security. RADIUS in particular provides excellent security and easy password management, particularly when there are multiple administrators that need access to the server. Individual protocols such as telnet, SSH, etc. can be disabled to further reduce open ports and running daemons in the server. Locally, the keypad on the server can be password protected to prevent tampering.

User Access Security
Aside from configuring the multiple ports for different network segments, unique access control lists per port can govern server response to client requests for time.

### Server/Client Authentication
Authentication is valuable to assure that time is being retrieved from the correct time server and not being spoofed in some way by an imposter or man-in-the-middle. The S350 supports the two NTP authentication protocols, MD5 and Autokey. Generally, authentication is used between critical time clients and the time server or between NTP peers across a WAN where trust is very important. MD5 symmetric key cryptography is reasonably easy to deploy between clients and servers and is used to verify NTP packet integrity. Symmetricom's state-of-the-art Autokey implementation is based on public key cryptography and is more sophisticated in its deployment. Autokey verifies both packet integrity and packet source using digital signatures. The S350 supports Autokey as a server and/or a client.

Time Reference Security
The best way to assure the correct time is to have multiple, trusted time sources. The S350 SAASM supports GPS satellite based military P(Y) code signals on L1 and L2 as well as the civil signal C/A-Code on L1. In addition, external timing signals such as IRIG feeds from other clocks and network peering to trusted NTP time servers can provide backup sources of time. In-

ternal to the S350, the NTP daemon continuously evaluates all configured time sources, selects the best and rejects the outliers.
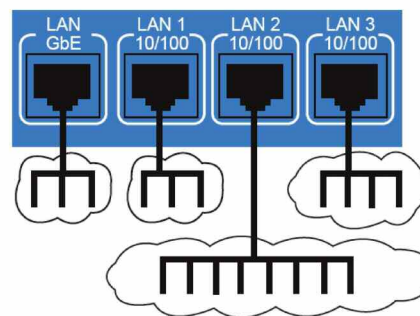
The Multiport configuration of the S350 with management on LAN 1 only is an excellent security measure and time distribution strategy.

BEST PRACTICES

• Always change the factory set password. Use RADIUS authentication if available.

• Keep the management port IP address private or exclusive. Use the three other ports to serve time to the network at large.

• Use access control lists on one or more ports to block unauthorized IP addresses.

• Lockout front panel keypad access to prevent unauthorized changes.

NETWORK PROTOCOLS

NTP (v2 - RFC1119, v3 - RFC1305, v4 - RFC5905)

NTP Unicast, Broadcast, Multicast, Autokey

SNTP Simple Network Time Protocol (RFC4330)

TIME (RFC868)

DAYTIME (RFC867)

HTTP/SSL/HTTPS (RFC2616)

SSH/SCP (Internet Draft)

Syslog 1 to 8 servers

SNMP v1, v2c, v3 (RFC3584)

Custom MIB

DHCP (RFC2131)

Telnet (RFC854)

MD5 Authentication (RFC1321)

RADIUS (RFC2865)

SMTP Forwarding

IPv4, IPv6 and IPv4/IPv6 Hybrid

Key management protocols can be individually disabled.

LAN 1: Management & Time protocols; LAN 2, 3 & GbE: Time protocols only.

SERVER PERFORMANCE

- 7000 NTP requests per second while maintaining accuracy associated with reference time source. The accuracy is inclusive of all NTP packet delays in and out of the SyncServer as measured at the network interface. Client synchronization accuracy to server on a LAN is 0.5 - 2 milliseconds (typical). The SyncServer easily supports many hundreds of thousands of NTP clients. NTP request handling capacity remains the same regardless of Stratum level.
- Stratum 1 via GPS: Overall time stamp accuracy of 7 microseconds to UTC with a variation of less than 42 microseconds typical
- Stratum 2: Peering can be used as the primary mode of operation or as a back up mode in case the primary reference signals are lost. Time stamp accuracy depends on NTP peer server(s).
- Holdover Accuracy/Oscillator Aging

TCXO (standard):	18 milliseconds/day	<1E-06/month
OCXO (optional):	1 milliseconds/day	<1E-07/month
Rubidium (optional):	3 microseconds/day	<5E-11/month

GPS SAASM GB-GRAM RECEIVER

- Receiver input: L1/L2, P(Y) code (PPS), SAASM GB-GRAM
- Tracking: 12 parallel, dual-frequency channels with RAIM (Receiver Autonomous Integrity Monitoring)
- Crypto Key input: DS-102. Compatible with AN/PYQ-10, AN/CYZ-10, KYK-13
- Security: SAASM GB-GRAM GPS PPS receiver
- Antenna/preamplifier: L1 1574.42 MHz and L2 1227.60 MHz, 40 dB gain
- GPS time traceable to UTC (USNO)
- Accuracy: <50 ns RMS, 150 ns peak to peak to UTC, ≥4 satellites tracked.
- Maximum Belden 9104 cable length: 150' (45 m). For longer cable runs see Options.

MECHANICAL/ENVIRONMENTAL

- Size: 1.75" x 17" x 11.25" (4.5 cm x 43.2 cm x 28.6 cm) 1U rack mount
- Power: 100-240 VAC, 50-60 Hz, 25 watts (45 watts with Rb osc.),
- Operating temperature: 0°C to +50°C
- Storage temperature: -10°C to +70°C
- Humidity: To 95%, noncondensing
- Certifications: FCC, UL
- Server weight: 9 lbs (4.1 kgs), Shipping package: 16 lbs (7.3 kgs)

Front Panel

Display:	Sharp, high-resolution 32x256 dot-matrix vacuum-fluorescent. 1, 2 or 4 line.
Keypad:	0-9 numeric, up, down, left, right, ENTER, CLR, TIME, STATUS, MENU. Keypad lockout.

LEDs (tri-color green/red/orange)

Sync:	Time reference status
Network:	Network connection status
NTP:	NTP activity
Alarm:	Fault condition
CV:	Crypto Variable Status

Serial:	DB9-F 9600, N, 8, 1
USB:	For back up, restore, and upgrade operations.
PLGR/DAGR:	DB15-M, Hot Start Port
Key Fill:	Crypto Key input. DS-102. Compatible with AN/PYQ-10, AN/CYZ-10, KYK-13. Black/red key support.
Button:	Zeroize crypto keys

Rear Panel

Network (4x):	1x RJ-45 10Base-T/100Base-TX/1000Base-T Gigabit Ethernet 3x RJ-45 10Base-T/100Base-TX Ethernet Speed/Duplex: Auto, 10/full/half, 100/full/half	
Sysplex:	DB9-M RS-232	
GPS:	BNC	
IRIG in:	BNC	IRIG A/B/E/G/NASA36/XR3/2137/IEEE-1344 AM: Ratio 2:1 to 3.5:1, Amp: 1V to 8V p-p, Zin >5KΩ DCLS: <1.5 V for logic 0, >2.0 V for logic 1
IRIG out:	BNC	IRIG A/B/E/G/NASA36/XR3/2137/IEEE-1344 AM: Ratio 10:3, Amp: 3.5 ± 0.5 Vpp, Zout 50Ω DCLS: <0.8 V for logic 0, >2.4 V for logic 1, Zout 50Ω IRIG G AM: Ratio 10:3, Amp: 3.0±0.5 Vpp, Zout 50Ω DCLS: <0.8 V for logic 0, >2.4 V for logic 1, Zout 50Ω
1PPS-in:	BNC	Rising edge active, TTL into 270Ω
1PPS-out:	BNC	Rising edge on-time, TTL into 50Ω
10 MHz-in:	BNC	Sine wave or square wave, 1Vpp to 8Vpp, Zin >50KΩ
10 MHz-out:	BNC	Sine wave >2Vpp & <6Vpp into 50Ω Sine wave >4Vpp & <12Vpp no load
Power:	IEC 60320 C14 connector & power switch.	
Relays:	2x, SPDT (Form C).	

CLIENT SOFTWARE

Included with the S350 SAASM is Symmetricom's SymmTime NTP client for Windows. See Options for comprehensive software solution.

PRODUCT INCLUDES

S350 SAASM Network Time Server, L1/L2 GPS antenna (ordered separately at no extra charge), 50' (15 m) Belden 9104 coaxial cable, 1 ft. antenna mounting mast (30 cm) with two clamps, category 5 patch cable, DB9-M to DB9-F RS-232 extension cable, manual, SymmTime NTP client for Windows, Enterprise MIB software, power cord, and rack mount ear kit. Two-year warranty.

OPTIONS

- Rubidium or OCXO oscillator upgrade for extended holdover
- ±40-60 Vdc power supply
- GPS antenna in-line amplifier for cable runs to 300' (90 m)
- Lightning arrestor
- Comprehensive time client, server & management software for easy distribution, management and monitoring of time across the network.
- NTP Network Time Displays, 2" or 4" (5 cm or 10 cm), 6 digit, red LEDs

Rear View

Front View

The S350 SAASM has been granted the Global Positioning Systems Wing Security Approval. United States government policy restricts the sale of Precise Positioning Service (PPS) GPS equipment such as the S350 SAASM to only users authorized by the U.S. Department of Defense. The views expressed in this brochure are those of Symmetricom and do not necessarily reflect the official policy or position of the Global Positioning Systems Wing, the Air Force, the DoD, or the U.S. Government.