

TimeHub 5500

NEBS Level 3 Certified Synchronization Supply Unit for Carrier Class Networks

KEY FEATURES

- * System can operate as Master or Remote shelf
- * Highest number of 1+1 protected outputs on the market
- * 140 protected outputs per Master or Remote shelf
- * 320 protected outputs per Expansion shelf
- * Up to 4 Expansion shelves per Master or Remote shelf
- * More than 1,400 protected outputs per system
- * Lowest cost per protected output
- * Single output card generates CC and DS1 signals
- * External alarm inputs collect alarms from legacy equipment
- * Supports SSM (Master and Remote)
- * Designed to be managed
- * Telcordia Audited
- * Compliant to SBC TP-76200MP
- * NEBS Level 3 Certified

The TimeHub™ 5500 is the next generation Synchronization Supply Unit (SSU) designed for Carrier Class Networks. Meeting the most stringent requirements for telecommunication products (Telcordia and NEBS Level 3), it guarantees all the Network Elements (NEs) perform at maximum efficiency, while serving as the synchronization source for new technologies, such as real-time Asynchronous Transfer Mode (ATM), Synchronous Optical Network (SONET) and Optical Switches and Multiplexers.

The TimeHub System

Explosive growth in telecommunication volume, both in voice and data, have led to new technologies and critical applications, like ATM, SONET and Optical Switches and Multiplexers.

Service providers are growing to meet this demand and, as a result, the requirements for synchronization have changed dramatically.

Symmetricom's TimeHub 5500 is the next generation SSU. It is a modular, fully redundant timing distribution system that tracks incoming timing references and qualifies the signals against network timing standards. Then, it filters and distributes precise timing to all equipment in the central office.

The TimeHub main shelf provides up to 140 1+1 protected outputs. If more outputs are required, up to four expansion shelves can be connected to the main shelf, increasing the capacity to over 1,400 fully protected 1+1 ports per system.

Management and Alarm Collection

The TimeHub system provides a new dimension in management by integrating and monitoring the performance of legacy equipment.

As an intelligent network element, TimeHub provides full visibility and manageability of all input and output ports and all cards on the main and expansion shelves. System parameters can be modified and controlled through any of its multiple interfaces - serial and Ethernet.

A TimeHub 5500 main shelf can monitor alarms and the performance of existing SSUs, including any third-party equipment. Using the external alarm input capability, the TimeHub can collect alarms and send them to the Network Operation Center (NOC).



FIG.1 TimeHub 5500 with Expansion Shelf



FIG.2 TimeHub 5500 Master Shelf

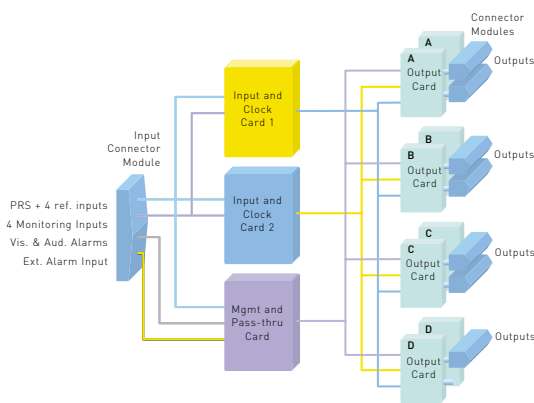


FIG.3 TimeHub 5500 Architecture

Monitoring Inputs

The ability to monitor multiple inputs allows performance measurement of existing local and remote SSUs or any DS1 line. Up to eight DS1 and one 5 or 10 MHz inputs can be monitored simultaneously and their results sent to the NOC. This helps ensure that legacy SSUs meet carrier class standards for reliability and compatibility with existing central office equipment.

Input and Clock Cards

The Input and Clock cards are combined in a single card with a highly stable clock engine. Each card accepts four DS1 inputs and one selectable 5 or 10 MHz input, which could be used as reference or monitoring inputs. Another version of cards supports an additional four DS1 inputs for monitoring purposes only.

The cards are available in either rubidium or quartz versions. The Stratum 2 and Stratum 3E clocks exceed the minimum specification requirements during holdover.

SmartClock™ Technology

SmartClock technology improves the performance and accuracy of the clocks. Using intelligent firmware algorithms, SmartClock "learns" the effects of aging and temperature on the clock while it is locked to the reference signal and stores this information. When the incoming reference signals are lost or disqualified, SmartClock uses the stored data to compensate for frequency changes.

The system will continue to distribute highly stable synchronization signals while predicting and correcting the behavior of the oscillators when all references are lost. The result is an improved, stable synchronization signal during holdover, which other holdover methods cannot achieve.

Output Cards

Each of the TimeHub output cards provides 40 outputs. The outputs are split in two groups of 20 outputs each. Depending on passive connector modules plugged in the back of the shelf, each group can provide 20 DS1 or CC output signals. The output cards recognize the connector modules and automatically switch each group to the appropriate signal type.

Output modules can be mixed in any combination to provide DS1 and CC output signals from the same card group. This unique feature adds flexibility to the TimeHub system, minimizing inventory costs and simplifying planning and maintenance of the synchronization network.

Protected Outputs

TimeHub 1+1 is a truly hitless protection scheme. Unlike conventional 1:1 protection schemes where only one card provides output signals at a time, in the TimeHub 1+1 scheme both output cards remain active. If a card fails or is removed, the mate card is already providing signal to the network elements. No time is lost waiting for a stand-by card to recognize a failure before it becomes active.

The result is a clean, hitless timing signal no other protection scheme can offer.

Pass-Thru Protection

Reliability is important in all modern networks, and the TimeHub 5500 offers additional levels of protection when things go wrong.

If both Input and Clock cards fail or are accidentally removed, the management card offers a lifesaver to the network. By entering Pass-Thru mode, the card bypasses the input reference signals to the output cards keeping the office alive.

Expansion Shelf

When 140 ports are not enough, TimeHub offers additional outputs via its expansion shelves. Each of the four additional expansion shelves can provide up to 320 protected or unprotected outputs, making it the expansion shelf with the highest output capacity on the market.

Each expansion shelf supports redundant, low cost controller cards and redundant links to the master shelf. In the event of a combined link and controller card failure, the TimeHub Expansion will continue to distribute highly stable synchronization signals. This is achieved without losing visibility or manageability of any expansion shelves or their components.



FIG.4 TimeHub 5500 Expansion Shelf

Master or Remote

A remote shelf makes it possible to synchronize network equipment located on multiple levels or in other buildings within large central office facilities, while maintaining phase alignment with a master synchronization system.

A unique TimeHub feature allows utilizing the same master shelf and cards as a remote system. This reduces inventory costs and simplifies the transition from master to remote shelves when expanding or upgrading central offices.

By setting a switch on the main shelf to operate as a remote system, the intelligent algorithms in the management and the clock cards modify their operation by adjusting their parameters and electronics to operate as a remote system.

The ST2 and ST3E clock cards will align in phase to the active CC input signal. Upon losing the CC reference signals, the intelligent clocks will provide ST2 or ST3E holdover performance preventing data slips for hours or days. This proprietary TimeHub feature gives the maintenance crew additional time to troubleshoot network problems, while ensuring the network continues to provide carrier-class Quality of Service.

TimeHub remote shelves can also operate in conjunction with existing SSUs. Carriers can enhance older SSU systems with state-of-the-art synchronization technology, while maximizing the value of their investment in legacy technology.

SSM Support

Synchronization Status Message (SSM) is a useful tool for monitoring and maintaining the health of the synchronization network. The master, expansion and remote TimeHub products support the latest SSM messages.

If new SSM standards require updates in the messages, they can be easily implemented by downloading the latest changes.

System Update

To keep the TimeHub Master and Remote systems with the latest features and standard recommendations, software can be easily downloaded.

Via the Ethernet connection, maintenance personnel can remotely download Firmware into the system in minutes. This saves time and avoids sending a maintenance crew to the site to replace cards.

Connectivity

TimeHub offers serial and Ethernet connectivity. Multiple TCP/IP sessions allow NOC personnel as local maintenance people to access the system.

Symmetricon's network element management system, TimePictra™, provides visibility of all TimeHub, TimeSource® and third-party network elements in the network.

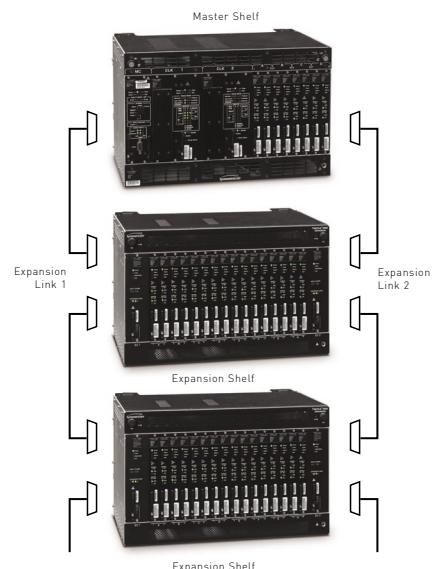


FIG.5 TimeHub Interconnection

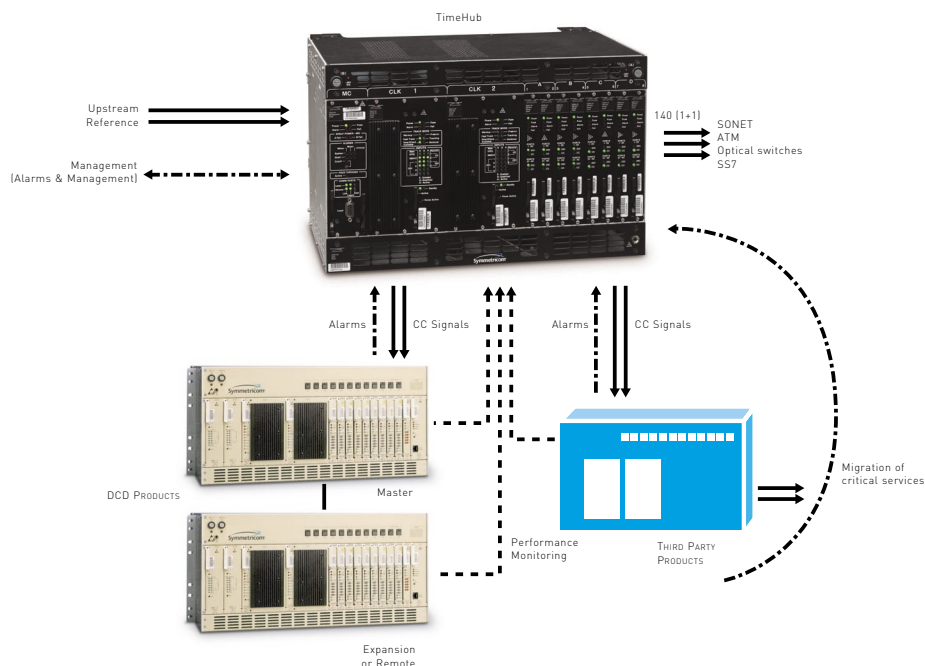


FIG.6 Migration of critical services (Optical Switches, ATM, SONET, SS7)

