Technical Specifications

OSA 5548C SSU

SSU for SDH, SONET and Mobile Synchronisation

Overall Architecture
- 5548C 6U/12U ETSI SSU main shelf: 8 inputs + 2 GPS receivers, 200 outputs
- 5548C 3U/6U ETSI SSU main shelf: 4 inputs + 2 GPS receivers, 60 outputs
- Up to 4 Expansion Shelves per main shelf, 200 outputs each for 1000 outputs total (dedicated redundant communication bus between master and expansion shelves).
- Remote shelves can also be connected, using E1 in order to propagate correctly the SSM (E1 signal). This allows a virtually unlimited output capacity.
- All cards can be protected 1:1

Inputs
- Up to 8 line inputs in 6U SSU (4 in mini SSU), optionally 1:1 protected, 4 inputs/ module
- Input types: E1, 2.048 MHz, 5 MHz, 10 MHz individually SW-selectable
- Up to 2 GPS inputs, active L1 antenna, 1575.42 MHz
- E1 inputs can be terminated, "terminated −20dB" or bridged (high impedance)

Input Selection:
- Priority table
- SSM value
- Performance Threshold Mask
- Manual selection

Tracking and Holdover:
- DDS-based Tracking & Holdover functionality
- G.811 PRC reference with embedded GPS (or external Cesium) source
- G.812 Type II SSU based on Rubidium holdover <2E-12/day(at 25°C)
- G.812 Type II SSU based on BVA holdover <1E-11/day (at 25°C)
- G.812 Type I & III SSU based on OCXO SC-P3 holdover <1E-10/day (at 25°C)

Outputs:
- 20 outputs per module (2 groups of 10)
- Up to 200, optionally 1:1 protected, on 5548C SSU
- Output type configurable by group of 10 outputs

Time Code Outputs:
- Up to 10 TCU (Time Code Unit) modules on SSU
- NTP (RFC 1305), SNTP v4 (RFC 2030)
- IRIG-B, AM-coded and DC level shift
- Each time distribution card occupies one main output slot

Standards compliance:
- IETF RFC 2030 (SNTP v4), RFC 1305 (NTP)
- ITU-T G.703, G.811, G.812, G.704, G.781

Re-timing:
- Re-timing modules take same slots as main output modules
- 8 E1 traffic carrying signals per module
- Up to 80 re-timed E1 signals on SSU
- Configurable alarm thresholds in slips per hour/day/week
- Protection with by-pass relay

Management:
- Status LED's on front panel
- Contact relay alarm closures (2x3 N.O. or N.C. contacts)
- Electrical alarm collection inputs(10),specific user-defined alarm messages
- Local RS-232C port, TL1 protocol on front and rear panel
- Remote 100BaseT
- Remote management via OSA SyncView New Generation Synchronisation Management software supporting full FCAPS capability

Performance Measurement:
- Phase measurement on all inputs, GPS included
- 1 ns resolution
- MTIE, TDEV, Ym curves computed locally
- Alarm thresholds, user settable

Expansion Shelves:
- Up to 200 outputs per shelf, optional 1:1 protection
- Up to 4 Expansion Shelves for a total of 1000 outputs per node (dedicated redundant communication bus between master and expansion shelves)

Power:
- 5548C SSU: -48 VDC power (-40 to −60 VDC)
- Power consumption: max. 200 W (fully equipped)

Simplified Maintenance
- Universal Input and universal Output cards
- Upgrade of all cards via SW download
- Dynamic inventory data accessible via management SW
- All cards software included in the same system release

Mechanical:
- 5548C SSU: (HxWxD)
  ETSI/12U rack: 532x535x240 mm
  19"/6U rack: 266x483x265 mm
- 5548C mini SSU: (HxWxD)
  ETSI/6U rack: 266x535x240 mm
  19"/3U rack: 133x483x265 mm

- ETSI EN 300 462-6, -4
- CE approved

5548C SSU-6U

OSA 5548C SSU

SSU for SDH, SONET and Mobile Synchronisation

SSU : Synchronisation Supply Unit

- Unique design for Master, Expansion and Remote shelves
- Entirely new family of SSU with 3U and 6U 19" shelves, or 6U and 12U ETSI shelves
- Adapts to all telecom node sizes, from a few 10's up to 1000's of synchronisation outputs
- Intuitive and modular architecture (protection groups, visual display of selected channels)
- Extremely compact: up to 200 protected (1:1) outputs in a 6U 19" or 12U ETSI shelf
- Single System (Master and 4 expansions) allows up to 1000 protected outputs
- G.811 PRC with optional GPS card(s)
- G.812 Type I or II or III SSU holdovers
- Universal output & input card design
- SSM on complete system (Master, Expansion, Remote)
- Manageable with intuitive Local and Remote Graphical User Interface
- Up to 80 re-timing channels
- Optional NTP and IRIG-B output modules

www.oscilloquartz.com

Oscilloquartz S.A.-Rue des Brévards 16—2002 Neuchâtel—Switzerland
tel. +41(0)32 722 55 55—fax +41(0)32 722 55 56—osa@oscilloquartz.com

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SWATCH GROUP ELECTRONIC SYSTEMS

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Introduction

The OSA 5548C Synchronisation Supply Unit (SSU) is the latest breakthrough from Oscilloquartz, a pioneer in synchronisation of SDH/SONET and mobile networks. It is designed to provide telecom operators with reliable synchronisation, using the latest in hardware and software technologies. The 5548C system provides a scalable synchronisation solution ranging from 20 unprotected up to thousands of 1:1 protected outputs.

Unparalleled flexibility

The 5548C can be a redundant G.811 PRC source if you decide to include one of two possible GPS cards (this does not change the number of inputs or outputs available). In addition to E1 and 2.048 MHz output cards, any of the 10 main output slots can be equipped with time distribution modules (NTP or IRIG-B) or with E1 re-timing cards. With it's complete and consistent family (6U/12U ETSI: 200 outputs, 3U/6U ETSI: 60 outputs, expansions,...), the 5548C is the SSU of choice when you need scalability and reduced spare parts inventory. This flexibility makes the 5548C the most versatile SSU in the marketplace.

Extreme Compactness

Each card is only 100 mm tall, contributing to a higher overall port/volume ratio, and therefore reducing the size of the 5548C shelf design to accommodate overcrowded Telecom Hub Rooms and Switching Center rack spaces.

High Availability

All cards are intelligent and communicate with each other to implement a distributed intelligence message passing system. This approach ensures absence of single points of failure and reliable uptime.

Inputs

The OSA 5548C SSU uses a universal Input Card (INC) designed to reduce spare counts. It accepts the following signals:

➢ E1 (G.703/G.704) with or without SSM

➢ 2.048 MHz (G.703)

➢ 5 and 10 MHz sine

Each Input card can accept up to four signals and can be 1:1 protected with an adjacent identical "B" card. Two input groups (therefore four slots) are available for Input Cards, giving flexibility from 4 unprotected inputs (one card) to 8 protected inputs (4 cards). The universal input tile in the back of equipment includes the following connectors:

✓ 120Ω balanced on sub-D

✓ 75Ω unbalanced on BNC

✓ 50Ω unbalanced on BNC

GPS Modules

In addition to line input card, one or two GPS input cards can be fitted to meet G.811 requirements without the need of installing and managing external receiver(s) or Cesium clock. This allows the simplification of the sync plan by flattening the sync distribution hierarchy and results in a reduction of the overall provisioning, operating and maintenance costs. The presence of a GPS input also gives access to precise time information that can be distributed via NTP or IRIG-B. Additionally, 5548C can accept any external GPS reference as one on the input Line of the INC.

Input Selection

The active reference input is selected among the set of eligible input signals based on one of the following criteria:

➢ Priority table

➢ SSM value

➢ Performance Threshold mask

➢ User selection

Tracking & Holdover

This card forms the beating heart of the OSA 5548C SSU.

The input reference jitter and wander are filtered by a high quality oscillator with DDS technology.

Three types of oscillator are available:

➢ Rubidium (Rb)

➢ BVA Quartz

➢ Double Oven Quartz (OCXO)

5548C Mini SSU-3U

Pass-through

In the extreme case of total failure of both oscillator cards or if they are pulled out, the pass-through feature of the 5548C SSU allows to still keep the office alive. In this case synchronization is obtained from one E1 input reference of the first TNC's group and distributed without filtering to the INC's output section.

Outputs

The 5548C SSU uses a universal Output Card of 20 outputs that will configure itself automatically (20 E1, 2.048 MHz or 10 E1 & 10 2.048MHz). Output cards slots are, like all the other functionalities on this SSU, separated in intuitive A and B groups (adjacent cards slot). The 5548C 6U SSU counts 10 groups of outputs, giving you the flexibility from 20 unprotected outputs to 200 protected outputs on one shelf (and the flexibility of having some outputs protected and some unprotected).

Output Connectors

The 5548C SSU provides maximum flexibility towards different interconnection requirements with its choice of modular tile sets:

✓ 20 x 120Ω balanced (E1, 2.048MHz) on sub-D

✓ 20 x 75Ω unbalanced (E1, 2.048MHz) on BNC

✓ 10 x 75Ω unbalanced on BNC and 10 x balanced on sub-D

Management

The management card provides connectivity with local and remote synchronisation management systems via a TL1 interface over RS-232C (local) and TCP/IP (remote). OSA Local Manager and SyncView Next Generation Remote Management software provide, locally and remotely, powerful fault, configuration, accounting/inventory, performance and security management functions through an intuitive graphical user interface. Local alarm information is provided as:

➢ Internal buzzer (audible)

➢ Relay contacts (electrical)

➢ Status LED's on front panel (visual)

Third party equipment can easily be managed through a set of 10 electrical alarm collection inputs; a specific user-configurable alarm message can be associated to each alarm input. As a future option, the 5548C will also be manageable directly by SNMP with embedded agent.
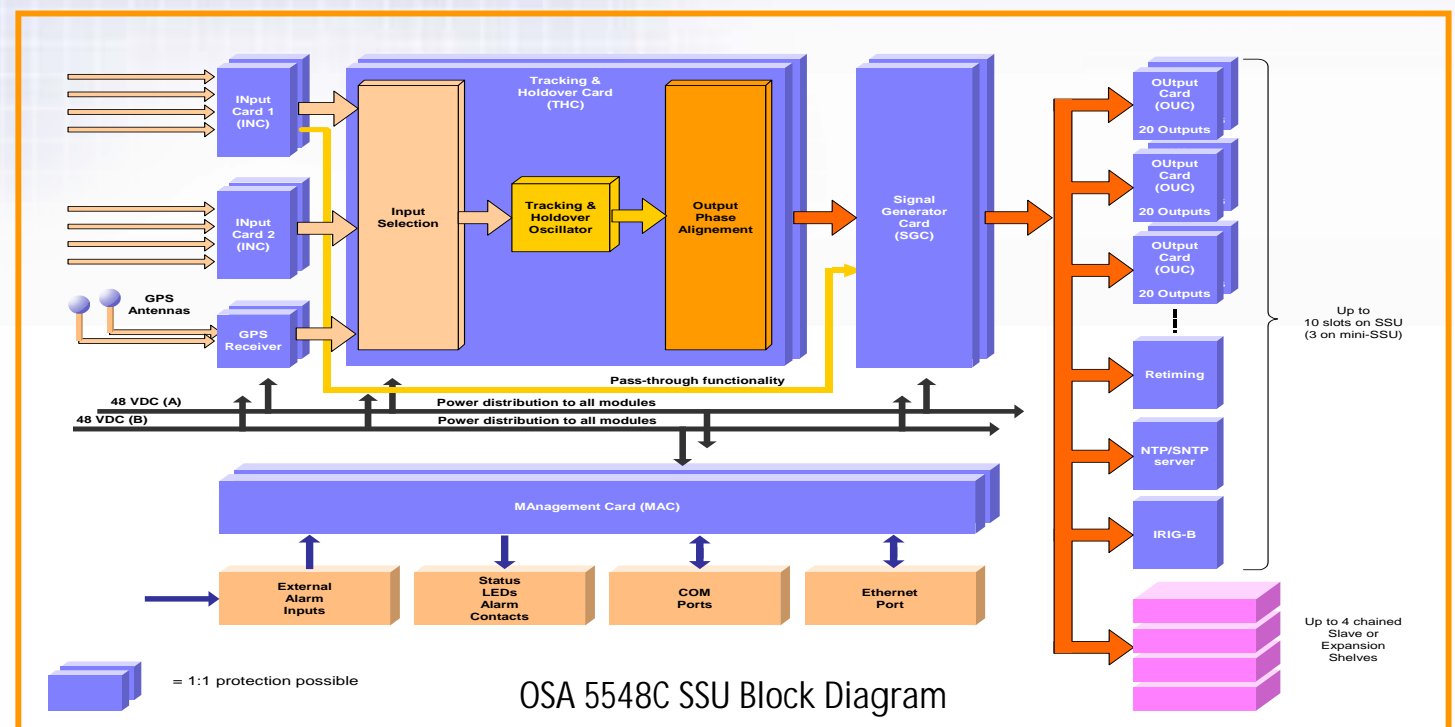
Performance Measurement

All active inputs are constantly measured against the current output reference with 1 ns resolution. The local processing of performance data presents the data in a way that reduces network overhead for remote retrieval. The computed MTIE and TDEV curves are:

➢ used internally for the input selection

➢ compared to standard masks to raise alarms if the curves are out of limits

➢ sent to the management station(s) for display, user validation and storage.

Time Code Units (TCU)

Time Code Units (TCU) allow precise time distribution when at least one GPS card is installed. This is a major advantage compared to having to additionally install and manage an external receiver with its GPS antenna and cabling. Two kinds of Time Code Unit output cards are available: TCU-NTP and TCU-IRIG-B. The NTP card provides full NTP server functionality on a separate 10 BaseT RJ-45 connector. The IRIG-B card provides four IRIG-B signals (two 1 kHz AM, two DC level shift) on BNC connectors. Time output cards can be fitted into any main output card slot.

Re-Timing

Each re-timing card provides 8 E1 re-timing channels and the card occupies only one output card slot.
Configurable alarm thresholds can be set via management software in terms of slips per hour/day/week. This allows continuous monitoring and immediate detection of synchronization problems on the incoming traffic signals and results in a higher Quality of Service.

Expansion or remote shelves

Up to 4 expansion shelves can be chained to the main shelf for a total of 1000 outputs, optionally protected 1:1.
Chaining of the expansion shelves is redundant in order to ensure maximum reliability.

Simplified Maintenance

SSU and Expansion Shelves share the same cards; this reduces homologation activity, stock of spare parts as well as overall administrative complexity and results in reduced cost of ownership.
All cards are easily reprogrammable via a simple software download and managed via a global shelf release.

Standards Compliance

The OSA 5548C SSU complies with all relevant telecommunications standards from ITU-T, ETSI and CE.

OSA 5548C SSU Block Diagram