

VCH-003 Synchronization Supply Unit – Vremya-ch

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The VCH-003 Synchronization Supply Unit (SSU) is designed for use in Telecommunications Networks. Depending on its configuration, the VCH-003 SSU can be used to generate and distribute 2048 kHz and 2048 kbit/s synchronization signals as part of a Primary Reference Clock (PRC) system; to operate as a Transit Node Clock (TNC) or Local Node Clock (LNC), recovering synchronization signals derived from transmission lines at network nodes; or to generate synchronization signals using GLONASS/GPS GNSS references.

Primary Application synchronization of digital telecommunications networks, SDH.

Key Features

- when used as part of an enhanced Primary Reference Clock (ePRC), the output synchronization signals comply with **ITU-T Recommendation G.811.1** .
- When operated as a Transit Node Clock (TNC) or Local Node Clock (LNC), the SSU complies with

ITU-T Recommendation G.812.

- Reference frequency and UTC time combiner (ITU T G.811.1/G.8272.1).
- Up to 8 synchronization inputs: **2048 kHz, 2048 kbit/s (E1), 1 MHz, 5 MHz, and 10 MHz** .
- **1 PPS** synchronization input.
- Synchronization inputs from a **PTP Grandmaster (PTP GM)** .
- Multi-band GNSS GLONASS, GPS, BeiDou, GALILEO (L1/L2,E1/E5, B1/B2).
- Spoofing detection.
- Synchronization from **GNSS** signals; in this mode, the output synchronization signal characteristics comply with **ITU-T Recommendation G.811** .
- Automatic validation of input synchronization signals.
- Monitoring of input signal parameters **MTIE, TDEV, dF/F** .
- Time synchronization via **NTP** and **PTP** protocols in Master/Slave modes, with **SyncE** support.
- high-stability internal **quartz crystal (DOCXO) or rubidium oscillator** .
- Internal DOCXO aging (frequency drift) compensation in Holdover mode (DOCXO+ option).
- Advanced **Direct Digital Synthesis (DDS)** technology.
- Up to **80 outputs with 1:1 redundancy** , compliant with **ITU-T G.703** (balanced interface, 120 Ω load).
- 20 user-configurable outputs per output signal generation module and per output signal distribution module.
- Independent configuration of each output: **2048 kHz / E1 / Off** .
- hot-swappable modules.
- Input signals are connected via universal **BNC connectors** , while output signals are available through widely used **DB9 connectors** .
- Fully redundant architecture with **1:1 protection** .
- **Bypass mode** , allowing the VCH-003 to continue operating and provide uninterrupted synchronization signal output even when the oscillator modules are not installed or available.
- Advanced signal processing and distribution.
- Continuous measurement and quality monitoring of input synchronization signals.
- Analysis of **Synchronization Status Messages (SSM)** on input synchronization signals and generation of SSM information in the output E1 stream.
- Graphical management software.
- Remote software updates.
- **9U ETSI / 19-inch chassis**. – SSUManager local control/monitoring software. – Global multi-user NMS (Linux, PostgreSQL).

Oscillator Options

- the customer can select the most suitable oscillator type: – **rubidium oscillator — ITU-T G.812 Type II** ;
- **double-oven quartz crystal oscillator — ITU-T G.812 Type I** .

NTP Functions

- synchronization of the local time scale to **UTC** using a GNSS reference.
- **NTP v3 and NTP v4** Network Time Protocol support in accordance with **IETF RFC 1305** and **RFC 5905** .
- **Stratum 1 NTP server** .
- Support for up to **50,000 NTP clients** .
- Up to **16 IPv4 addresses per Ethernet port** , with VLAN support.

PTP Functions

- **Precision Time Protocol PTPv2 (IEEE 1588v2)** .
- Inputs: antenna GNSS, external 1PPS, PTPv2 slave.
- PTP operation in **Master and Slave modes** .
- **Synchronous Ethernet (SyncE)** support in accordance with **ITU-T G.8261** , as well as ESMC message transmission.
- One RJ-45 and one isolated SFP ports (1000BASE-X) on each GNSS card.
- Configuration of up to **16 IPv4 addresses per Ethernet port** , VLAN support, and simultaneous operation of multiple PTP profiles.
- In Master mode, synchronization of the local time scale to **UTC** using a GNSS reference.
- Internal time-scale resolution: **5 ns** .
- Up to **1,024 PTP clients** at a synchronization message rate of **128 packets per second** .
- PTP message addressing modes: **multicast, unicast, or mixed** .
- PTP message transmission: Ethernet (L2), UDP(L3, IPv4).
- Timestamping modes: **one-step or two-step** .
- Delay measurement mechanisms: **end-to-end (E2E)** or **peer-to-peer (P2P)** .
- Supported profiles:
 - Frequency synchronization — **ITU-T G.8265.1 (unicast, L3)** ;
 - Phase/time synchronization — **ITU-T G.8275.1 (multicast, L2, syncE)** ;
 - Phase/time synchronization — **ITU-T G.8275.2 (unicast, L3, syncE)** ; • User-defined profiles.

Technical Specifications

Interfaces : RS-232C, USB, LAN.

Power supply : 36–72 V DC, dual power inputs.

Power consumption : max. 76 W; 130 W during warm-up.

Dimensions (W × H × D) : 483 × 399 × 302 mm.

Mounting : 19-inch rack.

Weight : 5 kg.

Frequency-Time combiner mode

GLONASS/GPS/GALILEO/BeiDou

Passive hydrogen maser VCH-1008C (PRS)

