US2G

Synchronization Supply Unit

US2G is a synchronization supply unit designed for digital telecommunication networks (PDH-SDH & ATM) where the frequency reference needs a very high accuracy.

The function of the unit is to supply to the various equipments necessary for telecommunication equipments (transmission and switching) a frequency signal with very precise characteristics (rated value, accuracy, stability) called a synchronization reference frequency.

The core of this unit is a thermostatic quartz oscillator with a very low frequency drift which is controlled over a cycle of 2048 kHz originating either form a synchronizing link PCM HDB3 at 2048 kbit/s or from Synchronous Digital Hierarchy (SDH). The ageing of this oscillator is less than 2.10-10 per day in holdover mode.

This unit additionally allows a dynamic monitoring of the synchronized transmission equipments.

The unit consists of a main frame supplying 32 outputs at 2048 kHz. An extension frame supplying 32 additional outputs can be provided. These frames slot into standard ETSI racks conforming to specification ETS 300 119-2.

MAIN FRAME		EXTENSION FRAME	
Height	: 600 mm	Height	: 320 mm
Width	: 450 mm	Width	: 450 mm
Depth	: 280 mm	Depth	: 280 mm

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The unit includes the following sub-assemblies:

- Redundant power supply with 50 – 50 % load distribution
- Redundant synchronization input ITU-T G 703 (75 ohm or 120 ohm).
- Signal 2048 kHz, as an option 2048 kbit/s.
- Clock recovery and filtering.
- 24 bits digital phase comparator. Resolution 0.04 degree.
- High-performance quartz-based oscillator : frequency drift (ageing) < 2.10^{-10} per day.
- 32 bits interlocking and phasing processor.
- Frequency synthesis : 2048 kHz.
- Alarm management with rapid switching of the synthetizer to the output modules.
- Output module : 2 redundant outputs (N + 1 amplifier, N = 2, for each output).
- ITU-T G 703 output signal. Maximum configuration 64 outputs at 2048 kHz.
- Return circuit monitor, phase deviation measurement.
- 32 bits management processor with various input/output interfaces.

Redundancy

For reliability reasons, all the critical elements are redundant.

The redundant modules are :

- Two input boards with priority switching over one of the two synchronizing links. In the event of a fault on the link in use, the system will automatically switch to the other link and return automatically, or not, when fault is cleared (time-delay 1000s).
- Two oscillators and synthetizers with either automatic switching of the synchronizing link or processor control.
- Three amplifier modules, one spare for each output.
- Two redundant power suppliers with 50 – 50 % load distribution.

User Interface

- The terminal is equiped with a main display panel and an output board's display panel.
  These two panels provide a mimic board with LEDs giving the status of the various modules in the unit.
- The unit can be supervised with an operating terminal which can be plugged to the front panel by a V28 interface.

Remote Management

This unit has a serial asynchronous remote management interface (V28, V11 or optocoupled).

- X 25/V25bis interface card.
- Ethernet 10baseT interface card.
- Extended SNMP agent for full US2G remote management.
- NMS : 3SR/LYNX SNMP manager with full graphical network management (SCADA software).

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US2G SPECIFICATIONS

- INPUT INTERFACE :
  - Two possible input functions:
    2048 kHz and 2048 kbit/s on a daughter board
  - Compliant with ITU-T G 703 recommendation
  - Input at 75 ohm or 120 ohm.
- FAULT DETECTION:
  - Phase jump
  - Loss of signal
  - AIS
  - Level inf. or = 50 % of rated value
- DIGITAL PLL:
  - Time constant programmable in steps of one second between 100 and 10 000 s
- MAINTENANCE AND TEST CAPABILITIES:

  Opening of the digital PLL (holdover mode)
  Control of the VCXO voltage
- QUARTZ OSCILLATOR:
  - Output frequency = 4,096 MHz
  - Frequency/time inf. or = $2\ 10^{-10}$ / day in holdover mode
  - Pull-in range inf. or = $\pm\ 5\ 10^{-7}$
  - Time to reach temperature (df/f inf. or = $2\ 10^{-9}$) : 60 min.
- AMPLIFIER MODULE:
  - Redundant outputs (2+1)
  - Two outputs per board
  - Impedance 75 or 120 ohm
  - Standardized output signal (ITU-T G 703 and G 812)
  - Hardware switching between oscillators
  - Return control measurement phase measurement compliant with notice ITU-T G 703 (75 or 120 ohm)

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US2G SPECIFICATIONS

- POWER SUPPLY
  - Input : 48V
  - Output: +5V 10 A
    +12V 7 A
    -12V 2.5 A
  - Load distribution
- REDUNDANCY :
  - The switching of any redundant element does not cause a phase jump greater than 1/64 IU.
    Compliant with ITU-T G 812.
- PHASE SHIFT MONITORING
  - Phase jump monitoring between oscillator and output return control
  - Resolution 5 °
  - Alarms for relative frequency drifts df/f ranging from 10^{-11} to 10^{-8}
- CONFIGURATION :
  - In maximum configuration, the unit offers 64 outputs:
    * 32 outptuts at 2048 kHz on the main frame
    * 32 outputs at 2048 kHz on the extension frame

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