Frequency Reference Unit (FRU-SAASM)

Features:

- Ultra-stable GPS Disciplined Frequency Reference
- 10 Independent 10MHz outputs
- 1U chassis
- Meets MIL-STD-188-164A stability requirements
- Frequency accuracy to $1 \times 10^{-12}$
- Dual Port NTP Server

The FRU is a state of the art, high-precision frequency standard capable of outputting ten isolated precision 10MHz frequency reference outputs. The FRU uses an internal GPS receiver to control a precision oscillator with accuracy up to $1 \times 10^{-12}$ and excellent short term stability.

The FRU meets the frequency stability requirements of MIL-STD-188-164A for SHF terminals.

A particular feature of the FRU is the ultra-high isolation (>100dB) between the 10MHz outputs, eliminating interaction between 10MHz outputs when they are loaded/unloaded. The FRU incorporates a high-sensitivity 12 channel Dual Ethernet ports are used for both monitoring/control of the FRU using Simple Network Monitoring Protocol (SNMP) as well as providing Network Time Protocol (NTP) to clients.

A Brandywine supplied user application may also be used to provide a Graphical User Interface to the FRU.

The FRU is available in a number of configurations to support specific applications. A Mobile Application version features a special vibration isolated oscillator that provides isolation of the reference source from portable generator induced phase noise. The High Performance version uses a rubidium oscillator.

A SAASM GPS receiver is available for military applications.
### FRU Technical Specifications

#### Input:
- **GPS Antenna Input**
  - Connector: BNC

- **1PPS input**
  - Connector: DB-15
  - Level: 0-10V<sub>pk</sub>
  - Impedance: 50 Ω

- **HAVEQUICK Input**
  - Connector: DB-15
  - Level: 0-5V<sub>pk</sub>
  - Impedance: 2 kΩ

#### Outputs:
- **10MHz outputs**
  - No of Outputs: 10
  - Frequency: 10MHz
  - Accuracy: 1X10<sup>-12</sup> (24hr avg.)
  - Amplitude: +13dBm
  - Harmonics: <40dBc
  - Non Harmonic: <90dBc
  - Isolation: <100dBc when adjacent channel is opened or shorted
  - Phase Noise: Static Vibration*<br>  - 10Hz: -120 -120<br>  - 100Hz: -140 -90<br>  - 1kHz: -150 -130<br>  - 10kHz: -150 -150<br>  - 100kHz: -155 -155
  - Phase perturbation <5mdeg. in 0.2sec

- **1PPS Output**
  - Accuracy: ±50ns
  - Connector: DB-15
  - Level: 0-10V<sub>pk</sub>
  - Impedance: 50 Ω

- **HAVEQUICK Output**
  - Connector: DB-15
  - Level: 0-5V<sub>pk</sub>

#### Power:
- 90 VAC to 260 VAC
- <15 Watts.
- Dual Redundant Power (opt)

#### Control and Status:
- **Type**: 10/100BaseT Ethernet
- **No of Ports**: 2 independent
- **Protocol**: IPV4, IPV6
  - SNMPv1, V3 (opt)
  - NTPv3, V4 (opt)

- **Graphical Interface**: BWC Application

#### GPS Receiver:
- **Receiver Type**: GB-GRAM
- **Frequency**: L1, L2 Dual Frequency
- **Satellite Code**: C/A, P(Y)
- **Receiver Type**: Parallel 12 Channel
- **Pos. Accuracy**: 16m SEP
- **Warm start**: <120 seconds with Almanac, CV loaded

#### Reliability:
- MTBF >70,000 hours

#### Physical:
- Size: 1U 19”x1.72x14” depth

#### Environmental:
- Humidity: 95% non-condensing.
- Temperature: 0 to +50°C operating
- -40 to +85°C non-operating.
- Temp. Shock: -20 to +70 °C 3 °C/min
- Vibration*: 1.5g peak. 50-2000Hz
- Shock*: MIL-STD-188-164A para. 5.1.2.16.c

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* Mobile Application Version only