

**AS9100 / ISO9001 Certified**

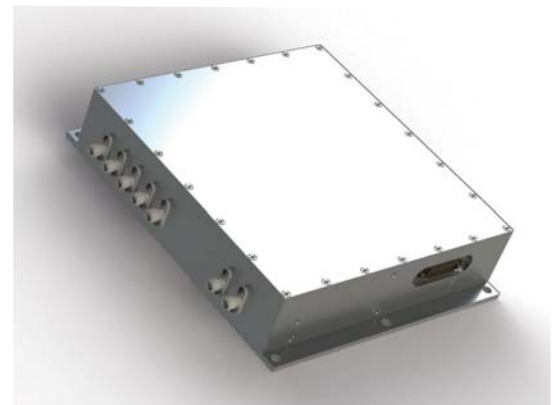
**Low Cost**

## Low G Sensitivity Cesium Atomic Frequency Reference Assembly for Airborne Applications

MTI introduces the next generation of atomic references for rugged military and airborne applications that combines Cesium atomic clock performance with MTI's patented Low-G sensitivity DOCXO in a small outline hermetically sealed package. The Precision Reference generates a highly accurate frequency (typically better than 5E-11 after 24hrs) with very low phase noise performance in dynamic environments. The device is also capable of locking to an external frequency reference or GPS. The entire assembly uses less than 16W at -40°C (total continuous power), offers fast warm-up of less than 9min. to an accuracy better than 4E-10 at -40°C (reference time 30 min.). RS-422 provides communication, control and status reporting along with wired RS-422 level status outputs. Thermal interface allows for use with minimal direct airflow such as encountered at high altitudes. Multiple options are available to offer a customized high performance next generation Atomic Frequency Reference.

### Applications

- Low G Sensitivity for rugged military applications
- Airborne and Shipboard
- Ground and Satellite Communications
- Secure Communication Links
- Rubidium Clock Replacement



### Electrical Performance and Features

**Frequency Outputs:** 10MHz (qty 1) & 100 MHz (qty 5)

**Supply Voltage:** 12VDC and 15VDC

**Warm Up Power Consumption:** 12VDC, 24W maximum ; 15VDC, 4 W maximum

**Phase Noise:** See phase noise graph

**Continuous Power Consumption:** 12VDC, 12W, 15VDC, 3.75W @ -40°C

**Operating Temperature:** -30°C to +70°C, Non-Operating -55°C to 90°C

**Temperature Stability:** 5.0E-10pp (Reference=Internal Cesium)

**Magnetic Sensitivity:** 3.0E-11/Gauss (Reference=Internal Cesium)

**Aging (Max), Internal CS Locked:** Per Day 4.0E-11, Per Month 4.0E-10, Per Year 1.2E-09, (after 30days continuous operation, reference=Internal Cesium)

**Acceleration Sensitivity :** Better than 1.0E-09/g/axis (For Low-G Options, consult factory)

**Retrace:** Better than 5.0E-11 after 2 hours (Reference=Internal Cesium)

**Warm Up Time/Stabilization time:** Less than 12 minutes at -30°C to 4.0E-10 (reference time 30 min.)

**Allan Deviation:** 1s 1.0E-11, 10s 1.0E-11, 100s 1.5E-11, 1000s 1.0E-11 (Reference=Internal Cesium)

**Atomic Standard:** Internal Cesium Clock

**EMI :** EMI protected

**Ruggedized Design:** For harsh industrial environments

**Serial Interface:** RS-422 serial communication, user command and control set

**Selectable Reference:** Using hardware Bit or software serial communications port selectable internal Cesium, external 10MHz, 1PPs, or optional internal GPS receiver.

**Bit Function Options:** Hardware using 3 hardware lines or software serial communication port (RS-422)

**Auto Calibration:** Internal CS Auto Calibration from external reference, Manual Calibration resolution better than 1.0E-12

**Moisture Sealed Chassis:** Per MIL-STD-202

**Connectors:** RF input/outputs, 7 SMA Female connectors

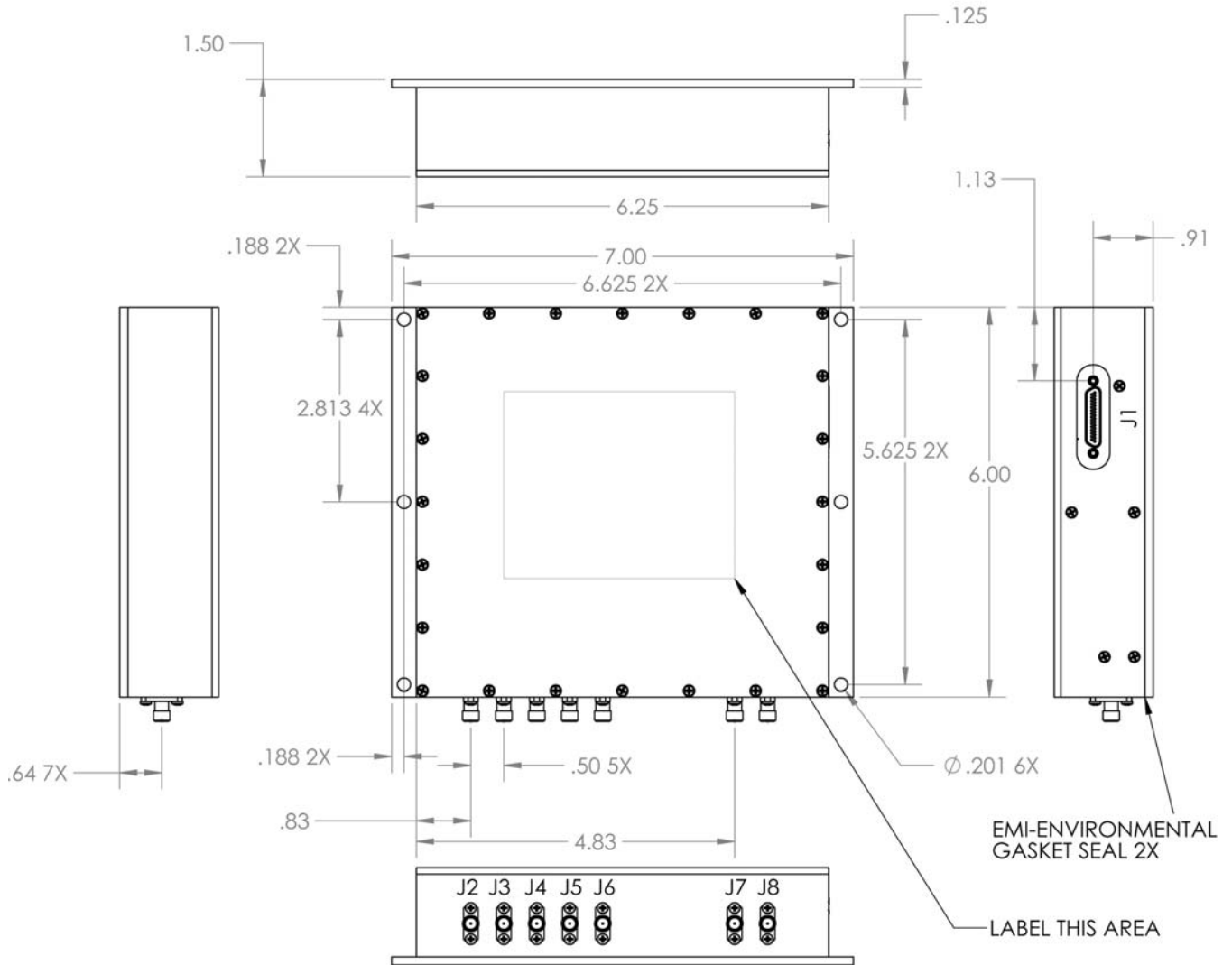
**Power-BIT-COMM on 31pin Micro-D**

**Package Dimensions:** 6.0"x7.0"x1.5", weight 3.5lbs, 6X 0.201" DIA flange mounting holes, See ICD

**MIL-STD-188:** Compliant

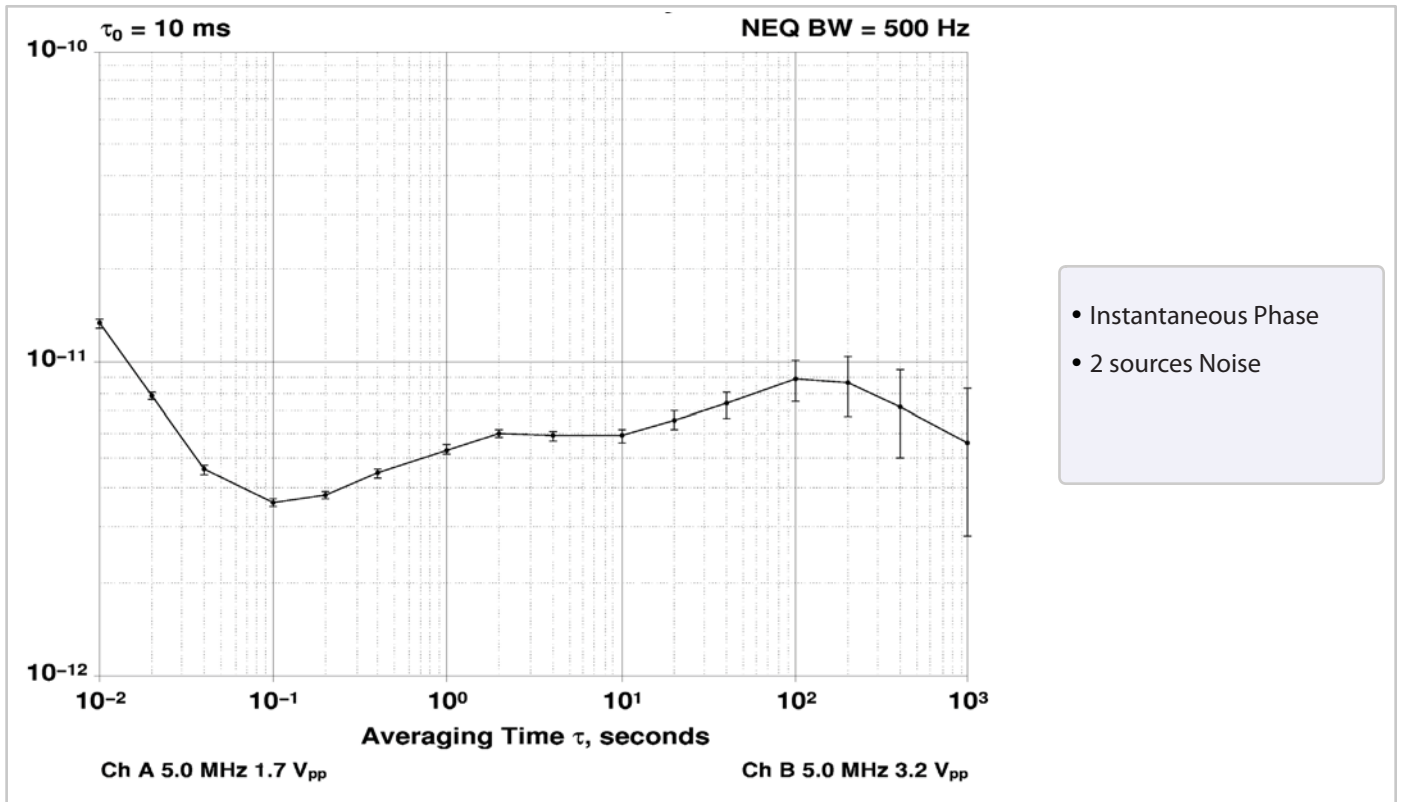
\*Parameters can be modified to meet specific application requirements

## Mechanical Outline

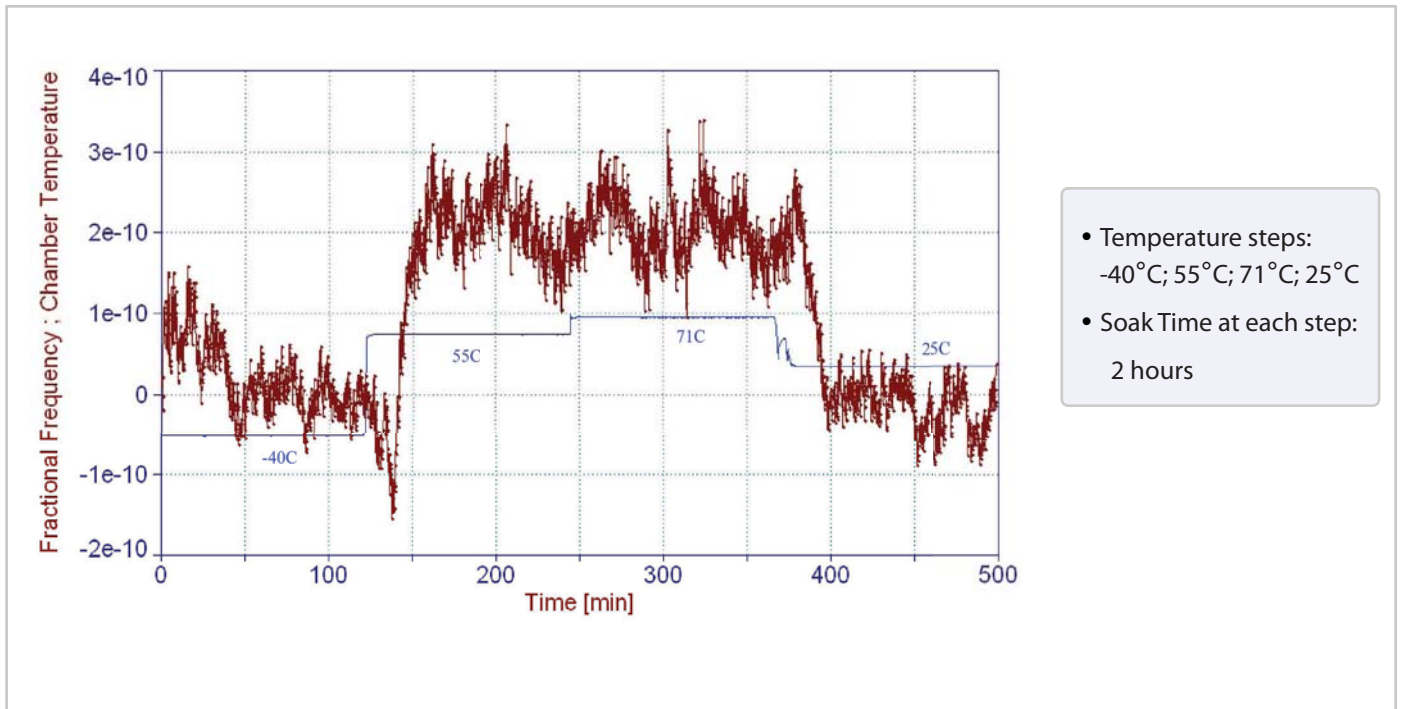


CONNECTION	FUNCTION	DESCRIPTION
J1	POWER-COMM	31 MICRO-D
J2	80MHZ OUT	SMA
J3	80MHZ OUT	SMA
J4	80MHZ OUT	SMA
J5	80MHZ OUT	SMA
J6	80MHZ OUT	SMA
J7	10MHZ OUT	SMA
J8	REF-IN, CAL-IN	SMA

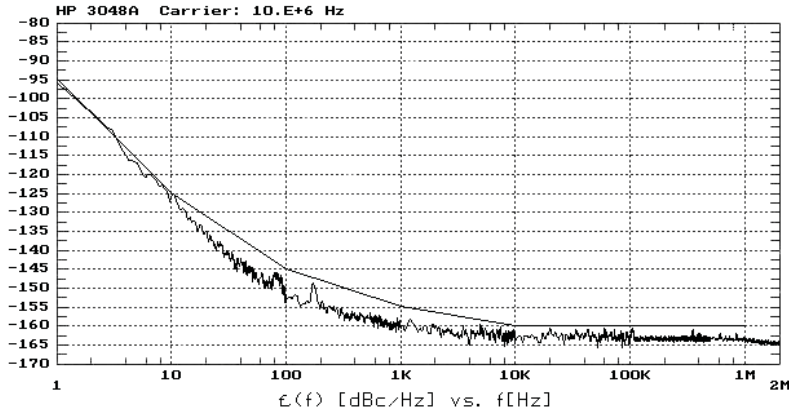
## Allan Deviation



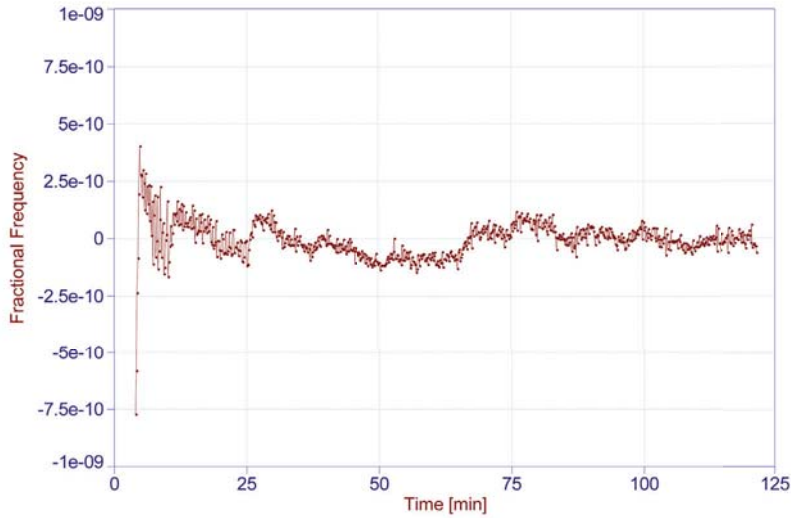
## Thermal Stability



## Phase Noise



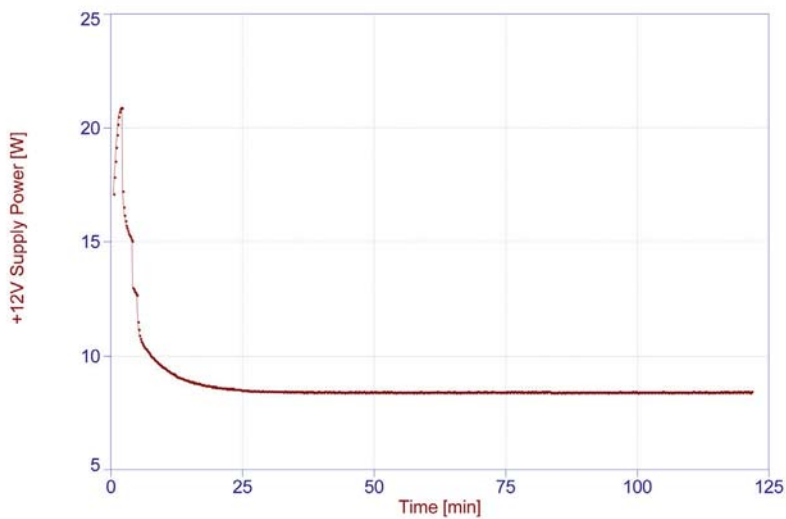
## Warm-Up Fractional Frequency vs. Time



Warm-Up @ 25°C (Zoom)

- Time to  $\pm 1E-7$  = 1.46min
- Time to  $\pm 5E-8$  = 1.52min
- Time to  $\pm 4E-10$  = 4.86min

## Warm-Up Power vs. Time



Warm-Up @ -40°C

- $P_{max}$  = 20.9W
- $P_{steady}$  = 8.45W