

## Efratom M100 Rubidium Frequency Standard (RFS)

The Efratom Model M-100 Rubidium Frequency Standard (RFS), Part Number (P/N)70502-1, is a sub-compact, lightweight, atomic resonance-controlled oscillator. The unit provides a pure and stable 10 MHz sinusoidal signal from a 10 MHz voltage-controlled crystal oscillator (VCXO), which is referenced and locked to the hyperfine transition of Rubidium 87 (Rb 87). The reference element is an optically-pumped integrated rubidium vapor cell, contained within the physics package. For the standard M-100, this technique provides long-term stability of  $\leq 6 \times 10^{-11}$ /month ( $\leq 3.6 \times 10^{-10}$  for first year) improving to  $\leq 2 \times 10^{-10}$ /yr starting with the second year.

### Output Characteristics:

- Frequency: 10 MHz Sine Wave, ( $\pm 5 \times 10^{-11}$  at shipment)
- Amplitude: 0.5 vrms (-10%+30%) into 50 ohm load
- Phase Noise (SSB 1 Hz BW): >120 dB at 100 Hz from carrier
- (Signal-to-Noise): >130 dB at 1000 Hz from carrier
- Harmonic Distortion: >-30 dBc
- Non-Harmonic Distortion: >-80 dBc
- Warm-up:
  - <10 minutes to reach 10 MHz  $\pm 2 \times 10^{-10}$  at 25 °C ambient
  - <30 minutes to reach 10 MHz  $\pm 5 \times 10^{-11}$  at 25 °C ambient
- Peak current during warm-up: approx. 2.2 amps max at 25°C with 26 vdc input