

# Rubidium Frequency Standard Oscillator

## AR-62A-02

|                                    |   |
|------------------------------------|---|
| <b>Output Frequency:</b>           | 2.048 MHz sine wave / 75 ohm                                    |
| <b>Short-Term-Stability:</b>       | <3 x 10 <sup>-11</sup> @ 1sec; <3x 10 <sup>-12</sup> @ 100sec   |
| <b>Low Aging</b>                   | 5E-10/year  |
| <b>Wide Temperature :</b>          | -40°C to +70°C (OPT)  |
| <b>Stability over Temperature:</b> | ±3E-10  |
| <b>Low Power:</b>                  | 10W @ steady state  |
| <b>Fast Warm-up:</b>               | < 4 min to lock   |
| <b>Compact:</b>                    | 114x83x83 mm  |
| <b>Digital Freq. Control:</b>      | <1x10 <sup>-12</sup> steps / >5 x 10 <sup>-7</sup> Range (opt.) |
| <b>Hold-Over Mode:</b>             | OCXO hold-over  |
| <b>High Reliability MTBF:</b>      | >261,000 hrs @ 25°C, G.B  |

### Description:

**AR-62A-02** is an extremely small, very high performance Atomic Rubidium Frequency Standard designed to operate reliably in demanding applications and harsh environment. The unit is a semi-militarized version of the AR-60A model. AR-60A includes a high performance Oven Controlled Crystal Oscillator (OCXO) which is locked to the Rubidium Atomic Resonance thus maintaining its very high stability and accuracy.

The unit contains a micro-processor which optimizes its performance vs. external disturbances. It has a unique hold-over mode which keeps the internal OCXO running with the last memorized frequency when lock is lost. (e.g. at a very high temperature or shock).

In addition, a built-in synthesizer allows a very fine digital frequency control over a wide range (option).



### Applications

- |   |  |   |
|---|--|---|
| <ul style="list-style-type: none"> <li>▪ Communication</li> <li>▪ Telecommunications</li> </ul> | <ul style="list-style-type: none"> <li>▪ Mobile Radio Base Stations</li> <li>▪ Wireless Communication</li> </ul> | <ul style="list-style-type: none"> <li>▪ Secure Communication</li> <li>▪ Calibration</li> </ul> |
|---|--|---|

AR-62A-03 Specification 12/3/2006  
THE BINDING SPECIFICATIONS ARE ONLY THOSE STATED IN OUR QUOTATION/PROPOSAL/CONTRACT.  
THIS PRODUCT IS COVERED BY THE FOLLOWING U.S. PATENTS: 6130583. OTHER PATENTS PENDING.

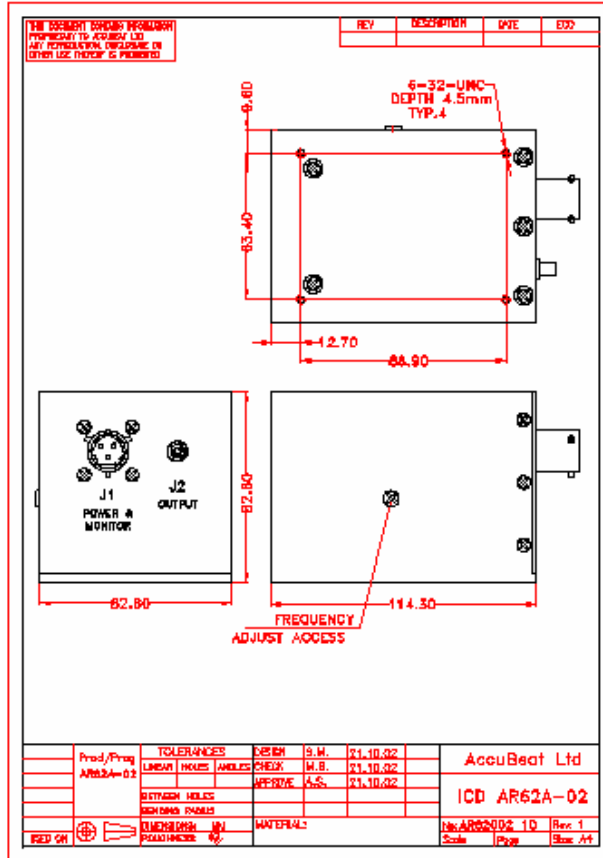
| Specification                              |   |  |
|--|---|--|
| <b>Accuracy</b>                            | <b>@ Shipment:</b>  | $5 \times 10^{-11}$  |
|  | <b>Holdover:</b><br>(when lock is lost)   | OCXO   |
| <b>Long Term Stability</b>                 | $< 2 \times 10^{-9}$ (1 <sup>st</sup> Year)<br>$< 5 \times 10^{-10}$ (2 <sup>nd</sup> Year)   |  |
| <b>Short Term Stability</b>                | $< 3 \times 10^{-11}$ @ 1sec<br>$< 3 \times 10^{-12}$ @ 100sec  |  |
| <b>Phase Noise (10 MHz)</b><br>Quiescent   | <u>From carrier</u><br>$< -100$ dBc/Hz @ 10Hz<br>$< -130$ dBc/Hz @ 100Hz<br>$< -144$ dBc/Hz @ 1KHz<br>$< -148$ dBc/Hz @ 10KHz   |  |
| <b>Harmonics</b>                           | $< -35$ dBc   |  |
| <b>Spurious (Non Harmonic)</b>             | $< -75$ dBc   |  |
| <b>Temperature Stability</b>               | $< \pm 3 \times 10^{-10}$ from $-20^{\circ}\text{C}$ to $+65^{\circ}\text{C}$   |  |
| <b>Warm-up Time</b>                        | $< 7.5$ min to reach $+ 5 \times 10^{-10}$ @ $25^{\circ}\text{C}$   |  |
| <b>Outputs</b>                             |   |  |
| <b>Output</b>                              | 2.048 MHz sine wave, 0.4 to 1.5 peak to peak / 75 ohm   |  |
| <b>Frequency Trim Rang:</b>                | <b>Mechanical:</b> +5E-9<br>Trimmer 10 turns  | <b>Electrical</b> (opt.): $\pm 1.5 \times 10^{-9}$ min/ 0 to 10VDC   |
|  |   | <b>Digital</b> (opt.): $< 1 \times 10^{-12}$ steps / $> 1 \times 10^{-6}$ range (TxD, TTL).<br>Included in this option:<br>a. Interface card for RS232 connection to PC.<br>b. Software. |
| <b>Built In Test (Bit) Lock Indication</b> | Detects $> 97\%$ of all failures<br><br>Open Collector: <ul style="list-style-type: none"> <li>• High Impedance=Unlock</li> <li>• Low Impedance "0" = Lock</li> </ul> |  |
| <b>Power Supply</b>                        |   |  |
| <b>Input Voltage</b>                       | 18 to 36 VDC  |  |
| <b>Power Consumption:</b>                  | $< 10$ W @ $25^{\circ}\text{C}$ Steady State  |  |

\* All specifications are at  $25^{\circ}\text{C}$  at quiescent conditions unless specified otherwise.

| Specification (continue)               |   |
|--|---|
| <b>Dimensions &amp; Weight</b>         |   |
| <b>Dimensions</b>                      | 82.5 x 82.5 x 114.3 mm  |
| <b>Weight</b>                          | 1Kg / 2.2 Pound   |
| <b>Environmental</b>                   |   |
| <b>Operating Temperature</b>           | -40 °C to +70 °C opt. (base plate)  |
| <b>Vibration</b>                       | Operation:                      Random: 3.0 g rms 20 to 500Hz   |
| <b>Humidity</b>                        | 95% non-condensing  |
| <b>Others</b>                          | Conforms to rain, humidity, salt, fog, and dust, requirements per MIL-STD-810   |
| <b>Magnetic Field Sensitivity:</b>     | < 4x10 <sup>-11</sup> /Gauss  |
| <b>Shock</b>                           | 20g half sine, 11 ms momentary offset < 1x10 <sup>-9</sup>  |
| <b>MTBF</b>                            |   |
|  | >261,000 hrs @ 25 °C, G.B<br>>108,000 hrs @ 60 °C, G.B. per MIL HDBK-217F   |
| <b>Connectors &amp; Electrical ICD</b> |   |
|  | <ul style="list-style-type: none"> <li>• J1 Connector (SMA):RF Output</li> <li>• J2 Connector, MIL-C-38999 Series II Shell Size 11, 35 Pins:               <ul style="list-style-type: none"> <li>○ pin 1 - N/C</li> <li>○ pin 2 - Crystal Control Voltage(Optional)</li> <li>○ pin 3 - Rb Lamp DC Light (Option)</li> <li>○ pin 4 - Ground</li> <li>○ pin 5 - Reserved for Factory Use</li> <li>○ pin 6 - Reserved for Factory Use</li> <li>○ pin 7 - Reserved for Factory Use</li> <li>○ pin 8 - Power</li> <li>○ pin 9 - BIT</li> <li>○ pin 10- GND</li> <li>○ pin 11- Power</li> <li>○ pin 12- Ground</li> <li>○ pin 13- Power</li> </ul> </li> </ul> |

\* All specifications are at 25 °C at quiescent conditions unless specified otherwise.

**Mechanical ICD**



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