# RUBIDIUM SPECIFICATIONS FRS / LPRO & LCRO

| | LPRO/FRS | LCRO |
|---|---|---|
| **Ouput** Frequency, MHz | 10 | 10 |
| Amplitude (inmto 50 ohm) | +8+2dBm | +8+2dBm |
| Voltage | 0.5-1.0Vrms | 0.5-1.0Vrms |
| **Adjustment:** | | |
| Mechanical/Electrical Range | 2E-9(min) | 2E-9(min) |
| Control Voltage | 0 - 5V | 0.5 V |
| Factory Setting | +5E-11 | +5E-11 |
| **Frequency Stability:** | | |
| Allan Var. 1s | 3E-11 | 1E-10 |
| 10s | 1E-11 | 3.16E-11 |
| 100s | 3E-12 | 1E-10 |
| **Aging:** 1 month | 4E-11 | 5E-11 |
| 1 Year | 5E-10 | 5E-10 |
| **Warm up time to 1E-9** | 5 min | 15 min |
| **Retrace** | | |
| after 24 hours off & hours on, same temperature | 2E-11 | 5E-11 |

| | LPRO/FRS | LCRO |
|---|---|---|
| **Phase Noise** L(f) - dBc/Hz | | |
| 10Hz | 100 | - |
| 100Hz | 130 | 110 |
| 1kHz | 140 | 130 |
| 10kHz | 145 | - |
| -dBc, Harmonics: | 40 | 40 |
| Spurious | 80 | 65 |
| **Power Supply** Inout Voltage | 22 - 30 | 22 - 30 |
| Power at Warm Up (6 min) | 45W | 42W |
| Power at steady state at +25°C | 10W | 8W |
| **Temperature** | | |
| Operating (Ambient) | -10°C-+55°C | -5°C-+55°C |
| Base Plate, not more than | +65°C | +65°C |
| Storage | -40°C-+85°C | -40°C-+85°C |
| Freq Offset over Temp range | 3E-10 | 3E-10 |
| **Magnetic Field sensitivity** | 2E-11/Guass | 3E-11/Guass |
| **Atmospheric Pressure** | 1E-13/mbar | |

**Defence specification vibration, shock, topple and thermal stress.**

Quartzlock
The most stable Frequency Standards available
GPS • Glonass & LF Track RX
Rubidium Atomic Standard
Hydrogen Maser

ISO 9001

Craft Award 2000/2 CE

NIST Traceable Standard

NPL Referenced

5x dti Smart Awards

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ADVANCE DATA
NEW
MINIATURE RUBIDIUM
OSCILLATORS


# OVEN CONTROLLED QUARTZ OSCILLATORS

| | | |
|---|---|---|
| **STABILITY** | to | **1 x $10^{-12}$ sec** |
| **PHASE NOISE** | to | **-165 dBc/Hz @ 10kHz** |
| **WARM TIME** | from | **15 seconds** |
| **POWER** | from | **150mW** |
| **SIZE** | from | **27x36x12 CO8** |

**PROVISIONAL INFORMATION**

**ISO9001**

# Quartzlock.com QUARTZ CRYSTAL OSCILLATOR SPECIFICATIONS

| | Astra A&B A3 2001 | Dubhe A3 3005 | EOS A3 2008 | Altair A3 2007 | Cosmo A3 2000 |
|---|---|---|---|---|---|
| Frequency MHz | 10 | 100 | 10 | 10 | 10 |
| Resonator Cut | SC | BT | SC | SC | SC |
| Aging per day | 1E-10 | 5E-09 | 5E-10 | 1E-10 | E-10 |
| per month | 1E-08 | 5E-08 | 5E-08 | 1E-08 | E-08 |
| per year | 5E-08 | 1E-07 | 1E-07 | 3E-08 | E-08 |
| Phase Noise -dBc/Hz | | | | | |
| 1Hz | 100 | 60 | 90 | 110 | 100 |
| 10Hz | 130 | 90 | 130 | 135 | 125 |
| 100Hz | 150 | 120 | 145 | 150 | 150 |
| 1kHz | 155 | 150 | 155 | 160 | 155 |
| 10kHz | 158 | 155 | 160 | 165 | 157 |
| Thermal Stability | +/- 5E-08 | +/- 1E-08 | +/- 1E-08 | +/- 3E-08 | +/- 3E-08 |
| Over range (°C) | -60...+70 | -60...+70 | -60...+70 | -60...+70 | -60...+70 |
| STS (1 second) | 5E-12 | 5E-11 | 5E-11 | 1E-12 | 2E-12 |
| Output 50Ω | 500mV | 300mV | 500mV | 500mV | ~500mV |
| Warm Time (<1E-7) | <3min @25°C | <3min @25°C | 15s @25°C | <3min @25°C | <30s @25°C |
| Supply Voltage (+/-10%) | 12V | 12V | 12V | 12V | 12V |
| Continous Power (T=25°C) | <250mW | <250mW | <300mW 150mW option | <250mW | |
| Size (LxWxH)mm | 50x40x23 B 53x33x24 A | 54x34x25 | 36x27x12.5 | 33x33x16 | 50x40x23 |

Large Quantity

Low Cost

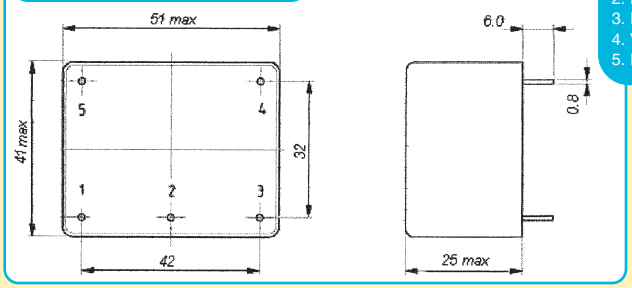
Custom Spec

| STS | |
|---|---|
| 1[1] | 3E-12 |
| 10[1] | 3E-12 |
| 100[1] | 1E-11 |
| 1000[1] | 8E-11 |

## BASE DIAGRAMS & PIN CONNECTIONS

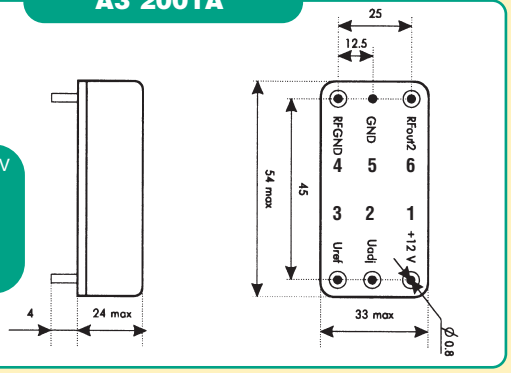
### ASTRA 'B' & COSMO
**A3 2001B & A3 2000**

1. Ground RF return
2. Electrical tuning input 0-8V
3. Reference voltage +8
4. Vcc +12V
5. RF output



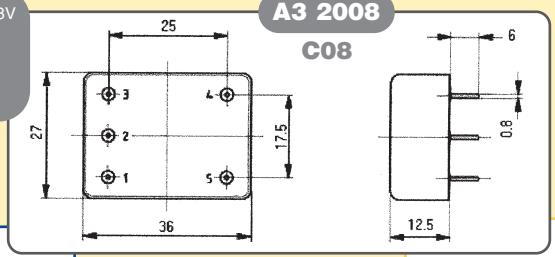

### ASTRA 'A'
**A3 2001A**

1. Electrical tuning input 0-8V
2. Reference voltage +8
3. Vcc +12V
4. RF GND
5. Ground
6. RF Output



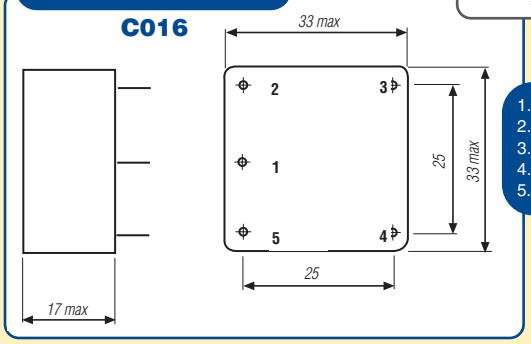

### EOS
**A3 2008**
**C08**

1. Electrical tuning input 0-8V
2. Reference voltage +8
3. Vcc +12V
4. RF output
5. Ground RF return

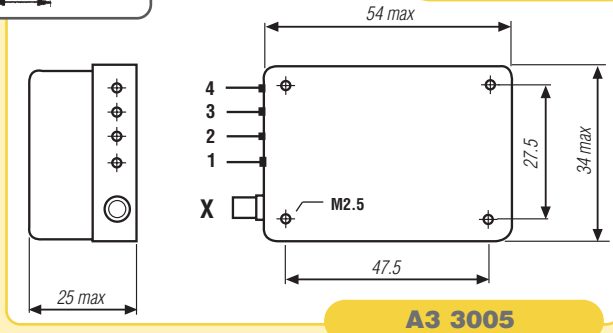



### ALTAIR
**A3 2007**
**C016**

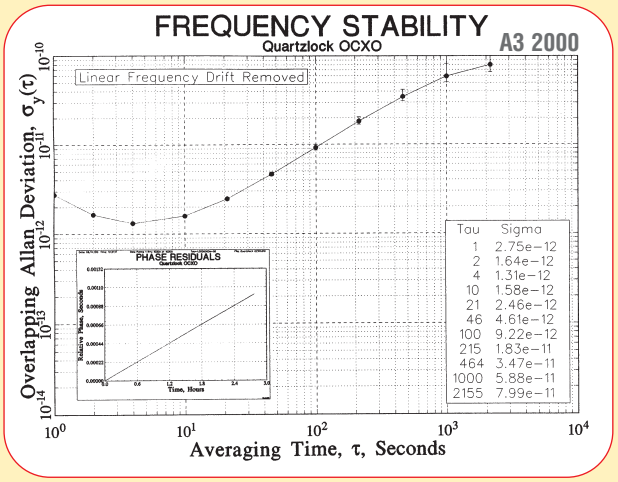
1. Ground
2. RF Output
3. Supply voltage
4. Reference voltage +8A
5. Electrical tuning input 0-8 V

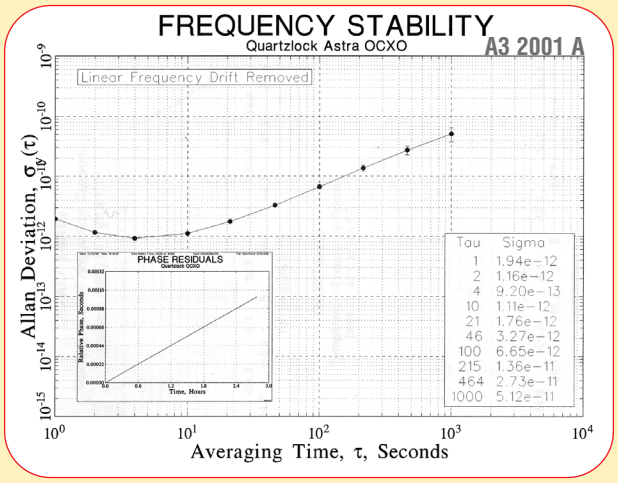


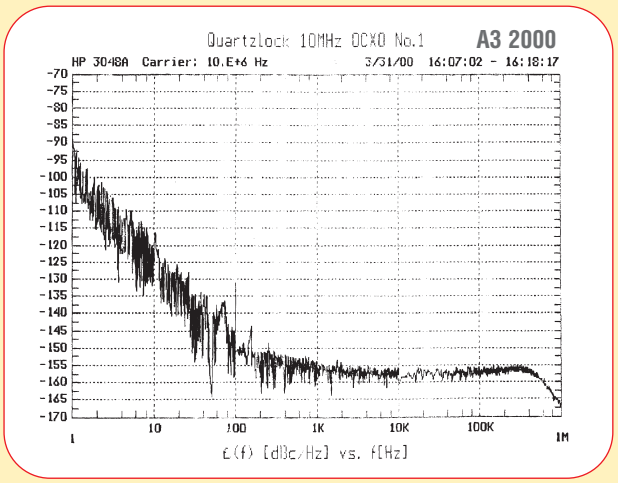

1. Ground
2. Electrical tuning input 0-8V
3. Reference voltage +8A
4. Supply voltage
X - RF Output (SMA - F)

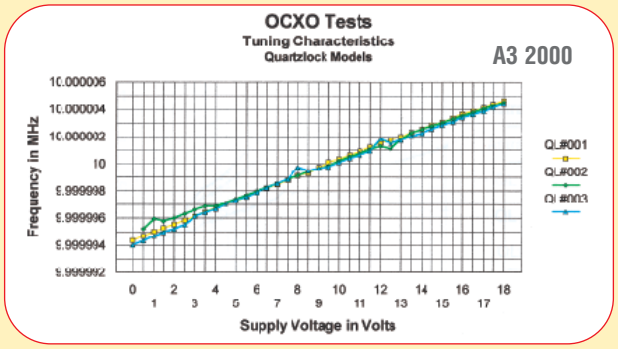


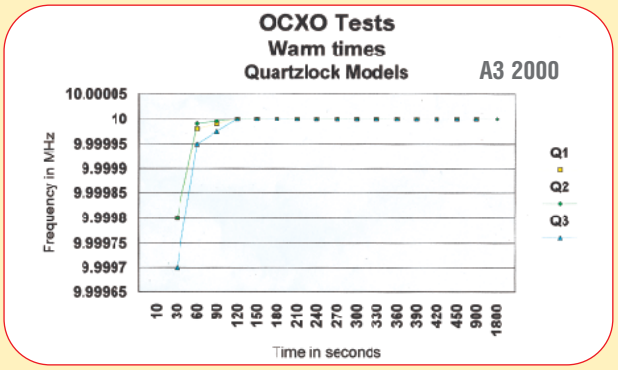

**A3 3005**
**DUBHE**

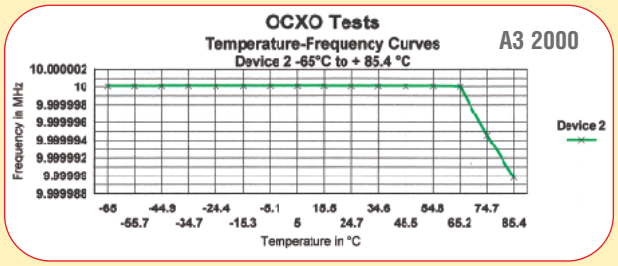

FREQUENCY STABILITY
Quartzlock OCXO
A3 2000
Linear Frequency Drift Removed
Overlapping Allan Deviation, σy(τ)
Averaging Time, τ, Seconds
PHASE RESIDUALS
Tau Sigma
1 2.75e-12
2 1.64e-12
4 1.31e-12
10 1.58e-12
21 2.46e-12
46 4.61e-12
100 9.22e-12
215 1.83e-11
464 3.47e-11
1000 5.88e-11
2155 7.99e-11

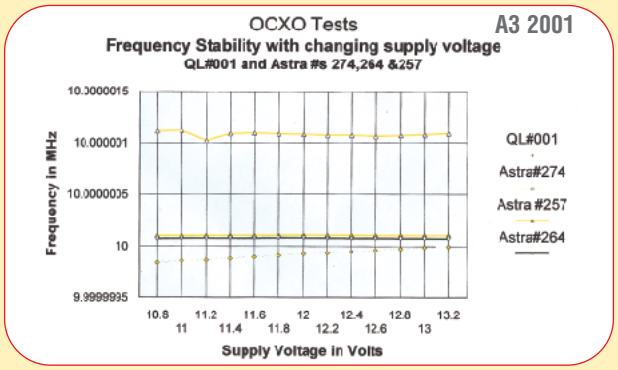

FREQUENCY STABILITY
Quartzlock Astra OCXO
A3 2001 A
Linear Frequency Drift Removed
Allan Deviation, σy(τ)
Averaging Time, τ, Seconds
PHASE RESIDUALS
Tau Sigma
1 1.94e-12
2 1.16e-12
4 9.20e-13
10 1.11e-12
21 1.76e-12
46 3.27e-12
100 6.65e-12
215 1.36e-11
464 2.73e-11
1000 5.12e-11

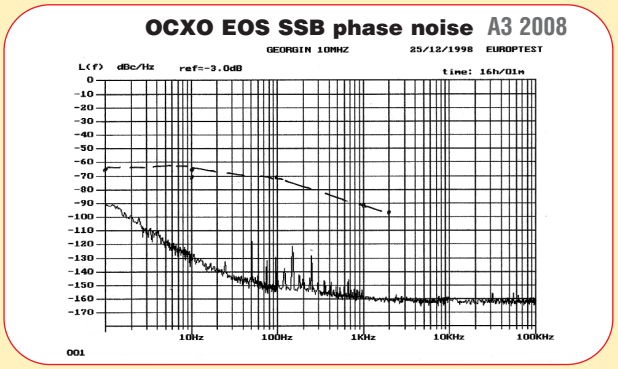

Quartzlock 10MHz OCXO No.1
A3 2000
HP 3048A Carrier: 10.E+6 Hz
3/31/00 16:07:02 - 16:18:17
ℒ(f) [dBc/Hz] vs. f[Hz]

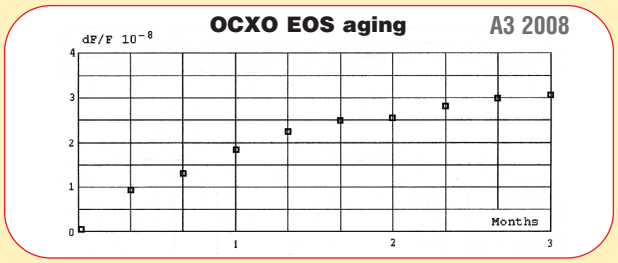

OCXO Tests
Tuning Characteristics
Quartzlock Models
A3 2000
Frequency in MHz
Supply Voltage in Volts
QL#001
QL#002
QL#003


OCXO Tests
Warm times
Quartzlock Models
A3 2000
Frequency in MHz
Time in seconds
Q1
Q2
Q3


OCXO Tests
Temperature-Frequency Curves
Device 2 -65°C to + 85.4 °C
A3 2000
Frequency in MHz
Temperature in °C
Device 2


OCXO Tests
A3 2001
Frequency Stability with changing supply voltage
QL#001 and Astra #s 274,264 &257
Frequency in MHz
Supply Voltage in Volts
QL#001
Astra#274
Astra #257
Astra#264


OCXO EOS SSB phase noise
A3 2008
GEORGIN 10MHZ
25/12/1998 EUROPTEST
L(f) dBc/Hz
ref=-3.0dB
time: 16h/01m


OCXO EOS aging
A3 2008
dF/F 10⁻⁸
Months