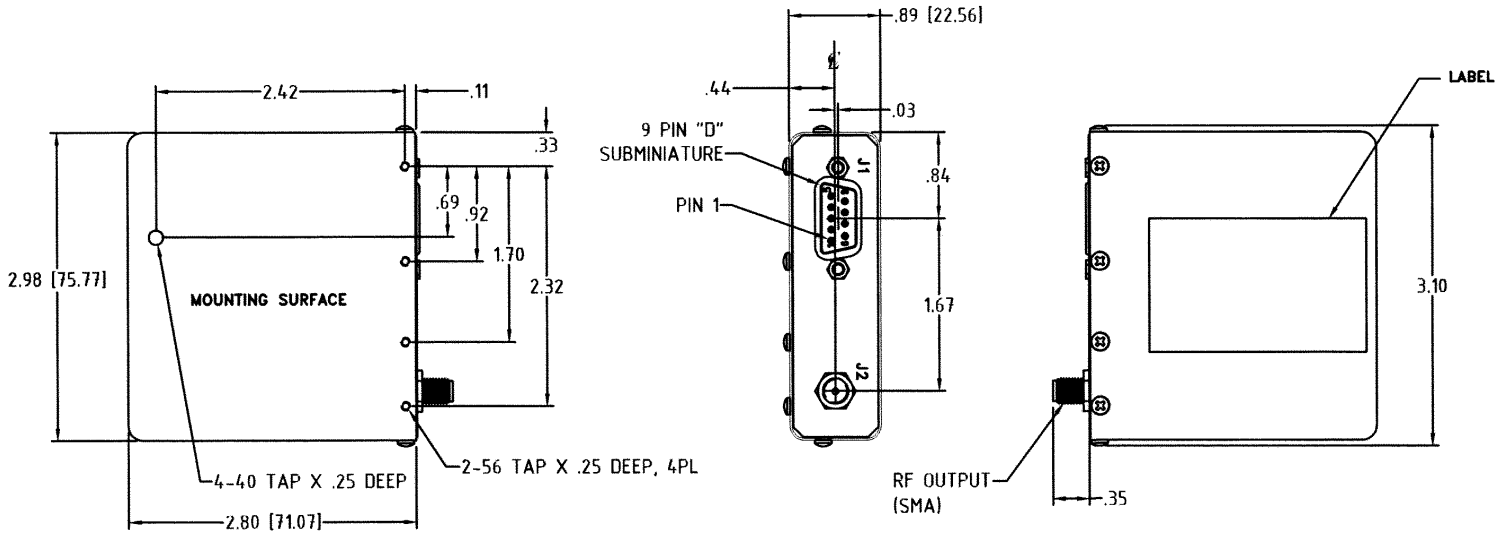


Model FE-505A Low Silhouette Model



Pin #	Function
1	15 VDC Input
2	15 VDC Return (Ground)
3	No Connection
4	5 VDC Input
5	5 VDC Return (Ground)
6	No Connection
7	No Connection
8	TTL Interface Rx Port (Data In)
9	TTL Interface Tx Port (Data Out)



FREQUENCY ELECTRONICS, INC.

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STATE OF THE ART QUARTZ CRYSTAL STANDARDS

Models

FE-205A

FE-405A

FE-505A

DESCRIPTION

This new design concept features a precision double oven crystal oscillator capable of analog or digital tuning. The serial digital tuning is ideal for disciplined applications in today's telecommunications industry. The temperature coefficient of this device is less than 1×10^{-10} . This is accomplished with no frequency over or under shoot, with fast temperature slew rates of 4°C per minute. Performance is Determined by a Double Oven SC Cut 5th Overtone Crystal. Output Frequency is Digitally Synthesized.

TYPICAL APPLICATIONS

- Cellular Base Stations
- Test Equipment
- Stratum Clocks
- GPS Timing Systems
- Rubidium Replacement
- Radar Timing
- Military Communications Systems

“PATENTED DESIGN No. 6,577,201”



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FE-205A



FE-405A & FE-505A

FEATURES

- Analog or Digital Interface [LSB $\approx 1.7 \times 10^{-14}$]
- Excellent Temperature Stability $< 1 \times 10^{-10}$
- -40°C to $+70^{\circ}\text{C}$ Operation
- Low Aging $< 5 \times 10^{-8}$ for 10 yrs.
- Retrace 1×10^{-10} after 1 hour, 24 hrs off
- Any frequency 5 MHz to 25 MHz
- Wide Linear Frequency Tuning Greater Than ± 50 ppm

TECHNICAL CHARACTERISTICS

Output

Frequency: 10 MHz and 15MHz Standard
(Option for any other frequency
5 to 25MHz)

RF Output

Level: 9dBm \pm 2dB into 50 ohm load
Waveform: Sine wave
Harmonics: -40dBc max
Spurious: -65dBc to 1 GHz

Frequency Stability

Temperature: $<1 \times 10^{-10}$ (-40° C to +70° C)
(Including frequency over or undershoot at any
fast or slow temperature slew rate)

Supply Voltage: $<\pm 2 \times 10^{-11}$ (15v \pm 5%)
 $<\pm 2 \times 10^{-11}$ (+5v \pm 5%)

Aging: (also see Option 28)
Per Day: $<1 \times 10^{-10}$ (after 14 days continuous
operation) Typical 5×10^{-11}
Per Year: $<1 \times 10^{-8}$
Per 10 Years: $<5 \times 10^{-8}$

Phase Noise

1Hz -85dBc/Hz
10Hz -95dBc/Hz
100Hz -125dBc/Hz
1KHz -135dBc/Hz
10KHz -145dBc/Hz

Short Term Frequency Stability (Allan Standard Deviation):

$t = 1$ second 1×10^{-11}
 $t = 10$ second 2×10^{-12}
 $t = 100$ second 1×10^{-12}

Retrace

1×10^{-10} in 1 hr. after 24 hours power off
 5×10^{-10} in 20 min. after 24 hours power off

G-Sensitivity: 2×10^{-9} per G, any axis

Input *

Digital Frequency Adjustment: Standard

RF output Frequency Adjustment: Digital control
Via TTL serial port interface. (For details see manual)
Serial Communication
9600 Baud, TTL level, 8 bits, no parity, 1 stop bit

Adjustment resolution: LSB $\approx 1.7 \times 10^{-14}$
Adjustment range: ± 20 Hz for 15MHz output
 ± 9.5 Hz for 10MHz output

*Other trim ranges can be special ordered

Electrical

Power:
Supply Voltage: +15v DC \pm 5% I amp max
+5v DC \pm 5%, 200ma
Warm-Up: 15W max.
Steady State: 3.5W Max at 25°C

Environmental

Temperature Range:
Operating -40°C to +70°C meets all specifications
Operational -55°C to +85°C may not meet frequency stability

Physical Size

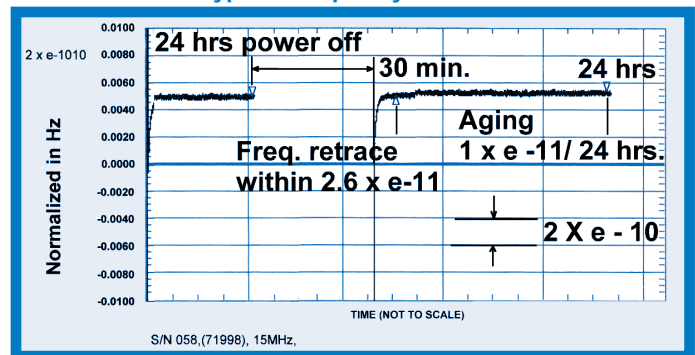
FE-205A 2.03" x 2.03" x 1.54"
FE-405A 3.01" x 3.03" x 1.44"
FE-505A 2.98" x 2.80" x 0.89"

Ordering information *

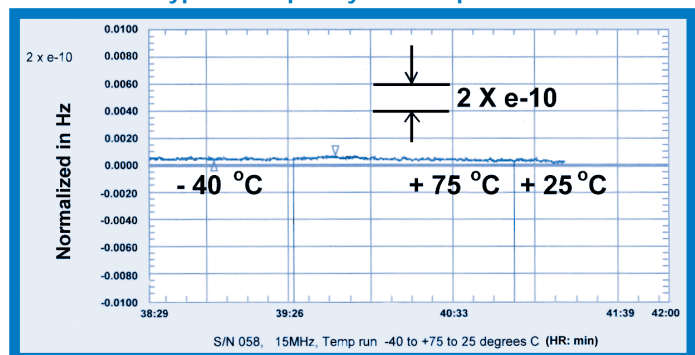
Option	Characteristic
20 (FE-205A Only)	Single 15v input
28	Aging 2.5×10^{-11} /day after 15 days of continuous Operation 2.5×10^{-9} / 10 year
30 (FE-205A Only)	Analog Frequency Adjustment: Via DC input of 5v \pm 5v (0 to +10v) Course Adjust Range: $\pm 2.4 \times 10^{-7}$ Fine Adjust Range: $\pm 0.5 \times 10^{-8}$
32	-40°C to +75°C
34	-40°C to +80°C

* Contact factory for specials including custom packages

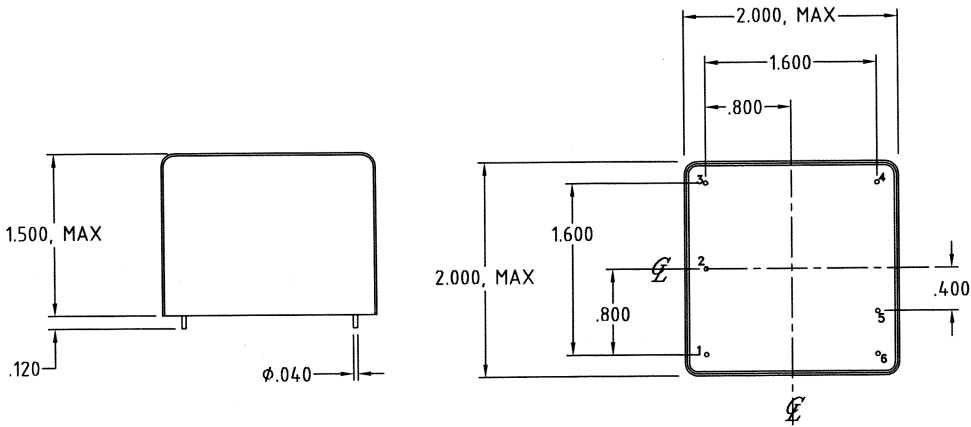
Typical Frequency Retrace



Typical Frequency VS. Temperature

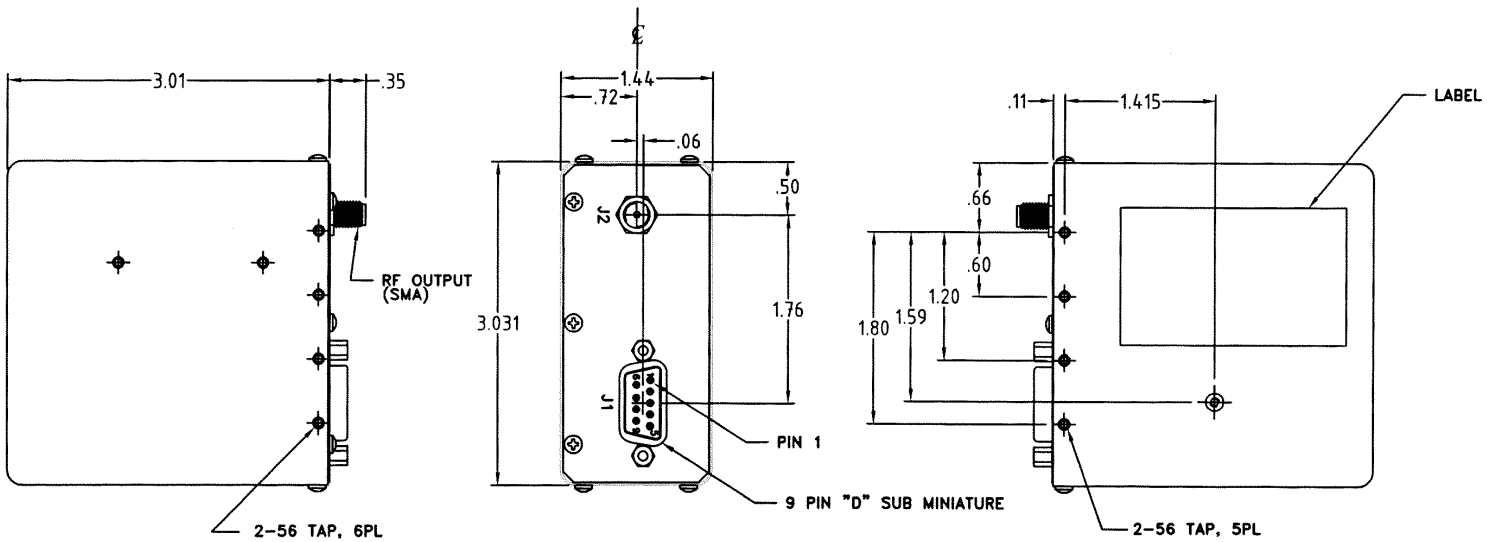


Model FE-205A



Pin #	Function
1	Frequency Tuning, Serial Interface TTL, RX Port or Analog VCO Course Tuning Input
2	+15 Volts B+ Input
3	RF Output
4	DC Return, Serial Digital return and Chassis Ground
5	+5 Volts dc Input
6	Frequency Tuning, Serial Interface TTL, TX Port or Analog VCO Fine Tuning input

Model FE-405A



Pin #	Function
1	15 VDC Input
2	15 VDC Return (Ground)
3	No Connection
4	5 VDC Input
5	5 VDC Return (Ground)
6	No Connection
7	No Connection
8	TTL Interface Rx Port (Data In)
9	TTL Interface Tx Port (Data Out)