Oven Controlled Crystal Oscillator,

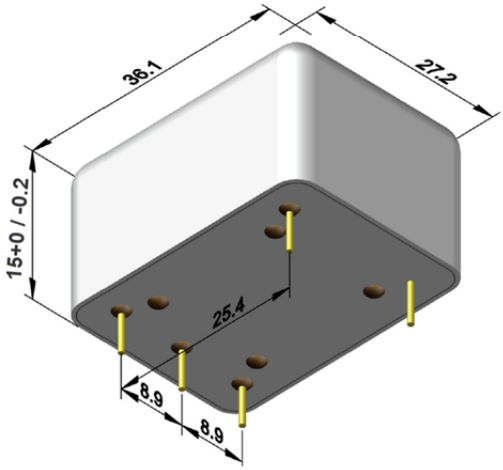
M3 5-49 MHz, M4 50-120 MHz, 5-18 Volts, 0.001ppm / 1ppb

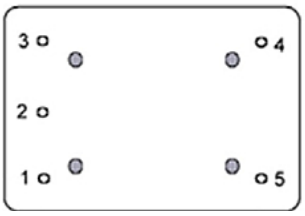
Our OCXO Family is a high stability oven controlled oscillator driven by an SC-cut crystal with excellent phase noise and short term stability in a hermetically sealed package.

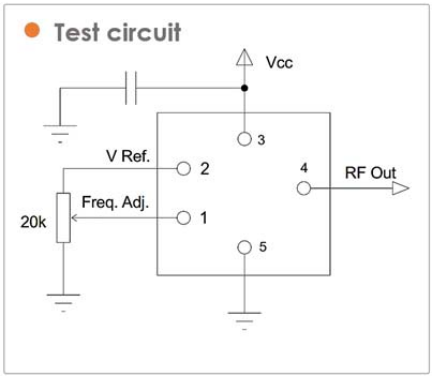
This product can be configured to any frequency between 5-120 MHz.

Key Features:

Frequency range 5-120 MHz	<2x10^{-10} aging per day (M3), < 5ppb (M4)
Low phase noise	Temp stability available to <1ppb (-20 to +70°C)
Excellent short term stability	Extended Temp range up to 125°C
Single 5 to 18V supply	Sine wave or HCMOS/TTL







Units: mm
Not to scale

Pin	Function
1	Freq. adjustment
2	Voltage Ref.
3	Voltage supply
4	RF output
5	Ground & Case

The table below shows the most common options; in most cases selecting one of these will ensure best combination of price, performance and availability. See options on the last page

M3 Model Specifications Frequency	**Daily aging**	**Temp stability**
10MHz (sine)	≤5 x 10^{-10}	≤20ppb -20+70°C
10MHz (sine)	≤3 x 10^{-10}	≤10ppb -20+70°C
10MHz (HCMOS)	≤5 x 10^{-10}	≤20ppb -20+70°C
10MHz (HCMOS)	≤3x 10^{-10}	≤10ppb -20+70°C
M4 Model Specifications Frequency	**Daily aging**	**Temp stability**
100MHz (sine)	≤5 x 10^{-9}	≤100ppb -20+70°C
100MHz (sine)	≤5 x 10^{-9}	≤50ppb -20+70°C
100MHz (HCMOS)	≤5 x 10^{-9}	≤100ppb -20+70°C
100MHz (HCMOS)	≤5 x 10^{-9}	≤50ppb -20+70°C

WORLD HQ: 1702L Meridian Ave. Suite 127, San Jose, Ca 95125, U.S.A.
Tel: (408) 266-7404 FAX: (408) 266-4483
WEB: www.raditek.com E-mail: sales@raditek.com

Oven Controlled Crystal Oscillator,

M3 5-49 MHz, M4 50-120 MHz, 5-18 Volts, 0.001ppm / 1ppb

M3 Model 10MHz Specifications

Frequency	**10MHz** (Available frequencies 10.23, 12, 12.8, 13, 16.384, 20MHz) 75MHz				
Aging per day (Typical)	<0.5ppb (Aging after 30 days of continuous operation) See options				
Aging per year Aging per 10 year	<30ppb 0.3 ppm				
Frequency stability vs Voltage supply	<1ppb per 10% change in Vdd				
Short term stability (Allan Deviation)	$<2 \times 10^{-12}$ (τ = 1 Sec.) $<5 \times 10^{-13}$ (τ = 1 Sec.) **Optional**				
Storage temperature	-55 to +150				
Typical frequency stability Vs temperature	<5ppb over –20 to +70°C (see more options on page 3)				
Output waveform	Sine wave+8dBm (±1dBm) into 50 Ω (AC coupled) HCMOS, <0.5V to >4V level (10KΩ/15pF), 45-55% Duty cycle				
Frequency adjustment (Typical)	Positive Tuning Slop $>4x10^{-7}$over 0-8v (sufficient for 10 years aging) +/- 0.5Hz for 50-100MHz)				
Voltage reference output (Typical)	8V for +12V supply, 4.5 for +5V supply. (See Note 1)				
Supply voltage (VDD)	+12 (±5%)				
Power consumption	5W at warm-up <1.2W at steady state at 20°C				
Warm-up time from +25°C	≤2 after 10 mins				
Phase Noise (10MHz) dBc/Hz	Option A	Option B	Option C	Option D	Option E
1Hz	<-100	<-110	<-115	<-118	-105
10Hz	-130	-135	-140	-140	-130
100Hz	-148	-150	-152	-152	-150
1KHz	-155	-155	-155	-155	-162
10KHz	-158	-160	-160	-160	-170
100KHz	-158	-160	-160	-160	-170
Harmonics distortion	<-30				
Spurious	<-90				
Shock	IE68-2-27 Test Ea 50G for 11ms (Notes 2)				
Vibration	IE68-2-06 Test Fc 10-55Hz, 1.5mm 55-500Hz, 10G				

Note 1: Voltage reference can be configured to any voltage, and must be less than supply/operating voltage.
Notes 2: Stresses beyond the ratings provided may cause permanent damage to the device. Exposure to conditions outside of the recommended operating conditions listed above may adversely impact the device resulting in failures not covered by the warranty

WORLD HQ: 1702L Meridian Ave. Suite 127, San Jose, Ca 95125, U.S.A.
Tel: (408) 266-7404 FAX: (408) 266-4483
WEB: www.raditek.com E-mail: sales@raditek.com

Oven Controlled Crystal Oscillator,

M3 5-49 MHz, M4 50-120 MHz, 5-18 Volts, 0.001ppm / 1ppb

M3 Model 10MHz Part Number Example:

Options **ROCXO-M3-XX XX -X- X X X – 10MHz**

Model

Daily Aging	
5x10-10	D
2x10-11	E
1x10-11	G

Temp. Stability	
±20ppb	P
±10ppb	R
±5ppb	S
±1ppb	T

Temperature code table			
-40	A	+25	N
-35	B	+30	O
-30	C	+35	P
-25	D	+40	Q
-20	E	+45	R
-15	F	+50	S
-10	G	+55	T
-5	H	+60	U
0	I	+65	V
+5	J	+70	W
+10	K	+75	X
+15	L	+80	Y
+20	M	+85	Z

Available up to 125°C

How to specify Temperature Code

First code	Lowest temperature A= - 40℃
Second code	Highest temperature Z= +85℃
Example	EW -20 ℃ to +70 ℃

Supply Voltage	
5V	05
9V	09
12	12
15V	15
18V	18

Case Height	
15	L
19	X
24	Z

Phase Noise	
Option	A
Option	B
Option	C
Option	D
Option	E

Waveform	
Sine	N
HCMOS	Q

ROCXO-M3-GT-AZ–NEL-12v–10MHz-c5. OCXO 10MHz sine, 12volt, 1ppb

Soldering guidelines
The unit should be mounted on the circuit board after any cleaning and drying process. Hand soldering is recommended with tip temperature of 370°C for 7 seconds and 430°C for 5 seconds maximum. Care must be taken to avoid any excessive bending or stress on the mounting pins. This can cause failure of the glass seals in the base.
This product is not suitable for immersion in cleaning fluids and should not undergo any ultrasonic cleaning process.

WORLD HQ: 1702L Meridian Ave. Suite 127, San Jose, Ca 95125, U.S.A.
Tel: (408) 266-7404 FAX: (408) 266-4483
WEB: www.raditek.com E-mail: sales@raditek.com

Oven Controlled Crystal Oscillator,

M3 5-49 MHz, M4 50-120 MHz, 5-18 Volts, 0.001ppm / 1ppb

M4 Model 100MHz Specifications

Frequency	**100MHz**		
Aging per day (Typical)	5ppb (Aging after 30 days of continuous operation) See options		
Aging per Month Aging per Year Aging per 10 years	<100ppb <300ppb 3ppm		
Frequency stability vs Voltage supply	<2ppb per 10% change in Vdd		
Short term stability (Allan Deviation)	<5 x 10^{-11} (τ = 1 Sec.)		
Storage temperature	-55 to +150°C		
Typical frequency stability Vs temperature	<50ppb over -20 to +70°C (see more options on page 3)		
Output waveform	Sine wave+9dBm (±1dBm) into 50 Ω (AC coupled) HCMOS, <0.5V to >4V level (10KΩ/15pF), 45-55% Duty cycle		
Frequency adjustment (Typical)	Positive Tuning Slop ±100ppm over 0 to +8V for +12V supply, (sufficient for 10 years aging) ±100ppm over 0 to +5V for +5V supply, (sufficient for 10 years aging) >20K trim input impedance		
Supply voltage (VDD)	+12 (±5%)		
Power consumption	5W at warm-up 1.2W at Steady-state @ 20°C		
Warm-up time from +25°C	≤2ppm after 10 mins (Optional fast warm-up <5mins)		
Phase Noise (100MHz) SSB dBc/Hz	Option A	Option B	Option C
10Hz 100Hz 1KHz 10KHz 100KHz	-90 -125 -150 -160 -160	-100 -130 -152 -165 -165	-110 -140 -162 -170 -170
Harmonics distortion	<-30		
Spurious	<-80		
Shock	IE68-2-27 Test Ea 50G for 11ms note 2		
Vibration	IE68-2-06 Test Fc 10-55Hz, 1.5mm 55-500Hz, 10G		
Humidity	100%rh		
Seal	hermetic, washable		

Note 1: Voltage reference can be configured to any voltage, and must be less than supply/operating voltage.
Notes 2: Stresses beyond the ratings provided may cause permanent damage to the device. Exposure to conditions outside of the recommended operating conditions listed above may adversely impact the device resulting in failures not covered by the warranty

WORLD HQ: 1702L Meridian Ave. Suite 127, San Jose, Ca 95125, U.S.A.
Tel: (408) 266-7404 FAX: (408) 266-4483
WEB: www.raditek.com E-mail: sales@raditek.com

Oven Controlled Crystal Oscillator,

M3 5-49 MHz, M4 50-120 MHz, 5-18 Volts, 0.001ppm / 1ppb

100MHz Part Number Example:

Options **ROCXO-M4-XX XX -X- X X X – 100MHz**

Model

Daily Aging	
5x10^{-9}	D
3x10^{-9}	E

Temp. Stability	
±100ppb	P
±70ppb	R
±50ppb	S
±20ppb	T

Temperature code table			
-40	A	+25	N
-35	B	+30	O
-30	C	+35	P
-25	D	+40	Q
-20	E	+45	R
-15	F	+50	S
-10	G	+55	T
-5	H	+60	U
0	I	+65	V
+5	J	+70	W
+10	K	+75	X
+15	L	+80	Y
+20	M	+85	Z

Available up to 125°C

Supply Voltage	
5V	05
9V	09
12	12
15V	15
18V	18

Case Height	
15	L
17	X

Phase Noise	
Option	A
Option	B
Option	C

Waveform	
Sine	N
HCMOS	Q

How to specify Temperature Code

First code	Lowest temperature A= - 40℃
Second code	Highest temperature Z= +85℃
Example	EW -20 ℃ to +70 ℃

ROCXO-M4-ET-AZ–NCL-12v–100MHz-c5. OCXO 100MHz sine, 1ppb
ROCXO-M4-ET-AZ–NCL-12v–75MHz-c5. OCXO 75MHz sine, 1ppb
ROCXO-M4-ET-AZ–NCL-12v–50MHz-c5. OCXO 50MHz sine, 1ppb

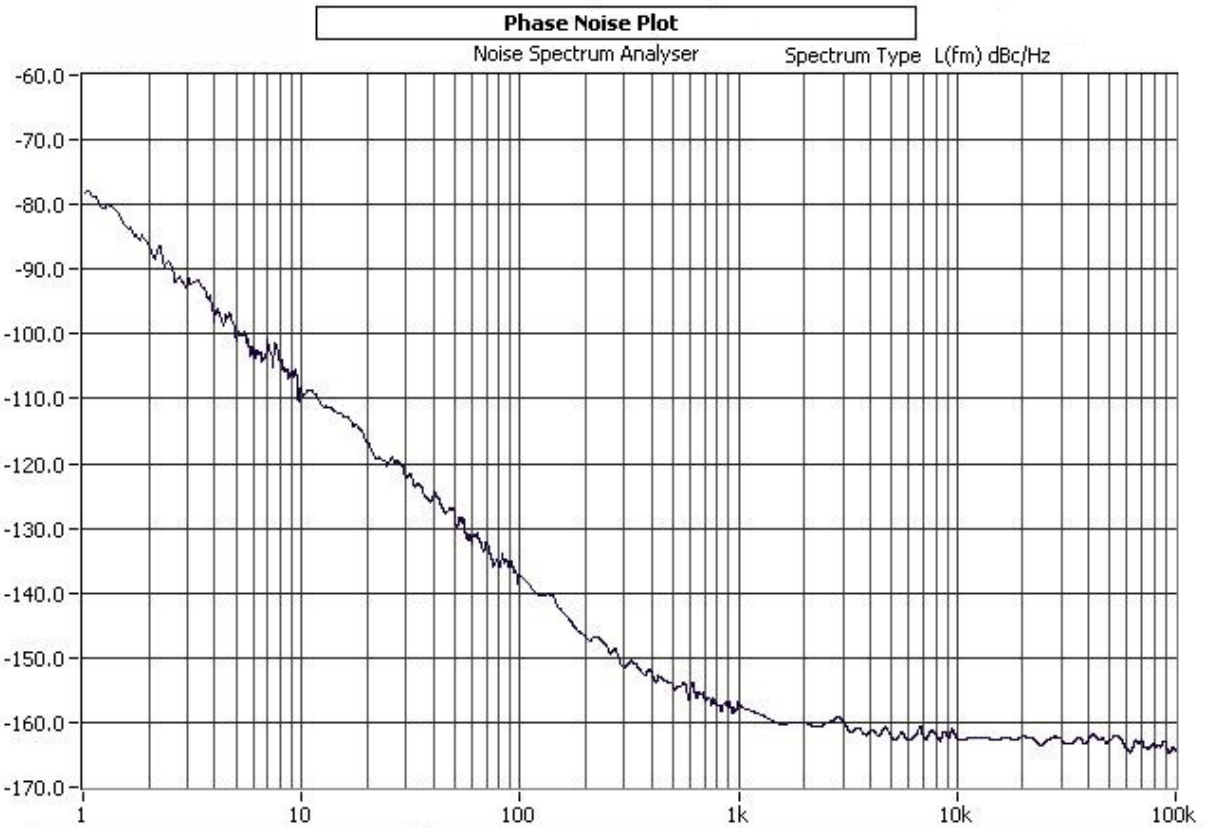
Soldering guidelines
The unit should be mounted on the circuit board after any cleaning and drying process. Hand soldering is recommended with tip temperature of 370°C for 7 seconds and 430°C for 5 seconds maximum. Care must be taken to avoid any excessive bending or stress on the mounting pins. This can cause failure of the glass seals in the base.
This product is not suitable for immersion in cleaning fluids and should not undergo any ultrasonic cleaning process.

WORLD HQ: 1702L Meridian Ave. Suite 127, San Jose, Ca 95125, U.S.A.
Tel: (408) 266-7404 FAX: (408) 266-4483
WEB: www.raditek.com E-mail: sales@raditek.com

Oven Controlled Crystal Oscillator,

M3 5-49 MHz, M4 50-120 MHz, 5-18 Volts, 0.001ppm / 1ppb

75MHz OCXO



WORLD HQ: 1702L Meridian Ave. Suite 127, San Jose, Ca 95125, U.S.A.
Tel: (408) 266-7404 FAX: (408) 266-4483
WEB: www.raditek.com E-mail: sales@raditek.com