

# RADITEK INC.

## Dielectric Resonant Oscillator, Miniature, 9-14GHz



code-m1

- Compact units suitable for TVRO, LO applications
- Sealed from EMI and the environment
- Similar to the discontinued Murata range.
- Mechanical tuning standard, Optional electronic tuning



Mechanical tuning screw (optional)

M2 2 places

View from underside

Pins 0.4 dia x 6 long 2/3 places

Nuts and Washers will be fitted to mounting studs

Pin	Function
1	Vcc
2	RF Output
3	Vt. (option)

**RADITEK**  
**RDRO-M-10878** Label  
 Date code yy-ww (Top)

**Dimension Table**

GHz	9-11	11-12.5	12.5-14
W	30	24	20.5
L	20	14	12.62
C	18	13	9.5
H	25	20	16.5

**NOTE**  
**No voltage regulator:** must be fed a controlled clean 5.0 ± 0.1 volts  
**No output buffering:** take care with designing it in to avoid frequency pulling

**PART#: RDRO-M-FREQ-POWER-VCC-Opt**

**Example: RDRO-M-9.5-6d-5v**

**Units: mm**

Mech. tuning screw location varies with frequency.

Specifications							Units
Center Frequency	9.2	9.5	10.6	12.0	13.05	14	GHz
<b>Frequency stability</b> , with temperature	±1	±1	±1	±1	±1	±1	MHz
with aging	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	ppm/year at 25°C
Supply voltage	5	5	5	5	5	5	Volts ±0.1
Supply current	50	50	50	50	50	50	mA maximum (25mA typical)
Output Power	6	6	6	10	6	6	dBm min
Pushing	± 0.2	± 0.2	± 0.2	± 0.3	± 0.3	± 0.2	kHz for ± 0.2V
Pulling	± 0.8	± 0.8	± 0.8	± 0.8	± 0.8	± 0.8	MHz into 1.5:1 VSWR
Mechanical tuning	± 10	± 10	± 10	± 10	± 10	± 10	MHz
Phase Noise @ 100kHz	-122	-122	-120	-116	-110	-110	dBc Typ
Operating temperature	-40 to 60	-40 to 60	-40 to 60	-40 to 60	-40 to 60	-40 to 60	°C
Maximum temperature	80	80	80	80	80	80	°C
Electrical tuning sensitivity	Vt 0 to +10Volts (do not use negative Vt), Approx 0.75-1 MHz/ V 20 MHz maximum typical 16-18GHz (depends on frequency) 8 MHz typical at 13GHz, 6 MHz typical at 9GHz						
Markings	As shown above						

**Options**

- Std with Tuning Screw (default)
- E Electrical tuning with Tuning Screw, (Frequency will be factory set at Vt=5V)

**RDRO-M-9-14G-6-10d-5v-m1**

**Specifications may be subject to change**

**02/03/11**

WORLD HQ: 1702L Meridian Ave. Suite 127, San Jose, Ca 95125, U.S.A.

Telephone: (408) 266-7404 FAX: (408) 266-4483

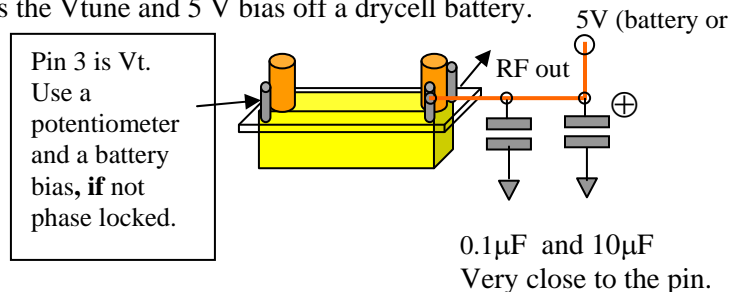
WEB: [www.raditek.com](http://www.raditek.com), E-mail: [sales@raditek.com](mailto:sales@raditek.com)

## Dielectric Resonant Oscillator, Miniature, 9-14GHz Application Note: RDRO-M series (miniature DROs)

The DRO-Ms are very low cost, high performance oscillators. Due to size constraints they have limited internal protection.

Any pretest or qualification should be done using the RADITEK proprietary test fixture. The fixture is extremely stable and shows no radiation or instability. Microstrip interfacing should be very well matched and be of minimum length, to prevent radiating. A small 2-3dB pad is recommended close to the RF output, for Microstrip interface to the RF pin. Trim the pin flush with the top of the Microstrip board. Do not use any sloppy soldering, and minimize any discontinuities.

1. Do not exceed the specified voltage, there is no internal regulator, or over voltage protection. Make sure any power supplies don't exhibit spikes on switch on or switch off-as it could damage the oscillator.
2. There is no-reverse polarity protection, to reverse the bias will damage the oscillator
3. Never ground DC bias pin with DC applied-this can also cause the power supply to spike, and damage the oscillator.
4. Soldering the leads: The leads will be soldered last, any pre-testing is best done in a RADITEK test fixture, which has precision, push fit 50 OHM interfaces, (contact the factory for more information). Soldered leads will not insert in the fixture properly, unless **all** the solder is carefully removed first. Make sure the leads are straight before insertion into the test fixture.
5. It is **not recommended** that the housing is soldered down. We have found that as long as the mating ground plane surface is a good, flat, low inductance ground (with lots of via holes etc), the ground will be adequate using just the M2 /2-56 mounting studs. The Raditek test fixture works spectacularly well without even screwing down (just pushed in).
6. Due to the nature of the DRO ( $TE_{01\delta}$ ) operation, the metal can integrity is very critical, any slight dent or mechanical distortion can pull the frequency. For this reason final in-circuit tuning can be accomplished either with the mechanical tuning screw (default). Or by deforming the can in a "no tuning screw" option (-NTS).
7. Recommended Bias circuit. It is recommended good RF decoupling and a series regulator is used in close proximity to the DRO with a very low inductance, common (with the DRO) ground. If the unit is to be phase locked do not use decoupling on the Vtune line, use a 0.1MF in parallel with 10 $\mu$ F capacitor otherwise. The best way to evaluate the open loop phase noise is to bias the Vtune and 5 V bias off a drycell battery.



The pins are Nickel plated steel, and should be readily solderable, with a standard tin lead solder, use additional liquid flux if necessary.

8. The DRO does not have any buffer, so when testing the unit, a minimum of a 3 dB pad should be used at the output. There should be minimal series Pin inductance, as this can cause a major mismatch.
9. If used into a poor match like a mixer, a series chip resistor of around 10 Ohms in line with the RF output should help improve the match sufficiently to maintain reliable DRO operation.