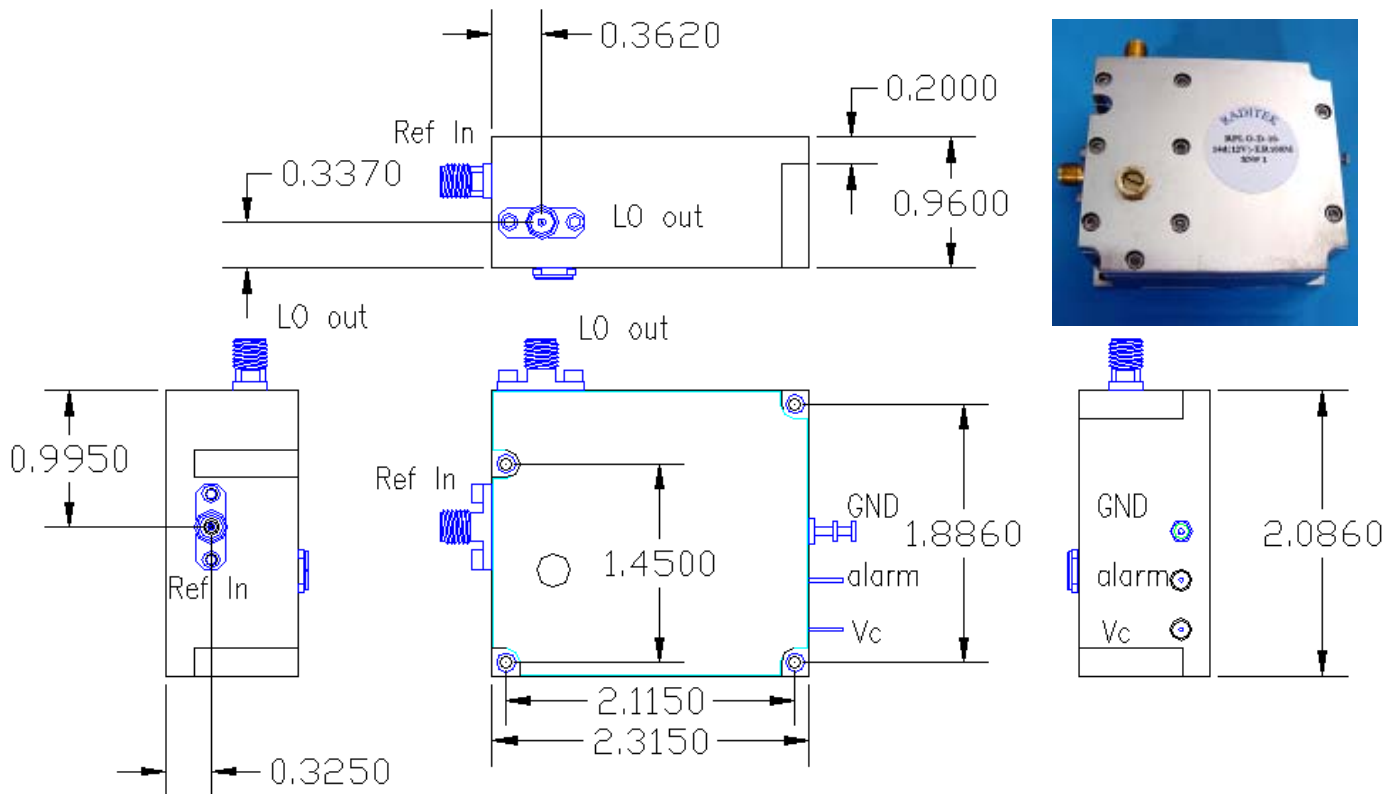


## Phase Locked Oscillators 1-24 GHz, ER

**RADITEK Phase Locked Oscillators (PLO's) use dielectric resonators for improved stability and phase noise. The oscillator is phase locked to a crystal oscillator reference (external or internal).**



**PART#: RPLO-D-FREQ-POWER (VCC)-ER-REF**

**Example: RPLO-D-8.0-13d (12-16V)-ER100M**

| Specifications                   |  | 1-5GHz                      | 5-24GHz | Units     |
|----------------------------------|--|-----------------------------|---------|-----------|
| Reference                        |  | External                    |         |           |
| Reference Frequency <sup>1</sup> |  | 50~500                      |         | MHz       |
| Reference Power <sup>2</sup>     |  | -3 ~+13                     | 0-4     | dBm       |
|                                  |  |                             |         |           |
| Harmonics                        |  | -15                         | -45     | dBc       |
| Spurious                         |  | -70                         | -80     | dBc       |
| Phase Noise                      |  | See Chart                   |         | (1 Hz BW) |
|                                  |  |                             |         |           |
| Supply Voltage@ Current          |  | 9-16                        |         | V         |
| Supply Current                   |  | 350mA                       |         | 15V       |
| Supply Current                   |  | 400mA                       |         | 12V       |
|                                  |  |                             |         |           |
| Operating Temp.                  |  | -40 to +70                  |         | °C        |
| Storage Temp.                    |  | -55 to +85                  |         | °C        |
| Mechanical Tuning                |  | See Chart                   |         | MHz       |
| Lock Alarm                       |  | TTL low <0.3V               |         | V         |
|                                  |  | TTL High,<br>Voltage Supply |         |           |
| Mounting holes                   |  | Thru                        |         |           |

**RPLO-D-1-24G-ER50-500M-d1**

Specifications may be subject to change

**02/03/11**

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38.88MHz External Reference OK, however because freq. too low, the noise may be high in the loop. It may affect the lock.

| Specifications                      |             |             |              |               | Units  |
|-------------------------------------|-------------|-------------|--------------|---------------|--------|
| Frequency                           | 1.26        | 4.50        | 7.0          | 7.1           | GHz    |
| RF Power <sup>5</sup>               | 12-15       | 12-15       | 10-14        | 10-14         | dBm    |
| Mechanical <sup>6</sup> Tuning >+/- | 0.951-1.052 | 3.442-3.619 | 6.8-7.2      | 6.8-7.2       | MHz    |
| Phase Noise (1 Hz BW)               |             |             |              |               |        |
| @ <100 kHz                          | 20*log(N)+3 |             |              |               | dBc/Hz |
| @ 100 kHz                           | -135        | -124        | -119         | -119          |        |
| @ 1 MHz                             | -141        | -141        | -144         | -144          |        |
| Frequency                           | 7.981-8.389 | 8.390-9.271 | 9.272-10.770 | 10.771-11.900 | GHz    |
| RF Power <sup>5</sup>               | 13-16       | 13-16       | 13-16        | 13-16         | dBm    |
| Mechanical <sup>6</sup> Tuning >+/- | 6.8-7.2     | 6.8-7.2     | 7.6-8.4      | 9.2-9.6       | MHz    |
| Phase Noise (1 Hz BW)               |             |             |              |               |        |
| @ <100 kHz                          | 20*log(N)+3 |             |              |               |        |
| @ 100 kHz                           | -119        | -118        | -117         | -116          |        |
| @ 1 MHz                             | -144        | -143        | -142         | -141          |        |

| Frequency                           | 11.901-13.160 | 13.161-15.290 | 15.291-16.070 | 16.071-18.50 | GHz    |
|-------------------------------------|---------------|---------------|---------------|--------------|--------|
| RF Power <sup>5</sup>               | 13-16         | 13-16         | 13-16         | 13-16        | dBm    |
| Mechanical <sup>6</sup> Tuning >+/- | 9.8-10.2      | 10.8-12.0     | 12.6          | 13.0         | MHz    |
| Mounting holes                      | 2mm tapped    | 2mm tapped    | Thru          | Thru         |        |
| Phase Noise (1 Hz BW)               |               |               |               |              |        |
| @ <100 kHz                          | 20*log(N)+3   |               |               |              | dBc/Hz |
| @ 100 kHz                           | -119          | -118          | -117          | -116         |        |
| @ 1 MHz                             | -144          | -143          | -142          | -141         |        |

| Frequency              | 19.631-20.640 | 20.641-21.700 | 21.701-22.810 | 22.811-23.980 | GHz    |
|------------------------|---------------|---------------|---------------|---------------|--------|
| RF Power               | 13-16         | 13-16         | 13-16         | 13-16         | dBm    |
| Mechanical Tuning >+/- | 16.0          | 17.0          | 17.8          | 18.8          | MHz    |
| Phase Noise (1 Hz BW)  |               |               |               |               |        |
| @ <100 kHz             | 20*log(N)+3   |               |               |               | dBc/Hz |
| @ 100 kHz              | -111          | -110          | -110          | -110          | dBc/Hz |
| @ 1 MHz                | -136          | -135          | -135          | -135          | dBc/Hz |

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| Specifications                      | Special Ruggedized   | Units |
|-------------------------------------|----------------------|-------|
| Frequency                           | 10.0 M2              | GHz   |
| RF Power <sup>5</sup>               | 13-16                | dBm   |
| Mechanical <sup>6</sup> Tuning >+/- | 9.8-10.2             | MHz   |
| Harmonics M2                        | -20                  | dBc   |
| Load VSWR                           | 1.5:1                |       |
| Humidity: non condensing to 35C     | 95                   | %     |
| Shock                               | 20G, 15ms            | GBNT  |
| Vibration (Random)                  | 12g, 5Hz~2000Hz, RMS | GBNT  |
| Humidity                            | 95% ±3 (30C-         | GBNT  |
| Seal                                | Environmental        |       |

- Notes: 1. The (output frequency/ (reference frequency) must be an integer. The integer value N determines the phase noise at <100 kHz offsets.  
2. The reference power is required to fall within a 6 dB window over the specified power range. Higher operating power yields better phase noise performance.  
3. Loop bandwidth setting based on reference noise characteristics, typically 10 kHz to 200 kHz.  
4. Total power variation over entire operating temperature range.  
5. High output power is available. Please contact the factory for more information.  
6. Not applicable to hermetically sealed Rugged Ultra Reliable DRO products.  
7. Rugged Ultra Reliable DRO products measure 2.350" x 2.000" x 0.700".

Phase noise of external reference must be better than -120 dBc/Hz at 100 KHz. It degrades by 20LOG N +3 dB of reference.

### Options include:

- ☐ 12V, 15V, Vcc
- ☐ **Phase lock alarm: Open Collector**
- 1. (A1, standard) Locked TTL High (customer supplied 5-16V, Unlocked TTL Low 0.2V Typical)

### Installation details:

1. Mechanical DRO adjustment is not advised. Monitor the Phase voltage during adjustment (to be mid way), wait 5 minutes (warm up) before any adjustment.
2. Crystal adjustment. Screw adjustment under cover, (on internal reference models). Monitor frequency Adjust after 5 minutes warm up. Monitor the Ref.

### Notes:

- 1) Ground, Supply Voltage, Lock Alarm, and Voltage are solderable terminals.
- 2) REF Monitor is field replaceable SMA female.
- 3) RF Output freq RF Output connector
  - f > 24GHz 2.92mm female
  - f < 24GHz SMA female
- 4) Dimensions are subject to change in the interest of improved product performance

| Typical Phase noise, in dBc/Hz, per offset: +/-4dB |            |
|----------------------------------------------------|------------|
| AT:→                                               | 5G         |
| 100Hz                                              | 20log(N)+3 |
| 1KHz                                               | 20log(N)+3 |
| 10KHz                                              | 20log(N)+3 |
| 100KHz                                             | 20log(N)+3 |
| 1MHz                                               | -132       |

### Note:

Phase noise less than 100 kHz from the carrier is essentially determined by the external crystal reference oscillator according to the equation  
External Ref. Noise (dBc/Hz) + 20logN where N is the output frequency ÷ reference, or the multiplication factor.

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### Phase Noise

