

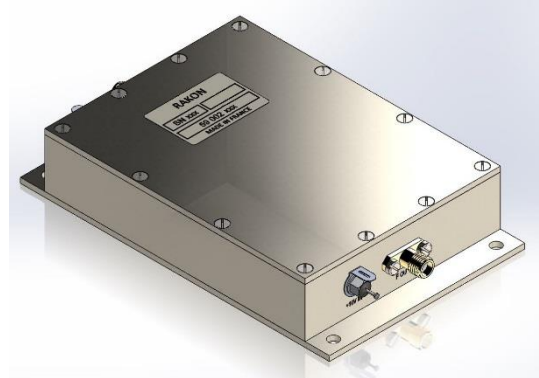
Specific request can be addressed to RAKON [hirel@rakon.fr](mailto:hirel@rakon.fr)

#### Product Description

LNO 4800 B3 is a low noise oscillator generating an output signal at 4800 MHz.

It is composed by an OCSO (Oven Controlled SAW Oscillator) at 480 MHz fundamental frequency, followed by a frequency multiplier x10. It can optionally include a PLL to be phase locked on an external 10MHz reference.

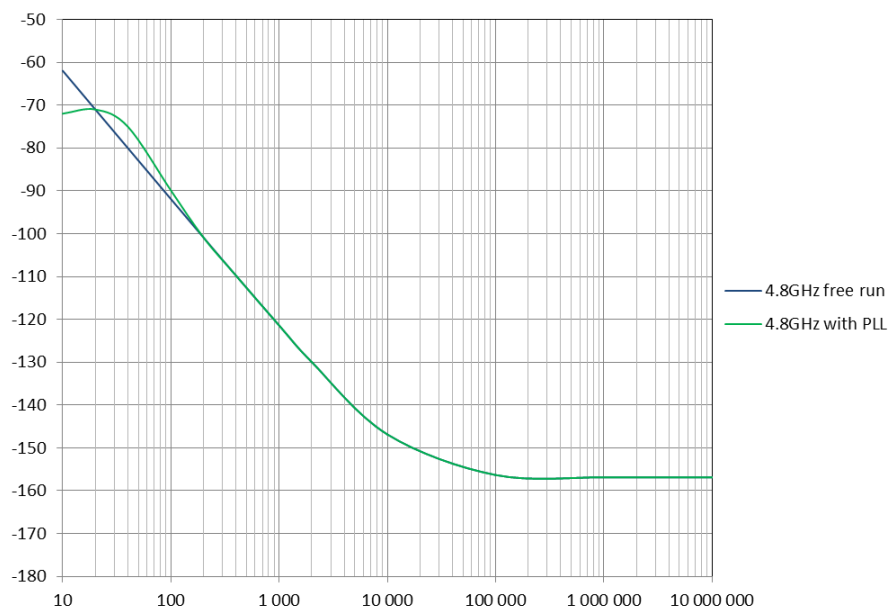
LNO 4800 B3 is designed for routine environment (test equipment, shelter, ground based military equipment ...). It is available in a 120.7mm x 76.2mm x 23.3mm package.



#### Features

Excellent phase noise performance (typical values) :

- -122 dBc/Hz @ 1 kHz offset
- -147 dBc/Hz @ 10 kHz offset
- -157dBc/Hz noise floor



#### Applications

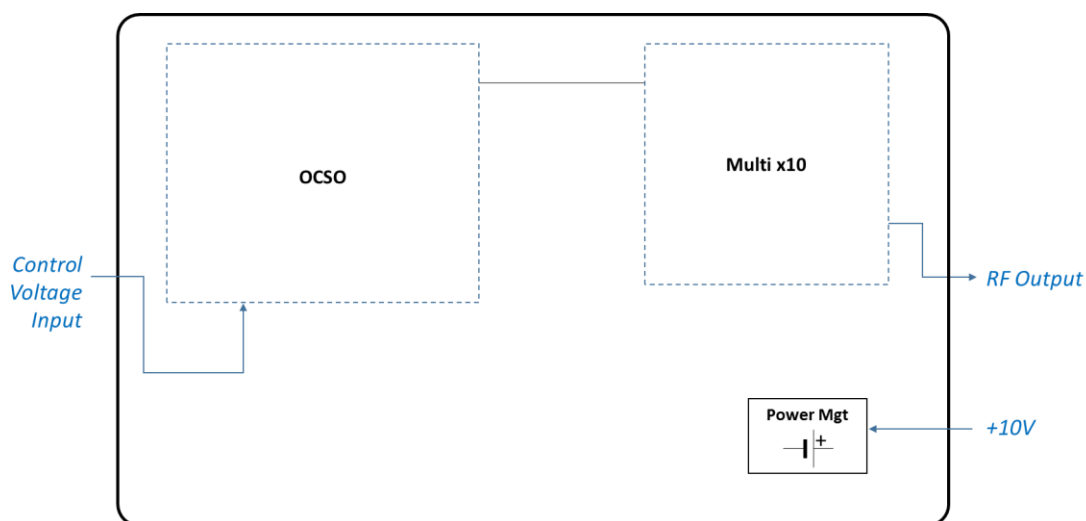
- Instrumentation (test equipment, simulator)
- Ground based military equipment as per MIL-PRF-28800F, Class 3
- Clock for high speed ADC

#### Technical Description

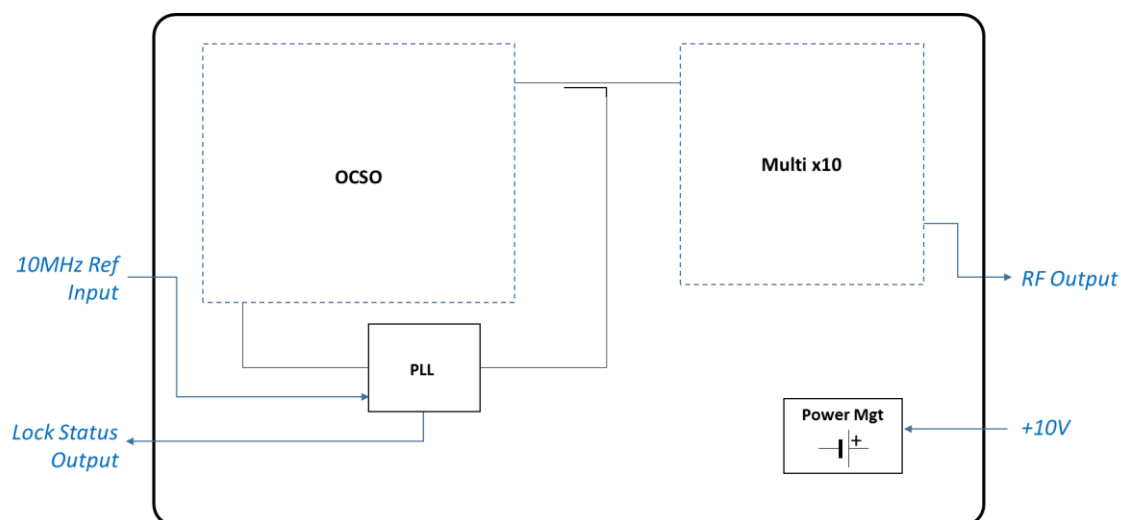
LNO 4800 B3 is available in two different versions :

- Standard version : in this case, it is a VC-OCSO (Voltage Controlled, Oven Controlled SAW Oscillator) that can be used either in free run mode, or controlled by an external DC voltage.
- PLL version : in this case, the unit needs an external 10 MHz reference to operate, and the output signal is phase-locked to this reference.

#### Standard version block diagram



#### PLL version block diagram



### Specifications

#### 1.0 Environmental conditions

| Line | Parameter                   | Test Condition                                 | Min | Max | Unit |
|------|-----------------------------|------------------------------------------------|-----|-----|------|
| 1.1  | Operating temperature range |                                                | 0   | +50 | °C   |
| 1.2  | Storage temperature range   |                                                | -40 | +85 | °C   |
| 1.3  | Shock                       | As per MIL-PRF-28800F, Class 3, test equipment |     |     |      |
| 1.4  | Random vibration            | As per MIL-PRF-28800F, Class 3, test equipment |     |     |      |

#### 2.0 Electrical interface

| Line                    | Parameter                 | Test Condition                         | Operating Range | Absolute Maximum | Unit |
|-------------------------|---------------------------|----------------------------------------|-----------------|------------------|------|
| 2.1                     | Supply voltage            | Pin 2                                  | +10 ± 0.2       | 0 to +15         | VDC  |
| 2.2                     | Load impedance            | Pin 3, 50Ω all phases                  | < 1.3:1         | -                | VSWR |
| <b>Standard version</b> |                           |                                        |                 |                  |      |
| 2.3                     | Control input voltage     | Pin 1                                  | +2 to +8        | -0.3 to +10      | VDC  |
| 2.4                     | Control input impedance   | Pin 1                                  | > 10            | -                | kΩ   |
| <b>PLL version</b>      |                           |                                        |                 |                  |      |
| 2.5                     | Reference input frequency | Pin 1                                  | 10 ± 0.00001    | -                | MHz  |
| 2.6                     | Reference input level     | Pin 1, sine wave, 50 Ω source and load | +5 to +10       | < +12            | dBm  |
| 2.7                     | Lock status               | Pin 4                                  | Open drain      |                  |      |

#### 3.0 Performances

| Line                    | Parameter                    | Test Condition                                         | Typ. Value | Guaranteed | Unit  |
|-------------------------|------------------------------|--------------------------------------------------------|------------|------------|-------|
| 3.1                     | Nominal output frequency     | Definition                                             | 4800       |            | MHz   |
| 3.2                     | Output power                 | Sine wave into 50 Ω load                               | -          | +5 ± 2     | dBm   |
| 3.3                     | Output impedance             | At 4800 MHz                                            | -          | < 2.0:1    | VSWR  |
| <b>Standard version</b> |                              |                                                        |            |            |       |
| 3.4                     | Output frequency calibration | Factory calibration @25°C, no control input (free run) | ±0.2       | < ±0.5     | ppm   |
| 3.5                     | Output frequency stability   | All causes (temperature and load)                      | -          | < ±2       | ppm   |
| 3.6                     | Long term stability          | After 30 days of continuous operation                  | -          | < ±1       | ppm   |
|                         |                              | 1 <sup>st</sup> year                                   | -          | < ±6       | ppm   |
|                         |                              | 10 years                                               | -          |            | ppm   |
| 3.7                     | Frequency tuning             | For full control input operating range                 | ±6         | > ±4       | ppm   |
| 3.8                     | Tuning slope                 | Positive                                               | 2          | 1.5 to 3   | ppm/V |

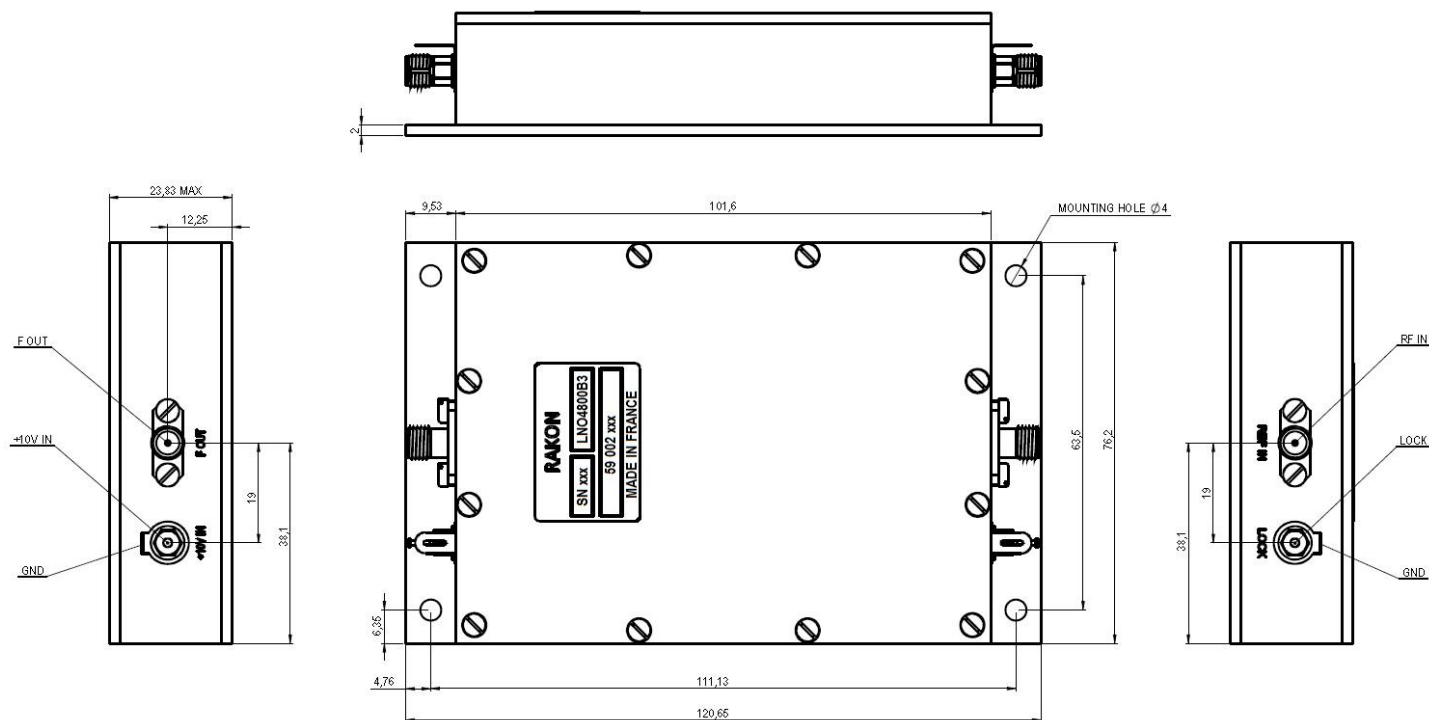
|                    |                                |                                                                                 |     |       |         |
|--------------------|--------------------------------|---------------------------------------------------------------------------------|-----|-------|---------|
| 3.9                | Steady state power consumption | @25 °C (calm air)                                                               | 4.5 | < 6   | W       |
| 3.10               | Warm-up power consumption      |                                                                                 | 9   | < 9.5 | W       |
| 3.11               | Warm-up time                   | ±1 ppm with reference to frequency reached after 1 hour of continuous operation | -   | < 5   | minutes |
| <b>PLL version</b> |                                |                                                                                 |     |       |         |
| 3.12               | Loop bandwidth                 | Internal                                                                        | 40  | < 50  | Hz      |
| 3.13               | Steady state power consumption | @25 °C (calm air)                                                               | 5   | < 6.5 | W       |
| 3.14               | Warm-up power consumption      |                                                                                 | 9.5 | < 10  | W       |
| 3.15               | Warm-up time                   | Lock status ON                                                                  | -   | < 2   | minutes |

### 4.0 Single side band phase noise (PN)

| Line | Parameter                        | Test Condition                                                              | Typ. Value | Guaranteed | Unit   |
|------|----------------------------------|-----------------------------------------------------------------------------|------------|------------|--------|
| 4.1  | PN power density @ 1 kHz offset  | Static conditions, at 25°C<br>(guaranteed values on full temperature range) | -122       | < -119     | dBc/Hz |
| 4.2  | PN power density @ 10 kHz offset |                                                                             | -147       | < -144     | dBc/Hz |
| 4.3  | PN power density @ 1 MHz offset  |                                                                             | -157       | < -154     | dBc/Hz |
| 4.4  | Harmonic distortion              | Sub-harmonics, 2 <sup>nd</sup> and 3 <sup>rd</sup> harmonics                | -50        | < -40      | dBc    |
| 4.5  | Spurious                         | Other than harmonic distortion                                              | -90        | < -80      | dBc    |
| 4.6  | Full offset range jitter         | From 10 Hz to 100 MHz                                                       | 150        | < 200      | fs     |
| 4.7  | Broadband jitter                 | From 10 kHz to 40 MHz                                                       | 5          | < 10       | fs     |

## 5.0 Mechanical features

Outline in mm, nominal values (general tolerances :  $\pm 0.15$ mm).



## 6.0 Pin description

| Line | Name    | Type      | Description                                                                                                                            |
|------|---------|-----------|----------------------------------------------------------------------------------------------------------------------------------------|
| 6.1  | REF IN  | SMA jack  | <u>Standard version</u> : DC control voltage input<br><u>PLL version</u> : 10 MHz reference input                                      |
| 6.2  | F OUT   | SMA jack  | 4800 MHz output signal                                                                                                                 |
| 6.3  | +10V IN | Feed-thru | Power supply (+)                                                                                                                       |
| 6.4  | GND     | Lug       | Mechanical and electrical ground (-)                                                                                                   |
| 6.5  | LOCK    | Feed-thru | <u>Standard version</u> : not used<br><u>PLL version</u> : Lock status<br>Lock OFF -> '0'<br>Lock ON -> 'HiZ', pull-up limited to 3.6V |
| 6.6  | GND     | Lug       | Mechanical and electrical ground (-)                                                                                                   |