

Fixed Ratio Frequency Source

DCC:  E1700347

Description

The fixed ratio frequency source implements an OCXO which is locked to an frequency signal using a fixed ratio phase-locked loop. It is a 1U rack mount unit which takes a 10 dBm input and provides an outputs at 13 dBm at a fixed frequency ratio. An output power monitor is available as well as the voltage readback of the PLL tuning signal and a out-of-lock alarm. These signals together with a temperature reading can be accesses through 25-pin D-sub on the read panel. There is also a BNC output which has a higher bandwidth. The unit requires +/-24V and +/-16.5V.

Power Monitors

The nominal slope of the power monitor is -100 mV/dBm with a reading of 4 V at 12 dBm. The formula is

$$\text{Power Level} = 12 \text{ dBm} - 10 \text{ dBm/V} * (\text{Voltage Reading} - 4 \text{ V})$$

Conversion table:

| RF power | Voltage reading |
|----------|-----------------|
| 30 dBm | 2.3V |
| 20 dBm | 3.2V |
| 10 dBm | 4.2V |
| 0 dBm | 5.2V |
| -10 dBm | 6.2V |
| -20 dBm | 7.2V |
| -30 dBm | 8.0V |

The temperature readout uses the following conversion

$$\text{Temperature} = 20 \text{ }^{\circ}\text{C} + 50 \text{ }^{\circ}\text{C/V} * (\text{Voltage Reading} - 6 \text{ V})$$

Specifications

DCC:  E1700348-v1

Ratio / Frequency:

- 13 x 9.1 MHz [Variant 1]
- 5 x 9.1 MHz [Variant 2]

Input:

- 9.1 MHz
- +10 dBm nominal
- N female

Output:

- Fixed frequency ratio
- +13 dBm nominal
- N female

RF power monitor (first monitor channel):

- Monitor power at output
- Range at least 40 dB
- Output: 0V - 10V single ended

Phase monitor (second monitor channel):

- Electrical tuning monitor
- Output: 0V - 10V single ended

Lock alarm (third monitor channel):

- Locked: +3.5 VDC to +5.2 VDC (Hi)
- Out-of-lock: +0.8 VDC max (Lo)

Phase noise:

| Frequency | Phase noise spec |
|-----------|------------------|
| 10 Hz | -120 dBc/Hz |
| 100 Hz | -150 dBc/Hz |
| 1 kHz | -165 dBc/Hz |
| 10 kHz | -167 dBc/Hz |

Amplitude noise:

| Frequency | AM noise spec |
|-----------|---------------|
| 10 Hz | -120 dBc/Hz |
| 100 Hz | -150 dBc/Hz |
| 1 kHz | -150 dBc/Hz |
| 10 kHz | -150 dBc/Hz |

Harmonics:

- < -30 dBc