VCO Assy

FREQUENCY RANGE: 2-18 GHz

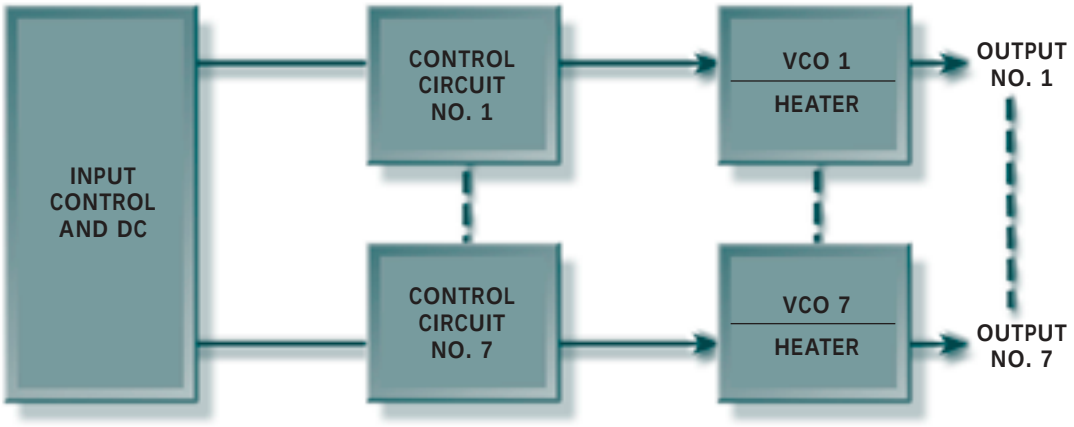
- Multi-Channel VCO
- High Stability
- Low PTD

APPLICATION

- EW Systems

TECHNOLOGY

- MMIC
- Thin Film
- Hermetically Sealed (Laser)



elisra electronic systems ltd.
Microwave Division
48 Mivtza Kadesh St., Bene-Beraq 51203, Israel. Tel: 972-3-617 5655 Fax: 972-3-617 5299 www.mw-elisra.com Email: trm1@elisra.com

SCOPE

This document describes 7 channels oscillator which consists of control mother-board and 7 oscillator modules. All signals, bias voltages and control signals are supplied via a 50 pin D connector. Modulation signals via coaxial lines.

Each channel gets its own tuning voltage, narrowband modulation (NB) and two control lines which select the mode.

Wideband modulation (WB) is supplied only once for all channels.

Each oscillator can be modulated by its own NB and the common WB modulation signal.

There are two control signals for each channel which switch the desired mode between "OFF", "NB", "WB1" and "WB2".

The modules have to be realized as plug-in devices.

The control mother-board contains all the circuits which distribute and process all control, tune and modulation signals.

ELECTRICAL PERFORMANCE (CARRIER)

Frequency Coverage

Channel 1: F1 ± 100 MHz

Channel 2: F2 ± 100 MHz

Channel 3: F3 ± 100 MHz

Channel 4: F4 ± 100 MHz

Channel 5: F5 ± 100 MHz

Channel 6: F6 ± 100 MHz

Channel 7: F7 ± 100 MHz

Output Power

Each channel:

- Minimum power vs freq. +10 dBm
- Maximum power vs freq. +20 dBm
- Power variation over whole channel ≤ 2 dB
  Ch6: ≤2 dB for ($HBC_{min.}$-100 MHz)....($HBC_{max.}$-1 GHz)
  Ch6: ≤3 dB for full band
- Power variation
  Within any 680 MHz ≤ 1 dB
  Ch6: ≤2 dB for ($HBC_{max.}$ -1 GHz)....$HBC_{max.}$
- Power variation over temperature ≤ 1 dB

VSWR

Output, 50 ohms ≤ 1.5 : 1

Frequency Pulling

Frequency change: load VSWR varies over 360 electr. Degrees ≤ 4 MHz

Frequency Pushing

Frequency change: change of bias voltage in spec. limits ≤ 50 MHz/V

Harmonics and Subharmonics

Power of harmonics above freq. band ≤ -20 dBc

Power of subharm. below freq. band ≤ -20 dBc

Spurious

Power of spurious in operation band (includes all harm, and subh. In band) ≤ -50 dB

Warm Up Time

-54°C to +95°C ≤ 3 minutes

Carrier Drift

Carrier drift across whole temp. range ≤ ± 4 MHz

Noise Levels

Max. noise floor at ≥ 10 MHz distance from carrier ≤ -60 dBc/MHz

Max. residual FM noise (IF-Bw: 1 kHz, 3 dBc) ≤ 150 kHz

Switching

Any switching in other channels shall not cause changes in the spectrum of the channel monitored after 5 µs.

Cross Talk

Change of $NB_{min.}$ if WB modulation is applied (any potentiometer setting) ≤ ± 1 MHz

Electrical Performance (Modulation):

Mode Selection

Modulation	Control Line1	Control Line2	RF Status
Undef	High	High	RF off
NB	Low	High	RF on
WB1	High	Low	RF on
WB2	Low	Low	RF on

State high: TTL-High: +2.7 . . . . . .+4.5V

State low: TTL-Low: +0.0 . . . . . .+0.8V

Internal pull-up resistor to Vcc is required for all control lines

Switching speed between any mode: 0.1 msec

RF Off Mode

The power of the RF off Mode shall be 80 dB down the RF on mode.

NB Mode

Input modulation for the NB mode is supplied separately for each channel.

Modulation signal characteristics:

Amplitude into load of 90…..100 ohm, AC coupled

Shunted by not less than 300 Ohm reactance:
0.0…..2V..

Frequency components
from 0.05 ….20 MHz

Modulation sensitivity variation (MHz/V)
≤ 1.5 : 1

Bandwidth of modulated RF-Signal:

RF-BW with NB-mod. Input voltage
0.2Vpp – –> $\leq NB_{min.}$

RF-BW with NB-mod. Input voltage
2.0Vpp – –> $\geq NB_{max.}$

Bandwidth change over any 680 MHz
≤ 20%

Bandwidth change over full temp. range
≤ ±2% or ≤ ± 5 MHz
Whichever is less

WB Mode

Input modulation for the WB mode is supplied only once for all 7 channels.

Two independently adjustable RF-bandwidths WB1 and WB2 (2 potentiometers) for each channel

Modulation signal characteristics:
Amplitude into load of 90…..110 Ohm, AC coupled shunted by not less than 300 Ohm reaktance
0.0……2 Vpp

Frequency components
from 0.05…30 MHz

Modulation sensitivity variation (MHz/V)
≤ 1.5 : 1

Bandwidth of modulated RF-Signal:

RF-BW dependent on potentiometersetting
$\leq WB_{min}$ …… $\geq WB_{max}$

Bandwidth change over any 680 MHz
≤ 20%

Bandwidth change over full temp. range
≤ ±2% or ≤ ± 35 MHz
Whichever is less

Accuracy for adj. Potentiometers
≤ ± 2 MHz

TUNING CHARACTERISTICS

Tuning Voltage

Tuning voltage for each oscillator is supplied by a pair of twisted wires separately for each channel.

Tuning voltage characteristics
Sawtooth, sinus or square wave
0….300 kHz incl. Const. DC levels

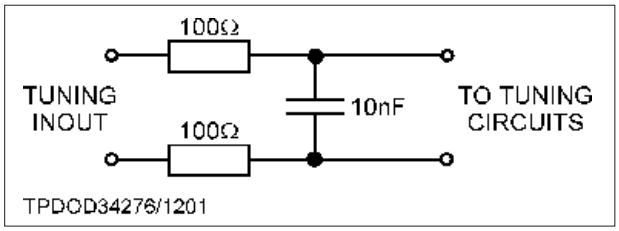
A differential input for a good common mode rejection with a bandwidth of 300 kHz and a load impedance of ≥300 pF, is required.

Tuning voltage range
-9…+4V

To obtain the whole frequency coverage for each channel a change of tuning voltage of minimum 8V is required.

Frequency must increase with increasing tuning voltage.

NOTE: *There is a tested tuning input filter for this version*



Tuning Linearity

Ratio of max. to min. slop (frequency vs tuning volt.)

For any whole channel
: ≤ 1.5:1

For any 680 MHz portion
: ≤ 1.2:1

Channel 6:

For the whole channel
: ≤ 1.8:1

For any 680 MHz portion
: ≤ 1.2:1

Frequency Setting Repeatability

Accuracy under identical conditions (measured 1 sec. after tuning voltage change earliest) :≤ ± 2 MHz

Frequency Setting Time (Post Tuning Drift)

Frequency deviation after 0.1 ms
: ≤ ± 10.0 MHz

Frequency deviation after 1.0 ms
: ≤ ± 5.0 MHz

Frequency deviation after 100 ms
: ≤ ± 1.0 MHz

All deviations are related to the frequency after 1 sec. which is assumed to be constant.

DC Power

+12V± 1V	: 1.8 A max.
-12V±1V	: 1.4 A max
+15V±1V	: 0.5 A max
-15V±1V	: 0.5 A max
+5V±1V	: 0.5 A max