

## FEATURES

- Superior Phase Noise
- 1 kHz Step Size
- External Reference 1-200 MHz (Optional)
- PXI, Compact PCI Size Compatible
- 5 Line Serial & USB Control

## DESCRIPTION

The **MLSP-Series** of YIG-Based wideband synthesizers are ideal as the main local oscillators in receiving systems, frequency converters and test and measurement equipment. They provide 1 kHz frequency resolution over the 600 MHz to 20 GHz frequency range. Power levels of +8 to +13 dBm are provided through out the series and full band tuning speed is 5 mSec. The units are 5" x 3" x 1" high and fit a 2 slot PXI chassis.

## APPLICATIONS

Test Equipment  
Local Oscillators  
Frequency Converters



## PERFORMANCE SPECIFICATIONS

(Operating Case Temperature: 0° to +60° C Baseplate) (Note 1)

Model No.	MLSP-0625	MLSP-2080	MLSP-4016	MLSP-6018	MLSP-7015	MLSP-8020
<b>RF Specifications</b>						
Output Frequency (Note 2)	0.6-2.5 GHz	2-8 GHz	4-16 GHz	6-18 GHz	7-15 GHz	8-20 GHz
Output Power Min. (Notes 6, 7 & 8)	+13 dBm	+13 dBm	+10 dBm	+10 dBm	+10 dBm	+8 dBm
Po Variation over Freq/Temp	4 dB	4 dB	5 dB	6 dB	6 dB	6 dB
Step Size, Min.	1 kHz	1 kHz	1 kHz	1 kHz	1 kHz	1 kHz
Switching Speed, 100 MHz Step,	1 mS	1 mS	1 mS	1 mS	1 mS	1 mS
1000 MHz Step,	3 mS	3 mS	3 mS	3 mS	3 mS	3 mS
Full Band Step,	5 mS	5 mS	5 mS	6 mS	6 mS	6 mS
Warm-up Time ("Lock") @ 0C (Minutes)	3.0	3.0	3.0	3.0	3.0	3.0
Output Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Load VSWR	2.0:1	2.0:1	2.0:1	2.0:1	2.0:1	2.0:1
Harmonics	-8 dBc	-12 dBc	-12 dBc	-12 dBc	-12 dBc	-12 dBc
Non-Harmonic Spurious						
100 Hz f off ≤500 kHz	-60 dBc	-60 dBc	-60 dBc	-60 dBc	-60 dBc	-60 dBc
>500 kHz	-80 dBc	-80 dBc	-80 dBc	-80 dBc	-80 dBc	-80 dBc
<b>Phase Noise Performance</b>						
(with Internal Crystal Reference)						
@ 100 Hz Offset	86 dBc/Hz	79 dBc/Hz	71 dBc/Hz	72 dBc/Hz	70 dBc/Hz	70 dBc/Hz
@ 1 kHz Offset	98 dBc/Hz	95 dBc/Hz	90 dBc/Hz	89 dBc/Hz	90 dBc/Hz	87 dBc/Hz
@ 10 kHz Offset	98 dBc/Hz	95 dBc/Hz	88 dBc/Hz	91 dBc/Hz	90 dBc/Hz	88 dBc/Hz
@ 100 kHz Offset	118 dBc/Hz	117 dBc/Hz	115 dBc/Hz	115 dBc/Hz	115 dBc/Hz	115 dBc/Hz
@ 1 MHz Offset	142 dBc/Hz	140 dBc/Hz	138 dBc/Hz	138 dBc/Hz	138 dBc/Hz	138 dBc/Hz

## MLSP PERFORMANCE SPECIFICATIONS (Continued)

Model No.	MLSP-0625	MLSP-2080	MLSP-4016	MLSP-6018	MLSP-7015	MLSP-8020
<b>Reference Oscillator Options</b>						
<b>Option A</b>						
External Reference (Note 3)	1 - 200 MHz	1 - 200 MHz	1 - 200 MHz	1 - 200 MHz	1 - 200 MHz	1 - 200 MHz
External Ref. Input Power	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm
Frequency Stability (<+/- 20ppm)	Cust Supplied	Cust Supplied	Cust Supplied	Cust Supplied	Cust Supplied	Cust Supplied
<b>Option B</b>						
External Reference with Internal Crystal (Note 4)	1 - 100 MHz	1 - 100 MHz	1 - 100 MHz	1 - 100 MHz	1 - 100 MHz	1 - 100 MHz
External Ref. Input Power	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm
Frequency Stability (Note 9)	Cust Supplied	Cust Supplied	Cust Supplied	Cust Supplied	Cust Supplied	Cust Supplied
<b>Option C</b>						
Internal Reference	100 MHz	100 MHz	100 MHz	100 MHz	100 MHz	100 MHz
Frequency Stability	+/- 1 PPM	+/- 1 PPM	+/- 1 PPM	+/- 1 PPM	+/- 1 PPM	+/- 1 PPM
<b>Supply Voltage &amp; Current (Note 5)</b>						
+15 Vdc ( $\pm 0.5$ )	525 mA	825 mA	1500 mA	1375 mA	1500 mA	1800 mA
+5 Vdc ( $\pm 0.25$ )	300 mA	300 mA	300 mA	300 mA	300 mA	300 mA
Power dissipation	9.4 watts	13.9 watts	23 watts	22.1 watts	23 watts	28.8 watts
<b>Supply Voltage Ripple</b> (Pk-Pk from 60 Hz to 3 MHz)	<50 mV	<50 mV	<50 mV	<50 mV	<50 mV	<50 mV
<b>Control Format</b>	5-Line Serial USB	5-Line Serial USB	5-Line Serial USB	5-Line Serial USB	5-Line Serial USB	5-Line Serial USB
<b>Phase Lock Alarm (P13) (TTL)</b>	1=Locked	1=Locked	1=Locked	1=Locked	1=Locked	1=Locked
<b>Weight</b>	15 oz / 426 g	15 oz / 426 g	15 oz / 426 g	15 oz / 426 g	15 oz / 426 g	15 oz / 426 g

### MLSP Options:

**Option A:** External Reference / No Internal Reference

**Option B:** Internal Reference / External Reference

**Option C:** Internal Reference / No External Reference, Drawing 181-003 & 181-004

**Option D:** RF Connectors Front, Drawing 181-001

**Option E:** RF Connectors Side, Drawing 181-002

**Option F:** Fixed power level >0 dBm, level flatness +/- 1.0 dB, +/- 0.25 dB typ. Degrades max. RF output power by 4-6 dB when implemented.

**Option G:** RF Power Leveling (-20dB Delta from attained power level (i.e. +10 to -10 dBm), in 0.1dB increments). Degrades max RF output power by 4-6 dB when implemented. Changes RF Phase up to 160° versus frequency and attenuation.

**Option H:** Higher RF Power level available, (4 dB improvement).

**Option J:** Internal Reference with Reference Output (100 MHz @ 0 dB  $\pm$  3 dB,  $\pm$  1 PPM), Drawing 181-005 & 181-006

Part Number Example: MLSP-8020CE 8 GHz to 20 GHz with Internal Reference and RF connectors on side.

#### Notes:

- 1) Special operating temperature range available.
- 2) Special frequency ranges available.
- 3) 50-100 MHz OCXO recommended for best phase noise performance. External reference directly effects phase noise performance.
- 4) Output phase noise performance is not dependent on external reference phase noise.
- 5) All values stated for units with external reference. For internal reference add 125mA on the +15 Vdc line.
- 6) Higher power levels available (Option H). Add 100 mA on the +15 Vdc line.
- 7) Improved level flatness fixed output level (Option F).
- 8) RF Power level control, adjustable over a 20 dB range in 0.1 dB increments (Option G). Level flatness specified @ 25 °C  $\pm$  10 °C.
- 9) Frequency accuracy must be within exact reference frequency selected, +/- 5ppm.