

## FEATURES

- Superior Integrated Phase Noise (2kHz - 50 MHz)
- 1 kHz Step Size
- External Reference 1-200 MHz (Optional)
- Excellent Error Vector Magnitude (EVM Performance)
- 5 Line Serial & USB Control

## DESCRIPTION

The **ML5G-Series** of YIG-Based 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 6 to 21 GHz frequency range. Power levels of +13 dBm are provided through out the series and full band tuning speed is 7 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.	ML5G-0618	ML5G-0820	ML5G-1021
<b>RF Specifications</b>			
Output Frequency	6 - 18 GHz	8 - 20 GHz	10 - 21 GHz
Output Power Min.	+12 dBm	+10 dBm	+10 dBm
Po Variation over Freq/Temp	6 dB	6 dB	6 dB
Step Size, Min.	1 kHz	1 kHz	1 kHz
Switching Speed, 100 MHz Step, Typ.	1 mS	1 mS	1 mS
1000 MHz Step, Typ.	3 mS	3 mS	3 mS
Full Band Step, Typ.	6 mS	7 mS	7 mS
Warm-up Time ("Lock") @ 0C (Minutes) (with Internal Crystal Reference)	3.0	3.0	3.0
Output Impedance	50 Ohms	50 Ohms	50 Ohms
Load VSWR	2.0:1	2.0:1	2.0:1
Harmonics	-12 dBc	-12 dBc	-12 dBc
Non-Harmonic Spurious	-60 dBc	-60 dBc	-60 dBc
<b>Phase Noise Performance (dBc/Hz)</b>			
(with Internal Crystal Reference)			
@ 100 Hz Offset	-72	-70	-70
@ 1 kHz Offset	-89	-87	-87
@ 10 kHz Offset	-90	-88	-88
@ 100 kHz Offset	-115	-118	-118
@ 1 MHz Offset	-138	-138	-138
@ 10 MHz Offset	-154	-153	-153
@ 100 MHz Offset	-164	-163	-163

## ML5G PERFORMANCE SPECIFICATIONS (Continued)

Model No.	ML5G-0618	ML5G-0820	ML5G-1021
<b>Integrated Phase Noise Performance</b>			
@ 18 and 20 GHz (2 kHz to 50 MHz)	-53 dBc	-52 dBc	-52 dBc
RMS Jitter	29 f sec	28 f sec	28 f sec
<b>Reference Oscillator Options</b>			
<b>Option A</b>			
External Reference (Note 2)	1 - 200 MHz	1 - 200 MHz	1 - 200 MHz
External Ref. Input Power	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm
Frequency Stability (< +/- 20ppm)	Cust Supplied	Cust Supplied	Cust Supplied
<b>Option B</b>			
External Reference with Internal Crystal (Note 3)	1 - 100 MHz	1 - 100 MHz	1 - 100 MHz
External Ref. Input Power	0 +/- 3 dBm	0 +/- 3 dBm	0 +/- 3 dBm
Frequency Stability (Note 5)	Cust Supplied	Cust Supplied	Cust Supplied
<b>Option C</b>			
Internal Reference	100 MHz	100 MHz	100 MHz
Frequency Stability	+/- 1 PPM	+/- 1 PPM	+/- 1 PPM
<b>Supply Voltage &amp; Current (Note 4)</b>			
+15 Vdc ( $\pm 0.5$ ) Vdc)	1375 mA	1800 mA	1900 mA
+5 Vdc ( $\pm 0.25$ ) Vdc)	300 mA	300 mA	300 mA
Power dissipation	22.1 watts	31 watts	33 watts
<b>Supply Voltage Ripple</b>			
(Pk-Pk from 60 Hz to 3 MHz)	<50 mV	<50 mV	<50 mV
<b>Control Format</b>			
	5-Line Serial	5-Line Serial	5-Line Serial
	USB	USB	USB
<b>Phase Lock Alarm (P13) (TTL)</b>			
	1=Locked	1=Locked	1=Locked
<b>Weight</b>			
	15 oz / 426 g	15 oz / 426 g	15 oz / 426 g

### ML5G 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

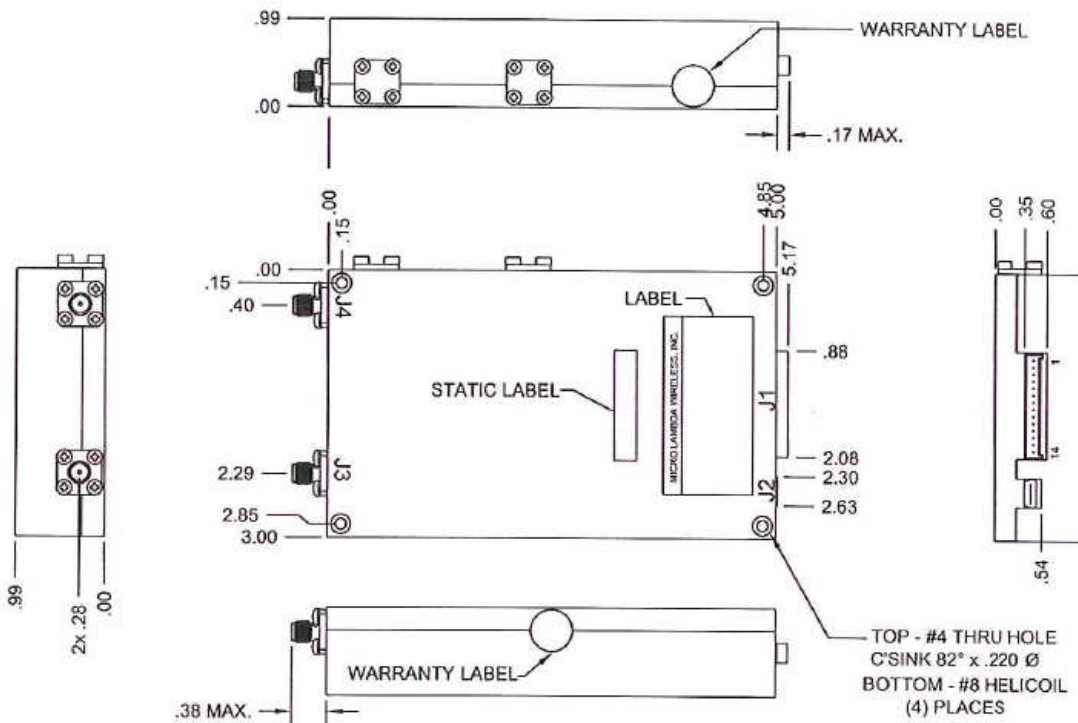
**Option D:** RF Connectors Front, Drawing 181-001

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

Part Number Example: ML5G-0820BD 8 GHz to 20 GHz with Internal Reference and External Reference with RF connectors on front.

#### Notes:

- 1) Special operating temperature range available.
- 2) 50-100 MHz OCXO recommended for best phase noise performance. External reference directly effects phase noise performance.
- 3) Output phase noise performance is not dependent on external reference phase noise.
- 4) All values stated for units with external reference. For internal reference add 125mA on the +15 Vdc line.
- 5) Frequency accuracy must be within exact reference frequency selected, +/- 5ppm.



**NOTES :**

- J1 MALE: - MOLEX# 35363-1460
- J1 MATES WITH: - MOLEX# 35507-1400
- CRIMP PIN: - MOLEX# 50212-8000

- J1 POWER SUPPLY INPUTS REQUIRED FOR USB OPERATION
- J1 RECOMMENDED WIRE SIZE = A.W.G. 22-24
- (\*) ACTIVE LOW

CONNECTIONS			
CONN.	TYPE	PIN #	FUNCTION
J1	35363-1460	1	+15 VDC, +12V OPT.
J1	35363-1460	2	+15 VDC, +12V OPT.
J1	35363-1460	3	GROUND
J1	35363-1460	4	GROUND
J1	35363-1460	5	+ 5 VDC
J1	35363-1460	6	+ 5 VDC
J1	35363-1460	7	N/C
J1	35363-1460	8	N/C
J1	35363-1460	9	CLOCK (*)
J1	35363-1460	10	DATA IN
J1	35363-1460	11	SELECT (*)
J1	35363-1460	12	BUSY
J1	35363-1460	13	LOCK ALARM
J1	35363-1460	14	DATA OUT

CONNECTIONS			
CONN.	TYPE	PIN #	FUNCTION
J2	USB MINI-B	1	+V
J2	USB MINI-B	2	D-
J2	USB MINI-B	3	D+
J2	USB MINI-B	4	GND
J2	USB MINI-B	5	GND
J3	SMA-FEMALE	1	REF. INPUT
J4	SMA-FEMALE	1	RF OUTPUT

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ARE:  
FRACTIONS DECIMALS ANGLES  
± .01 ± .02 ± .010

WEIGHT 15 Oz. / 425gr

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS DATE

DRAWN N.NGUYEN 3/12/12

ENGR DS 3/12/12

MANUF.

Q.A.



MICRO LAMBDA WIRELESS, INC.

MLSP SYNTHESIZER, EXT. REF. ( FRONT )

SIZE

CAGE No  
ORN63

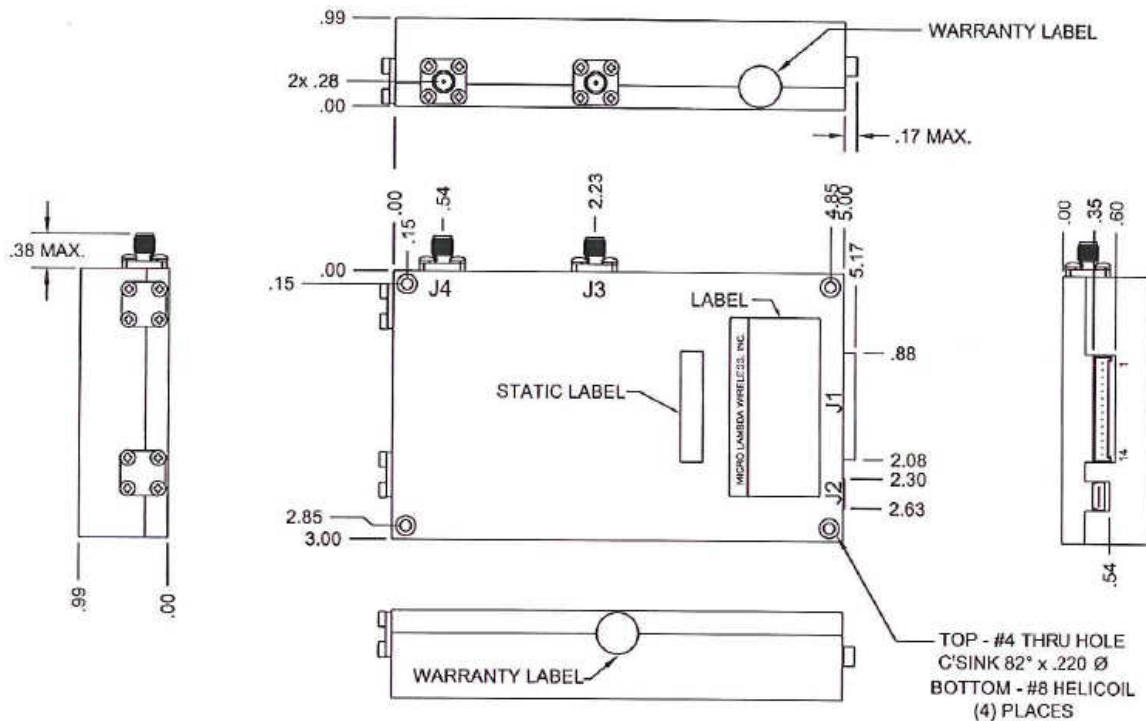
DAWG No

181 - 001

REV

B





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J1	35363-1460	2	+15 VDC, +12V OPT.
J1	35363-1460	3	GROUND
J1	35363-1460	4	GROUND
J1	35363-1460	5	+ 5 VDC
J1	35363-1460	6	+ 5 VDC
J1	35363-1460	7	N/C
J1	35363-1460	8	N/C
J1	35363-1460	9	CLOCK
J1	35363-1460	10	DATA IN
J1	35363-1460	11	SELECT (*)
J1	35363-1460	12	BUSY
J1	35363-1460	13	LOCK ALARM
J1	35363-1460	14	DATA OUT

CONNECTIONS			
CONN.	TYPE	PIN #	FUNCTION
J2	USB MINI-B	1	+V
J2	USB MINI-B	2	D-
J2	USB MINI-B	3	D+
J2	USB MINI-B	4	GND
J2	USB MINI-B	5	GND
J3	SMA-FEMALE	1	REF. INPUT
J4	SMA-FEMALE	1	RF OUTPUT

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCE ARE:  
 FRACTIONS DECIMALS ANGLES  
 .015 ±.002 .015 ±.002  
 .001 ±.001 .001 ±.001  
 .001 ±.001 .001 ±.001  
 WEIGHT 15 Oz. / 425gr  
 FINISH  
 DO NOT SCALE DRAWING

CONTRACT NO.	
APPROVALS	DATE
DRAWN N. NGUYEN	3/12/12
ENGR DS	3/12/12
MANUF.	
QA	



**MICRO LAMBDA WIRELESS, INC.**

**MLSP SYNTHESIZER, EXT. REF. ( SIDE )**

SIZE	CAGE No	DWG. NO.	REV.
	0RN63	181 - 002	B