

FEATURES

- Superior Phase Noise
- 1 Hz Step Size
- Additional RF Output (Optional)
- External Reference 5-100 MHz (Optional)
- 2nd L.O. Output (Optional)

APPLICATIONS

Test Equipment
Local Oscillators
Frequency Converters



DESCRIPTION

The MLSE-Series of YIG-Based wideband synthesizers are ideal as the main local oscillators in receiving systems, frequency converters and test and measurement equipment. Rivaling the best lab-grade test equipment, they provide 1 Hz frequency resolution over the 2 to 20 GHz and 1 to 22 GHz frequency range. Power levels of +14 to +20 dBm are standard through out the series. Spurious performance is -60 dBc and full band tuning speed is 31 mSec. The units are 7" x 5" x 2" high and consume 43 watts. This series of synthesizers utilizes a micro controller with non-volatile memory and up to 1,000 preset frequency commands. Flexibility of the design yields special options available to the user when specified. These options include; Additional RF outputs, second LO output and special auxiliary frequency input to allow an external signal applied in the frequency range of the unit to be switched to the main output connector.

PERFORMANCE SPECIFICATIONS

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

Model No.	MLSE-0220	MLSE-0122
RF Specifications		
Output Frequency Range (J5)	2.0-20.0 GHz	1.0-22.0 GHz
Output Power, Min.	+20 dBm	+17 dBm
Output Power Variation Vs Frequency	4 dB	5 dB
Frequency Step Size, Min.	1 Hz	1 Hz
Warm-up Time (minutes)	3.0	3.0
Output Impedance	50 ohm	50 ohm
Load VSWR	2:0:1	2:0:1
Switching Speed, Typical		
100 MHz	30 mS	32 mS
1000 MHz	30 mS	32 mS
Full Band	30 mS	32 mS
Harmonics	-12 dBc	-12 dBc
Non-Harmonics Spurious		
100 Hz = f off = 10 kHz	-60 dBc	-60 dBc
10 Hz = f off = 100 kHz	-60 dBc	-60 dBc
f off > 100 kHz	-60 dBc	-60 dBc
External Ref. Osc (Fixed Freq) (J2)	10 MHz	10 MHz
(Unit is not Phase Coherent to External Reference)		
External Ref Input Power	0 ± 3 dBm	0 ± 3 dBm

“MLSE-Series Synthesizer Phase Noise Specifications”

	100 Hz	1k	10k	100k	1 M
2 GHz	-84	-104	-114	-123	-148
8 GHz	-77	-97	-105	-115	-145
12 GHz	-72	-93	-102	-110	-139
20 GHz	-67	-91	-96	-105	-136

“MLSE-Series Synthesizer Typical Phase Noise”

	100 Hz	1k	10k	100k	1 M
2 GHz	-87	-107	-117	-126	-151
4 GHz	-84	-106	-114	-123	-148
6 GHz	-83	-101	-111	-119	-148
8 GHz	-80	-100	-108	-118	-148
10 GHz	-79	-99	-105	-114	-145
12 GHz	-75	-96	-105	-113	-142
14 GHz	-74	-95	-103	-111	-142
16 GHz	-72	-94	-102	-111	-142
18 GHz	-72	-94	-102	-110	-141
20 GHz	-70	-94	-99	-108	-139

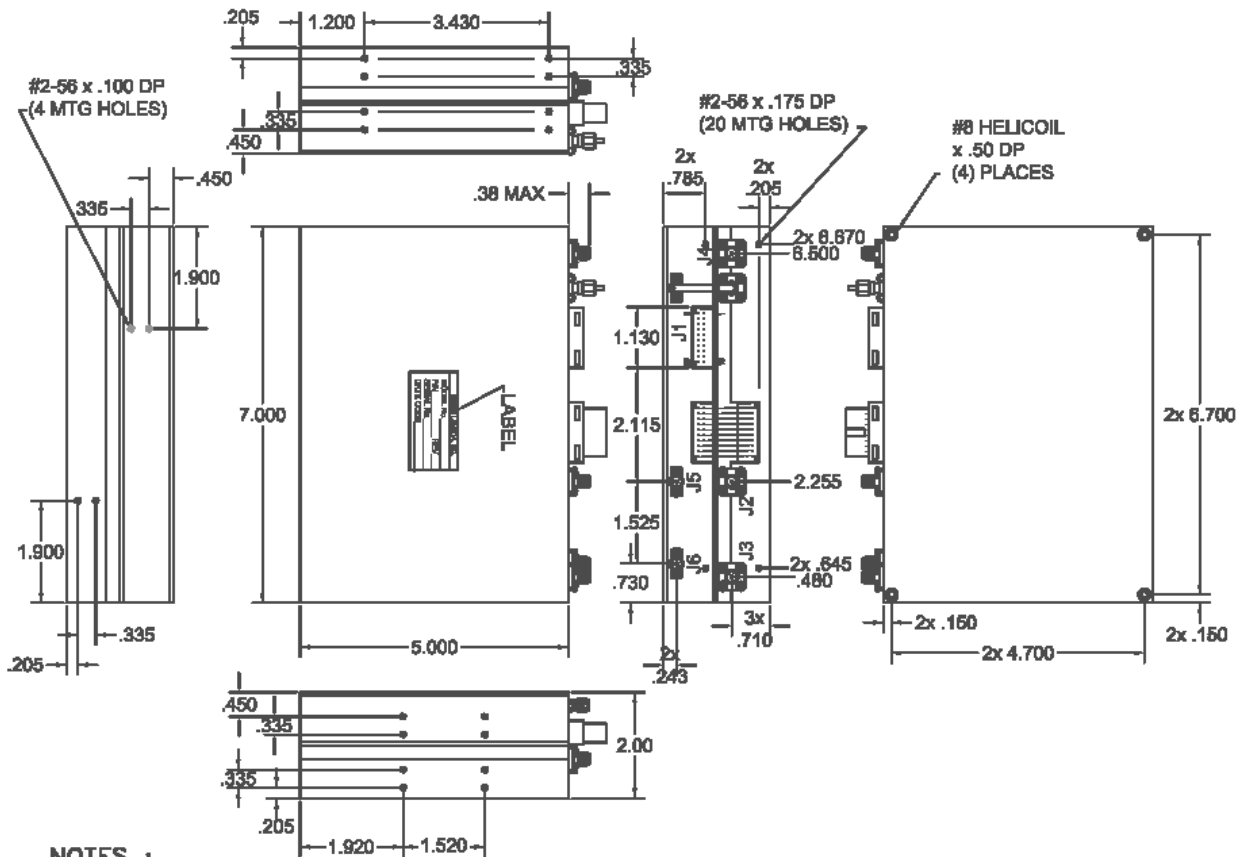
Model No.	MLSE-0220	MLSE-0122
Supply Voltage & Current (J1)		
+15 Vdc (+10%, -5%)	2300 Max.	2200 Max.
+5 Vdc (+10%, -5%)	1600 Max.	1700 Max.
Supply Voltage Ripple (Pk-Pk from 2 kHz to 3 MHz)	10 mV	10 mV
Digital Control Format (J1) (SPI & Busy)	5-Line Serial	5-Line Serial
Phase Lock Alarm (Programmable) Connections	High = Locked	High = Locked
Control / Alarm (J1)	Amp-103166-8	Amp-103166-8
RF Connectors (J2-J6)	SMA-F	SMA-F
Case Style	171-001	171-001

MLSE SERIES CONTINUED

Model No.	MLSE-0220	MLSE-0122
Options:		
- External Ref Osc (Fixed Freq) (J2)	5-100 MHz	5-100 MHz
Input Power Level	0 ± 3 dBm	0 ± 3 dBm
- 2nd L.O. Frequency (VCO Band Dependant) (J3)	500-4000 MHz	500-4000 MHz
Phase Noise @ 100 kHz (VCO Dependant)		
Output Power Level, Min.	+15 dBm	+15 dBm
Power Variation Vs Frequency	± 2 dB	± 2 dB
Tunable Step Size	1 MHz	1 MHz
Current Increase		
+5V	+500 mA	+500 mA
+15V	+400 mA	+400 mA
- Additional RF Output (J4)	4-11.0 GHz	4-11.0 GHz
Output Power Level, Min.	+7 dBm	+7 dBm
Output Power Var. Vs Freq.	± 3 dB	± 3 dB
Harmonics	-12 dBc	-12 dBc
Non-Harmonic Spurious		
100 Hz = f off = 10 kHz	-60 dBc	-60 dBc
10 Hz = f off = 100 kHz	-60 dBc	-60 dBc
f off > 100 kHz	-60 dBc	-60 dBc
Phase Noise @ 100 Hz Offset	-75 dBc/Hz	-75 dBc/Hz
@ 1 kHz Offset	-96 dBc/Hz	-96 dBc/Hz
@ 10 kHz Offset	-103 dBc/Hz	-103 dBc/Hz
@ 100 kHz Offset	-115 dBc/Hz	-115 dBc/Hz
@ 1 MHz Offset	-137 dBc/Hz	-137 dBc/Hz
Switching Speed, Typical		
100 MHz	30 mS	32 mS
1000 MHz	30 mS	32 mS
Full Band	30 mS	32 mS
- Auxillary Frequency Input (J6)		
Input Frequency Range	2-20 GHz	1-22 GHz
Input Power Level, Max.	+23 dBm	+23 dBm
Input Power Level, Min.	+15 dBm	+13 dBm
(For Specified Output Level)		
Output Power Level, Min. (J5)	+18 dBm	+15 dBm

REV	DESCRIPTIONS	DATE	APPD
A	NEW DRAWING #	9/8/04	DS
B	DISCONNECTED PINS # 15-18,20 OF J1;FIXED J1 PIN LOCATIONS		

NOTE:
 J2,J3,J4,J5 AND J6 MALE SMA MATING CONNECTOR
 CENTER PIN MUST BE 0.065" TO 0.085" LONG
 OR DAMAGE MAY OCCUR



NOTES :

- J1 MATES WITH: - AMP#102398-8
- FRONT LATCHING COVER: - AMP#102881-5
- BACK COVER: - AMP#102536-8

- RECOMMENDED WIRE SIZE = A.W.G. 22-24
- ** POLARITY SOFTWARE PROGRAMMABLE
- (*) ACTIVE LOW

CONNECTIONS			
CONN.	TYPE	PIN #	FUNCTION
J1	AMP103166-8	1	+15 VDC
J1	AMP103166-8	2	+15 VDC
J1	AMP103166-8	3	GROUND
J1	AMP103166-8	4	GROUND
J1	AMP103166-8	5	+ 5 VDC
J1	AMP103166-8	6	+ 5 VDC
J1	AMP103166-8	7	N/C
J1	AMP103166-8	8	N/C
J1	AMP103166-8	9	CLOCK
J1	AMP103166-8	10	DATA IN
J1	AMP103166-8	11	ENABLE (*)
J1	AMP103166-8	12	BUSY
J1	AMP103166-8	13	LOCK ALARM **

CONNECTIONS			
CONN.	TYPE	PIN #	FUNCTION
J1	AMP103166-8	14	DATA OUT
J1	AMP103166-8	15	N/C
J1	AMP103166-8	16	N/C
J1	AMP103166-8	17	N/C
J1	AMP103166-8	18	N/C
J1	AMP103166-8	19	N/C
J1	AMP103166-8	20	RESERVED
J2	SMA-FEMALE	1	EXTERNAL REF. INPUT
J3	SMA-FEMALE	1	2ND L.O. FREQ. OUTPUT
J4	SMA-FEMALE	1	2ND R.F. FREQ. OUTPUT
J5	SMA-FEMALE	1	MAIN FREQ. OUTPUT
J6	SMA-FEMALE	1	AUXILLARY R.F. INPUT

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
 TOLERANCE ARE:
 FRACTIONS DECIMALS ANGLES
 .010 ±.002 .005 ±.001 .001 ±.001

CONTRACT NO.

APPROVALS DATE

DRAWN N.NGUYEN 2/12/08

ENGR.

MANUF.

Q.A.



MICRO LAMBDA WIRELESS, INC.

MLSE SYNTHESIZER W/ HORIZ.& VERT. MTC

REV

DATE IN: ORN63

DWG. NO.

171 - 001

REV. B

WEIGHT 57 Oz. / 1618gr

FINISH

DO NOT SCALE DRAWING