



MICRO LAMBDA WIRELESS, INC.

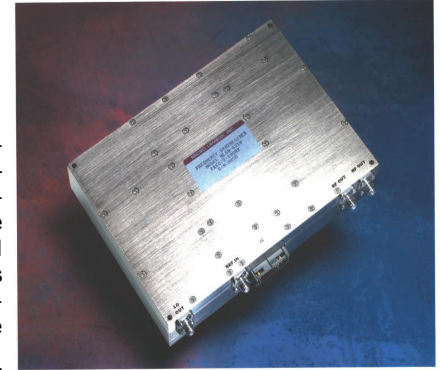
MLSN SERIES NARROW BAND, LOW NOISE SYNTHESIZERS 2-16 GHz (In 2 GHz Bands)

FEATURES

- 2-16 GHz Frequency Coverage
- In 2 GHz Bands
- Superior Phase Noise
- 1 Hz Step Size
- Dual RF Output (Optional)
- External Reference 5-50 MHz (Optional)
- 2nd L.O. Output (Optional)
- Analog Sweep (Optional)
- Low Profile Package

APPLICATIONS

SATCOM / TELECOM
256 To 1024 QAM Radio Systems
Frequency Converters



DESCRIPTION

The MLSN-Series of YIG-Based narrowband synthesizers are ideal as the main local oscillators in receiving systems, frequency converters and various SATCOM and TELECOM applications. This series of synthesizers provide 1 Hz frequency resolution over any 2 GHz frequency range from 2 to 16 GHz. Power levels of +8 to +13 dBm (depending on frequency) are standard through out the series. Spurious performance is -60 dBc and full band tuning speed is 12 mSec. The units are 7" x 5" x 1" high and consume 17 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 options available to the user when specified. These options include; dual RF outputs, second LO output and special external reference input.

PERFORMANCE SPECIFICATIONS

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

Model No.	MLSN-2040	MLSN-3050	MLSN-4060	MLSN-5070
RF Specifications				
Output Frequency	2-4 GHz	3-5 GHz	4-6 GHz	5-7 GHz
Output Power Min.	+13 dBm	+12 dBm	+12 dBm	+10 dBm
Po Variation over Freq/Temp	3 dB	3 dB	3 dB	4 dB
Step Size, Min.	1 Hz	1 Hz	1 Hz	1 Hz
Switching Speed, 100 MHz Step, Typ.	10 mS	10 mS	10 mS	10 mS
1000 MHz Step, Typ.	11 mS	11 mS	11 mS	11 mS
Full Band Step, Typ.	12 mS	12 mS	12 mS	12 mS
Warm-up Time ("Lock") @ 0C (Minutes)	3.0	3.0	3.0	3.0
Output Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Load VSWR	2.0:1	2.0:1	2.0:1	2.0:1
Harmonics	-10 dBc	-12 dBc	-15 dBc	-15 dBc
Non-Harmonic Spurious				
100 Hz ≤ f off ≤ 10 kHz	-60 dBc	-60 dBc	-60 dBc	-60 dBc
10 kHz ≤ f off ≤ 100 kHz	-60 dBc	-60 dBc	-60 dBc	-60 dBc
f off > 100 kHz	-60 dBc	-60 dBc	-60 dBc	-60 dBc
Phase Noise @ 100 Hz Offset	-80 dBc/Hz	-80 dBc/Hz	-77 dBc/Hz	-77 dBc/Hz
@ 1 kHz Offset	-100 dBc/Hz	-100 dBc/Hz	-98 dBc/Hz	-98 dBc/Hz
@ 10 kHz Offset	-110 dBc/Hz	-108 dBc/Hz	-106 dBc/Hz	-106 dBc/Hz
@ 100 kHz Offset	-120 dBc/Hz	-120 dBc/Hz	-118 dBc/Hz	-118 dBc/Hz
@ 1 MHz Offset	-145 dBc/Hz	-145 dBc/Hz	-140 dBc/Hz	-140 dBc/Hz
External Ref. Osc. - Fixed Freq.	10 MHz	10 MHz	10 MHz	10 MHz
(Unit is not Phase Coherent to External Reference)				
External Ref. Osc. Input Power	0 +/- 6 dBm	0 +/- 6 dBm	0 +/- 6 dBm	0 +/- 6 dBm
Supply Voltage & Current				
+15 Vdc (+10% -5%)	900 mA	900 mA	900 mA	900 mA
+5 Vdc (+10% -5%)	700 mA	700 mA	700 mA	700 mA
Supply Voltage Ripple (Pk-Pk from 2 kHz to 3 MHz)	10 mV	10 mV	10 mV	10 mV
Digital Control Format	5-Line Serial	5-Line Serial	5-Line Serial	5-Line Serial
Phase Lock Alarm (Programmable)	High=Locked	High=Locked	High=Locked	High=Locked
Connections				
Control/Alarm (J1)	AMP-103166-8	AMP-103166-8	AMP-103166-8	AMP-103166-8
RF Connectors (J2 - J5)	SMA-F	SMA-F	SMA-F	SMA-F
Case Style	161-001	161-001	161-001	161-001

Notes: 1) Special operating temperature range available.

MLSN PERFORMANCE SPECIFICATIONS

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

Model No.	MLSN-6080	MLSN-7090	MLSN-8010	MLSN-9011
RF Specifications				
Output Frequency	6-8 GHz	7-9 GHz	8-10 GHz	9-11 GHz
Output Power Min.	+10 dBm	+10 dBm	+8 dBm	+8 dBm
Po Variation over Freq/Temp	4 dB	4 dB	4 dB	4 dB
Step Size, Min.	1 Hz	1 Hz	1 Hz	1 Hz
Switching Speed, 100 MHz Step, Typ.	10 mS	10 mS	10 mS	10 mS
1000 MHz Step, Typ.	11 mS	11 mS	11 mS	11 mS
Full Band Step, Typ.	12 mS	12 mS	12 mS	12 mS
Warm-up Time ("Lock") @ 0C (Minutes)	3.0	3.0	3.0	3.0
Output Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Load VSWR	2.0:1	2.0:1	2.0:1	2.0:1
Harmonics	-15 dBc	-20 dBc	-20 dBc	-20 dBc
Non-Harmonic Spurious				
100 Hz ≤ f off ≤ 10 kHz	-60 dBc	-60 dBc	-60 dBc	-60 dBc
10 kHz ≤ f off ≤ 100 kHz	-60 dBc	-60 dBc	-60 dBc	-60 dBc
f off > 100 kHz	-60 dBc	-60 dBc	-60 dBc	-60 dBc
Phase Noise @ 100 Hz Offset	-77 dBc/Hz	-75 dBc/Hz	-75 dBc/Hz	-75 dBc/Hz
@ 1 kHz Offset	-98 dBc/Hz	-96 dBc/Hz	-96 dBc/Hz	-96 dBc/Hz
@ 10 kHz Offset	-104 dBc/Hz	-104 dBc/Hz	-103 dBc/Hz	-103 dBc/Hz
@ 100 kHz Offset	-116 dBc/Hz	-116 dBc/Hz	-115 dBc/Hz	-115 dBc/Hz
@ 1 MHz Offset	-140 dBc/Hz	-137 dBc/Hz	-137 dBc/Hz	-137 dBc/Hz
External Ref. Osc. - Fixed Freq.	10 MHz	10 MHz	10 MHz	10 MHz
(Unit is not Phase Coherent to External Reference)				
External Ref. Osc. Input Power	0 +/- 6 dBm	0 +/- 6 dBm	0 +/- 6 dBm	0 +/- 6 dBm
Supply Voltage & Current				
+15 Vdc (+10% -5%)	900 mA	900 mA	900 mA	900 mA
+5 Vdc (+10% -5%)	700 mA	700 mA	700 mA	700 mA
Supply Voltage Ripple	10 mV	10 mV	10 mV	10 mV
(Pk-Pk from 2 kHz to 3 MHz)				
Digital Control Format	5-Line Serial	5-Line Serial	5-Line Serial	5-Line Serial
Phase Lock Alarm (Programmable)	High=Locked	High=Locked	High=Locked	High=Locked
Connections				
Control/Alarm (J1)	AMP-103166-8	AMP-103166-8	AMP-103166-8	AMP-103166-8
RF Connectors (J2 - J5)	SMA-F	SMA-F	SMA-F	SMA-F
Case Style	161-001	161-001	161-001	161-001

Notes: 1) Special operating temperature range available.

MLSN PERFORMANCE SPECIFICATIONS

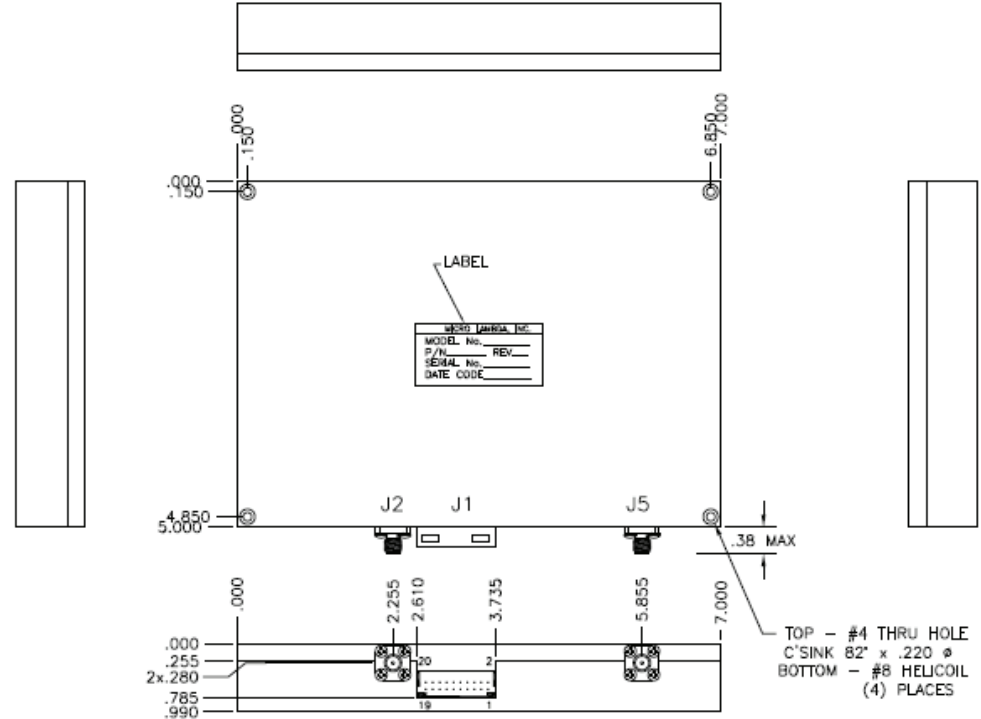
(Operating Case Temperature: 0° to +60° C Baseplate)

Model No.	MLSN-1012	MLSN-1214	MLSN-1416
RF Specifications			
Output Frequency	10-12 GHz	12-14 GHz	14-16 GHz
Output Power Min.	+8 dBm	+8 dBm	+8 dBm
Po Variation over Freq/Temp	4 dB	4 dB	4 dB
Step Size, Min.	1 Hz	1 Hz	1 Hz
Switching Speed, 100 MHz Step, Typ.	10 mS	10 mS	10 mS
1000 MHz Step, Typ.	11 mS	11 mS	11 mS
Full Band Step, Typ.	12 mS	12 mS	12 mS
Warm-up Time ("Lock") @ 0C (Minutes)	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	-20 dBc	-25 dBc	-30 dBc
Non-Harmonic Spurious			
100 Hz ≤ f off ≤ 10 kHz	-60 dBc	-60 dBc	-60 dBc
10 kHz ≤ f off ≤ 100 kHz	-60 dBc	-60 dBc	-60 dBc
f off > 100 kHz	-60 dBc	-60 dBc	-60 dBc
Phase Noise @ 100 Hz Offset	-75 dBc/Hz	-74 dBc/Hz	-73 dBc/Hz
@ 1 kHz Offset	-96 dBc/Hz	-95 dBc/Hz	-94 dBc/Hz
@ 10 kHz Offset	-103 dBc/Hz	-102 dBc/Hz	-101 dBc/Hz
@ 100 kHz Offset	-115 dBc/Hz	-113 dBc/Hz	-110 dBc/Hz
@ 1 MHz Offset	-137 dBc/Hz	-136 dBc/Hz	-135 dBc/Hz
External Ref. Osc. - Fixed Freq.	10 MHz	10 MHz	10 MHz
(Unit is not Phase Coherent to External Reference)			
External Ref. Osc. Input Power	0 +/- 6 dBm	0 +/- 6 dBm	0 +/- 6 dBm
Supply Voltage & Current			
+15 Vdc (+10% -5%)	900 mA	1000 mA	1200 mA
+5 Vdc (+10% -5%)	700 mA	700 mA	700 mA
Supply Voltage Ripple	10 mV	10 mV	10 mV
(Pk-Pk from 2 kHz to 3 MHz)			
Digital Control Format	5-Line Serial	5-Line Serial	5-Line Serial
Phase Lock Alarm (Programmable)	High=Locked	High=Locked	High=Locked
Connections			
Control/Alarm (J1)	AMP-103166-8	AMP-103166-8	AMP-103166-8
RF Connectors (J2 - J5)	SMA-F	SMA-F	SMA-F
Case Style	161-001	161-001	161-001

Notes: 1) Special operating temperature range available.

REV	DESCRIPTIONS	DATE	APP'D
A	NEW DRAWING #	8/27/01	DS
B	ADDED NOTE : WEIGHT	1/22/02	DS
C	CHANGED CONNECTOR LOCATIONS & ADDED (16)#2 MTG HOLES (VERTICAL)	6/12/02	DS
D	CORRECTED THE WEIGHT	9/22/03	DS
E	CORRECTED THE MTG HOLE LOCATIONS (UPPER SIDE)	4/04/06	DS
F	ELIMINATED THE VERT. MTG HOLES & J3 & J4 CONNECTORS.	9/09/08	DS
G	CORRECTED DRAWING NAME TO: "...EXT. REF."	6/03/09	

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



TOP - #4 THRU HOLE
 C'SINK 82° x .220 φ
 BOTTOM - #8 HELICOIL
 (4) PLACES

NOTES :

- J1 MATES WITH: - AMP#102398-8
- FRONT LATCHING COVER:- AMP#102681-5
- 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	EXT NB FM +
J1	AMP103166-8	16	EXT WB FM +
J1	AMP103166-8	17	EXT NB FM -
J1	AMP103166-8	18	EXT WB FM COMMON
J1	AMP103166-8	19	N/C
J1	AMP103166-8	20	RESET (LOW=RESET) (*)
J2	SMA-FEMALE	1	REF. INPUT
J5	SMA-FEMALE	1	R.F. OUTPUT

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ARE :	CONTRACT NO.	
	APPROVALS	DATE
FRACCTIONS DECIMALS ANGLES	DRAWN	N.NGUYEN
± .010 .005	ENGR.	6/03/09
WEIGHT	MANUF.	
24 Oz. / 680gr	Q.A.	
FINISH		
DO NOT SCALE DRAWING		



HIGH RES. SYNTHESIZER W/ EXT. REF.

SIZE	CAGE No	DWG. NO.	REV.
	ORN63	161 - 001	G