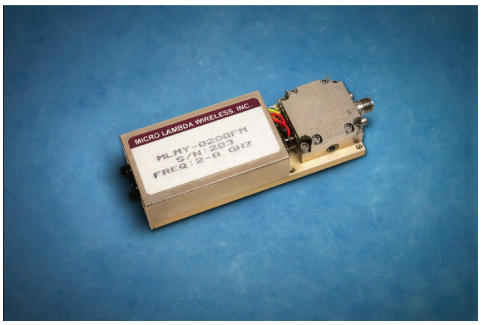
MICRO LAMBDA WIRELESS, INC.

PERMANENT MAGNET OSCILLATORS WITH COMMERCIAL SERIAL DRIVERS
SD-SERIES



FEATURES
- 2 GHz To 22 GHz
- Compensation for Temperature Drift
- Voltage Regulators for Improved Stability
- 16 Bit Tuning Resolution

DESCRIPTION
Micro Lambda ***MLPM and MLPW Series*** Permanent Magnet YIG Oscillators are available with integrated serial driver circuits. These drivers eliminate the need for customers to design or develop their own driver circuits and sophisticated test and alignment procedures. Integrating a driver at Micro Lambda's factory ensures peak performance. Alignment and compensation with the particular YIG oscillator can be maximized down to the component level.

All drivers in this series provide input voltage regulators and compensation circuits to improve frequency drift. All voltages required by the YIG oscillator, except the heater inputs are supplied by the voltage regulators.

COMMERCIAL SERIAL DRIVERS	**2-22 GHz PMO's, SD & SG SERIES**
DRIVER INPUT & RESPONSE	SPECIFICATION (0 to +65 deg. C)
Tuning Command	Start Word (all 0's) = Lowest Frequency Stop Word (all 1's) = Highest Frequency
Tuning Resolution	16 BIT Positive Logic (Fmax-Fmin)/65,535 Bit Resolution
Tuning Accuracy (excluding hysteresis)	See Table (Page 3)
Tuning Speed (Note 1)	10 mS for 1 GHz step to within ±10 MHz. (residual FM is 10 kHz Pk-Pk)
Main Driver Inputs	
Supply Voltage & Current (Note 2)	+12 V ± .5 V @ 265 mA, Max. -12 V ± .5 V @ 165 mA, Max.
Supply Voltage Pushing	± 100 kHz, Max. @ ± .5 Vdc
Supply Voltage Ripple	10 mV Ripple Pk-Pk from 2 kHz to 3 MHz
Ground	Chassis Ground
YIG Heater Voltage & Current	+24 Vdc ±4 Vdc @ 300 mA surge for 2 seconds, 25 mA steady state Polarity independent : ±12 Vdc or ±15 Vdc acceptable
Digital Interface	The MLWI digital driver interface is a standard 3-wire connection compatable with SPI/QSPI/MICROWIRE interfaces. The chip-select input (CSELECTn) frames the serial data loading at the data input pin (DATA). Immediately following CSELECTn's high-to-low transition, the data is shifted synchronously and latched into the input register on the rising edge of the serial-clock input (CLOCK). After 16 data bits have been loaded into the serial input register, it transfers its contents to the DAC latch on CSELECTn's low-to-high transition (Figure 2). Note that if CSELECTn does not remain low during the entire 16 CLOCK cycles, data will be corrupted. In this case, reload the DAC latch with a new 16-bit word.

Power-On Reset

The MLWI digital driver has a power-on reset circuit to set the DAC's output to OV(F-min) in unipolar mode when VDD is first applied. This ensures that unwanted DAC output voltages will not occur immediately following a system power-up, such as after power loss.

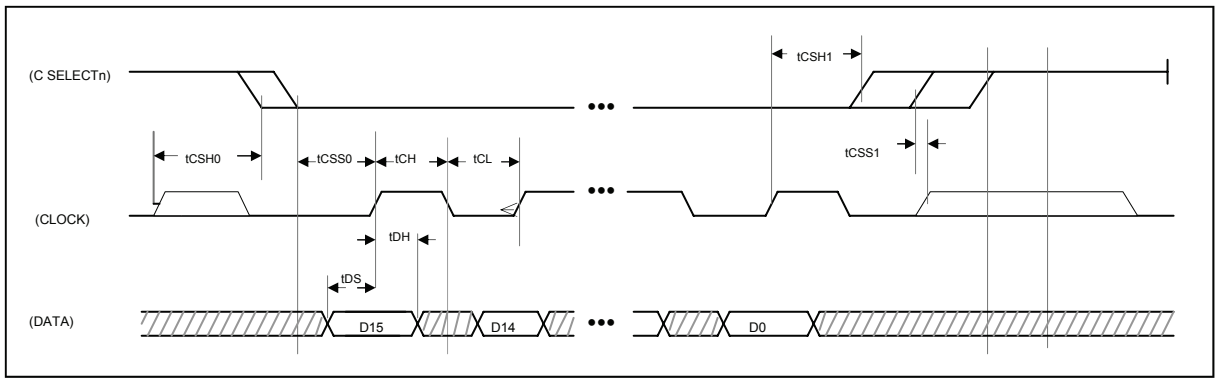


Figure 1. Timing Diagram

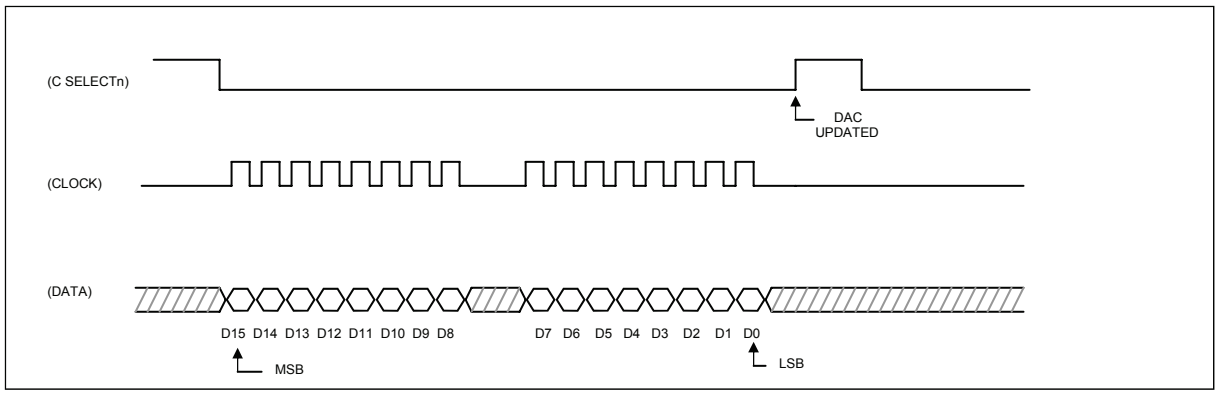


Figure 2. 3-Wire Interface Timing Diagram

TIMING CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
CLOCK Frequency	fCLK				10	MHz
CLOCK Pulse Width High	tCH		45			ns
CLOCK Pulse Width Low	tCL		45			ns
CSn Low to CLOCK High Setup	tCSS0		45			ns
CSn High to CLOCK High Setup	tCSS1		45			ns
CLOCK High to CSn Low Hold	tCSH0		30			ns
CLOCK High to CSn High Hold	tCSH1		45			ns
DATA to CLOCK High Setup	tDS		40			ns
DATA to CLOCK High Hold	tDH		0			ns
VDD High to CSn Low (power-up delay)				20		µs

FM Coil Driver (SG Option)

Voltage	± 10 V
Current	± 100 mA
Input Impedance	1 k-Ohms
Sensitivity (Note 3)	± 2.5 MHz/V
Frequency Deviation	± 25 MHz

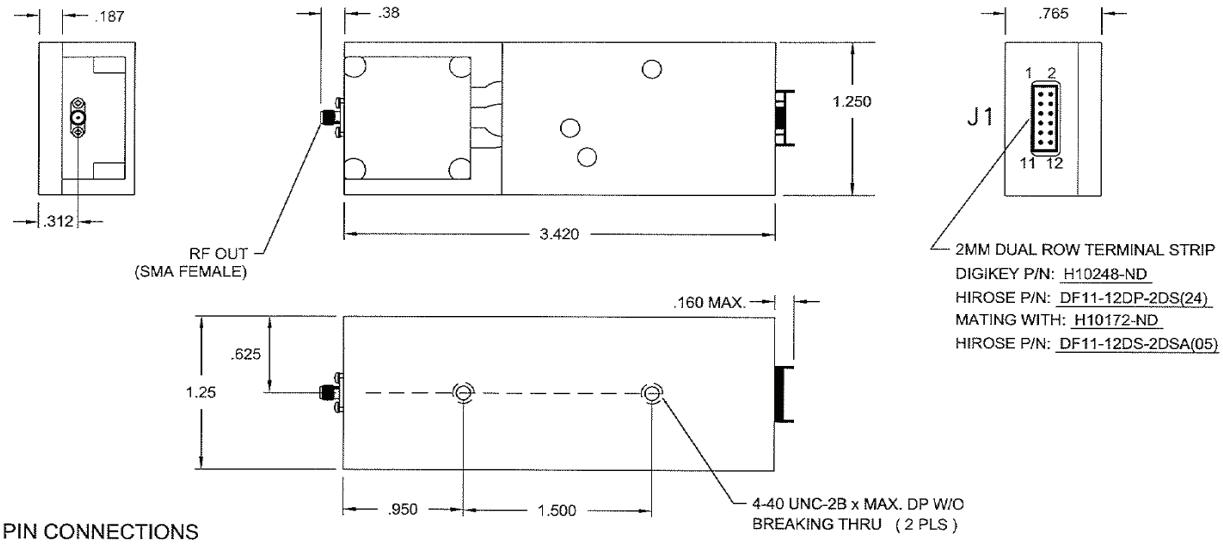
Note: 1.Optional 1mS Tuning Speeds Available.
2. Some YIG devices require higher voltages - Check with factory.
3. FM Coil Sensitivity Adjustment Available. Sensitivity Stated is Average Over Frequency Range.

PERFORMANCE SPECIFICATIONS
Permanent Magnet YIG Oscillators with Positive Input Serial Drivers (0º C to +65º C)

Model Number	Frequency GHz	Accuracy (MHz) *	Current +12 V (mA)	Current -12 V (mA)	Outline Drawing	Outline Drawing (SG Option)
Bi-Polar						
MLPM-0204SD	2-4	+/- 10	265	165	61-105	61-105
MLPM-0305SD	3-5	+/- 10	265	165	61-105	61-105
MLPM-0406SD	4-6	+/- 10	265	165	61-105	61-105
MLPM-0507SD	5-7	+/- 10	265	165	61-105	61-105
MLPM-0608SD	6-8	+/- 10	265	165	61-105	61-105
MLPM-0709SD	7-9	+/- 10	265	165	61-105	61-105
MLPM-0810SD	8-10	+/- 10	265	165	61-105	61-105
MLPM-0911SD	9-11	+/- 10	265	165	61-105	61-105
MLPM-1012SD	10-12	+/- 10	265	165	61-105	61-105
MLPM-1113SD	11-13	+/- 10	265	165	61-105	61-105
MLPM-1214SD	12-14	+/- 10	265	165	61-105	61-105
FET						
MLPM-0911FSD	9-11	+/- 10	265	165	61-105	61-105
MLPM-1012FSD	10-12	+/- 10	265	165	61-105	61-105
MLPM-1113FSD	11-13	+/- 10	265	165	61-105	61-105
MLPM-1214FSD	12-14	+/- 10	265	165	61-105	61-105
MLPM-1315FSD	13-15	+/- 10	265	165	61-105	61-105
MLPM-1416FSD	14-16	+/- 10	265	165	61-106	61-106
MLPM-1517FSD	15-17	+/- 10	265	165	61-106	61-106
MLPM-1618FSD	16-18	+/- 10	265	165	61-106	61-106
MLPM-1719FSD	17-19	+/- 10	265	165	61-106	61-106
MLPM-1820FSD	18-20	+/- 10	265	165	61-106	61-106

Model Number	Frequency GHz	Accuracy (MHz) *	Current +15 V (mA)	Current -15 V (mA)	Outline Drawing	Outline Drawing (SG Option)
Ultra-Wide Tuning Range						
MLPW-0812SD	8-12	+/- 15	315	215	61-106	61-106
MLPW-1014SD	10-14	+/- 15	315	215	61-106	61-106
MLPW-1418SD	14-18	+/- 15	315	215	61-106	61-106
MLPW-1822SD	18-22	+/- 15	315	215	61-106	61-106

* Accuracy includes frequency drift and linearity errors over the temperature range.



J1 - PIN CONNECTIONS

PIN NO	FUNCTION
1	CLOCK
2	DATA IN
3	CSELECTn
4	GROUND
5	-V SUPPLY
6	+V SUPPLY
7	HTR + or N/C
8	HTR - or N/C
9	FM + or FM V
10	FM - or FM GND
11	N/C
12	N/C

REV	DESCRIPTION	DATE	APPROVED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ARE :
FRACTIONS ± DECIMALS .xx ±.02 .xxx ±.010 ANGLES ±
MATERIAL
FINISH
DO NOT SCALE DRAWING

CONTRACT NO.

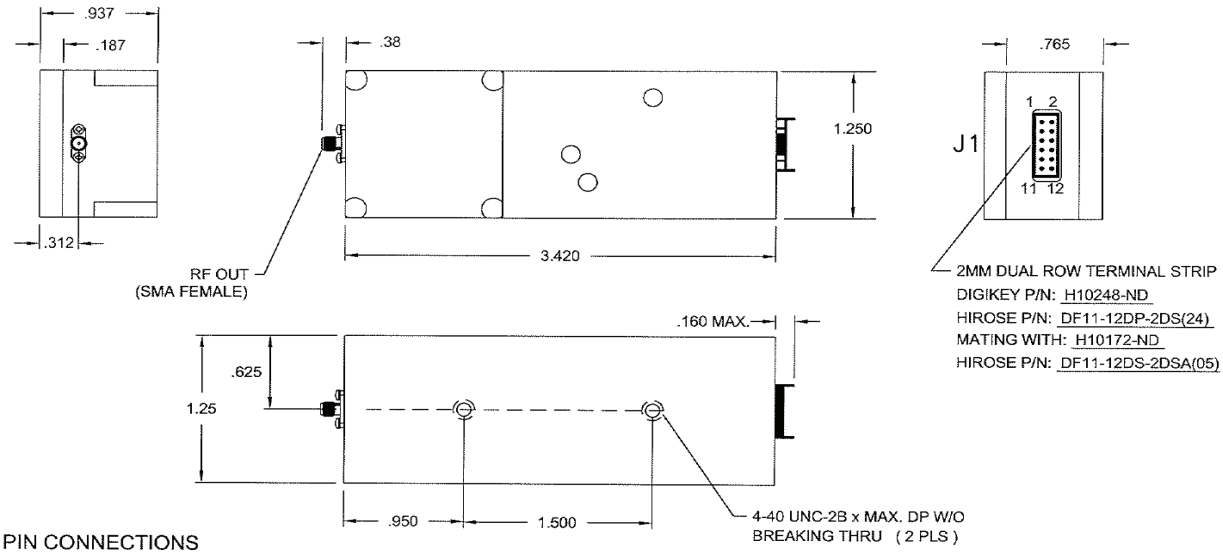
APPROVALS	DATE
DRAWN N.NGUYEN	2/23/09
ENGR DS	5/15/09
MANUF	
Q.A.	

MICRO LAMBDA WIRELESS, INC.

OSC. 1.00" W/16BIT SERIAL DRIVER

SIZE	CAGE	DWG. NO.	REV.
	0RN63	61 - 105	

SCALE SHEET



J1 - PIN CONNECTIONS

PIN NO	FUNCTION
1	CLOCK
2	DATA IN
3	CSELECTn
4	GROUND
5	-V SUPPLY
6	+V SUPPLY
7	HTR + or N/C
8	HTR - or N/C
9	FM + or FM V
10	FM - or FM GND
11	N/C
12	N/C

REV	DESCRIPTION	DATE	APPROVED

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCE ARE :
FRACTIONS ± DECIMALS .xx ±.02 .xxx ±.010 ANGLES ±
MATERIAL
FINISH
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN N.NGUYEN	2/23/09
ENGR DS	5/15/09
MANUF	
Q.A.	

MICRO LAMBDA WIRELESS, INC.

OSC. 1.25" W/16BIT SERIAL DRIVER

SIZE	CAGE	DWG. NO.	REV.
	0RN63	61 - 106	

SCALE SHEET