MICRO LAMBDA WIRELESS, INC.

MINIATURE YIG FILTERS WITH COMMERCIAL SERIAL DRIVERS SM SERIES

FEATURES

- 500 MHz to 18 GHz
- Low-Profile Package
- Input Regulators for Improved Stability
  - Versus Power Supply Variations
- 16 Bit Tuning Resolution

DESCRIPTION

MICRO LAMBDA YIG Filters, model types MLFI, MLFM and MLFD Series are available with integrated serial driver circuits.

MICRO LAMBDA 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 that peak performance will be achieved at the time of manufacture. Alignment and compensation with the particular YIG filter can be maximized down to the component level.

All drivers in this series provide input voltage regulators, and compensation circuits to improve frequency drift.

COMMERCIAL SERIAL DRIVERS	**.5-18 GHz YTOs, SM 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
Tuning Speed	5 mS for 1 GHz step to within ±10 MHz.
Main Driver Inputs	
Supply Voltage & Current (P1-6)	+15 V ± .5 V @ Filter Tuning Current +50 mA, Max.
(P1-5)	-15 V ± .5 V @ 50 mA
Supply Voltage Pushing	± 100 kHz, Max. @ ± .5 Vdc
Supply Voltage Ripple	10 mV Ripple Pk-Pk from 2 kHz to 3 MHz
Ground (P1-4 & 12)	Chassis Ground
YIG Heater Voltage & Current (P1-7 & 8)	+24 Vdc ±4 Vdc @ 300 mA surge for 2 seconds, 25 mA steady state Polarity independent : ±12 Vdc or ±15 Vdc acceptable
Digital Interface (P1-1, 2, 3, 4)	The MLWI digital driver interface is a standard 3-wire connection compatable with SPI/QSPI/MICROWIRE interfaces. The 3-wire serial interface will operate in a 5V or 3.3V logic system. The chip-select input (SELECTn) frames the serial data loading at the data input pin (DATA). Immediately following SELECTn'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 SELECTn's low-to-high transition (Figure 2). Note that if SELECTn 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.

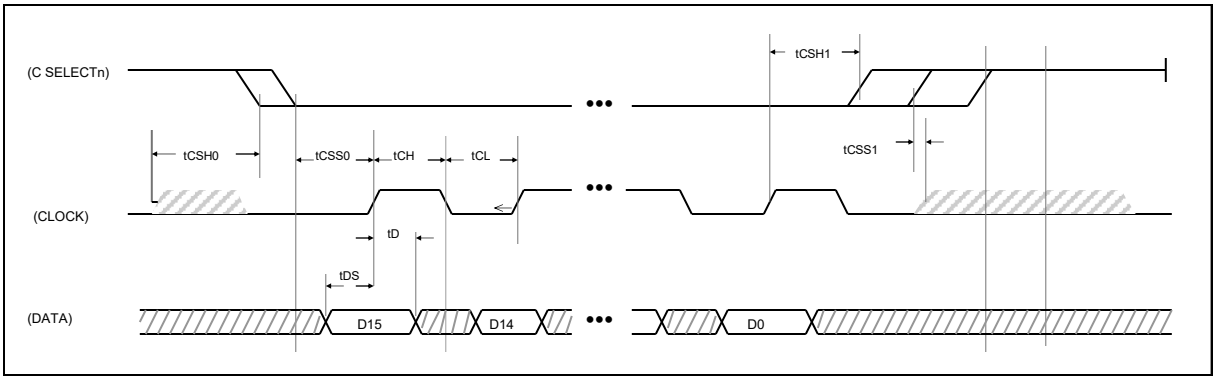


Figure 1. Timing Diagram

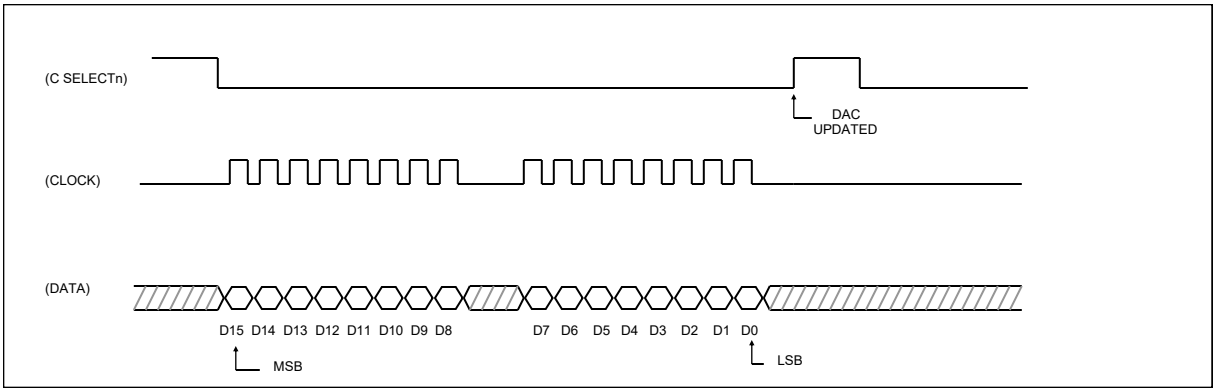


Figure 2. 3-Wire Interface Timing Diagram

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

Bandpass Filters with Serial Drivers SM Series: Mini Profile Filter (0º C to +65º C)

MODEL NUMBER	# Stages	Frequency GHz	3 dB Bandwidth (MHz)	Accuracy (MHz) *	Current +15V (mA)	Current -15V (mA)	Outline Drawing
MLFI-41002SM	4	1.0 to 2.0	20	+/- 6	150	50	99-0021-170
MLFI-42004SM	4	2.0 to 4.0	30	+/- 8	250	50	99-0021-170
MLFI-44008SM	4	4.0 to 8.0	40	+/- 12	450	50	99-0021-170
MLFI-42008SM	4	2.0 to 8.0	30	+/- 13	450	50	99-0021-170
MLFI-61002SM	6	1.0 to 2.0	25	+/-6	150	50	99-0021-170
MLFI-62004SM	6	2.0 to 4.0	40	+/- 8	250	50	99-0021-170
MLFI-64008SM	6	4.0 to 8.0	45	+/- 12	450	50	99-0021-170
MLFI-62008SM	6	2.0 to 8.0	40	+/- 13	450	50	99-0021-170

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

Bandpass Filters with Serial Drivers SM Series: 1” Cube Filter (0º C to +65º C)

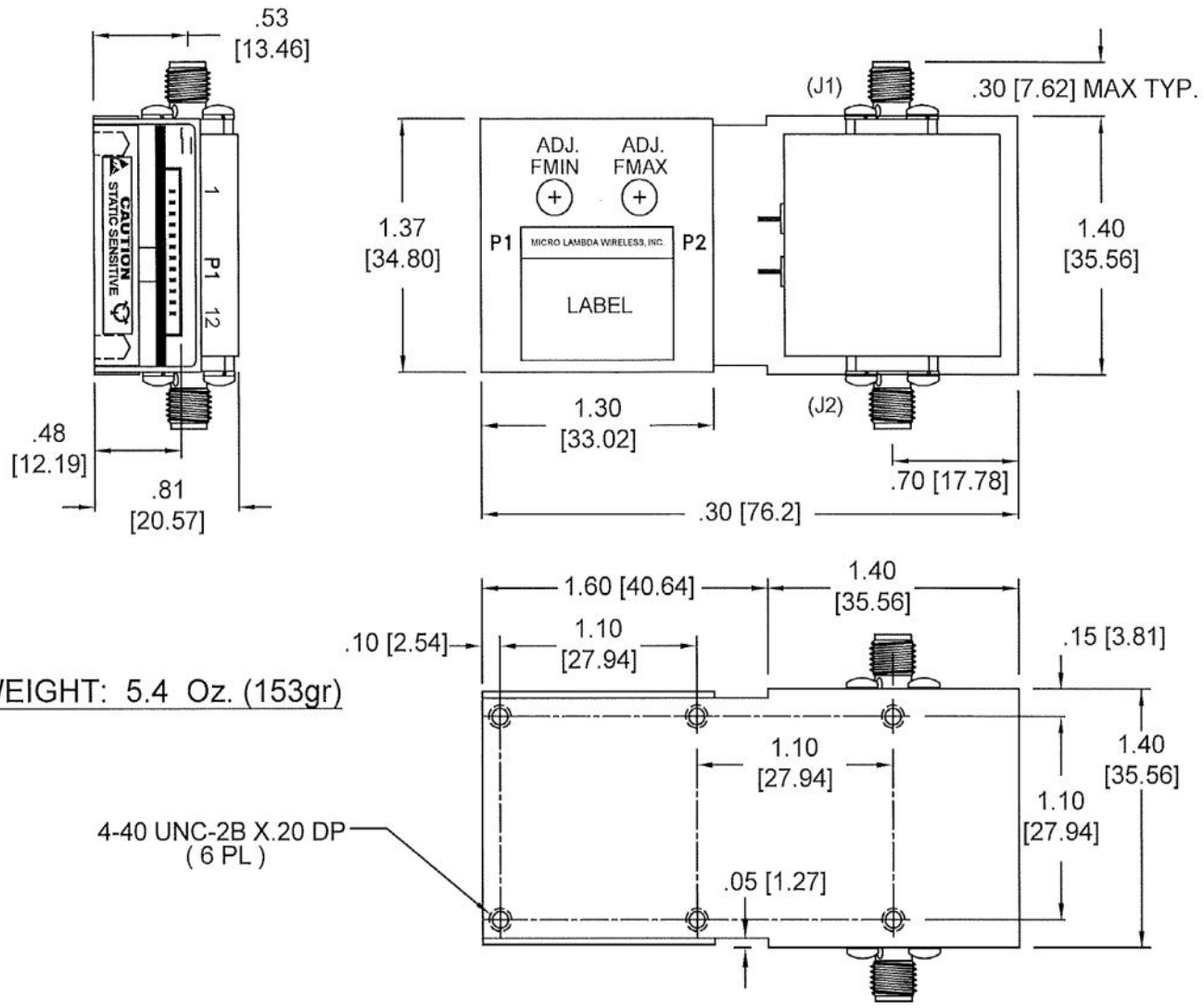
MODEL NUMBER	# Stages	Frequency GHz	3 dB Bandwidth (MHz)	Accuracy (MHz) *	Current +15V (mA)	Current -15V (mA)	Outline Drawing
MLFM-30520SM	3	0.5 to 2.0	15	+/- 7	150	50	99-0021-169
MLFM-40540SM	4	0.5 to 4.0	15	+/- 10	250	50	99-0021-169
MLFM-42008SM	4	2.0 to 8.0	30	+/- 13	450	50	99-0021-169
MLFM-42018SM	4	2.0 to 18.0	40	+/- 13	1010	50	99-0021-169
MLFM-46018SM	4	6.0 to 18.0	40	+/- 13	980	50	99-0021-169

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

Dual Channel Bandpass Filters with Serial Drivers SM Series: 1” Cube Filter (0º C to +65º C)

MODEL NUMBER	# Stages	Frequency GHz	3 dB Bandwidth (MHz)	Accuracy (MHz) *	Current +15V (mA)	Current -15V (mA)	Outline Drawing
MLFD-40540SM	4	0.5 to 4.0	15	+/- 10	250	50	**
MLFD-42008SM	4	2.0 to 8.0	20	+/- 13	450	50	**
MLFD-42018SM	4	2.0 to 18.0	30	+/- 13	1010	50	**
MLFD-46018SM	4	6.0 to 18.0	30	+/- 13	980	50	**

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



WEIGHT: 5.4 Oz. (153gr)

INPUT

P1 ANALOG MODEL		P1 SERIAL MODEL
PIN	*FUNCTION*	*FUNCTION*
1	CONTROL-V 0-10V	CLOCK (SCLK)
2	CONTROL RETURN	DATA (MOSI)
3	N/C	SELECTn ($\overline{CS}$)
4	GROUND	GROUND
5	-V SUPPLY	-V SUPPLY
6	+V SUPPLY	+V SUPPLY
7	HEATER 1	HEATER 1
8	HEATER 2	HEATER 2
9	N/C	N/C
10	N/C	N/C
11	N/C	N/C
12	GROUND	GROUND

FILTER RF CONNECTIONS

CONN.	*TYPE*	*FUNCTION*
J1	SMA	RF INPUT
J2	SMA	RF OUTPUT

NOTES:

1- RECOMMENDED WIRE SIZE = 24 GAUGE
2- P1 CONNECTION:
   – MOLEX PART # : 5040501291(1.5MM)
   – MATING WITH # : 5040511201
   – CRIMP CONTACT : 5040520098
3- DIMENSIONS ARE IN INCHES
4- [ ] DIMENSIONS ARE IN MM.

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

MATERIAL

FINISH

DO NOT SCALE DRAWING

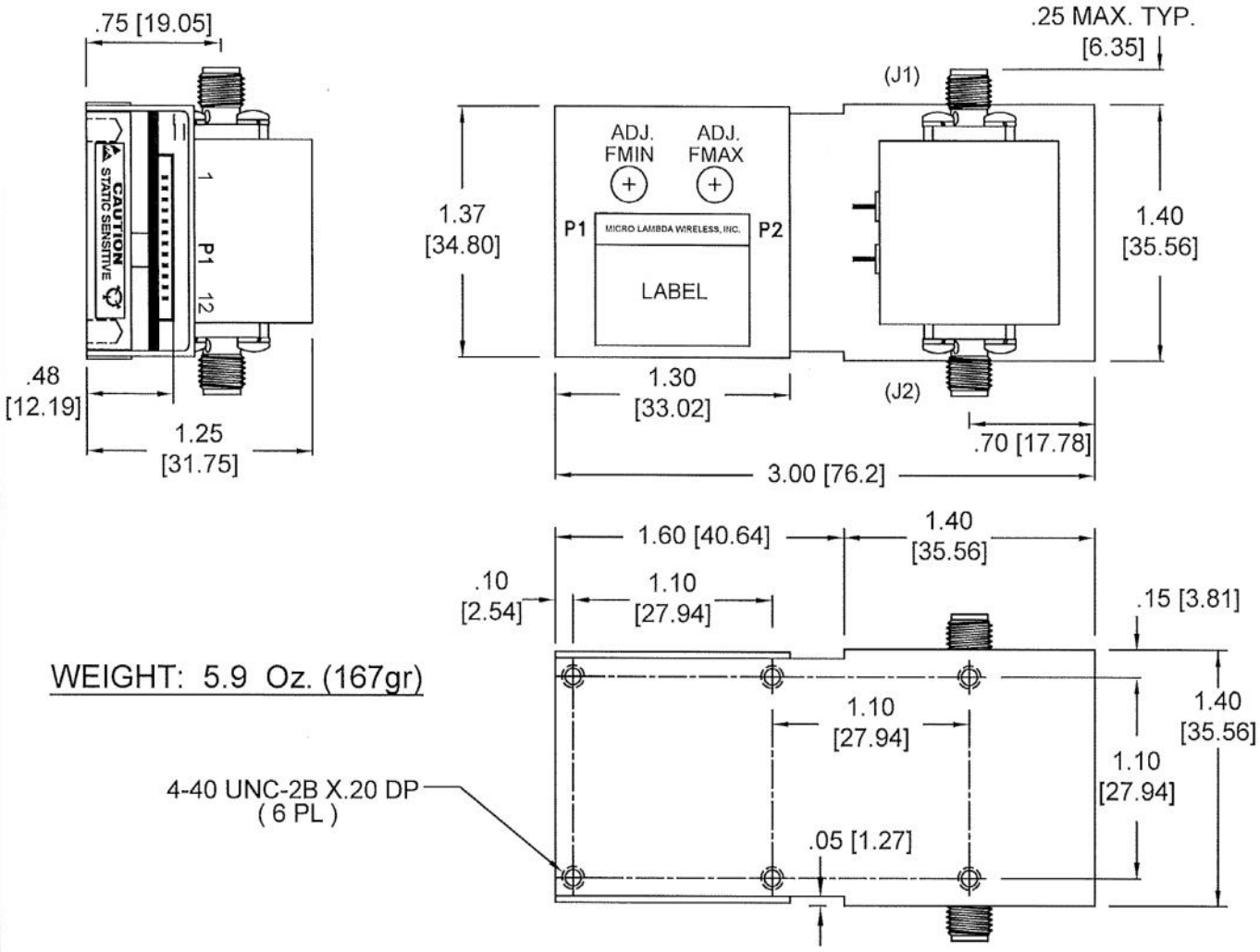
CONTRACT NO.

APPROVALS	DATE
DRAWN N.NGUYEN	5/19/2022
CHECKED DS	5/26/22
ISSUED	

MICRO LAMBDA WIRELESS, INC.

ANALOG OR SERIAL DRIVER WITH 1.2" BP FILTER

SIZE	CAGE No	DWG. NO.	REV.
	0RN63	99 - 0021 - 170	A



WEIGHT: 5.9 Oz. (167gr)

INPUT

P1 ANALOG MODEL / P1 SERIAL MODEL

PIN	*FUNCTION*	*FUNCTION*
1	CONTROL-V 0-10V	CLOCK (SCLK)
2	CONTROL RETURN	DATA (MOSI)
3	N/C	SELECTn ($\overline{CS}$)
4	GROUND	GROUND
5	-V SUPPLY	-V SUPPLY
6	+V SUPPLY	+V SUPPLY
7	HEATER 1	HEATER 1
8	HEATER 2	HEATER 2
9	N/C	N/C
10	N/C	N/C
11	N/C	N/C
12	GROUND	GROUND

FILTER RF CONNECTIONS

CONN.	*TYPE*	*FUNCTION*
J1	SMA	RF INPUT
J2	SMA	RF OUTPUT

NOTES:

1- RECOMMENDED WIRE SIZE = 24 GAUGE
2- P1 CONNECTION:
   – MOLEX PART # : 5040501291(1.5MM)
   – MATING WITH # : 5040511201
   – CRIMP CONTACT : 5040520098
3- DIMENSIONS ARE IN INCHES
4- [ ] DIMENSIONS ARE IN MM.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCE ARE :
FRACTIONS DECIMALS ANGLES
♣ .xx ±.02
♠ .xxx ±.010

MATERIAL

FINISH

DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN N.NGUYEN	5/19/2022
CHECKED DS	5/26/22
ISSUED	

MICRO LAMBDA WIRELESS, INC.

ANALOG OR SERIAL DRIVER WITH 1.0" BP FILTER

SIZE	CAGE No	DWG. NO.	REV.
	0RN63	99 - 0021 - 169	A