MICRO LAMBDA WIRELESS, INC.

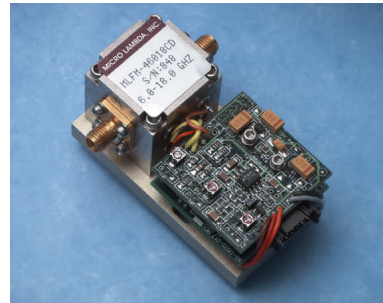## MINIATURE YIG FILTERS WITH COMMERCIAL SERIAL DRIVERS SD SERIES

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

DESCRIPTION

MICRO LAMBDA YIG Filters, model types MLFI-Series, MLFM-Series 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.

STANDARD POSITIVE INPUT DIGITAL DRIVER SELECTION GUIDE: SD SERIES

COMMERCIAL SERIAL DRIVERS	.5-18 GHz YTOs, SD 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	+15 V ± .5 V @ Filter Tuning Current +50 mA, Max. -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	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 3-wire serial interface will operate in a 5V or 3.3V logic system. 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.

Miniature YIG Filters with Serial Drivers

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.
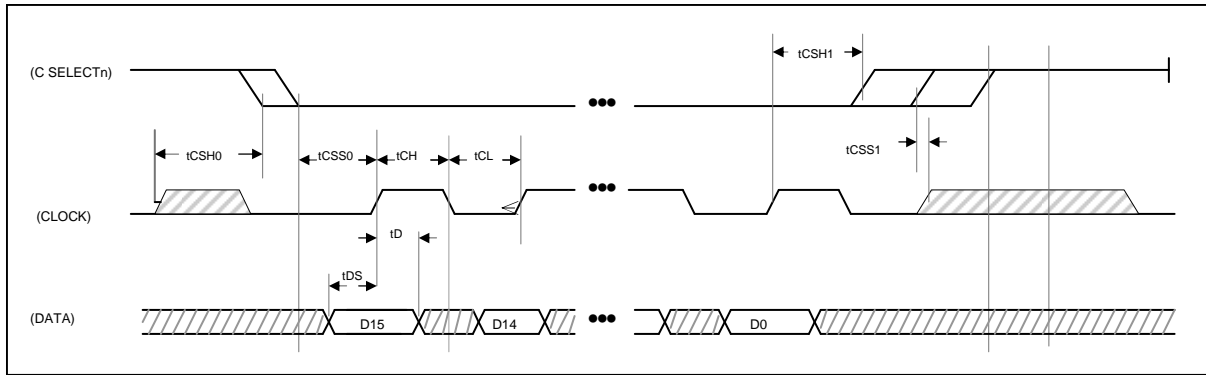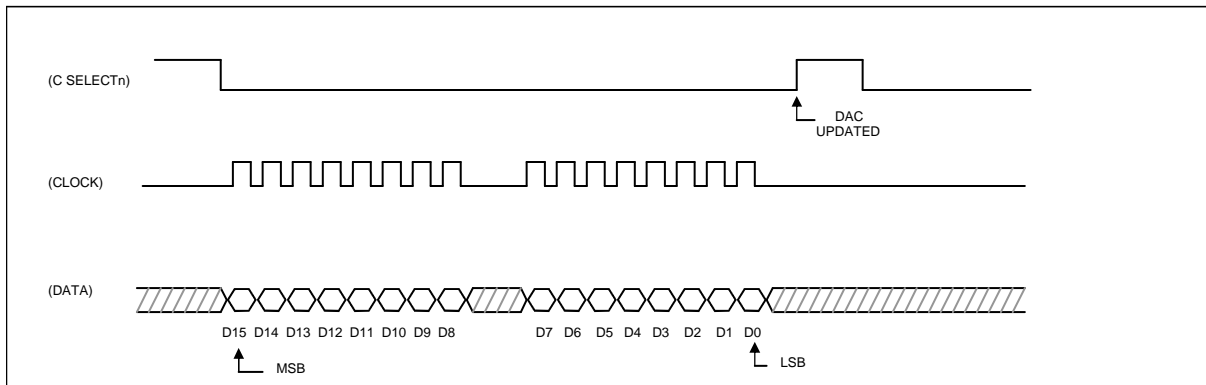

Figure 1. Timing Diagram

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

MICRO LAMBDA WIRELESS, INC.

**MINIATURE YIG FILTERS WITH
COMMERCIAL SERIAL DRIVERS
SD SERIES – CONTINUED**

Bandpass Filters with Serial Drivers SD 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-41002SD	4	1.0 to 2.0	20	+/- 6	150	50	21-123
MLFI-42004SD	4	2.0 to 4.0	30	+/- 8	250	50	21-123
MLFI-44008SD	4	4.0 to 8.0	40	+/- 12	450	50	21-123
MLFI-42008SD	4	2.0 to 8.0	30	+/- 13	450	50	21-123
MLFI-61002SD	6	1.0 to 2.0	25	+/-6	150	50	21-123
MLFI-62004SD	6	2.0 to 4.0	40	+/- 8	250	50	21-123
MLFI-64008SD	6	4.0 to 8.0	45	+/- 12	450	50	21-123
MLFI-62008SD	6	2.0 to 8.0	40	+/- 13	450	50	21-123

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

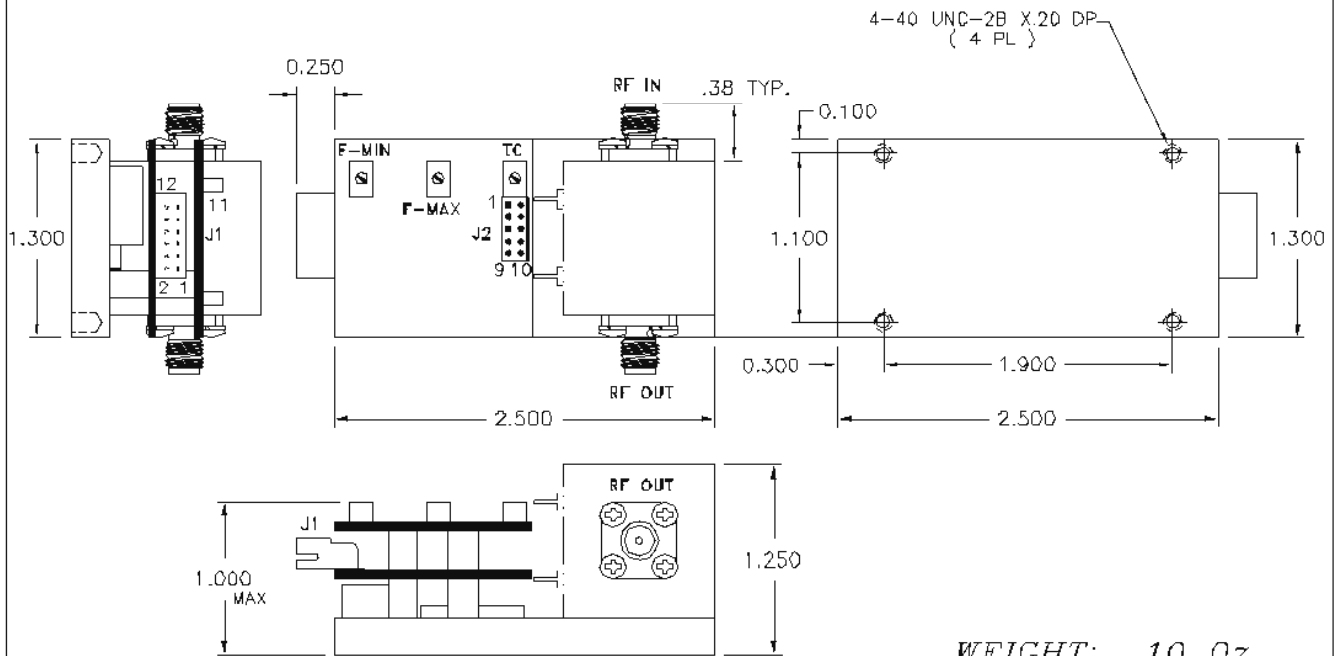## Bandpass Filters with Serial Drivers SD Series: 1" Cube Filter   (0º C to +65º C)

MODEL NUMBER	# Stages	Frequency GHz	3 dB Bandwidth (MHz)	Accuracy (MHz) *	Current +15V (mA)	Current -15V (mA)	Outline Drawing
MLFM-30520SD	3	0.5 to 2.0	15	+/- 7	150	50	21-064
MLFM-40540SD	4	0.5 to 4.0	15	+/- 10	250	50	21-064
MLFM-42008SD	4	2.0 to 8.0	30	+/- 13	450	50	21-064
MLFM-42018SD	4	2.0 to 18.0	40	+/- 13	1010	50	21-064
MLFM-46018SD	4	6.0 to 18.0	40	+/- 13	980	50	21-064

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

Dual Channel Bandpass Filters with Serial Drivers SD 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-40540SD	4	0.5 to 4.0	15	+/- 10	250	50	21-071
MLFD-42008SD	4	2.0 to 8.0	30	+/- 13	450	50	21-071
MLFD-42018SD	4	2.0 to 18.0	40	+/- 13	1010	50	21-071
MLFD-46018SD	4	6.0 to 18.0	40	+/- 13	980	50	21-071

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

4-40 UNC-2B X.20 DP
(4 PL)

RF IN
.38 TYP.
F-MIN   TC
F-MAX   1
            J2
            9 10

0.250
1.300
12 11
J1
2 1

0.100
1.100
1.300

RF OUT
2.500

0.300
1.900
2.500

J1
RF OUT

1.000 MAX
1.250

WEIGHT: 10 Oz

BOTTOM BOARD (DAC BOARD)
J1 (2MM DUAL ROW TERMINAL STRIP)

DIGIKEY PART # : H2065-ND
MATING WITH # : H2141-ND

PIN	FUNCTIONS	
1	CLOCK	
2	DATA	
3	CSELECTn	
4	GROUND	
5	-V SUPPLY	
6	+V SUPPLY	
7	HEATER 1	
8	HEATER 2	
9	FM +	(*)
10	FM -	(*)
11	N/C	
12	N/C	

NOTES:
1- (*) : NOT USED FOR FILTER
2- RECOMMENDED WIRE SIZE = 20-22 GAUGE

MICRO LAMBDA WIRELESS, INC.

1" FILTER W/ 1.3" 16 BIT SERIAL DIGITAL DRIVER

| SIZE | CAGE No ORN63 | DWG. NO. | 21 - 064 | REV. A |

.765

P1

1 2
11 12
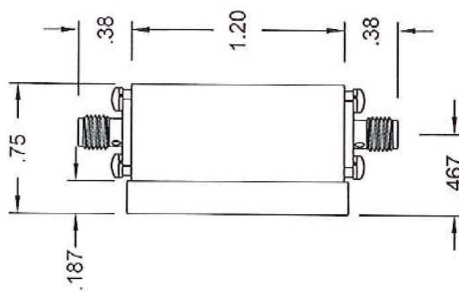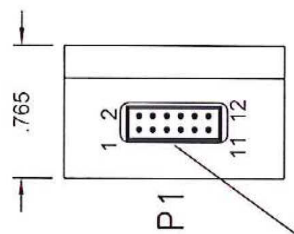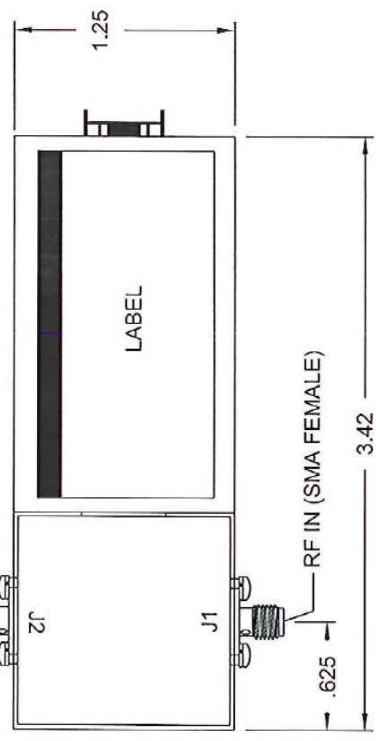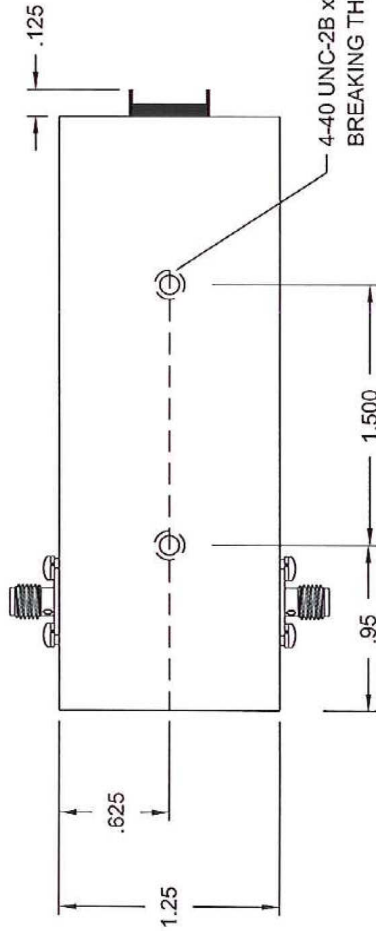
2MM DUAL ROW TERMINAL STRIP
DIGIKEY P/N: H10248-ND
HIROSE P/N: DF11-12DP-2DS(24)
MATING WITH: H10172-ND
HIROSE P/N: DF11-12DS-2DSA(05)

WEIGHT : 5 Oz [142 Gr.]MAX.

1.25

.125

RF OUT (SMA FEMALE)

LABEL

RF IN (SMA FEMALE)

3.42

J2

J1

.625

4-40 UNC-2B x MAX. DP W/O
BREAKING THRU (2 PLS)

1.500

.95

.625

1.25

.38

1.20

.38

.75

.467

.187

P1 - PIN CONNECTIONS

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

REV | DESCRIPTION | DATE | APPROVED

CONTRACT NO.

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

APPROVALS | DATE
DRAWN N.NGUYEN 2/24/12
ENGR DS 2/24/12
MANUF
Q.A.

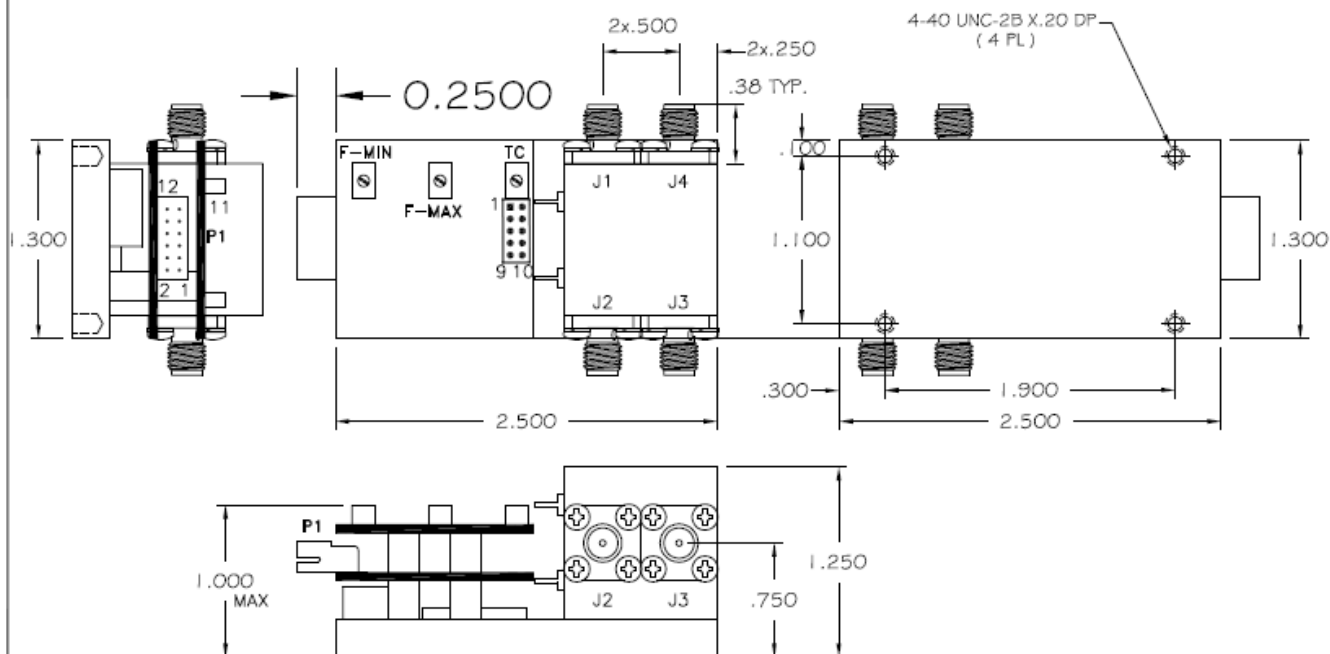MATERIAL

FINISH

DO NOT SCALE DRAWING

MICRO LAMBDA WIRELESS, INC.

1.2" MINI FILTER W/16 BIT SERIAL DRIVER

SIZE | CAGE ORN63 | DWG. NO. 21 - 123 | REV.

SCALE | SHEET

2x.500
2x.250
.38 TYP.
4-40 UNC-2B X.20 DP (4 PL)

0.2500

F-MIN
F-MAX
TC

12 11
P1
2 1

J1 J4
J2 J3

1
9 10

.100
1.100
.300
1.900

1.300
1.300
1.000 MAX

2.500
2.500

1.250
.750

P1

J2 J3

BOTTOM BOARD (DAC BOARD)
P1 (2MM DUAL ROW TERMINAL STRIP)

DIGIKEY PART # : H2065-ND
MATING WITH # : H2141-ND

CONNECTIONS

CONN.	TYPE	PIN#	FUNCTIONS
J1	SMA FEMALE	THD	RF IN
J2	SMA FEMALE	THD	RF OUT
J3	SMA FEMALE	THD	RF IN
J4	SMA FEMALE	THD	RF OUT

PIN	FUNCTIONS	
1	CLOCK	
2	DATA	
3	CSELECTn	
4	GROUND	
5	−V SUPPLY	
6	+V SUPPLY	
7	HEATER 1	
8	HEATER 2	
9	FM +	(*)
10	FM −	(*)
11	N/C	
12	N/C	

WEIGHT: 12 Oz

NOTES:

1− (*) : NOT USED FOR FILTER

2− RECOMMENDED WIRE SIZE = 20−22 GAUGE