RADITEK

YIG
Filters & Oscillators

FILTERS and oscillators based on yttrium-iron-garnet (YIG) tuning, are noted for their excellent linearity over broad frequency range, often, multi-octave, low phase noise and good image rejection. For that reason, YIG oscillators are often used in microwave instruments such as broad band swept oscillators, and YIG filters as pre-selectors in spectrum analyzers. Covering octave and multi octave tuning bandwidths between 500MHz and 50GHz

RADITEK is a leading supplier of both (YIG, Phased locked or, Synthesized etc) Oscillators and Filters.

The YIG product line brings these two product groups together under a common type of "resonator"-the **YIG sphere**. As with most of its other products, Raditek is not a "me-too" supplier. For example, the increase in filter bandwidth (200MHz bandwidth) at, and below 2GHz!

RADITEK has both an **analog** and a unique **12 bit programmable** driver option available for any of its **YIG Filters or Oscillator** products. The 12 bit driver is a sophisticated unit with microcontroller and look up tables to compensate the YIG over temperature, based on a 4 hour calibration process. For a given YIG device (oscillator or filter), the frequency can be stepped in 4095 steps between the lowest and highest frequency in its range. So, for example, a 2 to 6 GHz tuning range filter or oscillator would have around 1MHz step size per bit. All 0's would give 2GHz and all 1's would give 6GHz, in this case.

We have: Band pass, Band stop or band reject filters and low phase noise oscillators. Small, narrower band oscillators such as permanent magnet YIG oscillators, which reduce cost and size, whilst maintaining the excellent phase noise, are a good solution for low phase noise, telecommunications local oscillators, for example

Tracking Yig tuned filter/oscillator

■ ***Characteristics***

Output frequency is continuously adjustable with analog driver, over 1 to 18GHz, for example. Excellent for Spectrum analyzer front end/preselector etc.

■ ***Applications***

Used in microwave Spectrum analyzers, broad band radar receivers

These units have typical Image rejection of 70 dBc, Oscillator output is 10dBm, with -12dBc 2nd harmonic.

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YIG FILTERS & OSCILLATORS Overview

Other YIG products include: Miniature, permanent magnet- YIG-tuned oscillators covering 2 to 4 GHz, 4 to 6 GHz, 5 to 7 GHz, 6 to 8 GHz, and 8 to 10 GHz, etc., with better than -60 dBc spurious. The low power consumption allows continuously operation for over 6 hrs using a standard 9V dry cell battery. Makes an ideal Local oscillator for Point to point digital radios for in QPSK, 16QAM, 64QAM etc, to 40GHz, with up to 8GHz tuning range. Linear tuning up to 2 GHz, with extremely low phase noise; and FM phase-locking port.

RADITEK YIG TUNED BANDPASS FILTERS

STANDARD Bandpass Filter — **Ripple is 2dB, Operating Temperature: -20 to +60°C**

Frequency GHz	3dB MHz Bandwidth	Insertion loss dB	Isolation dB	Spurious dB	Tuning linearity ±MHz	Frequency LAG (Max.) MHz	Temp drift MHz
0.5-1	10	6	70	40	2	4	6
1-2	10	5	70	40	3	4	8
2-4	15	4	70	40	3	6	8
4-8	20	4	70	40	5	8	12
8-12	25	4	70	40	8	15	15
12-16	25	4	70	40	10	15	20
18-26.5	30	5	50	35	25	30	25
26.5-40	40	6	40	25	30	60	30

Multi-Octave Bandpass Filter — **Ripple is 2dB, Operating Temperature: -20 to +60°C**

Frequency GHz	3dB MHz Bandwidth	Insertion loss dB	Isolation dB	Spurious dB	Tuning linearity ±MHz	Frequency LAG (Max.) MHz	Temp drift MHz
0.5-2	10	6	70	40	2	4	8
2-8	20	5	70	40	6	8	8
8-18	20	4	70	40	10	15	20
1-18	20	8	70	40	20	25	20
2-18	20	6	70	40	20	25	20
2-26.5	20	8	70	40	30	30	25

Broad Bandwidth Bandpass Filter — **Ripple is 2.5dB, Operating Temperature: -20 to +60°C**

Frequency GHz	3dB MHz Bandwidth	Insertion loss dB	Isolation dB	Spurious dB	Tuning linearity ±MHz	Frequency LAG (Max.) MHz	Temp drift MHz
2-4	100	6	70	40	10	8	8
4-8	150	6	70	40	10	10	15
8-12.4	400	7	70	40	10	15	15
12-18	400	8	70	40	25	15	20
6-18	400	8	70	40	30	25	50

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YIG FILTERS & OSCILLATORS Overview

RADITEK YIG TUNED BANDPASS FILTERS

Miniature Bandpass Filter				Ripple is 2dB Operating Temperature: -20 to +60°C			
Frequency	3dB MHz	Insertion loss	Isolation	Spurious	Tuning linearity	Frequency LAG (Max.)	Temp drift
GHz	Bandwidth	dB	dB	dB	±MHz	MHz	MHz
1-2	10	5	70	40	3	4	8
2-4	15	4	70	40	3	6	10
2-8	18	4	70	40	8	10	15
4-8	20	4	70	40	5	8	15
Miniature HIGH selectivity Bandpass Filter				**Ripple is 2dB Operating Temperature: -20 to +60°C**			
Frequency	3dB MHz	Insertion loss	Isolation	Spurious	Tuning linearity	Frequency LAG (Max.)	Temp drift
GHz	Bandwidth	dB	dB	dB	±MHz	MHz	MHz
1-2	20	7	100	60	2	3	10
2-4	25	7	100	60	2	4	12
4-8	30	7	100	60	2	6	17
High Sweeping Bandpass Filter				**Ripple is 2dB Operating Temperature: -20 to +60°C Tuning/sweep speed: 80µs/GHz**			
Frequency	3dB MHz	Insertion loss	Isolation	Spurious	Tuning linearity	Frequency LAG (Max.)	Temp drift
GHz	Bandwidth	dB	dB	dB	±MHz	MHz	MHz
1-2	10	5	70	40	80	4	8
2-4	15	4	70	40	80	6	10
4-8	20	4	70	40	100	8	15
2-8	18	4	70	40	100	15	20

Response time of a 12bit or analog driver with the above product:
Filter 3 dB bandwidth is 15 to 400MHz, and <5dB Insertion loss typically
Size: 102 x 44 x 50 mm

Frequency GHz	Digital Response µs/GHz	Analog Response µs/GHz
1-2	200	100
2-4	300	120
4-8	500	150
2-8	800	200

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RADITEK YIG TUNED OSCILLATORS

STANDARD Octave Band
Model
RYTO

Main tuning coil sensitivity: 20MHz/mA
FM Coil tuning sensitivity: 300KHz/mA (for phase locking and modulation.)
Operating Temperature: -20 to +55°C
Spurious: -60dBc max

Frequency	Output Power	Power Flatness	Tuning Linearity	2nd Harmonic	Frequency LAG (Typ.)	Tuning Sensitivity	Power Supply
GHz	dBm	±dB (Max.)	%	dB	±MHz	MHz/mA	V
1-2	10	3	0.1	12	3	20	+15, -5
2-4	10	3	0.1	12	4	20	+15, -5
3-6	10	3	0.1	12	4	20	+15, -5
4-8	10	3	0.15	12	8	20	+15, -5
8-12	10	3	0.15	12	10	20	10
12-18	10	3	0.2	12	12	20	10

Ultra Wide Band Octave Band
Model
RYTO

Main tuning coil sensitivity: 20MHz/mA
FM Coil tuning sensitivity: 270-300KHz/mA (for phase locking and modulation.)
Operating Temperature: -10 to +55°C
Spurious: -60dBc max
Heater Voltage: 15-20V @ 25mA (300mA turn on surge)

Frequency	Output Power	Power Flatness	Tuning Linearity	2nd Harmonic	Frequency LAG (Typ.)	Tuning Sensitivity	Power Supply
GHz	dBm	±dB (Max.)	%	dB	±MHz	MHz/mA	V
2-8	10	3	0.2	12	3	20	+15 @200mA; -5@50mA
2-10	10	4	0.25	10	4	20	+15 @200mA; -5@50mA
4-18	10	5	0.3	10	4	20	+10@400mA*
2-18	8	3	0.3	10	8	20	+10@400mA*
2-20	6	3	0.3	10	10	20	+10@400mA*

***Includes TTL frequency band switching funtion.**

Miniature Permanent Magnet Band
Model
RPMYTO

Main tuning coil sensitivity: 20MHz/mA
FM Coil tuning sensitivity: 300KHz/mA (for phase locking and modulation.)
Operating Temperature: -20 to +55°C
Spurious: -60dBc max
Heater Voltage: 15-20V @ 25mA (300mA turn on surge)

Frequency	Output Power	Power Flatness	Tuning Linearity	2nd Harmonic	Phase Noise	Power Supply
GHz	dBm	±dB (Max.)	%	dB	dBc/Hz	V
2-4	10	2	0.2	12	-103	+12, -5
4-6	10	2	0.25	12	-103	+12, -5
5-7	10	2	0.3	12	-98	+12, -5
6-8	10	2	0.3	12	-95	+12, -5
8-10	10	2	0.3	12	-95	12

***Includes TTL frequency band switching function.**

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