DATA SHEET

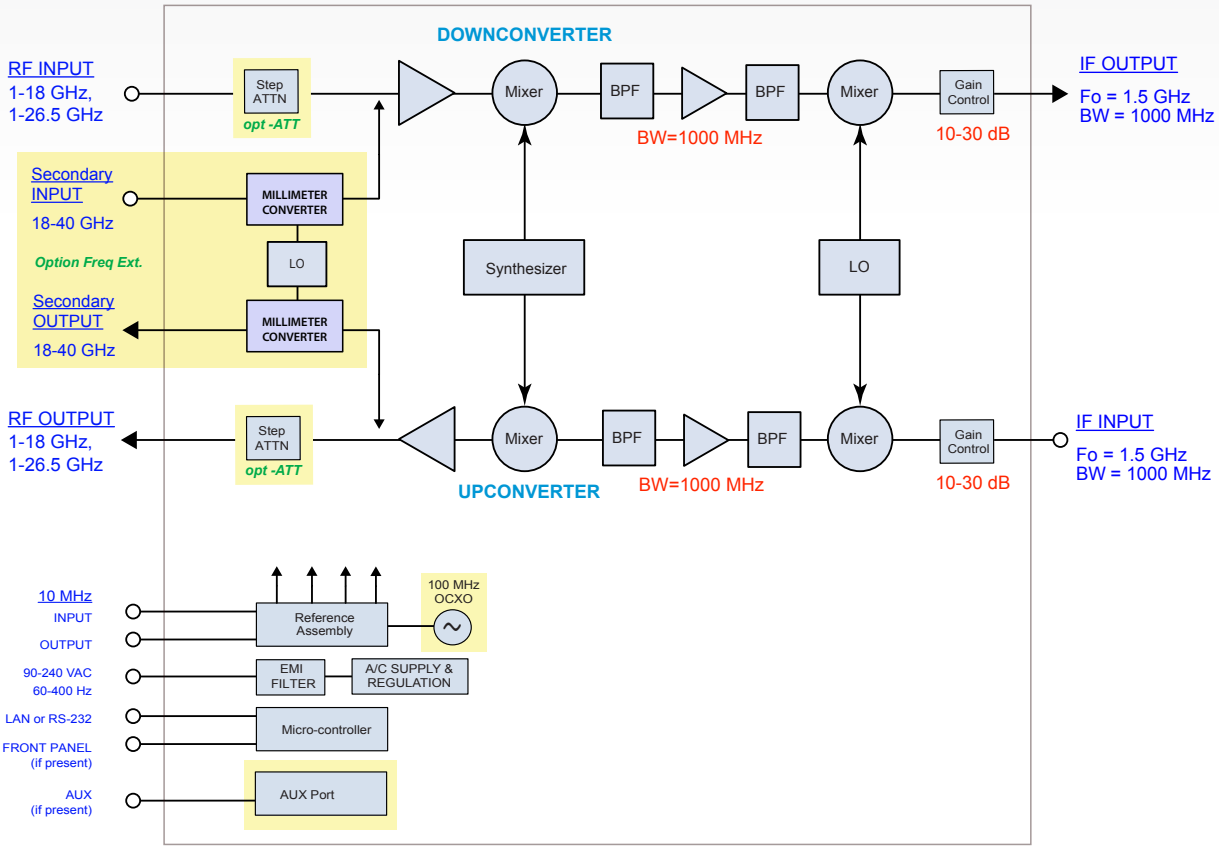
RFT-5100 Series Microwave Up/Downconverter

RFT-5174-C
RFT-5184-C
RFT-5194-C

The RFT-**5100** Series tuners are specialized frequency converters with phase coherent RF paths for upconversion and downconversion. Both converters utilize shared LOs which the phase coherent frequency conversion. The intermediate frequency (IF) and the instantaneous bandwidth (IBW) can be tailored to customer specification at the time of order. Remote access is available via ethernet and RS-232. The device can be controlled through either front panel controls or remotely using the Windows-GUI or SCPI commands. A single set of commands control both converters.

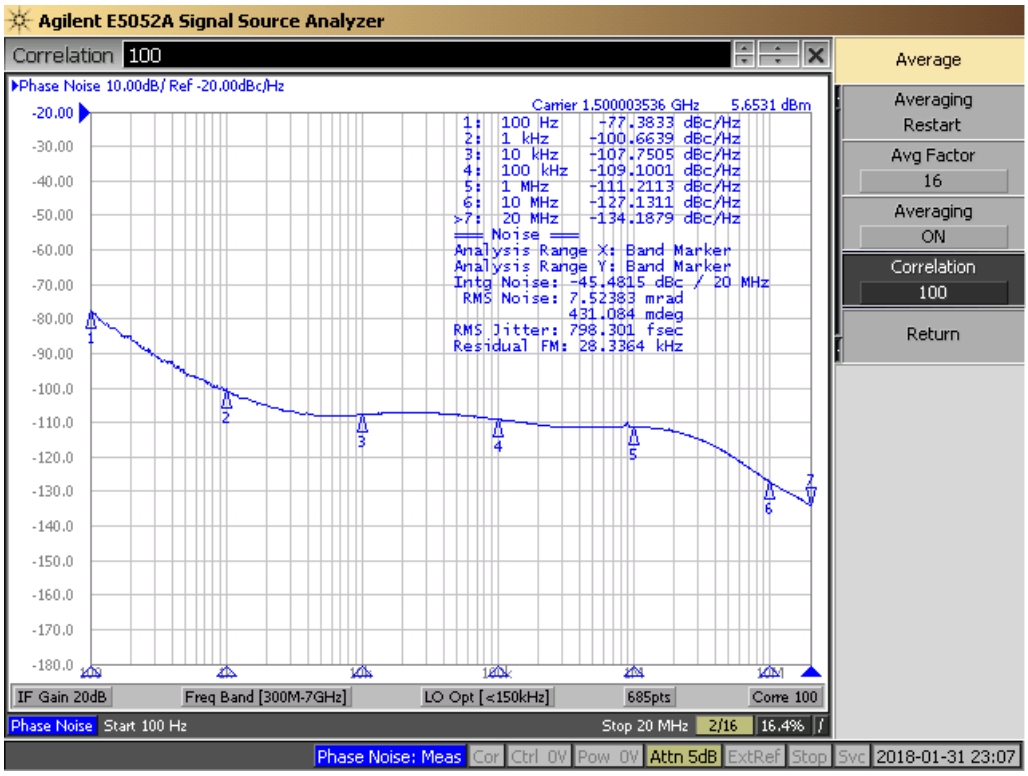
Models

RFT-5174: with 500 MHz IBW
RFT-5184: with 1000 MHz IBW
RFT-5194: with 2000 MHz IBW



Phase Noise Details

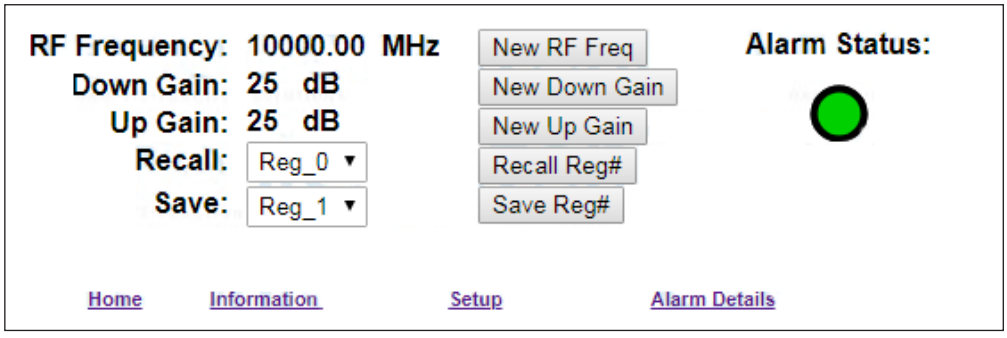
Mercury's standard microwave RFT Series frequency converters have excellent phase noise, as shown below. With option -LN, improvements by as much as 20 dBc/Hz can be obtained, as well as stability within 0.1 ppm.



Standard Phase Noise profile

GUI and SCPI-based Interfaces

All RFT-5100 series microwave converters have a complete SCPI-based command-set accessible over a choice of ethernet or serial ports. GUI solutions are browser-based and usable on Windows, Mac and Linux platforms.



Terminal Support

In addition to the browser-based GUI, each RFT is equipped with a serial port and can support terminal communications. SCPI-based commands are providing another human-readable user interface.

Downconverter Input Characteristics

Characteristic	Description
Input Tuning Range	**RFT-5174** 0.5-18 GHz, **RFT-5184** 1.0-18 GHz, **RFT-5194** 1.0-18 GHz
Tuning Resolution	10 kHz (finer resolutions available)
Tuning Speed	2 ms, typ
Input 1 dB Compression Point	-15 dBm, typ
Input iP3	-5 dBm typ
Input VSWR	2.5:1 (50 OHM), max
LO Re-radiation (23-40 GHz)	- 70 dBm, max
Max input level (no damage)	+20 dBm

Option: Input Millimeter Extensions

Provides a secondary input for millimeter inputs, used to extend the input frequency range up to 40 GHz.

Characteristic	Description
Input Frequency Range	**FXT-52** 18-26.5 GHz, **FXT-54** 18-40 GHz
Input Connector	2.92mm female
Spectral Sense	Inverting
Input P1 dB	-10 dBm, typ

Downconverter Output Characteristics

Characteristic	Description
Output Center Frequency, Fixed	**RFT-5174** 1.0 GHz, **RFT-5184** 1.5 GHz, **RFT-5194** 1.5 GHz
Output BW (3 dB)	**RFT-5174** 500 MHz, **RFT-5184** 1.0 GHz, **RFT-5194** 2.0 GHz
Spectral Sense	Non-Inverting
RF Gain Variation	+/- 2 dB, typ, across the input range
Gain	10-30 dB typ, in 1 dB steps
Linear Dynamic Range, P1 dB (1 MHz BW)	85 dB, typ
Output Compression at max gain	+10 dBm, min
Output Third Order Intercept, at max gain	+20 dBm, typ
Spurious, carrier related, at +10 dBm output, in band	<-70 dBc, typ
Spurious, internally generated (input referenced)	<-90 dBm, typ
SFDR, 3rd Order	>60 dB, typ
Image Rejection	60 dB min, 70 dB typ
Noise Figure, at max gain	12 dB typ, 17 dB max

Upconverter Input Characteristics

Characteristic	Description
Frequency, Fixed	**RFT-5174** 1.0 GHz, **RFT-5184** 1.5 GHz, **RFT-5194** 1.5 GHz
Instantaneous BW (3 dB)	**RFT-5174** 500 MHz, **RFT-5184** 1.0 GHz, **RFT-5194** 2.0 GHz
VSWR (in band)	2.0:1 max (50 ohm)
RF Connectors	SMA-F
Input level	up to -10 dBm

Option: Output Millimeter Extensions

This option extends the output range of the RFT. The FXT is brought out on a second RF connector and the RF output becomes active when the output frequency enters the relevant range of the option.

Characteristic	Description
Additional Output Frequency	**FXT-52** 18-26.5 GHz, **FXT-54** 18-40 GHz
Output Connector	2.9mm
Conversion sense	inverted
Gain @ 25 C, at minimum attenuation	30 dB typical, 25 dB min
Gain Adjustment range (same as 1-18 GHz path)	20 dB min, 1 dB steps
1 dB Compression Point, at max gain	+10 dBm typ, +7 min

Upconverter Output Characteristics

Characteristic	Description
Tuning Range	**RFT-5174** 0.5-18 GHz, **RFT-5184** 1-18 GHz, **RFT-5194** 1.5-18 GHz
Tuning Resolution	10 kHz (finer resolutions available)
Tuning Speed	2 ms, typ
Spectral Sense	Non-Inverting
IF to RF Gain	10-30 dB, typ, in 1 dB steps
RF Gain Variation	+/-2 dB typ, across output frequency range
Linear Dynamic Range, P1 dB, (1 MHz BW)	85 dB, typ
3rd Order Dynamic Range (1 MHz BW)	>60 dB, typ
1 dB Compression Point	+10 dBm, typ +7 dBm min
Spurious	>-50 dBm, typ
Harmonics	-25 dBc typ at 0 dBm output
VSWR	2.5:1 (50 OHM), max
Connector	SMA-F

Reference and Local Oscillators

The LO system includes an internal reference that is used for all phase-locked and synthesized sources. The system is auto-sensing and will become phase locked to an external reference if one is detected.

	Standard configuration	Option -LN (Low Noise)
Reference Select	Auto-select. Locks to external if present	
Aging, Internal Reference	<2 ppm/yr	<1 ppm/yr
Internal Reference Stability	<+/- 0.5 ppm	<+/- 0.1ppm
External Reference	10 MHz @ 0 dBm +/- 6 dB	
Lock-in Range of External Reference	+/- 3 ppm	+/- 0.5 ppm
Reference Connectors	BNC, Female (input and output)	
Reference Output	10 MHz @ 0 dBm, min, locked to ref in use	
Phase noise, typ (10 GHz input), at 100 Hz offset	-76 dBc/Hz	-90 dBc/Hz
at 1 kHz offset	-100 dBc/Hz	-105 dBc/Hz
at 10 kHz offset	-107 dBc/Hz	-107 dBc/Hz
at 100 kHz offset	-109 dBc/Hz	-111 dBc/Hz
at 1 MHz offset	-111 dBc/Hz	
at 10 MHz offset	-127 dBc/Hz	
System Phase Noise	0.5 deg RMS, typ (100 Hz to 10 MHz)	0.4 deg RMS, typ

General Characteristics

	Rack Mount or Desktop	Option - XTR (Ruggedized/ATR)
Operating Temperature	0-50 deg C	-30 to +55 deg C
Storage Temperature		–54° C to +71° C per MIL-STD-810E, Method 501.4 & 502.4, Procedure I
Humidity		Up to 95% non-condensing
Altitude		0 to 10,000 ft
Shock		Per MIL-STD-810E, Method 516.4, Procedure 1, functional test profile for flight equipment, with peak shock level of 20 G's.
Vibration		MIL-STD-810E Method 514.4, Categories 1, 2, 6, and 8
EMI		Designed to MIL-STD-461F, surface ship limits, below decks. Tested to CE102

Ordering Information

Model	Name	Features
RFT-5174-C	Base Unit, 500 MHz BW	Tuner, 0.5 to 18 GHz
RFT-5184-C	Base Unit, 1000 MHz BW	Tuner, 1.0 to 18 GHz
RFT-5194-C	Base Unit, 2000 MHz BW	Tuner, 1.5 to 18 GHz
Options: Frequency Extensions		
FXT-52-C	Frequency Extensions	Extends Microwave to 26.5 GHz
FXT-54-C		Extends Microwave to 40.0 GHz
FXT-50-C		Extends IF down to 100 MHz
Other Factory Options		
-LN	Improves Phase Noise	Up to 20 dB improvement in near-in phase noise, and increases stability to 0.1ppm
-ATT	Optional RF Step attenuator	Adds RF Step attenuator (30 dB range, in 1 dB steps) to Dowconverter RF Input and/or Upconverter RF Output

Need More Help? Need a Variant of This Product?

Contact Mercury's RF & Microwave engineering team at **rf.microwave@mrcy.com** or visit **www.mrcy.com/rf** for a detailed listing of RF and Microwave products.

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