DATA SHEET

RFT-4200 Series Microwave Upconverter with AGILE IF

RFT-4280: BW's up to 1000 MHz
RFT-4290: BW's up to 2000 MHz

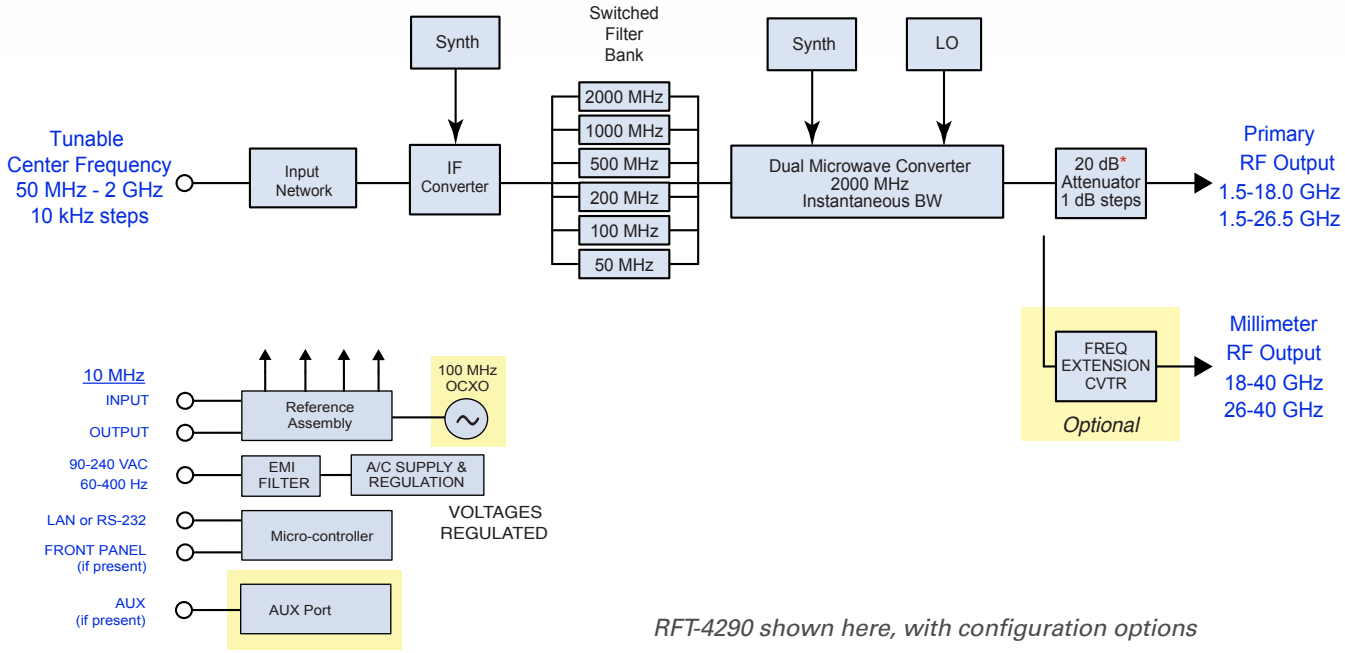
Agile IF means the user has the freedom to upconvert from any IF input frequency. So, whether starting from an Arbitrary Waveform Generator (AWG), a DAC, or any other source, never be locked into a single IF Frequency choice again. The RFT-4200 will upconverter your signal and provide an output up to 40 GHz

1 **Start from any input frequency from 50 to 2000 MHz**

2 **Tune to any output frequency up to 40 GHz**

3 **Select bandwidth from 50 MHz to 2 GHz**

Tunable Output Range	Tune to frequencies up to 18, 26.5 and 40 GHz; Select BW to suit, from 50 to 2000 MHz
Input Range	Tunable, 50 to 2000 MHz in 10kHz steps
Phase Noise	<0.5 deg RMS
Interface	SCPI-Based Command-set and GUI



RFT-4290 shown here, with configuration options

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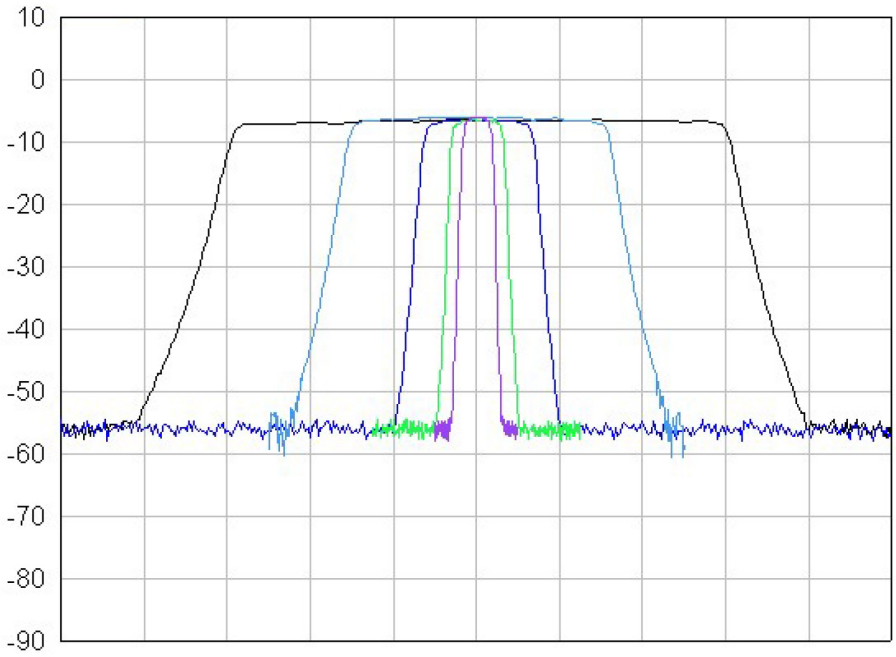
Bandwidth Choices

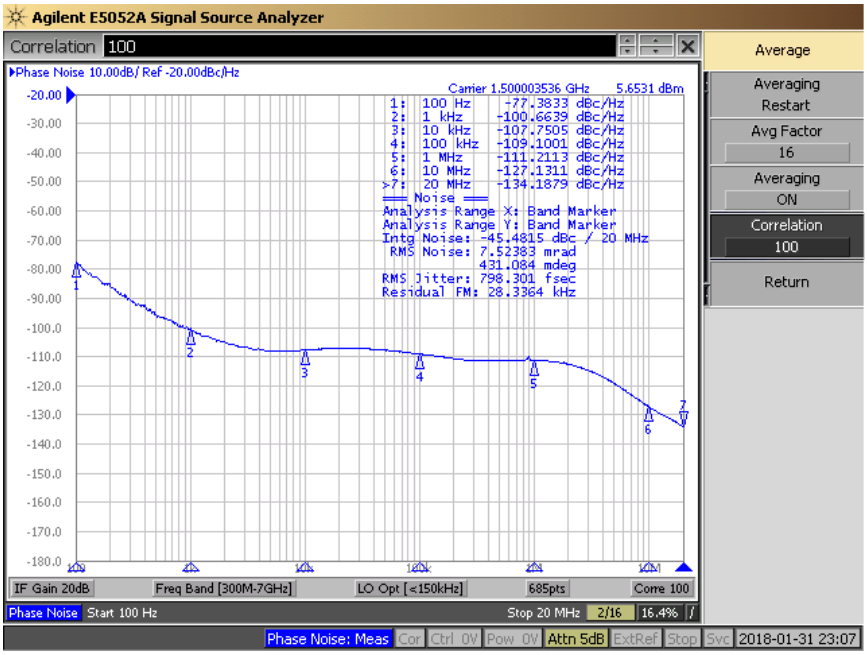
Models	Bandwidths
Model RFT-4280	1000, 500, 200, 100 and 50 MHz
Model RFT-4290	2000, 1000, 500, 200, 100 and 50 MHz



Shown with BW's of 1000, 500, 200, 100 and 50 MHz

Outstanding Phase Noise

Our 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.

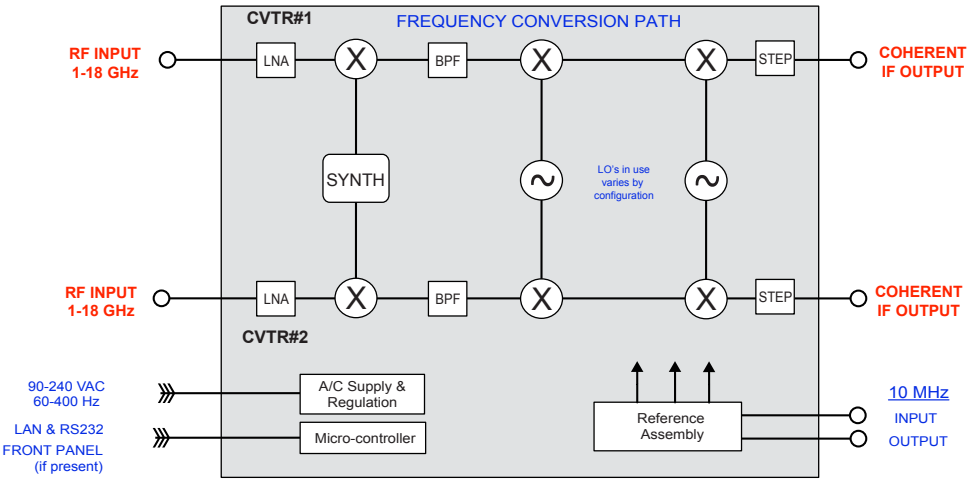


Standard Phase Noise profile

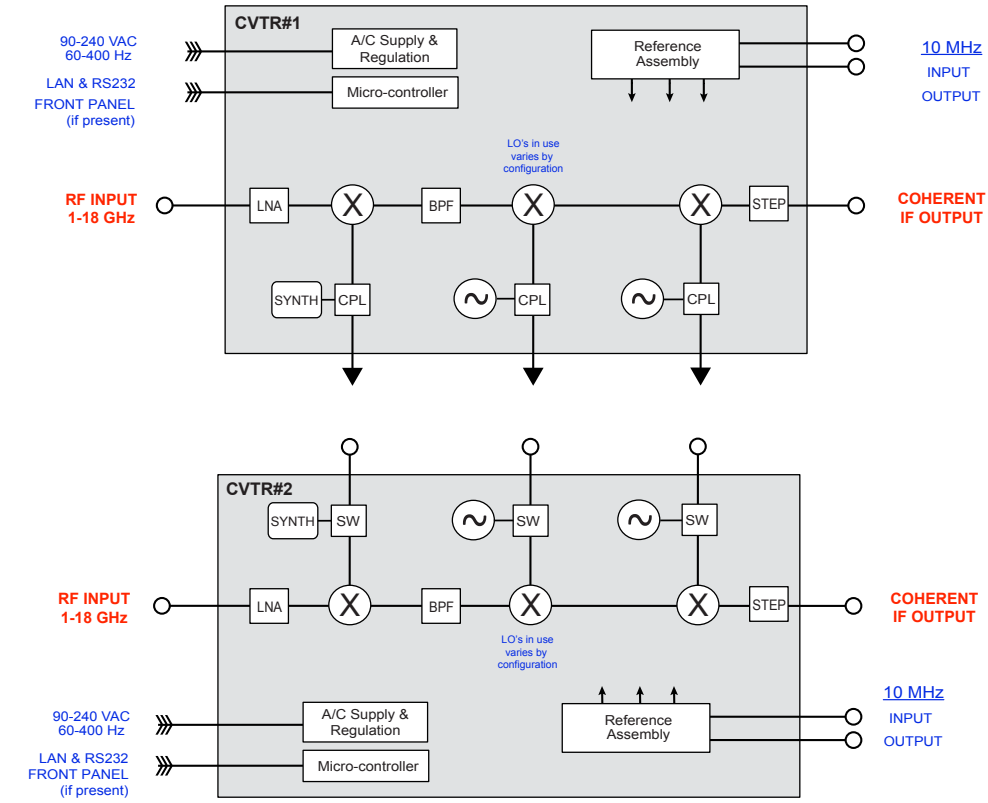
Phase Coherent

Our Microwave RFT-Series Frequency converters are available in a variety of phase-coherent configurations, supports such modes as “shared LO” and “Master/Slave”. The phase coherent converters can also be configured for stand-alone or coherent operation, so as needs shift the equipment continues to meet user’s needs.

“All-in-One” Configuration

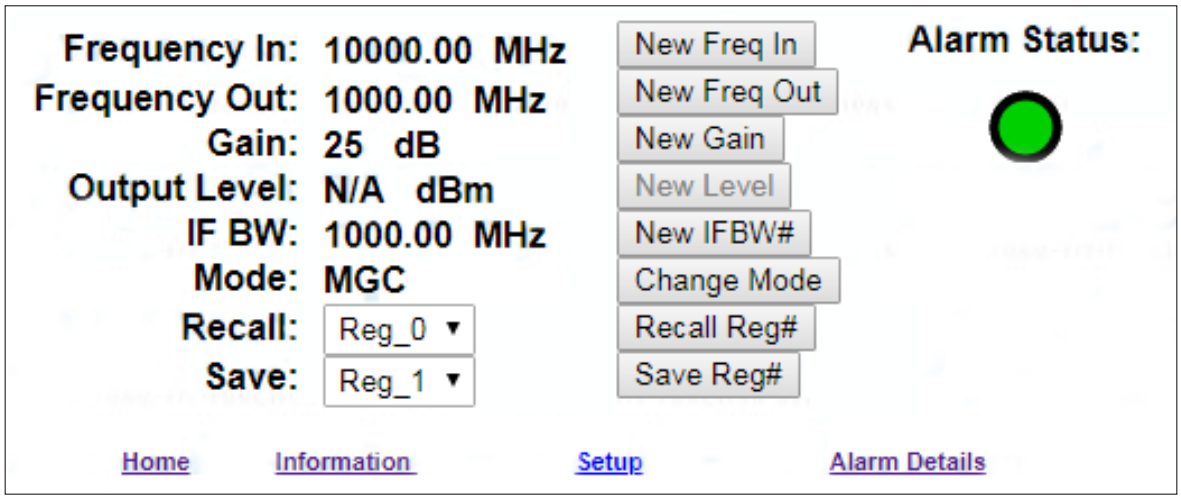


“Master/Slave” Configuration



GUI and SCPI-based Interfaces

All RFT-3200 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 send and received, providing another human-readable user interface.

Housing Options

Rack Mount Version

Benchtop Version

Ruggedized RFT

RF Output Details

Upconverter Output Characteristics

The RFT-4200 Upconverters have a standard output Frequency range starting at 1 GHz (1.5 GHz FOR RFT-4290). The Primary output range can also be extended up to 26.5 GHz with option FXT-003

Characteristics	Description
Input Tuning Range	RFT-4280: 1.0-18 GHz; RFT-4290: 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

Millimeter Output Extension

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.

Characteristics	Description
Additional Output Frequency	FXT-003 18-26.5 GHz, FXT-004 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

IF Input Specifications

Input Characteristics

The IF Input of the RFT-4200 employs a unique approach. The input frequency is tunable, enabling changes from application to application.

Characteristic	Description
IF Input Frequency Range	50 to 2000 MHz
IF Input Tuning Resolution	10 kHz
VSWR (in band)	2.0:1 max (50 ohm)
RF Connector	SMA-F
Input level	up to -10 dBm

Bandwidths

User-selectable bandwidths are another unique feature of the RFT-4200, offering the variety of throughput range to support ever-changing requirements and set-up configurations. This table shows the bandwidth choices available as well as the correspondent minimum recommended IF Output center frequencies.

Bandwidth Selection	Minimum recommended IF input center frequency
50 MHz	50 MHz
100 MHz	70 MHz
200 MHz	120 MHz
500 MHz	270 MHz
1000 MHz	520 MHz
2000 MHz	1020 MHz (RFT-4290 only)

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	Changes with option -LN
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	-96 dBc/Hz
at 1 kHz offset	-100 dBc/Hz	-108 dBc/Hz
at 10 kHz offset	-107 dBc/Hz	-110 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

Characteristic	Description
Operating Temperature	0-50 deg C ambient
Humidity	Up to 95% non-condensing
Power Requirement	90-240VAC, 60-400 Hz; 35 Watts typ (1-18 GHz), 50 Watts (1-40 GHz)
Size, inches	EIA 19" 1RU Chassis: 24" deep max; Benchtop: 1/2 Rack, 2RU
IP Parameters	Set IP Mode (DHCP or Static IP) Set IP Address, Gateway, Subnet Mask Read MAC Address
Remote Access	Ethernet & RS-232
Remote Control	SCPI-type commandset and Browser-based GUI

Ordering Information

Model	Name	Features
RFT-4280	Base Unit, 1000 MHz max BW	Tuner, 1.0 to 18 GHz
RFT-4290	Base Unit, 2000 MHz max BW	Tuner, 1.5 to 18 GHz
(Options: Input Extensions)		
FXT-001	For Primary or Second. Input	Extends output to 26.5 GHz
FXT-002		Extends output to 40.0 GHz
FXT-005		Extends input down to 100 MHz
(Other Factory Options)		
-XTR	Ruggedized version, in 1/2 ATR	Increases temperature range and adds specs for shock, vibe and other harsh service conditions
-LN	Improves Phase Noise	Up to 20 dB improvement in near-in phase noise, and increases stability to 0.1ppm
-ATT	Adds Output attenuator	Up to 70 dB of output attenuation. Can be added to Primary or Secondary inputs, or both
-MS	Master/Slave Option	Adds internal components to enable the converter to be used either as an independent, stand-alone converter, or paired into a Master/Slave configuration, in which the Master controls the Slave, and LOs and Reference from the Master are shared with the Slave.
-2U	Benchtop Chassis	Utilizes Mercury's 2U High, 1/2 Rack Chassis

Need a matching Downconverter

Our RFT-3200 Series Downconverters match the RFT-4200 Series Downconverters with

- Input/Output frequencies
- Bandwidths
- Common command-sets.

Under the Hood

At the heart of every tuner and downconverter you'll find our world-class microwave synthesizer, the DS-3000.

- Tunes to 20 GHz
- Steps in 1 Hz
- Switches as fast as 200 uSec
- Offers extremely low phase noise, with <-116 dBc/Hz at 10 kHz when tuned to 10 GHz

8011.00E-0719-ds-RFT-4200

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