

# thinkRF™ D4000

## RF Downconverter/Tuner



## Extend your existing RF test equipment to 40 GHz



### COMPACT & LIGHT DESIGN

Smaller than a notebook!  
19.3 cm x 19.3 cm x 4.1cm  
(7.6" x 7.6" x 1.6")  
1.7 kg (3.7 lbs)



### SINGLE IF OUTPUT

Easy integration with  
Spectrum Analyzers or  
Receivers.



### BUILT-IN LOCAL OSCILLATORS

No need for external  
synthesizers.



## OVERVIEW

### D4000 RF Downconverter/Tuner

Small, powerful and cost-effective downconverter / tuner for the next generation RF environment

1

24-40 GHz RF In

2

1.536 GHz to the  
Spectrum Analyzer

3

100 kHz tuning resolution

4

20 W @ 12V input power  
consumption

5

Optional 10 MHz  
clock synchronization

6

Control from the Spectrum  
Analyzer or from a computer



## Portable, High Performance, 5G Ready

Today's high-band signal standards are using higher frequencies and wider bandwidths than ever before. The thinkRF™ D4000 RF Downconverter /Tuner extends existing RF test equipment to 40 GHz to meet these new wireless standards. This portable, high performance, and plug-and-play platform based on thinkRF tuner technology enables purpose-built, 5G-ready

solutions and is the industry's first 40 GHz RF Downconverter/Tuner. Mobile operators and system integrators can retain existing field, lab, and manufacturing test equipment, extend the life of their investment, and reduce time to market and costs when measuring 5G signals in a variety of deployment scenarios and applications.

# CAPABILITIES

## D4000 RF Downconverter/Tuner

### 1 COMPACT FORM FACTOR

Smaller than a notebook! Measuring 19.3 cm x 19.3 cm x 4.1cm (7.6" x 7.6" x 1.6") and weighing 1.7 kg (3.7 lbs), the D4000 RF Downconverter/Tuner features a compact design that makes it portable, versatile, and easy to use for 5G analysis in any deployment scenario without adding significant size, weight, and power (SWaP) requirements.



### 2 OPEN PLATFORM

The D4000 works with third-party test equipment, RF Spectrum Analyzers, Software-Defined Radios and interfaces. The open platform works seamlessly with current spectrum analysis solutions through standard SCPI control over Ethernet, allowing control of the unit through the spectrum analyzer or any standard PC.



### 3 STANDARD CONFIGURATION INTERFACE

The D4000 supports open APIs for C/C++ and Python, and standard configuration protocols via SCPI commands over a Telnet connection, or configuration via spectrum analyzer software over a LAN connection.



### 4 MULTI-UNIT SYNCHRONIZATION CAPABILITY

The D4000 includes 10 MHz input and output clock references to support clock synchronization with external modules. This allows the ability to run multiple units in parallel to coordinate a compound signal monitoring system, particularly for wideband signal monitoring and capture.



# KEY FEATURES

## D4000 RF Downconverter/Tuner

### 1 WIDE BAND

The D4000 has 500 MHz of Analog Bandwidth - the widest on the market in this compact form factor. This is important because the maximum channel bandwidth for 5G is 400 MHz.

### 2 FREQUENCY COVERAGE

This covers the entire mm-Wave frequency range for 5G FR2 from 24 to 40 GHz.

### 3 PRE-SELECT FILTERING

The sophisticated RF filter technology of D4000 eliminates out-of-band signals and enables spurious mitigation. Without filtering these can result in interference within the analysis bands.

### 4 SINGLE IF OUTPUT

This makes it easier to integrate with Spectrum Analyzers or Receivers.

### 5 CALIBRATED OUTPUT

The output IF signal is accurate to within a small range of the input signal so there's no need to account for gains or losses in the signal chain and this makes integration simpler.

### 6 BUILT-IN LOCAL OSCILLATORS

This eliminates the requirement for external synthesizers.

### 7 EXTENSIBLE

The D4000 can be extended to cover lower 5G FR1 bands using other complementary ThinkRF receiver products.



# RF Specifications

Frequency		
<b>Frequency Range</b>		
RF In	24 to 40 GHz	
IF Out	1.536 GHz	
<b>Real-Time Bandwidth (RTBW)</b>	500 MHz	
<b>Tuning Resolution</b>	100 kHz	
<b>Amplitude Accuracy @ IF Output</b>	± 1.2 dB	
<b>Amplitude Flatness</b>	TBD	
<b>Max. Safe RF Input Level</b>	+ 10 dBm, 10Vdc	
<b>Max. RF Input Operating Level</b>	+10 dBm	
<b>Noise Figure</b>		
Normal Mode	34 dB (estimate)	
Pre-Amp On	24 dB (estimate)	
Bypass Mode	20 dB (estimate)	
<b>Phase Noise (@ 35 GHz)</b>		
1 kHz	-83 dBc/Hz (estimate)	
10 kHz	-93 dBc/Hz (estimate)	
100 kHz	-96 dBc/Hz (estimate)	
1MHz	-99 dBc/Hz (estimate)	
<b>Third Order Intercept (TOI)</b>	+10 dBm -10 dBm	@Pre-amp OFF @Pre-amp ON
<b>Image Rejection</b>	60 dBc	@-25 dBm RF input
<b>Spurious performance</b>		
Non-Input related (Residual)	-90 dBm max.	
Spurious Free Dynamic Range (SFDR)	70 dBc min	@ - 30 dBm RF input
<b>10 MHz Reference</b>		
Output Level	+5 dBm min.	
Initial Tolerance	± 1.5 ppm @ 25°C	
Stability over temp	± 0.2 ppm (0 °C to 50 °C)	
Aging	± 0.5ppm/year	

# General Specifications

Connectors	
RF In	2.92mm female 50 Ω
IF Out	SMA female, 50 Ω
10 MHz Reference In and Out	SMA female, 50 Ω
10/100/1000 Ethernet	RJ45
Power	LEMO connector, 4 pin
Aux. GPIO	D-type, Female 15 pin

## General Specifications

### Status Indicators

PLL Lock / 10 MHz reference clock status

Ethernet Link and Activity Status

CPU and Power Status

### Power

Physical Power Supply      Use AC Wall Power Adaptor      Input AC 120V-240V/+12V  
provided      Output

Power Consumption      20 W @ 12V input

### Physical

Operating Temperature Range      -10°C to +55°C

Storage Temperature Range      -51°C to +71°C

Size (W x L x H)      193 x 193 x 41 mm      Approximately (including  
(7.6 x 7.6 x 1.6 inches)      connectors)

Weight      1.7 kg (3.7 lbs.)      Approximately

### Regulatory Compliance

RoHS Compliance      RoHS/RoHS 2 (European  
Union)

REACH      Per Regulation (EC) No  
1907/2006 of the  
European Parliament

Marks      CE, CSA, FCC

EMC Directive      EN 61326-1:2013, FCC      Electromagnetic Compatibility  
PT15 & IEC-003

Low Voltage Directive      IEC/EN 61010-1, CSA/UL      Safety  
61010-1

## Software Specifications

### APIs and Protocols

Standard SCPI      Control over Ethernet

## Ordering Information

### Base Units

24 to 40 GHz RF Downconverter/Tuner

### Part Number

D4000

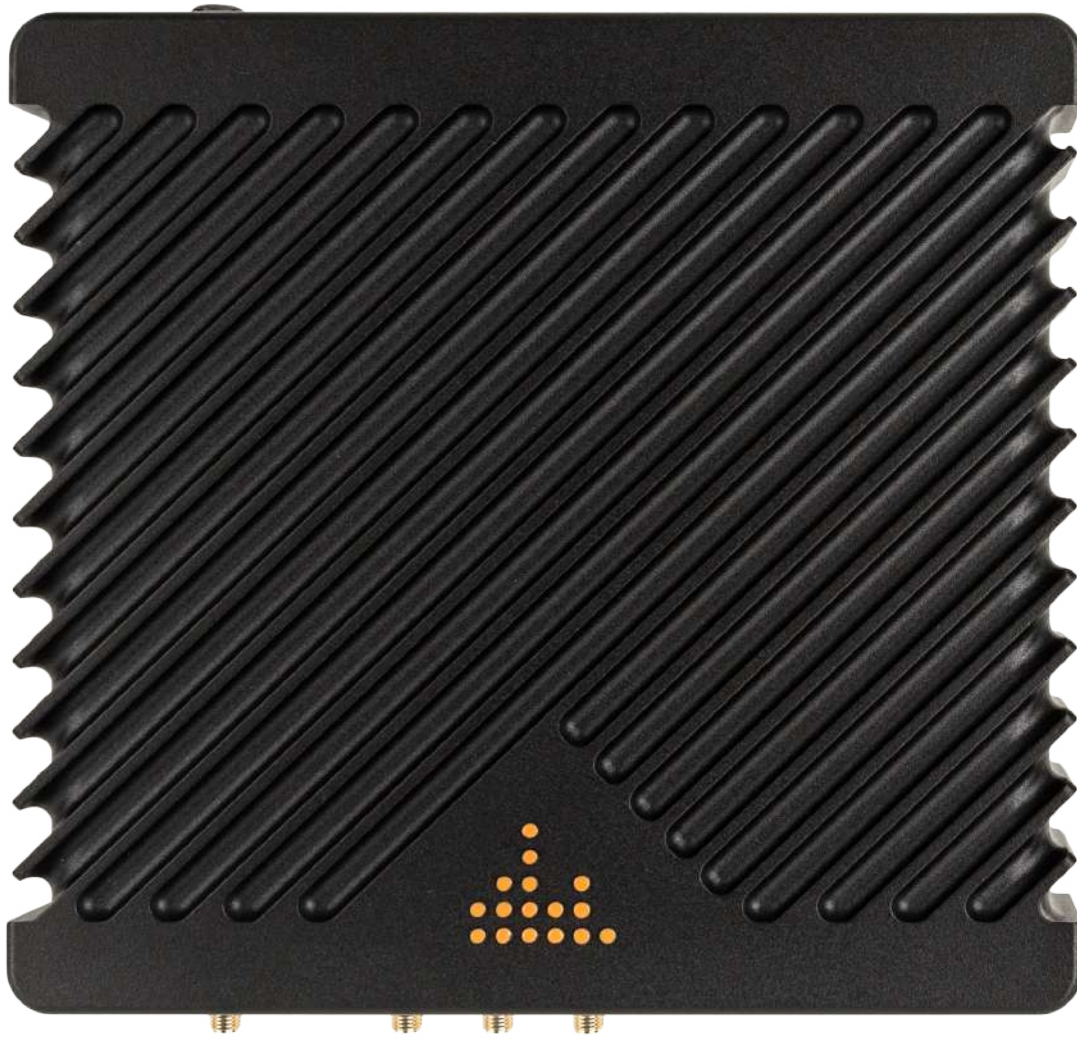
### Description

24 - 40 GHz RF Downconverter/Tuner

CONTACT US TODAY  
FOR A FREE DEMO!

# thinkRF™ D4000

## RF Downconverter/Tuner



[sales@thinkrf.com](mailto:sales@thinkrf.com)

+1-613-369-5104

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The thinkRF D4000 product line are protected by patents, (US8,675,781, US9,197,260, US9,350,404, US8,886,794) in the United States. This information is provided to satisfy the patent marking provisions including, but not limited to, the patent marking provisions of the America Invents Act (AIA) and is intended to serve as notice under 35 U.S.C. § 287(a), as amended by Section 16 of the AIA. Additional patents may be pending in the United States and/or elsewhere.

**thinkRF™**  
monitor. detect. analyze.

74-0102-200212