

NDR504

SMALL 40 GHz 4 CHANNEL COTS DOWNCONVERTER

ENABLING EASY SYSTEM EXTENSIONS

The increasing number of signals of interest above 18 GHz, including mmWave 5G and beyond, has made it ever more critical to extend the frequency coverage of intercept systems. Historically, this has been achieved using in-house designed, exquisite custom assemblies. The NDR504 breaks this paradigm with an off-the-shelf standard product that can be widely deployed in existing and new systems.

Allowing access to 40GHz in a low SWaP form factor, the NDR504 provides flexibility for installation near any antenna aperture: on the ground, on UxS, and in airborne environments. For applications where the highest precision is required, the unit features delay-matching between channels, and a test upconverter channel designed to feed a precisely-known signal to all four downconverters simultaneously for on-mission system calibration.

The NDR504 is a four channel 18 to 40 GHz downconverter with IF outputs below 18 GHz. Each downconverter channel has a 2-band sub-octave pre-selector at the input stage covering the 18 to 26.5 GHz and 26.5 to 40 GHz frequency bands. The unit includes an integrated LO that tunes to 28.8 GHz and 43.2 GHz to downconvert the two input bands to an IF below 18 GHz.

The LO is generated, split four ways and provided to all 4 channels resulting in 4 channel phase coherent operation. The IF output is designed to be connected to the input of an 18 GHz receiver.

The NDR504 also accepts a test signal source input with a tuning range up to 18 GHz and upconverts the test signal source to the 18 to 40 GHz range.

The unit is powered by a +12 VDC external power input and control is via RS-232 over USB or via 1-bit switch control. It is packaged in 4.8" x 5.7" x 1.6" sized housing and constructed of a rugged aluminum chassis that provides RF shielding, thermal management, and protection suitable for harsh environments.

The 40 GHz downconverter can be deployed to **extend new and existing systems from any manufacturer**. However, **Epiq Solutions** offers numerous COTS 18 GHz products, in various form factors, that are well suited to the final downconversion, digitization and signal



KEY FEATURES

- Designed to Fly
- Commercial Off-the-Shelf (COTS)
- Proven heritage of products on Programs of Record

RF Highlights

- 4 channel 18–40 GHz downconverter
- Each channel independently selects 18–26.5 or 26.5–40 GHz to downconvert
- Accurately phase-aligned channels
 - Ideal for independent search, phase coherent DF, other combinations
- Dedicated test channel allows an external test signal to be upconverted to feed each converter for on-mission calibration

SWaP Highlights

- Size: 4.8 x 5.7 x 1.6"
- Weight: 2.5 lb.
- Power: +12 VDC, 45 W

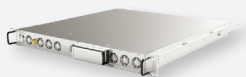
processing of signals of interest. The NDR504 enables Epiq to provide complete radio solutions from HF to 40 GHz, processed all the way through to useful digital output. The following pages illustrate some common use cases and platform deployment examples. [Contact us](#) for more information, or visit [our website](#).

COMPATIBLE PRODUCTS

The **NDR504** is designed to be compatible with a wide range of downstream SDRs and tuners from across the industry. Below are some examples of 18 GHz-enabled multi-channel Epiq products that make ideal system partners.

Airborne

19" Rack-based high performance



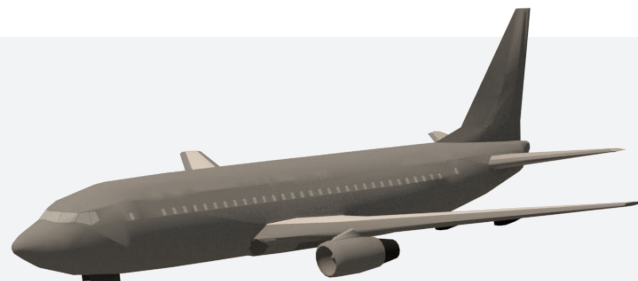
NDR562 Tuner

- 20 GHz
- 4 channel
- 500 MHz IBW



NDR551 Tuner

- 18 GHz
- 4 channel
- 80 MHz IBW



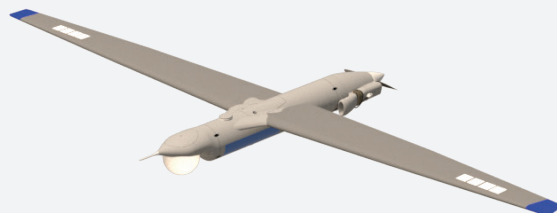
UAS

Small form-factor, ultra-low SWaP;
Mod Payload etc.



MATCHSTIQ™ X40 SDR

- 18 GHz
- 4 channel,
- 450 MHz IBW
- GPU-enabled



Land Vehicle

3U VPX, modular compliant solutions



NDR585 Tuner

- 3U VPX
- 18 GHz
- 4 channel
- 500 MHz IBW



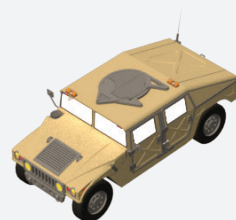
SIDEKIQ™ VPX410 Tuner

- 3U VPX
- 18 GHz
- 4 channel
- 1 GHz IBW

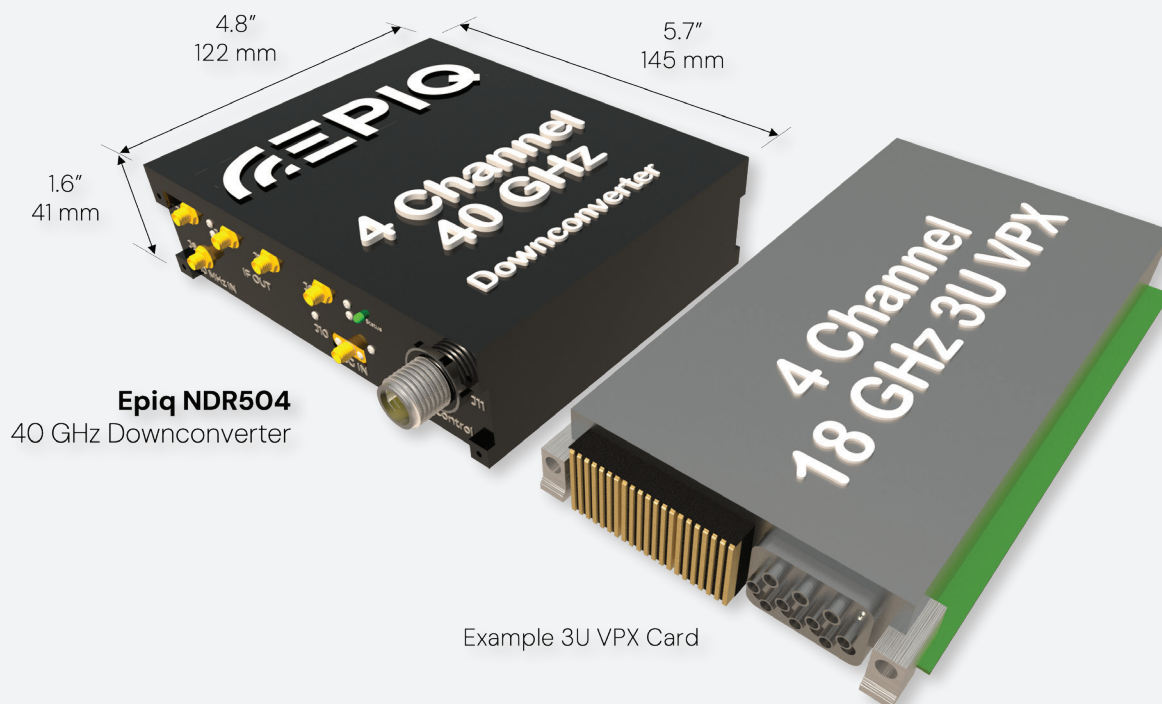


NDR664 SDR

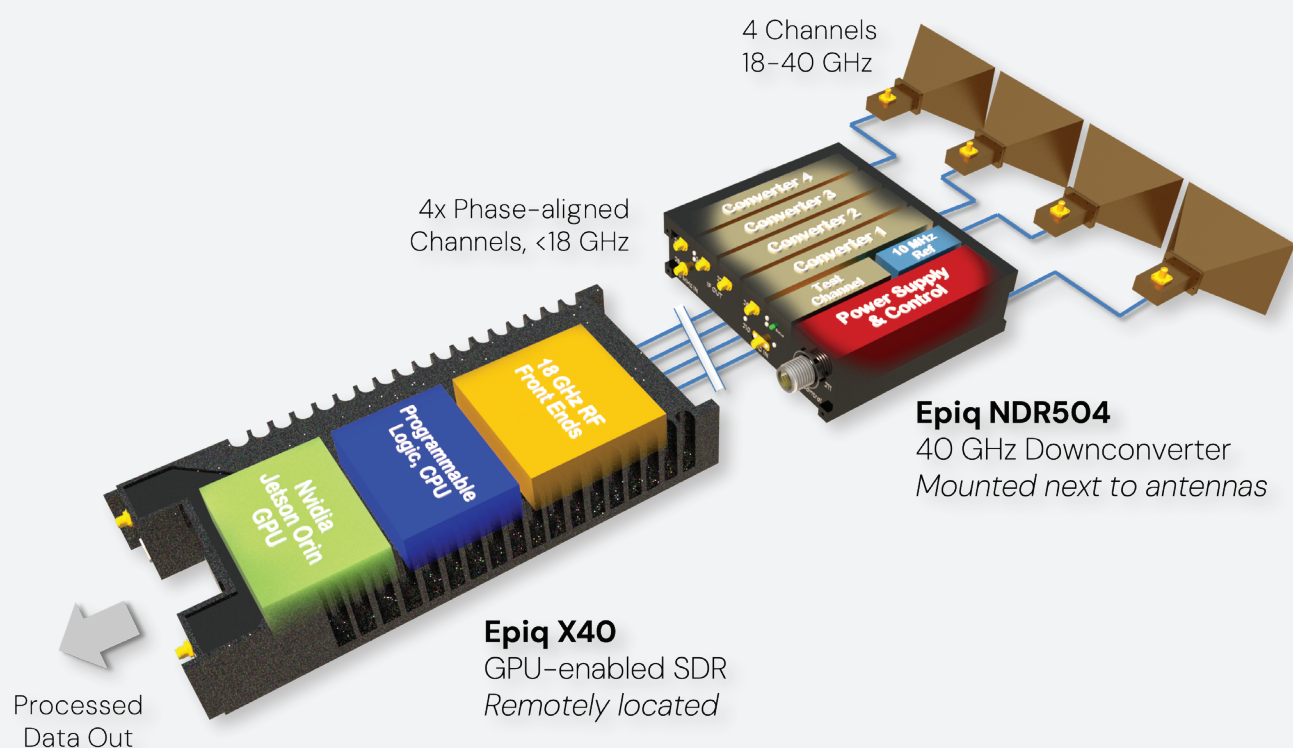
- 3U VPX
- 18 GHz
- 4 channel
- 500 MHz IBW



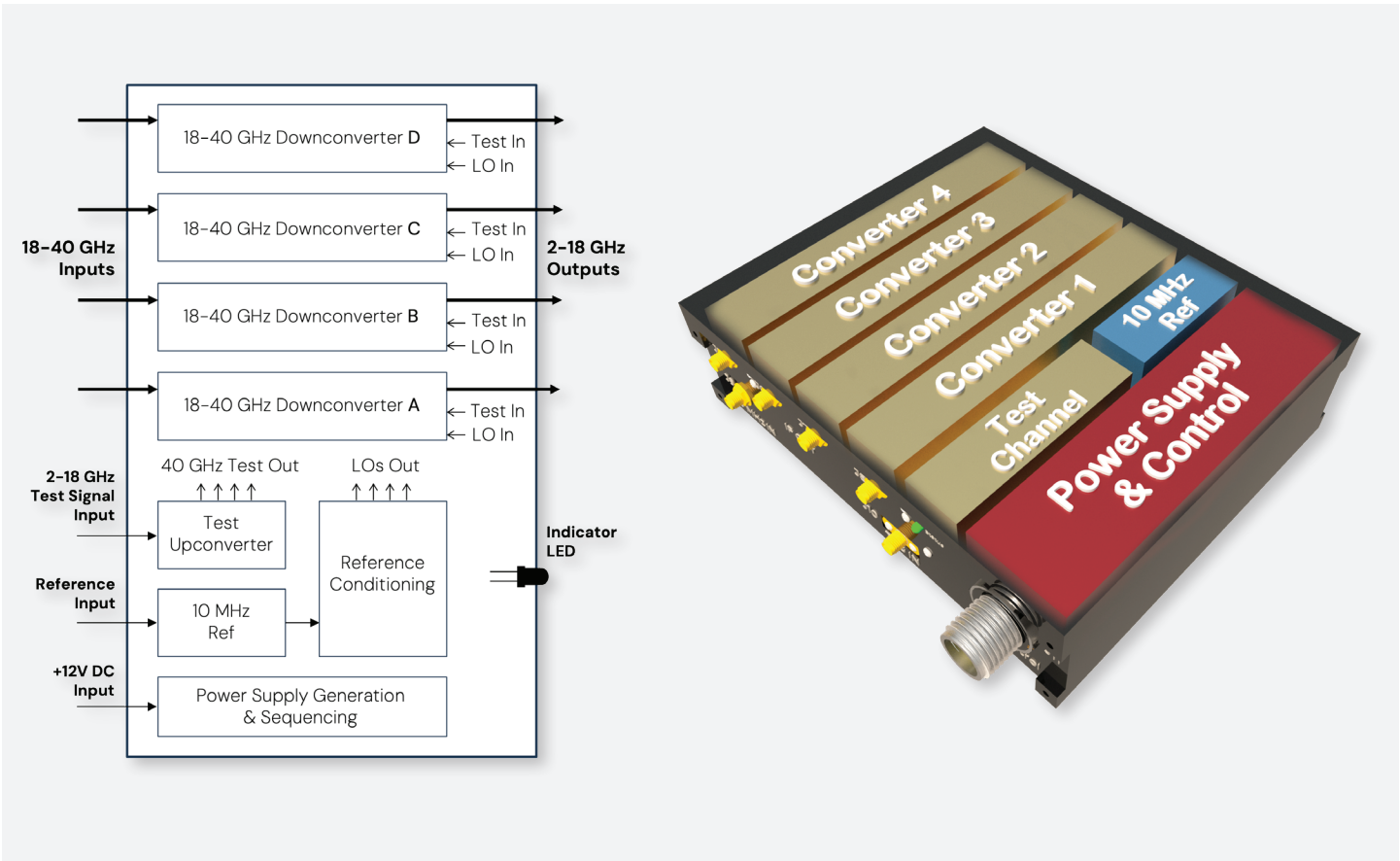
PHYSICAL SIZE COMPARISON



EXAMPLE USE CASE



FUNCTIONAL BLOCK DIAGRAM



(Front View)

(Back View)



SPECIFICATIONS

Parameter	Value	Parameter	Value
RF Specifications		Size, Weight, Power	
Input frequency range	18-40 GHz	Dimensions	4.8 x 5.7 x 1.6" 122 x 145 x 41 mm
Input pre-selector bands	18-26.5 GHz 26.5-40 GHz	Weight	<2.5 lb. <1,200 grams
IF output frequency range	2-18 GHz	Power	+12V DC 45 W
Number of phase coherent downconverter channels	4		
RF routing	Length-matched	Environmental	
Gain (typ.)	30 dB	Altitude (max)	30,000 ft
Noise figure (typ.)	12 dB	Operating temperature range	-40 to 85 °C
IIP3 (typ.)	+3 dBm		
10 MHz reference input level	0 dBm		
Downconverter frequency plan			
• 18 to 26.5 GHz RF input converted to 2.3 to 10.8 GHz IF output			
• 26.5 to 40 GHz RF input converted to 3.2 to 16.7 GHz IF output			
Test signal upconverter			
• Input frequency range	0.5 to 18 GHz		
• Output frequency range	18 to 40 GHz		
Interfaces			
Control	RS-232 over USB or 1 Bit Switch Control		
LED indicator	Power OK, Ref Lock		

Specifications subject to change without notice.

Epiq Solutions exports its products strictly in accordance with all US Export Control laws and regulations which shall apply to any purchase or order.



ABOUT EPIQ

Epiq Solutions develops cutting edge tools for engineering teams and government-focused organizations requiring situational awareness and detailed insight into their RF environments in order to identify and act against wireless threats.

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