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 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**.

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

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

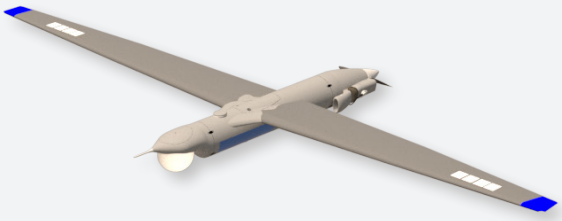
NDR551 SDR
- 18 GHz
- 4 channel
- 80 MHz IBW

NDR684 SDR
- 18 GHz
- 4 channel
- 500 MHz IBW

UAS

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

MATCHSTIQ™ X40 SDR
- 18 GHz
- 4 channel,
- 450 MHz IBW
- GPU-enabled



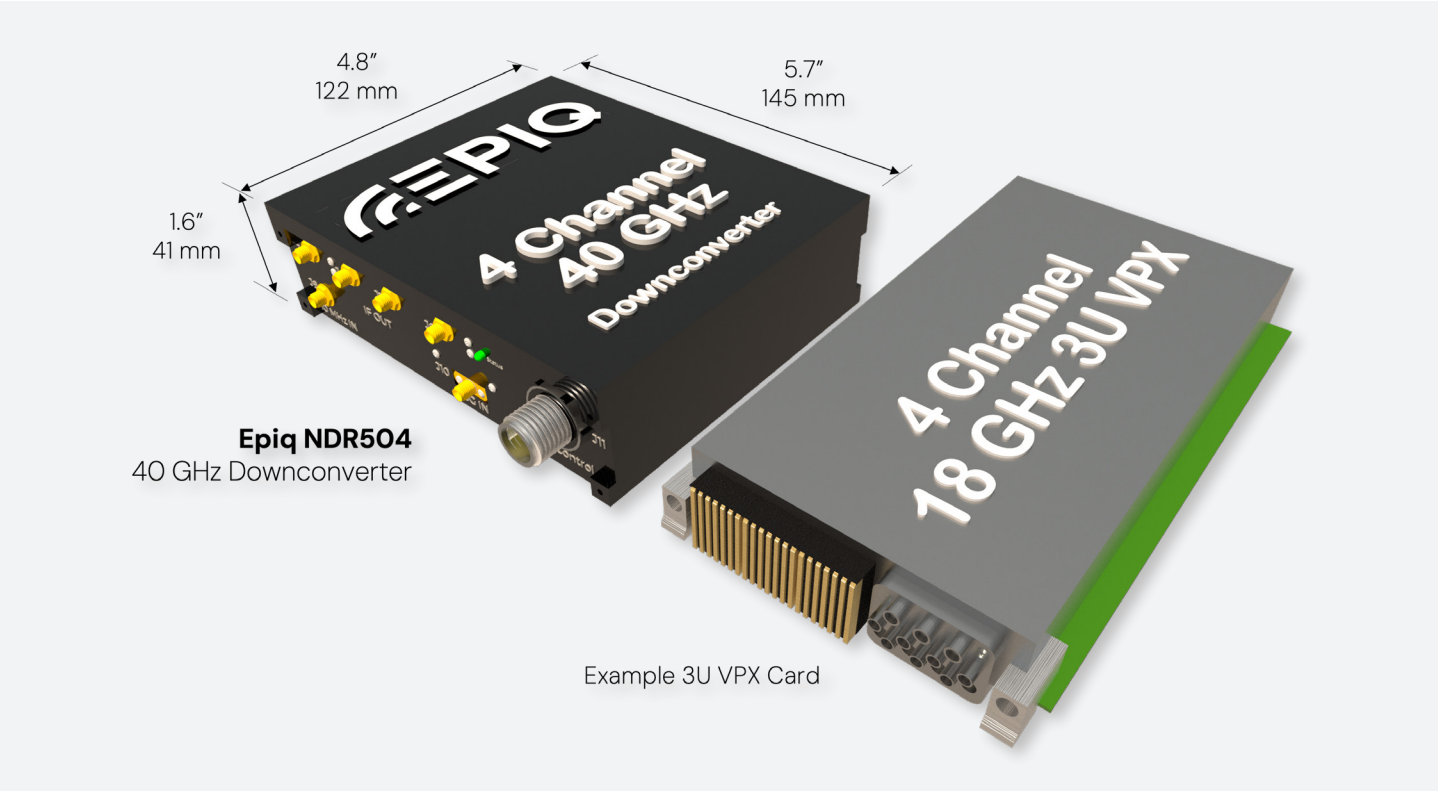
Land Vehicle

3U VPX, modular compliant solutions

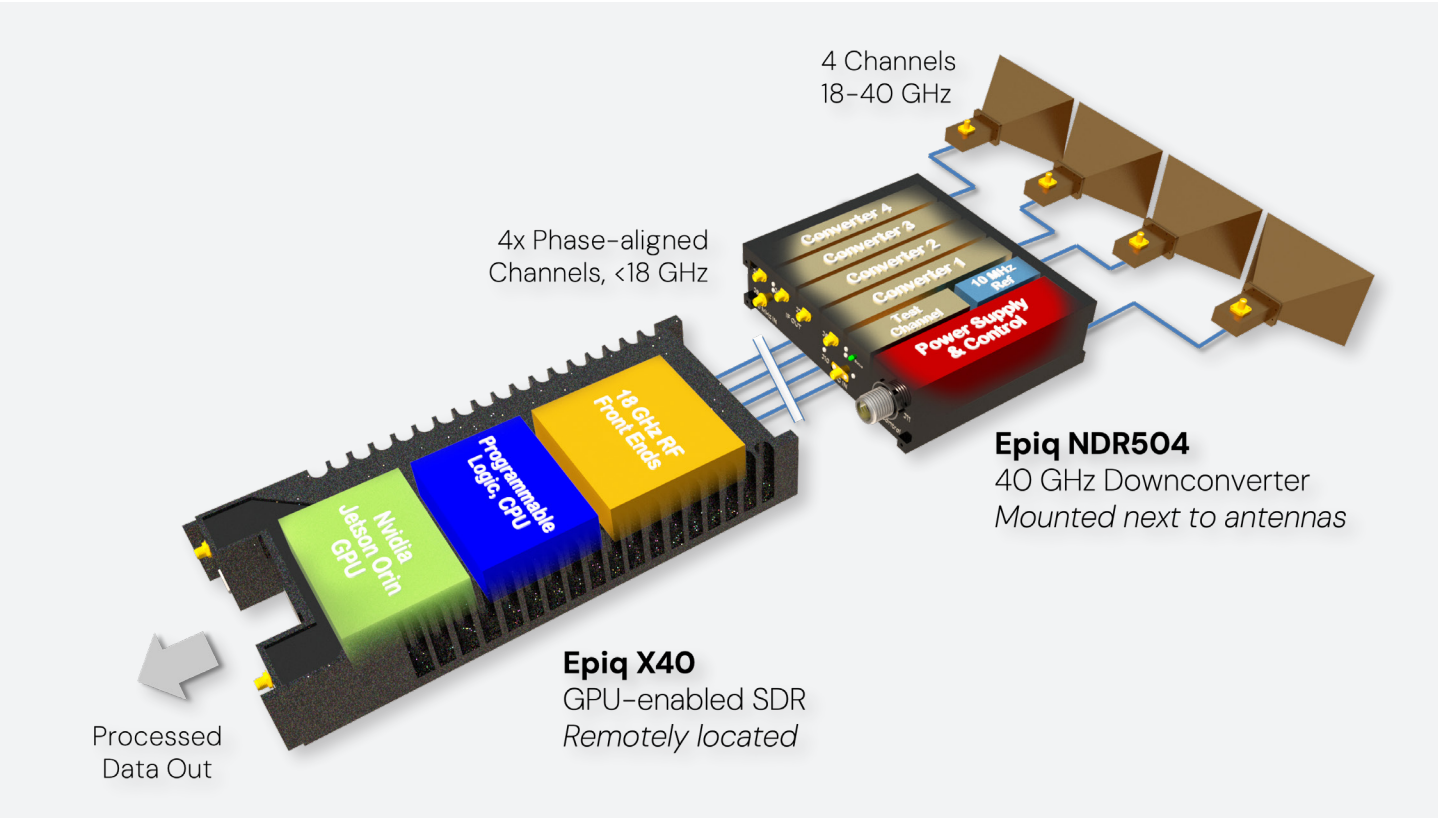
NDR585 Tuner
- 3U VPX
- 18 GHz
- 4 channel
- 500 MHz IBW

SIDEKIQ™ VPX410 Tuner
- 3U VPX
- 18 GHz
- 4 channel
- 1 GHz IBW

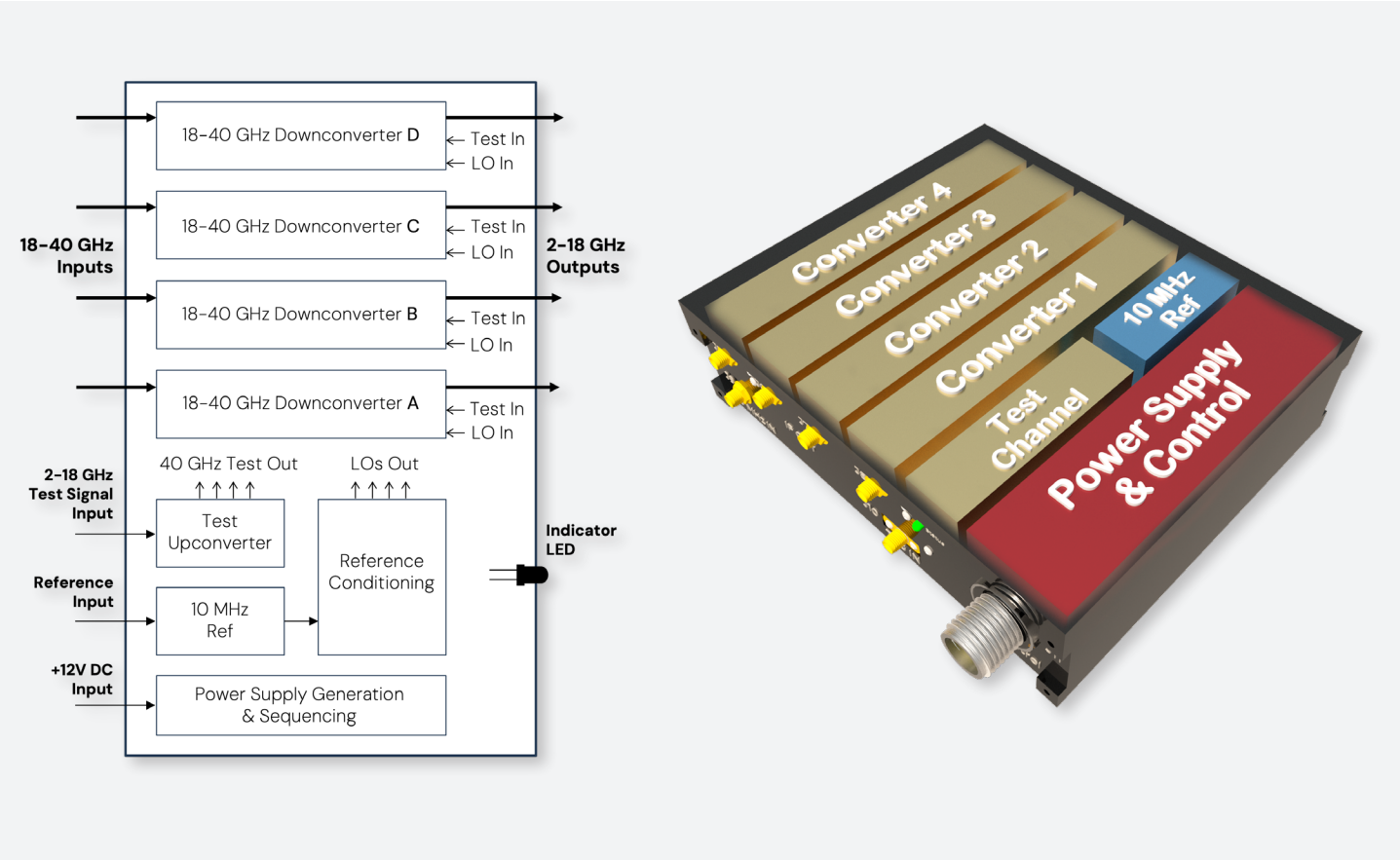
PHYSICAL SIZE COMPARISON



EXAMPLE USE CASE



FUNCTIONAL BLOCK DIAGRAM



(Front View)

(Back View)

SPECIFICATIONS

Parameter	Value
RF Specifications	
Input frequency range	18-40 GHz
Input pre-selector bands	18-26.5 GHz 26.5-40 GHz
IF output frequency range	2-18 GHz
Number of phase coherent downconverter channels	4
RF routing	Length-matched
Gain (typ.)	30 dB
Noise figure (typ.)	12 dB
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 • Output frequency range	 0.5 to 18 GHz 18 to 40 GHz
Interfaces	
Control	RS-232 over USB or 1 Bit Switch Control
LED indicator	Power OK, Ref Lock
J1 to J4 RF Inputs, J10 TSG IN RF Interfaces	2.92 mm
J5 to J8 RF Outputs, J9 10 MHz IN	SMA

Parameter	Value
Size, Weight, Power	
Dimensions	4.8 x 5.7 x 1.6” 122 x 145 x 41 mm
Weight	<2.5 lb. <1,200 grams
Power	+12V DC 45 W
Environmental	
Altitude (max)	30,000 ft
Operating temperature range	-40 to 85 °C

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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