Matchstiq™ G20/ G40

Multi-Channel 6 GHz SDR Enabling AI & ML in Small Form Factor Applications at the RF Edge

Complete SDR + FPGA + CPU + GPU Transceiver Platform for COMINT, C-UAS, Comms, EW, DF, Wireless Survey and Test on Small Platforms



The Matchstiq™ G20 and G40 are highly flexible RF and signal processing SDR platforms, ready to enable applications with the most challenging SWaP-C requirements. Both the Matchstiq™ G20 and G40 have Epiq's flagship small form factor SDR, Sidekiq™ NV100, as a fundamental component. The Matchstiq™ G20 incorporates a single Sidekiq™ NV100, a 2TB SSD, and an Nvidia Orin NX, enabling direct RF record, analysis, and playback. The Matchstiq™ G40 integrates the Orin NX with two NV100s, enabling phase-coherent operation across four RF channels, ideal for beam forming applications or independent operation for multi-band applications.

With Sidekiq™ NV100 at the core, Matchstiq™ G20 and G40 are designed for small form factor UxS payloads, as well as handheld and dismounted applications, offering an unprecedented level of integration and performance.

Product Web Page:

Both platforms are equipped with the Nvidia Orin NX 16G —ideal for hosting AI and machine learning algorithms. These low SWaP-C SDRs enable AI & ML capabilities to move to the RF edge, reducing data transfer speeds to the host and system power consumption.

Key Features

- Low SWaP Platform with high level of integration and transmit & receive functionality
- Optimized for small UxS payloads and dismounted applications
- Up to 50 MHz instantaneous bandwidth per channel and 6 GHz coverage makes it ideal for detection and DF
- Supports phase coherent and independent operation
- Fast frequency hopping supported on all RF channels
- Integrated NVIDIA Orin NX for signal processing
- Libsidekiq API for SDR control and application development
- Tested to a subset of MIL-STD-810H

Specifications at a Glance: G20 (G40)

Category	Output	F_{Min}	F_{Max}	LO Tuning	Timing Inputs	CPU Enabled	GPU Enabled
Platform	Digital	10 MHz	6 GHz	Indep. Pairs & Coherent	10 MHz, PPS, GPS	Yes	Yes

Max Rx Channels	Max Tx Channels	IBW_{Max}	$SFDR_{Typ.}$	Weight	Typ. Power Consumption	Interfaces	ADC bits/ DAC bits
2 (4)	2 (4)	50 MHz	75 dB	1.5 lb. 0.7 kg	25 W (30 W)	Ethernet etc.	16/ 16

Specifications

Model:	G20	G40
Environmental Specifications		
Temperature (operating)	-40 to +70 °C, cold plate surface temperature under typical operating conditions	
Temperature (Storage)	-40 to +85 °C	
Size	7.6 x 4.4 x 1.0 inches 193 x 112 x 25 mm	
Weight	1.5 lb. 0.7 kg	
Power (Typ.)	25 W	30 W
Supply Voltage Input Range	9 - 19 VDC	
MIL-STD-810H Environmental Testing	Tested for a subset of parameters including temperature (operating, non-operating, shock), mechanical shock and vibration. See results on page 11.	
Other		
Export Classification	5A991.b	
CE-Marked	Yes	

Model:	G20	G40
Digital Specifications		
FPGA	AMD Xilinx Artix 7 XC7A50T	2x AMD Xilinx Artix 7 XC7A50T
CPU/ GPU	Jetson Orin NX 16 GB Ampere GPU + Arm Cortex-A78AE CPU + 16 GB LPDDR5	
NVMe SSD	1 TB (Jetson module operating system and user storage space)	
Additional Storage	2 TB SSD	None
User I/O	• 1 GbE connection via RJ45 • USB 2.0 and USB 3.2 via USB-A connector • Linux serial console via USB Micro-B connector • USB 2.0 and USB 3.2 used for additional serial console and Ethernet via USB-C connector • STAT LEDs and a recessed push button switch (used for Orin NX reset or recovery)	
GPIO I/O	NV100 GPIO and TR_proxy lines, Orin NX GPIO, I2C, and SPI	
Inertial Measurement Unit (IMU) Sensor	NV100 TDK / InvenSense ICM-20602 6-axis Motion Tracking Device (3-axis gyroscope, 3-axis accelerometer) - Gyroscope sensitivity error: ±1% - Gyroscope noise: ±4 mdps/√Hz - Accelerometer noise: 100 µg/√Hz	

Data subject to change without notice.

Specifications

Model:	G20	G40
RF Specifications		
All		
Frequency Range	30 MHz to 6 GHz (RF access to 10 MHz)	
Channel Bandwidth	50 MHz	
Tuning Operation	See table on next page.	
Tuning Step Size	~4.5 Hz	
Receivers		
Connector Type	SMA female, 50 Ohms, shared with transmitters	
Channels	2	4
Rx Filtering	Sub-octave pre-selection filtering for interference protection from ~30 MHz to 6 GHz; automatically selected when tuning the RF receiver.	
Noise Figure (Typ.)	<5 dB	
IIP3 (Typ.) per physical port designation	TRx1: 0 dBm, TRx2: +9 dBm	TRx1A: 0 dBm, TRx2A: +9 dBm TRx1B: 0 dBm, TRx2B: +9 dBm
Gain Control Range	0 to 34 dB, 0.5 dB steps	
Gain Control Modes	Manual or AGC	
Spurious Free Dynamic Range (Typ.)	75 dB	
Max RF Input Power Level (without damage)	+20 dBm	
RF full scale input (at max gain)	TRx1: -25 dBm, TRx2: -18 dBm, frequency dependent	TRx1A: -25 dBm, TRx2A: -18 dBm, TRx1B: -25 dBm, TRx2B: -18 dBm, frequency dependent
Typical I/Q Balance	>65 dB	
A/D Converter Sample Rates	Defined rates between 24 KS/s and 61.44 MS/s. See user documentation for details and caveats.	
A/D Bits	16	

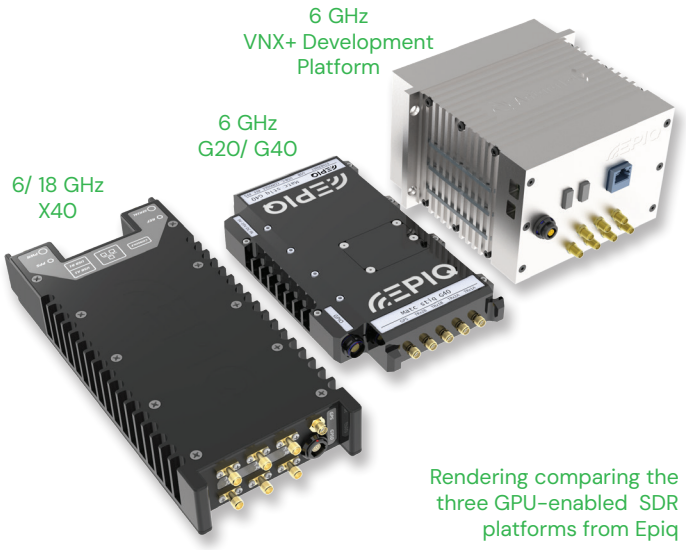
[1] NV100s also have their own on-board clock & GPS modules which are selectable if desired. See G-series hardware manual for more details.

Model:	G20	G40
RF Specifications (continued)		
Transmitters		
Connector Type	SMA female, 50 Ohms, shared with receivers	
Channels	2	4
Typical Output Power	+5 dBm	
Gain Control Range	0 to 41.75 dB in 0.25 dB steps	
Typical OIP3	30 dBm	
Typical I/Q Balance	> 60 dB	
D/A Converter Sample Rates	Defined rates between 24 KS/s and 61.44 MS/s. See user documentation for details and caveats.	
D/A Bits	16	
Clocking		
External Reference Clock		
Connector	MMCX, 50 Ohms	
Input Frequency	10 MHz	
Input Power Range	0.2 – 2 Vpp, -10 dBm to +10 dBm, (0 dBm nominal) from 50 ohm source	
On-Board Reference Clock		
Initial Accuracy at 25 °C	+/- 120 ppb	
Stability Over Temperature (<24 hr)	+/- 150 ppb	
GPS		
Antenna Input	SMA female, 50 Ohms	
Maximum Safe Input (without damage)	+10 dBm	
Antenna Bias	3.3 V bias voltage available for active GPS antenna, software enabled/ disabled	
GPSDO Type	u-blox LEA-M8F[1]	
Functions	NMEA sentences, PPS, and frequency-disciplining	
PPS		
Connector	MMCX (high-Z)	
Input Level	3.3 V (5 V tolerant)	

RF Modes

Mode	G20	G40
Receive:		
Single channel Rx	Yes	Yes
Two channel phase coherent Rx	Yes	Yes
Four channel phase coherent Rx	No	Yes
Two channel independently tunable Rx	Yes	Yes
Four channel independently tunable Rx	No	Yes
Transmit:		
Single channel Tx	Yes	Yes
Two channel phase coherent Tx	Yes	Yes
Four channel phase coherent Tx	No	Yes[2]
Two channel independently tunable Tx	Yes	Yes
Four channel independently tunable Tx	No	Yes
Transceive:		
1Tx + 1Rx (FDD, on different antenna ports)	Yes	Yes
1Tx + 1Rx (TDD, on the same antenna port)	Yes	Yes
1Tx + 1Rx (TDD, on different antenna ports)	Yes	Yes
2Tx + 2Rx (FDD, on different antenna ports)	No	Yes
2Tx + 2Rx (TDD, on the same antenna ports)	No	Yes
2Tx + 2Rx (TDD, on different antenna ports)	No	Yes
Fast -Frequency Hopping (FFH) Receive:		
Single channel Rx	Yes	Yes
Two channel Rx	Yes	Yes
Four channel Rx	No	Yes
Two channel phase coherent Rx	Yes[2]	Yes[2]
Four channel phase coherent Rx	No	Yes[2]
Fast -Frequency Hopping (FFH) Transmit:		
Single channel Tx	Yes	Yes
Two channel Tx	Yes	Yes
Four channel Tx	No	TBD
Two channel phase coherent Tx	Yes[2]	Yes[2]
Four channel phase coherent Tx	No	TBD

[2] Future support



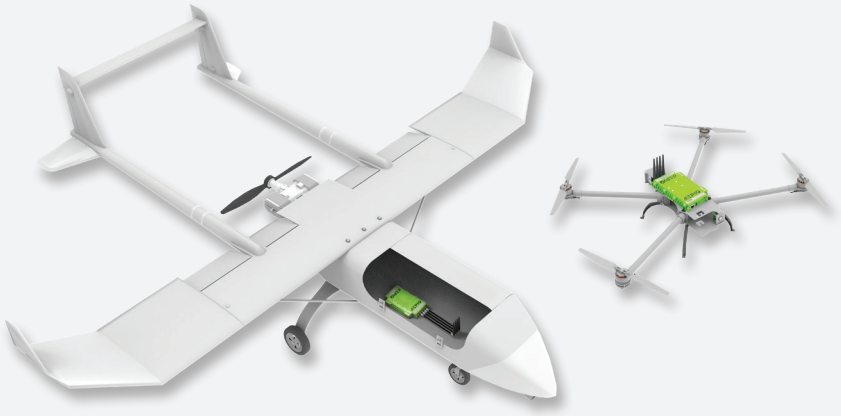
Rendering comparing the three GPU-enabled SDR platforms from Epiq

Deployment Examples

Example 1: UAS Payloads

The G-series is particularly suited to deployment as a battery powered RF platform for airborne use. At 2 lb./ 0.9 kg and 25-30 W typical power consumption, it has ample on-board processing, RF coverage to 6 GHz, wide instantaneous bandwidth to 50 MHz per channel, fast frequency hopping and transmit capability.

Ideal for detecting and DF'ing radars from small platforms.



Example 2: Vehicle Mount C-UAS

While not waterproof, the G-series is very rugged, having been tested to a subset of MIL-STD-810H including temperatures (operating temperature, storage temperature, thermal shock), as well as mechanical shock and vibration. Deployable as a self contained system with an antenna, it is an easy way to enhance sensor capability on existing platforms.



Example 3: Man-Portable DF System

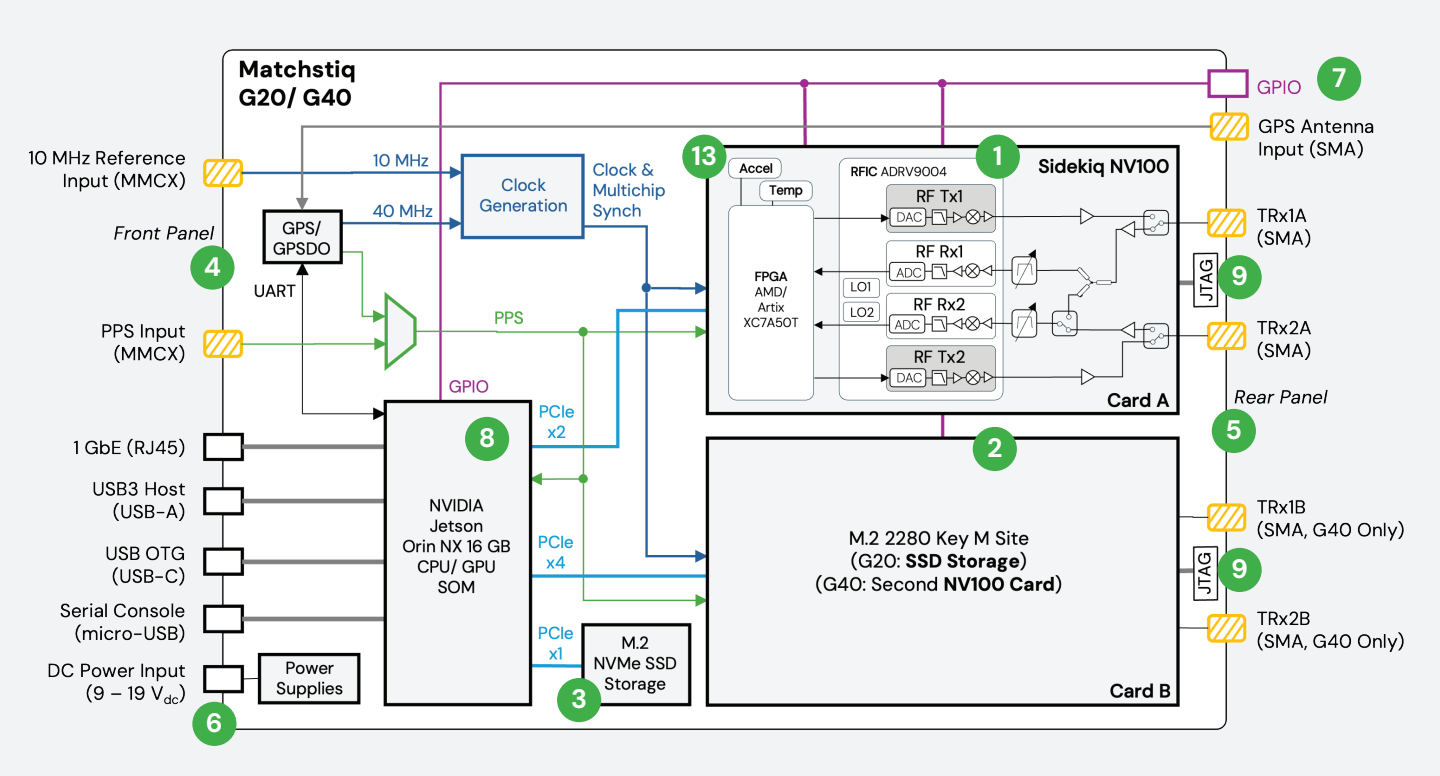
Similar to the X40 GPU-enabled SDR platform from Epiq, the G-series comfortably strap to a small tripod-mounted broadband DF antenna, and easily hosts AI/ML-enabled capabilities such as DeepSig's OmniSIG to form a complete system.



Other Examples

- Mesh networks
- MIMO Communications
- SATCOM
- A-PNT Receiver
- Portable Spectrum Awareness
- Transmitter Decoy
- Arbitrary Waveform Generator
- RF-Enabled Cyber
- Test and Measurement

G-Series Block Diagram



Features of Note

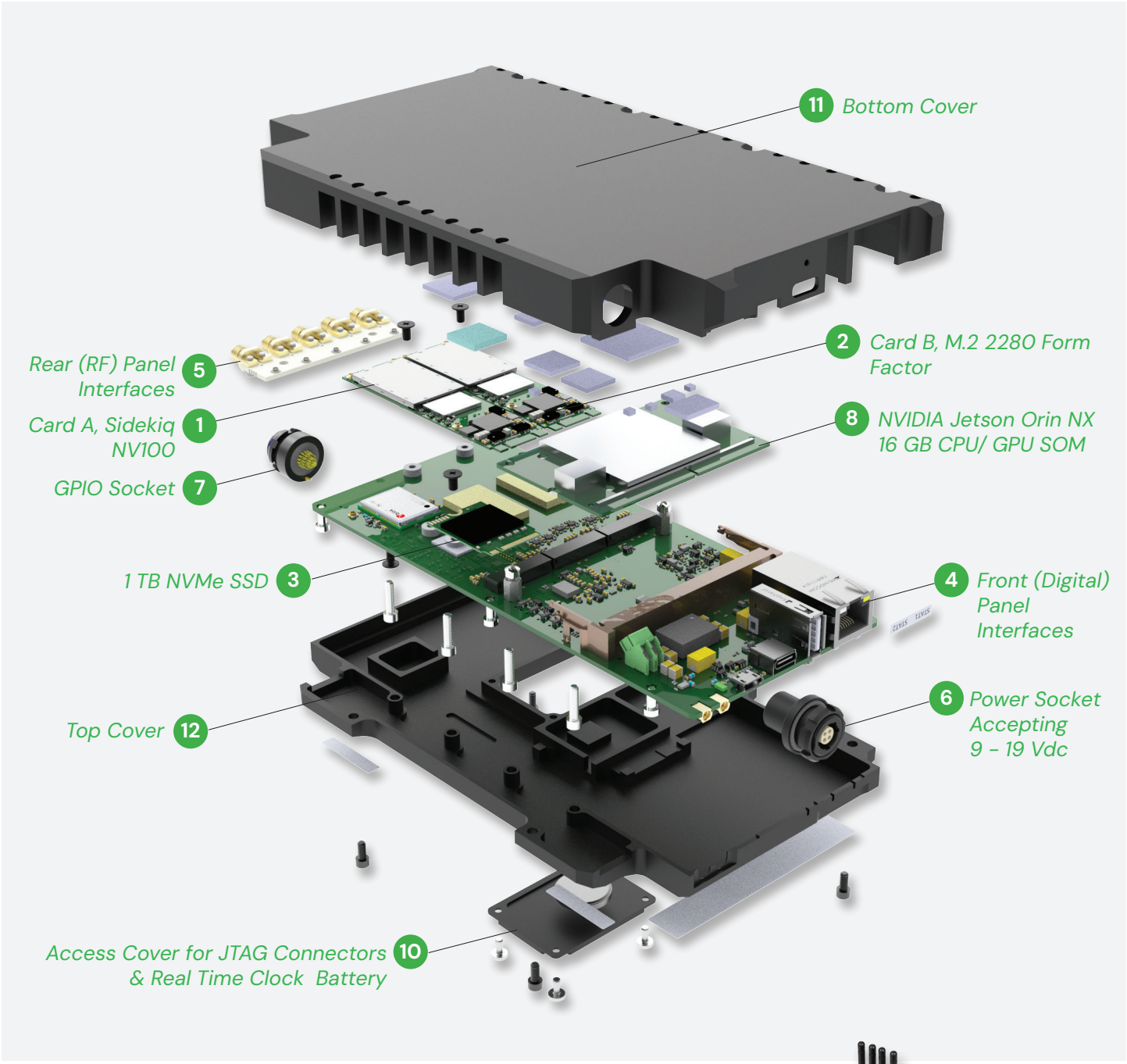
Numbered items may be highlighted on the block diagram and/or exploded view.

1. Card A, M.2 2280 form factor Sidekiq NV100[3] SDR
2. Card B, M.2 2280 form factor:
   - Second Sidekiq NV100 card (G40)
   - 2 TB NVMe SSD (G20)
3. 1 TB NVMe SSD
4. Front (Digital) Panel Interfaces
5. Rear (RF) Panel Interfaces
6. Power Socket accepting 9 - 19 V_{dc}. Corresponding cable mating connector is ODU A10YAR-P04XFG0-0000 or Nexus NX-A10YAR-P04XFG0-0000
7. GPIO Socket. Corresponding cable mating connector ODU GK1WAM-P27WBC0-000L or Nexus NNX-GK1WAM-P27WBC0-000L
8. NVIDIA Jetson Orin NX 16 GB CPU/ GPU SOM
9. JTAG Connectors*
10. Access Cover* for JTAG Connectors & Real Time Clock (RTC) CR2032 coin cell battery. Removal requires a 1.5 mm hex wrench (not supplied)
11. Bottom Cover* - also the cold plate surface
12. Top Cover*
13. Temperature & Inertial Measurement (IMU) sensors*

[3] More detailed information about NV100 may be found here.

* Visible on only one of the two views

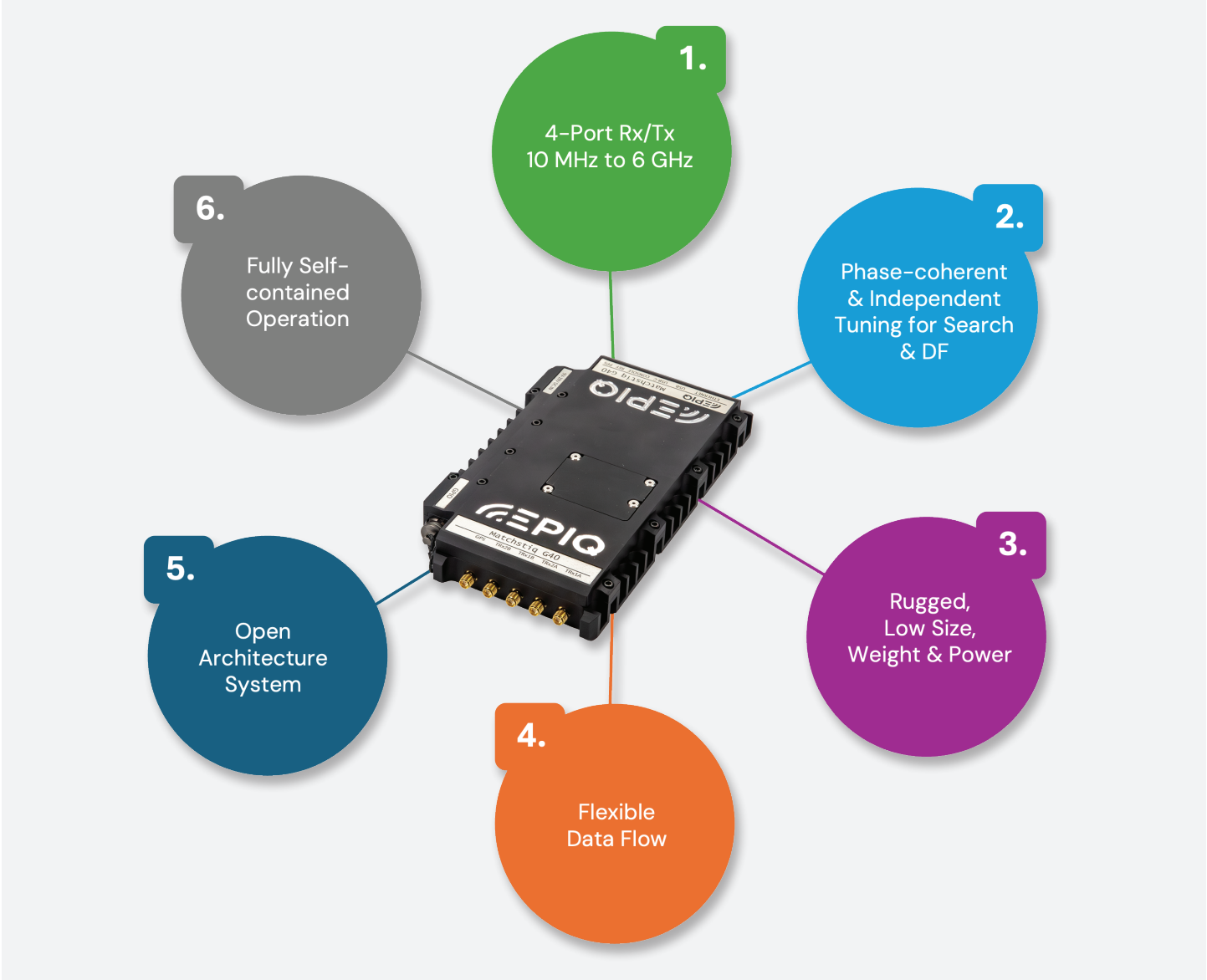
Anatomy of a G-Series SDR





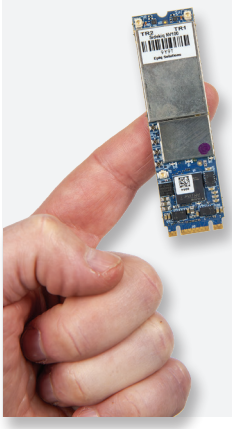
G40 and X40 platforms
(antennas not included)

G-Series Features



Full Featured, 4-Channel, 6 GHz GPU-Enabled SDR System

1.



The G-series contains either one or two NV100 RF cards. Each M.2 2280 form-factor card includes pre-selection filtering, a Zero IF architecture RFIC, 16-bit analog-to-digital conversion, and an open Artix-7 XC7A50T FPGA. Together, the paired radios provide four Rx/Tx channels, each supporting 50 MHz of bandwidth and tunable up to 6 GHz. The open FPGA architecture supports custom FPGA processing and waveform development, while fast frequency hopping enables agile mission sets across dynamic RF environments. The highly configurable Tx/Rx front end supports flexible deployment options and can be configured for up to four independent tunable LOs or four coherent Tx/Rx channels.

The following panels show some of the features that make the NV100, and hence the G-series, so useful.

1.

Continues...

Each NV100 RF front end has an input switch allowing antenna sharing if desired

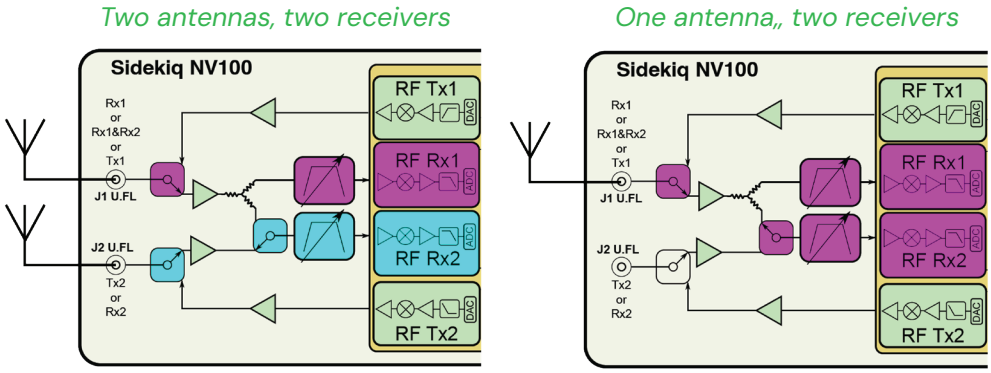
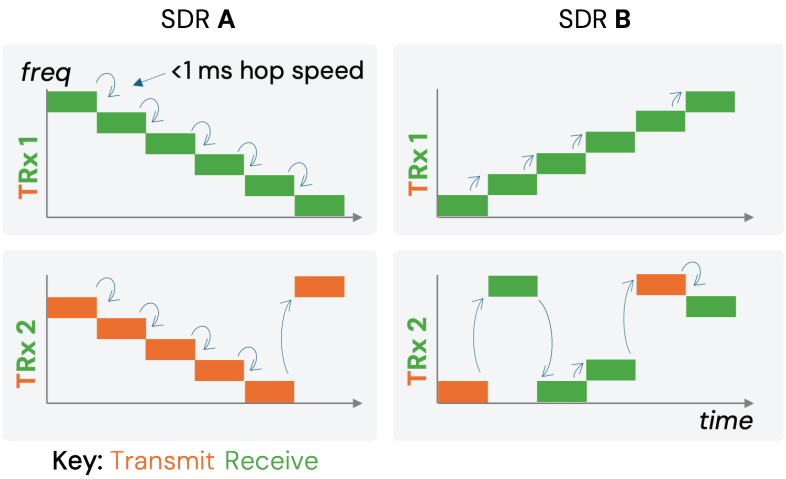
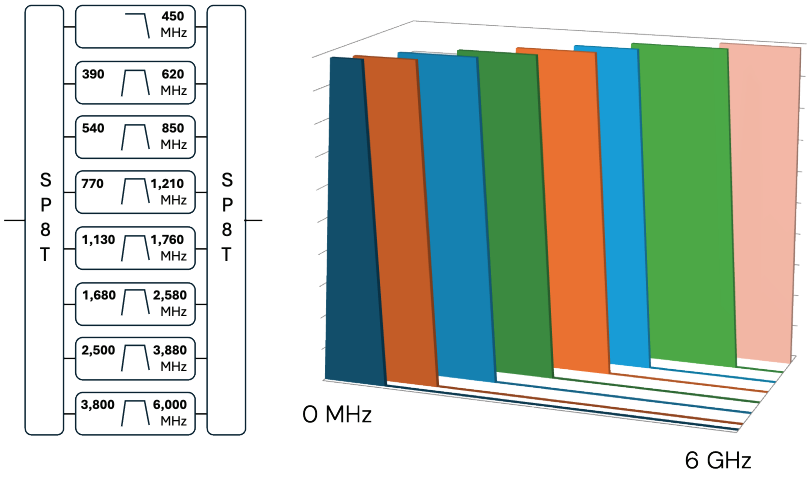


Illustration of frequency hopping transmit and receive channels with the benefit of 4 independent LOs and a hop speed of less than 1 ms.



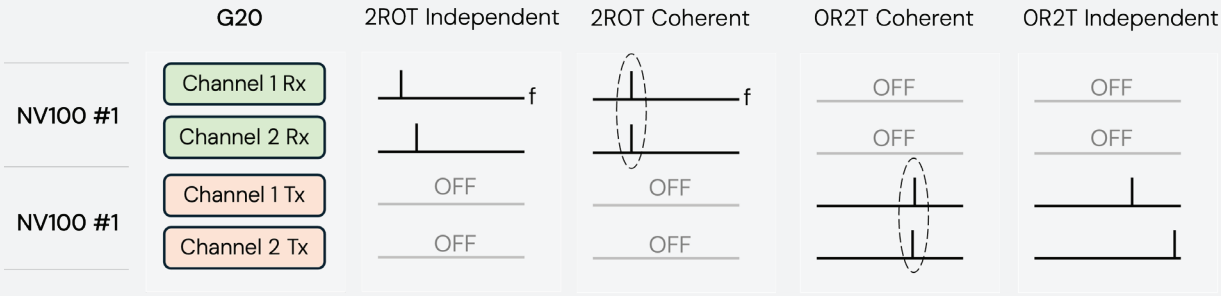
Pre-selection filtering block diagram and visualization of NV100 pre-selection bands; slopes are not representative of actual filter roll-offs.

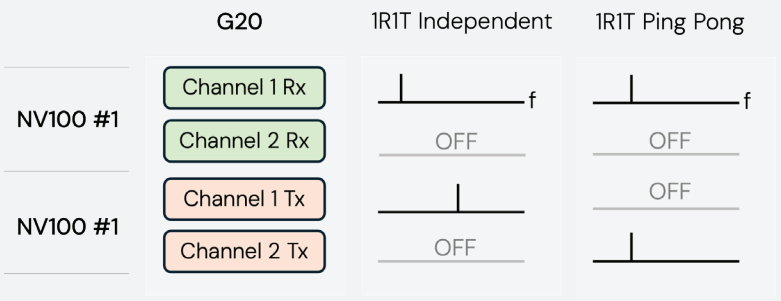


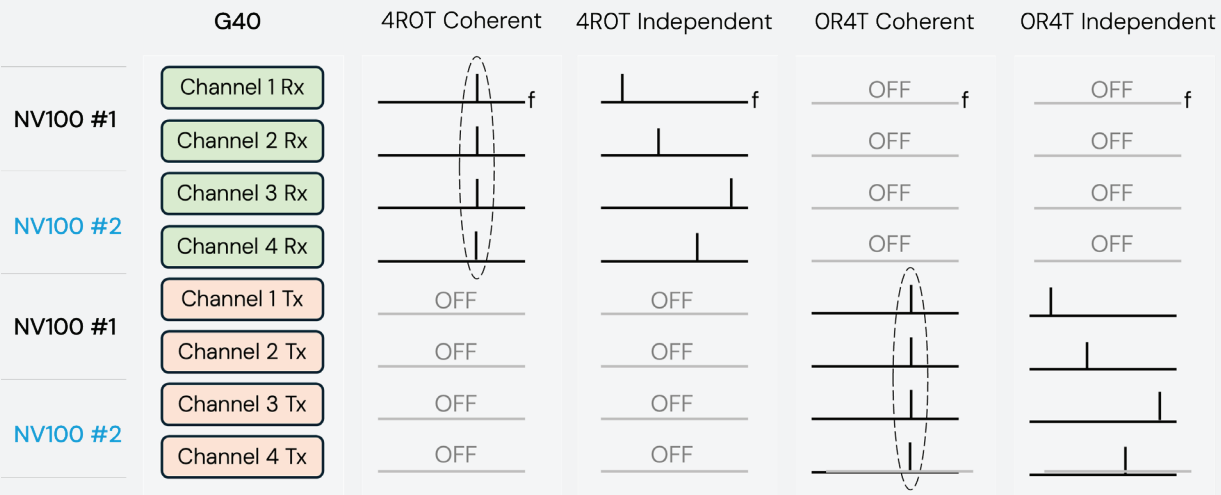
Phase-coherent & Independent Tuning for Search & DF

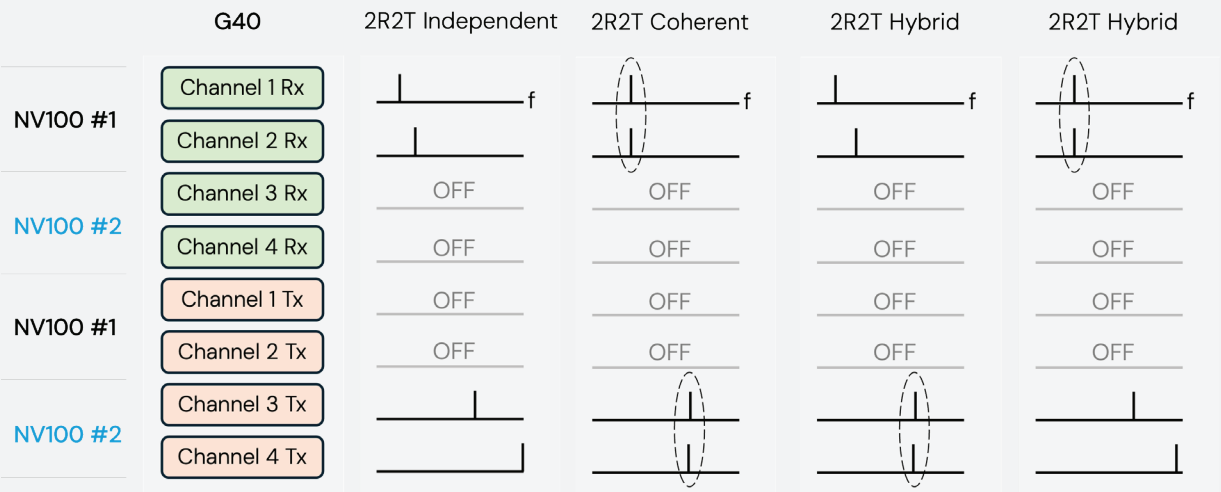
2.

The embedded NV100(s) front ends can be used independently or coherently in various combinations. The diagrams below illustrate some example combinations for the G20 and the G40. The dashed lines indicate that the channels are being operated phase-coherently.









Rugged, Low SWaP

3.

Given how much capability is packed into the G20 and G40, they are remarkably compact and power efficient. The photo shows relative physical sizing of some comparable Epiq platform SDRs, with quantitative comparisons below. Note that the G & X models have an on-board GPU. So far we have put the G & X models through MIL-STD-810H testing for ruggedness, with the G-series results below.



	G20/ G40	X40	Z4
Dimensions	• 7.6 x 4.4 x 1.0" • 193 x 112 x 25 mm	• 9.75 x 4.25 x 1.45" • 248 x 108 x 37 mm	• 6.0 x 3.5 x 1.14" • 152 x 89 x 29 mm
Volume	• 33.4 inch^3 • 540,400 mm^3	• 60 inch^3 • 991,008 mm^3	• 24 inch^3 • 392,312 mm^3
Weight	• 1.5 lb./ 0.7 kg	• 2.6 lb./ 1.2 kg	• 1.2 lb./ 0.55 kg
Power, typ.	• 25/ 30 W	• 50 W (6 GHz) • 65 W (18 GHz)	• 10 - 20 W full power mode

MIL-STD-810H Test Results

Test	Test Standard	Test Parameters	Result
• Temperature, Non-Operating	• Low Temp: MIL-STD-810H, Method 502, Procedure I • High Temp: MIL-STD-810H, Method 501 Procedure I	• Low Temp: -25 °C ambient temp • High Temp: +85 °C cold plate temp • 2 hrs at each extreme, after temperature stabilization	Passed
• Temperature, Operating	• Low Temp: MIL-STD-810H, Method 502, Procedure II • High Temp: MIL-STD-810H, Method 501 Procedure II	• Low Temp: -25 °C ambient temp • The G40 was not mounted to a cold plate for this test • High Temp: +71 °C cold plate temp • Unit exercised by running OmniSIG in it's default operating mode • 2 hrs at each extreme, after temperature stabilization	Passed
• Temperature, Shock	• MIL-STD-810H, Method 503, Procedure I-C	• Low Temp: -40 °C ambient temp • High Temp: +85 °C ambient temp • Held at each temp extreme until temperature stabilization • <1 min transition time between temperature extremes • 3 temperature cycle; unpowered with no cables plugged in	Passed
• Mechanical Vibration	• MIL-STD-810H, Method 514, Procedure I	• Vibration profile: • 5 - 100 Hz: +3 dB/oct • 100 - 1,000 Hz: 0.04 g2/Hz • 1,000 - 2,000 Hz: -3 dB/oct • 1 hr in each principal axis; unpowered with no cables plugged in • Meets VITA47.1, Class V2 test requirements	Passed
• Mechanical Shock	• MIL-STD-810H, Method 516, Procedure I	• 20g, 11 ms, sawtooth waveform • 3 pulses each direction of the three principal axes (18 total pulses) • Unpowered with no cables plugged in • Meets VITA 47.1 OS1 test requirements	Passed

Flexible Data Flow

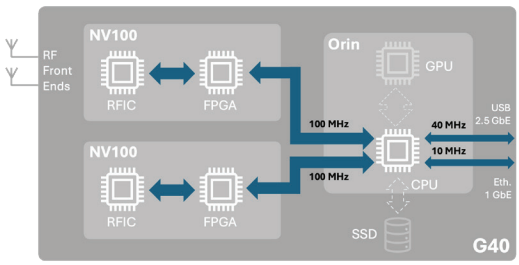
4.

Similar to its Matchstiq X40 and VNX+ Development Platform cousins, the G-series platforms are ready-to-deploy sets of sensing, power management, and data processing hardware. IQ data streams can be started, stopped, and coordinated with precision timestamps through libsidekiq, enabling a dynamic dataflow model across sensing, recording, processing, and transmit functions. Paired with the high-throughput PCIe backplane, the full RF bandwidth of the installed radios can be moved into the Jetson Orin NX for CPU and GPU processing, allowing the system to support real-time analytics, classification, and other accelerated compute workloads at the edge.

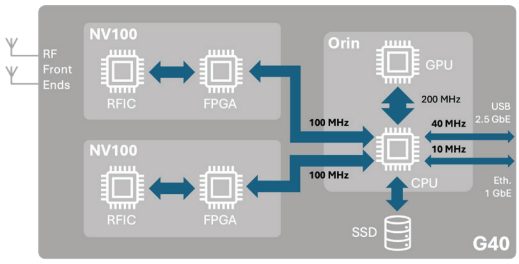
The architecture also supports truly heterogeneous compute. Advanced processing functions can be offloaded into the radio FPGA using the open FPGA reference design, enabling applications such as inline FFT processing, channelization of receive paths, and waveform playback or interpolation on transmit paths. Local SSD storage supports onboard capture for later offline exploitation, while also providing a source for arbitrary waveform playback, including coherent or independent playback across all four transmit channels.

The systems can also stream data off-board for downstream processing, whether by transmitting lower-bandwidth IQ data to a remote node or by exporting metadata and higher-level products generated by the Jetson Orin. Together, these capabilities allow the G-series to support flexible edge processing workflows ranging from autonomous operation to distributed sensing and AI-assisted classification in real time.

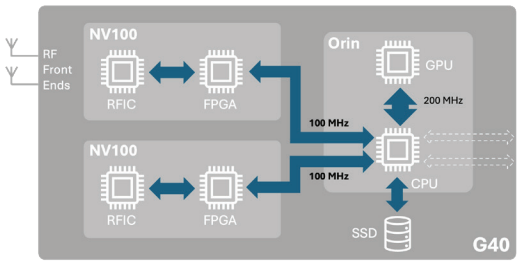
a) G40 processing on the host and streaming data off-board (e.g. 3dB Labs Sceptre)



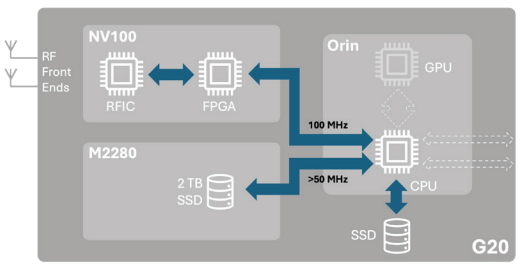
b) G40 processing on the host and GPU, offloading processed results (e.g. DeepSig's OmniSIG)



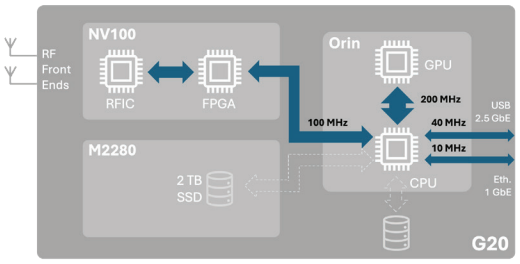
c) Headless G40 processing on the host and GPU and storing to disk



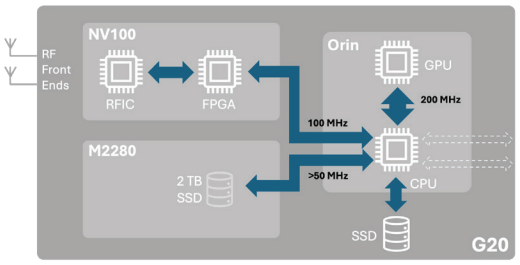
d) G20 record and playback



e) G20 processing on host & GPU, streaming results or IQ data off-board



f) G20 processing/ playing back using host & GPU

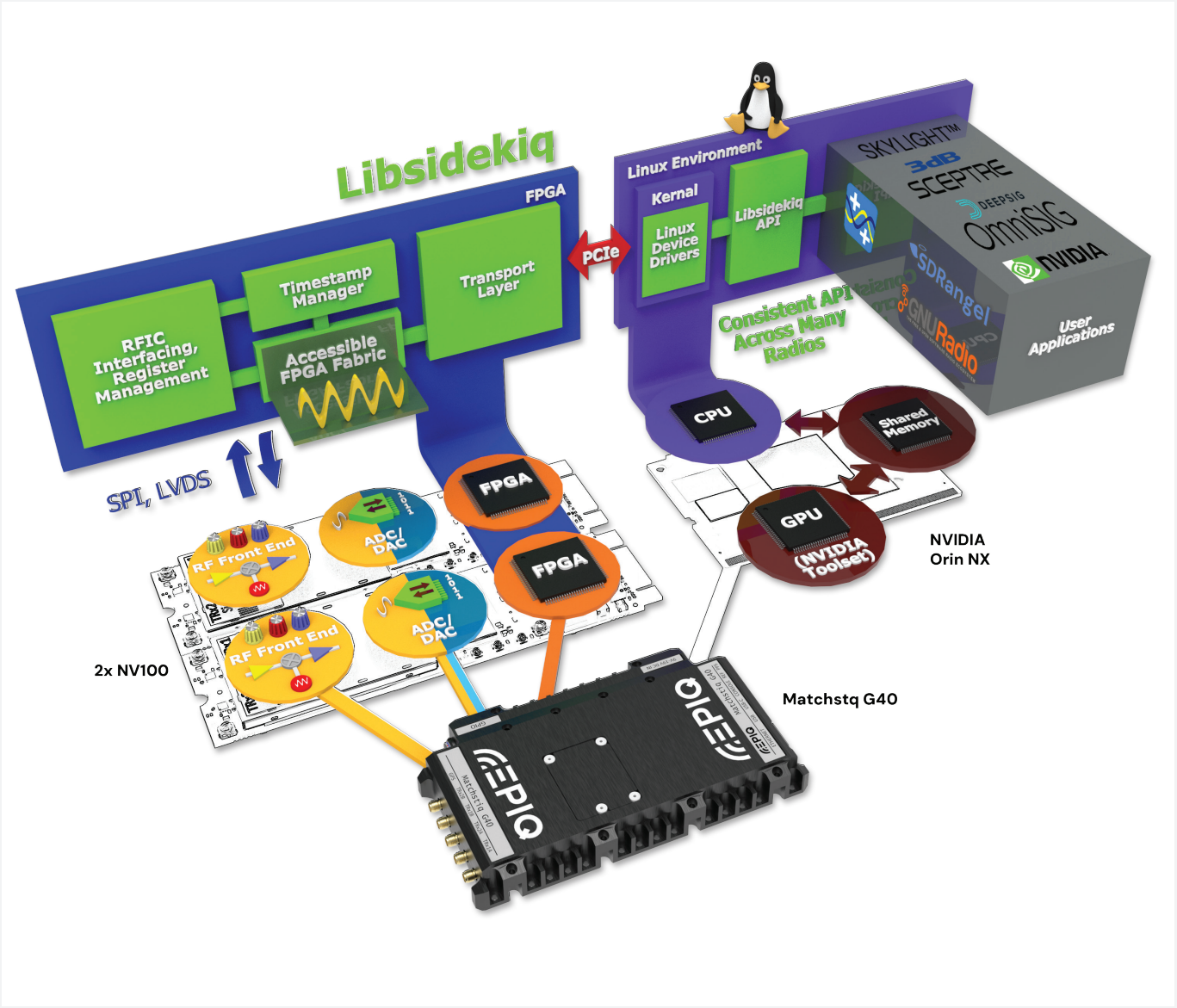


Open Architecture System

5.

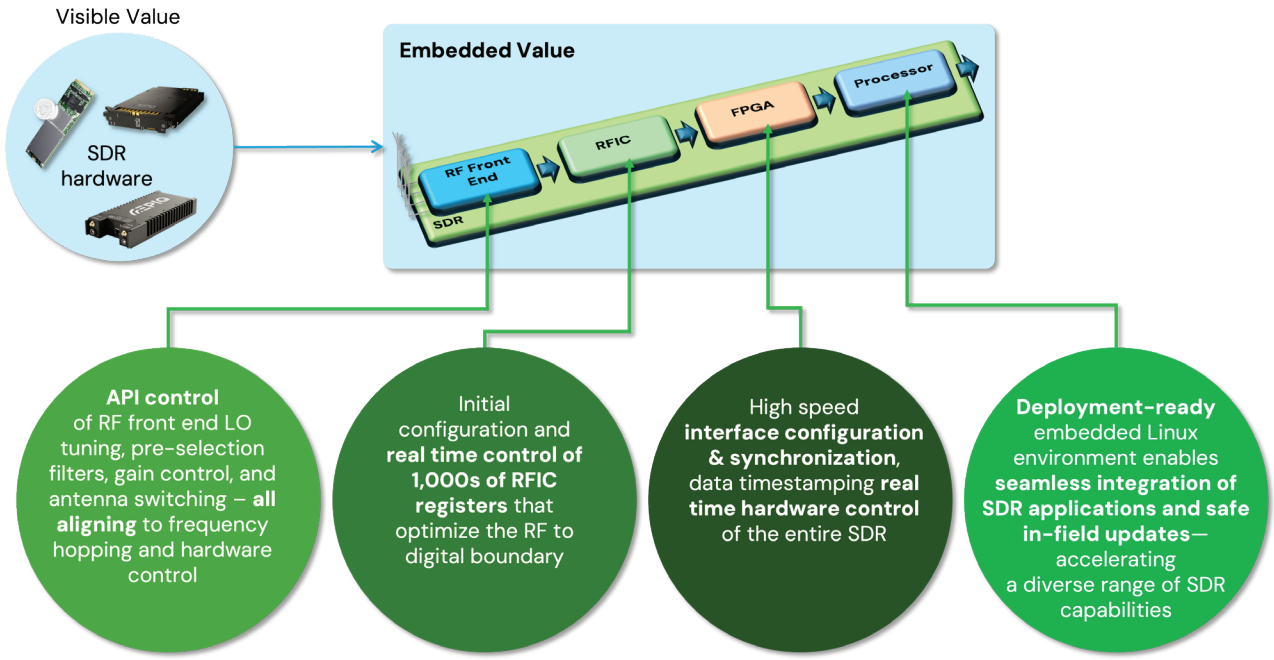
At the core of G-series is Libsidekiq, Epiq's proven software framework for controlling and scaling advanced SDR platforms. Used across generations of Epiq radios, Libsidekiq provides a consistent API that unifies RF front-end control, data conversion, precision timestamping, and transport into the Linux environment. Its efficient FPGA footprint preserves more than half of on die slice/bram/dsp blocks for customer-developed processing, while its Linux drivers and host API on the Orin NX enable a wide range of third-party and mission-specific applications to run directly at the edge.

For developers and integrators, the G-series is designed to provide meaningful platform access rather than a closed processing pipeline. Customers receive full access to the FPGA RTL and Linux kernel driver source, enabling deep customization of datapath functions, hardware acceleration, and system integration. The Libsidekiq development offering also includes a runtime installer that explicitly supports redistribution by integrators, helping partners build, deploy, and sustain their own applications on top of the platform. The result is a system that combines a mature software foundation with the openness needed for custom waveforms, embedded processing, and mission-specific application development.



5.

Continues...



What you see is only a tiny part of the value. Epiq's BSP & API accelerate application development by tens of thousands of engineering hours by supplying a mature SDR platform with all advanced processing and real time subsystems debugged and provided. We did the work, so you don't have to.

Open-Source Platform

Epiq's popular Libsidekiq, which enables the G-series, makes it simple to switch between many of our radios depending upon need. It also enables compatibility with a wide variety of open-source frameworks such as GNU Radio, SDR++, Gqrx, SDRangel and SoapySDR. High quality I/Q data is available over the high speed USB 3.0 interface.

For those with the desire to do custom FPGA development, we've got that covered. Through the G-series platform development kit (PDK), creation of novel techniques, on-the-fly FFT processing, equalization and many other time-sensitive functions can be implemented scalably.

SDR++

GNU Radio
THE FREE & OPEN SOFTWARE RADIO ECOSYSTEM

SDRangel

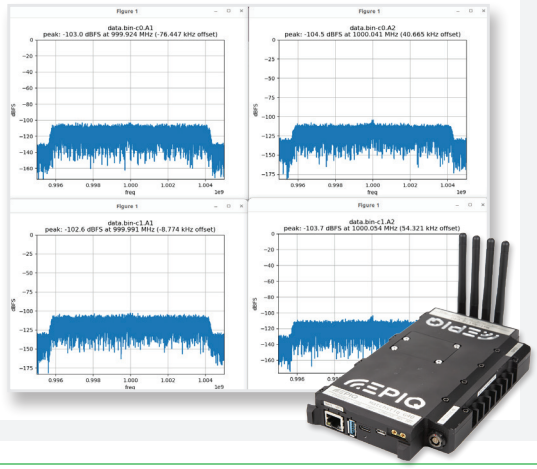
Gqrx SDR

SoapySDR

Developing with Libsidekiq

Libsidekiq is the radio control library that exposes a consistent API across all matchstiq and sidekiq radios. It ships with a self contained set of dependencies and ready to compile examples along with extensive documentation in the form of a developers manual and an API manual. The examples are also pre-compiled for out of the box functionality. Launch a terminal spectrum plot over an SSH session to immediately start analyzing spectrum from a remote target, or start transmitting from an IQ file to evaluate playback capabilities, or execute the coherent receive example to immediately begin examining 4 channel coherent performance.

See examples on the next page...



5.

Continues...

1

```
//////////Example Application/////////////

./example_apps/advanced_apps/bin/coherent_sample_g40 --rx-
rate=10000000 --rx-bandwidth=8000000 --rx-freq=1000000000 --
rx-gain=255 --rx-samples=20000 --cards=0,1
```

1) *Execute the coherent_sample_g40 example*
2) *Examine the source code for the **coherent_sample_G40** example*
3) *Observe the ease of use by matching a handful of function calls to abstracted hardware control*

2

```
//////////////PSUEDOCODE//////////////////////

a //configure the G40 clocking chip
  hmc_init(&hmc_device);
  hmc_device.clkin_input_source = 40_CLKIN_GPS_REF;

b //initialize the NV100s
  skiq_init(cards)

c //configure the rfic
  skiq_write_rx_sample_rate_and_bandwidth_multi(card,
  handle, rx-rate, rx-bandwidth)
  skiq_write_rx_gain(card, hdl, rx-gain);

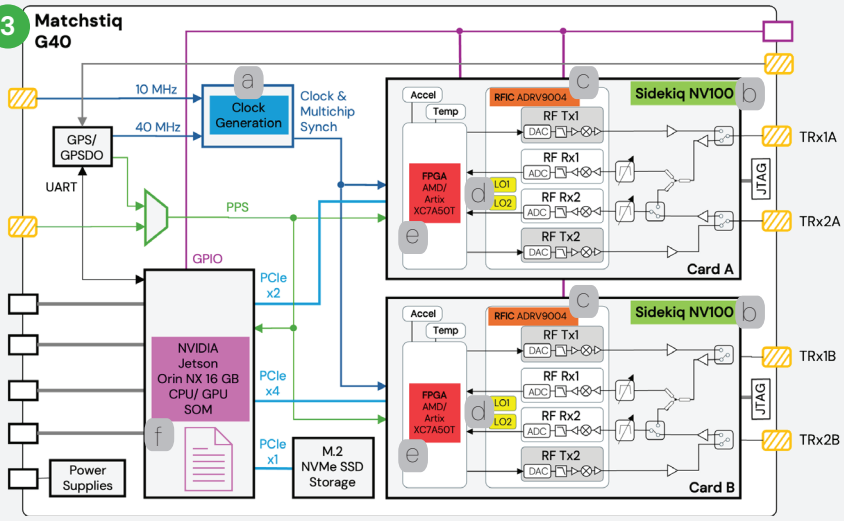
d //configure the LO frequency
  skiq_write_rx_LO_freq(card, handle_1, rx-freq)

e //initiate synchornized IQ streams
  skiq_start_rx_streaming_multi_synced()

f //Receive data on host CPU
  while(receiving)
  skiq_receive(card, handle, rx_block, len)

g //stop acquisition & cleanup application
  skiq_stop_rx_streaming_multi_synced()
  skiq_exit()
```

3



4

```
Help Options:
-h, --help              Show help options

Application Options:
-c, --card=ID           Use specified Sidekiq card
-S, --serial=SERNUM     Specify Sidekiq by serial number
--rx-handle=['A1','A2','B1','B2','C1','D1','ALL']
                        Rx handle to use
--rx-rate=Hz            List of Rx sample rates, per handle in Hertz
--rx-bandwidth=Hz       List of Rx bandwidths, per handle, in Hertz
--rx-freq=Hz            Comma delimited list of Center frequencies (in Hertz)
-g, --rx-gain=index     Manually configure the gain by index rather than using automatic
-d, --rx-path=PATH      Output file to store Rx data
-s, --rx-samples=N      Number of samples to receive
-1, --use-j1-only=1     Use just j1 antena port for both inputs (useful for calibration)
-f, --use-cal-file=true Use fast warmboot calibration file to speed up configuring radios. If no file found, it will save calibration after radio is configured for next time.
```

4) *All pre-compiled examples provide --help for out of box execution*

5

```
Example App         Description
rx_hopping          Shows a minimal program to execute rx frequency hopping
rx_to_file          Receive I/Q samples into memory buffer and then save to a file.
tx_from_file        Transmit I/Q samples from a file.
tx_tone             This app will generate the I/Q samples and transmit a test tone.
fdd_rx_tx_samples   Transmits and receives at the same time. Can transmit an I/Q sample file or a generated tone.
read_gpsdo          This application will loop until the gpsdo is locked, then it will print out every second the average and instantaneous error of the clock.
read_telemetry      Reads the temp, IMU, or accelerometer on the Sidekiq card, depending on what the card is capable of.
rx_benchmark        Determines the receive throughput of a specific card and port to see if the overall system performance can meet the desired sample rate.
rx_samples          Receive I/Q samples and store them into a file.  Also, it can present an FFT plot of the acquired I/Q samples.
plot_rxsamples      Plots the resulting file from rx_samples. This is a python script that gets called from rx_samples when the -p option is given. This script can be run by itself to plot a file of I/Q samples.
spectrum_plot       Provides a real-time spectrum plot, similar to a logic analyzer. It works on a standard terminal and through ssh.
tx_benchmark        Determines the transmit throughput of a specific card and port to  see the if overall system performance can meet the desired sample rate.
tx_samples          Transmits either the contents of an I/Q file, or a generated tone.
xcv_benchmark       Determines the transmit and receive throughput of a specific card and port to see if the overall system performance can meet the desired sample rate.
```

6

Categories of available Libsidekiq functions:

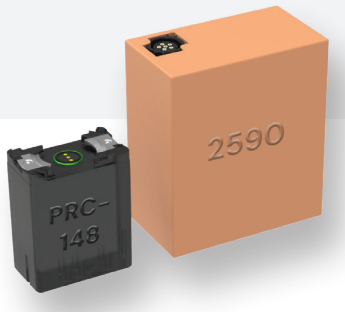
- Library Functions
- Card Functions
- Timestamp Functions
- RFIC Functions
- RF Port Functions
- Receive Functions
- Transmit Functions
- Fast Frequency Hopping Functions
- FPGA Functions
- 1PPS Functions
- Crystal Oscillator (TCVCXO) Functions
- Accelerometer Functions
- Receiver Calibration Functions
- Flash Functions
- GPS Disciplined Oscillator (GPSDO) Functions

5) ***Basic** examples have simplified introductions to the API, **Advanced** examples demonstrate extended functionality, and **Utility** examples aid with configuration and debugging.*
6) *The libsidekiq API is extensive and mixes high level abstractions with low level access.*

Fully Self-Contained Operation

6.

Equipped with an accessible CPU, GPU and FPGA, the G-series make ideal edge nodes that can be customized as needed. There is also a wide variety of COTS and GOTS applications that will either run on the G20/ G40 locally, or accept streaming data from them. Some are detailed in the next section. Units have a built-in GPS receiver in addition to their 10 MHz reference and PPS inputs, making them flexible to deploy.

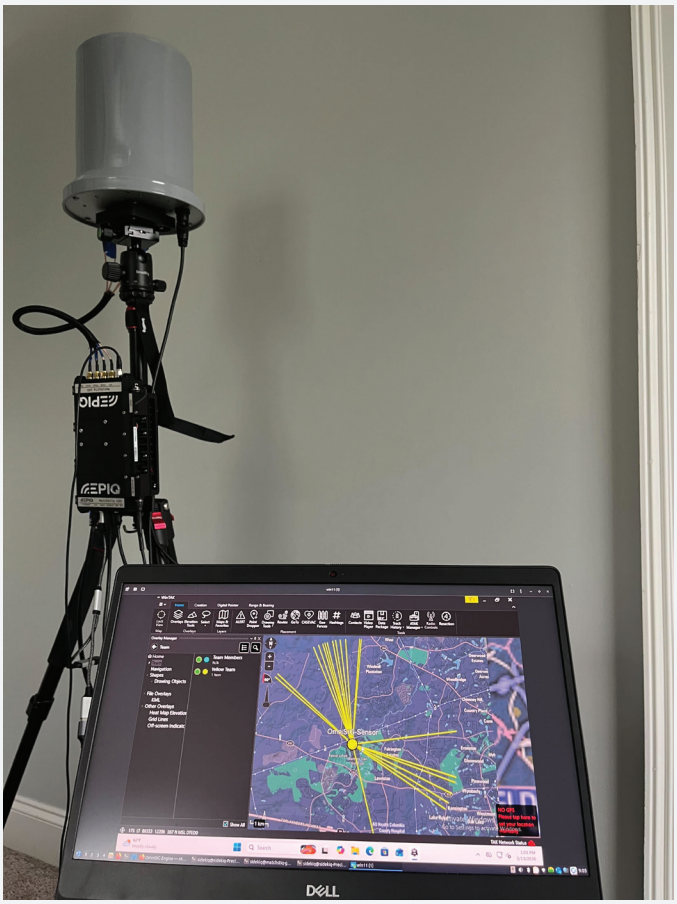


Easy Battery Operation
With a wide 9 – 19 V_{dc} input range and low power consumption of 25 - 30 W typical, the G-series is ideal for power-sensitive and battery-powered applications.

An example deployment scenario as an edge node is provided by the Mission Phoenix kit which is composed of your choice of Matchstiq G20, G40 or X40 SDR together with a cost-effective multi-element 600 MHz to 6 GHz DFH-1100 DF antenna, a tripod, cables, on-board antenna calibration, and DeepSig's OmniSIG DF software, all running on the Matchstiq device. Contact Epiq for more details.

MISSION PHOENIX
RESILIENCE REDEFINED

Self-contained system showing DF results on networked Battle Management Software (BMS)



G40 edge node system with optional 2590 battery cable



Capabilities

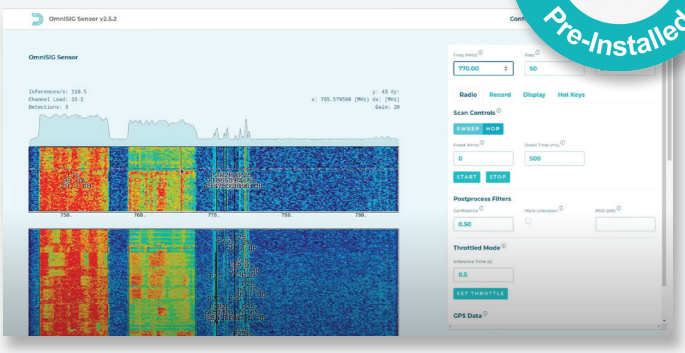
The following partner applications have been tested with the G40 and G40, providing signal classification, direction finding and a wealth of other capabilities out of the box. A trial license of DeepSig's OmniSIG comes pre-installed on models of the G20 and G40.

DEEPSIG OmniSIG

Trial License G20 G40 Pre-Installed

Next Generation RF Awareness

OmniSIG is a machine-learning (ML) software application that provides RF situational awareness to a wide range of radio systems. DeepSig's custom neural network provides real-time identification, classification, and localization of known and unknown RF signals, enables automated alerting and reaction, and open-standards based descriptions of signal activity.

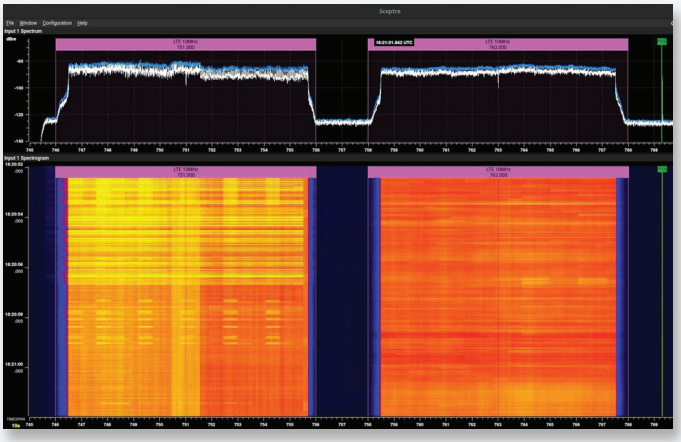


3dB LABS SCEPTRE

Reveal The Unknown

Quickly identify and locate anomalous signals across multiple domains.

Sceptre provides state of the art signal processing software built for real-time and offline spectrum and temporal analysis. Sceptre enables advanced signal discovery through remote spectrum operations, precision geo-location and multi-discipline analysis.

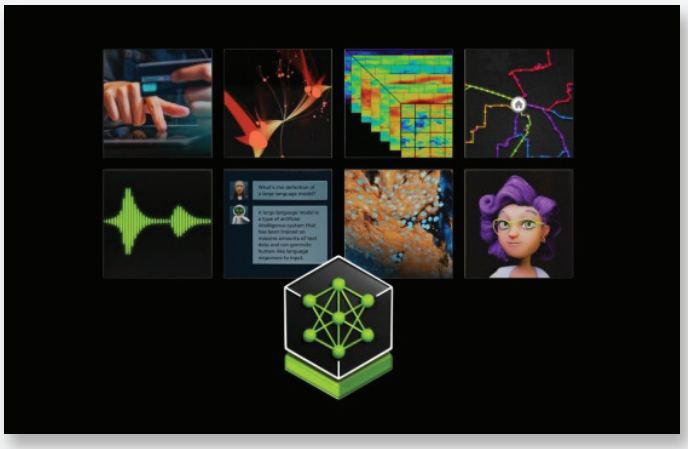


NVIDIA Jetson Orin NX

Jetson Software

The Jetson software stack begins with NVIDIA JetPack™ SDK, which provides Jetson Linux, developer tools, and CUDA-X accelerated libraries and other NVIDIA technologies.

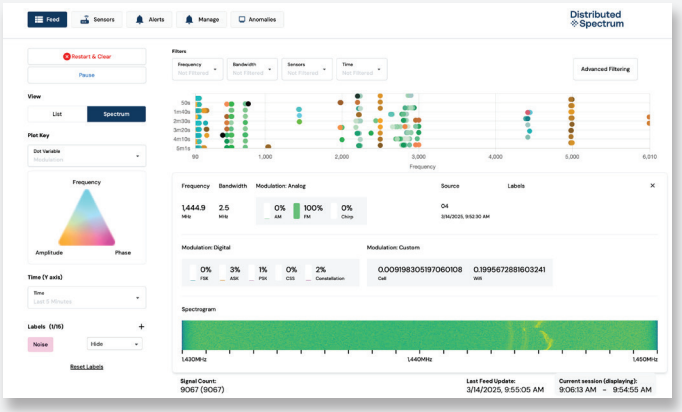
JetPack enables end-to-end acceleration for your AI applications, with NVIDIA TensorRT and cuDNN for accelerated AI inferencing, CUDA for accelerated general computing, VPI for accelerated computer vision and image processing, Jetson Linux API's for accelerated multimedia, and libArgus and V4l2 for accelerated camera processing.



Distributed Spectrum RF VISION

RF Vision is a machine learning (ML) software platform that delivers RF situational awareness across diverse radio systems. Using Distributed Spectrum's specialized ML stack, it can identify, classify, and locate both known and unknown RF signals in real time.

The system supports automated alerts and responses, as well as open-standard formats for describing signal activity. RF Vision outputs can also be seamlessly integrated into ATAK and WinTAK environments to enhance operational awareness and decision-making.



PROCITEC® go2signals

One Piece of Software, Countless Custom Solutions

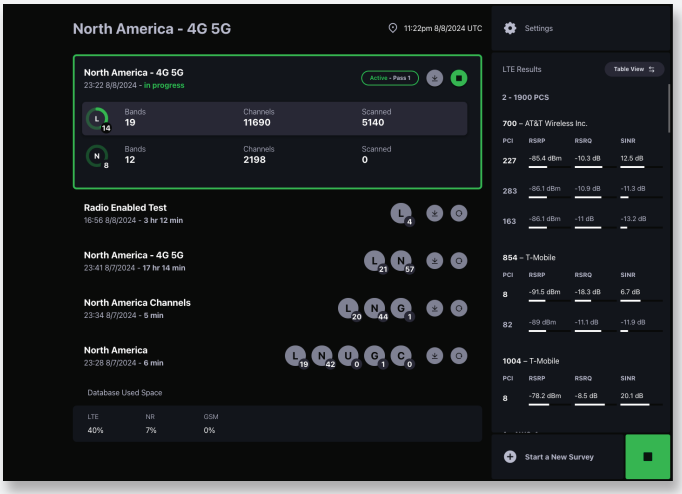
go2signals covers the full spectrum of software-based signal processing. From SLF to SHF, it specializes in HF and V/UHF signals. As the software is modular, freely configurable and universally scalable, it can be adapted to meet your exact needs.

- Functional (signal searching, monitoring, signal processing or analysis)
- Application-specific (be it monitoring the electromagnetic spectrum for FOIs and SOIs, monitoring or indication and threat warning)
- Land, sea or air



EPIQ SKYLIGHT™

Skylight™ is a software application that runs on Epiq's SDRs to provide low SWAP or high-performance cellular survey and wireless network characterization. Skylight™ is for anyone who needs to understand the wireless network environment around them.



The Epiq Family of Products



The G-series is part of our Platforms group of products that contain an accessible CPU which can run Linux or other operating systems and allow them to operate without a host. It goes further by also offering an NVIDIA Orin which gives even more compute capacity as well as an on-board GPU, an attribute shared with the X40 and VNX+ Development Platform.

The tables below show some examples of the Epiq portfolio, with the full range available in the comparison table here.

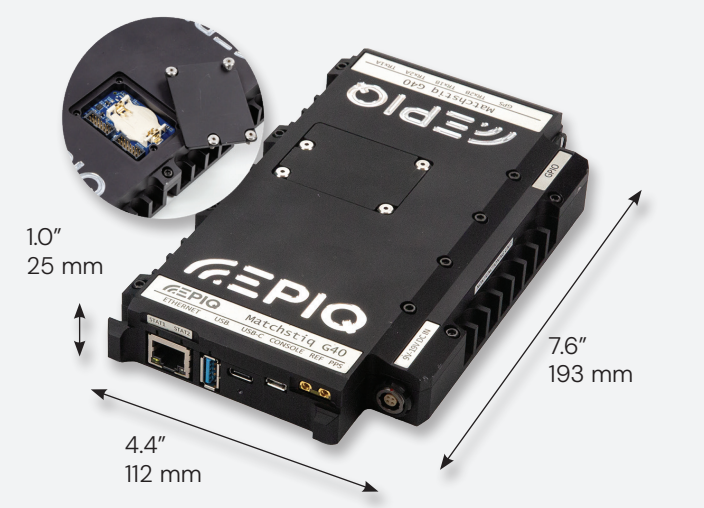
Product	**Matchstiq X40 (6 GHz)**	**Matchstiq X40 (18 GHz)**	**Matchstiq G20**	**Matchstiq G40**
				
Description	GPU-equipped SDR		GPU-equipped SDR with SSD	SWaP-optimized GPU-equipped SDR
Output	Digital			
Max Channels Rx/ Tx	4/ 2	4/ 1	2/ 2	4/ 4
Frequency Range	1 MHz - 6 GHz	1 MHz - 18 GHz	10 MHz - 6 GHz	
IBW Max	450 MHz		50 MHz	
SFDR Typ.	75 dB			
CPU?	Yes			
GPU?	Yes			
Typ. Power Consumption	50 W	65 W	25 W	30 W
Interface e.g.	Ethernet & USB			

Maximum number of Rx, Tx channels, often not simultaneously. SFDR = Spurious Free Dynamic Range. IBW = Instantaneous Bandwidth. Interface example, often others present also.

Product	Sidekiq Z2	Matchstiq Z3u	Sidekiq NV100	Sidekiq NV800
				
Description	Tiny 6 GHz SDR with CPU	Small, packaged 6 GHz SDR with CPU	Small 6 GHz SDR with RF pre-selection	8-Channel 6 GHz VITA 49 streaming SDR
Output	Digital			
Max Channels Rx/ Tx	1/ 1	2/ 1	2/ 2	8/ 1
Frequency Range	45 MHz - 6 GHz		10 MHz - 6 GHz	
IBW Max	50 MHz			
SFDR Typ.	60 dB		75 dB	
CPU?	Yes		-	
GPU?	-			
Typ. Power Consumption	2.5 W	4.5 W	5 W	25 W
Interface e.g.	USB	USB	PCIe	Eth., VITA 49 Streaming

Product	NDR325	NDR585	NDR374	NDR358
				
Description	Mod Payload High Performance SDR	High Performance 3U VPX 18 GHz Tuner	High Performance 8 GHz SDR Rackmount	High Performance 6 GHz SDR Rackmount
Output	Digital	RF	Digital	
Max Channels Rx/ Tx	4/ 0	4/ 0	4/ 0	8/ 0
Frequency Range	20 MHz - 6 GHz	20 MHz - 18 GHz	2 MHz - 6 GHz	20 MHz - 6 GHz
IBW Max	500 MHz		125 MHz	80 MHz
SFDR Typ.	90 dB			
CPU?	Yes	-		
GPU?	-			
Typ. Power Consumption	67 W	48 W	145 W	145 W
Interface e.g.	MAIM	Ethernet (Control)	Ethernet, VITA 49 Streaming	

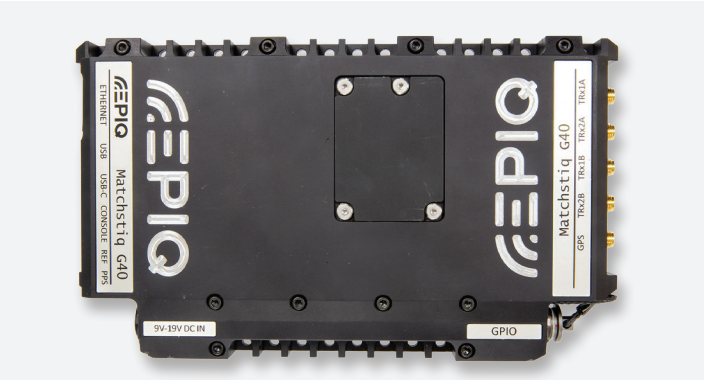
Physical Views

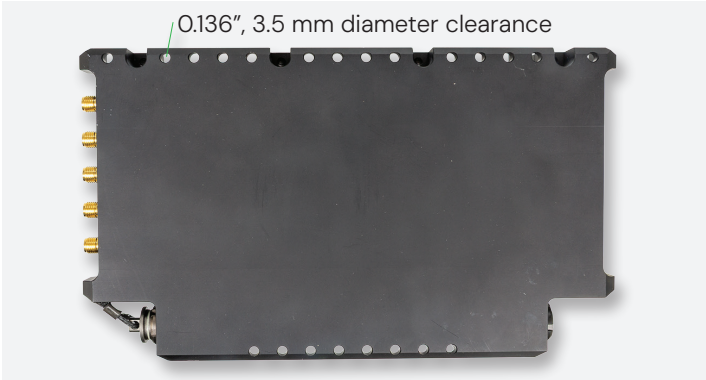


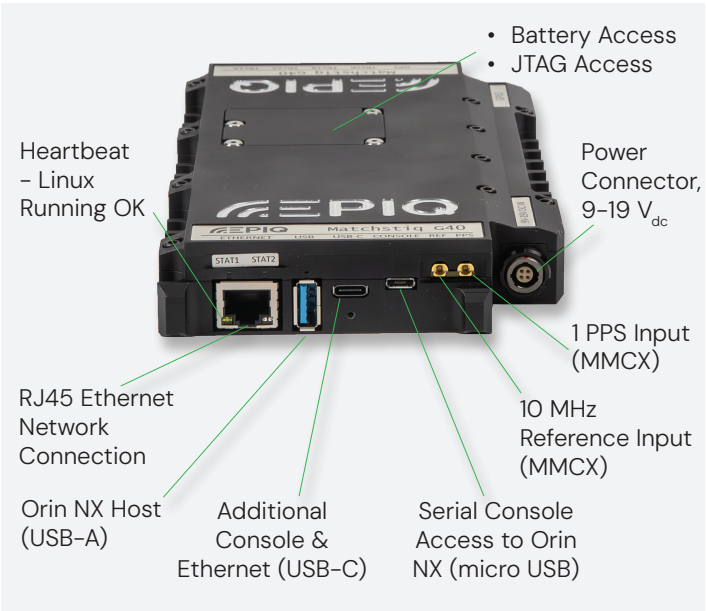


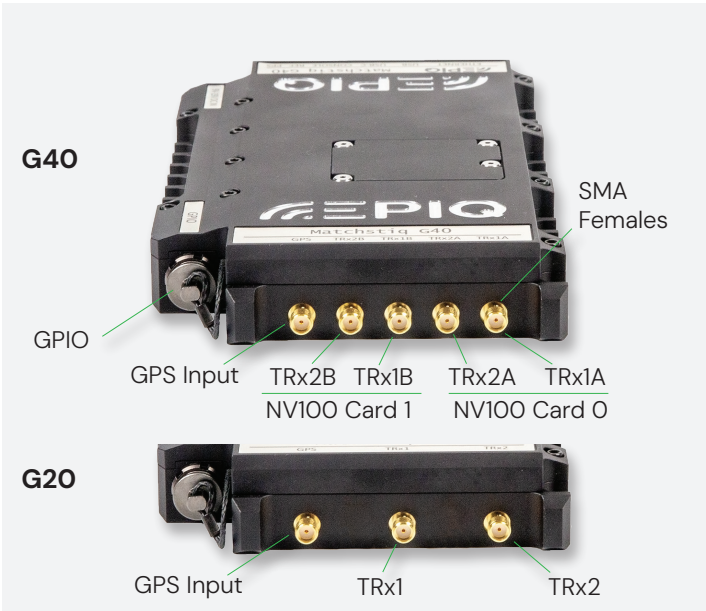












Optional Accessories

Note that G20/ G40 units are shipped with no accessories unless ordered in addition.

PDK Kit

The Platform Development Kit (PDK) contains the same items for the G20 and G40, as follows:

- Matchstiq GXX multi channel flexible SDR
- 12V AC/DC Power Adapter Cable Assembly
- 27 Pin GPIO Cable
- G20/G40 Fan Unit Kit
- PDK license
- Private support forum access for one year for up to three (3) users
- One year hardware warranty
- DeepSig's OmniSIG Trial License



Battery Cables

Two different adapter cables are also orderable:

- G20/ G40 power connector to PRC-148 (~30", 0.75 m)
- G20/ G40 power connector to 2590 (~30", 0.75 m)


PRC-148 cable


2590 cable

Heatsink and Fan Unit Kit

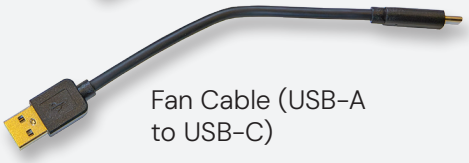
G-series units have very low SWaP, with high power density. They therefore require careful management of heat, with attachment to a cold plate recommended when deployed. To make development easier, a fan kit is available as shown below (G-series SDR not included). Optionally, the fan may be powered by plugging the supplied cable into the USB-A socket on the G-series unit.



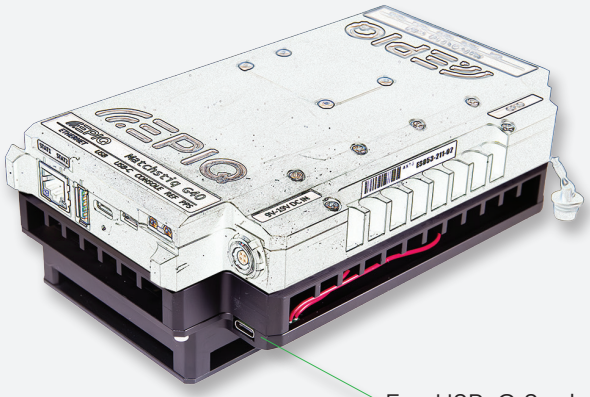
Fan Unit



Mounting Screws



Fan Cable (USB-A to USB-C)



Fan USB-C Socket

Power Brick Kit



US 120V power cable, with a Universal power brick capable of 120/ 240V 50/ 60 Hz operation, delivering 12 V_{DC}, 5 A to the G-series unit.

Power Brick & GPIO Kit

GPIO Pigtail

As Left



Mating Cable Integration Kit

This kit contains two non-RF cables suitable for integration of the G-series units into a wiring harness or battery. These include one each of the power cable, and GPIO cable, each approximately 12" (30 cm) in length. Each cable is shown alongside the corresponding socket on the G-series unit.



GPIO





DC Power



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 high performance 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.

5th August, 2026

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