

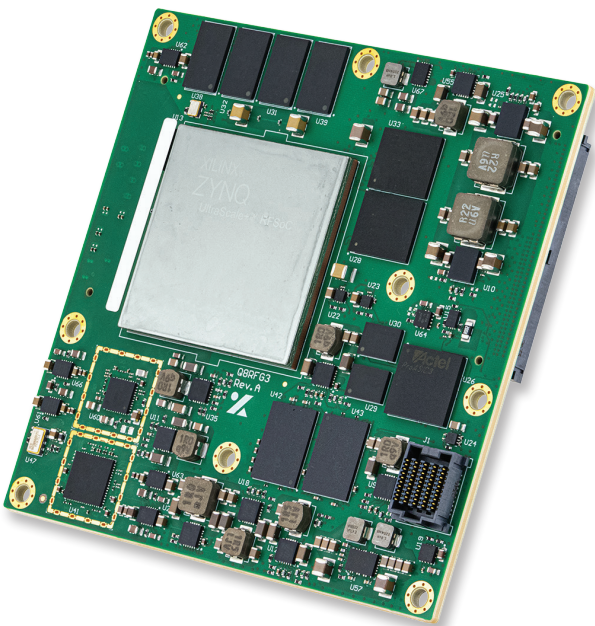
Powerful Third-Generation RFSoc-
Based SDR/Processor Card

Based on the original Q8RF, the Xiphos Q8RFG3 uses the third generation Zynq UltraScale+ RFSocS (RF System-on-Chip) devices which add upgrades to the digitization portion of the architecture, the RF input bandwidth and the ability to synchronize multiple Q8RFG3s together for applications such as digital beam forming. These Zynq devices are highly integrated system-on-chip devices from AMD Xilinx that combine high-speed RF-class ADCs and DACs, programmable FPGA logic, and embedded ARM processors on a single chip.

This architecture enables direct RF sampling and real-time digital signal processing without the need for external data converters or complex analog front ends. By tightly coupling processing and conversion resources, RFSocS significantly reduce system size, weight, power, and latency—making them ideal for advanced RF applications that demand high channel density, wide bandwidth, and low-latency signal chain control.

Xiphos has combined these RFSoc devices with its fault-tolerant space architecture that has been developed over more than two decades to ensure trouble-free operation in-orbit.

The new Q8RFG3 is based on the third generation of Xilinx RFSoc devices which adds upgrades to the digitization portion of the architecture, the RF input bandwidth and the ability to synchronize multiple Q8RFs together for applications such as digital beam forming.



COMPARING MODELS

The Q8RF and **Q8RFG3** are based on different generations of AMD Xilinx RFSoc, providing two different price/performance points to choose from, depending upon the needs of the mission.

Model:	Q8RF	Q8RFG3 <i>(this product)</i>
Storage	2x 32 GB NAND Flash	2x 128 GB eMMC
RFSoc Model	ZU28DR	ZU48DR
ADCs	8, each 4.096 GSPS max; 12-bit	8, each 5.0 GSPS max; 14-bit; Improved interleaving architecture and associated spurious
RF Input Frequency, max	4 GHz	6 GHz
DACs	8, each 6.5554 GSPS max; 14-bit	8, each 9.85 GSPS max; 14-bit
Decimation/ Interpolation	1x, 2x, 4x, 8x	1x, 2x, 3x, 4x, 5x, 6x, 8x, 10x, 12x, 16x, 20x, 24x, 40x
Multi-Chip Synch		Greater scalability and tighter synchronization



FEATURE HIGHLIGHTS

INDUSTRY-LEADING PERFORMANCE

The Q8RF family extends the capability of Xiphos' Q-Card line with an embedded multi-channel RFSoc (RF System On Chip). Like other Q-Cards, it provides a heterogeneous compute architecture including a full ARM processing subsystem and extensive FPGA fabric. It adds complete analog/digital programmability across the RF signal chain.

LOW MASS, VOLUME, POWER

The Q8RFG3 measures 100 mm x 100 mm x 20 mm and consumes as little as 20 W. Its small size, low mass and power consumption make it ideal for multi-channel RF applications that demand extremely high performance.

INTEGRATED HYBRID ENVIRONMENT

The Q8RFG3 provides a tight integration of RF ADC and DACs, a quad core ARM Cortex A53 Application Processing Unit, a dual core ARM Cortex R5 Real Time Processing Unit, and massive programmable logic resources for application-specific use.

PRODUCT INTEGRATION MODULE (PIM)

Each Q8RFG3 is delivered with a detachable PIM to facilitate development. The PIM provides standard commercial interfaces (e.g. JTAG, USB), and other lab development features.

SOFTWARE DEVELOPMENT

Xiphos provides an Application Development Kit with standard Linux libraries for C/C++ to support software development on Linux workstations. Code previously developed for Linux desktop and server applications can be easily ported to the Q8RF family. Q8RF hardware and logic interfaces are all accessible through either standard Linux and Xilinx kernel drivers or custom drivers provided by Xiphos.

LOGIC DEVELOPMENT

Logic development uses standard Xilinx development tools. Xiphos, Xilinx and many third party vendors also provide a wide range of compatible reusable logic cores for Xilinx FPGAs.

FLEXIBLE INTERFACING

The Q8RFG3 provides 8x RF ADCs and 8x DACs, external Ref Clock(s) Inputs, and a Ref Clock Output through its RF mezzanine connector.

It also provide multiple digital I/O lines, including 1.8V/3.3V GPIO, LVDS, 28.21 Gbps GTY transceivers supporting PCIe Gen 3 & 100G Ethernet, and GTR transceivers supporting PCIe Gen 2 & SATA through digital mezzanine connectors.

APPLICATIONS

The extremely high performance and extensive FPGA fabric and RF ADCs/DACs make the Q8RFG3 ideally suited for applications such as:

- Multi-band advanced Software Defined Radios (SDR)
- Broadband Comms
- IoT
- Digital Beam-forming Networks
- Synthetic Aperture Radar (SAR)
- RF Monitoring & Signal Intelligence (SIGINT)

RADIATION ROBUSTNESS FEATURES

- Triple mode redundancy in Control FPGA
- EDAC-protected RAM
- Upset and multi-current monitoring
- Over-current protection (multiple)
- FPGA bit stream scrubbing
- Software robustness/ watchdog

CHARACTERISTICS

Model:	Q8RFG3
Environmental Characteristics	
Temperature (operating)	De-rated to -40 to +60 °C
Size	100 mm x 100 mm x 20 mm
Weight	200 g
Power (typ.)	25–35 W @ 5–15 V
Memory	
Memory	• 4 GB PS LPDDR4 DRAM (with EDAC) • 4 GB PL DDR4 DRAM • 2x 256 MB QSPI Flash (NOR)
Storage	2x 128 GB eMMC
RFSoc	
Model	ZU48DR
Application Processing Unit	Quad-core ARM Cortex A53 Application Processing Unit at up to 1.2 GHz
Real-Time Processing Unit	Dual-core ARM Cortex-R5 @ 500 MHz
ADCs	8, each 5.0 GSPS max; 14-bit
RF Input Frequency, max	6 GHz
DACs	8, each 9.85 GSPS max; 14-bit
Decimation/ Interpolation	1x, 2x, 3x, 4x, 5x, 6x, 8x, 10x, 12x, 16x, 20x, 24x, 40x
System Logic Cells	930,000
CLB Flip Flops	850,000
CLB LUTs	425,000
DSP Slices	4,272

Model:	Q8RFG3
Control FPGA	
	Microchip ProASIC3
Operating System	
	Yocto Linux BSP (LTS distribution)
Bottom RF Mezzanine Connector	
	• 8x Transmit + 8x Receive RF • Ext Ref Clock(s) In
Bottom I/O Mezzanine Connector	
	• 46x LVDS or 92x 1.8V GPIO, 39x 3.3V GPIO • 16x 28.21 Gbps GTY transceivers supporting PCIe Gen 3 & 100G Ethernet • 3x GTR transceivers supporting PCIe Gen 2 & SATA

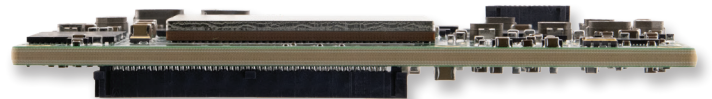
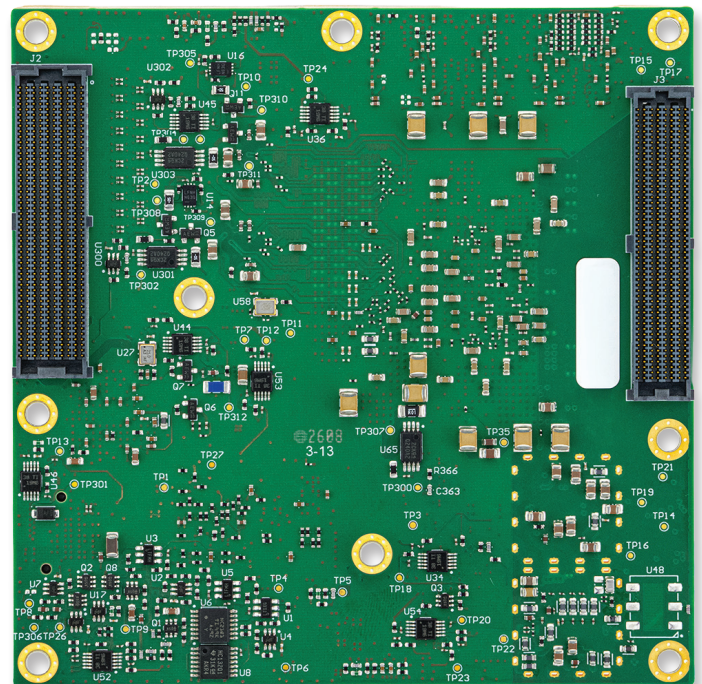
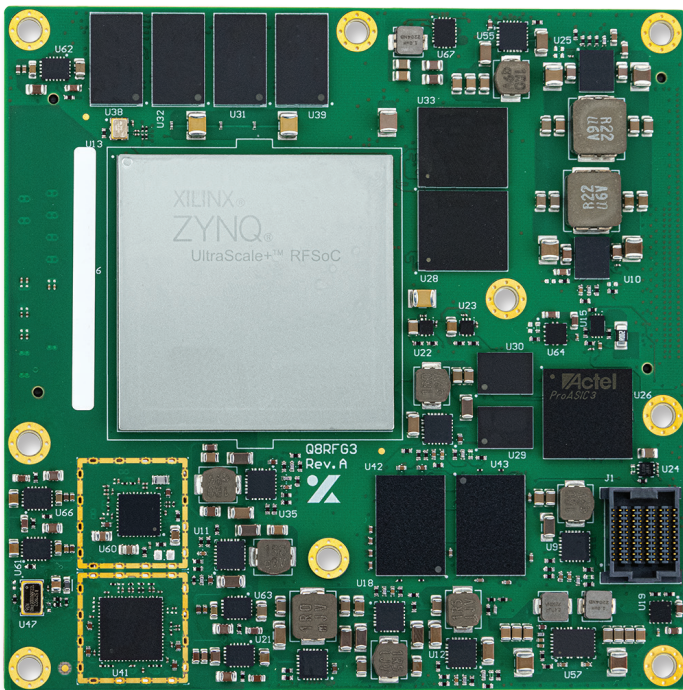
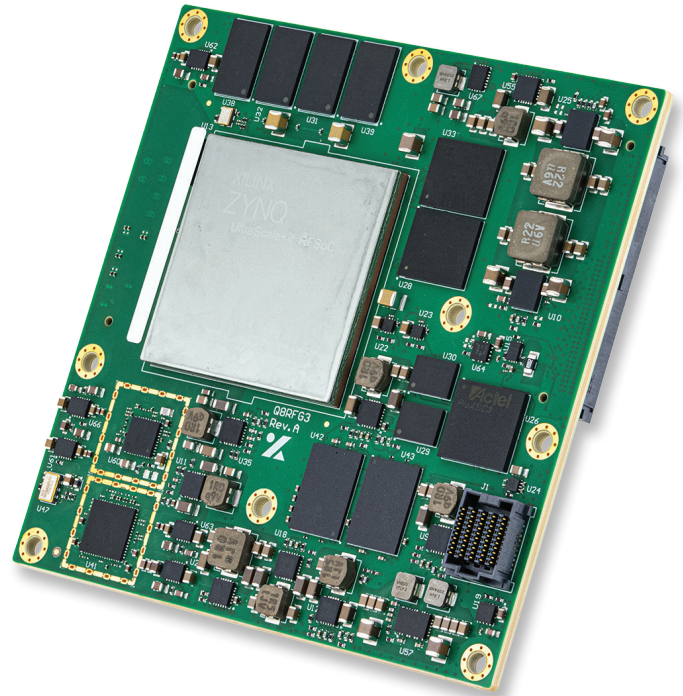
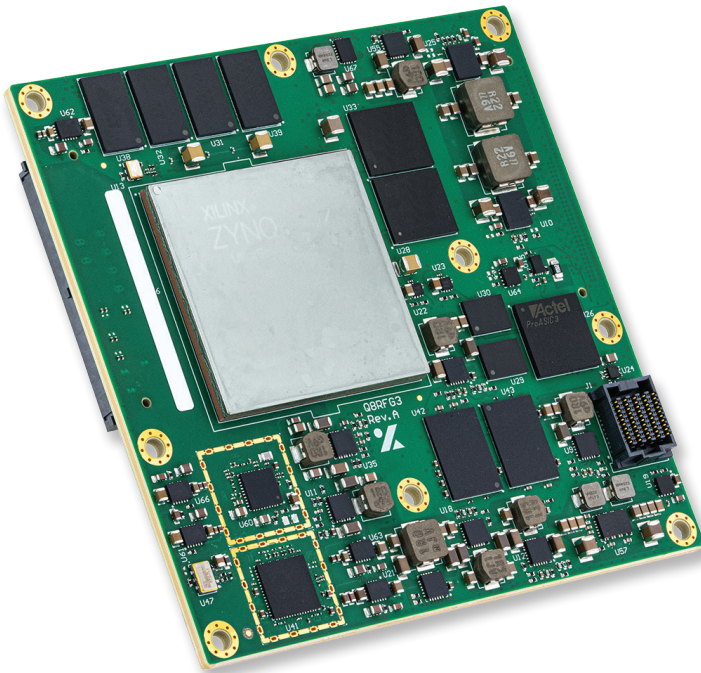
ENGINEERING MODEL (EM) VS. FLIGHT MODEL (FM) OPTIONS

	EM	FM
IPC Class	Class 2	Class 3
Acceptance Temperature Range	Room Temperature	Flight Levels, -40 to +60 °C
Conformal Coating Available	No	Yes
EIDP Available	No	Yes
Extended Warranty Available	No	Yes
PIM & Accessories Supplied	Yes	No

- EMs ship with PIM/ fansink mounted and include accessories
- FM's ship without PIM/ fansink and do not include accessories

MECHANICAL VIEWS

Q8RFG3



Q8RFG3 ORDERING INFORMATION



Use the QR code at right to be taken to the Q8RFG3 product page to request a quote.

Q8RFG3-001

- Standard engineering and flight model configuration. This model is used by customers to mate with their custom daughter board. Development can begin right away leveraging the power, Ethernet, Linux console and digital interfaces provided by the PIM.

Q8RFG3-002

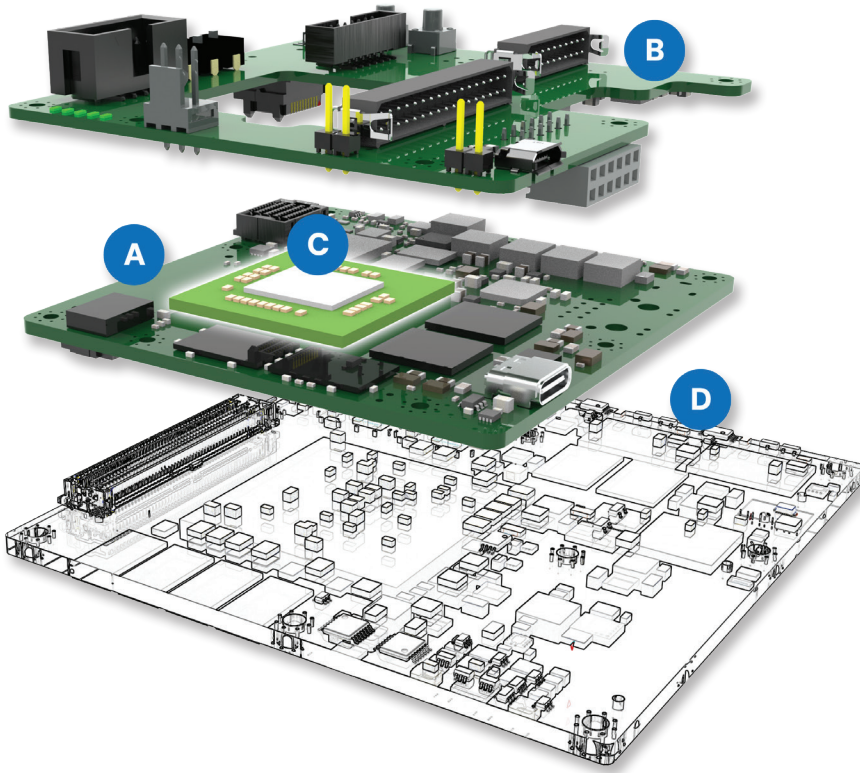
- This model comes installed on a RF breakout board to support RF testing right away but is otherwise identical to Q8RFG3-001.

	Q8RFG3-001	Q8RFG3-002
EM Uncoated	XS011-10002-002-02-A	XS011-10005-001-02-A
FM Uncoated	XS011-10001-001-01-A	-
FM Coated	XS011-10001-002-01-A	-
Startup Voltage	5.0 V	
Brownout Voltage	4.5 V	
Global Hardware Over-current Limit	3 A	
PUDC option (Pull-Up During Configuration)	Pull-up active	
RF DAC onboard PLL bypass	Onboard PLLs	
RF ADC onboard PLL bypass	Onboard PLLs	
RF SYSREF clock coupling	DC coupled	
VCXO Configuration	122.88 MHz	
GTY and GTR AC Coupling capacitor value	100 nF	
Serial Comms		
ttyPS0 routing (RDP)	PIM serial to USB connector	
ttyPS1 routing (RDP)	Serial port pins in the mezzanine connector	RS422 on Breakout Board J2
ttyPS2 routing	Serial port pins in the mezzanine connector	RS422 on Breakout Board J2

DEVELOPING WITH XIPHOS

It's All Included.

Xiphos delivers flight-ready processor hardware as a complete, open development platform: Linux boots out of the box, baseline FPGA logic is already configured, the PIM and cables provide immediate console/ network/ JTAG access, and customers retain low-level flexibility instead of being locked into a closed or bare-metal environment. More specifically:



1. Ready to Use Out of the Box

Xiphos products (A) are designed to accelerate development from the moment they are powered on. Rather than requiring customers to perform extensive low-level hardware bring-up, each processor boots directly into Linux and provides immediate access to a command-line interface. Developers can begin building and testing their applications right away, reducing integration effort and shortening time to productivity.

2. The PIM is Included as Part of Every Board Package

The Product Integration Module (PIM) (B) gives customers everything they need to begin development immediately. It provides convenient access to console, networking, JTAG, power, test, and other key interfaces in a lab-friendly format. These capabilities are included as part of the platform, not as an add-on, allowing teams to focus on development instead of building their own integration infrastructure.

3. Open Platform. Unlimited Flexibility.

Xiphos products are designed to grow with your application. Out of the box, they include baseline FPGA logic (C) and Linux drivers that initialize the processor board and PIM interfaces, as well as any Xiphos daughter board, while supporting the Linux development environment. For advanced users, the reference design and Vivado skeleton project serves as a proven foundation for developing custom FPGA logic and software and integrating mission-specific daughter cards (D), providing maximum flexibility without sacrificing ease of use.

4. Supports Both Software-First and Hardware Integration Workflows

Whether your priority is software or hardware, Xiphos products provide the right starting point. Software teams can begin developing immediately with the out-of-the-box Linux environment, while hardware teams can use the PIM and daughter-board architecture to implement custom I/O, FPGA logic, and mission-specific functionality. The PIM exposes the essential interfaces needed for early development, and the daughter board provides the flexibility for full system integration. Start simple. Scale to a fully customized solution.

5. And There's More...

Xiphos delivers a complete development ecosystem, not just a processor board. Customers receive access to a dedicated support portal with direct Engineering support, a comprehensive Wiki containing 3D models, user manuals, ICDs, and other technical resources, and an SDK that is available as soon as an order is placed – before the hardware even ships. Built on a Yocto Linux Board Support Package (BSP) using a Long-Term Support (LTS) distribution, Xiphos platforms provide a robust and stable software foundation from day one, enabling teams to develop faster and integrate with confidence.

Q8RFG3 INCLUDED ACCESSORIES

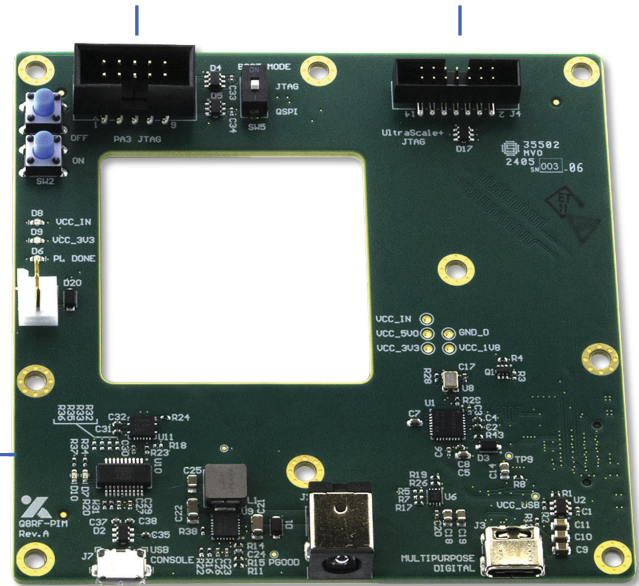
Q8RF and Q8RFG3 EM units ship with the following as standard:

- Product Integration Module (PIM)
- 12V output wall-mount power supply
- Fansink cooling assembly
- Ethernet Adapter to USB-A Male
- USB-C to female USB-A cable
- Male Micro USB

PA3 SUPERVISOR FPGA JTAG

ULTRASCALE+ FPGA JTAG

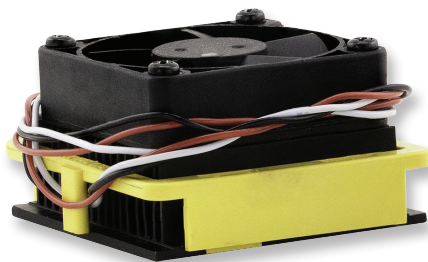
Q8RF/
Q8RFG3 PIM



12V output wall-mount power supply



Ethernet Adapter to USB-A Male



Fansink cooling assembly



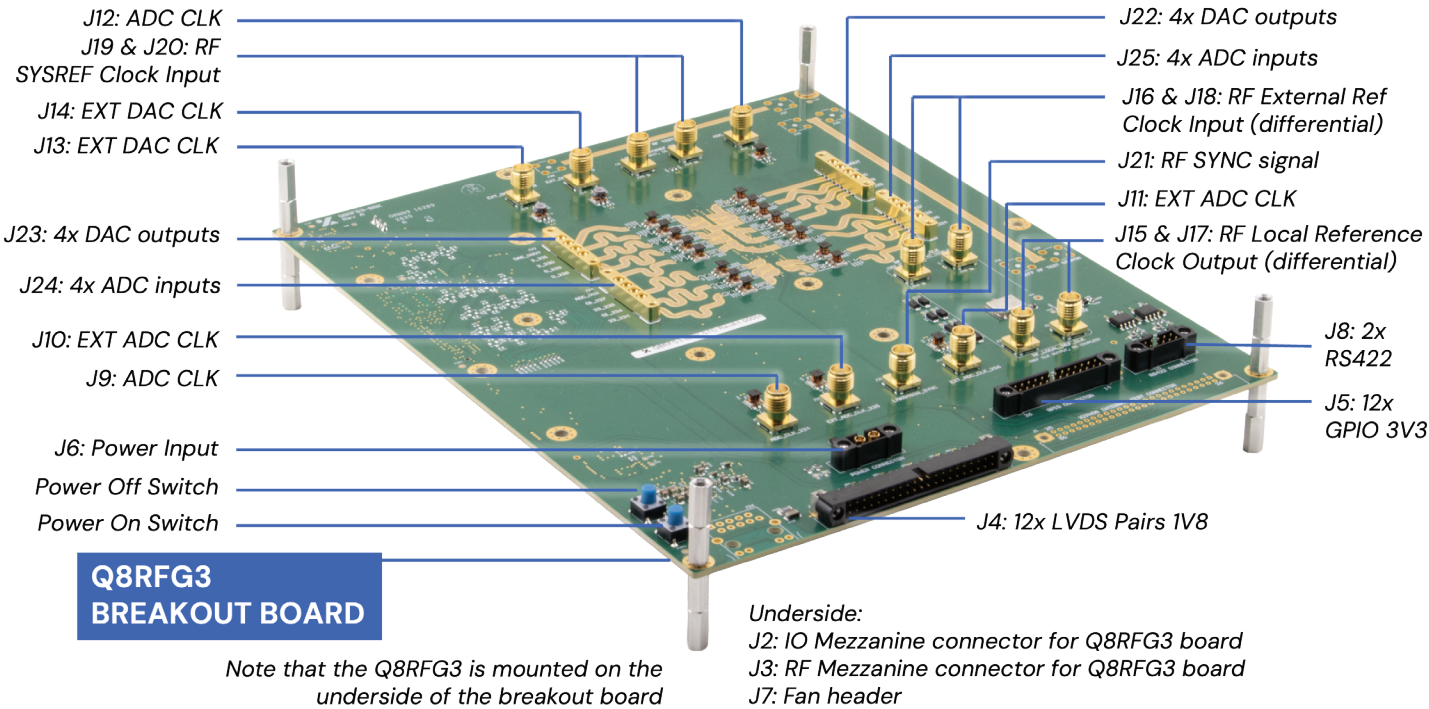
USB-C to female USB-A cable



Male Micro USB

Q8RFG3 OPTIONAL BREAKOUT BOARD

An optional breakout board is available to aid faster development, as shown below. Q8RFG3 not included.



WHY CHOOSE XIPHOS?

Faster Time to Launch Using COTS Processing With Heritage

FLIGHT-PROVEN PROCESSORS:

Space-hardened, COTS-based computing solutions deployed across hundreds of commercial, civil and defense missions.

HIGH PERFORMANCE:

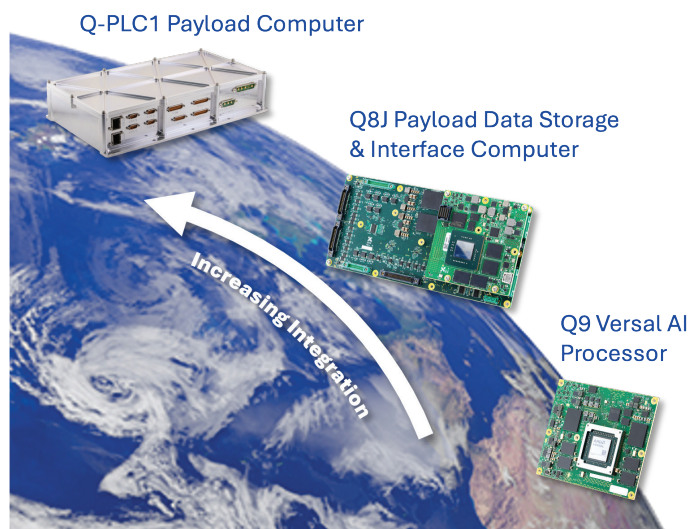
Products offer impressive processing, networking, RF and storage performance by leveraging state-of-the-art commercial devices.

COST-EFFECTIVE PERFORMANCE:

Delivers high performance and reliability at a fraction of the cost of traditional space processors.

SCALABLE SOLUTIONS

Flexibility across the design stack ensures the right level of integration for your use case.



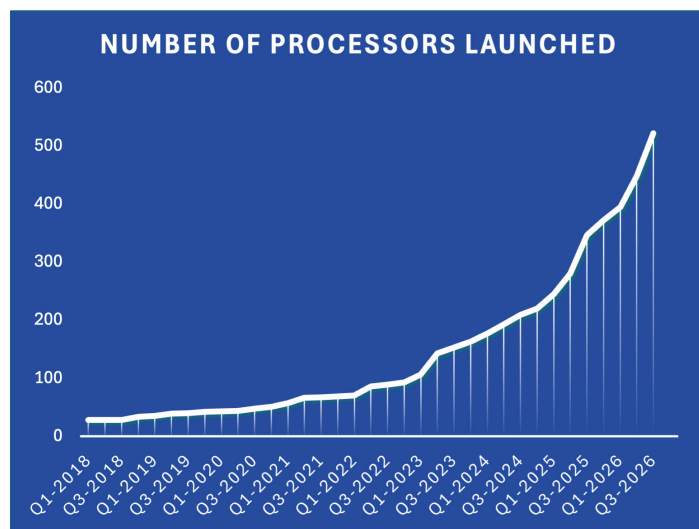
ABOUT XIPHOS

Xiphos, based in Montreal and part of Epiq Solutions since 2023, has over 20 years of experience delivering thousands of low-SWaP-C COTS-based processor cards for space applications including satellites, landers, rovers, and space stations. Known for high reliability, radiation tolerance, and strong customer support, Xiphos specializes in compact processing solutions using cutting-edge processors for commercial, scientific, and military missions.

IMPRESSIVE HERITAGE:

We've been a new space company for more than 20 years and have delivered many thousands of cards. In that time, we've accumulated a LOT of experience that you get to benefit from when you partner with us.

As of August 2026, our cumulative Q-Card time on orbit stands at more than 750 years.



COMPACT, EFFICIENT, FLEXIBLE:

Ideal for spacecraft, unmanned systems, and robotics requiring small size, low power, and adaptability.

CERTIFIED QUALITY:

AS9100 and ISO 9001:2015 certified; explore our FPGA-based multiprocessors, SoCs, and advanced subsystems.

ENHANCED COTS SOLUTIONS

Optimizes the cost & performance trade while still providing radiation robustness

OPEN ARCHITECTURE DESIGNS

Enables development across a variety of toolkits

SHORTER LEAD TIMES

Shipping 500+ processors annually

30th September, 2026