

Q8 SPECIFICATIONS

FEATURE HIGHLIGHTS

INDUSTRY-LEADING PERFORMANCE

The Q8 features a Multi-Processor System-on-Chip (MPSoC), including multi-core CPUs providing 64-bit processor scalability supported by programmable logic resources and a wide array of hardware interfaces.

LOW MASS, VOLUME, POWER

The Q8 measures 80 mm x 80 mm x 11.2 mm and consumes as little as 5 W. Its small size, low mass and power consumption make the Q8 ideal for aerospace applications that demand extremely high performance.

INTEGRATED HYBRID ENVIRONMENT

The application space in a Q8 is a tight integration of a quad core ARM Cortex A53 Application Processing Unit, a dual core ARM Cortex R5 Real Time Processing Unit, an ARM Mali 400 GPU, and programmable logic featuring 504,000 system logic cells, 461,000 flip flops, 274,000 lookup tables and 1,728 DSP slices reserved for application-specific use.

FLEXIBLE INTERFACING

The Q8 provides Gigabit Ethernet networking through its RJ45 connector along with a USB 2.0/USB 3.1 Gen 1 Host port. The Q8 also provides multiple digital I/O lines, including up to 52 GPIO, 12 MIO, 64 LVDS pairs, 3 Gigabit transceivers, USB 2.0 and factory selectable RS-232/422/485 through its mezzanine connector.

OVERVIEW

The Q8 is part of the highest performance family of Q-Card processors that is based on the Xilinx Zynq UltraScale+ MPSoC FPGA. For a modest size, weight, and power increase, it offers additional processing, logic, and I/O capacity over the Zynq 7020-based Q7 processor card. Q-Cards combine a small form factor with broad networking, processing, and I/O capabilities. At the core of each Q8 is a hybrid environment of powerful multi-core CPUs and reprogrammable logic, providing flexible and scalable performance.

APPLICATIONS

The extremely high performance and extensive FPGA fabric make the Q8 ideally suited for onboard:

- High resolution camera interfacing and control
- Onboard image processing
- Synthetic Aperture Radar (SAR) processing
- Hyper/multispectral compression
- Image registration and alignment
- Convolutional neural networks
- Advanced Software Defined Radios (SDR)

PRODUCT INTEGRATION MODULE (PIM)

Each Q8 is delivered with a detachable PIM to facilitate development. The PIM provides standard commercial interfaces (e.g. CAN, RS-232/422/485, 1-Wire, 13 GPIO, 8 analog inputs, 4 analog outputs, JTAG), debug LEDs 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 Q8. Q8 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.

FLIGHT HERITAGE

The Q8S, the Flight Model (FM) version of the Q8, has been flying since September 2020.:

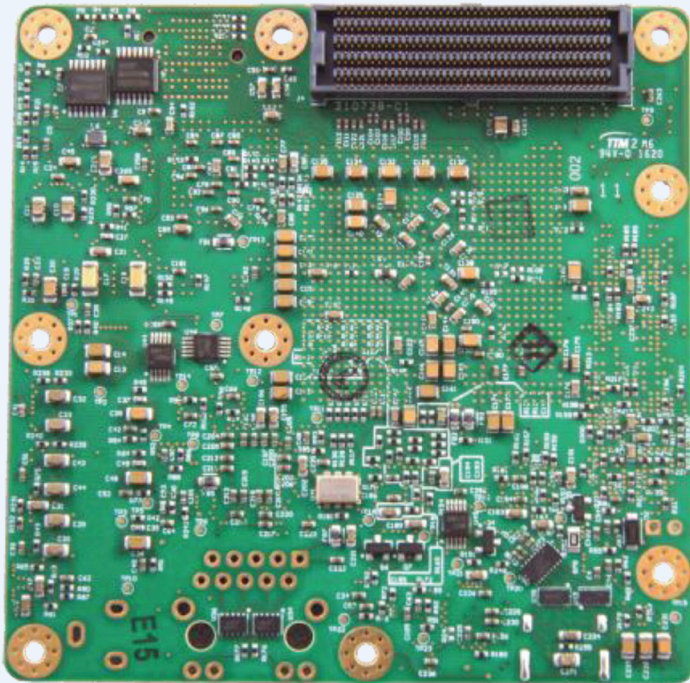


Other flight heritage products in the current Xiphos Q-Card family include the Q7S and Q8JS



Xiphos has been flying previous generations of the Xiphos Q-Card family since 2002

FRONT & BACK



CHARACTERISTICS

MEMORY

- 4 GB LPDDR4 DRAM with EDAC
- 2x 256 MB QSPI Flash (NOR)
- 2x eMMC, 128 GB each, on independent buses / power control

MULTI PROCESSOR SYSTEM ON CHIP

- Xilinx Zynq UltraScale+ XCZU7EG
- Quad core ARM Cortex A53 Application Processing Unit at up to 1.2 GHz
- Dual core ARM Cortex R5 Real Time Processing Unit at up to 500 MHz
- ARM Mali 400 GPU at up to 600 MHz
- 504,000 system logic cells
- 461,000 flip flops (FF)
- 274,000 lookup tables (LUT)
- 1,728 DSP slices

CONTROL FPGA

- Microchip ProASIC3

OPERATING SYSTEM

- Yocto Linux BSP (LTS distribution)

REAL TIME CLOCK

- RTC with sleep & wake up on alarm/interrupt
- Dedicated power pin for external battery

POWER

- 5 W, typical
- 5 to 16 VDC
- Various power modes (including deep sleep)
- Overcurrent detection & protection (global and local) and brownout protection

FORM FACTOR

- 85.8 mm x 80 mm x 22.6 mm, 64 g (with RJ45 and power connectors)
- 80 mm x 80 mm x 11.2 mm, 56 g (without connectors)

ENVIRONMENTAL

- Operating Temperature -40 to +60C

INTERFACES

- Power
- Gigabit Ethernet (RJ45)
- 1x USB Type-C Host port (USB 2.0 & USB 3.1 Gen 1)
- CAN Bus controller (in logic)
- Up to 38 single-ended GPIO 3.3 V, 14 single-ended GPIO 1.8 V, 12 MIO 1.8 V, 64 LVDS pairs/128 single-ended GPIO 1.8 V, 3 Gigabit transceivers (SATA, PCI express), USB 2.0, and factory-selectable RS- 232/422/485 (Mezzanine connector)

Q8S FLIGHT MODEL INCLUDES

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