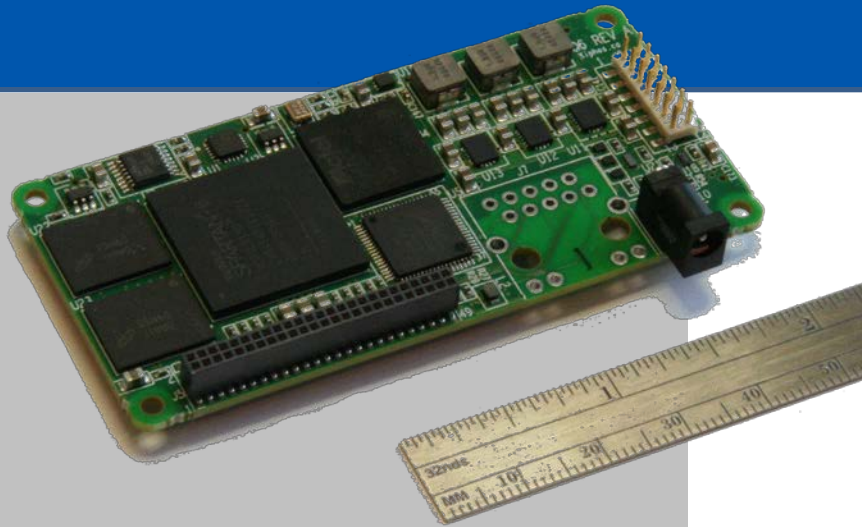


# Q6 SPECIFICATIONS



# Q6

## FEATURE HIGHLIGHTS

### High Performance

The Q-Card family is comparable to CPUs operating at GHz speeds and can provide more than 10x performance improvement in terms of instructions per Watt for optimized applications.

### Low Mass, Volume, Power

The Q6 measures 78 mm x 38 mm x 12 mm, has a mass of 17 g (excluding connectors) and consumes 1 W for typical applications. Its small size, low mass and power consumption make the Q6 ideal for aerospace applications.

### Integrated Hybrid Environment

The application space in a Q6 is a tight integration of one or more MicroBlaze soft processors and programmable logic, featuring 138,000 flip-flops and 69,000 look-up tables reserved for application-specific use.

### Flexible Interfacing

The Q6 provides 10/100 Ethernet networking through its RJ45 connector. The Q6 also provides multiple analog and digital I/O lines, and can provide USB, FireWire, SpaceWire and RS-232 through its mezzanine connectors.

### Fault – Tolerant

Fault tolerance features include:

- Q6 can detect and correct faults within itself
- Combination of software and logic processing creates an excellent fail-safe environment; both can also be made triple mode redundant
- RAM designed to support EDAC techniques
- Independent RAM and independent MicroSD provide redundancy

## OVERVIEW

The Q6 is part of the Xiphos Q-Card family of low-cost, embedded nodes for control, processing and interface applications, primarily for aerospace markets. Q-Cards combine a small form factor with broad networking, processing and I/O capabilities. As an individual network entity, each node runs its own network stack and command handling functions.

At the core of each Q6 is a hybrid environment of reprogrammable logic and a soft processor core, providing consistent, reliable performance. The library of logic and software functions is augmented by onboard analog and digital I/O.

## FLIGHT HERITAGE

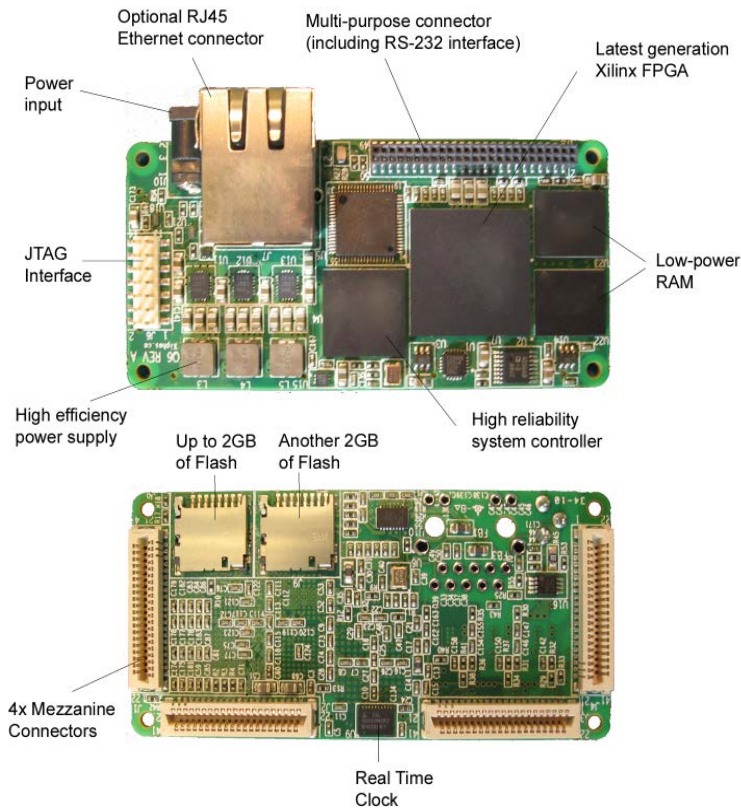
The Q6 is the latest in a line of spaceflight-ready boards. The first flight of the Q6 is planned for 2011. The Q6's predecessors include the Q5 and Q4:

- The Q5 was first flown in June 2004 and has been operating continuously in orbit since June 2006
- The Q4 is certified for manned space flight and has been used on the International Space Station



# Q6

## Actual Size



### Software Development

Xiphos provides an Application Development Kit with standard Linux libraries for C/C++ to support software development on Windows and Linux workstations. **Code previously developed for Linux desktop and server applications can be easily ported to the Q6.**

Q6 hardware and logic interfaces are all accessible through either standard Linux and Xilinx kernel drivers or custom drivers provided by Xiphos.

For MathWorks users, Xiphos offers an Embedded Real-time Target for Real-Time Workshop, allowing applications to be developed in Simulink and Stateflow.

### 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.

## Characteristics

### Memory

- 2 independent 128 MB LPDDR RAM chips on independent buses
- 2 MicroSD slots (max. 2 GB each) on independent buses

### Application FPGA

- Xilinx Spartan-6
- 138,000 flip-flops (FF) and 69,000 look-up tables (LUT)
- One or more 32-bit MicroBlaze soft processors with optional FPU
- Optional alternate soft CPUs (eg LEON3)

### Control FPGA

- Actel ProASIC3

### Operating System

- Linux 2.6
- Optional alternative configurations, including XilKernel or standalone

### Real Time Clock

- RTC with sleep and wake-up on alarm/interrupt

### Power

- Scalable, typ. 1 W
- 3.3 V to 5.5 V
- Variable power modes (including deep sleep)
- Overcurrent detection and protection

### Mass

- 23 g with RJ45 connector
- 17 g without RJ45 connector

### Form Factor

- 78 mm x 38 mm x 19 mm (with RJ45 connector)
- 78 mm x 38 mm x 12 mm (without RJ45 connector)

### Environmental

- Operating Temperature -40C to +85C

### Interfaces

- RJ45 (10/100 Ethernet)
- Multi-purpose connector (RS-232, Analog and digital I/O)
- Mezzanine connectors (90 application FPGA I/O, 10 control FPGA I/O, 8 analog output, 7 analog input)
- JTAG

### Standard Expansion Modules

- Power card (includes additional power conditioning features, as well as CAN, SpaceWire and Ethernet interfaces)
- Analog and Digital Interface Module
- USB/FW/Serial Interface Module
- Motor Drive Module