



A passion for performance.

**SpaceWire Products from  
Aeroflex Colorado Springs:**

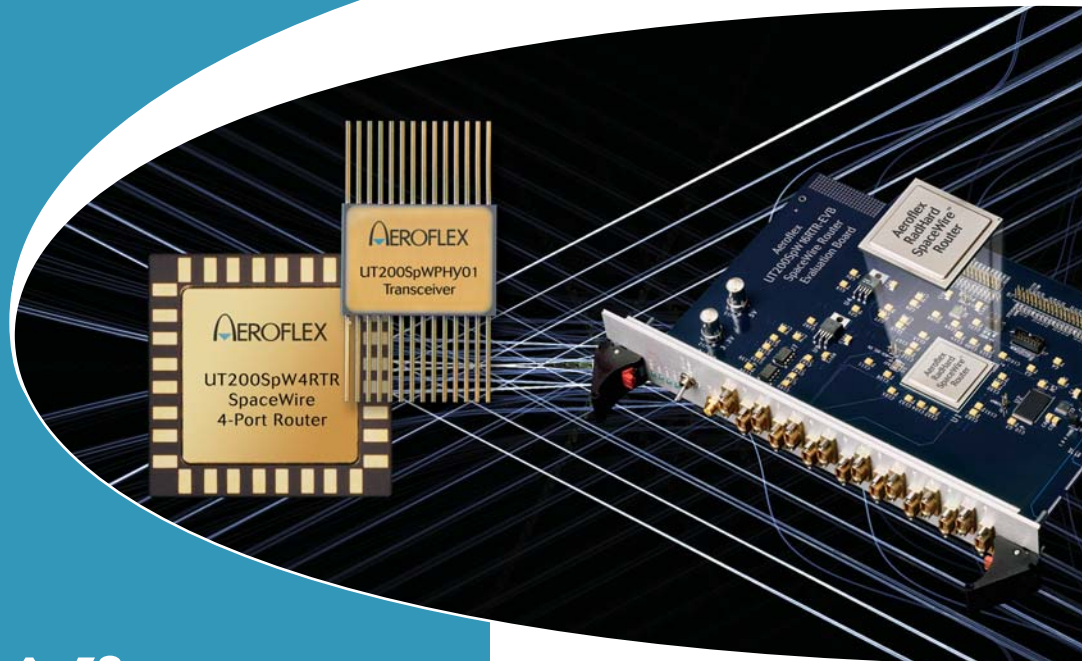
**Physical Layer Transceiver**

**Protocol Handler IP**

**Routers**

**Evaluation Boards**

**Test Equipment**



# SpaceWire Family

## What is SpaceWire?

SpaceWire is a standard that governs serial communication among systems. Originally developed by The European Cooperation for Space Standardization (ECSS), their goal was a high-speed, low-power serial interface to communicate with a simple user interface. ECSS's goal was accomplished by marrying IEEE-1355 with an LVDS physical layer. This standard supports data rates of 2Mbits/sec to 400Mbits/sec over 10 meters of cable.

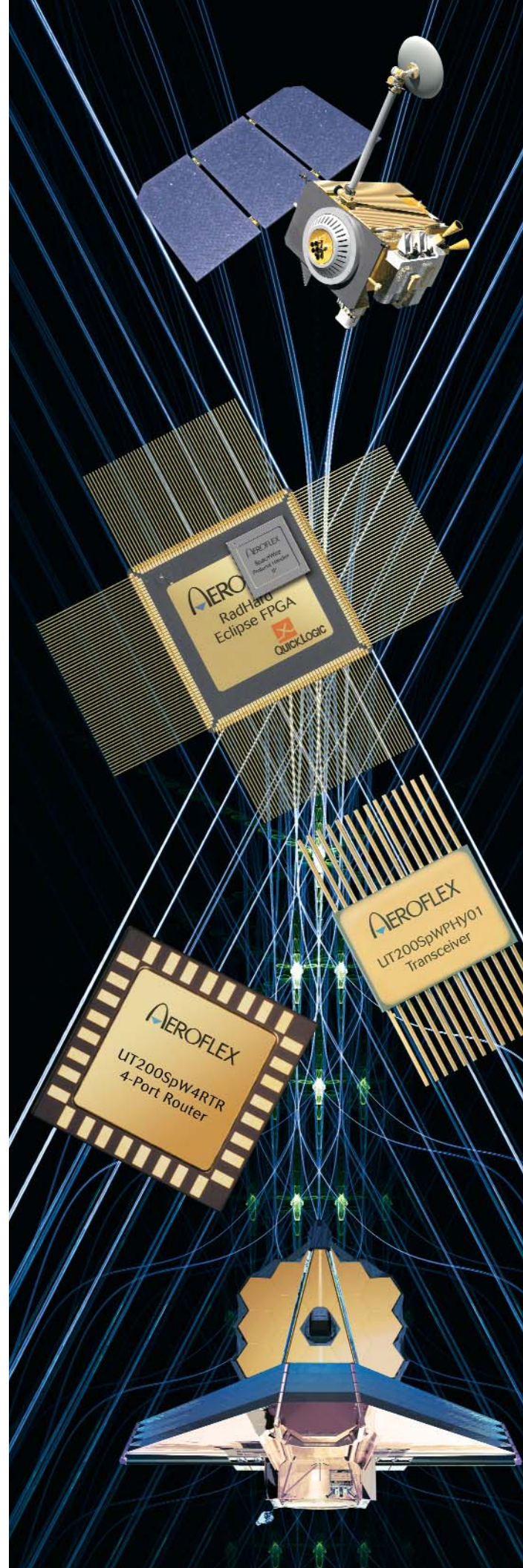
### THE PROBLEM

Since 1999, Aeroflex has worked with our aerospace customers to assist them in transmitting large amounts of data using our flight-proven LVDS products. The problem was that missions were becoming more and more complex every day. Our customers required a low-overhead, high-performance, easy-to-implement serial databus solution.

### THE SOLUTION

SpaceWire offers real-time data communications between sensors, memory units, and processors. Using a network router, many network configurations are possible allowing trade-offs between performance, fault tolerance, and overall mass of the network. Components or nodes connect together using a point-to-point link. A link or router connects the nodes together allowing for reliable high-speed communications between all nodes on the network.

Aeroflex can assist you in deciding whether SpaceWire can work in your project. For applications assistance, please call **800-645-8862** or go to [www.aeroflex.com/spacewire](http://www.aeroflex.com/spacewire).





## Aeroflex products

### UT200SpWPHY01 physical layer transceiver

- | Handles critical timing of DS encoding
- | LVDS physical interface
- | 2 bit ser/des functionality
- | Data rate 2 to 200Mbit/sec
- | QML-Q and V qualified

### UT100SpW02 protocol handler IP

- | 9 bit XMIT & RCV FIFO interface
- | Data rate 2 to 85 Mbit/sec
- | Interfaces to 2 transceivers UT200SpWPHY01
- | Uses 35% of Eclipse FPGA
- | Uses 8% of on-board memory

### UT200SpW4RTR 4-port router

- | 4-port router with system interface port for 5 total ports
- | Data rates up to 200Mbps on all 4 SpaceWire ports
- | 2.5V core power supply, 3.3V I/O power supply
- | Compliant to Standard ECSS-E-50-12A
- | Group adaptive routing for 2 ports when using logical addressing
- | Host (FIFO) clock frequency: 50MHz
- | 9 by 128 receive and transmit FIFOs on each port

### Evaluation boards

Evaluation boards aid your design.

### Test equipment

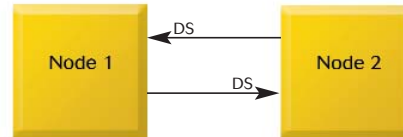
Aeroflex Colorado Springs also offers test equipment from 4Links. See the offerings at [www.4Links.co.uk](http://www.4Links.co.uk)



## System examples

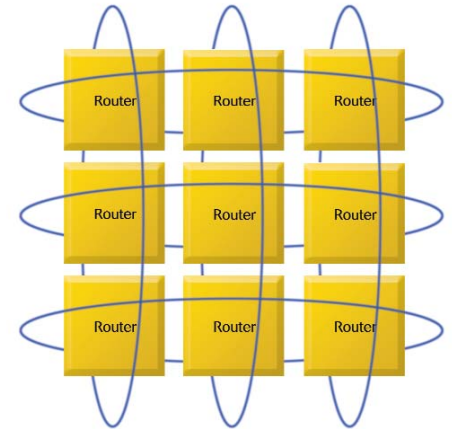
### Point-to-Point

A point-to-point interface is an ideal method to transmit data between high bandwidth data sources and processors. High speed communication is managed by a low-overhead flow control token messaging scheme. The receiving node sends a transmit token indicating it can receive 8 bytes of data, and can allocate up to 7 transmit tokens to the transmitting node. When not transmitting a data payload or without tokens, the transmitting node sends null characters to maintain link initialization. Most nodes have a simple transmit and receive FIFO interface architecture to the system.



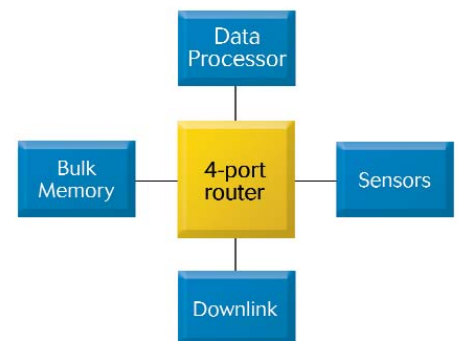
### Distributed Network

A distributed network interface is an ideal method to transmit data between high bandwidth data sources, processors, and storage devices. To give the system redundancy, a link network can be formed with multiple cross-strapped rings so that multiple paths exist between nodes. The network router is key. A typical router has an integer number point-to-point connections; path information is contained in message headers as well as local look-up tables within the router. A message can take several paths from the transmitter to the receiver ensuring system reliability if wires or node fail.



### Centralized Network

This topology has a router that is responsible for interconnecting transmit and receive nodes. Each network connection begins with the point-to-point connection between the router and a node. A message header provided by the transmitting node identifies the router's transmit port (i.e. message destination). If multiple nodes are trying to communicate through the same router output port, the conflict is resolved using a round-robin arbitration scheme internal to the router. A centralized router topology provides a latency network for the movement of data between network devices. Cross-strapped centralized routers provide a low latency, redundant network for critical network applications.



## Aeroflex roadmap

### 2006

UT200SpWPHY01  
transceiver

### 2007

UT200SpW16RTR-  
EVB router  
evaluation board

### 2008

UT100SpW02  
SpaceWire  
protocol handler IP

### 2009

UT200SpW4RTR  
4-port router

### 2010

UT200SpW16RTR  
16-port router

UT200SpW16RTR-  
FB router flight  
board

 **AEROFLEX**  
A passion for performance.



Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.

**WEB SITE** [www.aeroflex.com/spacewire](http://www.aeroflex.com/spacewire)

**TELEPHONE** 1-800-645-8862