



# HIGH SPEED SPACE interconnect



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*Involved in a great number of space projects in orbit and beyond for over 20 years, Axon' Cable has a wealth of experience in designing and manufacturing interconnect solutions able to withstand the stresses of launch and the harsh environment of space.*

*The company is particularly strong in the area of high data rate interconnect, and has provided high speed links on-board telecommunication, military, scientific and earth observation satellites including Alphabus, ISS, Astro H, Bepi Colombo, Maven, Sentinel and Solar Orbiter.*

## APPLICATIONS

High speed data links offered by Axon' Cable are designed to be used in spacecraft for different applications including:

SATELLITE AND LAUNCHER CABLING

CONNECTION BETWEEN THE MAST OF THE LAUNCHER AND THE CONTROL SYSTEM

SPACECRAFT COMMUNICATION NETWORK

DRIVER TECHNOLOGY COMPATIBILITY : LVDS  
(LOW VOLTAGE DIFFERENTIAL SIGNALING)

HIGH DATA RATE PAYLOADS :

- INTERCONNECTION OF HIGH DEFINITION IMAGERY SENSORS IN SATELLITES
- SYNTHETIC APERTURE RADAR AND HYPER-SPECTRAL OPTICAL INSTRUMENTS
- DRIVER TECHNOLOGY COMPATIBILITY : CML (CURRENT MODE LOGIC)

**axon'**  
cables & connectors

## AXOBUS®: HIGHLY SECURE MIL-STD-1553 DATABUS HARNESSES

Axon' Cable combines a wide range of expertise in cable and connector manufacturing. For example, the company designs and manufactures all the key components (cables, couplers and connectors) used in the **AXOBUS® MIL-STD-1553** databus looms for military, avionics and space applications.

Axon' has been supplying these databus looms to the Ariane 5 launcher since the early '90's.



## SPACEWIRE: HIGH INTEGRITY OF LVDS SIGNALS

In addition to databus harnesses which ensure the connection between on-board devices, SpaceWire links (according to **ECSS-E-ST-50-12C Rev1**) enable faster data transfer rates of up to 400 Mb/s. The **ESCC3902/003** qualified cables and **ESCC3401/029 EPPL2** Micro-D connectors and accessories manufactured by Axon' protect the integrity of LVDS signals provided by the devices. The 9 way Micro-D connector can be used with a wide variety of cable types.

Qualified to **ESCC3902/004**, Axon' also offers the only true, **Low Mass SpaceWire** cable, rendering SpaceWire links around half the mass per metre, more flexible and with greater radiation tolerance than existing solutions.

PROTOCOL	DATA RATE	UP TO 1MB/S
SPACEWIRE		9-WAY MICRO-D (STANDARD CABLE: ESCC3902.002 FOR HIGHER EL)
SPACEFIBRE, WIZARDLINK		
TT-ETHERNET (ETHERSPACE)		
RS 422/ RS 485 / CAN		D-SUB & MICRO-D CONNECTORS 120 OHM TWISTED SHIELDED PAIRS ESCC3902.002 VARIANT 21 TO 30 (100 OR 120 OHMS SHIELDED PAIRS)
BUS 1553		D-SUB & ACB1 CONNECTORS BUS COUPLERS ACB1 TRIAXIAL CONNECTORS

(\*) COMPATIBLE WITH THE FOLLOWING STANDARDS: 10BASE-T/ 1000BASE-T/ 10GBASE-T/ 100BASE-TX/ 2.5GBASE-T/ 10G

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# CE INTERCONNECT



## MICROMACH®: ENHANCED HIGH SPEED PERFORMANCE

As data rates and EMI requirements increase, the Micro-D becomes more limited. Axon' has therefore developed **MicroMach®**, a new, optimized high data rate connector. Drawing on the twin heritages of Axon's blisteringly fast **AxoMach®** range and the tried and tested Micro-D with its high-reliability, Twist Pin contact system, this new connector:

- >Is very close in size to the 9 way Micro-D, so little additional footprint required on equipments.
- >Has matched 100 ohm impedance pairs, so provides excellent continuity of signal.
- >Enjoys a robust EMC design, providing protection for both the cable and the equipment.
- >Is capable of data rates well in excess of typical SpaceWire performance – up to 3Gb/s.

The **EPPL2-listed MicroMach®** range includes four in-line connector/harness variants, (**ESCC3409/002**) three PCB variants (**ESCC3401/095**) and a connector saver (**ESCC3401/096**). Combined with Axon's **ESCC3902/004 Low Mass SpaceWire cable**, this connector provides an unbeatable SpaceWire performance to mass ratio.

With its 4 x 100 ohm matched impedance cavities, and excellent EMC screening on both inner and outer shields, the **MicroMach®** connector is equally suited to many other high speed protocols, such as Ethernet, where it comfortably exceeds **CAT6a** requirements.

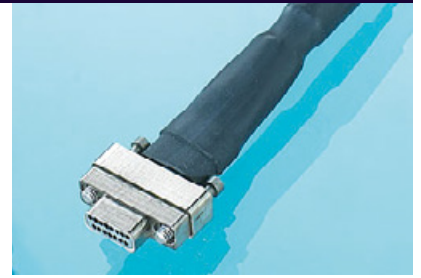


## AXOMACH®: SUPER-FAST, MULTI-GIGABIT DATA RATE LINKS

For even higher data rates Axon' offers **AxoMach®**, a range of very high data rate links composed of low loss microwave coaxial cables and a full range of connector variants: as well as in-line male and female variants (harnesses according to **ESCC3409/001**), **AxoMach®** connectors are available in panel mount and surface mount varieties (**ESCC3401/089**) and also connector savers. (**ESCC3401/090**).

**AxoMach®** links can also be terminated with SMA panel mount RF connectors at one end. The data transmission rate on this range is up to 10 Gb/s per lane.

A condensed 2 way **AxoMach® SpFi** variant of these connectors and links forms the «Type A» electrical connector for the new, multi-gigabit **SpaceFibre** protocol (**ECSS-E-ST-50-11C**).

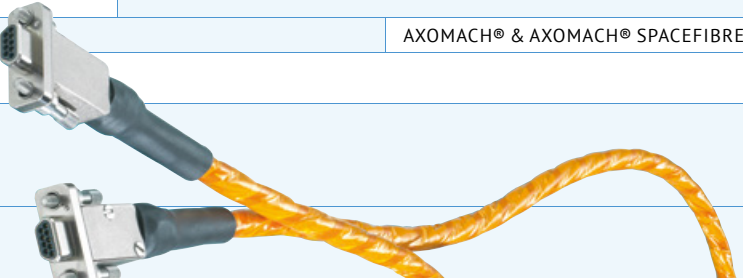


## ULTRA LOW MASS COAX LINK: SMALL IS BEAUTIFUL!

The **Ultra Low Mass Coax link**, drawing on Axon' miniaturized coaxial cable expertise, is almost 30% lighter than the already very light **Low Mass SpaceWire**.

This radical solution is significantly smaller and more flexible than the conventional twisted pair approach and exceeds the performance requirements for high speed serial data links compared to twisted pair cables. It can be an interesting alternative for applications where installation space and mass budgets are extremely limited, or particularly where an alternative protocol to SpaceWire is used.

## ich Axon' solutions for which data rate ?

UP TO 400MB/S		UP TO 3GB/S	UP TO 10GB/S
03 VARIANT 01 AND 02) OR LOW MASS CABLE (ESCC3902 004 VARIANT 01) OR MICROMACH® ELECTRICAL PERFORMANCES (XTALK/EMI/SIGNAL INTEGRITY)			
		AXOMACH® & AXOMACH® SPACEFIBRE	
MICROMACH® (ALSO SUITED TO CAT6A AND BELOW) *			
			

100BASE-T4/ 5GBASE-T/ ATM-25/ ATM-51/ ATM-155/ 100VG-ANYLAN/ TR-4/ TR-16 ACTIVE/ TR-16 PASSIVE



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Axon' Cable is a global leader in the design and manufacture of high-performance interconnect solutions for a wide range of industries, including aerospace, defence, medical, and industrial markets. Since 1965, Axon' Cable has established itself as a trusted partner to its customers by providing innovative solutions that meet their most demanding requirements. From custom-designed cables and connectors to cable assemblies and harnesses, Axon' Cable's expertise and state-of-the-art manufacturing facilities enable it to deliver reliable, high-quality products that are optimized for performance and reliability. With a commitment to excellence and a focus on customer satisfaction, Axon' Cable is dedicated to driving innovation and advancing the state-of-the-art in interconnect technology.

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