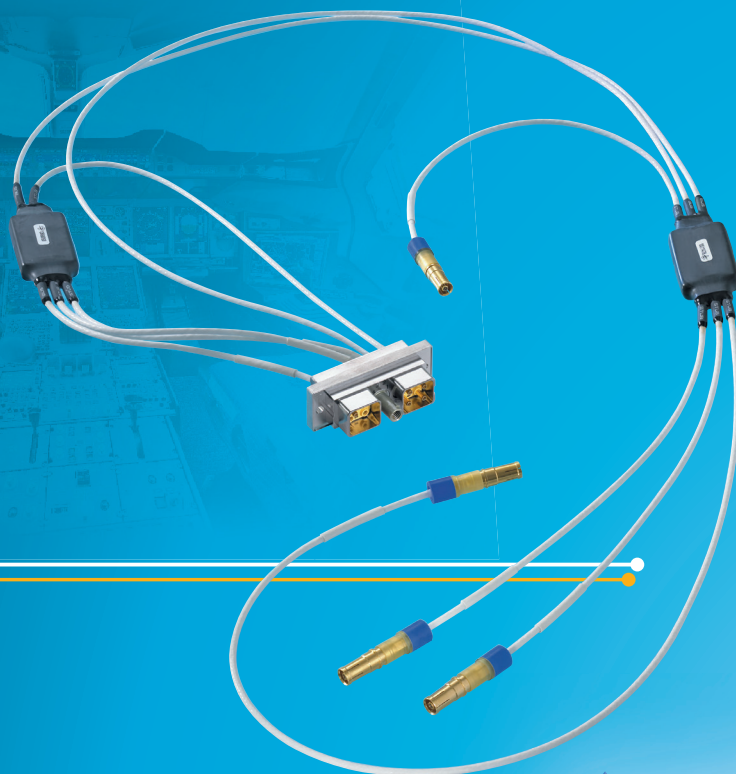


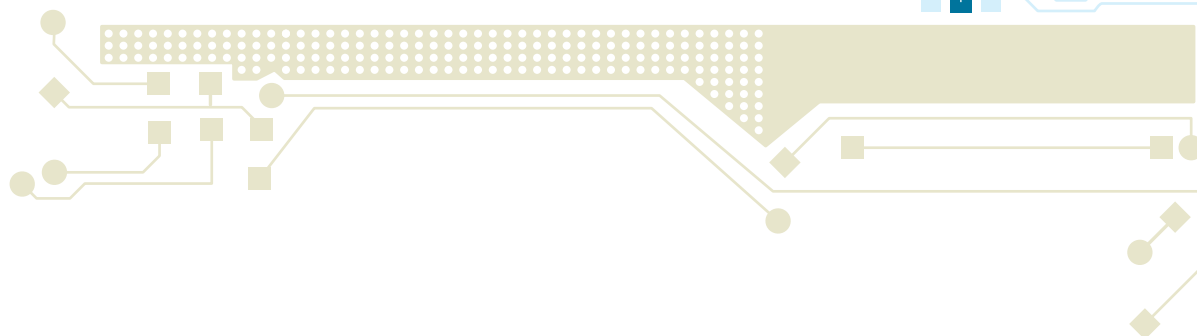


General information

MIL-STD-1553
Databus products
for aeronautics applications



Contents



General information

EXPERT IN DATABUS PRODUCTS

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THIS CATALOGUE IS INTENDED AS A GUIDE TO AID SELECTION OF AXON' PRODUCTS.
THE INFORMATION IN THIS CATALOGUE IS ACCURATE TO THE BEST OF OUR KNOWLEDGE AT TIME OF GOING TO PRINT,
HOWEVER, AXON' CANNOT BE HELD LIABLE FOR ANY ERRORS MADE AS A RESULT OF INFORMATION CONTAINED HEREIN.
CHANGES AND MODIFICATIONS CAN BE MADE TO THIS BROCHURE AT ANY TIME WITHOUT PRIOR NOTICE.



Expert in Databus Products

AXON' CABLE designs and manufactures custom designed interconnect solutions including electrical wires, round or flat cables, flat flexible cables, composite cables, coaxial cables, cable assemblies, high data rate links, connectors and mini systems for any application including aeronautics, military, space, automotive, consumer electronics, industry, medical and research centres.

MIL-STD-1553 databus products

AXON' CABLE specialises in the design and manufacture of all components used in data transmission systems in compliance with the MIL-STD-1553 standard. AXON's databus products include databus cables, inline couplers, box couplers, inline couplers to be cabled (ACC), rack couplers, relay couplers, databus connectors, triaxial contacts and accessories (databus terminators, stub loads, braids, connector backshells, splices, etc).

Databus cables

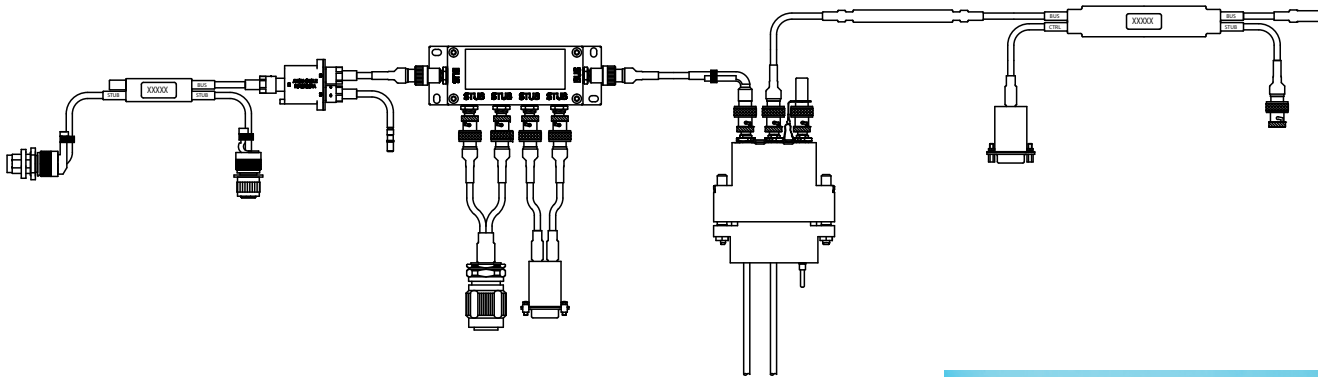
Databus cables are 22, 24 and 26 AWG screened twisted-pair cables. All of them are designed to meet 77 Ω nominal impedance. AWG 24 cables are a good compromise between the electrical, space and weight characteristics, whilst AWG 26 cables provide a reduction in weight.

Inline couplers

Inline AMB couplers for 1 to 8 stubs are an excellent weight saving and cost effective solution. Generally speaking, inline couplers are dedicated to networks with a fixed design. These couplers are available in aeronautics and space versions. For the space version, please ask for our catalogue "cables and harnesses for space applications".



INLINE COUPLERS



Box couplers

Box couplers ADB for 1 to 6 stubs are removable couplers. Easy to use, they are an ideal solution for prototype manufacture or as a means of reducing maintenance cost. Removable databus box couplers allow the user to build its databus network for itself, branches can be easily changed.



BOX COUPLER

ACC couplers

AXON' has developed a new concept of coupler which enables customers to build their Bus network for on-board equipment for themselves. Dismountable and lightweight : the Cabling Coupler has all the advantages of both inline couplers (see page 12) and box couplers (see page 42) but with none of the drawbacks.

This is an ideal solution covering the various options of space modelling, maintenance and service equipment. This coupler provides flexibility to the databus designer. It meets the MIL-STD-1553 standard.



ACC COUPLER

Rack couplers

AXON' also offers rack couplers which fit to the existing fixation system in electrical racks. All couplers are concentrated into a rack and the stubs are routed from the rack to the equipment. They are particularly well adapted to meet the requirements of aeronautics standard racks in civil and military aircrafts.

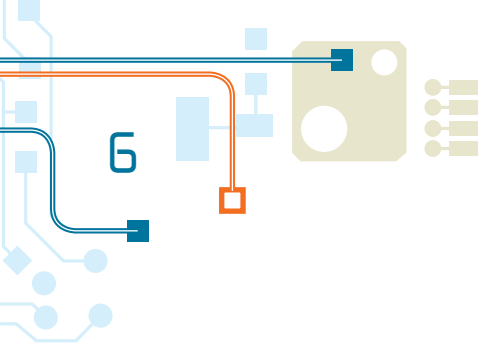


RACK COUPLER

Relay couplers

They have been developed for applications which require to allow for an automatic disconnection of a number of equipment from the network without affecting the other remote terminals already connected. For example, this is the case when a ground test bench is connected to an aircraft or in the case of applications which need to simultaneously disconnect a group of devices (a satellite or a rocket).

AXON's relay couplers transmit the signal without distortion and they can switch the signal to another line or to a particular component.



Databus connectors

AXON' has developed several types of connectors and contacts dedicated to MIL-STD-1553 Bus assemblies. ACB1 triaxial connectors are suitable for any type of 24 AWG shielded twisted pair cables. They are easy to assemble as central and intermediate contacts are crimped in the same step. A single crimping tool M22520/5.01 with an AXON' die is required. Moreover, the mounting of the ACB1 connector does not require potting. ACB1 connectors and mating halves can integrate either pin or socket contacts. They are available in both threaded and bayonet versions with 3 and 4 lugs (locking system).

They are suitable for on-board material as well as for land-based equipment. A space-saving elbow version is also available.



ACB1 DATABUS CONNECTOR

Databus network testers

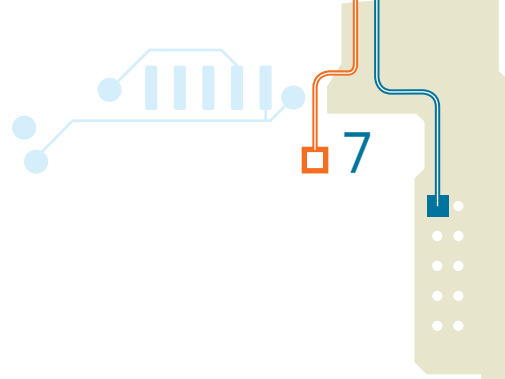
AXON' has developed a portable test bench in order to check databus network. It checks that the MIL-STD-1553 databus networks have been properly cabled and have not been damaged during installation.



RECEPTOR MODULE



PRODUCTION



Programmes

MIL-STD-1553 transmission networks offer high security of data and signal integrity. They are used for strategic on-board systems for aeronautics, space and military applications.

The use of MIL-STD-1553 databus system allows for weight and room saving, better reliability and simplified diagnostics of avionics.

AXON's databus products are used for applications including tanks and weapons systems, aircrafts, helicopters, missiles, rocket launchers, manned flights, Leo and Geo satellites, space probes, civil airplanes for Flight Control System (FCS). AXON's databus products have been approved for programmes including aircrafts such as A350, ATR, A400M, C27J, Eurofighter, Gripen, MB339, Mirage, MIG21, NIMROD, EF18, MELTEM, A350, helicopters such as Tiger, NH90, EH101, Lynx, A129, A109, Rooivalk, OH1, weapon systems such as Leclerc tank, Crotale and missiles such as Apache, Aspic, Crotale, MICA, Stormshadow.

They also have been approved for space programmes including Alphabus, Alos, Ariane 5, ATV, Biolab, Columbus, ISS, Cryosat, Eurostar3000, Sentinel and Shenzhou.



CLASS 100000 CLEAN ROOM

Databus qualifications

- European standards

According to EN 3375, aeronautic qualification for cable.
 According to EN 3567, aeronautic qualification for couplers.
 According to EN 3716, aeronautic qualification for connectors.

- PANAIA-EFA standards

PAN 6421 : qualification of the cable
 JN1042-JN1052-JN1176 : qualification of Eurofighter couplers.

- International Space Station

SSQ21655 qualification by NASA/BOEING for 4 Bus cables.
 SSQ 21676 qualification by NASA/BOEING for couplers.
 Couplers and cables listed in NASA's MAPTIS database.

- ARIANE V qualifications.

- CNES/ESA approval .

- ESCC qualification (ESCC3401/079) for ACB1 connectors.

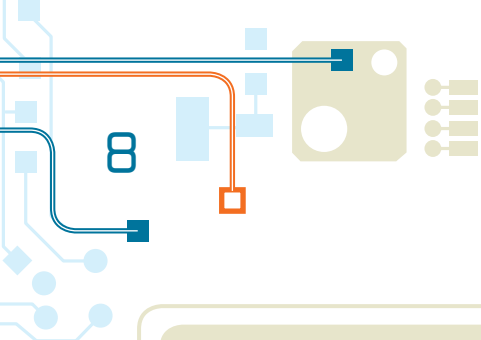
- Airbus specifications

ABS1592 : ACB1 connector.
 ABS1593 : databus terminator.
 ABS1595 : rack coupler.

- Customers' qualifications .

FOR THE SPACE VERSION, PLEASE ASK FOR OUR CATALOGUE "CABLES AND HARNESSSES FOR SPACE APPLICATIONS".





Databus cable

SPECIFICATIONS

MIL-STD-1553B
 MIL-C-17/176-00002
 pr EN 3375
 PANAVIA 6421
 ECS 0700
 SSQ 21655

OPERATING TEMPERATURE

-90°C to +200°C - (ambient and peak temperature).

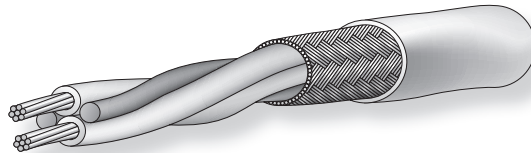
CHARACTERISTIC IMPEDANCE

$77 \pm 7 \Omega$ at 1 MHz - ($77 \pm 3 \Omega$ at 1 MHz for TWINAX BUS cable 31).

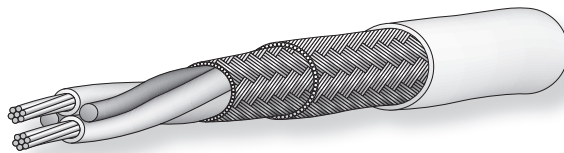
LINEAR CAPACITANCE BETWEEN WIRES

See table on next page.

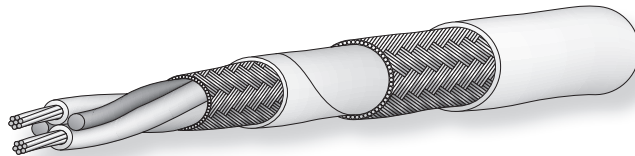
TYPE A (*)



TYPE B (*)



TYPE C (*)



(*) see cable construction in the chart on the next page.

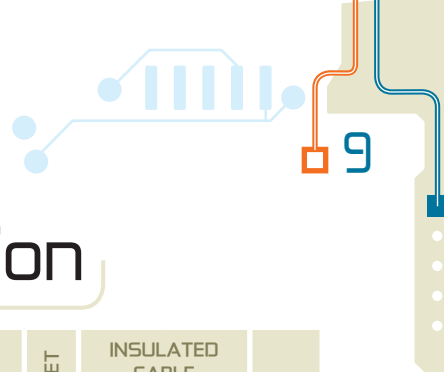
Special cable versions

- Supplementary jacket or protection on the jacket.
- Insertion of the Bus cables inside a complex round construction.
- In some cases possibility to differentiate Bus and Stub cable with a striped colour tape under the transparent jacket or the extrusion of a colour jacket.

Transfer impedance standard value mΩ/m max

TYPE OF CABLE	CONSTRUCTION	FREQUENCY			
		0 Hz	1 MHz	10 MHz	30 MHz
TWINAX BUS 10	A	30	40	100	200
TWINAX BUS 20	A	45	45	45	100
TWINAX BUS 21	B	15	5	5	10
TWINAX BUS 22	C	15	2.5	2.5	0.1
TWINAX BUS 31 or 61	B	20	10	10	10
TWINAX BUS 40	A	30	40	100	200
TWINAX BUS 41	B	15	5	5	10
TWINAX BUS 45	A	30	40	100	200
TWINAX BUS 60	A	40	50	85	165
TWINAX BUS 43 or 70	A	70	75	90	140
TWINAX BUS 44 or 71	B	30	30	15	15
TWINAX BUS 72	C	15	2.5	2.5	0.1

NOTE : The transfer impedance values of the TWINAX BUS 20, 21, 22 and 31 cables are specified in the corresponding standards. The values of the other cable types are guaranteed by AXON'.



Cable construction

PRODUCT DESIGNATION	VERSIONS	SPECIFICATION	CABLE TYPE	AWG	PRIMARY WIRE		SHIELD NOM. Ø (mm)	BRAID & TAPE MATERIAL	OUTER JACKET	INSULATED CABLE		CAPACITY pF/m
					CONDUCTOR MATERIALS AND CONSTRUCTION	DIELECTRIC AND FILLER MATERIALS				OUTER Ø (mm)	WEIGHT (g/m)	
TWINAX BUS 10 P 502810	A	MIL-STD-1553B MIL-C-17/176-00002	A	24	SPC alloy 19 x 0.127 mm	Extruded PTFE	2.60	Single braid : SPC alloy	PFA	3.15 to 3.40	26.80 max.	< 78.75
TWINAX BUS 20 P 502805	A	MIL-STD-1553B NF-L-52161-1 pr EN 3375-003	A	24	SPC alloy 19 x 0.120 mm	Extruded PTFE	2.58	Single braid : SPC	FEP	3.10 to 3.30	24.00 nom.	< 78.75
TWINAX BUS 21 P 512806	A	MIL-STD-1553B NF-L-52161-2 pr EN 3375-004	B	24	SPC alloy 19 x 0.120 mm	Extruded PTFE	3.00	Double braid : SPC	FEP	3.60 to 3.80	37.00 nom.	< 78.75
TWINAX BUS 22 P 512807	A	MIL-STD-1553B NF-L-52161-3 pr EN 3375-005	C	24	SPC alloy 19 x 0.120 mm	Extruded PTFE	3.10	Double braid : SPC - High magnetic permeability tape	FEP	3.70 to 3.90	43.30 nom.	< 78.75
TWINAX BUS 31 PANAVIA BUS P 507991	E	MIL-STD-1553B PAN 6421	B	24	SPC alloy 19 x 0.118 mm	Polyimide tape and PTFE filler	3.14	Double braid : SPC	FEP	3.50 to 3.80	29.00 max.	< 98.40
TWINAX BUS 40 BUS BOEING/NASA NDBC-TFE-24S2SJ-75 P 512296	S	MIL-STD-1553B SSQ 21655 Rev. E	A	24	SPC alloy 19 x 0.127 mm Silver plating 2µm	Extruded PTFE	2.58	Single braid : SPC alloy Silver plating 2µm	FEP	3.175 to 3.37	24.40 nom.	< 80.00
TWINAX BUS 41	S	MIL-STD-1553B	B	24	SPC alloy 19 x 0.120 mm Silver plating 2µm	Extruded PTFE	3.00	Double braid: SPC Silver plating 2µm	FEP	3.60 to 3.80	37.00 nom.	< 78.75
TWINAX BUS 43	S	MIL-STD-1553B	A	26*	SPC 19 x 0.102 mm Silver plating 2µm	Extruded PTFE	2.05	Single braid : SPC Silver plating 2µm	FEP	2.40 to 2.60	14.60 nom.	< 78.75
TWINAX BUS 44 P530781	S	MIL-STD-1553B	B	26*	SPC 19 x 0.102 mm Silver plating 2µm	Extruded PTFE	2.40	Double braid: SPC Silver plating 2µm	FEP	2.80 to 3.00	21.00 max.	< 80.00
TWINAX BUS 45 BUS BOEING/NASA NDBC-TFE-22S2SJ-75 P 812302	S	MIL-STD-1553B SSQ 21655 Rev. E	A	22*	SPC alloy 19 x 0.16 mm Silver plating 2µm	CELLOFLON® expanded PTFE	3.09	Single braid : SPC alloy Silver plating 2µm	FEP	3.76 to 4.06	27.70 nom.	< 80.00
TWINAX BUS 60 P 819845	E	MIL-STD-1553B	A	24	SPC 19 x 0.127 mm	CELLOFLON® expanded PTFE	2.41	Single braid : SPC	FEP	2.90 to 3.10	18.00 nom.	< 70.00
TWINAX BUS 61 P 815721	E	MIL-STD-1553B	B	24	SPC 19 x 0.127 mm	CELLOFLON® expanded PTFE	2.76	Double braid : SPC	FEP	3.10 to 3.30	24.00 nom.	< 70.00
TWINAX BUS 70 P 504621	A	MIL-STD-1553B	A	26*	SPC 19 x 0.102 mm	Extruded PTFE	2.05	Single braid : SPC	FEP	2.40 to 2.60	14.60 nom.	< 78.75
TWINAX BUS 71 P 517417	A	MIL-STD-1553B ECS 0700	B	26*	SPC 19 x 0.102 mm	Extruded PTFE	2.40	Double braid : SPC	FEP	2.80 to 3.00	21.00 max.	< 80.00
TWINAX BUS 72 P511981	A	MIL-STD-1553B	C	26	SPC 19 x 0.102 mm	Extruded PTFE	2.45	Double braid : SPC-High magnetic permeability tape	FEP	2.90 to 3.10	25.00 nom.	< 80.00

OTHER CABLES ON REQUEST.

SPC : Silver Plated Copper - * In case of AWG 26 or AWG 22 cable, please ask AXON' for compatibility with crimp connectors.
A = AERONAUTICS - E = EUROFIGHTER - S = SPACE

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