

Specification for

Data bus interconnecting systems

Committees responsible for this British Standard

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- British Airways
- BEAMA Ltd.
- British Cable Makers' Confederation
- British Rubber Manufacturers' Association
- Civil Aviation Authority
- Electronic Components Industry Federation
- Ministry of Defence
- National Supervising Inspectorate
- Society of British Aerospace Companies Limited

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Foreword

This British Standard, having been prepared under the direction of the Aerospace Standards Policy Committee, gives guidance on the interconnection of data bus systems of all types used on aircraft, either civil or military. The data bus systems have been divided into type A and type B. Type A is intended to comply with the general requirements of ARINC 429, which is usually called up for civil aircraft. Type B will comply with the appropriate requirements of Def. Stan. 00-18 and/or MIL-STD-1553 B, which are generally the requirements for military systems.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 14, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard establishes requirements for data bus interconnecting systems for aerospace applications. It defines the characteristics of the data bus line and components up to the interface with electronic components of the system.

Digital data transmission systems fall basically into two categories working at data rates either above or below 100 kilobits/second. The electrical requirements of the components of the transmission systems in these categories are different and the categories are classified in this standard as follows:

type A systems, operating at rates of 100 kilobits/second or less;

type B systems, operating at rates greater than 100 kilobits/second.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the definitions given in BS 9520 apply.

3 Cable

3.1 The cable used for the mains bus and all stubs shall be a two-conductor screened and jacketed twisted pair having a mutual capacitance not exceeding 98.4 pF/m at a frequency of 1 kHz. The cable specification used shall include requirements for insulation and screening efficiency.

3.2 The cable shall be formed with not less than 13 twists per metre, where a twist is defined as a 360° rotation of the wire pair.

3.3 The nominal characteristic impedance (Z_0) of cables for type A and type B systems shall be 77 Ω . When measured at a frequency of 1 MHz, the impedance shall be $77 \pm 7 \Omega$ for type A systems and $77 \pm 3 \Omega$ for type B systems.

3.4 The cable attenuation shall not exceed 4.92 dB per 100 m at a frequency of 1.0 MHz.

3.5 The effectiveness of the cable screening shall be determined by measuring the surface transfer impedance (Z_t) at a frequency of 30 MHz.

Z_t shall be not greater than 100 m Ω /m, at a frequency of 30 MHz unless a higher screening efficiency is called for in the detail specification.

NOTE 1 A typical method for the determination of surface transfer impedance is given in Appendix A and may be used pending publication of a definitive method which is under consideration.

NOTE 2 See Appendix B for typical cable constructions.

3.6 Cable classed as suitable for air frame use shall satisfy the electrical performance characteristics of this standard and shall be suitable for use in the temperature ranges -65°C to 135°C , -65°C to 150°C , -65°C to 200°C , or -65°C to 260°C .

The physical dimensions of these cables and their performance shall be as given in Appendix B and shall be in accordance with the appropriate test requirements of BS G 230.

3.7 The two ends of the data bus line shall be terminated with a resistance equal to the nominal characteristic impedance (Z_0) $\pm 2\%$ (see clause 7).

The termination shall be screened and the effectiveness of the screening shall be determined by measuring Z_t , which shall be not greater than 10 m Ω at 30 MHz for use on type A or type B systems.

4 Coupling

4.1 Cable stub connections for type A systems

4.1.1 Cable stub connections for type A systems shall be direct, as shown in Figure 1, and shall not exceed 0.3 m in length.

4.1.2 The electrical connections of the conductors of the stub to those of the bus shall be soldered in accordance with an acceptable quality standard, or crimped, in which case the connections shall comply with the applicable performance requirements of BS 4G 178-1.

4.1.3 The screening of the connection shall be continuous and provide 360° coverage. The effectiveness of screening of the stub connection shall be determined by measurement of the surface transfer impedance (Z_t) of an assembly at a frequency of 30 MHz. Z_t shall be not greater than 100 m Ω /m for type A systems and 10 m Ω /m for type B systems.

4.2 Cable stub connections for type B systems

Cable stub connections for type B systems shall be as shown in Figure 2.

Transformer coupled stubs (see Figure 2) shall be as short as practicable and shall not exceed 6.1 m in length.

NOTE The distance between stubs and their lengths may have to be adjusted so as to avoid digital errors arising from spurious pulse reflections.

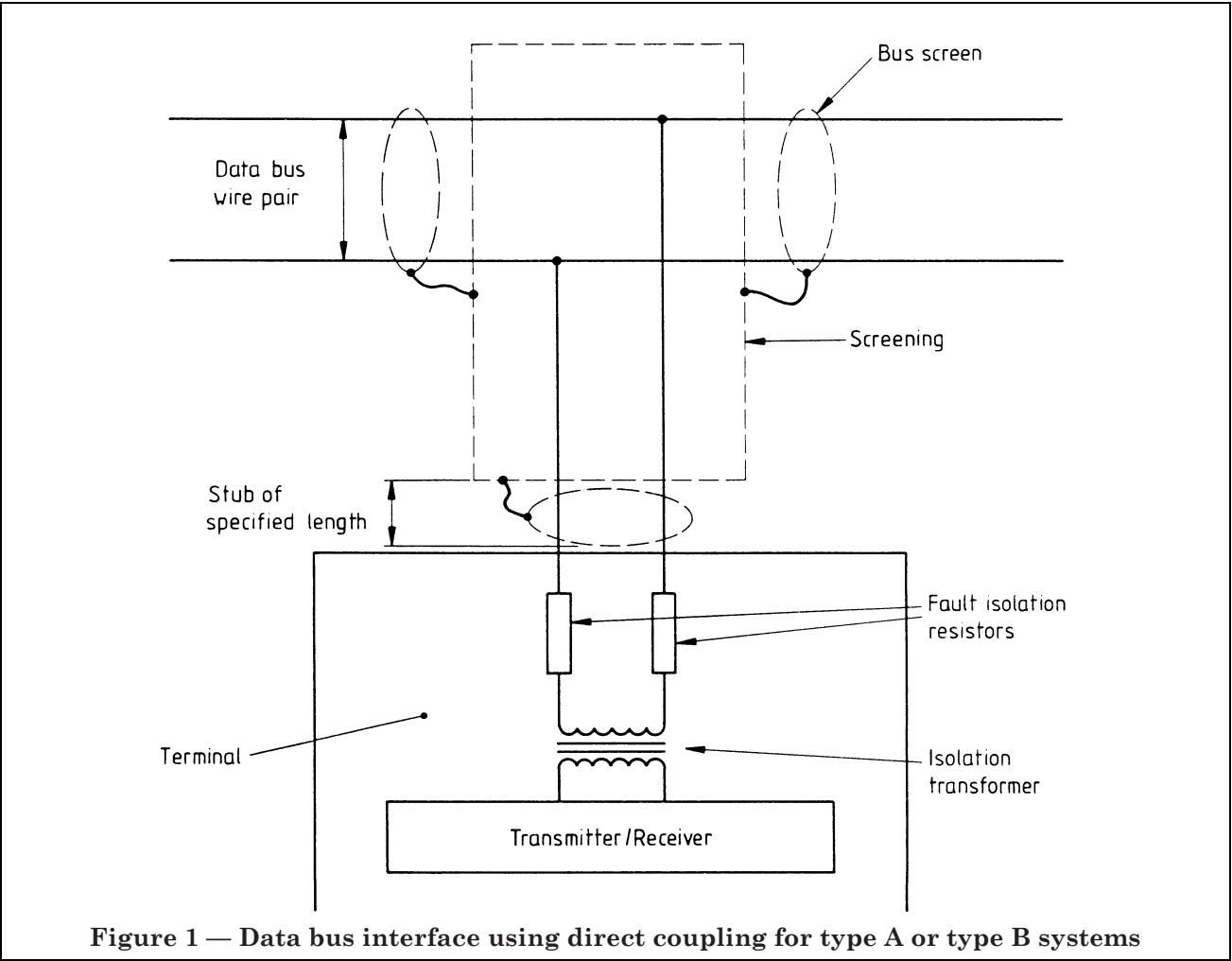


Figure 1 — Data bus interface using direct coupling for type A or type B systems