Digital Data Buses - presented by www.EASA66.de

For the EASA part 66 and other Part 66 exams: Module 5 Digital Techniques.

MIL-STD-1553

Mil-Std-1553 bus can handle approximately 100 other inputs from discrete and analog lines. Cable has 70Ω to 85Ω, 1MHz and may be Transformer coupled.

The multiplex data bus system operates asynchronously in a command /response mode, half-duplex.
Information data consists of three types of words `command`, `data`, and `status`.

The most significant bit is transmitted first. Transmission rate is 1.0 megabit/s. A word consists of 16 bits plus the sync waveform and the parity bit.

ARINC-429

The ARINC 429 standard defines the Electrical Interface, Label and Address assignments, and Word Format Description for the ARINC 429 aircraft bus system.

Its transmission system is based on a single data source and reception of that data by up to 20 sinks or receivers. 8 bit destination addresses provide $2^8 = 256$ possible addresses. The cable is a 78Ω, unbalanced, shielded, twisted pair simplex = transmission in one direction only. For bi-directional transmission a second simplex link is used. Three (Return to Zero RZ)signal states are

`HI = +6.5V to +13V    NULL = +2.5V to -2.5V    LO = -6.5V to -13V`
`HI-Speed is 100kibit/s    Low speed is from 12 to 14.5` kbit/s

ARINC 429 uses data in 32 bit words. Bit 32 is the parity bit, bits 31 and 30 are sign/status bits. Type of data being transferred is on data label bits 1 to 8.

Typical data set of a `word` consists of Binary Coded Decimals (BCD) or alphanumeric data encoded per ISO Alphabet #5.

ARINC-629

ARINC 629 provides hi-speed bidirectional connection of multiple systems, capable of either periodic or aperiodic transmissions. It does not need a bus controller. Access to the bus is achieved by a bus access timer. The three terminal to bus couplings are `current mode coupling` , `voltage mode coupling` and `optical mode coupling`. Fibre optic option provides better noise immunity!

The speed is 2-Mbits/s ARINC 629 is 20 times faster than the older ARINC 429 high speed and up to 120 terminals are allowed on the bus.