

Fibre Optics Brainstorm www.EASA66.org

Function of Data links is to convert electrical input signal to an optical signal, to transmit the optical signal over the optical fibre and to convert the optical signal back to an electrical signal.

Parts used in a data link are transmitter (LED or Laser Diode), optical fibre (including connector, cable, splice and connector) and receiver (PIN Diode or Avalanche Diode and signal conditioning circuit).

The signal in the cable can be distorted, weakened due to absorption, dispersion and scattering in the fibre optics wave guide. Noise (causes weakening of the signal) can disturb the quality of the electrical signal.

Cables are classified as single and multi mode fibres. www.JAR66.info

loss is the decrease of light in respect of input (may be caused by impurities in the fibre material). Loss is measured in dB/km. Low-Loss optical fibres have less impurities and are made of a high-Silica-Core. Multi mode Cables have nowadays a loss (attenuation) of 0.5 dB/km at a wavelength of about 1300nm, whereas single mode cables have loss of 0.25 dB/km at a wavelength of about 1500nm (year 2000).

Single mode cables have less loss and are used for long-haul systems.

Aircraft tend to use multi mode system cables over short distance e.g in a LAN with multiple connections. www.JAR66.de

Advantages of using fibre optical systems:

System Performance, Economical - low installation - and cost per channel.

Size and weight and environmental advantages e.g temperature, corrosion,

immune to noise EMI (do not need a common ground), less signal losses, less bit errors,

more rugged and less restrictive in harsh environment ... www.EASA66.org