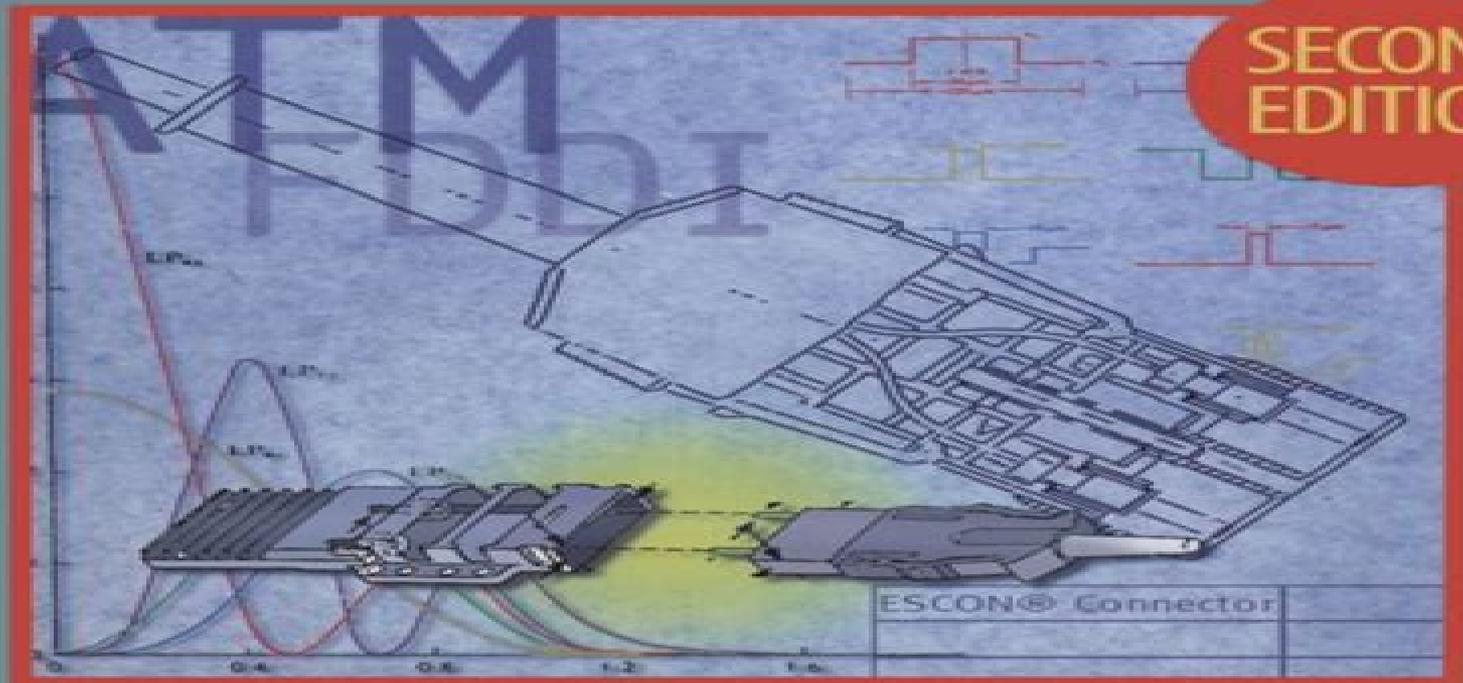




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# Handbook of Fiber Optic DATA COMMUNICATION

**Edited by Casimer DeCusatis**

# Handbook Of Fiber Optic Data Communication

**Kirk M. Anne**



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assembly are emerging in bandwidth hungry applications The first high performance computing systems are now on the market in which optical transceivers are mounted onto the switch chip package Still cost and assembly efforts related to optics hinder a more widespread application of optical link technology Integration strategies at all levels are required to enhance performance and functionality of optics while reducing cost Optical printed circuit board technology and integrated photonics offer tight integration between electrical and optical functions

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Recommendations G 652 to G 657 The wavelength spectrum allocation for the L C S E and O bands is discussed Related technologies such as time division multiplexing and erbium doped fiber amplifiers are also described in this context Topics include service mapping using the generic framing procedure and virtual concatenation technology for optical transceivers and filters reconfigurable optical add drop multiplexers fiber Bragg gratings and array waveguides WDM link budgets and noise sources are also discussed including rings and other topologies protection schemes dispersion compensating fiber equalization and modulation options including extensions to 100G *Handbook of Fiber Optic Data Communication* Casimer DeCusatis,2013-08-09 This chapter will examine the technical requirements for designing fiber optic data communication systems We begin with an introduction to basic link budget design techniques suitable for practitioners such as network designers followed by a more detailed review of optical link design considerations Optical link design concepts discussed include transmitter output power receiver sensitivity and properties of optical connectors couplers and splices Figures of merit including bit error rate and signal to noise ratio are defined Both worst case and statistical techniques are presented including test and validation methods for the completed link Optical power penalties are discussed including dispersion modal and chromatic intersymbol interference mode partition noise mode hopping extinction ratio relative intensity noise multipath interference wavelength dependent attenuation bending loss timing jitter radiation induced darkening modal noise and stimulated Raman and Brillouin scattering *Handbook of Fiber Optic Data Communication* Stephen R. Guendert,2013-08-09 Fibre Channel technology is the primary means for attaching servers to storage via storage area networks SANs The subject of network architectures that can continue to effectively use the quickly increasing bandwidth of optical technologies to deliver real data communications performance to applications is in a state of intense research and rapid development This chapter gives an overview of Fibre Channel at a fairly detailed level including definitions of N\_Ports E\_Ports and F\_Ports Fibre Channel forwarders frame structures protocols sequences exchanges connectionless routing classes of service arbitrated loop FICON ESCON FC over IP and related technologies It also describes the current main application areas for Fibre Channel SANs Finally this chapter gives an overview of how Fibre Channel in contrast with other network architectures leverages the advantages of high speed high reliability optical technology to provide high overall data communications performance **Handbook of Fiber Optic Data Communication** Casimer DeCusatis,2013-08-09

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to modern data center traffic patterns This chapter reviews the evolution from conventional network architectures into designs better suited to dynamic distributed workloads This includes flattening the network converging Ethernet with storage and other protocols and virtualizing and scaling the network Effects of oversubscription latency higher data rates availability reliability energy efficiency and network security will be discussed

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