



Diagram of a digital optical receiver showing various components. Vertical dashed lines group receiver components into three sections.

# Optical Communication Receiver Design

**Günther Arnold**



## **Optical Communication Receiver Design:**

Optical Communication Receiver Design Stephen B. Alexander, 1997 This Tutorial Text provides an overview of design principles for receivers used in optical communication systems intended for practicing engineers The author reviews technologies used to construct optical links and illustrates the flow of system performance specifications into receiver requirements Photodetector fundamentals associated statistics characteristics and performance issues are presented together with a tutorial on noise analysis and the specific techniques needed to model optical receivers CMOS Receiver Front-ends for Gigabit Short-Range Optical Communications Francisco Aznar, Santiago Celma Pueyo, Belén Calvo Lopez, 2012-08-09 This book describes optical receiver solutions integrated in standard CMOS technology attaining high speed short range transmission within cost effective constraints These techniques support short reach applications such as local area networks fiber to the home and multimedia systems in cars and homes The authors show how to implement the optical front end in the same technology as the subsequent digital circuitry leading to integration of the entire receiver system in the same chip The presentation focuses on CMOS receiver design targeting gigabit transmission along a low cost standardized plastic optical fiber up to 50m in length This book includes a detailed study of CMOS optical receiver design from building blocks to the system level Coherent Optical Communication Jia Xi Kan, Technical University of Denmark. Electromagnetics Institute, DTH., 1988 **Analysis and Design of Transimpedance Amplifiers for Optical Receivers** Eduard Säckinger, 2017-09-20 An up to date comprehensive guide for advanced electrical engineering students and electrical engineers working in the IC and optical industries This book covers the major transimpedance amplifier TIA topologies and their circuit implementations for optical receivers This includes the shunt feedback TIA common base TIA common gate TIA regulated cascode TIA distributed amplifier TIA nonresistive feedback TIA current mode TIA burst mode TIA and analog receiver TIA The noise transimpedance and other performance parameters of these circuits are analyzed and optimized Topics of interest include post amplifiers differential vs single ended TIAs DC input current control and adaptive transimpedance The book features real world examples of TIA circuits for a variety of receivers direct detection coherent burst mode etc implemented in a broad array of technologies HBT BiCMOS CMOS etc The book begins with an introduction to optical communication systems signals and standards It then moves on to discussions of optical fiber and photodetectors This discussion includes p i n photodetectors avalanche photodetectors APD optically preamplified detectors integrated detectors including detectors for silicon photonics and detectors for phase modulated signals including coherent detectors This is followed by coverage of the optical receiver at the system level the relationship between noise sensitivity optical signal to noise ratio OSNR and bit error rate BER is explained receiver impairments such as intersymbol interference ISI are covered In addition the author presents TIA specifications and illustrates them with example values from recent product data sheets The book also includes Many numerical examples throughout that help make the material more concrete for readers

Real world product examples that show the performance of actual IC designs Chapter summaries that highlight the key points Problems and their solutions for readers who want to practice and deepen their understanding of the material Appendices that cover communication signals eye diagrams timing jitter nonlinearity adaptive equalizers decision point control forward error correction FEC and second order low pass transfer functions Analysis and Design of Transimpedance Amplifiers for Optical Receivers belongs on the reference shelves of every electrical engineer working in the IC and optical industries It also can serve as a textbook for upper level undergraduates and graduate students studying integrated circuit design and optical communication

Optical Communications Jürgen Franz, Virander K. Jain, 2000 The advantages of optical communications are many ultra high speed highly reliable information transmission and cost effective modulation and transmission links to name but a few It is no surprise that optical fiber communications systems are now in extensive use all over the world Along with software and microelectronics optical communication represents a key technology of modern telecommunication systems Optical Communications Components and Systems provides the basic material required for advanced study in theory and applications of optical fiber and space communication systems After a review of some fundamental background material component based chapters discuss all relevant passive and active optical and optoelectronic components used in point to point links and in networks Systems chapters address the analysis and optimization of both incoherent and coherent systems introduce fiber optic link design and discuss physical limits The authors also provide an overview of applications such as optical networks and optical free space communications The advanced interactive multimedia communications of today and the future rely on optical fiber and space communication techniques Optical Communications Components and Systems offers engineers and physicists a working reference for the selection and design of optical communication systems and provides engineering students with a valuable text that prepares them for work in this essential and rapidly growing field

Adaptive Receiver Design for High Speed Optical Communication İlter Özkaya, 2018 Mots clés de l'auteur Optical Receiver IO links DFE High Speed CDR Adaptive Sensitivity Phase Rotator Injection Locked Oscillator

**High Frequency Optical Communications** O. Glenn Ramer, Paul Sierak, 1987

*Design of an Optical Communications Receiver* Timothy Joseph Berry, 1987

**CMOS Multichannel Single-Chip Receivers for Multi-Gigabit Optical Data Communications** Paul Muller, Yusuf Leblebici, 2007-10-29 In the world of optical data communications this book will be an absolute must read It focuses on optical communications for short and very short distance applications and discusses the monolithic integration of optical receivers with processing elements in standard CMOS technologies What's more it provides the reader with the necessary background knowledge to fully understand the trade offs in short distance communication receiver design and presents the key issues to be addressed in the development of such receivers in CMOS technologies Moreover novel design approaches are presented

*Advanced Free-space Optical Communication Techniques/applications II and Photonic Components/architectures for Microwave Systems and Displays* Lars

J. Sjöqvist, Rebecca Anne Wilson, 2006 Proceedings of SPIE present the original research papers presented at SPIE conferences and other high quality conferences in the broad ranging fields of optics and photonics These books provide prompt access to the latest innovations in research and technology in their respective fields Proceedings of SPIE are among the most cited references in patent literature *Optical Communications* Bor-Uei Chen, Steven S. Cheng, Society of Photo-optical Instrumentation Engineers, 1992 **Optical Fiber Communications** John M. Senior, 1992 This is the second edition of this highly successful book giving an introduction to the fundamentals problems and techniques of design and utilisation of optical fibre systems all the chapters have been updated and many have been extended with extra sections including the most recent developments In addition three new chapters have been incorporated *Terrestrial Wireless Optical Communication* Devi Chadha, 2013-03-26 A practical guide to next generation wireless terrestrial optical communication through the atmospheric channel Terrestrial Wireless Optical Communication provides in depth details on free space optics FSO from basic concepts to design implementation The book explains channel characteristics in the near IR and IR range of the spectrum atmospheric channel models modulation and detection techniques optimal performance capacity enhancement methods and forward error coding schemes Link and system design issues reliability and safety standards are also discussed The information in this essential guide enables you to deliver cost effective and transparent wireless network interoperability and expandability Coverage includes Introduction optical wireless communication systems Wireless optical channels Channel modeling Modulation techniques Diversity and detection techniques in optical fading channels Channel capacity Coding in FSO channels FSO link and system design **Coherent Optical Communications Systems** Silvello Betti, Giancarlo De Marchis, Eugenio Iannone, 1995-02-06 This valuable professional resource offers a timely in depth look at the many new and innovative technologies and systems configurations available to telecommunications engineers who design optical communications networks In addition to providing a broad ranging review of state of the art technologies and systems it arms designers with comprehensive analytical tools with which to comparatively assess available components and systems configurations for performance reliability and practicality *Semiconductor Devices for Optical Communication* Günther Arnold, 1982 With contributions by numerous experts Journal of Optical Communications , 1987 Principles and Applications of Optical Communications Max Ming-Kang Liu, 1996 Designed for a senior or graduate level course in optical communications Principles and Applications of Optical Communications offers comprehensive coverage of a variety of light wave technologies not often found in other texts Taking an applied approach to the subject this text has utility in a number of different optical communications courses and in advanced signal processing The coverage and approach reflect Dr Liu s background in industry They offer students exposure to the latest technologies and give strong preparation for industry positions in optical communications Summaries of Papers Presented at the Optical Fiber Communication Conference ... , 1995 CMOS Multichannel Single-Chip Receivers for Multi-Gigabit Optical Data Communications Paul

Muller, Yusuf Leblebici, 2009-09-03 In the world of optical data communications this book will be an absolute must read It focuses on optical communications for short and very short distance applications and discusses the monolithic integration of optical receivers with processing elements in standard CMOS technologies What s more it provides the reader with the necessary background knowledge to fully understand the trade offs in short distance communication receiver design and presents the key issues to be addressed in the development of such receivers in CMOS technologies Moreover novel design approaches are presented

**Analogue Optical Fibre Communications** Brett Wilson, Zabih Ghassemlooy, Izzat

Darwazeh, 1995 This book covers issues involved in improving the present range of systems and technology of optical fibre based telecommunications services operating with analogue sourced signals

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