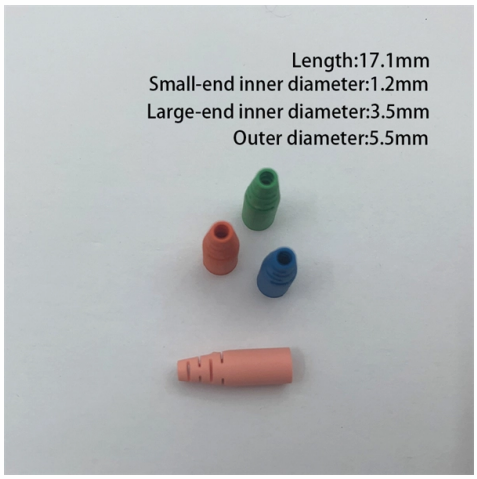
Point-to-Point Fiber Optic Communication Experiment Report



Overview

Lab manual for optical communication experiments: fiber optic links, propagation loss, numerical aperture. College/university level.

Key Takeaways

A point-to-point fiber optic communication experiment demonstrates the transmission of electrical signals as light through an optical fiber, allowing measurement of signal integrity, losses, and system performance.

Objective

The main objective of the experiment is to set up a point-to-point fiber optic link and study the transmission of analog and digital signals through the fiber, analyzing the relationship between input and received signals, and evaluating system performance such as signal attenuation and fidelity.

Apparatus Required

Optical fiber trainer kit (e.g., ST2502 or ST2501)Optical fiber cable (plastic or glass)Fiber optic transmitter (LED or laser source)Fiber optic receiver (photodiode or detector)Function generator (for sinusoidal and square wave signals)Oscilloscope (20 MHz dual trace recommended)Microphone and headphone (for analog signal testing)Connectors and mechanical crimping tools for fiber termination TheoryFiber optic communication converts electrical signals into light signals for transmission through an optical fiber. The transmitter converts electrical input into optical energy, which propagates through the fiber via total internal reflection.

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The receiver converts the light back into electrical signals. Key concepts include: Numerical Aperture (NA): Determines the acceptance angle for light entering the fiber. Attenuation: Loss of signal power due to absorption, scattering, and bending.

Modulation: Analog or digital signals can be transmitted using amplitude, frequency, or pulse width modulation.

Procedure

Fiber Preparation: Terminate the fiber ends with connectors using room-temperature epoxy and mechanical crimping. Ensure proper alignment to minimize losses. Transmitter Setup: Connect the function generator to the transmitter.

Generate a 1 kHz sinusoidal or square wave signal. Fiber Link Connection: Connect the transmitter to the optical fiber and the fiber to the receiver. Signal Observation: Use the oscilloscope to observe the received signal.

Compare amplitude, waveform, and any distortions with the input signal. Measurements: Record signal attenuation, bending losses, and any variations in signal quality. Repeat for different fiber lengths if available.

Data Analysis: Calculate the percentage loss, signal-to-noise ratio, and verify theoretical predictions of fiber performance.

Observations

Input and output waveforms on the oscilloscopeMeasured optical power at the receiverAttenuation values for different fiber lengthsEffects of bending or misalignment on signal qualityResultsTabulate input vs. received signal amplitudeCalculate total link loss (dB)Compare experimental results with theoretical expectations based on fiber specificationsConclusionThe experiment demonstrates the efficiency and limitations of point-to-point fiber optic communication. Observations typically show that signal attenuation increases with fiber length and bending, while proper connector installation ensures minimal loss. The experiment reinforces understanding of optical signal propagation, modulation techniques, and practical aspects of fiber optic system design.

Report Writing Tips

Include a title, objective, apparatus, theory, procedure, observations, results, and conclusion. Use tables and graphs to present data clearly. Discuss sources of error and suggest improvements.

Ensure the report is professionally formatted and references relevant theory. This structure provides a complete framework for a point-to-point fiber optic communication experiment report, aligning with standard laboratory practices.

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Article Content

Optical Fiber Communication Lab Experiments

The document details two experiments conducted in an Optical Fiber Communication Lab. Experiment 9 focuses on measuring optical attenuation in point-to-point communication, while Experiment 10

LabManual

This information is provided by The Fiber Optic Association, Inc. as a benefit to those interested in teaching, designing, manufacturing, selling, installing or using fiber optic communications systems or

Optical Communication Lab Manual

Lab manual for optical communication experiments: fiber optic links, propagation loss, numerical aperture. College/university level.

Fiber Optics Communication Lab Manual

EE 420 Fiber Optics Communication Lab Manual. Experiments on optical power, lasers, fiber optics, LEDs, and photodiodes for university students.

Optical Fiber Communication ECE Practical File.pdf

This document summarizes 10 experiments on optical fiber communication: 1. Studying a 650mm fiber optic analog link and the relationship between input and received signals.

Optical Fiber Communication Laboratory

Calculate the dispersion-limited fiber length for a fiber optic transport system that employs standard single-mode fiber and a directly-modulated single-mode laser diode transmitter.

(PDF) Fiber-Optic Experiment Lab Report

PDF | This is a simple Lab Report made from the course PHY307N (Physics Laboratory I) from IISER Bhopal.

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Optical Fiber Communication Experiment

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This experiment demonstrates analog audio signal transmission using different types of optical fibers, including step index and graded index fibers. The objectives are to identify fiber optic communication

MergedFile

In telecommunication, an optical time domain reflectometer (OTDR) is an optoelectronic instrument used to characterize an optical fiber. An OTDR is used for purposes like: fiber optic testing in fiber optic

Fiber Optic Lab Manual

In the previous experiment you learned that while having many advantages, fiber optics technology is not "perfect" because some light is lost as it travels down the optical core.

(PDF) Laboratory Manual For Optical Communication

This laboratory manual provides a comprehensive framework for performing experiments in optical communication, focusing on various modulation techniques including intensity modulation, frequency

Microsoft Word

In this experiment we investigate attenuation spectra of MM optical fiber in the spectra region around 1500nm. The fiber to be used is a graded-index multi-mode fiber (Ericsson AB, Sweden) with the

LabPoster_Optical Communication Lab.pptx

system. Experiments and Projects using Light Runner and Rsoft, OptiSim will be carried out in the Laboratory. The Experiment topics range from study of characteristics of Optical Fiber sources,

Introduction to Optical Fiber Communication

Experiment No. 1 introduces optical fiber communication. Optical fibers transmit light through a glass or plastic core surrounded by cladding and can carry signals over long distances with low loss. John

FIBER OPTICAL COMMUNICATIONS (R17A0418)

UNIT I general Optical Fiber communication system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory t ansmission, Total Interna Fiber materials, Fiber

Optical Fiber Communication Laboratory

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Introduction An optical fiber is a long thin strand of impurity-free glass used as a transport medium for data. A typical point-to-point fiber optic communication network consists of a transmitter (laser), a

LABORATORY MANUAL COMMUNICATION SYSTEMS LAB (S7 T) OPTICAL ...

LIST OF EXPERIMENTS surement of Numerical Aperture of Fiber after preparing the fiber ends Study of losses in optical fiber. Setting up of fiber optic digital link. Preparation of splice joint and

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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