Optical Transmitter Experiment Report

Overview

Optical Signal Transmission Analysis | PDF | Optical Fiber. This document summarizes the contents and methodology of an opto-electronics project explori.

Key Takeaways

This report details the study of fiber optic transmitters, their components, and signal transmission characteristics over varying fiber lengths. 1.

Objectives

To study the structures and characteristics of light sources used in fiber optic transmitters, such as LEDs and laser diodes. To examine the components of a fiber optic communication system, including the transmitter, optical fiber, and receiver. To observe energy loss in optical fibers at different transmission distances and analyze its effect on signal integrity.

2.

Equipment and Materials

Function Generator (for analog and digital signals)Optical Fiber Cables: 1-meter, 5-meter, and 10-meter duplex fibersFiber Optic Transmitter Module (e.g., KL-95001)Oscilloscope (2-channel)AC-to-DC Power AdapterConnecting Leads and JumpersReceiver Module with comparator and low-pass filter 3.

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Experimental Procedure

Place the transmitter module on the worktable and ensure the data transceiver mode selector is in the OFF position. Connect the function generator output to the transmitter input and the oscilloscope channel 1 input using connecting leads. Connect the receiver output to a speaker or measurement device using a jumper cable.

Transmit signals through optical fibers of varying lengths (1 m, 5 m, 10 m) and record the received signal voltages on the oscilloscope. Adjust the transmitter bias and modulator settings to ensure proper signal amplitude and waveform integrity. Measure rise and fall times of the transmitted signal to evaluate the response of the optical transmitter.

4.

Data and Results

Fiber Length

Received Voltage (V)1 meter5. 605 meters5. 4610 meters5.

23The data shows a gradual decrease in voltage with increasing fiber length, indicating energy loss proportional to transmission distance. 5.

Observations

Signal amplitude decreases slightly as fiber length increases, demonstrating attenuation in the optical fiber. The 5-meter duplex fiber successfully transmitted audio signals with minimal distortion, confirming reliable short-distance transmission. Rise and fall times of the transmitted signal were consistent with the expected response of the laser diode and driver circuit.

6.

Conclusion

The experiment successfully met its objectives by analyzing the structure and function of fiber optic transmitters, studying system components, and observing energy loss over different fiber lengths. The results highlight the importance of fiber length on signal integrity and demonstrate the reliable transmission of electrical signals converted to optical form. These findings provide practical insights into the operational dynamics and performance characteristics of fiber optic communication systems.

7.

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References

Optical Communication Lab Manual, Studylib.net Experiment No. 6 Optical Fiber Driver (Transmitter), University of Technology LOFRANCO & SARIGUMBA, Fiber Optic Transmitter Experiment Report

Article Content

Optical Signal Transmission Analysis | PDF | Optical Fiber ...

This document summarizes the contents and methodology of an opto-electronics project exploring signal transmission using optical means. The project aims to compare transmitting a 1 kHz signal over free

Optical Communication Lab Manual (ST Sem, 2017-18)

RESULTS: Different components used in transmitter and receiver section are configured to create a basic 150 km optical fiber communication system and important parameters like Eye pattern (noise

EM Lab Record: Fiber Optic Digital Transmission Experiment

Optical fibre is used as the transmission medium in filere optic communication system. It is teansparent flexible filament that guides optical information signal from transmitted side to the services side

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. 2. Achieving amplitude

Laboratory Manual

In case of optical fiber, since the signal is transmitted in the form of light which is completely different in nature as that of electrons, one has to consider the interaction of matter with the radiation to study

Experiment No. 6 Optical Fiber Driver (Transmitter)

Experiment No. 6 Optical Fiber Driver (Transmitter) Experiment Aim To design and study the Laser diode and Light Emitting diode (LED) driver electronic circuit for optical fiber (optical fiber transmitter).

(PDF) Real-time full-duplex transmission experiment for an air and ...

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This experiment is the first report on real-time and 4 K video stream transmission for a line-of-sight full-duplex optical wireless communication in the invisible light band via...

Microsoft Word

Determine if both of the transmitter fiber optic LEDs (IF-E96) are on by measuring the voltage across them with a multimeter or oscilloscope when the momentary switch is closed.

Laboratory Manual

Transmitter: Fiber optic transmitters are typically composed of a buffer, driver & optical source. The buffer electronics provided both an electrical connection & isolation between the transmitter & the

Fiber Optics Communication Lab Manual | PDF

This experiment involves setting up a fiber optic analog link to transmit an audio signal. A fiber optic transmitter converts an electrical input signal into optical energy that is transmitted through the fiber

Fibre Optic Communications Lab Report

Fibre Optic Communications Lab Report The document reports on an experiment characterizing the components of a fibre optic telecommunications system. It describes building a point-to-point link and

Study of Optical Fiber Analog Links

The optoelectronic components employed in ALS04 are identical to the devices that were characterised by another Tester LPS04, designed to study dc characheristics of fiber optic LEDs, PIN photodiodes

EM Lab Record: Fiber Optic Digital Transmission Experiment

Drive liruist for binary digital teansmission I the LED lircuit for digital and analog transmission Scanned with OKEN Scanner 2 OPTICAL EXPERIMENTS EXPERIMENT.

Exp. No. 1 Characteristics of Light Emitting Diode (LED)

Aim of experiment In this experiment, we study and measure the P-I characteristics of Light Emitting Diode (LED), which used in optical fiber communication as a light source.

Microsoft PowerPoint

Introduction: Microwaves offer an opportunity to study optical phenomena on length scales of centimeters rather than hundreds of nanometers. This makes it very easy to investigate wave

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(PDF) Fiber-Optic Experiment Lab Report

This report might be useful to the Physics majors for reference and theoretical understanding of the experiment. This Report intends no published work.

012-04630G(cov).p65

In this experiment, you will reflect the wave from the Transmitter back upon itself, creating a standing wave pattern. By measuring the distance between nodes in the pattern and mul-tiplying by two, you

Measuring Light Speed in Fiber Optics

This document provides instructions for an experiment to measure the speed of light using a fibre-optic method. The experiment aims to measure the time-of-flight of optical photons propagating along

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

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

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