

**INVESTIGATION OF COUPLING EFFICIENCY OF OPTICAL FIBER
MICROLENS**

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MAY 2006

ACKNOWLEDGEMENTS

I am very grateful and thank a lot to Almighty Allah S.W.T in giving me patience and strength to complete this final year project.

I would like to take this opportunity to express my gratitude and appreciation to the entire person that involved in this project especially to my supervisor Prof. Madya Dr. Mohd Kamil Abd. Rahman for his continuous guidance, invaluable advises constructive comments and patience during the course of this project.

I also wish to express my appreciation to my partner for this project, Norsuzila bt. Mohd Yusoff for her cooperation.

I wish to express my deepest appreciation to my project coordinator, Dr. Sulaiman Shaari for his guidance and information throughout this project and the preparation of this report.

Last but not least, my heartiest appreciation to all my friends and others who have directly or indirectly helped during this project term of success.

Thank you very much.

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ABSTRACT

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The project investigates the effective ways for coupling optical fiber to a laser diode. The study was very important in improving coupling efficiencies by using fiber microlens and the way to produce microlens.

There are many ways to improved of coupling efficiency, one of the ways is by using microlens to increase the efficiency of coupling. This work on the project consists of getting the skill and experience on optical waveguide alignment system that has six degree of freedom. This project involved precision equipment and each equipment has their own characteristics and functions.

One of the most important is work investigation on the technique of making fiber microlens. The result obtained from this project has improved coupling efficiencies using a fiber microlens coupled to laser diode.

CHAPTER 1

INTRODUCTION

1.1 Background

An optical fiber is a transparent thin fiber usually made of glass or plastic, for transmitting light. The most common uses of optical fiber is as a medium for telecommunication and networking, there are because it is flexible and can be bundle as cables. An optical fiber that made from glass is always used in long distance telecommunication applications because of the lower optical absorption. Fibers are generally used in pairs with one fiber of the pair carrying a signal in each direction. There are two kinds of fiber which is single-mode and multi-mode fibers. Fibers optics can send the signals down hair-thin strands of glass or plastic fiber. The light is “guided” down the center of the fiber called the “core”. The core is surrounded by an optical material called the “cladding” that traps the light in the core using an optical technique called “total internal reflection”. The core and cladding is made from ultra-pure glass, but some of fibers are all plastic or a glass core and plastic cladding. The fiber usually coated with a protective plastic covering called the “primary buffer coating”, the function is to protect it from moisture and damage. “Jacket” is another protection that provided by the “cable” which has the fibers and strength members inside an outer covering.