

**MODELLING OF HYBRID FIBER PRE-AMPLIFIER  
FOR WDM SYSTEM**

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FOR WDM SYSTEM**

**This project report is presented in partial fulfillment for the award of the  
Bachelor of Engineering (Hons.) in Electronics (Communication)  
UNIVERSITI TEKNOLOGI MARA  
(JULY 2012)**



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## **ACKNOWLEDGEMENT**

In the name of ALLAH, the Beneficent and the most Merciful. Without Him, this thesis will not be finished. I would like to express my gratitude and appreciations to all of the followings in assisting me in completing my thesis.

I am highly in debt to my thesis supervisor, Puan Suhaila Subahir for giving me the opportunity to work under her supervision. She has encouraged me a lot and guided me in completing my thesis. Only ALLAH can repay her kindness.

I must acknowledge the lecturers who have taught me in the past few years. They had taught me a lot about theories and skills in doing research. I would also do not forget to show my appreciation to the Cik Siti Hajar from British Malaysia Institute (BMI), Encik Romli Mohammad from Research and Development of Telekom Malaysia (TM) as a trigger to give some idea regarding this project.

Finally, I would like thanks to my beloved family especially my parents, for their support and advice. Last but not least, special thanks to my entire friends who had given me support and contribution to this project especially to my colleague researcher Muhammad Hafiz Halal, Mohd Syukri Mohd Hashim, Mohd Hazim Mohamed Harith and Norazam Mat Khir .

## ABSTRACT

Recently, the demand of fiber optic has been at an extraordinary rate. The service provider needs to extend their Wavelength Division Multiplexing (WDM) network in long distances of the optical transmission network. Therefore, to maintain a good quality of optical transmission signal, they need to locate several optical amplifiers such as Semiconductor Optical Amplifier (SOA) and Erbium Doped Fiber Amplifier (EDFA) in their transmission network. However, those conventional optical amplifiers does not relevant enough to provide a good transmission quality in high speed data transfer. The answer to this issue is hybrid amplifier. The purpose of this thesis is to design and analyze the performances of multiple modelling of hybrid pre-amplifiers of 10Gbps bit rate in a WDM system. The hybrid amplifier is designed by having two different cascading methods. The performances in term of output power, gain, noise figure, quality factor and bit error rates were analyzed by using Optisystem 7.0 software. The goal of this work is to obtain the best performances of hybrid amplifier and have better performances compared to the EDFA and SOA. In hybrid amplifier design, the pump laser power of 9m length of EDFA is varied from 100mW to 1000mW for both 980nm and 1480nm wavelengths. The injection current of SOA is constant at 1A. In a nutshell, the (EDFA+SOA) at 980nm wavelength was proposed to be the best model of amplifier in a WDM system.

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