

ABSTRACT

Optical power meter is a measuring tool used to measure the value of the optical signal power in a fiber-optic communication systems. Measurement of the optical signal power has a role in the process of planning, monitoring and control of a system of fiber optic communications network. Optical power meter made up of several supporting electronic devices during the process of measuring: the optical receiver, the screen display, the buttons (keypad) and power supply (adapter). This measure using a fiber optic as the transmission medium of optical signals from an optical source at the time of the measurement process.

Optical power meter designed in this thesis consists of 5 blocks: the block receiving the optical signal power, the minimum system block AT Mega 8535 AVR microcontroller, serial to Universal Serial Bus (USB) converter, personal computer (PC) and the power supply block. Optical source used is a programmable light source type AQ-4304 with wavelength 600-1600 nm. Optical signals have different power and different wavelengths will be transmitted with fiber optics to block the receiver. Block consists of an optical signal receiver string of photo detector and amplifier circuits. Photo detector serves to convert the received optical signals into electrical signals. Electrical signal which has been weakened would be strengthened by the amplifier circuit to obtain the maximum output voltage form. The output voltage will be connected to the microcontroller ATMEGA8535 minimum system block. In this block the incoming voltage level is converted into the ADC data with programming language C. ADC data will be sent to a personal computer (PC) via a universal serial bus to serial converter. The computer will buffer the ADC data and will display the value of optical power on the computer monitor.

Optical power meter that had been designed and implemented in this thesis are expected to measure the optical signal with wavelength 600-1000 nm in the transmission line fiber-optic single mode type with a level of accuracy and precision $\leq 5\%$. Optical signal measurement result data will be buffered and displayed by the computer in the form of the optical signal power (nw).

Keywords: Photo detector, ATMEGA8535 AVR Microcontroller, Analog to Digital Converter (ADC), Serial to USB Converter, and Personal Computer (PC).