

**ARDUINO – BASED FAULTY PILOT CABLE DETECTOR AND
DIGITAL SAMPLING OSCILLOSCOPE**

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ABSTRACT

This project shows another way of developing faulty pilot cable detector based on time-domain reflection (TDR). The faulty pilot cable detector is implemented on Arduino microcontroller. Since it is digital based, it is easily programmed and the circuitry is not as bulky as analogue type. Using the Arduino-based microcontroller, the faulty at the pilot cable can be detected by injecting the TDR pulse signal into the inspection cable or wire. The edge and reflected signals from the inspection cable are captured and measured by the Digital Sampling Oscilloscope. Then, the pattern of healthy or faulty cable with its location can be determined by analyzing the reflected pulse signal (step waveform). This system has been successfully tested on 30m cable with shorted and opened conditions. The whole system to detect faulty in the pilot cable are coded using C language.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The term of pilot cable is applied to conductors that transfer voltage or current signals from one point to another for comparison with other voltage or current signals as part of a protection scheme. Pilot cable is a special control cable laid in parallel with a power cable and intended for transmitting signal related to the operation of the cable. Pilot cables are also used to transfer switching signals from one point to another such as controlling signal in communication, cable protection and signaling, speech and data transmission [1].

Pilot cable have a bundle of wire that enclosed in wire amour or single core round hard drawn aluminum wire applied helically (spiral-shaped) over them and single core wire covered by dual insulation with an inner core of cellular polyethylene and outer skin of solid polyethylene [2]. In Malaysia, Tenaga Nasional Berhad, which is Malaysia Utility Company complying this pilot cable to provide the channel between the supply substation for communication and for protective relaying of high voltage undergoes and overhead [3].

However, when there is an over voltage in the pilot cable cores, it may cause severe damage to the power system and the problem also occurs when the pilot cable along the transmission line enters swampy area as water might seep into it and damage the pilot cable. Thus, this requires immediate actions and the persons in charge would like to know the location of the faulty cable so that they can amend the cable.