

ABSTRACT

Precocity of electromagnetic technology in several recent years thinks out a new method at exploration of geophysics, that is Ground Penetrating Radar (GPR). Ground Penetrating Radar (GPR) is a method of geophysics by using electromagnetic techniques that are designed to detect the buried object in subsurface or underground and evaluate the depth of the objects. GPR can also be used to know the conditions and characteristics of subsurface without drilling or excavation.

GPR system consists of transmitter and receiver. Transmitter is antenna which is connected to pulse generator and high voltage supply with controlling by timing circuit. Receiver is antenna which connected to LNA and ADC, and then connected to processing unit and display. And pulse generator is one of the important component that produce the appropriate pulses for GPR, in cases where the maximum depth of object that will detect depend on pulse's characteristics that is used and ground's profile that is penetrated.

At this final project, the writer designed and implemented the circuit of pulse generator for GPR that is used to detect the buried object. The pulses are monocycle with frequency (200 ± 15) MHz and pulse width (5 ± 0.5) ns. For some soils that was analyzed, the maximum depth that can be responsible for the pulses is 212 meter (at soil: clayey dry with $\epsilon_r = 6$, $\mu_r = 0.25$ and $s = 0.0001$), whereas the minimum depth is 11 centimeter (at soil: sandy wet with $\epsilon_r = 15$, $\mu_r = 2.5$ and $\sigma = 0.1$). The highest GPR resolution value is 55 cm (at soil: sandy wet with $\epsilon_r = 30$) and the lowest is 1.5 meter (at soil: sandy dry, loamy dry and clayey dry with $\epsilon_r = 4$).