

Developing Laser Spot Position Determination and PRF Code Detection with Quadrant Detector

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Abstract : In this paper, we are interested in modeling, simulation, and measurement of the laser spot position with a quadrant detector. We enhance detection and tracking of semi-laser weapon decoding system based on microcontroller. The system receives the reflected pulse through quadrant detector and processes the laser pulses through a processing circuit, a microcontroller decoding laser pulse reflected by the target. The seeker accuracy will be enhanced by the decoding system, the laser detection time based on the receiving pulses number is reduced, a gate is used to limit the laser pulse width. The model is implemented based on Pulse Repetition Frequency (PRF) technique with two microcontroller units (MCU). MCU1 generates laser pulses with different codes. MCU2 decodes the laser code and locks the system at the specific code. The codes EW selected based on the two selector switches. The system is implemented and tested in Proteus ISIS software. The implementation of the full position determination circuit with the detector is produced. General system for the spot position determination was performed with the laser PRF for incident radiation and the mechanical system for adjusting system at different angles. The system test results show that the system can detect the laser code with only three received pulses based on the narrow gate signal, and good agreement between simulation and measured system performance is obtained.

Keywords : four quadrant detector, pulse code detection, laser guided weapons, pulse repetition frequency (PRF), Atmega 32 microcontrollers

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