DESIGN AND IMPLEMENTATION OF A ROBOTIC ARM ABLE TO PLAY "TIC-TAC-TOE" CONTROLLED BY A FPGA

Abstract. This paper shown a field programmable gate array (FPGA) based control of a robotic arm able to play TIC-TAC-TOE. The architecture of the control scheme is simple and thus facilitates realization of the proposed digital controller. The designed controller has been implemented using the SPARTAN-3 STARTER KIT from Xilinx, Inc. Our "IC" can be used as a microprocessor in applications of robotic arm control. Due to the high-speed nature of FPGAs, the sampling frequency of the IC can be raised to values that cannot be reached using a conventional digital controller based on a microcontroller. The strength of this paper is the implementation of a 9-choice algorithm that makes the robotic arm wins the game. "VHDL" language and Synthesis tool (view logic) was used to provide the FPGA with the information of the moves and the algorithm to select the most appropriate move.

Keywords: VHDL, digital design, Robotic Arm, FPGA