CREATION OF CONTROL SYSTEMS IN THE SCIENCE OF MICROPROCESSOR SYSTEMS

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Annotation: *Today, microprocessor-based control system is the main component of most industrial control and automation applications. This paper provides microprocessor-based design and implementation for the management and use of the computer system compression forming process system. The electronic in which the application is developed is a system in which a specific design is installed at low prices. Simulation and analysis tests were carried out to check the design of the prototype circuit board. The performance of the system was the final assessment seen in real-time experiments.*

Keywords. *Computer technology, Intel, processor, CMOS technology, microcircuit, SRAM*

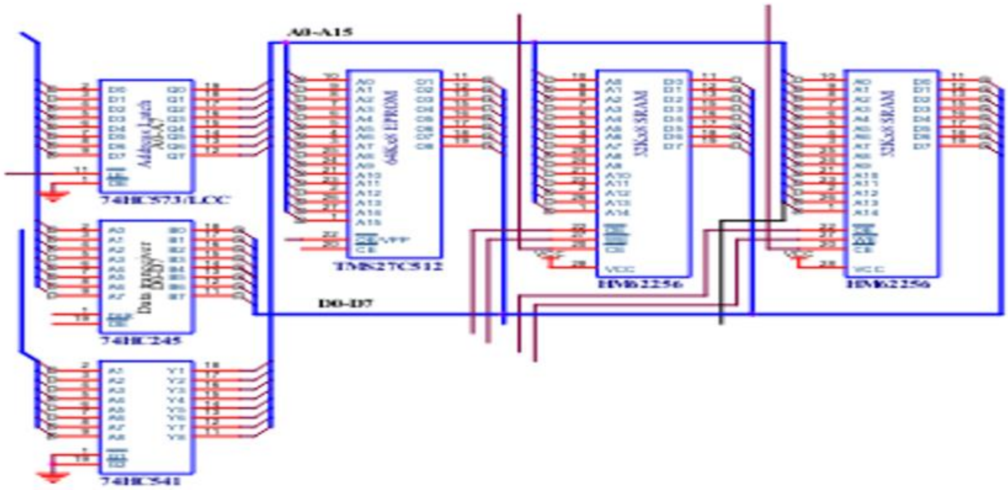
INTRODUCTION

Embedded systems are ubiquitous and represent the main microprocessor market. Recent research has shown that microprocessor-based controller is one of the main divisions of industrial control systems. Modern industrial controllers read application instructions based on the digital computers, make control calculations and execute instructions devices by moving the appropriate commands. The use of digital computers as a process controllers allows improvements and updates in control programs to be made very easily. The introduction of computer technology into automated manufacturing operations has led to more complex systems such as computer-integrated manufacturing and flexible manufacturing systems. Machine systems are becoming more complex and demanding today. As a result, companies such as Intel have developed software installed microprocessors and special systems for motion control. This document provides the design and implementation of compression control and operation of the operating system for concrete material die casting process, based on the 80c188eb Intel embedded microprocessor (25 MHz, 20bit address bus, 1m address space, 8bit information bus, 16 Men/o Pim, 3 Zero / counters, 5V) CMOS technology. 80c188eb microprocessor designed as a built-in controller. The controller mainly consists of the 80c188eb microprocessor unit, two programmable peripheral interface adapters(PPI), digital-analog and analog-digital converters, a simple alphanumeric keyboard (0-F) and an indicator display (5x7-segment LEDs). The control system developed is an open module architecture, which allows additional addition of modules(see Figure 1). Therefore, high-level interactive management (Visual C/C++) is currently under development. Finally, system performance testing is done through VHDL (IEEE) simulations of standard hardware description language) and actual tests at the machine construction company (Adams machine structures Co., Volos, Greece). The rest of this article is organized as follows. Section 2 provides a brief description of the system-the process is under control. Section 3 provides details of the methodology and implementation process used in the design of the controller described below. Section 4 design simulations and the brief performance results listed in Section 5 are the functionality of the controller derived from the actual tests. The conclusion and related future studies are listed in Section 6.

The system process is under control. The compression forming process being examined involves pressing a wet concrete mixture into two halves of the mold to fill the material in the form of a mold. The Controlled Compression System is part of a mainly composed hydraulic press machine that drives two and a half mold (mold table and breaker head), mold location proximity sensors (solid-state inductive type), electrocanes, hydraulic solenoids, and pumping system these real tracks Miller actuators. Compression is performed by a dual hydraulic 1700 MPa active pressure cylindrical actuator. The compression system uses a 24vdc double actuated solenoid valve to strengthen and retreat from the mold unit. The system is controlled by a large hydraulic pump, which requires the following 240Vac (rated at 20A).

Developed and proprietary hardware and software. Control of the compression forming process based on the sensory information obtained from mold position sensors. In this way the data is collected from the process and used as input to control the software algorithm. Sensors allow a core control unit (80c188eb processor) process to determine the state of compression molding (e.g., whether the sense of inductive proximity sensors passes a metal object nearby). The Sensor senses a change in the signals that change for this controller when. This is usually done by activating a voltage or current, or closed. The controller processes the input of the sensors in communication and driving electric valve control equipment (hydraulic pump motor and compression actuators). The typical process parameters for entering the controller are mold condition (replacement based on mold limit), valve condition (opened or closed), and engine on or off. Valves control the speed of hydraulic fluid flow, perform mold compression and product release to actuators through hydraulic solenoids. here, the performance of the compression mold produces several pieces of concrete products in each work cycle.

Controller design architecture core of control part 80c188eb architecture optimized microprocessor for applications in industrial controllers. Using microprocessor reduces the amount of elements required to simplify the design process and then board dimensions. Early design development procedures were followed by controller and control software simulations and real-time implementation. Development of the controller's physical location design was done using the CAD Capture program (Cadence Design Systems, Inc.). The control hardware controller consists mainly of 80C188EB microprocessor unit, memory modules, D/A and a / D converters, and programmable peripheral interface units. This controller has embedded all the necessary architecture control and compression forming system to realize the operation. One of the advantages is the low power consumption of the controller (5 volt shutdown supply). Synchronization of the system is carried out through an external oscillator (32 MHz) with high accuracy and an order is required to provide a TTL-level signal. Figure 3 shows a part of the basic 80c188eb based control unit design. The system uses two 74hc573 latch chains (a three-state eight - Type D latch) and a 74hc541 buffer (a three - state eight buffer-line drive) to buffer addresses (A0-A7,A8-A15, and A16-A17) from microprocessor EPROM and SRAMs memory units. 74hc245 (eight tri-state) data transceiver (CMOS) data is used (AD0 - AD7) transmission lines. EPROM memory is selected by UCS pin, while GSCO and GSC1 pins are SRAM devices. AD0-AD7 is a bidirectional data bus and devices used for memory and peripheral data transfer.



1.Image

Figure 1 shows EPROM and SRAM memory units. The controller is focused on operation of electro-hydraulic valves (open / close) and ac action motor (start/stop) (rated voltage 240V, rated current 9.1 a) controlling the hydraulic pump, so that the Horn receive the sensor signals and process. The controller therefore uses 82C55 PPI and D/A and a/D cycles to rotate. 82c55 separates the IC 24 line.

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The controller is focused on the operation of electro-hydraulic valves (open / close) and ac action motor (start/stop) (rated voltage 240V, rated current 9.1 A) which control the hydraulic pump, as well as the acquisition and process of sensor signals. The controller therefore uses 82C55 PPI and D/A and a/D cycles to rotate. 82c55 separates the IC 24 line.

Performance results. The performance of the developed control system was evaluated in real-time performance conditions. Real-time experiments have been conducted to monitor the functionality of compression molding system of the controller during Operation. All tests and measurements were carried out on the basis of the existing constant compression pressure, as well as other specific production factors and conditions. During the actual testing process, multiple systems collected and analyzed internal data for testing-primarily the efficiency and accuracy of the system. Although real-time experiments took a lot of time, they were performed on some tests and the results obtained were compared to the stages to the specifications specified during the initial design. Although some early design features had to be redefined and redesigned, Final control ensured that the system was stable and operated in a normal controlled process.

Conclusion. The design of complex control systems requires the efficient and powerful CAD tools, which can have the correct positive effect if applied to built-in quality, development time and cost of the product. It is an efficient controller of compression forming system that has been presented in paper cheap design. The controller 80c188eb was implemented on an Intel-based embedded microprocessor. It is clear that the amount of electronic elements using a microprocessor boat is reduced in the design and final implementation. In addition, in the system only they work the schemes necessary to carry out the process monitoring and control. Accurate analysis and evaluation of the controller were carried out using the simulation software. Although there are several problems solved, the implemented results are satisfactory from the presented control system, and in some cases the system's performance accuracy has improved under control. In addition, further important points studies have been identified. In any automated system, mastery can occur events that can lead to costly delays and losses production. For this reason, among other purposes (e.g., improving a high level of control based on previous studies of work), future work aims to improve selfdiagnostic functions such as fault tracking for the controller, and recovery automatically perform the necessary corrective actions.

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