STEPPER MOTOR CONTROL WITH SPECIALIZED INTEGRATED CIRCUITS

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Abstract: The paper presents some investigations and research results concerning the general purpose PWM(pulse-width modulation) with applications to stepper motor control.. The laboratory prototype of the implemented digital control system, and experimentally results are also presented in the paper.

Key words: stepper motor, PWM chopper, digital control system , full- bridge driver.

1. INTRODUCTION

The most remarkable effect of the integrated circuits increasing complexity and functions number is represented by, as it is widely accepted, its "intelligence". There is almost no applications domain in which the microelectronic devices "intelligence" shouldn't have played a majore role, one of the fields enjoying its advantages being the low power electric drives [1]. The stepper motor was and still is the most utilized motor in low power adjustable electrical drives, due to relatively simpe methodes of speed control.The most typical application for these drives is represented by precision positioning systems. Taking into consideration the above mentioned aspects, the autor present in this paper the comand with L297+ L298+L6210 specialized integrated circuits of stepper motor[2][3].

2. THE L297 STEPPER MOTOR CONTROLLER

The L297[3] Stepper Motor Controller integrates all the control circuitry required to control bipolar stepper motor. Used with a dual bridge driver such as the L298 forms a complete microprocessor-to-bipolar stepper motor interface. It receives control signals from the system's controller, usually a microcomputer chip, and provides all the necessary drive signals for the power stage. The L298 is a high voltage, high current dual full-bridge driver designed to accept standard TTL logic levels and drive inductive loads.

3. THE EXPERIMENTAL LABORATORY SYSTEM

The experimental research was performed in Electrical Drives Laboratory from the Engineering Faculty, "Petru Maior " University of Târgu-Mureş, where it was implemented an electrical drive system using stepper motor. The electrical schematic of the realized board (L 297+L298 +L6210) is shown in figure 1. In figure 2 is presented the general view of the realized board. The general view of experimental laboratory test system is shown in figure 3. As experimental results, the phase current of a two-phase bipolar stepper motor, are shown in figure 4.

4. CONCLUSION

The test stand dedicated to the stepper motor command presented in this paper has the following advantages:

- dramatically simplified stepper motor driving small-and medium-sized motors;
- complete microprocesor (microcontroller, PC) – to - bipolar stepper motor;

5. REFERENCES

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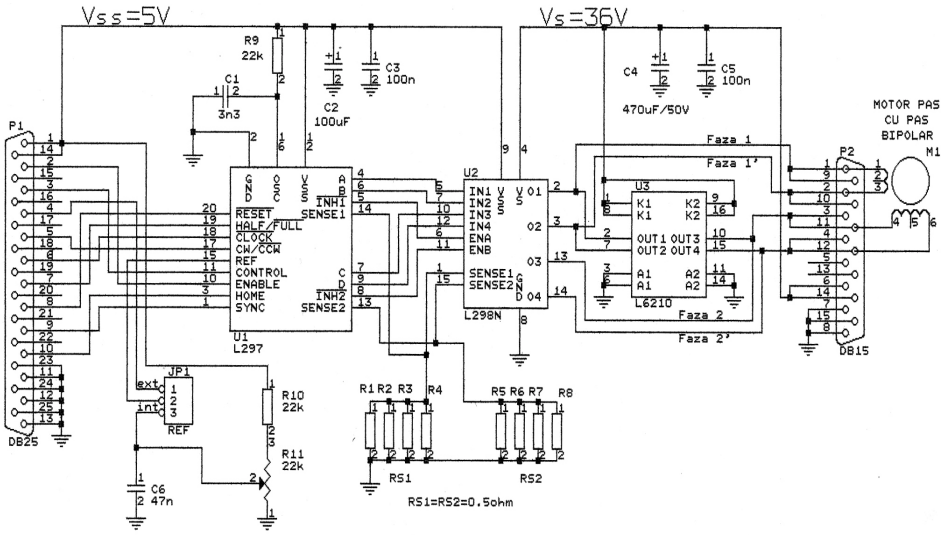

Figure 1–The electrical schematic of the realized board (L 297+L298 +L6210).

Figure 2–General view of the realized board (L297+L298+L6210)

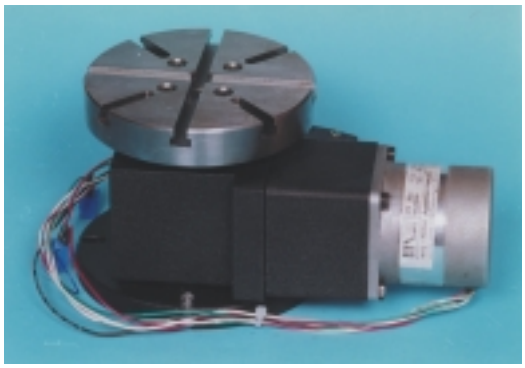

Figure 3–General view of experimental laboratory test system.

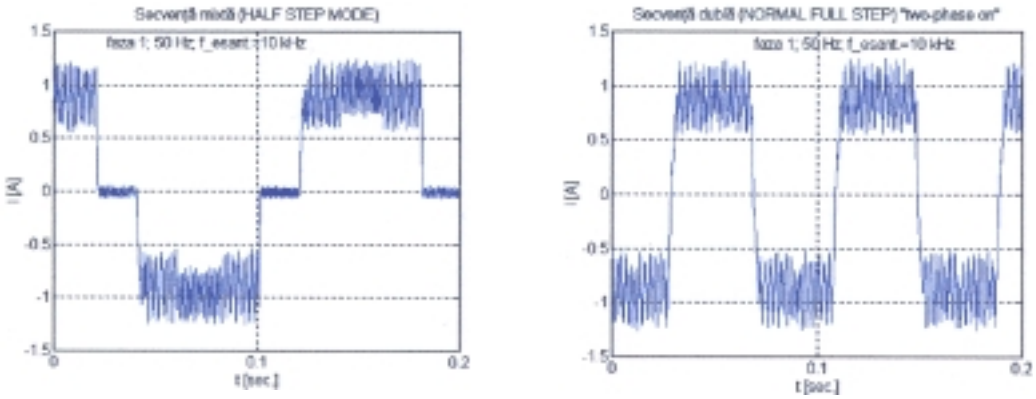

Figure 4–Experimental results, the phase currents of a two-phase bipolar stepper motor.