

ABSTRAK

PERANCANGAN SISTEM OTOMATIS MESIN SABLON KAOS MENGUNAKAN KENDALI ELEKTRONIK

(2026 : xii + 78 halaman + 28 gambar + 14 tabel + 9 lampiran)

MURDIA

062230330795

JURUSAN TEKNIK ELEKTRO

PROGRAM STUDI D-III TEKNIK TELEKOMUNIKASI

POLITEKNIK NEGERI SRIWIJAYA

Penelitian ini bertujuan merancang sistem otomatis pada mesin sablon kaos menggunakan kendali elektronik berbasis ESP32. Sistem dirancang untuk membantu proses pengepresan dengan mengatur suhu, waktu press, dan mekanisme penekanan secara otomatis sehingga pengguna tidak perlu melakukan proses secara manual. Komponen utama yang digunakan meliputi ESP32, sensor suhu termokopel tipe K dengan modul MAX6675, RTC DS1307, relay SSR, driver BTS7960, linear actuator, LCD 16×2, dan keypad analog. Hasil pengujian menunjukkan bahwa seluruh komponen dapat bekerja sesuai dengan fungsinya. Sensor suhu mampu membaca temperatur dengan baik dan memiliki selisih pengukuran yang kecil dibandingkan thermogun. Berdasarkan pengujian kualitas hasil sablon, suhu 120°C dengan waktu press 20 detik menghasilkan kualitas cetakan terbaik karena sablon menempel dengan baik tanpa merusak bahan kain. Selain itu, sistem penekanan otomatis menggunakan linear actuator dan limit switch dapat bekerja sesuai urutan proses yang telah dirancang. Dengan demikian, sistem yang dibuat mampu membantu proses sablon menjadi lebih mudah, praktis, dan konsisten.

Kata kunci: ESP32, mesin sablon kaos, suhu, waktu press, linear actuator.

ABSTRACT

DESIGN OF AN AUTOMATIC T-SHIRT SCREEN PRINTING MACHINE SYSTEM USING ELECTRONIC CONTROL

(2026: xii + 71pages + 28 figures + 14 tables + 9 appendices)

MURDIA

06223033079

5

**DEPARTMENT OF ELECTRICAL ENGINEERING
DIPLOMA III PROGRAM IN TELECOMMUNICATION
ENGINEERING SRIWIJAYA STATE POLYTECHNIC**

This study aims to design an automatic control system for a T-shirt screen-printing machine using an ESP32-based electronic controller. The system was developed to automate the pressing process by controlling temperature, pressing time, and the pressing mechanism, reducing the need for manual operation. The main components used in this system include an ESP32, a K-type thermocouple sensor with a MAX6675 module, an RTC DS1307, an SSR relay, a BTS7960 driver, a linear actuator, a 16×2 LCD, and an analog keypad. The test results showed that all components functioned properly according to their intended purposes. The temperature sensor was able to measure temperature accurately with only a small difference compared to a thermogun. Based on the screen-printing quality test, the best result was achieved at a temperature of 120°C with a pressing time of 20 seconds, producing good adhesion without damaging the fabric. In addition, the automatic pressing mechanism using a linear actuator and limit switches operated according to the designed sequence. Therefore, the developed system can make the screen-printing process easier, more practical, and more consistent.

Keywords: *ESP32, T-shirt screen-printing machine, temperature, pressing time, linear actuator.*