

University of Macau

Abstract

UNIT PRODUCTION CONTROL SYSTEM FOR
GARMENT INDUSTRY

by

LOU IP KEONG

Thesis Supervisor: Prof. CHEN WEI JI
Electrical and Electronics Engineering

In this thesis, we discussed the reason developed a hanger system for garment industries, which not only can increase the rate of production efficiency but also can have low cost. Hanger control system is important part of the hanger system. The most hanger control systems in the world are based on microprocessor and general logic IC. But the PLC is high reliable controller and simple programming method, and easy to modify the program design. So we develop the control system from microprocessor to PLC and mixed microprocessor and PLC. Besides a non-contact ID reader was developed. We illustrated how to make a prototype of hanger control system used single chip microprocessor and used Programmable Controller (PLC) and Radio Frequency Identification (RFID). We explained the system operation and discussed software and hardware design of the system.

We had finished three projects in the last few years. All the projects were connected to a 1:3 mainline prototype. At the first, to use four AT89C2051 microprocessors and PC assembled a RS-232 network. Each workstation consisted of AT89C2051, ICL232 and ULN2004. There was a DS2401 silicon serial number in the Hanger. AT89C2051 direct connected to DS2401 through terminal and indirect connected to PC through ICL232. ULN2004 was a current driver for the inlet and outlet Pneumatic Pusher.

At the secondary, to use two SIEMENS S7-214 PLC and PC assembled a RS-485 network. Each PLC controlled two workstations. There was a DS2401 silicon

serial number in the Hanger too. PC connected to PLCs through SIEMENS Point to Point interface (PPI) cable. To read DS2401, we used an AT89C2051 to make a reader and transferred data to PC via RS-485 network. S7-214 PLC had many different output models. We chose the open collector output model. So it could drive the inlet and outlet Pneumatic Pusher.

At the last, same as the secondary, the controller use two SIEMENS S7-214 PLCs and four AT89C2051 in a RS-485 network. There was a TK5551 Radio Frequency ID module in the Hanger. A RF reader/writer was consisted by AT89C2051 and U2270B. It could read/write TK5551 in contact-less.

The three different kinds of controlling methods are suitable to use in small factories (4-12 workstations), medium factories (10-40 workstations) and large factories (over 40 workstations). For the future, if an Expert System develop for the hanger control system. It will become an intelligent system that mean is no need the production manager to plan and to modify the production. The production rate can increase more and more.