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Automatic pet feeder using PIC / Mohd Azwan Mokhtar.

AUTOMATIC PET FEEDER USING PIC

Mohd Azwan Bin Mokhtar

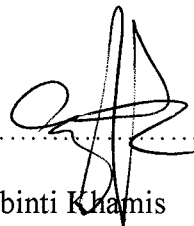
Bachelor of Mechatronic Engineering

May 2010

“I hereby declared that I have read through this report entitle “Automatic Pet Feeder using PIC” and found that it has comply the partial fulfillment for awarding the degree of Bachelor of Mechatronic Engineering”

Signature

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Supervisor's Name

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Date

: 22 April 2010

AUTOMATIC PET FEEDER USING PIC

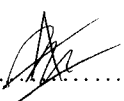
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**This Report is submitted in Partial Fulfillment of Requirements for the Degree of
Bachelor in Mechatronic Engineering**

**Faculty of Electrical Engineering
UNIVERSITI TEKNIKAL MALAYSIA MELAKA**

APRIL 2010

I declare that this report entitle “Automatic Pet Feeder using PIC” is the result of my own research except as cited in the references. The report has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature : 

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Date : 22 April 2010

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ABSTRACT

This project is about designing an automatic pet feeder that could automatically serves food to the pets. The title of this project is Automatic Pet Feeder Using PIC. The pet meals that will be served are from the small types because some studies have shown that feeding the pet with smaller meals over the course of the day can prevent pet obesity and lead the pets to better health. The user will specify when their pet will be fed. This automatic pet feeder uses a microcontroller and it consists of an interface with buttons, liquid crystal display (LCD), RC servo motor and the hardware part. The RC servo motor shaft will be attached at one side of a feeding plate. When the servo motor runs, the feeding plate will spin which will turn pet food drops down through the perforated feeding bowl. So, the pets will receive regular amounts of food on a steady feeding schedule.

ABSTRAK

Projek ini adalah mengenai merekabentuk dan menyiapkan sebuah alat yang dapat memberi makanan kepada haiwan peliharaan secara automatik. Projek ini diberi tajuk 'Automatic Pet Feeder Using PIC'. Makanan yang akan disediakan untuk haiwan peliharaan tersebut adalah dari jenis yang kecil kerana berdasarkan beberapa kajian yang telah dibuat menunjukkan penyediaan makanan yang kecil dapat mencegah haiwan tersebut daripada obesiti dan seterusnya mendapat kesihatan yang lebih baik. Pengguna akan menetapkan sendiri bilakah waktu haiwan peliharaan mereka akan diberi makanan. Alat pemberi makanan ini menggunakan sebuah mikropengawal and ia dilengkapi dengan beberapa butang, paparan cecair kristal (LCD/liquid crystal display), sebuah motor servo kawalan radio (RC servo motor), dan juga bahagian perkakasan. Motor servo tersebut akan dihubungkan ke suatu bahagian pada plat bekas pemberi makanan tersebut. Apabila motor servo bergerak, ia akan memusingkan plat tersebut dan menyebabkan makanan yang terdapat di dalam bekas itu dapat disalurkan ke bawah untuk dimakan oleh haiwan peliharaan tersebut.

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LIST OF ABBREVIATIONS

LCD	-	Liquid Crystal Display
PIC	-	Peripheral Interface Controller
RTC	-	Real-Time Clock
RC	-	Radio-Controlled
AFF	-	Automatic Fish Feeder
APF	-	Automatic Pet Feeder
IR	-	Infra Red
DC	-	Direct Current
RISC	-	Reduced Instruction Set Computer
RAM	-	Random Access Memory
EEPROM	-	Electrically Erasable Programmable Read-Only Memory
PWM	-	Pulse Width Modulation
USART	-	Universal Asynchronous Receiver/Transmitter
POR	-	Power-on Reset
PWRT	-	Power-up Timer
OST	-	Oscillator Start-up Timer
WDT	-	Watchdog Timer
ICSP	-	In-Circuit Serial Programming
GND	-	Ground
Vcc	-	Positive supply voltage
PCB	-	Printed Circuit Board
CAD	-	Computer-Aided Design
HEX	-	Hexadecimal

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CHAPTER 1

INTRODUCTION

This project is about designing an automatic pet feeder that could automatically serves food to the pets. It uses a microcontroller to control the time for the pets to be fed. This chapter will explain about the background of the project, its concept, objective, scope of the project and the problem statement.

1.1 BACKGROUND OF THE PROJECT

This 'Automatic Pet Feeder using PIC' is a device that will assist the owner of pets to feed their pets automatically when they are not at home. The users just have to set the time for their pet to be fed. The programming software will identify when the servo motor should runs and how long it runs so that the feeding plate could be opened to drop the foods. This is based on the angle of deflection of the servo motor that has been programmed into the microcontroller. This automatic pet feeder consists of interface with buttons, a 2 x 16 liquid crystal display (LCD) and a motor-controlled food dispenser where a servo motor is used to turn the plate of the dispenser bowl. The microcontroller that is used in this project is PIC16F877A.

1.2 OBJECTIVE

The objectives of this project are:

- 1) to design and construct a programmable feeder that dispenses meals for pets.
- 2) to assist owners with pet care by providing a system that could automates diet management with programmable feeder that dispenses meals for pets.

1.3 SCOPE

The scope of this project is to construct a programmable feeder that dispenses meals automatically when the user specified the time. It is also to understand the function of components for this project, some theories about project background research and literature review had been studied. The components such as PIC microcontroller and RC servo motor will be considered as main component in this project. The microcontroller that will be used in this project is PIC16F877A. There are some software that will be used in this project including MikroC, Proteus and SolidWorks.

1.4 PROBLEM STATEMENT

There are so many people that love to nurse pets. But they do not know how to take care of their pets properly. Unfortunately, most working people can't get home to feed their pet at lunch and many will forget to put out breakfast in a rush to get out the door in the morning. Unforeseen situations arise, such as working overtime, unexpected meetings or short business trips, which prevent pet owners from feeding their pets. In these situations, pet owners have limited options in solving the problem. Most of the pet owners resort to asking somebody, perhaps a friend or a family member, to help feed their pets when they are unable to do it

themselves. Although this is a viable solution, it may become an inconvenience for the people who have to help with the chore of feeding pets that they do not own. Also, trust must be established between the pet owners and the helpers who help feed the pets as well as the pets and helpers. Thus, asking somebody to help feed the pet is not a long-term practical solution for pet owners, as it becomes an annoyance to the helpers and a trust issue.

So, to solve this problem the owners of the pets can use this automatic pet feeder to assist them with pet care by providing a system that automates diet management of the pets and serves the small type meals.

CHAPTER 2

LITERATURE REVIEW

In this chapter, a review of previous research project that are related of this project will be discussed. It is to make a brief understanding of the researches related to the project.

2.1 Automatic Fish Feeder

This project is developed by Patrick Audet and Tomas Martin in year 2005. This automatic fish feeder (AFF) is a product that focuses on the market. Its purpose is to dispense frozen fish food into an aquarium. It is capable of dispensing frozen blocks of food at a several times a day at any desired time (all times are programmable). The device uses an array of thermoelectric coolers mounted onto a stainless steel cold plate to keep the product frozen without making any noise. A heat sink is mounted onto the hot side of the thermoelectric device. A low speed fan keeps the heat sink temperature low.

The prototype system can deliver one frozen food blocks per day at a preprogrammed time. The system runs a counter to derive one minute pulse which is used to run the real time clock (the clock returns to zero at midnight). Feeding times are stored on a table, which the main loop checks constantly. Figure 2.1 shows the Automatic Fish Feeder after fully assembled.

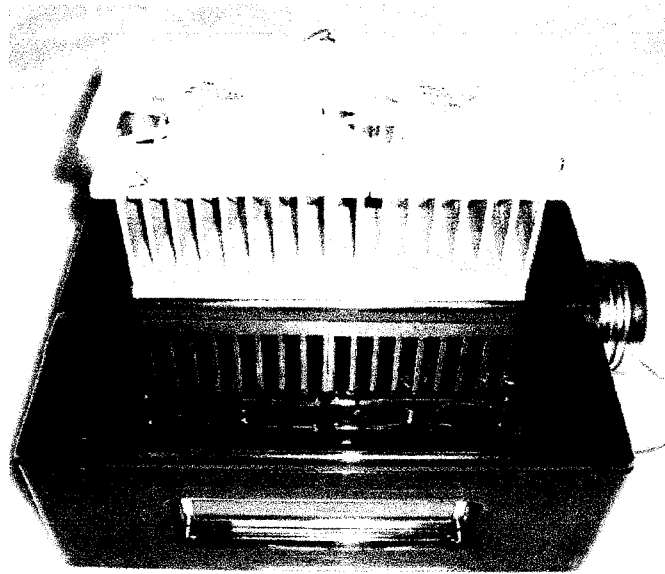


Figure 2.1: Automatic Fish Feeder

2.2 Automatic Pet Feeder (APF) using Microcontroller M68HC11A8

Automatic Pet Feeder (APF) using Microcontroller M68HC11A8 is a project of Luis Rodriguez, Maria Raquel Diaz, Sonimar Fernandez and Myra Ruiz. It has been done in year 1998. This APF has five compartments that serve for five days. The user will specify the time of the pet to be feed for each day. With the press of a button the user has the option to fill each food compartment one by one. This system is very user friendly, takes you step by step through the different options available, like setting the hour, setting the number of days, filling the food trays, setting the clock and resetting the system.

When the APF is plug-in, it set the default hour and initializes the clock. Then, the system check for a clock interrupt and/or a user input. If a clock interrupt occurs the system will update the current hour in memory and in the display. When the current time reaches user specified hour and the counter of days remaining is more than 0, the system will move to the next tray.

When user input is detected, the system checks for the type of the user request. For a Set_clock request, it asks and read user-input hour and saves it in memory. For a Program (Prog) request, it ask and read the amount of days (days count) and the hour of each day (userh) the system will move to next tray. If an invalid input is detected in either of the request mentioned above, the system will display an Error message and return to the read phase. On the other hand, the user can exit both requests with the Escape option. A Reset request will clear the memory and other inputs will be ignored by the system. Figure 2.2 shows the system specifications of this project.

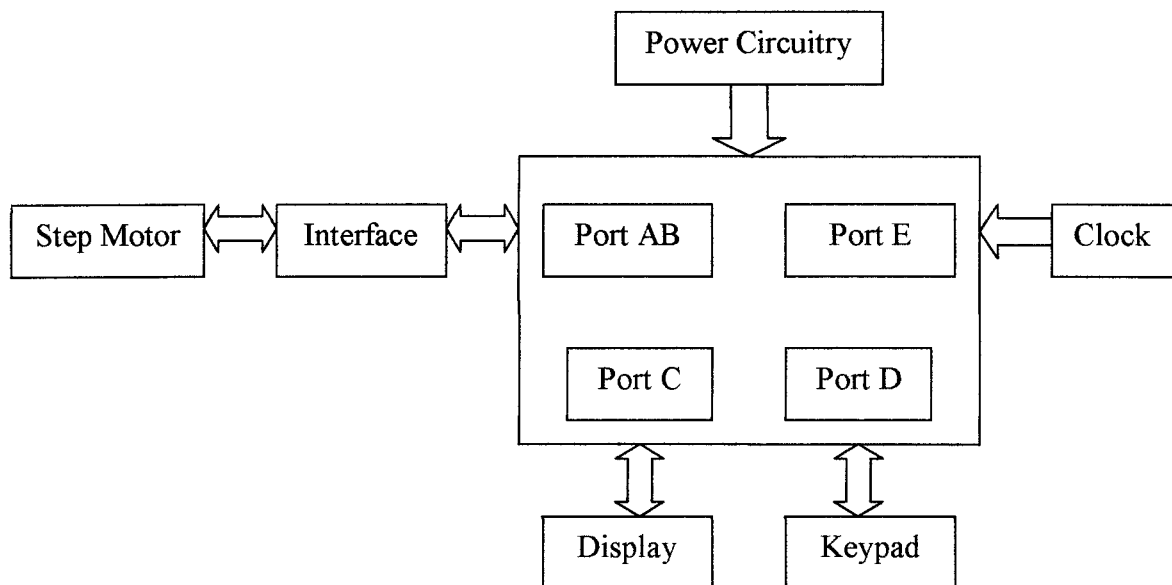


Figure 2.2: The System Specification of APF using Microcontroller M68HC11A8

2.3 Auto Cat Feeder

This project was developed by a team consists of Benjamin Wang, Jason Chang, Eric Huang, Christian Losari and Leung Hoang in 2003. The overall system will operate according to the block diagram shown in Figure 2.3 below.

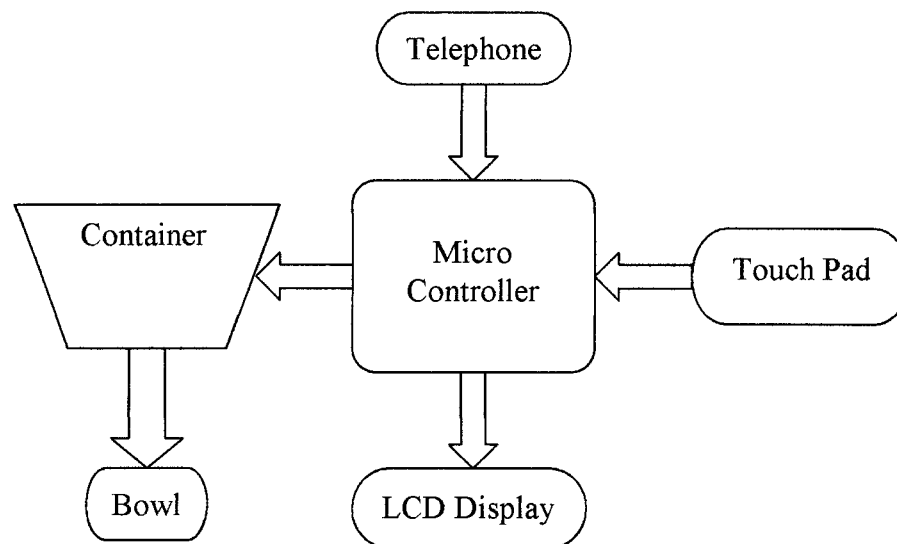


Figure 2.3: The Overall System of Auto Cat Feeder

This system has one LCD, which serves the purpose of helping the user to interface with the system easily. The processing unit of the system is a micro-controller. The controller receives and processes signals from the touch pad or the telephone. Then it will send signals to the output devices for performing tasks such as controlling the food dispenser and displaying required information on the LCD. Figure 2.4 shows the flow chart for controlling the latch of food dispenser.

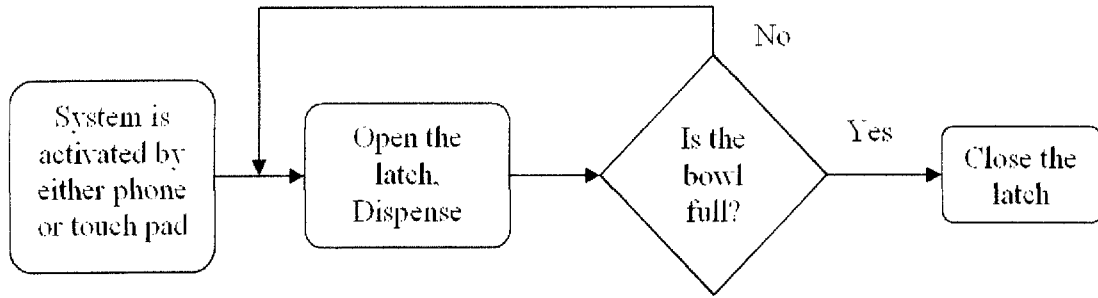


Figure 2.4: Flow Chart for Controlling Food Dispenser

2.4 Automated Pet Feeder

This project is developed by Chong Siew Jun and Marvin HD Mao. This project is an automated pet feeder that is controlled by a wireless infra-red remote control. It consists of two components. The first component is a remote control that allows pet owners to design the diet plan for their pet. The second component is a feeder that receives instruction from the remote control and refills the pet bowl (to feed the pet) when appropriate. Wireless communication is achieved via infrared transmission. The overall program flow is illustrated in Figure 2.5.

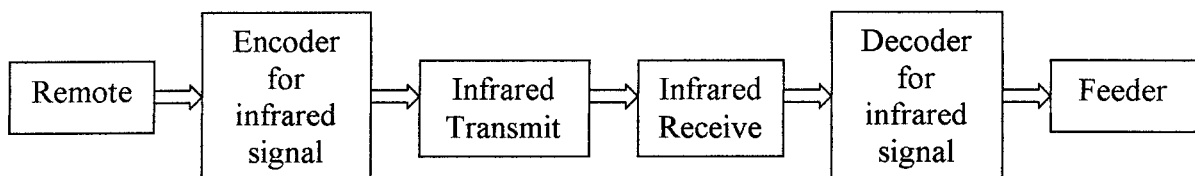


Figure 2.5: Program Flow of Automated Pet Feeder.

The user interface on the remote consists of a keypad and liquid crystal display (LCD). The LCD prompts the options the user can select and the keypad allows the user to make a selection and input data. The feeder consists of a motor-controlled food dispenser (where a

high torque direct current motor is used to turn a wheel in the cereal dispenser) and three weight sensors to monitor the weight of food in the pet bowl. The user interface and the feeder communicate via a pair of infrared transceivers and infrared endecds (encoder and decoder).

2.5 Conclusion

After doing some researches and literature review, there are lots of projects that are related to this project. The related aspect is in the term of pet feeder which supplies the food to the pets. Although they are related, there are some aspects that differentiate the other project and this project such as the controller of the system and the components used in the projects.