AUTOMATED PET FEEDER

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This report is submitted in partial fulfillment of the requirements for the award of Bachelor of Electronic Engineering (Industrial Electronics) With Honours.

Faculty of Electronic and Computer Engineering
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UNIVERSTI TEKNIKAL MALAYSIA MELAKA
FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN
PROJEK SARJANA MUDA II

Tajuk Projek	:	**AUTOMATED PET FEEDER**
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Special dedicated to my beloved parents, family, lecturer and fellow friends, who had strongly, encourage and supported me in my entire journey of learning.

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ABSTRACT

A microcontroller is a high technology that can store and running the program. This project is about a food container that can feed pet(hamster) twice a day without human observation by using the microcontroller ATMega32 software which can control the size of the automatic feeding machine's door. The time for the door to open had been program earlier in the microcontroller. To make sure that the pet's food is not over limit, force sensor will be place at the bottom of the bowl. It will detect the weight of the food where the operation will be program earlier in the microcontroller. The 'Automated Pet Feeder' will be controlled by a wireless infra-red remote control.

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ABSTRAK

Pengawal mikro merupakan cip yang berteknologi tinggi yang mampu menyimpan dan melaksanakan sesuatu aturcara program. Projek ini adalah tentang mengawal makanan binatang peliharaan(hamster) dua kali sehari secara automatic menggunakan pengawal mikro ATMega32. Ia digunakan untuk mengawal bukaan pada alat pemakanan secara automatik. Tempoh masa untuk bukaan telah ditetapkan. Untuk memastikan tiada makanan yang melimpah keluar dari mangkuk makanan, alat pengesan tekanan diletakkan dibawah mangkuk makanan. Ia akan mengesan berat makan yang dituangkn ke dalam mangkuk makanan seperti yang telah di programkan di dalam microcontroller. 'Automated Pet Feeder' akan dikawal oleh alat kawalan jauh infra-merah tanpa wayar.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Automated pet feeder is one of the new technologies for feed pet. It will help pet owner to take care of their pet while they are not at home. Even the owners are not at home, they still can feed their pet. Automated pet feeder is built to help pet owner taking care of their pet. Automated pet feeder is one of the pet feeders that will be controlled by a wireless infra-red remote control. The automated pet feeder will be automatically dispenses predetermined amounts of food at the exact times user choose with controlled by a wireless infra red remote control.

As pet lovers, user should understand those pets also need a proper diet management. Sometimes, the responsibilities of life inhibit pet owners from properly caring for their pets. Whether user away from home unexpectedly or simply would like one less chore to worry about, user can feel secure that the beloved pet will be cared for and fed on time, every time.

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1.2 Project Objective

The objective of this project is to create an automatic feeding machine. Nowadays, everyone can have a pet at home without giving their full commitment to have a healthy pet. With this automatic feeding machine, it will help pet owner to manage their pet dietary well. When user at home, it can be controlled by wireless infrared remote control. If user is not at home, user can set the timer to feed their pet. To make sure that the food does not exceed, force sensor will active and detect the exact amount should be in the bowl.

1.3 Problem Statement

As we look nowadays, pet owners sometimes does not have much time to look at their pet. Because of this disability, an automated pet feeder had been build. For information, automated pet feeder offers some tangible advantage to the pet owners. Potential advantages included are this purpose could help pet owners to give good diet management for their pet and to help pet get a healthy life.

1.4 Scope of Work

The scope of works in this project is to develop pet feeder by using wireless infra red remote control. Pet owners will just use the wireless infra red remote control to depressed predetermined amount of food at one time. In order to implement this design, both software and hardware will be use. Microcontroller that will be used is ATMega32.

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1.5 Thesis Outline

This thesis represent by five chapters. The following is the outline for this project in order to understand the whole report.

Chapter 1 of the thesis will explain briefly about the project background, objective of the project which needs to be achieved, problem statement of the project, scope of works regarding the project and methodology of the project.

Chapter 2 describes about literature review involved gather information of the project in order to complete the whole project. This study is focused especially on microcontroller that been used and others component that important for this project.

Chapter 3 explains about the project methodology where how the project is implemented. The approach for meeting the goals and objectives and project life cycle phase is described in this chapter, along with the tasks needed to complete it.

Chapter 4 describes the project finding which includes the simulation design. This chapter also discusses and analyze about the project and operation of the software such as the programmed for the microcontroller.

Chapter 5 will be the conclusion and suggestion to the project in future undertakings.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Automated pet feeder is one of the new technologies that can help pet owner to manage their pet dietary well. So, in terms of made an automatic pet feeder, some research about the component that be used will be made. It will give more information about the component.

2.2 Microcontroller

A microcontroller (also MCU or μC) is a functional computer system-on-a-chip. It contains a processor core, memory, and programmable input/output peripherals. Microcontrollers include an integrated CPU, memory (a small amount of RAM, program memory, or both) and peripherals capable of input and output.

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2.2.1 ATMega32

The Atmel ATmega series of microcontrollers are very popular due to the large number of peripherals inbuilt in them. It have features such as internal PWM channels, 10-bit A/D converters, UART/USART and much more, which are useful for a lot of applications. It is also help reducing external hardware these are built-in.

Figure 2.1: ATMega32

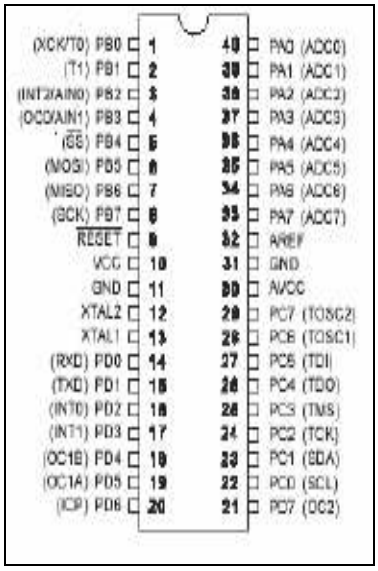

Figure 2.2: ATMega32 symbol[4]

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2.3 Infra-Red remote control

A remote control is an electronic device used for the remote operation of a machine. Commonly, remote controls are used to issue commands from a distance to consumer electronics. Remote controls for these devices are usually small wireless handheld objects with an array of buttons for adjusting various settings such as track number and volume. In fact, for the majority of modern devices with this kind of control, the remote contains all the function controls while the controlled device itself only has a handful of essential primary controls. Most of these remotes communicate to their respective devices via infrared (IR) signals and a few via radio signals.

2.4 IR encoder/decoder

IR encoder is remote control device paired with IR decoder utilizing infrared signal transmission. It encodes the data either from the button or from the microcontroller, with the address code into a serial coded waveform sending through IR modulation. IR decoder receives the IR signal using the IR receiver module, and decodes it back to data and address.

2.4.1 MCP2120 IR encoder/decoder

MCP2120 is a low-cost, high-performance, fully-static infrared encoder/decoder. This device sits between a UART and an infrared (IR) optical transceiver. The data received from a standard UART is encoded (modulated) and output as electrical pulses to the IR Transceiver. The IR Transceiver also receives data which it outputs as electrical pulses that the MCP2120 decodes (demodulates) then transmits the data via the MCP2120 UART. This modulation and demodulation method is performed in accordance with the IrDA standard.

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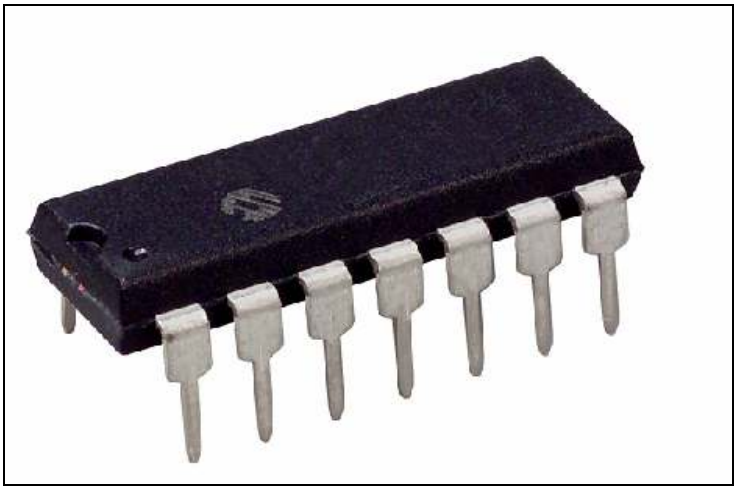

Figure 2.3: MCP2120

It also builds up with CMOS technology with special specification. The specification is listed below.

SPECIFICATION
Low-power, high-speed CMOS technology
Fully static design
Low voltage operation
Commercial and Industrial temperature ranges
Low power consumption - < 1 mA @ 3.3V, 8 MHz (typical), 3 mA typical @ 5.0V when disabled.

Table 2.1: MCP2120 specification[5]

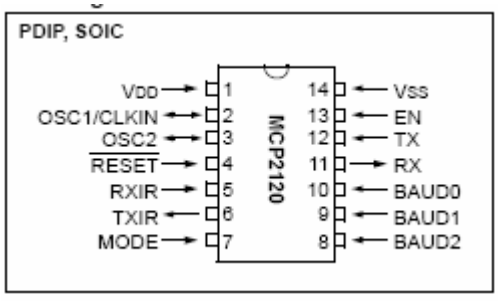

Figure 2.4: MCP2120 symbol[5]

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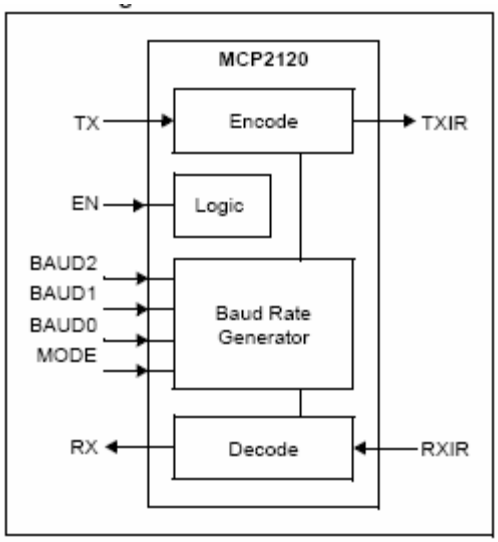

Figure 2.5: MCP2120 block diagram[5]

2.5 Transceivers

A transceiver is a device that has both a transmitter and receiver which are combined and share common circuitry or a single housing. If no circuitry is common between transmit and receive functions, the device is a transmitter-receiver. The term originated in the early 1920s. Technically, transceivers must combine a significant amount of the transmitter and receiver handling circuitry.

2.5.1 TFDU6103

The TFDU6103 is a low-power infrared transceiver module compliant to the latest IrDA physical layer standard for fast infrared data communication, supporting IrDA speeds up to 4.0 Mbit/s (FIR), and carrier based remote control modes up to 2 MHz. Integrated within the transceiver module are a PIN photodiode, an infrared emitter (IRED), and a low power CMOS control IC to provide a total front solution in a single package.

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Figure 2.6: Transceivers[6]

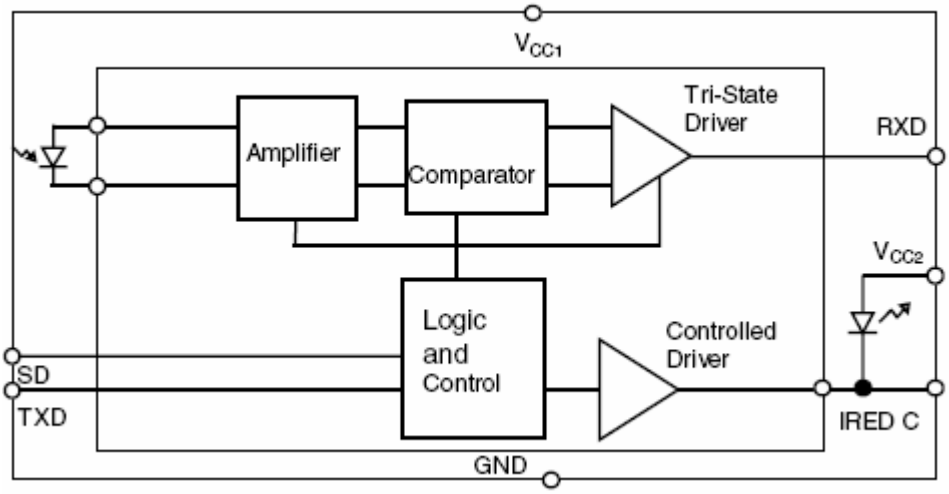

Figure 2.7: TFDU6103 block diagram[6]

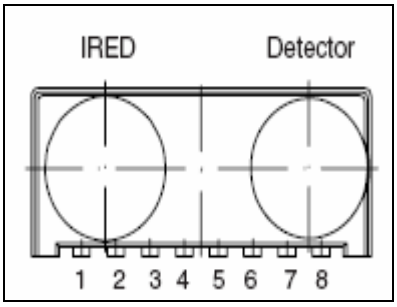

Figure 2.8: TFDU6103 pin diagram[6]

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2.6 Transistor

A transistor is a semiconductor device commonly used to amplify or switch electronic signals. A transistor is made of a solid piece of a semiconductor material, with at least three terminals for connection to an external circuit. A voltage or current applied to one pair of the transistor's terminals changes the current flowing through another pair of terminals. Because the controlled (output) power can be much larger than the controlling (input) power, the transistor provides amplification of a signal. The transistor is the fundamental building block of modern electronic devices, and is used in radio, telephone, computer and other electronic systems. Some transistors are packaged individually but most are found in integrated circuits.

2.6.1 BUZ73 Power Transistor

Buz73 is one of the transistor families. It is n-type channel JFET transistor. JFET means junction field effect transistor and use electron for conduction since it is n-type channel.

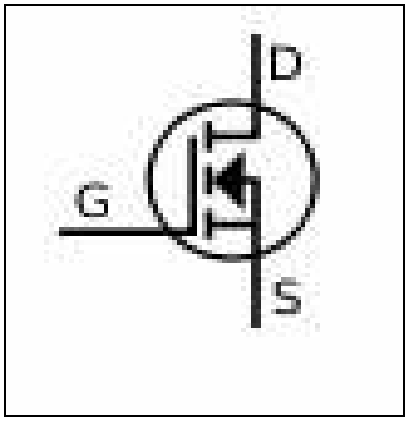

Figure 2.9: BUZ73 symbol

Figure 2.10: BUZ73

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2.7 Opto-isolator

An opto-isolator (or optical isolator, optocoupler, photo coupler, or photoMOS) is a device that uses a short optical transmission path to transfer a signal between a transmitter and a receiver, while keeping them electrically isolated. The opto-isolator is a package that contains both an infrared LED and a photo detector such as silicon diode, transistor Darlington pair, or SCR. The wave-length response of each device is tailored to be as identical as possible to permit the highest measure of coupling possible.

2.7.1 Darlington pair

Darlington pair is a compound structure consisting of two bipolar transistors (either integrated or separated devices) connected in such a way that the current amplified by the first transistor is amplified further by the second one. This configuration gives a much higher current gain (written β, h_{fe}, or h_{FE}) than each transistor taken separately and, in the case of integrated devices, can take less space than two individual transistors because they can use a *shared* collector. Integrated Darlington pairs come packaged in transistor-like integrated circuit packages.

2.7.2 4N35 Opto-isolator

For this project, opto-isolator type 4N35 is choosing. 4N35 had been choosing because it is in a simple package and it is easy to construct with the circuit.

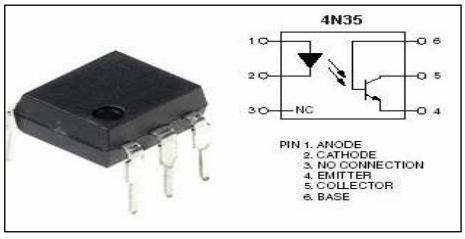

Figure 2.11: Opto-isolator

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