

STANDARDIZATION OF DIGITAL CLOCK IN THE BUILDING AND
ORGANIZATION

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ORGANIZATION

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Tajuk Projek : STANDARDIZATION OF DIGITAL CLOCK IN THE BUILDING AND ORGANIZATION

Sesi Pengajian :

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Tarikh :

To my beloved father and mother

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Thank to Allah, because of His grace, I have been able to implement this project with the good I want to take this opportunity to extend my appreciation to everyone who has helped me throughout my performing PSM. I express my gratitude and hope that Allah will repay you well.

ABSTRAK

Projek ini adalah untuk merekabentuk sistem yang menyelaraskan masa dalam bentuk digital. Sistem ini direka mengawal semua jam tanpa menggunakan wayar. Semua masa pada jam digital dikawal oleh pengawal jam dengan menghantar data masa menggunakan modul modul XBee RF dan jam digital akan mengira masa yang telah ditetapkan dengan sendirinya. Module Xbee RF yang digunakan mengandungi alamat bit yang sama untuk mengawal data masa dari diterima oleh penerima yang lain. Masa pada semua jam mestilah sama dengan jam yang lain walaupun sesaat yang bermaksud tiada kelewatan antara semua jam.

ABSTRACT

This project designs the systems that can synchronize the time in digital form. This system is designed to control all digital clock by using wireless system. All the time on the digital clock is controlled by a remote digital clock which send the data of time using Xbee RF module and count the time that was set by itself. Xbee RF modules used contains the same address bits to control the time of data received by the receiver. Time must be the same at all digital clock even a second mean no delay between them.

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LIST OF SYMBOL / ABBREVIATION / TERM

LCD	-	Liquid-crystal display.
OB Van	-	Outside Broadcasting Van
MCR	-	Multichannel Room
POC	-	Production Operation Center
SOC	-	Satellite Operation Center
VTR	-	Video Tape Recorder
IC	-	Integrated Circuit.
PIC	-	Programmable Interface Controller.
EEPROM	-	Electrically Erasable Programmable Read-Only Memory
I2C	-	Inter-Integrated Circuit
RF	-	Radio Frequency
LED	-	Light Emitting Diode.

CHAPTER I

INTRODUCTION

1.1 Project Introduction

This project is designed to synchronize time and display in a digital clock for the building or organization which is created in digital. The project is also designed to facilitate all the people in the organization at the same time. A digital clock is a type of clock that displays the time digitally. For example in numerals or other symbols, as opposed to an analog clock, where the time is indicated by the positions of rotating hands. Digital clocks are associated with electronic drives, but the "digital" description refers only to the display, not to the drive mechanism. The digital clock is design to people get the accurate time not only approximate time. Usually by using analog clock, people will get the approximate time. This digital clock is design for wall clock. This project use digital clock for easily standardize the time in the organization.

For this project, the system develops to control all the digital clock by using wireless system. The advantage using wireless synchronized digital clock is can use for portable and fixed clock but for wired synchronized digital clock just for fixed are used. Furthermore, by using wireless synchronized digital clock, it can be save cost if the long range between digital clock with another clock. Besides that, the maintenance for the synchronized digital clock can be decrease.

The sustainable development that involve in this project is interrupt, up counter, transmit data and receive data. Interrupt system about when the time is set by the set button which can up and down. Up counter mean the timer of time that always increase number. Transmit data mean the data of time at remote control digital clock sends to digital clock by transmitter of XBee RF module and run by itself. Lastly, receive data process happens at display clock which receive the data of time that be send by transmitter and display at display clock. The time that display at two or more digital clock must be.

1.2 Problem Statement

In television station, synchronization of time system is very important for recording, live shows, advertisement and broadcasting. If the time is not synchronized, many problem exist because in processing broadcast programs, difference department at difference area communicate together. Furthermore, there are no available portable digital clock for OB Van usage for outside live or record shows. All the clock on the RTM is connected by wired and it will costly if the connection of another clock in another department is far.

The broadcasting each show in television station involve many department which in different area. Figure 1.1 shows Block Diagram of The Flow Broadcasting Television Show at Television Station. For example, production of a live show titled "Fikrah" is produce at Studio and at the same time the result from studio send to Conty and MCR (Multichannel Room) for branding and send to another department for broadcasting. The result from MCR send to KL tower and Telekom Malaysia for broadcast in peninsular Malaysia. For Sabah and Sarawak, the signal of the television show is broadcast by satellite which conduct by SOC (Satellite Operation Centre) department. While POC (Production Operation Center) department functions to record that live show for reference of television station in the future.

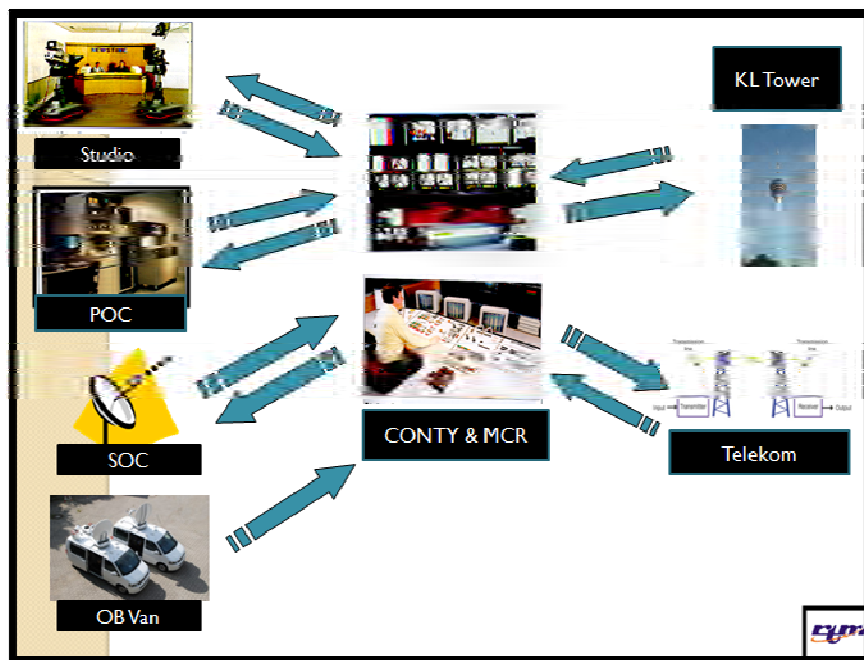


Figure 1.1: Block Diagram of The Flow Broadcasting Television Show at Television Station

Another important of synchronized time at television station when live show is the different input by the employee which the input used for certain slot in the show. For example, the starting show at 10:30:00 start with input from VTR (Video Tape Recorder) in the control room at studio. Then, at 10:30:30 is the introduction of the show from the studio 1a, which the host of the show give little speech about the show. Next, employee at VTR studio 1 give the input for the show as video from the tape in 10:34:58. When the sponsor advertisement slot, MCR department take over the channel from studio at 10:58:00 and 11:17:00. At 11:00:00, the another studio will take over to give way for current news. In this show also have slot for live band from studio 1b. Basically, each studio have two or more stage for difference usage of the show. Each input from must on time with the television show planning. If not, the unwanted input will exist which can overlap with another input. Table 1.1 shows the example of Live of Television show planning in RTM which titled FIKRAH. The program planning shows by detail in hour, minute and second for each slot that mean even each second the slot must put on the time.

Table 1.1: Example of Live TV show planning (FIKRAH) [5]

Time	Slot	Department
10 : 30 : 00	Montage of FIKRAH	VTR Studio 1
10 : 30 : 30	Intro	Studio 1a
10 : 34 : 58	Video Nasyid	VTR Studio 1
10 : 37 : 38	Forum	Studio 1a
10 : 56 : 00	Live Band	Studio 1b
10 : 58 : 00	Sponsor Advertisement	MCR
11 : 00 : 00	Current News	Studio 3

Time	Slot	Department
11 : 05 : 00	Continue Forum	Studio 1a
11 : 15 : 00	Montage	VTR Studio 1
11 : 17 : 00	Sponsor Advertisement	MCR
11 : 20 : 00	Continue Forum	Studio 1a
11 : 27 : 00	Live Band, add effect (credit)	Studio 1b, Studio Multicontroller
11 : 30 : 00	Advertisement	MCR

This synchronized digital clock also can be used as another application. In industrial environments, synchronized time helping the entire team meet productivity goals. That mean all the employee will refer to one data of time which display on all the clock on the industry. So, all employee can come to work and rest on time. In healthcare facilities, synchronized hospital clocks are critical to daily operations, whether it's checking on patients or delivering medications. The delivering medications on time will increase the effectiveness of the medications. Lastly, at schools and universities rely on accurate timekeeping to smoothly transition students from one class to the next. It will avoid the lecture to wait another lecture on at out of the class.

1.3 Project Objectives

This project aims to create the synchronized digital clock and the same time analyze and identify the problem that will exist if the time not synchronized. The objectives of this project is to design the digital clock by using PIC microcontroller which show time in 24hours format, calendar and days of the week. Another objective is to set time of a few digital clock by single remote control digital clock using wireless

system by XBee RF modules that set at as transmitter at remote digital clock and receiver at digital clock. Besides that, this project is to synchronize time at digital clock in the organization or building. Furthermore, this project design to create a portable synchronized digital clock which can be controlled wirelessly.

1.4 Project Scope

This project involves two major parts which digital clock and remote digital clock, remote digital clock transmit data of time to display at digital clock, then digital clock will run the time that was set by itself. The circuit of digital clock will be designed at Proteus software with the main component PIC16F887A and have display clock which connected to DS1307 that will run the time precision with real time. The meaning of real time is each second run in truly one second and not have delay. The circuit of digital clock also design by using Proteus software with the main component is PIC16F877A and interrupt by three push buttons which use to set time, increase time and decrease time. The digital clock is designed with LCD Screen to display the digital clock which contain time in 24 format, date and day of week.

XBee RF Module 2.4GHz is used to transmit data of time from remote digital clock and receive at the digital clock then run the time itself. XBee RF Module is design as transceiver which can be as transmitter and receiver. XBee RF module on remote digital clock is set as transmitter and on digital clock is set as receiver. Digital clock receive data of time from the remote digital clock by receiver and display the time which the digital clock is connected to the receiver of XBee RF Module. The time that display in digital clock must same as time at another digital that was set by remote digital clock together. Same receiver is set at difference digital clock to receive data from one transmitter mean all the receiver are addressed by one address which can configure with one transmitter. The clock system displays time in hours, minutes, seconds, date and day of the week.

CHAPTER II

LITERATURE REVIEW

2.1 Literature review overview

The theory and description plus details about the project have taken as guidance in completing this project. By this chapter, an overview of some application that similar to the project and related project design is presented.

2.2 Previous Research of Wireless Synchronized Clock

The wireless synchronized clock that already have in market is so expensive which the wireless system use GSM modem. By using the GSM modem, the user must always pay to GSM system to get the service of synchronized time from master clock to another display clock, Each data that send using GSM system must be pay. That means, this product is expensive for daily usage.[6]

Furthermore, the wireless synchronized digital clock can be portable and fixed digital clock while wired synchronized digital clock only can be use as fixed clock. An addition, there are low cost of wireless synchronized digital clock if design for the long range. The disadvantage of this project is use more electricity than wired synchronized digital clock because each of digital clock must use adapter or battery. Table 2.1 shows the difference between wired and wireless synchronized digital clock.

Table 2.1: The Difference Between Wired and Wireless Synchronized Digital Clock.

Wired Synchronized Digital Clock	Wireless Synchronized Digital Clock
Fixed clock	Portable and Fixed clock
High cost for long range	Low cost for long range
Save electricity	Use more electricity
High maintenance	Low maintenance

2.3 Microcontroller

A microcontroller is a computer on a chip or a single chip computer. Another term to describe a microcontroller is embedded controller because the microcontroller and its support circuits are often built into or embedded in the devices they control.

A microcontroller is similar to the microprocessor inside a personal computer. It also can be define as a single chip computer because it contains memory and I/O interfaces in addition to the CPU.