

CHAPTER 4

RESULT AND DISCUSSION

4.1 GPS Receiver Testing

GPS Receiver Module unit is tested to determine the functional of it. The approach to test this board is using the external circuit contain the MAX 232 as a serial interfacing device of GPS Receiver Module and computer in order to receive the data from the satellite. The outputs of the GPS Receiver Module are in National Marine Electronics Association (NMEA) code which read in ASCII character in serially data. All the code from the GPS Receiver Module has their characteristics which need datasheet to recognize it. The output messages of NMEA are shown in Table 4.1.

Table 4.1: NMEA Output Description

Option	Description
GGA	Time, position and fix type data.
GLL	Latitude, longitude, UTC time of position fix and status.
GSA	GPS receiver operating mode, satellites used in the position solution and DOP values.
GSV	The number of GPS satellites in view satellite ID numbers, elevation, azimuth and SNR values.
MSS	Signal-to-noise ratio, signal strength, frequency and bit rate from a radio-beacon receiver.
RMC	Time, date, position, course and speed data.
VTG	Course and speed information relative to the ground.

4.1.1 GPS Receiver Module Result

The result of testing procedure for GPS receiver module is shown in Figure 4.1. The \$GPGGA shows the position of latitude and longitude. It will be used in calculation procedure in microcontroller. The longitude and latitude position directly got from satellite. The validation of data received can be determined by checking the \$GPGGL data as shown in Figure 4.2.

```
1-HyperTerminal
File Edit View Call Transfer Help

$GPGSV,3,2,11,15,31,324,,30,30,135,,05,30,161,33,09,27,035,41*73
$GPGSV,3,3,11,31,23,191,,06,16,170,31,25,13,216,*46
$GPRMC,085511.651,A,0624.8131,N,10008.2044,E,0.03,197.81,100407,,A*63
$GPVTG,197.81,T,M,0.03,N,0.1,K,A*09
$GPGGA,085512.651,0624.8132,N,10008.2044,E,1.05,1.9,0.7,M,,0000*0F
$GPGLL,0624.8132,N,10008.2044,E,085512.651,H,A*53
$GPGSA,A,3,21,05,09,18,06,,,,,,,,,2.9,1.9,2.2*31
$GPGSV,3,1,11,21,79,173,43,22,39,030,,14,38,333,,18,37,013,38*74
$GPGSV,3,2,11,15,31,324,,30,30,135,,05,30,161,34,09,27,035,43*76
$GPGSV,3,3,11,31,23,191,,06,16,170,31,25,13,216,*46
$GPRMC,085512.651,A,0624.8132,N,10008.2044,E,0.13,235.75,100407,,A*62

$GPVTG,235.75,T,M,0.13,N,0.2,K,A*0B
$GPGGA,085513.651,0624.8133,N,10008.2043,E,1.05,1.9,0.6,M,,0000*09
$GPGLL,0624.8133,N,10008.2043,E,085513.651,H,A*54
$GPGSA,A,3,21,05,09,18,06,,,,,,,,,2.9,1.9,2.2*31
$GPGSV,3,1,11,21,79,173,42,22,39,030,,14,38,333,,18,37,013,37*7A
$GPGSV,3,2,11,15,31,324,,30,30,135,,05,30,161,33,09,27,035,42*70
$GPGSV,3,3,11,31,23,191,,06,16,170,30,25,13,216,*47
$GPRMC,085513.651,A,0624.8133,N,10008.2043,E,0.09,15.86,100407,,A*52
$GPVTG,15.86,T,M,0.09,N,0.2,K,A*3C
$GPGGA,085514.650,0624.8129,N,10008.2044,E,1.05,1.9,0.1,M,,0000*04
$GPGLL,0624.8129,N,10008.2044,E,085514.650,H,A*5E
$GPGSA,A,3,21,05,09,18,06,,,,,,,,,2.9,1.9,2.2*31
$GPGSV,3,1,11,21,79,173,42,22,39,030,,14,38,333,,18,37,013,37*7A
$GPGSV,3,2,11,15,31,324,,30,30,135,,05,30,161,34,09,27,035,42*77
$GPGSV,3,3,11,31,23,191,,06,16,170,30,25,13,216,*47
$GPRMC,085514.650,A,0624.8129,N,10008.2044,E,0.07,65.65,100407,,A*5C
$GPVTG,65.65,T,M,0.07,N,0.1,K,A*38
$GPGGA,085515.650,0624.8131,N,10008.2044,E,1.05,1.9,0.2,M,,0000*0F
$GPGLL,0624.8131,N,10008.2044,E,085515.650,H,A*56
$GPGSA,A,3,21,05,09,18,06,,,,,,,,,2.9,1.9,2.2*31
$GPGSV,3,1,11,21,79,173,42,22,39,030,,14,38,333,,18,37,013,37*7A
$GPGSV,3,2,11,15,31,324,,30,30,135,,05,30,161,34,09,27,035,41*74
$GPGSV,3,3,11,31,23,191,,06,16,170,30,25,13,216,*47
$GPRMC,085515.650,A,0624.8131,N,10008.2044,E,0.13,21.06,1004
```

Figure 4.1: NMEA Output Messages

4.1.2 GGA-Global Positioning System Fixed Data

Table 4.2 contains value for the following example:

```
$GPGGA,161229.487,3723.2475,N,12158.3416,W,1,07,1.0,9.0,M,, , ,0000*18
```

Table 4.2: GGA Data Format

Name	Example	Units	Description
Message ID	\$GPGGA		GGA protocol header
UTC Time	161229.487		hhmmss.sss
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
Position Fix Indicator	1		See table 3
Satellites Used	07		Range 0 to 12
HDOP	1.0		Horizontal Dilution of Precision
MSL Altitude ³	9.0	meters	
Units	M	meters	
Geoid Separation ¹		meters	
Units	M	meters	
Age of Diff. Corr.		second	Null fields when DGPS is not used
Diff. Ref. Station ID	0000		
Checksum	*18		
<CR> <LF>			End of message termination

4.1.3 GGL-Geographic Position – Latitude / Longitude

Table 4.3 contains value for the following example:

```
$GPGLL,3723.2475,N,12158.3416,W,161229.487,A*2C
```

Table 4.3: GGL Data Format

Name	Example	Units	Description
Message ID	\$GPGLL		GLL protocol header
Latitude	3723.2475		ddmm.mmmm
N/S Indicator	N		N=north or S=south
Longitude	12158.3416		dddmm.mmmm
E/W Indicator	W		E=east or W=west
UTC Position	161229.487		hhmmss.sss
Status	A		A=data valid or V=data not valid
Checksum	*2C		
<CR> <LF>			End of message termination

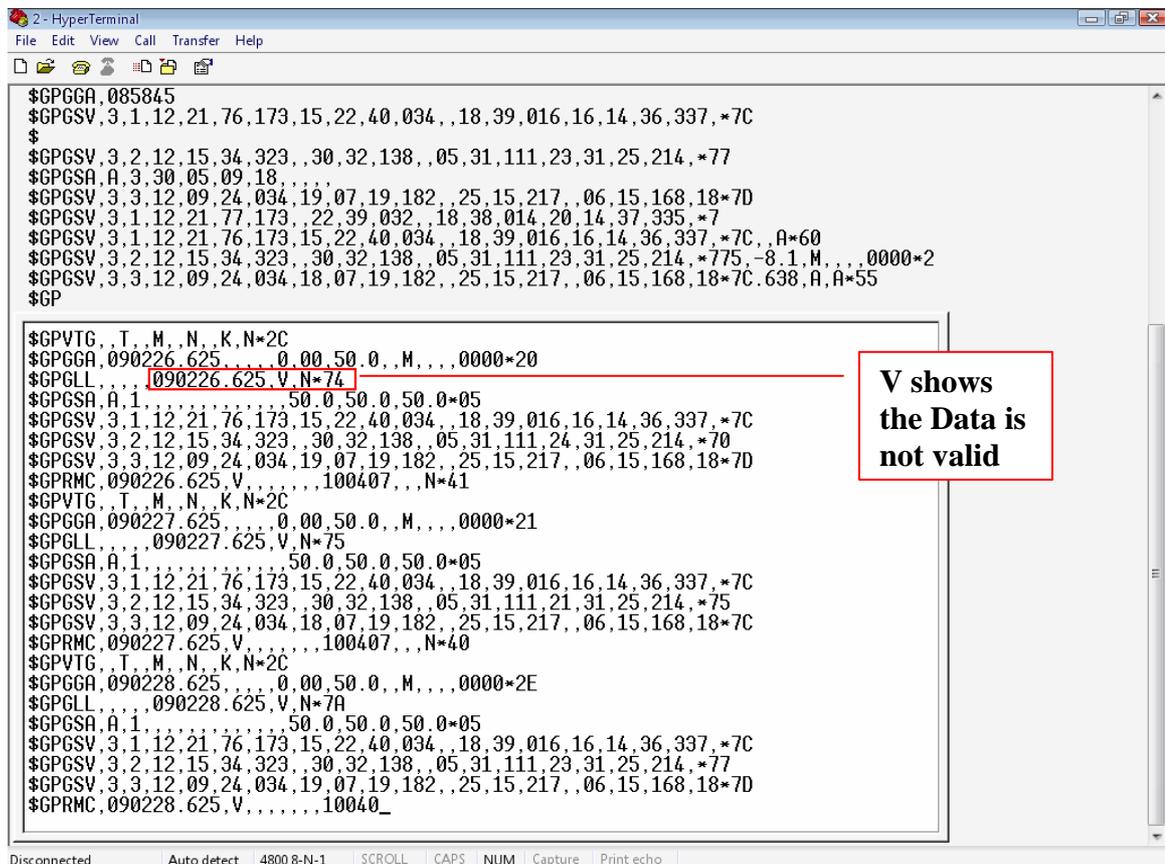


Figure 4.2: Example of Invalid Data Receive From GPS

4.2 Real Time Clock Result

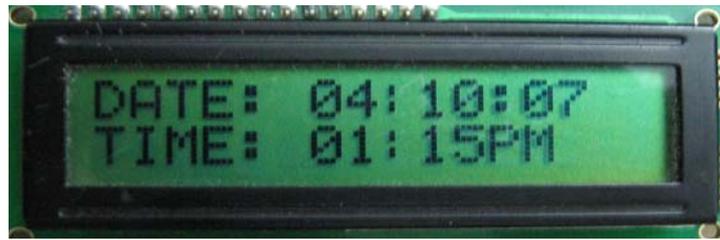


Figure 4.3: LCD Screen Display Date and Time

For this project, 20x2 LCD is used. RTC is used to show the date and time. The DS1307 is used in this project in order to give the information of the time and the date currently. The RTC for this project function as expected before the project is develop as shown in Figure 4.3.

4.2 Pray Time Result



Figure 4.4: Result for Pray Time

The pray time displayed via LCD screen after microcontroller finished calculate the pray time. The result shows the Zuhr pray time. It must be sequence with the Real Time Clock.

4.4 Discussion

In this project, the ORCAD Released 9.1 was used as a process of designing the hardware part. However, the problem occurred when designing the layout using the Layout program. There were a lot of procedure such as the footprint, via spacing and many more needed to be considered. Then, the design was sent to the PCB Fabrication Lab to finish the process of making the board. It was taken about two to three weeks to complete all the processes of making the microcontroller board. The board was tested to make sure it can be functioned or not used the assembly language program. The test procedure were included all the output port and the serial connection. Then the board was confirmed can be work as expected.

Afterwards, the process of develop software was continued. In this process, C Language Programming is using to programmed the microcontroller to calculate the pray time system by taking the spatial data from GPS Receiver Module, LCD screen to display the result and keypad to set the date and time. Referred to the result above, the data that was received by GPS receiver can be used as the referenced position for the calculation pray time as shown in Table 4.3. The data is valid if the \$GPGLL shows the 'A' label in the spatial data received and it is not valid if the data shows 'V' label. Subsequently all the software that have been developed need to be combined in order to interface all the external hardware with microcontroller and to make sure all the devices can communicated with each other.

The result is depend on where is the device took place because the data is continuously load the location from satellite as long as the device is supplied with voltage. The problem faced while doing this project were to learn the microcontroller and the GPS module architecture and design. For Communication students, there is no embedded and microcontroller subject was offered for their course. Hence, there is a need for them learn it themselves.

CHAPTER 5

BUSINESS PLANNING

5.1 Introduction

Nowadays, the market place is very competitive. A good strategy will ensure the product will be competing with other brand. To make sure it works, a wise market strategy should be arranged properly in order to dominate the market inside and outside the country.

“In business, there are no guarantees. There is simply no way to eliminate all the risks associated with starting a small business - but you can improve your chances of success with good planning, preparation, and insight. Start by evaluating your strengths and weaknesses as a potential owner and manager of a small business. Carefully consider each of the following questions [7].”

5.2 Propose of Business Planning

A formal business plan important to establish the business, irrespective the size of it as it is for the start up. The functions of the business plan are:

- To help the managements or entrepreneurs to clarify, focus and research their business.
- To provide a consideration and logical framework within which a business can develop and pursue business strategies.
- To serve as a basic for discussion with the third parties such as shareholder, agencies, bank and investor.

5.3 Strategy to Commercialized

In the process of creating a marketing strategy, it must consider many factors. Although there are many factors, it should be done step by step mean that priority should be put for the most important step. It is because each strategy must address some unique consideration. However, many are common to all marketing strategies. There are two major components of marketing strategy which is the first one is how to address the competitive market place and second is how to offer the product which will be most effective in the markets.

This project has been planned to establish the functional and information requirement that will allow providing business value. It also defines the basic application architecture and identifies the maintainability requirements for the application.

The world view is refined to focus more fully on a specific domain of interest. Within a specific domain, the need target system element is a data, software, hardware and people was analyzed. Finally, the analyzed, design and construction of a target system element are initiated. Besides that, there are some factors of strength and reliability this project. This project was developing so that it can easily enter the market.

There is certain level of focusing this project in order to publish this system everywhere especially via advertising method. With the strength of this project such as auto reload position, quick calculation of time and friendly user product will make this project able to compete with other people product. Apart from that, with a reasonable price offer this product will win the customer.

After defining the strategy, the information was gathered to determine whether the strategy will make sense or not to fulfill objective of making enterprise competitive in the market place. The most important assessment such as the cost is the profit potential.

Having selected the direction most beneficial for the overall interest of the enterprise, the next step is to choose a strategy for the offering that will be most effective in the market. This means choosing one of following generic strategies; cost leadership strategy, a differentiation strategy and focus strategy [7].