

# EGT10 DESIGN AND APPLICATION FOR POSITION GPS TRACKER WITH VISUAL BASIC

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## **ABSTRACT**

*As a navigation tool, GPS can be used to guide a person towards the desired location. The trick is to combine data obtained from the GPS coordinates with a digital map. From there it can be known to the person's position relative to its target location. This study tries to view a map using visual basic. Data from a map using GPS data EGT-10. The results showed that the data received by GPS coordinates EGT-10 the same as the Garmin GPS 60, while the decimal value of the minute differences are influenced by the level of accuracy of each GPS and within the accuracy of GPS is used. GPS can be visualized on a digital map.*

## **KEYWORDS**

*GPS, Visual Basic, EGT-10, Map.*

## **1. INTRODUCTION**

GPS has long been used by the military as a navigation tool troops, fighter planes, helicopters and others. Currently GPS has become a technology that can be consumed by the general public and is often used for driving, sightseeing, or sailing.

As a navigation tool, GPS can be used to guide the location of the desired goal. Of the received position data it is known the position where we are. In addition to GPS, the map is also required in the navigation system. In this case, the map is used as a marker position and guide the direction to achieve the desired goal location.

Position tracking system applications are divided into two parts, namely the objects and the navigation. Section in charge of sending a data object - GPS data in the form of latitude, longitude, speed, and direction. Part of Visual Basic-based navigation system served to create a mapping GPS data received on a digital map. Digital map format used is JPEG file type extension. Purpose of making the mapping system is to facilitate the user in a position to observe.

Some of the projects that I've done before this project, among others, performed by Ingot Marito N, student, University of Indonesia in 2008 under the title "Helicopter Navigation System Based on Data Position In Telemetry". This project implements the application of GPS and digital compass as an automatic navigation system on a helicopter flight with the aim that the helicopter can fly to the destination from the starting position with the automatic.

GPS and digital compass is used in the form of a module that is integrated with a microcontroller. The data obtained by telemetry transmitted to a computer for further processed and monitored. This project succeeded in simulating a helicopter navigation system based on data obtained from the GPS position yangdikirimkan the telemetry to the computer.

Slamet Widodo[2011], a project of making a vehicle tracking system based on GPS positioning using sms media. This project can know the position of a motor vehicle based on the coordinates of the earth in the form of longitude and latitude based on the GPS then sends the data via sms media.

Tegar[2011] conducted a study entitled "Preparation of software for tracking the position of eg the use of t-10 gps and digital maps". In his research, he has managed to display the data langtitude longitude are displayed on a digital map.

## 2. RESEARCH METHOD

### General system configuration

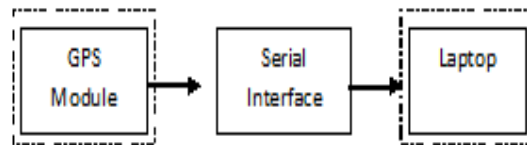


Figure 1. Block diagram of the system

In general, the system is divided into two parts, namely

- A Parts of the object, in this section there is a functioning GPS module receives the data coordinates (position data).
- Navigation section, this section of the media used laptop as a display face to face to the user (user interface), and data processing center through visual basic software.
- For the second part of this mengabungkan needed a system of communication, namely communication RS-232 serial port with baudrate 4800.

### Hardware design

The design of the hardware in this system, the serial interface, which consists of a series of power supply and converter circuit TTL - RS232.

### Design Series Power Supply

GPS EG T-10 LEADTEK LR980ST module requires power equal to 3.2 to 5.0 VDC. Power supply is commonly used adapter or batteries. Adapter / battery is not able to provide voltage 3.2 volt or 5 volt. It is necessary to lower the voltage regulator circuit generated by the adapter / battery voltage of 5 volts. To make a 5 volt supply, use IC LM7805, a provider of a stable 5 volt supply. More detail can be seen in the image below:

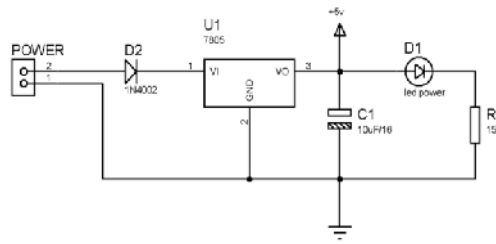


Figure 2. Volt regulator circuit.

### Design of Converter TTL - RS232

Data from the GPS module is sent through the serial port using TTL voltage levels. To be able to communicate with devices using RS232 voltage levels, it would require a converter from TTL to RS232. IC is used as the converter is MAX232 IC. Pins are used in IC MAX 232 will be described as follows:

- Pin T1out, serves as a data transmission path to a laptop in the form of RS232 serial communication. T1out pin connected to pin 2 on the serial port (DB9).
- Pin T1in, serves as a data transmission path from the GPS module in the form of TTL serial communication. T1in pin is connected to the output of the GPS module TX1.
- Pin R1in, serves as a pathway to acceptance of data in the form of IC MAX 232 RS232 communication. R1in pin is connected to pin 3 on the serial port (DB9). In this system, the pin on the IC MAX 232 R1in unused.
- Pin R1out, serves as a data transmission path to the GPS modules in the form of TTL serial communication. PinR1out RX1 is connected to the input of the GPS module. In this system, the GPS module RX1 pin is unused.

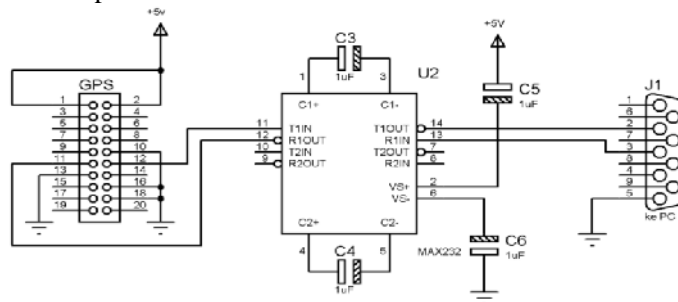


Figure 3. The circuit IC MAX 232

### Flowchart Program

In the software design is preceded by the flowchart of the system designer to be made, the following is a flowchart of the program are made.

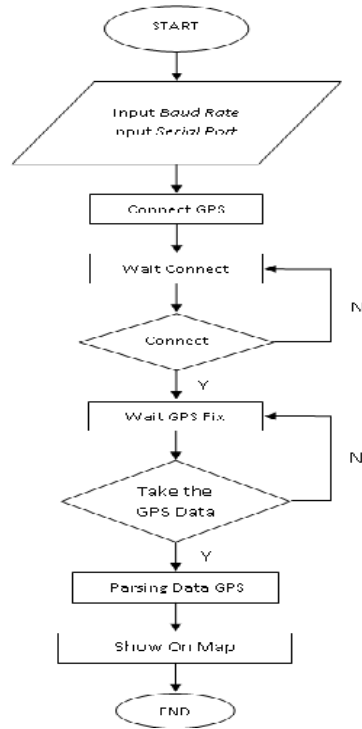


Figure 4. Flowchart Position Tracker

### 3. RESULT AND ANALYSIS

#### Leadtek GPS Module Testing EG T-10

Leadtek GPS Module Testing EG T-10 carried out to find that GPS Module is used to work fine, it is characterized by whether the GPS Module is used to indicate the actual position coordinates. To ensure that the GPS Module has been able to show the actual position coordinates we need a reference from another GPS, in this study used a Garmin GPS 60 as a reference. Here is a table that coordinates the results obtained from both the GPS. Here is a picture of the data retrieval from the second sampling GPS



Figure 5. Garmin GPS 60 sampling points A

Table 1.. The results of the coordinate data collection

Sampling point	GPS Module Leadtek EG T-10		GPS 60 GARMIN	
	East	South	East	South
A	110° 19.2972'	7° 48.5859'	110° 19.302'	7° 48.581'
B	110° 19.3153'	7° 48.5901'	110° 19.317'	7° 48.593'
C	110° 19.3180'	7° 48.5835'	110° 19.324'	7° 48.582'
D	110° 19.3464'	7° 48.6073'	110° 19.324'	7° 48.584'
E	110° 19.3355'	7° 48.5988'	110° 19.319'	7° 48.591'
F	110° 19.3238'	7° 48.5931'	110° 19.325'	7° 48.593'
g	110° 19.3349'	7° 48.5767'	110° 19.331'	7° 48.578'
H	110° 19.3365'	7° 48.5764'	110° 19.335'	7° 48.582'
I	110° 19.3269'	7° 48.5928'	110° 19.326'	7° 48.597'
J	110° 19.3385'	7° 48.5997'	110° 19.338'	7° 48.600'
K	110° 19.3356'	7° 48.5660'	110° 19.345'	7° 48.569'
L	110° 19.3464'	7° 48.5699'	110° 19.351'	7° 48.569'
M	110° 19.3397'	7° 48.6323'	110° 19.339'	7° 48.633'
N	110° 19.3370'	7° 48.6300'	110° 19.337'	7° 48.632'
O	110° 19.3358'	7° 48.6165'	110° 19.340'	7° 48.619'
P	110° 19.3374'	7° 48.6052'	110° 19.336'	7° 48.605'
Q	110° 19.3236'	7° 48.6012'	110° 19.327'	7° 48.600'
R	110° 19.3219'	7° 48.6033'	110° 19.324'	7° 48.603'
S	110° 19.3183'	7° 48.6024'	110° 19.320'	7° 48.603'
T	110° 19.3216'	7° 48.6034'	110° 19.322'	7° 48.600'
U	110° 19.3137'	7° 48.6038'	110° 19.322'	7° 48.600'
V	110° 19.3123'	7° 48.6059'	110° 19.316'	7° 48.605'

**Position Tracker Software Testing**

Position tracking software testing process includes the following stages:

A. Run the program UMY GPS via start> programs> UMY GPS> GPS UMY. So it will appear as in Figure 6.

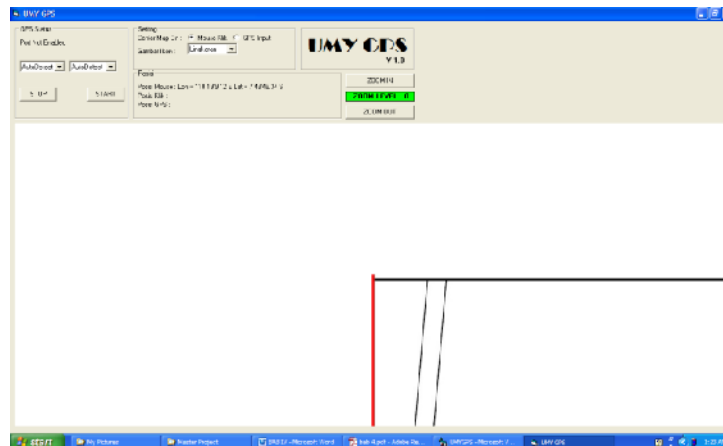


Figure 6. display program

On systems using digital maps Muhammadiyah University of Yogyakarta (UMY).

- Then the input baud rate to 4800 and the serial port is used for example COM 5, then click the "START" position on the tracking program.
- Wait for GPS to initialize and read the coordinates. If the coordinates are read have fix the position will be known and its location will be visible digital maps.
- To end the GPS position tracking, click the "STOP", then the communication between the objects and the navigation will be interrupted.
- 

#### 4. ANALYSIS OF TEST RESULTS

GPS Module on the test results indicate that the data received by GPS coordinates with the coordinates of the data received by the GPS 60 Garmin, in terms of the degree and minute as for minute differences in the decimal value is affected by the accuracy of each GPS and it is still within the limits accuracy of each GPS is used. In the tracking software testing position, as shown in Figure 7 image coordinate data from GPS EG T-10 can be visualized on a digital map. GPS coordinates of the position also showed the same 60 garmin GPS, can be seen in table 2.

Table 2. Test results table position tracking software

Location	GPS POSITION			
	THE GPS SOFTWARE		GPS 60 GARMIN	
	degrees minutes seconds		degrees minutes seconds	
	East	South	East	South
1	110°19'39.36"	7°48'11.26"	110°19'39.36"	7°48'11.40"
2	110°19'19.75"	7°48'35.74"	110°19'19.80"	7°48'35.76"
3	110°19'16.43"	7°48'36.24"	110°19'16.50"	7°48'36.42"
4	110°19'13.00"	7°48'34.90"	110°19'12.90"	7°48'34.44"
5	110°19'	7°48'	110°19'	7°48'
6	110°19'	7°48'	110°19'	7°48'
7	110°19'	7°48'	110°19'	7°48'
8	110°19'	7°48'	110°19'	7°48'
9	110°19'	7°48'	110°19'	7°48'
10	110°19'	7°48'	110°19'	7°48'

GPS coordinates of the position of the tracking software is shown in position in the scale degrees minutes seconds while the Garmin GPS 60 in the amount of decimal degree minute, so to prove that the position indicated by the GPS EG T-10 is suited with the reference GPS Garmin GPS 60 is a necessary convert coordinate data generated by the Garmin GPS 60 minutes decimal degrees of the scale in the form of degrees minutes seconds.

As for the calculation as in the example the following data:

The coordinates of the GPS 60 Garmin at fist location is East 110 ° 19 656 'and 7 ° South 48 190',  
 to east  $110^{\circ} 19.656' = 110^{\circ} 19' (0.656' \times 60)$   
 $= 110^{\circ} 19' 39.39''$   
 South  $7^{\circ} 48.190' = 7^{\circ} 48' (0.190' \times 60)$   
 $= 7^{\circ} 48' 11.40''$

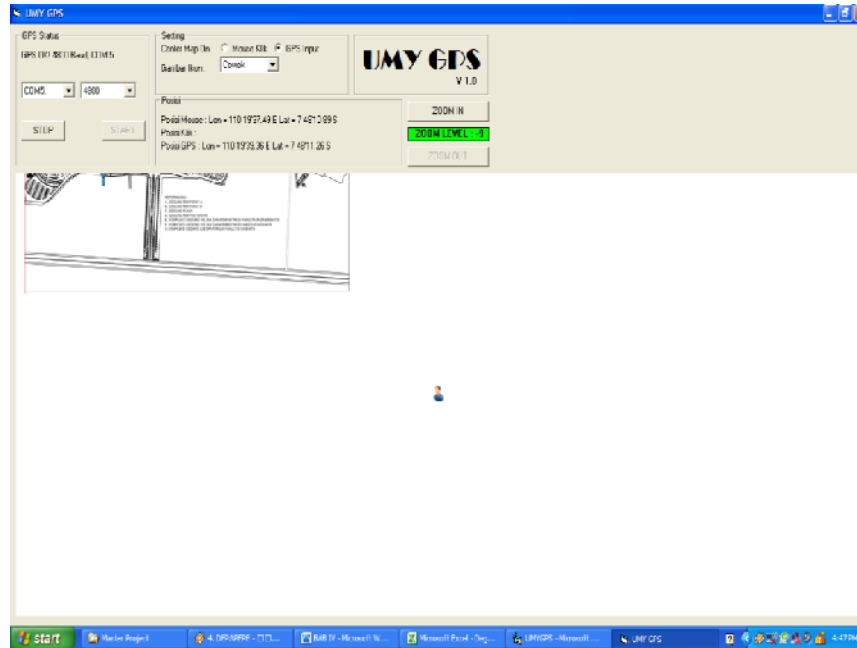


Figure 7 Display test results in the first location

So the Garmin 60 GPS coordinates at the first location for the East 110 ° 19 656 'and 7 ° South 48 190' in the amount of decimal degree minute became an East 110 ° 19'39 .39" and South 7 ° 48'11 .40" in the amount of degrees minutes seconds, and GPS coordinates on EG T-10 at the first location is the East 110 ° 19'39 .36" and South 7 ° 48'11 .26". Position on digital maps and the actual position of this difference occurs because the reference method possible to enter coordinates on a map that is used is not perfect.

## 5. CONCLUSIONS

Has created a program that use GPS position tracking EG T-10 and the digital map by using Visual Basic 6.0 programming, which serves to determine a position based on latitude and longitude coordinates are accessed via a laptop. Based testing has been done, the conclusion that this program has successfully met the specified design requirements are able to display GPS position data in the form of latitude and longitude on digital maps.

The results obtained display still has shortcomings in terms of accuracy of the position shown in the map with the actual position. This is caused by the level of GPS accuracy when GPS is used in this study have a level of accuracy of 10 meters, and also how to enter coordinates on a map used.

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