Desing and Implementation System for Ship Communication

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Abstract-- The Global Positioning System offers a very easy and a relatively cheap way of finding out ones location on the planet. This project is uses the most important feature of GPS. It is a very difficult for fishermen who are in the middle of the ocean without knowing where they are actually located. This project addresses these problems by providing a preprogrammed portable navigational guide .The GPS receiver continuously generates and gives the latitude and longitude Information continuously. The system uses a microcontroller which is already programmed with the boundary co-ordinates of the country. The information from the GPS receiver is given The microcontroller where the current co-ordinates are compared with the boundary co-ordinates and it is found out if the device is with the boundary of the country or not. In addition the project houses a distress alert system in which the concerned authorities are immediately sent a distress call From the boat if the fisherman are facing distress facing from the boat if the fishermen are facing some calamity . Also a communication between the fisherman boat and the on nearby ship is introduced in this system by using automatic Identification System. That is instead of pressing the key a sensor is fixed and the information's from the fishermen boat is automatically transferred to the coastguard section.

Index term - Global Positioning System, Automatic Identification system, ARM controller, RF module.

I. INTRODUCTION

The global positioning system is a satellite based navigation system consisting of 24 orbiting satellite network which is eleven thousand nautical miles in space and six different orbital paths. GPS has become an indispensable aid to navigation around the world, and an important tool for map-making and land surveying. GPS also provides a precise time reference used in many applications including scientific study of earthquake, and synchronization of telecommunication network. There are many applications of GPS that are widely being used. This project aims at another possible application of GPS which can aid small scale ship another possible from passing over into over into international waters.

This project aims at another possible application of GPS which can aid small scale ship from accidentally crossing over into international waters.

The project involves the construction of a portable device which will give an audio visual indication to fishermen if visual indication to fishermen if they approach or cross over into international waters. The heart of the system is a GPS receiver which is connected to a controller unit and a display device which shows the fishermen their current position and the country they are in at any point in time. The data transfer to the central system takes place through the high frequency RF module transceivers. On the reception side there is a RX attached to the RF transceivers that gives the location of the stranded fishermen and alerts the authorities in case of reception of distress call. In the proposed work a communication between fishermen boat and the nearby ship is introduced embedded system is a combination of hardware and software used to achieve a single task.

In addition the project houses a distress alert system in which the concerned authorities are immediately sent a distress call from the boat if the fishermen are facing some calamity. The data transfer to the central system takes place through the high frequency RF transceiver. On the reception side there is a PC attached to the RF transceivers that gives the location of the stranded fishermen and alerts.

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Embedded systems are computer system that monitor, respond to, or control an external nature environment.

II. BLOCK DIAGRAM

The block diagram consists of three sections. The first one is Tracking unit. The tracking unit consists of the ARM microcontroller, GPS section. The transceiver section and the sensors. The second is the guard unit. In the coast guard unit. In the coat it consists of the PC section which is connected by a transceiver .Through this transceiver the information came from the ship. The third is the nearby ships section this placed in the nearby ships. If there is the any difficulty felt by the fishermen then the information is passes to the coastguard section and also to the nearby ships simultaneously. The coast guard section consists of one PC which is connected to the internet and RF transceiver .this RF transceiver is used to communicate with the fishermen.
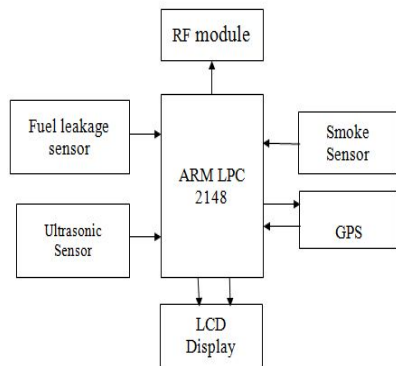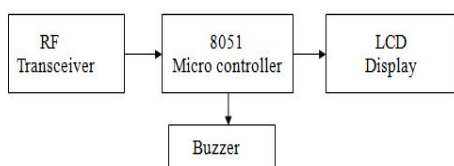
Fig.1 Block Diagram for Tracking Unit

Fig.2 Block Diagram For Nearby Ship Section

III. PORTABLE GPS NAVIGATION AID FOR FISHERMAN

Tracking unit is used to find out the path of the small scale fisherman in the sea water. Here it consists of a microcontroller, GPS receiver, RF transceiver, water level sensor and an alarm unit.

A. GPS RECEIVER

The Global positioning system (GPS) is currently the only fully functional satellite navigation system more than two dozen GPS satellites are in medium Earth orbit, transmitting signals allowing GPS receivers to determine the receiver's location speed and direction. A GPS receiver calculates its position by measuring the distance between itself and three or more GPS satellites. Measuring the delay between transmission and reception gives the distance to each GPS satellite, since the signal travels at known speed. The signals also carry information about the satellites' location. By determining the position of, and distance to, at least three satellites, the receiver can compute its position location using clock error.

B. GPS BROADCAST SIGNAL

GPS satellites broadcast three different types of data in the primary navigation signal. [4] The first is the almanac which Is sends coarse time information about the satellite sends

coarse about the satellite. The second is ephemeris, which contains orbital information that allows the receiver to calculate the position of the satellite. This data is included in the 37,500 bit Navigation message, which takes 12.5 minutes to send at 50 bps.

C. CALCULATING POSITION

The coordinate are calculated according to the World Geodetic system WGS84 coordinates system. To calculate its position, receiver needs to know the precise time. The satellites are equipped with extremely accurate atomic clocks, and the receiver uses an internal crystal oscillator-based clock that is continually updated using the signals from the satellites. The receiver identifies each satellite's signal by its distinct C/A code pattern, and then measures the time delay for each satellite. To do this, the receiver produces an identical C/A sequence using the same seed number as the satellite accuracy and error sources and then measures the time delay for each satellite.

D. RF MODULE

Here using XBee-PRO OEM RF modules. XBee and XBee –PRO Modules were engineered to meet Zig Bee/IEEE 802.15.4 standards and support the unique need of low-cost, low –power wireless sensor networks.[5] the modules require minimal power and provide reliable delivery of critical data between devices . The modules operate within the ISM 2.4 GHz frequency band and are pin-for-pin compatible with each other.

E. ARM CONTROLLER

The LPC2148 ARM controller is used here. This is based on a 16-bit/32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32kB to 512kB.
16-bit/32-bit ARM7 TDMI –S microcontroller in a tiny LQFP64 package.

➢ KEY FEATURES

▪ 8 KB to 40 KB of on-chip static RAM and 32 KB to 512 KB of on-chip flash memory. 128-bit wide interface/accelerator enables high-speed 60 MHz operation.
▪ In- System Programming In-Application Programming (ISP/IAP) via on-chip boot loader software. Single Flash sector or full chip erase in 400 ms and programming of 256 bytes in 1ms.
▪ Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high-speed tracing of instruction execution.

- USB 2.0 Full-speed compliant device controller with 2kb of end point RAM. In addition, the LPC2146/48 provides 8kb of on-chip RAM accessible to USB by DMA.
- Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog.
- Low power Real-time Clock (RTC) with independent power and 32 kHz clock input.

F. COAST GUARD SECTION

To interface the project to the computer, the RS232 port on the computer is used.RS232 is   the technical name of the serial port on the computer, which is also referred to as the common port (communications port). Before going into the details of the RS232 Let's first evaluate all the other options available and find out why the RS232 port is used for the project.

The standard IBM clone PC has a variety of ports or interfaces available for different application. Some of these ports like the VGA port, the Ethernet port and the PS2 port are for dedicated purposes. But the rest of the interfaces are quite general and can be used for interfacing custom hardware and application like experimental projects. These are the ports like,

- The Universal Serial Bus Port or the USB port or the USB port
- The parallel port.
- 3. The serial port or the common port.

G. RS 232 PORT

The serial port or the common port (short form for communication port) is another available option for interfacing to the PC. The serial port on computers is in accordance with the RS232 standard defined by the EIA/TIA (Electronics Industry Association and the telecommunications Industry association) and hence is also referred to as the RS232 port (RS means Recommended standard). Bu unlike the parallel port the RS232 port is much easier to use for general purpose interfacing and experimentation. On the programming front the serial port can be directly accesses from most high level languages directly with simple commands. Also most microcontrollers come with an inbuilt serial communication module (USART) and hence programming the PC programming the PC and microcontroller for serial communication is very easy.

H. LEVEL MEASUREMENT USING FLOAT

Float is the one type of transducer which is used to measure the water level in the tank.
Circuit Description:
The float changes the resistance value depending on the water level. This change is resistance is converted into corresponding voltage signal which is given to inverting input terminal of the comparator. The reference voltage is given to non inverting input terminal. The comparator is constructed by the operational amplifier LM 741. The comparator compares with reference water level and delivered the error voltage at the output terminal.

Then the Amplifier LM 741 .In the gain amplifier the variable resistor is connected in the feedback path, by adjusting the resistor is we can get the desired gain. Then convert the analog signal to digital signal. Then the corresponding digital signal is given to microcontroller in order to find the water level in the tank. Then final voltage is given to ADC for error voltage is given to next stage of gain amplifier which is constructed by another operational amplifier LM 741. In the gain amplifier the variable resistor is connected in the feedback path, by adjusting the resistor we can get the desired gain. Then the final voltage is given to ADC for convert the analog signal to digital signal. Then the corresponding digital signal is given to microcontroller in order to find the water level in the tank.

IV. PROPOSED WORK

In the proposed system a communication between the fishermen boat and ship is being introduced. For that a by RF transceiver section is place in the nearby ship and then the communication is possible between the fishermen boat and the near ships. In addition to that an ASI system is introduces. This automatically identifies the difficulties caused by the fishermen boat and it sends the information automatically to the coastguards section and also to the nearby ships. By this the nearby ship coastguards. This is the main advantages of this proposed system. Also instead of pressing the key the information is automatically passes to the coast and help the fishermen who all are in trouble earlier than the coastguards. This is the main advantages of this proposed system. Also instead of pressing the key the information is automatically passes to the coastguards and the nearby ships.

V. CONCLUSION

It is a useful device for safer navigation, especially for fishermen. The design of the device can be made even smaller than proposed by modifying the design specification. Efficiency can be improved by implementing more accurate GPS systems. This system prevents the small scale fishermen on crossing the International and latitudinal values and is compared with the pre-programmed value in the microcontroller unit and is found whether the device is within the country border or not. This can also be used as a distress alert system to the coast guard section whenever the fishermen face any calamities within the ocean. Also the communication between the nearby ships will help them in the dangerous conditions. This project is mainly a commercial and social concerned project to aid the fishermen,To provide safety to them in mid-sea. This project can be implemented in any fishing boats being a cost effective and a portable one[7] the cost of the project can be reduced by producing the device in high level. In future the project can be further extended to provide full aid by identifying the density of fish in an area. In the ice dense cold areas it can be used to identify the ice bergs in ocean.

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