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Standalone Maritime Boundary detection System Using Floating Station

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ABSTRACT: Nowadays many fishermen in Tamilnadu are caught by the srilankan navy. This system helps them to identify the sea limit by detecting the boat coming near to the border with the help of floating station. The power provided for floating station is done with the help of both solar and wind power. The transmitter is placed in the boat while the receiver is placed in the floating station. This system more helpful to identifying the sea border and Navigating the Route.

KEYWORDS: PIC. Transmitting Base Station, RF Signal, Message, Receiver

I. INTRODUCTION

This paper tells about the prevention of fisherman from going outside the border by placing a floating module in the respective sea border. The floating module consists of hybrid power generation section and receiver section. The hybrid Section uses both solar and wind sources for power generation. It is given to the PIC Controller. It senses the amount voltage produced by the solar and wind turbine. The transmitter is placed in respective boats. Each Boat is having Different Frequencies i.e. Modulation Frequency. The transmitter encodes the modulation signal to the carrier signal (433.92MHz). In the receiver side, the modulation signal is separated from the carrier signal and it is given to the PIC Controller. In this System when the boat is nearing the border, the module alerts the boat by a voice message. This activity is monitored by the coast guard in helicopter. When the fisherman is near to the border, he will be alerted by the coast guard.

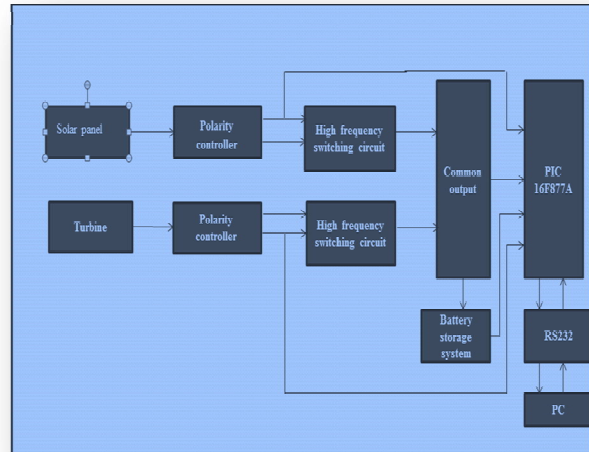
II. HARDWARE DESCRIPTION

This System uses the Hybrid module for power generation By solar and wind sources. This is connected to the pic controller. This will display the amount of power generated in solar and wind turbine. The Receiver is connected to the pic controller. The transmitter is placed in the boat. It has transmitter module and transmitting antenna. The receiver receives the signal from transmitting antenna, decodes it and given to the PIC controller.

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SOLAR PANEL

Solar cell is a p-n junction diode of large area (1-100 cm²), which converts energy of the incident photons into electrical energy. A typical construction of a p-n junction solar cell, which consists of a shallow p-n junction formed on the surface of a substrate, front ohmic contact grids and a back ohmic contact, and an antireflection coating on the front surface. When a solar cell is exposed to solar spectrum, photons having energy equal to or greater than the band gap (E_g) of the solar cell material, get absorbed and hole and electron pairs are generated, which are collected by the respective terminals. Photon energy in excess of ' E_g ' is converted into electrical energy while photon energy less than ' E_g ' is either dissipated as heat in the solar cell or transmitted through. The current source ' I_{ph} ' results from the charge carriers excited by solar radiation.

WIND TURBINE

Wind mills that produce electricity are very eco-friendly. For one thing, they produce no harmful waste products. Also, they do not require consumption of a limited amount of natural resources nor do they endanger the environment through mining or drilling. The natural resource, wind, is already available and cannot be used up. As the concern about fossil fuels and the impact it has had on our environment grows, there are more efforts being diverted to finding renewable energy sources. You have to have a wind supply in order for them to work. If there is no wind, the blades will not spin and nothing will be produced. Windmills are not very practical in areas of the world where there is little to no wind. However, as long as you live in a region that experiences plenty of wind, you will find that windmills are a cheap source of energy and can create electricity without the harmful effects. Here turbine used is rotated at 60rpm and produces the output of 230v. This output is given to the Step down transformer. It will produce 12v output. Then it is given to the Power supply unit.

POLARITY CONTROLLER

A diode is a specialized electronic component with two electrodes called the anode and the cathode. Most diodes are made with semiconductor materials such as silicon, germanium, or selenium. Diodes can be used as rectifiers, signal limiters, voltage regulators, switches, signal modulators, signal mixers, signal demodulators, and oscillators. The fundamental property of a diode is its tendency to conduct electric current in only one direction. When the cathode is negatively charged relative to the anode at a voltage greater than a certain minimum called forward break over, then current flows through the diode. If the cathode is positive with respect to the anode, is at the same voltage as the anode, or is negative by an amount less than the forward break over voltage, then the diode does not conduct current. This is a simplistic view, but is true for diodes operating as rectifiers, switches, and limiters. The forward break over voltage is approximately six tenths of a volt (0.6 V) for silicon devices, 0.3 V for germanium devices, and 1 V for selenium devices.

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HIGH FREQUENCY SWITCHING CIRCUIT

The technique used by the high Frequency circuit is the pulse charging technique. This is Trickle method in boost charging system. A high end high frequency charging technique will be employed to charge the battery without loading the turbine and photo-voltaic cell. This method reduces the charging time. For example if cell phones are charged using this way, then the cell phones will not get heated up. The switching circuit consists of the 555 timer and a MOSFET. The 555 timer works as the astablemultivibrator which produces pulses of required frequency.

PIC

To perform the various operations and conversions required to switch, control and monitor the devices a processor is needed. The processor may be a microprocessor, micro controller or embedded controller. In this project an embedded controller has been preferred because of its industrial advantages in power electronics like built in ADC, RAM, ROM, ports, USART, DAC. This leads to lesser space occupation by the circuit and also the speed of embedded controllers are more compared to other processors. The embedded controller selected for this project is PIC16F877A due to its various features

GENERAL FEATURES

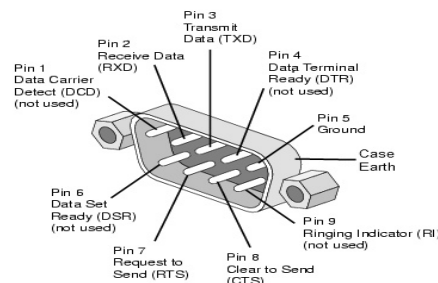
High-performance RISC(Reduced Instruction Set Controller) CPU.Only 35 single word instructions to learn. All single cycle instructions except for program branches which are two cycle .Operating speed: DC - 20 MHz clock input and DC - 200 ns instruction cycle4K x 14 words of Program Memory (EPROM). 256 x 8 bytes of Data Memory (RAM) .Interrupt capability (up to 14 internal/external interrupt sources) .Eight level deep hardware stack. Direct, indirect, and relative addressing modes.12-bit multi-channel Analog-to-Digital converter On-chip absolute band gap voltage reference generator. Universal Synchronous Asynchronous Receiver Transmitter supports high/low speeds and 9-bit address mode (USART/SCI)

PIN DETAILS

It is connected to the PC via RS-232 interface .The RS232 interface has MAX232 IC which connects the RS 232 Interface to the PC.

RS-232

The most common communication interface for short distance is RS-232. RS-232 defines a serial communication for one device to one computer communication port, with speeds up to 19,200 baud. Typically 7 or 8 bits (on/off) signal are transmitted to represent a character or digit.The9 pin connector is used. The pin detail is given below.



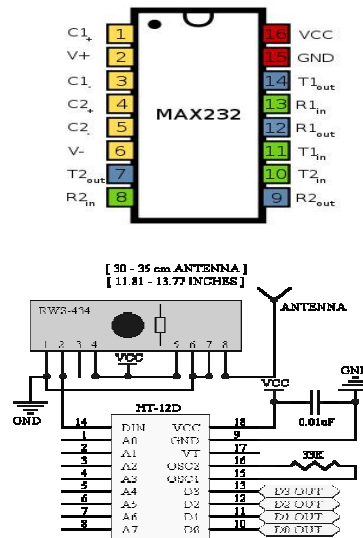
MAX 232 IC

The Max 232 is a dual RS-232 receiver / transmitter that meets all EIA RS232C specifications while using only a +5V power supply. It has 2 onboard charge pump voltage converters which generate +10V and -10V power supplies from a single 5V power supply. It has four level translators, two of which are RS232 transmitters that convert TTL\CMOS input levels into + 9V RS232 outputs. The other two level translators are RS232 receivers that convert RS232 inputs to 5V .

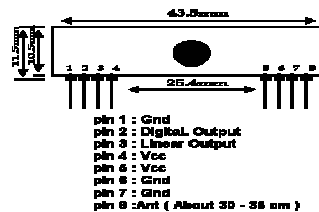
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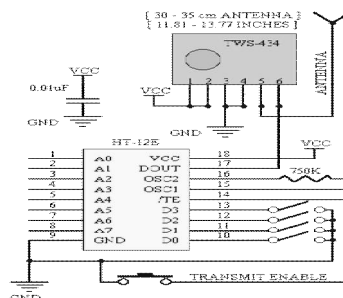
PIN DETAILS



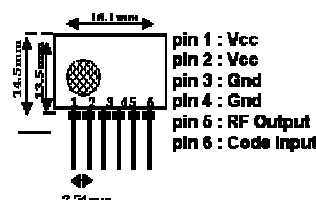
This pin diagram which is shown above is used as a receiver module in this project in order to implement wireless communication. The block diagram is given which will receive the data from the transmitter through the antenna and pass it to a microcontroller which is then converted to a digital data and that data will be transmitted to the computer

RF TRANSMITTER SPECIFICATIONS

The transmitter is placed in the Boat which has a transmitting Antenna and encoder.



PIN DETAILS OF RF TRANSMITTER MODULE



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The pin diagram and block description of the transmitter module is shown in Fig 3.3.1 and Fig 3.3.2 This module is implemented in order to transmit the frequency output of the LM331 to the remote computer which actually make the system wireless.

VISUAL BASIC

Visual Basic is a third-generation event-driven programming language and integrated development environment (IDE) from Microsoft for its COM programming model first released in 1991. Microsoft intends Visual basic to be relatively easy to learn and use. Visual Basic was derived from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications, access to databases using data Access Objects, Remote data Objects, or ActiveX Data Objects, and creation of ActiveX controls and Objects.

A programmer can create an application using the components provided by the Visual Basic program itself. Program written in Visual basic can also use the Windows API, but doing so requires external function declarations. Though the program has received critics' for its perceived faults, version 3 of Visual Basic was a commercial success, and many companies offered third party controls greatly extending its functionality.

Like the BASIC programming language, Visual Basic was designed to accommodate beginner programmers. Programmers can create both simple and complex GUI applications. Programming in VB is a combination of visually arranging components or controls on a form, specifying attributes and action for those components, and writing additional lines of code for more functionality. Since VB defines default attributes and actions for the components, a programmer can develop a simple program without writing much code. Program built with earlier versions suffered performance problems, but faster computers and native code compilation has made this less of an issue. Forms are created using drag-and-drop techniques tool is used to place controls (e.g., text boxes, button, etc.) on the form (Window). Controls have attributes values and event handlers associated with them. Default values are provided when the control is created, but may be changed by the programmer. Many attribute values can be modified during run time based on user actions or changes in the environment, providing a dynamic application. For example, code can be inserted into the form resize event handler to reposition a control so that it remains centered on the form, expands to fill up the form, etc. By inserting code into the event handler for a key press in a text box, the program can automatically translate the case of the text being entered, or even prevent certain characters from being inserted.

Visual Basic can create executables (EXE files), ActiveX controls, or DLL files, but is primarily used to develop Windows applications and to interface database systems. Dialog boxes with less functionality can be used to provide pop-up capabilities. Controls provide the basic functionality of the application, while programmers can insert additional logic within the appropriate event handlers.

Unlike many other programming languages, Visual Basic is generally not case sensitive-though it transforms keywords into a standard case configuration and forces the case of variable names to conform to the case of the entry in the symbol table. String comparisons are case sensitive by default.

The Visual Basic compiler is shared with other Visual Studio languages (C, C++), but restrictions in the IDE do not allow creation of some targets (Windows model DLLs) and threading models

III. CHARACTERISTICS

The following visual basic traits differ from C-derived languages. Statements tend to terminate with keywords, such as "End If", instead of using "}"s to group statements. Multiple variable assignments are not possible. A=B=C does not imply that the values of A, B and C are equal. The Boolean result of "Is B=C?" is stored in A. The result stored in A would therefore be either false or true. Boolean constant True has numeric value -1. This is because the Boolean data type is stored as a 16 bit signed integer. In this construct -1 evaluates to 16 binary 1s (the Boolean value True), and 0 as 16 0s (the Boolean value False). This is apparent when performing a Not operation on a 16 bit signed integer value 0, which returns the integer value -1, in other words True=Not False. This inherent functionality becomes especially useful when performing logical operations on the individual bits of an integer such as And, Or, Xor and Not. This definition of true is also consistent with BASIC since the early 1970s Microsoft BASIC implementation and related to the characteristics of CPU instructions at the time. Logical and bitwise operators are unified. This is unlike some C-derived languages (such as Perl), which have separate logical and bitwise operators. This again is a traditional feature of BASIC. Variable array base. Arrays are declared by specifying

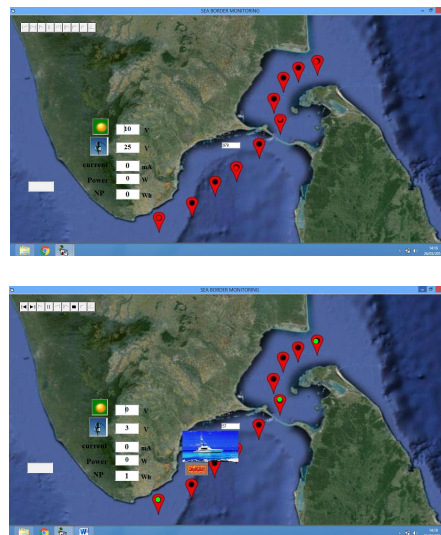
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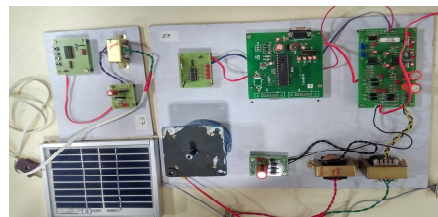
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the upper and lower bounds in a way similar to Pascal and FORTRAN. It is also possible to use the Option Base statement to set the default lower bound. Use of the Option Base statement can lead to confusion when reading Visual Basic code and is best avoided by always explicitly specifying the lower bound of the array. This lower bound is not limited to 0 or 1, because it can also be be set by declaration. In this way, both the lower and upper bounds are programmable. In more subscript-limited languages, the lower bound of the array is not variable. This uncommon trait does exist in Visual Basic.NET but not in VBScript. OPTION BASE was introduced by ANSI, with the standard for ANSI Minimal BASIC in the late 1970 relatively strong integration with the windows operating system and the component object model. The native types for strings and arrays are the dedicated COM types, BSTR and SAFEARRAY .Retype statements in total offered by Visual Basic 6.0. The default type may be overridden for a specific declaration by using a special suffix character on the variable name (# for Double, ! for Single, & for Long, % for Integer, \$ for String, and @ for Currency) or using the key phrase As (type). VB can also be set in a mode that only explicitly declared variables can be used with the command Option Explicit.

IV. RESULTS



HARDWARE CONFIGURATIONS



V. CONCLUSION

This Project is able to finding the sea limits about the boundary before some kilometres of distance if the fishermen are going to reach the boundary it alerts the fishermen automatically by sending voice message. So we say that the crossing of sea border by the fisherman is prevented. This Paper is enhanced by placing a transceiver in the boat. So that the coast guard will change the direction of the boat while crossing the border by the help of Auto steering mode i.e. a stepper motor and Driver Ic is placed.

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REFERENCES

- 1] Access to Geo-Fenced resources from Registered location, International Journal of Scientific & Engineering Research, Volume 5, Issue 9, September-2014, 63 ISSN 2229-5518.
- 2] RF based fishing surveillance system: An integrated Approach. International Journal of Engineering and Technology .
- A Hybrid model of solar-wind power generation system. (International 3] Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (ISO 3297: 2007 Certified Organization) Vol. 2, Issue 8, August 2013.
- Hybrid Power Generation System, International Journal of Computer and Electrical Engineering, Vol.4, No.2, April 2012
- 4] Bauersfeld, M.L. and Biicking, M. (2011) 'A novel approach of Geofencing and Geotagging System based Border Identification', IEEE Aerospace and Electronic Systems Magazine, Vol.12, No.8, pp.2086-2089.
- [5] Chenn, Q. (2005) 'Programming of PIC Microcontroller for Power Factor Correction', International Journal of Students Research in Technology and Management, Vol.25, No.11, pp.124-325.
- [6] Domenico Caputo, M. and Corrado Fanelli, K. (2012) 'Border crossing detection and tracking through localized image processing', International Journal of Innovative Research in Wireless Radar Sensor networks, Vol.18, No.6, pp.2674-2677.
- [7] Irwandi, S. (2013) 'GPS Based Vessel Position Monitoring And Display System ', IEEE Aerospace and Electronic Systems Magazine, Vol.11, No.13, pp.978-981.
- [8] Jolliffe, I.T. (2005) ' RF based Fishing Vessel Surveillance System', IEEE Aerospace and Electronic Systems Magazine , Vol.15, No.9, pp.295-395.
- [9] Michalski, A. and Czajewski, J. (2011) 'The accuracy of the Global Positioning Systems', IEEE Instrumentation and Measurement Magazine, Vol.7(1), No.10, pp.56-60. [7] Sancho, J.V. (2008) ' Embedded Controllers in Fishing Vessels', IEEE Instrumentation and Measurement Magazine, Vol.24, No.9, pp.326-441.
- [10] Treutter, D. (2014) ' Border Alert System for Boats using ZigBee', International Journal of Innovative Research in Computer and Communication engineering, Vol.33, No.19, pp.1295-1395.
- [11] Yoshioka, N. (2008) 'Integrated Controls at Border Crossing', IOSR Journal of computer engineering, Vol.18, No.17, pp.395-445.
- [12] Zhou Yanming and Xin Xue Hao Xiaoli , (2014) ' Border alert system for fishermen using GPS', International Journal of Students Research in Technology and Management, Vol.02, No.8, pp.3981-3985