

Wi-Fi Based Traffic Controlling System & Protecting Patients & Finding the Stolen Vehicle

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Abstract

This paper presents an intelligent traffic control system to pass emergency vehicles smoothly. Each individual vehicle is equipped with special radio frequency identification (RFID) tag (placed at a strategic location), which makes it impossible to remove or destroy. We use RFID reader, NSK EDK-125-TTL, and PIC16F877A system-on-chip to read the RFID tags attached to the vehicle. It counts number of vehicles that passes on a particular path during a specified duration. It also determines the network congestion, and hence the green light duration for that path. If the RFID-tag-read belongs to the stolen vehicle, then a message is sent using GSM SIM300 to the police control room. In addition, when an ambulance is approaching the junction, it will communicate to the traffic controller in the junction to turn ON the green light. This module uses ZIGBEE modules on CC2500 and PIC16F877A system-on-chip for wireless communications between the ambulance and traffic controller. The prototype was tested under different combinations of inputs in our wireless communication laboratory and experimental results were found as expected.

Here we implementing in existing way Wi-Fi based controlling.

Introduction

This template, modified in MS Word 2007 and saved as a "Word 97-2003 Document" for the PC, provides authors with most of the formatting specifications needed for preparing electronic versions of their papers.

All standard paper components have been specified for three reasons: (1) ease of use when formatting individual papers, (2) automatic compliance to electronic requirements that facilitate the concurrent or later production of electronic products, and (3) conformity of style throughout a conference proceedings. Margins, column widths, line spacing, and type styles are built-in; examples of the type styles are provided throughout this document and are identified in italic type, within parentheses, following the example. Some components, such as multi-leveled equations, graphics, and tables are not prescribed, although the various table text styles are provided. The formatter will need to create these components, incorporating the applicable criteria that follow.

Ease of Use

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious.

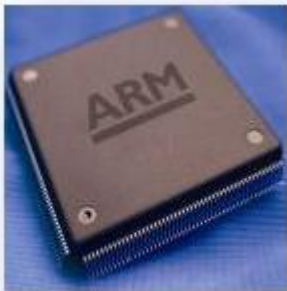
All embedded systems are including computers or microprocessors. Some of these computers are however very simple systems as compared with a personal computer.

The very simplest embedded systems are capable of performing only a single function or set of functions to meet a single predetermined purpose. In more complex systems an application program that enables the embedded system to be used for a particular purpose in a specific application determines the functioning of the embedded system. The ability to have programs means that the same embedded system can be used for a variety of different purposes. In some cases a microprocessor may be designed in such a way that application software for a particular purpose can be added to the basic software in a second process, after which it is not possible to make further changes. The applications software on such processors is sometimes referred to as firmware.

ARM PROCESSOR OVERVIEW:

ARM stands for Advanced RISC Machines. It is a 32 bit processor core, used for high end application.

It is widely used in Advanced Robotic Applications.



History and Development:

- ARM was developed at Acron Computers Ltd of Cambridge, England between 1983 and 1985.
- RISC concept was introduced in 1980 at Stanford and Berkley.
- ARM Ltd was found in 1990.
- ARM cores are licensed to partners so as to develop and fabricate new microcontrollers around same processor cores.

Key features:

1. 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.

2. 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.
3. 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 1 ms.

Power Supply:

- The input to the circuit is applied from the regulated power supply. The ac. input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a *rectifier*. The output obtained from the rectifier is a pulsating dc voltage. So in order to get a pure dc voltage, the output voltage from the rectifier is fed to a filter to remove any ac components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure *constant dc voltage*.
- The abbreviation “i.e.” means “that is,” and the abbreviation “e.g.” means “for example.”

An excellent style manual for science writers is [7].

TEMPERATURE SENSOR

Temperature Sensor which converts temperature value into electrical signals. We used IC called LM 35 as a temperature sensor. LM35 series sensors are precision integrated-circuit temperature sensors whose output voltage is linearly proportional to the Celsius temperature. The LM35 requires no external calibration since it is internally calibrated. . The LM35 does not require any external calibration or trimming to provide typical accuracies of $\pm 1/4^{\circ}\text{C}$ at room temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55 to $+150^{\circ}\text{C}$ temperature range.

The LM35’s low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only $60\ \mu\text{A}$ from its supply, it has very low self-heating, less than 0.1°C in still air.

LIQUID CRYSTAL DISPLAY

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

1. The declining prices of LCDs.
2. The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
3. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.
4. Ease of programming for characters and graphics.
5. These components are “specialized” for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.



A model described here is for its low price and great possibilities most frequently used in practice. It is based on the HD44780 microcontroller (Hitachi) and can display messages in two lines with 16 characters each. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

Pins Functions:

There are pins along one side of the small printed board used for connection to the microcontroller. There are total of 14 pins marked with numbers (16 in case the

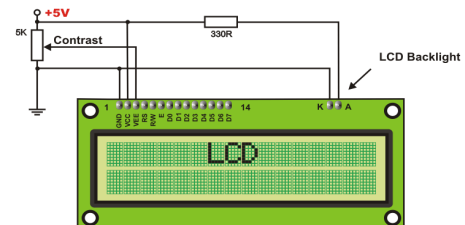
background light is built in). Their function is described in the table below:

TABLE:2

Function	Pin Number	Name	Logic State	Description
Ground	1	V _{ss}	-	0V
Power supply	2	V _{dd}	-	+5V
Contrast	3	V _{ee}	-	0 - V _{dd}
Control operating	4	RS	0	D0 - D7 are interpreted as commands
			1	D0 - D7 are interpreted as data
	5	R/W	0	Write data (from controller to LCD)
			1	Read data (from LCD to controller)
	6	E	0	Access to LCD disabled
			1	Normal operating
			From 1 to 0	Data/commands are transferred to LCD
Data / commands	7	D0	0/1	Bit 0 LSB
	8	D1	0/1	Bit 1
	9	D2	0/1	Bit 2
	10	D3	0/1	Bit 3
	11	D4	0/1	Bit 4
	12	D5	0/1	Bit 5
	13	D6	0/1	Bit 6
	14	D7	0/1	Bit 7 MSB

LCD screen:

LCD screen consists of two lines with 16 characters each. Each character consists of 5x7 dot matrix. Contrast on display depends on the power supply voltage and whether messages are displayed in one or two lines. For that reason, variable voltage 0-V_{dd} is applied on pin marked as V_{ee}. Trimmer potentiometer is usually used for that purpose. Some versions of displays have built in backlight (blue or green diodes). When used during operating, a resistor for current limitation should be used (like with any LE diode).



LCD Basic Commands:

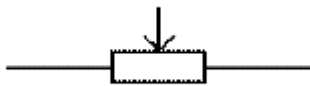
All data transferred to LCD through outputs D0-D7 will be interpreted as commands or as data, which depends on logic state on pin RS: RS = 1 - Bits D0 - D7 are addresses of characters that should be displayed. Built in processor addresses built in “map of characters” and displays corresponding symbols.

Displaying position is determined by DDRAM address. This address is either previously defined or the address of previously transferred character is automatically incremented.

- To perform time delay functions. Relays can be used to act as an mechanical time delay device by controlling the release time by using the effect of residual magnetism by means of a inserting copper disk between the armature and moving blade assembly.

POTENTIOMETER:

- Variable resistors used as potentiometers have all **three terminals** connected. This arrangement is normally used to **vary voltage**, for example to set the switching point of a circuit with a sensor, or control the volume (loudness) in an amplifier circuit. If the terminals at the ends of the track are connected across the power supply, then the wiper terminal will provide a voltage which can be varied from zero up to the maximum of the supply.



Potentiometer Symbol

Presets:

- These are miniature versions of the standard variable resistor. They are designed to be mounted directly onto the circuit board and adjusted only when the circuit is built. For example, to set the frequency of an alarm tone or the sensitivity of a light-sensitive circuit, a small screwdriver or similar tool is required to adjust presets.
- Presets are much cheaper than standard variable resistors so they are sometimes used in projects where a standard variable resistor would normally be used.
- Multi turn presets are used where very precise adjustments must be made. The screw must be turned many times (10+) to move the slider from

one end of the track to the other, giving very fine control.

SERIAL COMMUNICATION:

The main requirements for serial communication are:

1. Microcontroller
2. PC or any external device which can be interfaced with the microcontroller through serial communication.
3. RS 232 cable
4. MAX 232 IC
5. HyperTerminal

When the pins P0.0 and P0.1 of microcontroller are set, UART which is inbuilt in the microcontroller will be enabled to start the serial communication.

ASYNCHRONOUS AND SYNCHRONOUS SERIAL COMMUNICATION:

Computers transfer data in two ways: parallel and serial. In parallel data transfers, often 8 or more lines are used to transfer data to a device that is only a few feet away. Although a lot of data can be transferred in a short amount of time by using many wires in parallel, the distance cannot be great.

- To transfer to a device located many meters away, the serial method is best suitable.
- In serial communication, the data is sent one bit at a time. The 8051 has serial communication capability built into it, thereby making possible fast data transfer using only a few wires.
- The fact that serial communication uses a single data line instead of the 8-bit data line instead of the 8-bit data line of parallel communication not only makes it cheaper but also enables two computers located in two different cities to communicate over the telephone.
- Serial data communication uses two methods, asynchronous and synchronous. The synchronous method transfers a block of data at a time, while the asynchronous method transfers a single byte at a time. With synchronous communications, the two devices initially synchronize themselves to each other,

and then continually send characters to stay in sync. Even when data is not really being sent, a constant flow of bits allows each device to know where the other is at any given time. That is, each character that is sent is either actual data or an idle character.

- Synchronous communications allows faster data transfer rates than asynchronous methods, because additional bits to mark the beginning and end of each data byte are not required. The serial ports on IBM-style PCs are asynchronous devices and therefore only support asynchronous serial communications.

RFID

RFID or Radio Frequency identification is a technology that enables the tracking or identification of objects using IC based tags with an RF circuit and antenna, and RF readers that "read" and in some case modify the information stored in the IC memory.

Radio frequency identification (RFID) is a general term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object wirelessly, using radio waves. RFID technologies are grouped under the more generic Automatic Identification (Auto ID) technologies.

The RF tags could be divided in two major groups:

- Passive tags
- Active RFID tags

Passive Tags-The power to activate the tag microchip is supplied by the reader through the tag antenna when the tag is in the interrogation zone of the reader, as is the timing pulse

LED

Introduction:

A light-emitting diode (LED) is a semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet and infrared wavelengths, with very high brightness.

Basic concept of GPS

A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include

- the time the message was transmitted
- precise orbital information (the ephemeris)
- the general system health and rough orbits of all GPS satellites (the almanac).

The receiver uses the messages it receives to determine the transit time of each message and computes the distance to each satellite. These distances along with the satellites' locations are used with the possible aid of trilateration, depending on which algorithm is used, to compute the position of the receiver. This position is then displayed, perhaps with a moving map display or latitude and longitude; elevation information may be included. Many GPS units show derived information such as direction and speed, calculated from position changes.

ABOUT KEIL SOFTWARE:

It is possible to create the source files in a text editor such as Notepad, run the Compiler on each C source file, specifying a list of controls, run the Assembler on each Assembler source file, specifying another list of controls, run either the Library Manager or Linker (again specifying a list of controls) and finally running the Object-HEX Converter to convert the Linker output file to an Intel Hex File. Once that has been completed the Hex File can be downloaded to the target hardware and debugged. Alternatively KEIL can be used to create source files; automatically compile, link and convert using options set with an easy to use user interface and finally simulate or perform debugging on the hardware with access to C variables and memory. Unless you have to use the tools on the command line, the choice is clear. KEIL Greatly simplifies the process of creating and testing an embedded application.

Projects:

The user of KEIL centers on "projects". A project is a list of all the source files required to build a single application, all the tool options which specify exactly

how to build the application, and – if required – how the application should be simulated. A project contains enough information to take a set of source files and generate exactly the binary code required for the application. Because of the high degree of flexibility required from the tools, there are many options that can be set to configure the tools to operate in a specific manner. It would be tedious to have to set these options up every time the application is being built; therefore they are stored in a project file. Loading the project file into KEIL informs KEIL which source files are required, where they are, and how to configure the tools in the correct way.

KEIL can then execute each tool with the correct options. It is also possible to create new projects in KEIL. Source files are added to the project and the tool options are set as required. The project can then be saved to preserve the settings. The project is reloaded and the simulator or debugger started, all the desired windows are opened. KEIL project files have the extension

Simulator/Debugger:

The simulator/ debugger in KEIL can perform a very detailed simulation of a micro controller along with external signals. It is possible to view the precise execution time of a single assembly instruction, or a single line of C code, all the way up to the entire application, simply by entering the crystal frequency. A window can be opened for each peripheral on the device, showing the state of the peripheral. This enables quick trouble shooting of mis-configured peripherals. Breakpoints may be set on either assembly instructions or lines of C code, and execution may be stepped through one instruction or C line at a time. The contents of all the memory areas may be viewed along with ability to find specific variables. In addition the registers may be viewed allowing a detailed view of what the microcontroller is doing at any point in time.

The Keil Software 8051 development tools listed below are the programs you use to compile your C code, assemble your assembler source files, link your program together, create HEX files, and debug your target

program. μ Vision2 for Windows™ Integrated Development Environment: combines Project Management, Source Code Editing, and Program Debugging in one powerful environment.

- C51 ANSI Optimizing C Cross Compiler: creates re locatable object modules from your C source code,
- A51 Macro Assembler: creates re locatable object modules from your 8051 assembler source code,
- BL51 Linker/Locator: combines re locatable object modules created by the compiler and assembler into the final absolute object module,
- LIB51 Library Manager: combines object modules into a library, which may be used by the linker,
- OH51 Object-HEX Converter: creates Intel HEX files from absolute object modules.

What's New in μ Vision3?

μ Vision3 adds many new features to the Editor like Text Templates, Quick Function Navigation, and Syntax Coloring with brace high lighting Configuration Wizard for dialog based startup and debugger setup. μ Vision3 is fully compatible to μ Vision2 and can be used in parallel with μ Vision2.

CONCLUSION:

The project has been successfully designed and tested.

Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit.

Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

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