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Embedded Microcontroller Using GPS as A Security Resource for Disable People

GurijalaKiranTeja

M Tech(ES), VijayaKrishna Institute of Technology And Sciences, Hyderabad.

ABSTRACT:

Microcontroller controls the position of the windows autonomously and independently of the driver's presence, following predefined algorithm that uses sensors data obtained from the vehicle's Besides surroundings. temperature, the most important factors to ensure quality implementation of ventilation are detected movements around the vehicle, the presence of precipitation and other. This paper shows the components, their purpose and capabilities, advantages and disadvantages, as well as potential implementations and upgrades. The test results give insight into utilization options of this module and its usefulness.

Keywords: Microcontroller, MEMS, GPS, GSM.

INTRODUCTION

This work presents an alternative tool to give support to disabled people for several situations. Based on an embedded microcontroller and using a common GPS antenna, this system allows people to be located at any place by his/her nurse or any people which be responsible of him/her. The system is hidden on the wheelchair in a strategic position. the system sends a message with current location on several operation modes. Coordinates can be sent each second if an alarm button has been activated. If user suffers an epilepsy episode, an alarm tone starts and a message is sent to his/her caretaker. If user got lost, coordinates are sent to his/her caretaker and a message is sent with a legend to ask for support and be located. This system allows disabled people to be more independent and be supervised in long distances, being sure that can receive support if something goes wrong.

V Ajay Kumar

M Tech, Asst Prof, VijayaKrishna Institute of Technology And Sciences, Hyderabad.

BLOCK DIAGRAM

TRANSMITTER



Introduction to ARM:

Founded in November 1990, it is spun out of Acorn Computers, it Designs the ARM range of RISC processor cores. Licenses ARM core designs to semiconductor partners who fabricate and sell to their customers. ARM does not fabricate silicon itself, it also develop technologies to assist with the design-in

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of the ARM architecture. Software tools, boards, debug hardware, application software, bus architectures, peripherals etc.

Architectural overview:

The ARM7TDMI-S is a general purpose 32-bit microprocessor, which offers high performance and very low power consumption. The ARM architecture is based on Reduced Instruction Set Computer (RISC) principles, and the instruction set and related decode mechanism are much simpler than those of microprogrammed Complex Instruction Set Computers (CISC). This simplicity results in a high instruction throughput and impressive real-time interrupt response from a small and cost-effective processor core. Pipeline techniques are employed so that all parts of the processing and memory systems can operate continuously. Typically, while one instruction is being executed, its successor is being decoded, and a third instruction is being fetched from memory. The ARM7TDMI-S processor also employs a unique architectural strategy known as Thumb, which makes it ideally suited to high-volume applications with memory restrictions, or applications where code density is an issue. The key idea behind Thumb is that of a super-reduced instruction set. Essentially, the ARM7TDMI-S processor has two instruction sets:

- The standard 32-bit ARM set.
- A 16-bit Thumb set.

The Thumb set's 16-bit instruction length allows it to approach twice the density of standard ARM code while retaining most of the ARM's performance advantage over a traditional 16-bit processor using 16bit registers. This is possible because Thumb code operates on the same 32-bit register set as ARM code. Thumb code is able to provide up to 65 % of the code size of ARM, and 160 % of the performance of an equivalent ARM processor connected to a 16-bit memory system. The particular flash implementation in the LPC2141/42/44/46/48 allows for full speed execution also in ARM mode. It is recommended to program performance critical and short code sections (such as interrupt service routines and DSP algorithms) in ARM mode. The impact on the overall code size will be minimal but the speed can be increased by 30% over Thumb mode.

MEMS

MicroElectroMechanical systems (MEMS) are small integrated devices or systems that combine electrical and mechanical components MEMS stands for Micro-ElectroMechanical Systems. MEMS techniques allow both electronic circuits and mechanical devices to be manufactured on a silicon chip, similar to the process used for integrated circuits. This allows the construction of items such as sensor chips with built-in electronics that are a fraction of the size that was previously possible.

These systems can sense, control, and activate mechanical processes on the micro scale, and function individually or in arrays to generate effects on the macro scale. The micro fabrication technology enables fabrication of large arrays of devices, which individually perform simple tasks, but in combination can accomplish complicated functions.

Global System for Mobile communication (GSM) Definition:

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication.

TABLE I.	SOME COMMANDS USED IN GSM DATA TRANSFER MODULE
	OF THE SYSTEM

AT Command	Meaning
+CMGI	Module ok
+CMGS	Send message
+CMGW	Write message to memory
+CMGD	Delete message
+CMGC	Send command
+CMSS	Send message from storage

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MODEM SPECIFICATIONS

The SIM300 is a complete Tri-band GSM solution in a compact plug-in module.

Featuring an industry-standard interface, the SIM300 delivers GSM/GPRS900/1800/1900Mhz performance for voice, SMS, data and Fax in a small form factor and with low power consumption.

Advantages

- Sophisticated security
- Monitors all hazards and threats
- Alert message to mobile phone for remote information
- Mobile number can be changed at any time

Basic concept of GPS

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



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I. SOFTWARE USED

- Keil Compiler
- Embedded C

ADVANTAGES:

- Ease of operation
- Low maintenance cost
- Fit and forget system
- No wastage of time
- Durability
- Accuracy

APPLICATIONS:

- Hospitals
- Remote heart rate monitoring applications
- Local monitoring applications
- Designed for Home and Clinical Applications

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