Application of Microcontroller in Transmitter Section of Wireless System

Dr.M.J.Hedau

Department of Electronics, Shivaji Science College,Congressnagar, Nagpur, India

ABSTRACT:

The present paper describes how the microcontroller works in the transmitter section of wireless system. In last 40 years a silent but rapid revolution as far as electronics computing communication and control are concerned. Proof of this statement would be available in mobile handset, MP 3 player, automatic washing machine, microwave oven, portable digital blood pressure measurement and many more medical instruments, billing system in STD phone etc. This list is enomorous and growing exponteally. All these are possible because of usage of Microcontroller and having a PC which involves from microprocessor. Temperature is certainly among the most commonly measured parameters in industry, science, and academia. Recently, the growth of wireless instrumentation technology, along with some clever innovations, has provided new ways to apply temperature measurement sensors combined with personal computers to collect, tabulate, and analyze the data obtained.

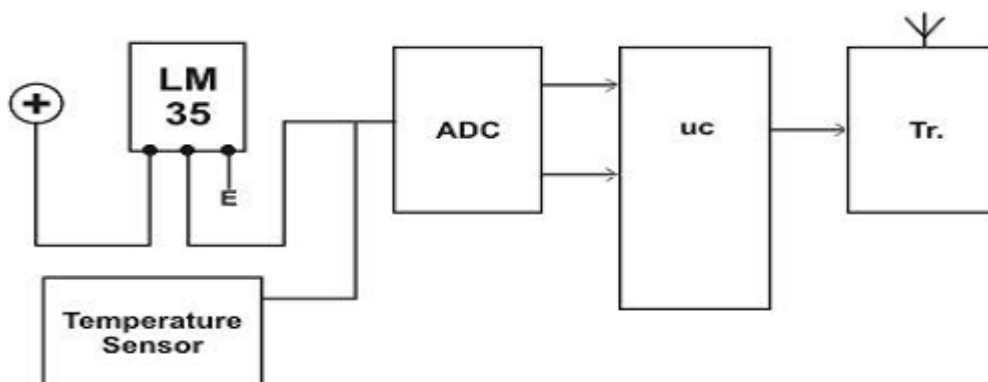*Keywords: Microcontroller, Temperature controller, CAN, flags, Buffer,ADC,Step response*

I. INTRODUCTION

Processor are 16-bit and 32-bit fixed- and floating-point processors include ARM based processors , ARM 9 family and Cortex-A8 processor-based microprocessors, video processors,[1] OMAP™ mobile applications processors, digital signal processors (DSP) and microcontrollers (MCUs).Microcontrollers have only been with us for a few decades but their impact (direct or indirect) on our lives is profound [2].Usually these are supposed to be just data processors performing exhaustive numeric operations. But their presence is unnoticed at most of the places like supermarkets, Weighing Scales, etc.

What inside them makes these machines smart? The answer is microcontroller. Creating applications for the microcontrollers is different than any other development job in electronics and computing [3].Before selecting a particular device for an application, it is important to understand what the different options and features are and what they can mean with regard to developing the application. It is to introduce the concept of microcontrollers, how it differs from microprocessors and different type of commercial microcontrollers available as well as their applications.

II.   DESCRIPTION

Fig(1.1) is a Block diagram of wireless temperature monitoring system


Fig(1.1) :- Block diagram of wireless temperature monitoring
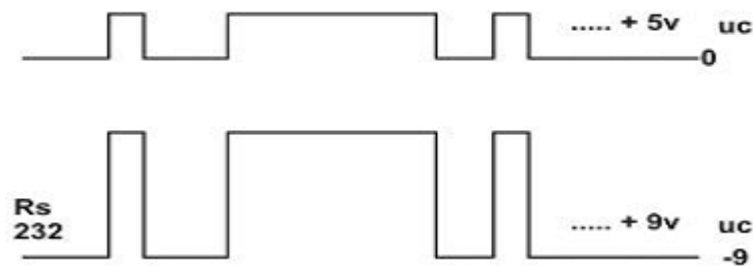
Fig(1.2) **:-** Clock cycle

This block diagram contains the wireless transmitter section. This section has microcontroller as a transmitter module, temperature sensor LM 35, ADC 0809.Each and every module in the transmitter section will be controlled by the Microcontroller. The Temperature sensor LM35 senses the temperature as analog signal, by the use of ADC 0809 these analog signals will be converted to digital and it will be transfer to the microcontroller. Microcontroller processes that digital signal and then transmits the digital signal through the Wireless Transmitter module as an analog signal [6].

ADC-809 has an inbuilt 8-channel multiplexer. It performs simultaneously A/D conversion of more than one analog signal. When the unknown analog input equals the reference voltage, the internal comparator output allows the digital output to become available at the output of the 8-bit latch. The characteristics of reference voltage is as shown in graph no.1   While the process of A/D conversion is initiated by positive pulse at the terminal marked 'START OF CONVERSION' the A/D converter produces the pulse at the terminal marked 'END OF THE CONVERSION'. This pulse is used to inform microcontroller that the cycle of A/D conversion has been completed.
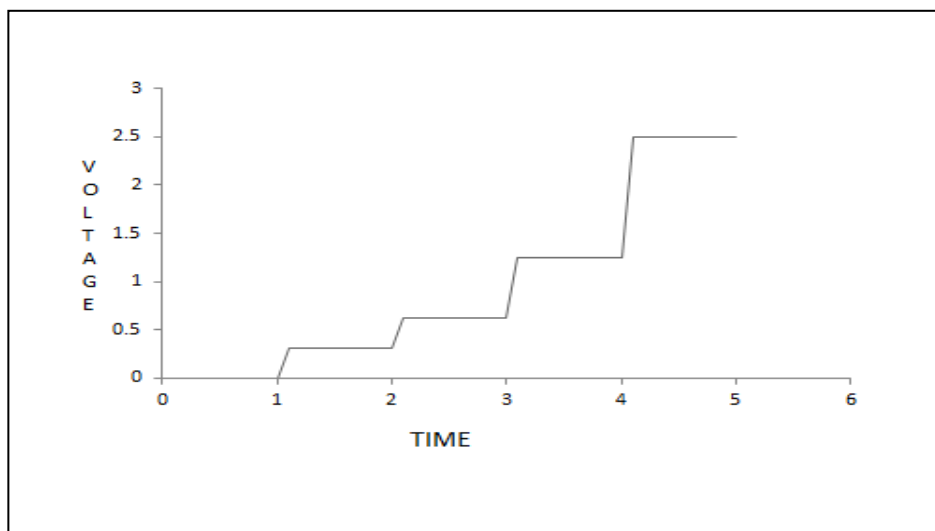
Graph No. 1: characteristics of reference voltage

This IC operates on a single DC supply of +5V.Thus +Vref ≤ +5V,- Vref is connected to ground. The input analog signal range is 0 to +5V.It is operates on the range of clock frequency from 10KHz to 12.80KHz.

The multiplexer address bits are operates as follows:

Output Enable	Logic Inputs			Channel Selected
	A	B	C	
1	0	0	0	CH 0
1	0	0	1	CH 1
1	0	1	0	CH 2
1	0	1	1	CH 3
1	1	0	0	CH 4
1	1	0	1	CH 5
1	1	1	0	CH 6
1	1	1	1	CH 7

Address logic input are controlled by programming the microcontroller system.

III. Transmitter Circuit

The transmitter module (TX433N) was interfaced to the microcontroller through the encoder IC HT12E.[3] It was used to modulate the digital data coming from the encoder IC into RF radio frequency signal by ASK modulation technique and transmitted via RF out antenna pin1, When a command was send from the μC, the encoder encodes the address and data bits upon getting transmission enable signal from the μC and send serially to the transmitter module Din pin2, the transmitter module converted the digital signal into RF signal and transmitted via wireless media.
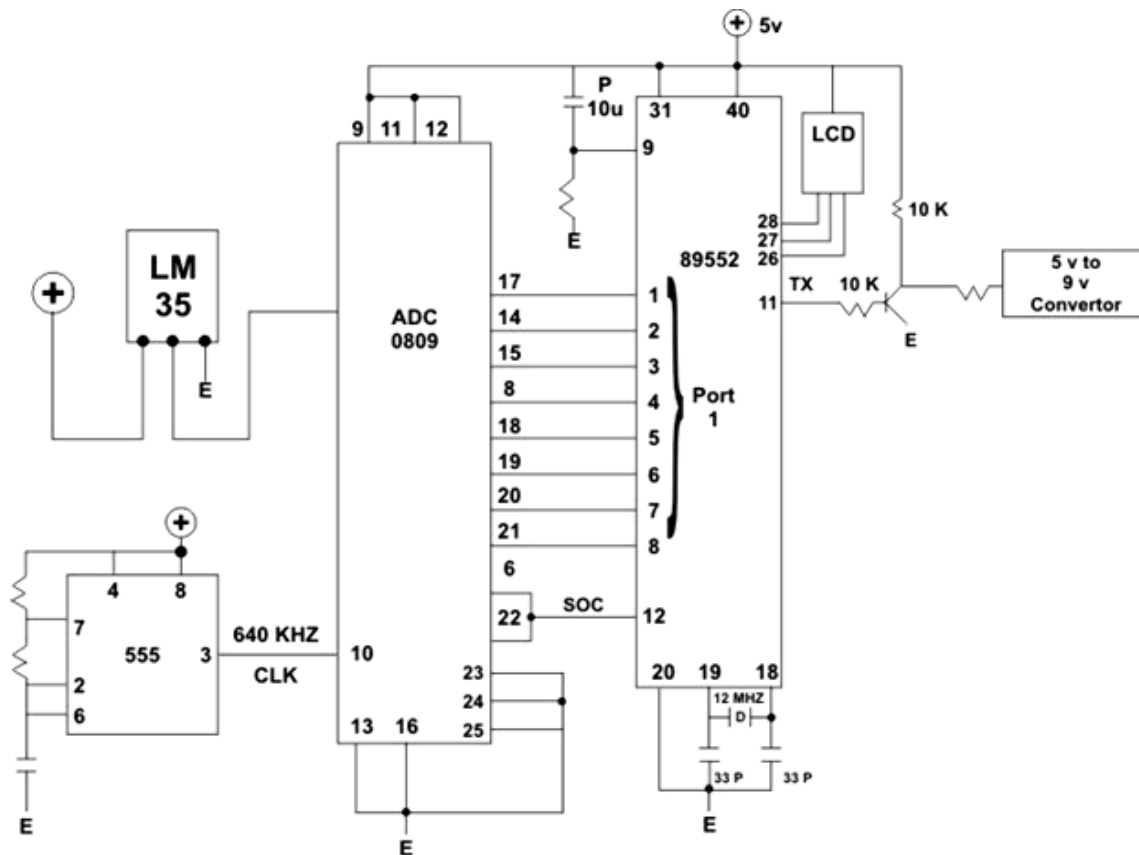
Fig(2.1) Transmitter Circuit using Microcontroller

The wireless transmitter module can be used to transmit data at up to 3 KHz from any standard CMOS/TTL source. The module had been made very simple to operate and offers low current consumption (typ. 11mA). Data can be supplied directly from a microprocessor or encoding device, thus keeping the component count down and ensuring a low hardware cost. TX1-433.92MHz was used in that module to transmit the data from the protected area. When the data had been received from the controller it then transmits the data at the frequency of 433.92MHz. The module was made very simple to operate, requiring only two connections. The module was also very efficient, used only 2.3mA which means that it may be driven directly from an encoder I/C or microcontroller. The output impedance had been designed to give optimum performance when coupled with a small antenna such as a tuned loop or short whip. The modules were compatible with the AM Receiver modules.

IV. CONCLUSION

In this system temperature sensor was used to detect a room temperature at a particular distance and transmit it through a wireless medium to a remote room. The output signal from the temperature sensor was digitized with ADC and fed to an embedded microcontroller 8051. The microcontroller was used to process the digital signal and the RF Transmitter module transmitted the data through a wireless medium at a frequency range of 433.92 MHz to a Receiver. A wireless temperature control based on embedded microcontroller had been demonstrated successfully. The performance of the wireless system was evaluated and compared with that of wired based temperature control. Its major advantage is that it does not require any physical wire to retrieve information from the sensor. This thesis can be extended further by adding more sensors and repeaters to make it possible to read temperatures from different locations. This is required in certain applications where temperatures from more rooms need to be monitored.

REFERENCES

[1]. ESPASA ROGER,VALERO,SMITH J.E ”Vector Architectures: Past, Present, and Future,” ICS '98, Proceedings of the 1998 International Conference on Supercomputing, July 13-17, 1998, Melbourne, Australia. ACM, 1998.

[2]. WAWRYNEK J,ASANOVIC K,KINKSBBURY B. ”Spert-II: A vector Microprocessor System,” IEEE Computer, March 1996.

[3]. BAILEY, D.H., “Extra-High Speed Matrix Multiplication on the Cray-2”, SIAM Journal on Scientific and Statistical Computing, Vol. 9, No. 3, May 1988

[4]. BALSTER E.J., SCARPINO, F.A., and W.W SMARI, “Wavelet Transform for Real- Time Image Compression Using FPGAs,” 12th IASTED International Conference on Parallel and Distributed Computing and Systems, Las Vegas, Nevada, Nov. 6 – 9, 2000, pp. 232-238

[5]. CUCCIHA R., , “Exploiting Cache in Multimedia”, IEEE International Conference on Multimedia Computing and Systems, , pp. 345 – 350, June 7, 1999

[6]. M. J. Hedau, M. P. Dhore, P. B. Dahikar, “Application of Wireless Signal Simulation Via Cell-Phone “International Conference on circuit system and simulation, , pp. 92 – 95, Vol.7(2011) IACSIT Press, Singapore

[7]. M. J. Hedau, P. B. Dahikar, “Vector Architectures :The Multitasking , pp.55 – 62, Hislopia Journal 3 (1) 2010, ISSN-0976-2124

[8]. Schramm, W. (1954). How communication works. In W. Schramm (Ed.), The process and effects of communication (pp. 3-26). Urbana, Illinois: University of Illinois Press.

[9]. M. J. Hedau, M.P.Dhore, P. B. Dahikar, “Application of microcontroller in technical communication pp.191– 194, International journal of Emerging technology and application in engineeing, technology and science.Vol5