# APPLICATION OF MICROCONTROLLER IN INFORMATION SYSTEM

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## ABSTRACT

Microcontrollers have revolutionized the landscape of electronic computing, communication, and control, embedding themselves in various applications ranging from everyday household devices to complex industrial systems. These compact, integrated circuits harness VLSI technology to operate within a vast spectrum of computing capacities, rendering them indispensable in developing and implementing information systems. The selection of an appropriate microcontroller is pivotal, influencing the success of projects across various domains. This paper presents a comprehensive overview of microcontrollers, detailing their architecture, capabilities, and the critical factors influencing their selection for specific applications. Emphasis is placed on the diversity of microcontrollers produced by leading manufacturers and the criteria vital for their application, including system requirements, performance, size, power consumption, and cost. The analysis underscores the microcontroller's role as the cornerstone of information systems, driving the efficacy and efficiency of modern technological solutions. Through this study, we aim to illuminate the criteria essential for selecting a microcontroller that aligns with an information system's specific needs and constraints, thereby facilitating informed decision-making and optimizing system performance.

**Keywords**: Microcontroller, Information System, VLSI Technology, System Design, and Electronic Computing.

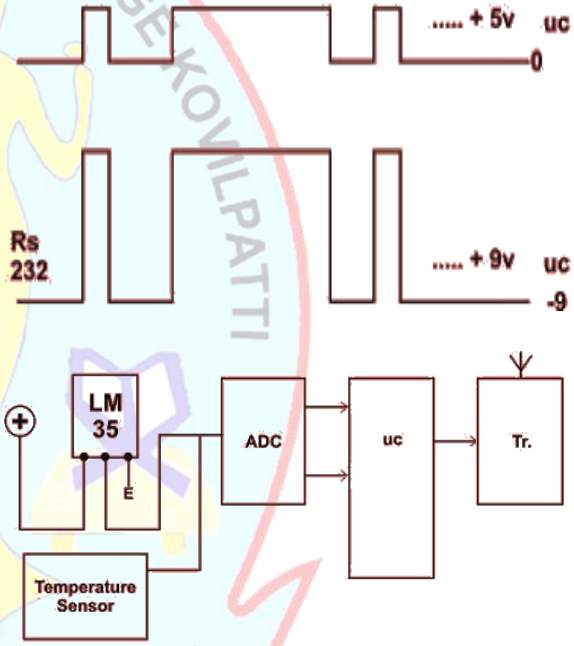
**Introduction**

**Criteria for choosing a microcontroller - Requirement for the System:**

If the system requires a single-chip MCU or extra peripherals, the design should begin with a blank paper describing the application requirements. The selection process begins with a choice of whether the application requires a 4-bit, 8-bit, 16-bit, or 32-bit microcontroller. Writing code for 4-bit architectures is more difficult because dealing with 4-bit instructions and data lengths limits arithmetic capabilities. Because the technology has existed for a long time and many controllers are available, most embedded applications are built using an 8-bit microcontroller. They're utilized in anything from low-cost, low-speed 4-bit microcontrollers to devices that provide tens of MIPS, like Atmel's AVR.

ARM-based processors, Arm 9 family and cortex-A8 processor-based microprocessors, video processors, OMAPTM mobile applications processors, digital signal processors (DSPs), and microcontrollers (MCU) are examples of processors that are 16-bit and 32-bit fixed and floating point. Microcontrollers are a relatively recent technology that has significantly (directly or indirectly) impacted our lives. Usually, these are only data processors running complex mathematical operations. However, most places, such as scales and supermarkets, must know their existence.

What is it about these technological marvels that make them so clever? Using a microcontroller is the answer; technologies of microcontroller applications are distinct from other computer and electronics technologies. Understanding the plethora of choices and capabilities before choosing a specific device for an application is circular.




**Wireless Temperature Monitoring**

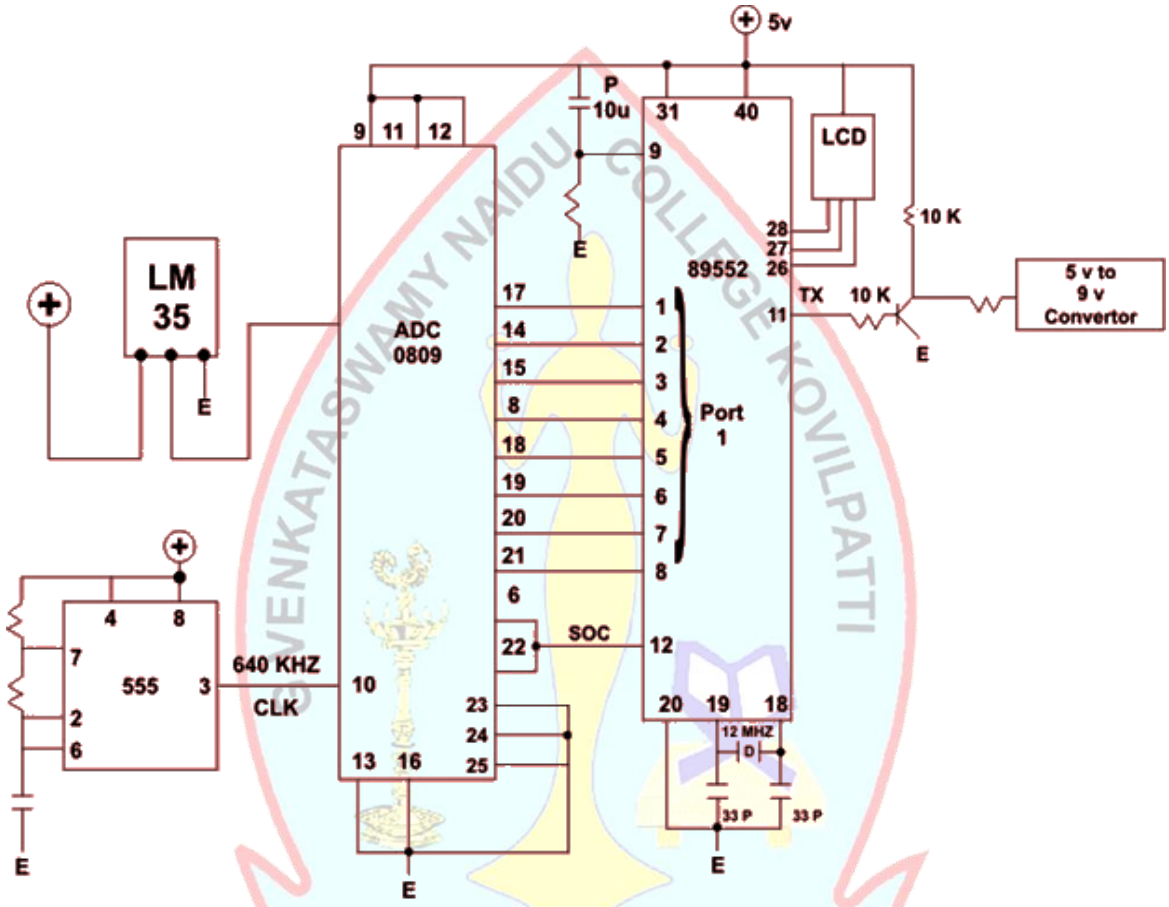
**Block Diagram**

**Clock Cycle**

**Overview**

The section for the wireless transmitter is shown in this block diagram. Temperature sensors LM 35, ADC804, and microcontrollers are transmitter modules in this portion. The microcontroller in the

transmitter part will have control over every module. The temperature is sensed by the temperature sensor LM35 as an analog signal, which is then converted to a digital signal by the ADC 0804 and sent to the microcontroller. The microcontroller processes the digital signal and then transmits it as an analog signal via the wireless transmitter module.




**Transmitter Circuit**

The encoder IC HT12E served as the interface between the transmitter module (TX433N) and the microcontroller. The digital data from the encoder IC was transformed using the ASK modulation process into an RF radio frequency signal, which was then sent via RF out antenna pin 1. The encoder encoded the address and data bits. It delivered them serially to the transmitter module's Din pin two upon receiving a transmission enable signal from the C whenever a command was sent. The transmitter module then converts the digital signal into an RF signal and transmits it over the wireless medium. Using the wireless transmitter module, any normal CMOS/TTL source may be utilized to broadcast data at up to 3 KHz. The module has a low current consumption

(about 11 mA) and is extremely easy to use. Data can be directly provided.

**Summary**

In this method, a temperature sensor wirelessly sends temperature data from one room to another after measuring the room's temperature from a distance. An ADC digitalizes the output signal from the temperature sensor before feeding it to the integrated 8051 CPU. The RF Transmitter module wirelessly delivered the data to the receiver at a frequency of 433.92 MHz once the microprocessor had processed the digital signal. It has already been proven successful in using an integrated microprocessor in a wireless temperature control system. The effectiveness of the wireless system and wiring–based temperature management were assessed and contrasted. Its key benefit is that sensor data can be obtained without needing a physical wire.

A microcomputer (MCU for microcomputer module) is a small processor constructed from a sole MOS integral circuit (IC) chip. A microcomputer is a processor with one or more CPU cores, memory, and programmed input/output devices. On-chip memory includes a small quantity of Memory as much as programming storage in the shape of ferromagnetic RAM, NOR flash, or OTP ROM. Unlike microcomputers used in desktop computers and other summary purposes, microcontrollers are designed for embedding applications and comprise a collection of separate chips. In today's terminology, a microcontroller is equivalent to, but less complicated than, a chipset (SoC). A microcomputer may be one of the SoC's components. Still, it's usually paired with more advanced peripherals like a graphical processor unit (GPU), a Wi-Fi module, or one or more coprocessors. The application note will list most of the factors this article presents when selecting an MCU. The choice is complex and will become more important as technology advances. Here are a few pointers on how to choose the appropriate one. Anyone may use their grading scale and make their judgment. As a result, this study's perspectives and views are not the only ones considered during the selection procedure.

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