

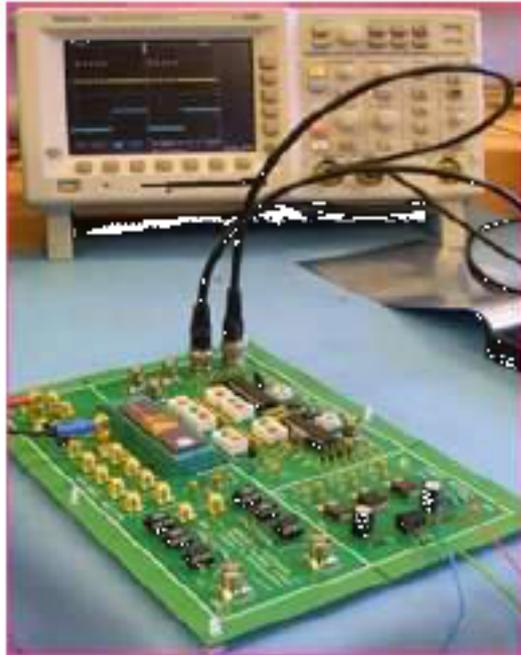
# LECTURE-6

# *ON BASIS OF APPLICATIONS*

➤ *LINEAR INTEGRATED CIRCUITS*

➤ *DIGITAL INTEGRATED CIRCUITS*

# DIGITAL INTEGRATED CIRCUITS



When the circuit is either in on-state or off-state and not in between the two, the circuit is called the digital circuit. ICs used in such circuits are called the *digital ICs*. They find wide applications in computers and logic circuits.

Example logic gates, flip flops, counters, microprocessors, memory chips etc.

# LINEAR INTEGRATED CIRCUITS



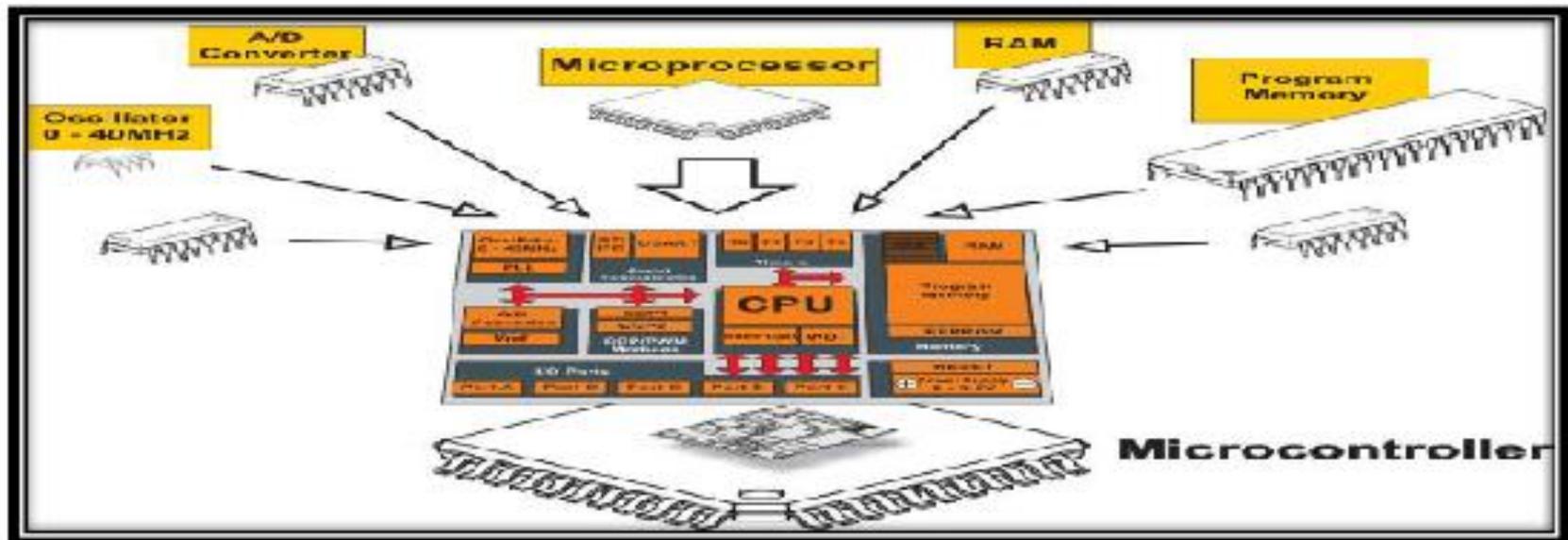
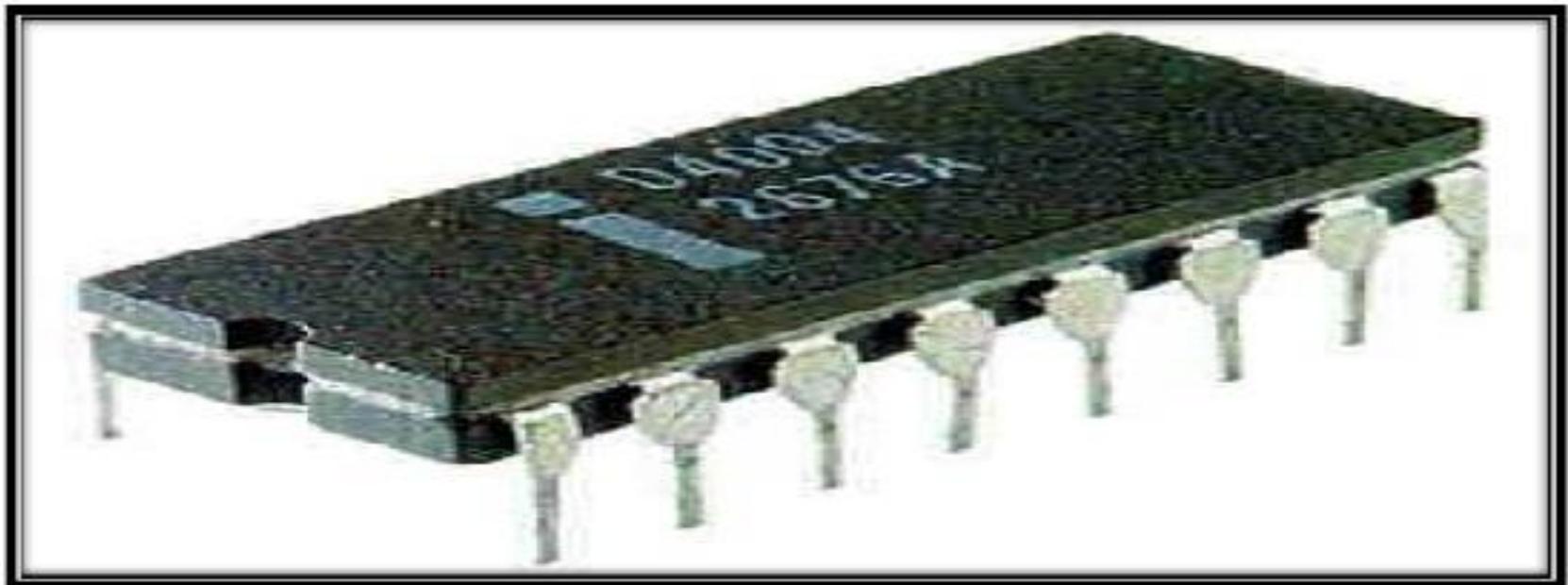
When the input and output relationship of a circuit is linear, *linear ICs* are used. Input and output can take place on a continuous range of values.

Example operational amplifiers, power amplifiers, microwave amplifiers multipliers etc.

# Types of Integrated Circuits

## **Digital Integrated Circuits**

Digital IC's are the one's which work only on two defined levels 1's and 0's. They work on binary mathematics. They can contain millions of logic gates, flip-flops etc integrated on a single chip. Microprocessors and microcontrollers are examples of digital IC's

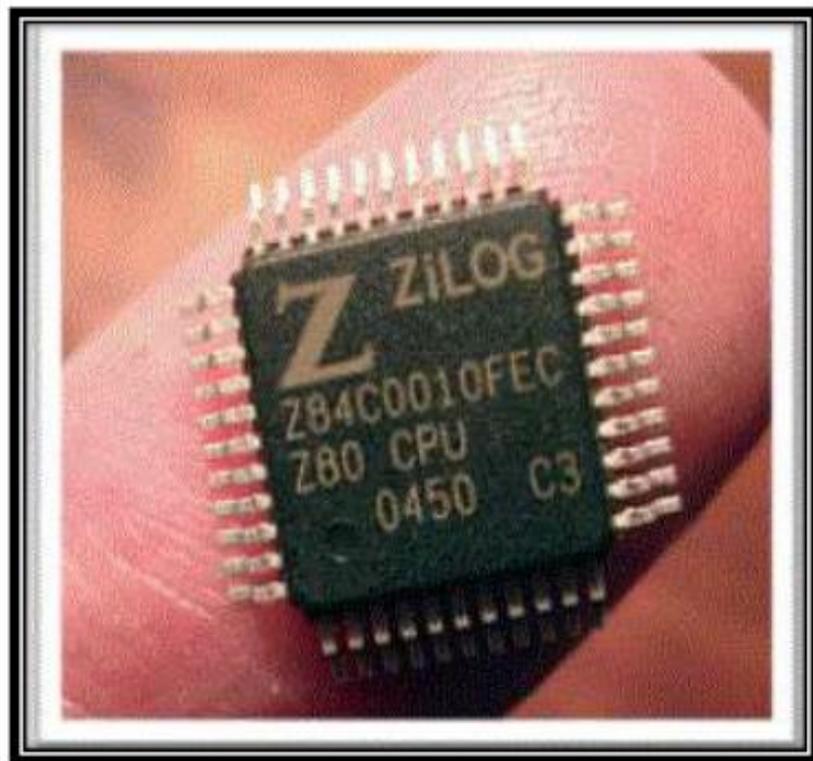
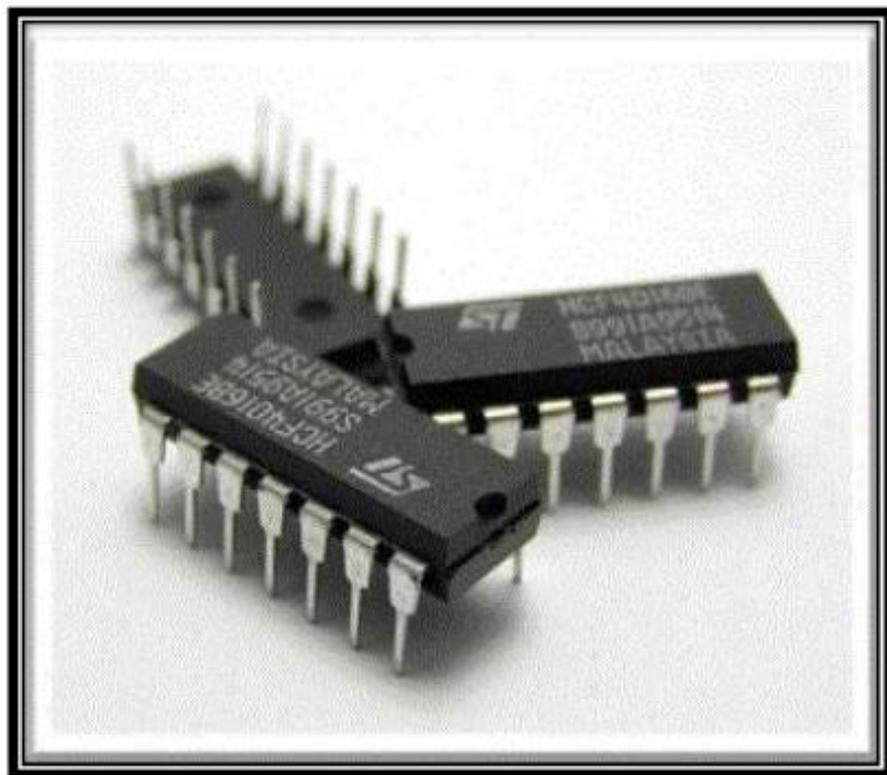


# Analog Integrated Circuits

They work by processing continuous signals. They perform functions such as filtering, amplification, modulation, demodulation etc. Sensors, OP-AMP's are analog IC's

# Mixed Signal Integrated Circuits

combination of Digital Integrated Circuit and Analog Integrated Circuit.



# Microprocessor Integrated Circuits

Composed of millions of transistors that have been configured as thousands of individual digital circuits, each of which performs some specific logic function.

# Memory Integrated Circuits

Memory is composed of dense arrays of parallel circuits that use their voltage states to store information. Memory also stores the temporary sequence of instructions, or program, for the microprocessor

# Application-specific Integrated Circuits

An application-specific IC (ASIC) can be either a digital or an analog circuit. As their name implies, ASICs are not reconfigurable; they perform only one specific function. For example, a speed controller IC for a remote control car is hard-wired to do one job and could never become a microprocessor. An ASIC does not contain any ability to follow alternate instructions.

# Radio-frequency Integrated Circuits

Radio-frequency ICs (RFICs) are rapidly gaining importance in cellular telephones and pagers. RFICs are analog circuits that usually run in the frequency range of 900 MHz to 2.4 GHz (900 million hertz to 2.4 billion hertz). They are usually thought of as ASICs even though some may be configurable for several similar applications.

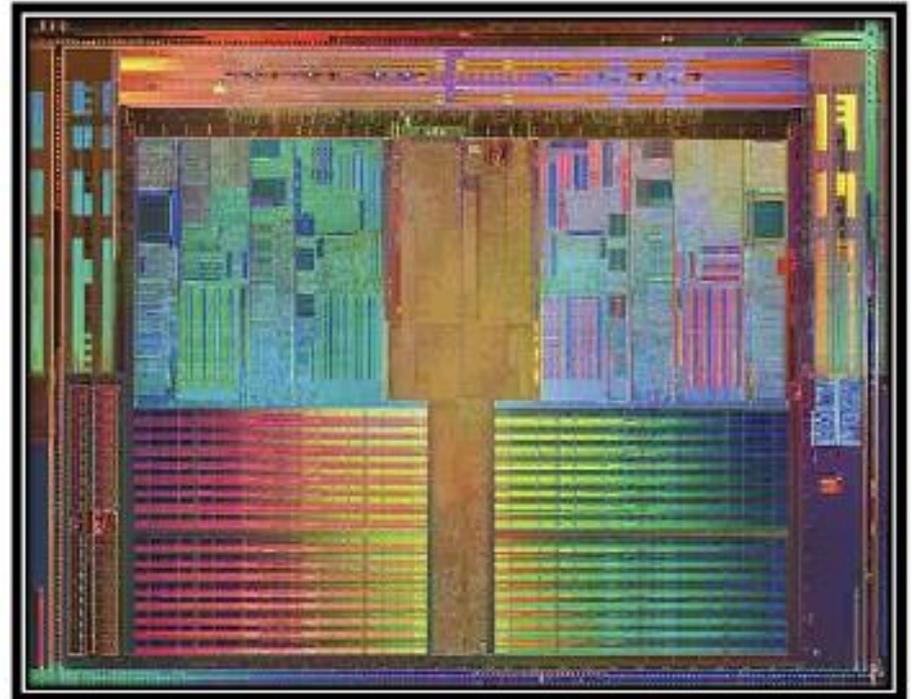
# Microwave monolithic Integrated Circuits

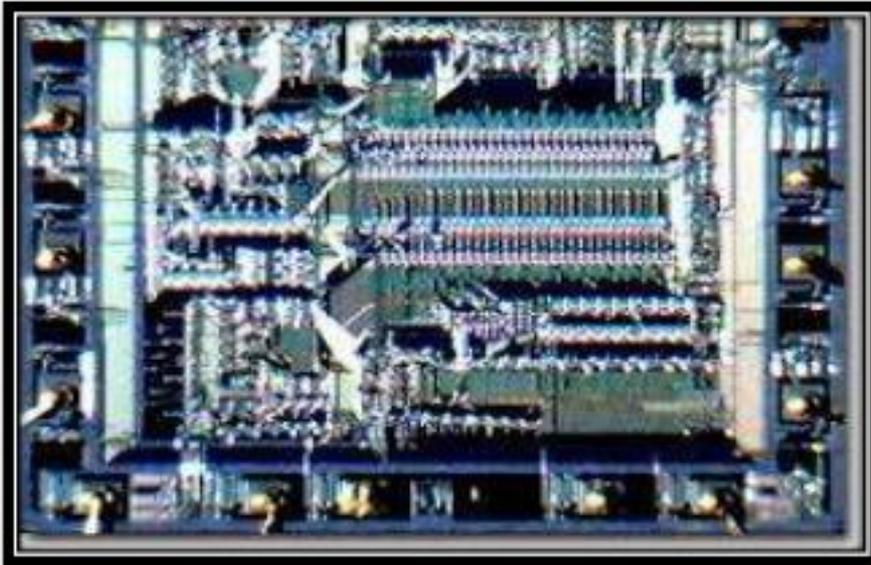
A special type of RFIC is known as a microwave monolithic IC (MMIC). These circuits run in the 2.4- to 20-GHz range, or microwave frequencies, and are used in radar systems, in satellite communications, and as power amplifiers for cellular telephones.



*Application Integrated  
Circuit*

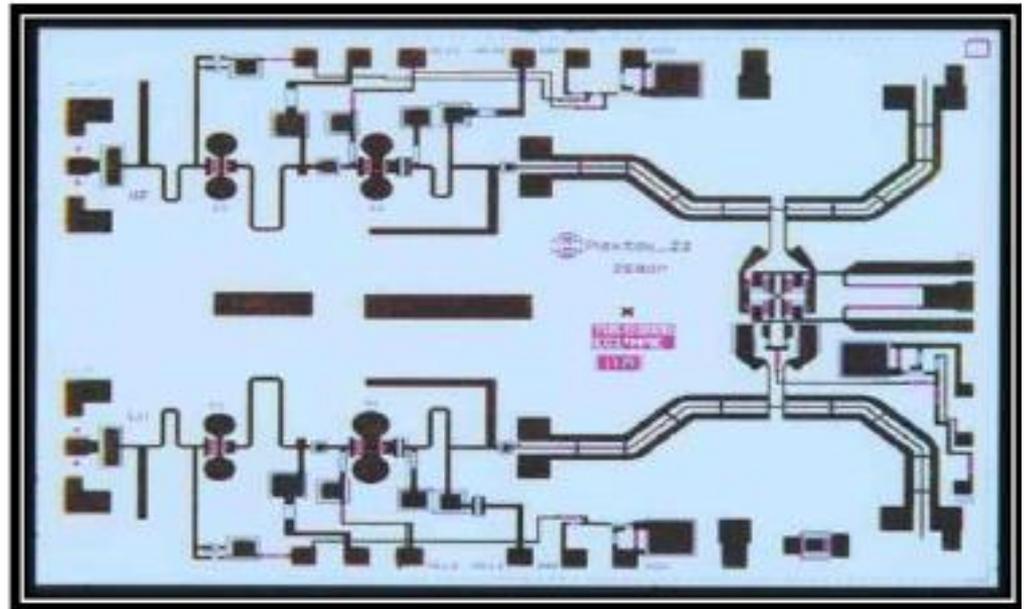
*Memory Integrated  
Circuit*





*Radio-Frequency  
Integrated Circuit*

*Microwave  
Monolithic  
Integrated Circuit*



# Classification of Ics

- Digital ICs
- Linear ICs

