ELECTRONIC PRINCIPLES AND DEVICES

Unit 4 –DIGITAL ELECTRONICS

ELECTRONIC PRINCIPLES AND DEVICES

Characteristics of Embedded Systems and Applications of Embedded Systems

Department of Electronics and Communication.

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Characteristics of an Embedded System

- All Embedded Systems are task specific. They do the same task repeatedly /continuously over their lifetime
  - ✓An mp3 player will function only as an mp3 player
- Embedded systems are created to perform the task within a certain time frame. It must therefore perform fast enough
  - ✓A car's brake system, if exceeds the time limit, may cause accidents
- They have minimal or no user interface (UI)
  - ✓A fully automatic washing machine works on its own after the programme is set and stops once the task is over

Characteristics of an Embedded System Continued...

- Some embedded systems are designed to react to external stimuli and react accordingly
  - ✓A thermometer, a GPS tracking device
- Embedded systems are built to achieve certain efficiency levels

They are small sized, can work with less power and are not too expensive

- Embedded systems cannot be changed or upgraded by the users

Hence, they must rank high on reliability and stability. They are expected to function for long durations without the user experiencing any difficulties

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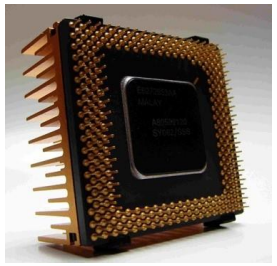
Characteristics of an Embedded System Continued...

- Microcontroller or microprocessors are used to design embedded systems
- Embedded systems need connected peripherals to attach input & output devices
- The hardware of an embedded-system is used for security and performance. The Software is used for features
- The firmware of an ES is pre-programmed and it is non alterable by the end user



Applications of Embedded System

Some real-life applications of Embedded Systems are as follows:

- **Consumer electronics –** Televisions and digital cameras; computer printers; video game consoles and home entertainment systems like PS4
- **Household appliances –** Refrigerators; washing machines, microwave ovens, air conditioners
- **Medical equipment –** Scanners like those for MRI, CT; ECG machines; devices to monitor blood pressure and heartbeat
- **Automobiles –** Fuel injection systems, anti-lock braking systems, music and entertainment systems, controls for air-conditioner

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Applications of Embedded System Continued...

- **Industrial applications –** Assembly lines, systems for feedback, systems for data collection
- **Aerospace –** Systems for navigation and guidance, GPS
- **Communications –** Routers, satellite phones

THANK YOU

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