BUS CONTROL IN EMBEDDED SYSTEM

EMBEDDED SYSTEM (PE-EC703A)

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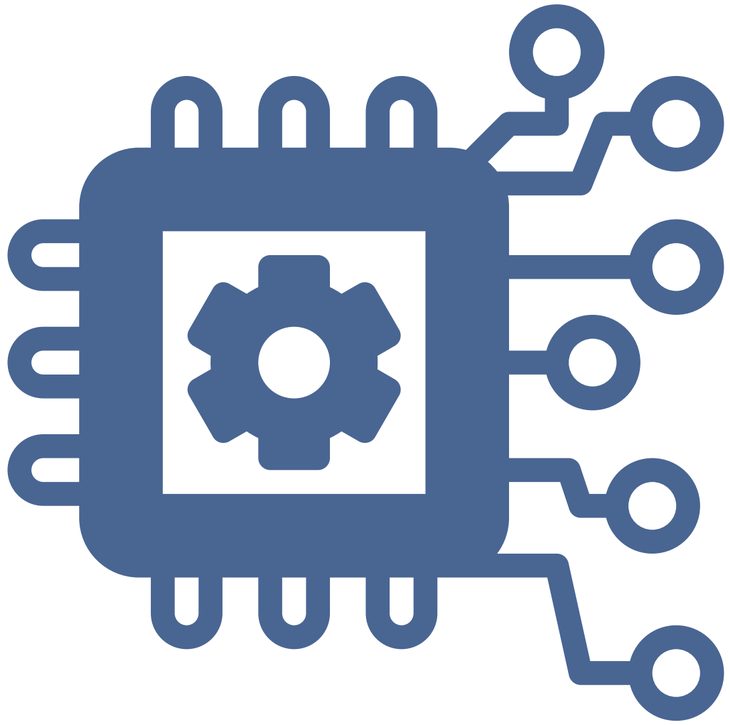
Content

- Introduction
- Types of Buses
- Bus Controllers
- Field Bus
- Inter-System Communication Components
- Conclusion

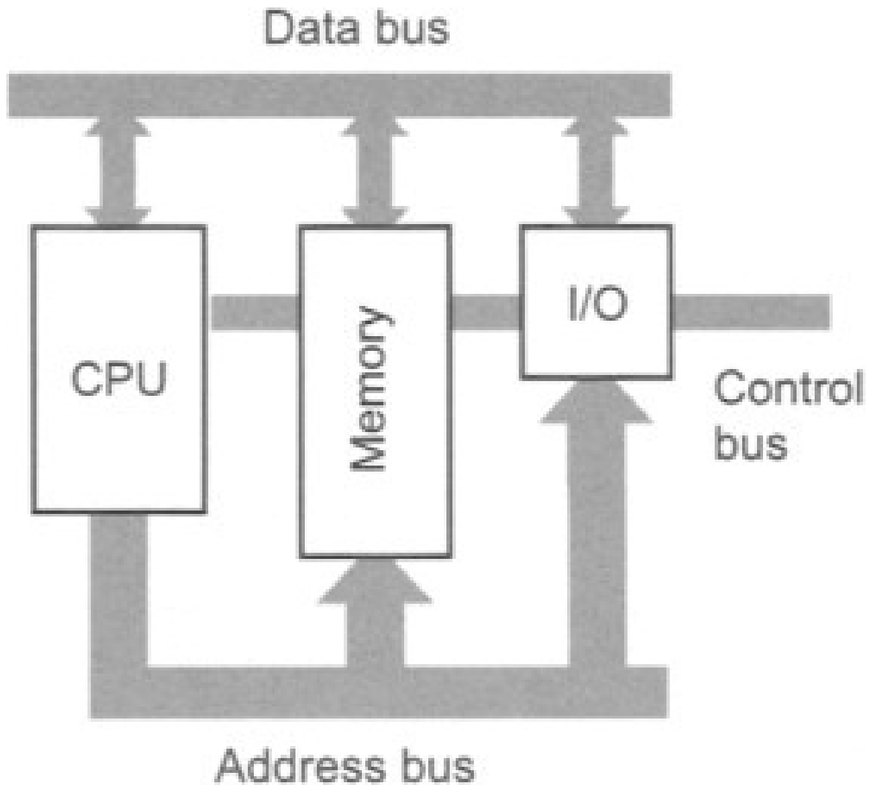


Introduction

- An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints.
- Bus control is an essential part of embedded systems, as it allows for communication between different components within the system.
- A bus is an electrically conducting path along which data is transmitted inside any digital electronic device.
- The bus controller is a communication device that transfers data between the components inside an embedded system.

Types of Buses

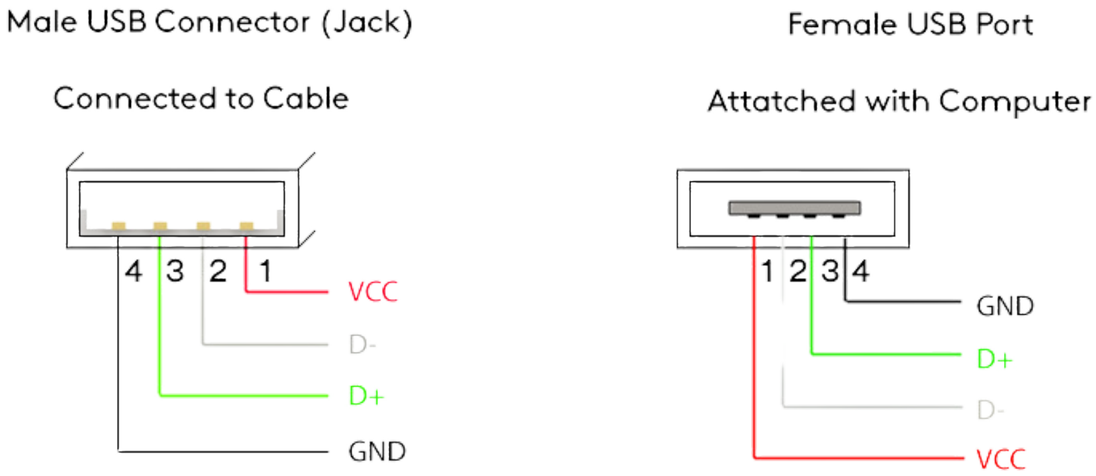
- There are **three** main types of buses in an embedded system:
    1. Address bus
    2. Data bus
    3. Control bus
- **The address bus** carries the memory addresses of data that the processor wants to access.
- **The data bus** carries the actual data between the processor and memory or I/O devices.
- **The control bus** carries control signals from the processor to other components.



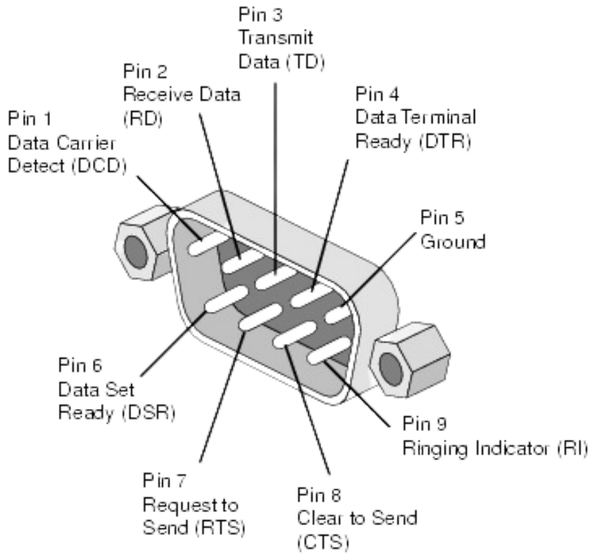
Bus Controllers

- A bus controller is a component that manages communication between different devices on a bus.

- Examples of bus controllers include serial buses such as **RS232** and **RS485**, and the **Universal Serial Bus (USB)**.

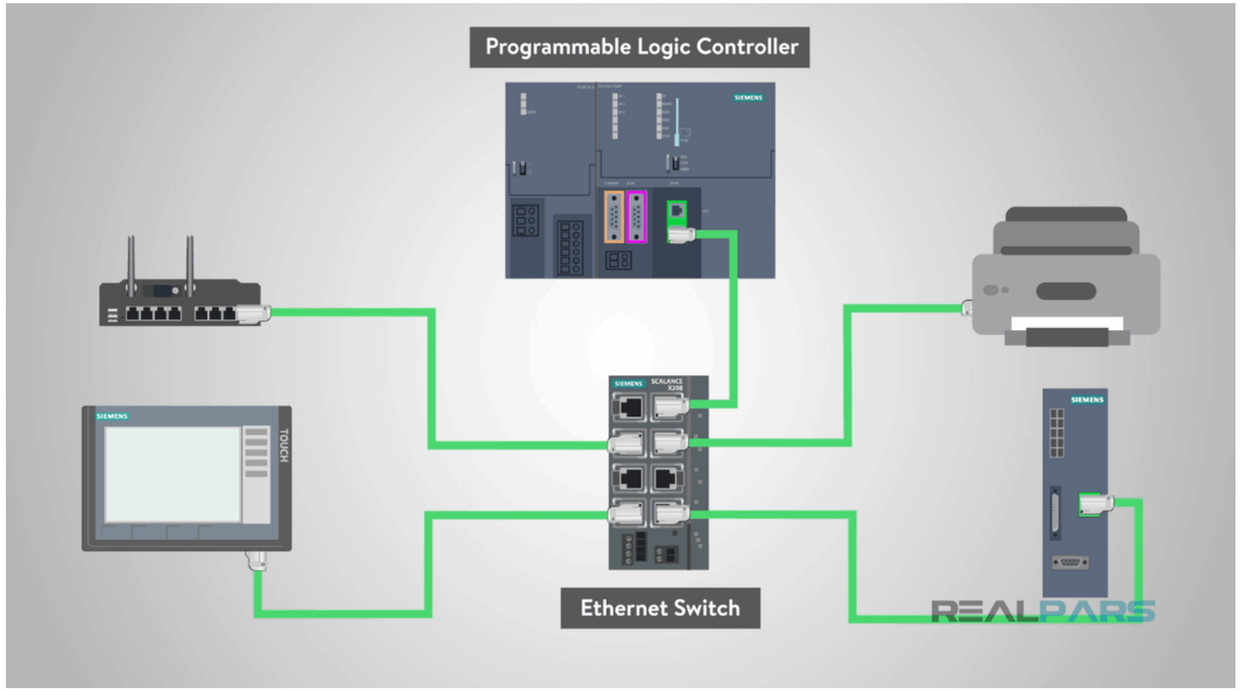


DB-9 Connector



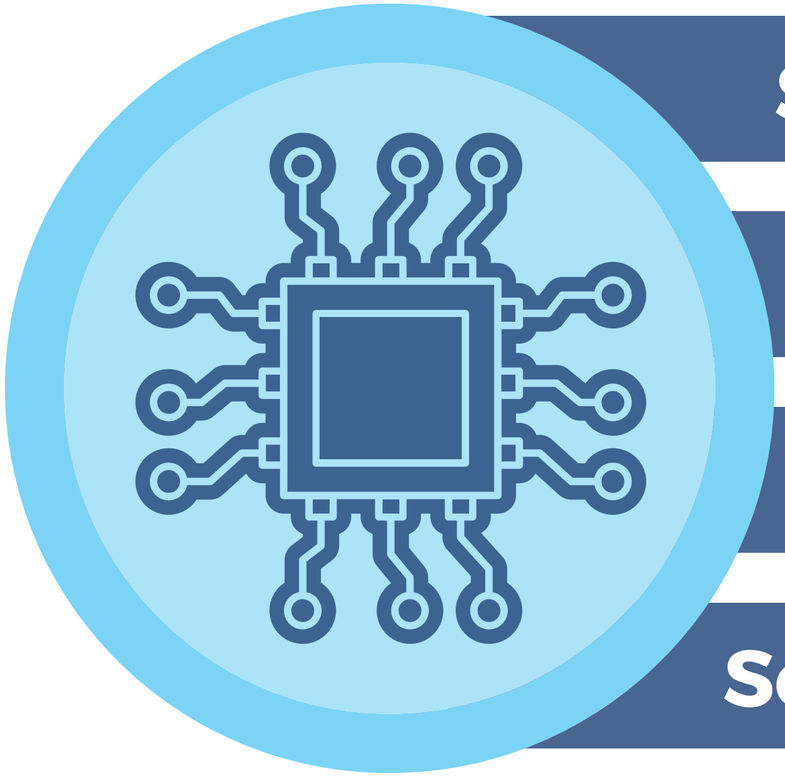
Field Bus

Serial communications allowed only two devices to communicate. Whereas, the Fieldbus connections are more closely compared to the typical Ethernet connections where we can connect multiple field devices to a single connection point that would then connect to the controller.



Inter-system Communication Components

There are several components used for inter-system communication in embedded systems.



- **Serial Lines**
- **Controller Area Network (CAN)**
- **Inter-Integrated Circuit (I2C)**
- **Serial Peripheral Interface (SPI)**

Conclusion

- In conclusion, bus control is an essential part of embedded systems. It allows for communication between different components within the system and enables efficient operation.
- Bus controllers, field buses, and inter-system communication components all play important roles in managing communication within an embedded system.
- By understanding the different types of buses and their functions, as well as the advantages and special requirements of field bus applications, we can design and implement effective bus control systems for embedded systems.
- As technology continues to advance, the importance of bus control in embedded systems will only continue to grow.

thank you!