# SNS COLLEGE OF TECHNOLOGY

## An Autonomous Institution

## Coimbatore-35

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
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# DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

## 19ITT204 - MICROCONTROLLER AND EMBEDDED SYSTEMS

II YEAR/ IV SEMESTER

## UNIT II PERIPHERAL INTERFACING

## TOPIC – RS232C

# OUTLINE

- Serial communication is a communication method that uses one or two transmission lines to send and receive data, and that data is continuously sent and received one bit at a time.
- Since it allows for connections with few signal wires, one of its merits is its ability to hold down on wiring material and relaying equipment costs.

## Serial communication standards

- ❖ RS-232C/RS-422A/RS-485areEIA (Electronic Industries Association) communication standards.
- ❖ Of these communication standards, RS-232C has been widely adopted in variety of applications, and it is even standard equipment on computer s and is often used to connect modems and mice.
- ❖ Sensors and actuators also contain these interfaces, many of which can be controlled via serial communication.

| Serial Standard | Operation mode | Total nr. of devices | Cable length | Speed | Wires |
|---|---|---|---|---|---|
| RS-232 | Single Ended | 1 Sender / 1 Receiver | 15 m | 20 Kbits/s | min. 3 |
| RS-422 | Differential | 1 Sender / 10 Receiver | 1200 m | 10 Mbit/s | 4 |
| RS-485 | Differential | 32 Sender / 32 Receiver | 1200 m | 10 Mbit/s | 2 |

## Single-ended signaling

- It is the simplest and most commonly used method of transmitting electrical signals over wires.
- One wire carries a varying voltage that represents the signal, while the other wire is connected to a reference voltage, usually ground.

## Differential signaling

- It is a method for electrically transmitting information using two complementary signals.
- The technique sends the same electrical signal as a **differential pair** of signals, each in its own conductor.
- The pair of conductors can be wires in a twisted-pair or ribbon cable or traces on a printed circuit board.

## RS-232C

This serial communication standard is widely used and is often equipped on computers as standard. Itis also called "EIA-232".The purpose and timing of the signal lines and the connectors have been defined (D-sub 25-pin or D-sub 9-pin).Currently the standard has been revised with the addition of signal lines and is formally called "ANSI/EIA-232-E".However, even now it is generally referred to as "RS-232C".

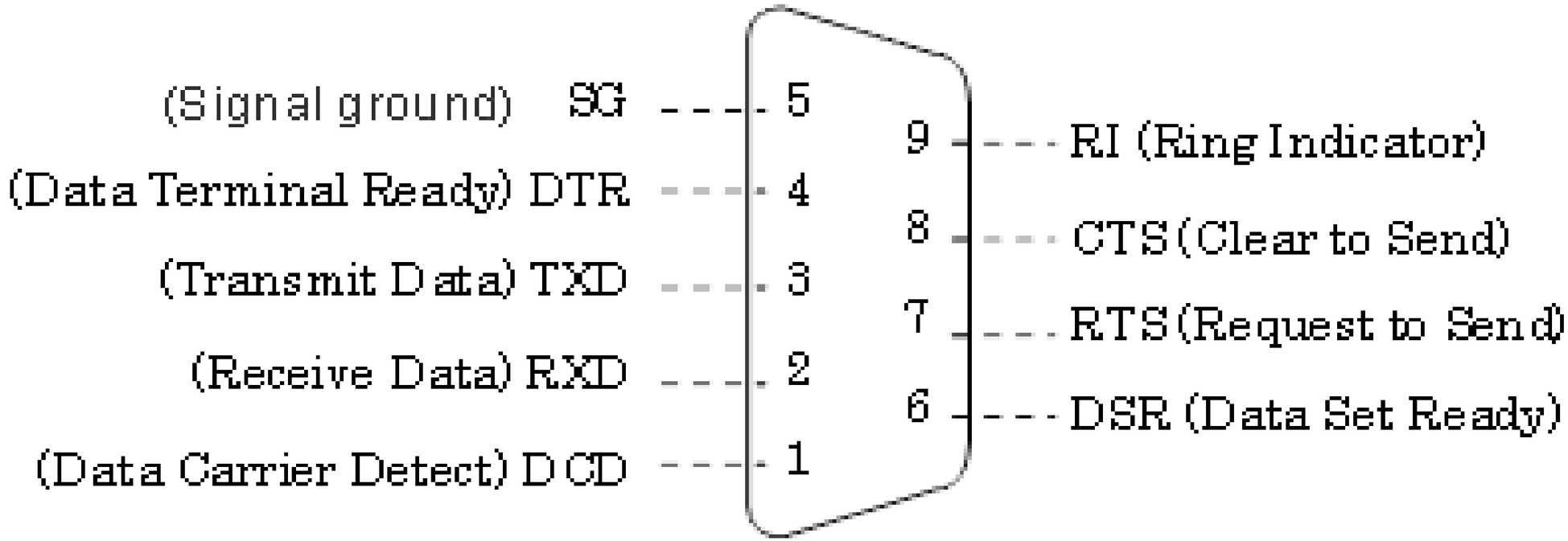
## RS-422A

This standard fixes problems in RS-232C such as a short transmission distance and a slow transmission speed. Itis also called "EIA-422A".The purpose and timing of the signal lines are defined, but the connectors are not. Many compatible products primarily adopt D-sub 25-pin and D-sub 9-pin connectors.

## RS-485

This standard fixes the problem of few connected devices in RS-422A.It is also called "EIA-485".RS-485 is forward compatible standard with RS-422A.The purpose and timing of the signal lines are defined, but the connectors are not. Many compatible products primarily adopt D-sub 25-pin and D-sub 9-pin connectors

In RS-232C, the connectors to use and the signal assignments have been defined and are standardized. The figure to the right describes the D-sub 9-pin signal assignments and signal lines.



| Pin No. | Signal name | Description | |
|---|---|---|---|
| 1 | DCD | Data Carrier Detect | Carrier detect |
| 2 | RxD | Received Data | Received data |
| 3 | TxD | Transmitted Data | Transmitted data |
| 4 | DTR | Data Terminal Ready | Data terminal ready |
| 5 | SG | Signal Ground | Signal ground or common return |
| 6 | DSR | Data Set Ready | Data set ready |
| 7 | RTS | Request To Send | Request to send |
| 8 | CTS | Clear To Send | Clear to send |
| 9 | RI | Ring Indicator | Ring indicator |
| CASE | FG | Frame Ground | Maintenance ground or earth |

## RS 232 Connection method

In RS-232C, the connectors and signal assignments have been standardized, so many standard-compliant cables are available commercially. However, equipment comes in the following types, and depending on the equipment that will be connected, a straight cable or a crossover cable is required.

**Equipment type**

**DCE**

**Data communication equipment.This term indicates equipment that passively operates** such as modems, printers, and plotters.

**DTE**

**Data terminal equipment.This term indicates equipment that actively operates such as** computers.

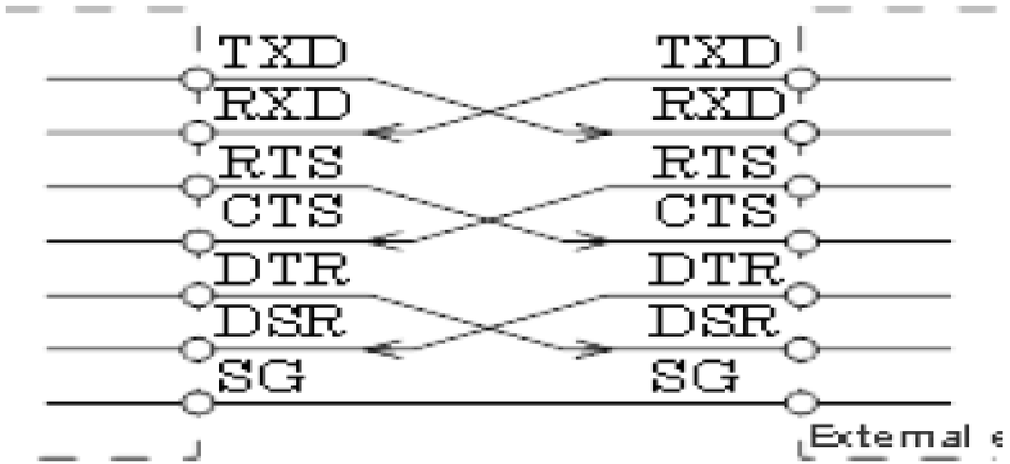
**Full-duplex communication**

A method where send and receive both have their own transmission line so data can be simultaneously sent and received.

**Half-duplex communication**

**A method where communication is performed using one transmission line while** switching between send and receive. For this reason, simultaneous communication **cannot be performed.**

## Crossover cable connection




**Full-duplex communication** A method where send and receive both have their own transmission line so data can be simultaneously sent and received. Half-duplex communication A method where communication is performed using one transmission line while switching between send and receive. For this reason, simultaneous communication cannot be performed

# THANK YOU