

RS-232

Networks and Embedded Software

Module 5.2.4 (optional)

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RS-232 (1)

- Design
 - Serial Communication Protocol (cf. Module 4.2.5)
 - Point-to-Point Communication
 - Unidirectional Transmission Lines
 - RxD: Received Data
 - TxD: Transmitted Data
 - Hardware flow control (optional)
 - RTS: Request To Send
 - CTS: Clear To Send

RS-232 (2)

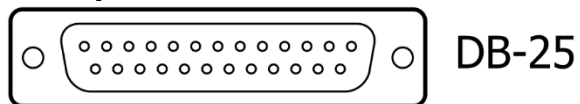
- Design (continued)

- Voltage Levels

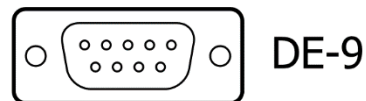
- 0: +3 ... +15 V (space), UART: GND (0 V)
 - 1: -15 ... -3 V (mark), UART: VCC (5.0 V, 3.3 V)

- Connectors

- 25-pin D-subminiature connector (standard recommendation)



- 9-pin D-subminiature connector (widely used)

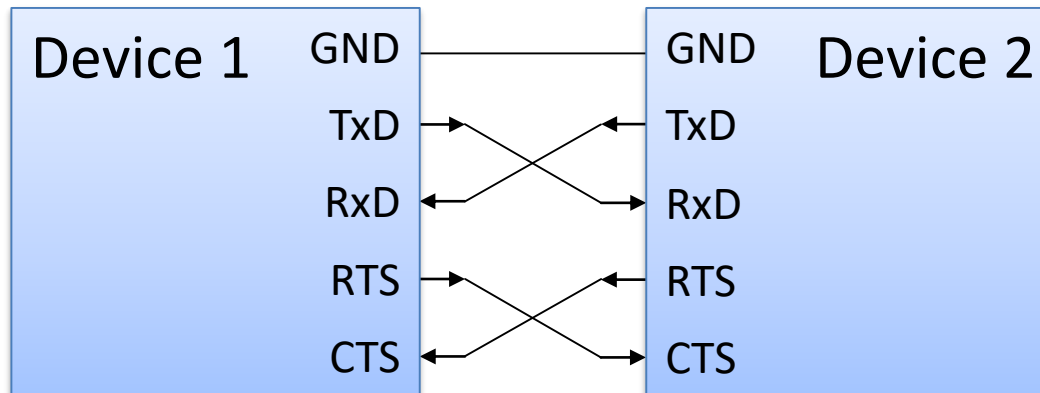


RS-232 (3)

- Settings
 - Speed
 - Data Bits
 - Parity
 - Stop Bits
 - Flow Control
 - No handshaking
 - Hardware handshaking (RTS and CTS)
 - Software handshaking (XON/XOFF control characters)

RS-232 (4)

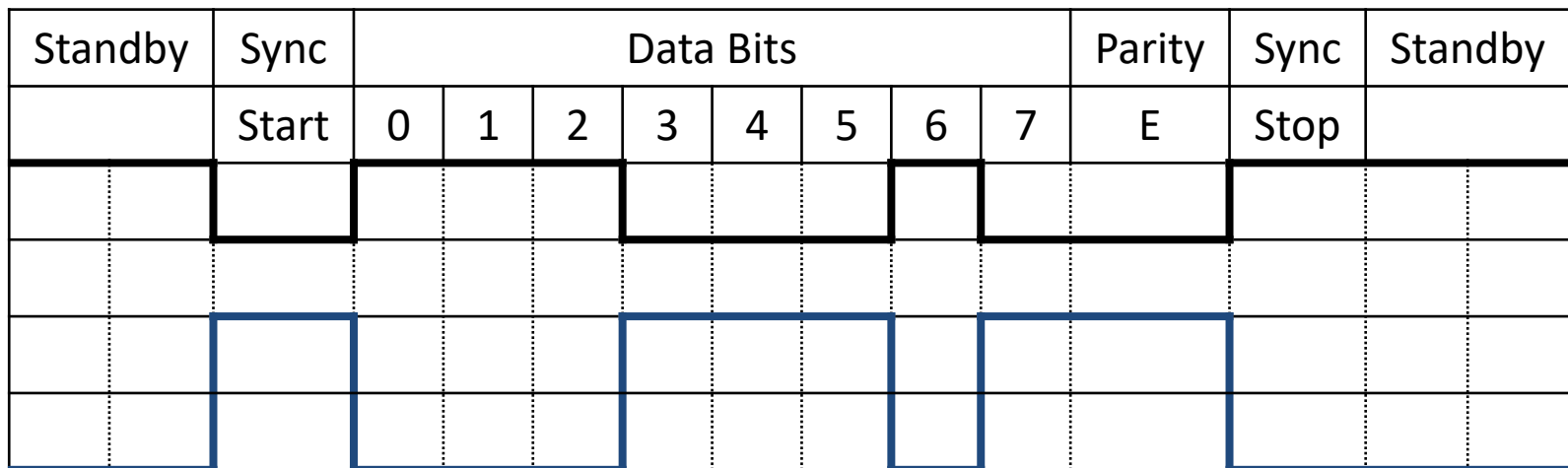
- Connection



RS-232 (5)

- Transmission

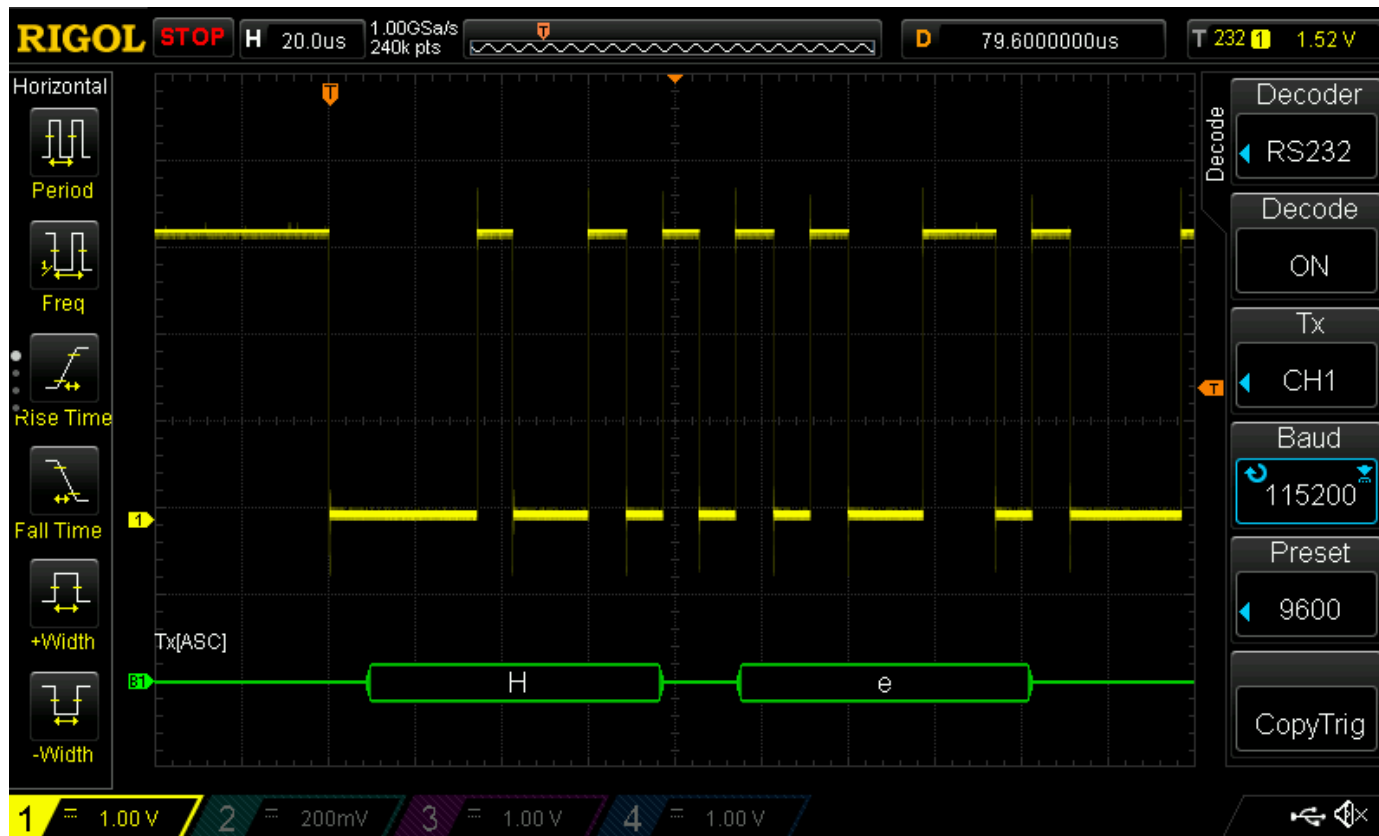
– Example: 8N1, G = 47_{hex} = 01000111



— Logical: 0, 1 — Signal: -15 V ... +15 V

RS-232 (6)

- Real-Life Example (3.3 V positive logic levels)



RS-232 (7)

- Advantages
 - Simplicity
 - Low cost
 - Easy to implement
 - Widely used
 - Converters and adaptors available

RS-232 (8)

- Disadvantages
 - Point-to-point
 - No automatic configuration
 - Many configuration settings
 - Requires transceiver chip
 - MAX233 level shifter