Serial Interface Basics

- Also called Universal Asynchronous Receiver/Transmitter (UART)

- or after the I standards:
  - RS232 (-C) or EIA232
Typical 3-wire Interface
RS232 Signals

- Signals between +25V and -25V; some say ±15V usually +12V to -12V
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- AVR runs on 3V or 5V
- Driver chip translates between voltages
Valid Signals
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Figure courtesy of http://www.camiresearch.com
Basic 3-Wire Connection of Machines
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What goes over these wires?
RS-232 Frame

- Every RS-232 consists of:
  - 1 start bit
  - 8 data bits
  - 1 stop bit
  - (optional 1 parity bit)
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Signal Timing
Signal Timing (continued)

<table>
<thead>
<tr>
<th>Start</th>
<th>D0</th>
<th>D1</th>
<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
<th>D6</th>
<th>D7</th>
<th>Stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1 1 1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

? bit period
Baud Rate

- Baud specifies the inverse of the bit-period
e.g. 9600 Baud = a bit-period of 1/9600 second
  = 104.2 microseconds

- Typical data rates: 75, 110, 300, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 33600, 56000, 115000
  and (rarely) 330000 baud.