Serial Peripheral Interface

Networks and Embedded Systems
Second Grade Level
Wolfgang Neff
• Operation
  – Master controls communication
  – Two shift register form a circular buffer
  – Master shifts data to slave via MOSI
  – Slave shifts data to master via MISO
SPI (2)

• Addressing
  – Point-to-point connection
  – Several slaves possible
  – Slave select
    • Control line
    • Active low
    • Activates slave
    • Just on slave active
    • The other must be inactive

Serial Peripheral Interface
• Three-state logic
  – Third state in addition to 0 and 1
  – Remove devices from circuit
    • High impedance
      – High resistance → insignificant current
  – State table

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Low</td>
</tr>
<tr>
<td>1</td>
<td>High</td>
</tr>
<tr>
<td>Z</td>
<td>High impedance</td>
</tr>
</tbody>
</table>
• Real-Life Example
SPI (5)

- Advantages
  - Simple software implementation
  - Extremely simple hardware interface
  - Full duplex communication
  - High throughput
SPI (6)

• Disadvantages
  – No formal standard available
  – Requires more pins than other protocols
  – Extra lines due to the lack of addressing protocol
  – No error checking by protocol
  – Handles short distances, only