

Questions?

- Show and Tell
 - Still very few #8 and #9!
- Project
 - First prototype are due in 2 weeks...
 - New reading about user evaluation on the site...

I2C

- Key points
 - Data is transmitted one bit at a time, both ways
 - Synchronous: Both party are sharing a clock
 - 2 wires protocol
 - *Data (SDA), Clock (SCL)*
 - *Device identified by their address*
 - In general set in hardware
 - 7 or 10 bits

I2C setting

- To do:
 - Disable the SPI subsystem (SSPCON1bits.SSPEN)
 - Set Master SSP to I2C master (SSPCON1bits.SSPM3:0)
 - Set the Baud generator (SSPADD)
 - Set the Slew control (SSPSTATbits.SMP = 1)
 - Set direction for SCK (RC3), SDI (RC4)
 - Clear collision detection (SSPCON1bits.WCOL)
 - Enable the module

I2C Write (Master side)

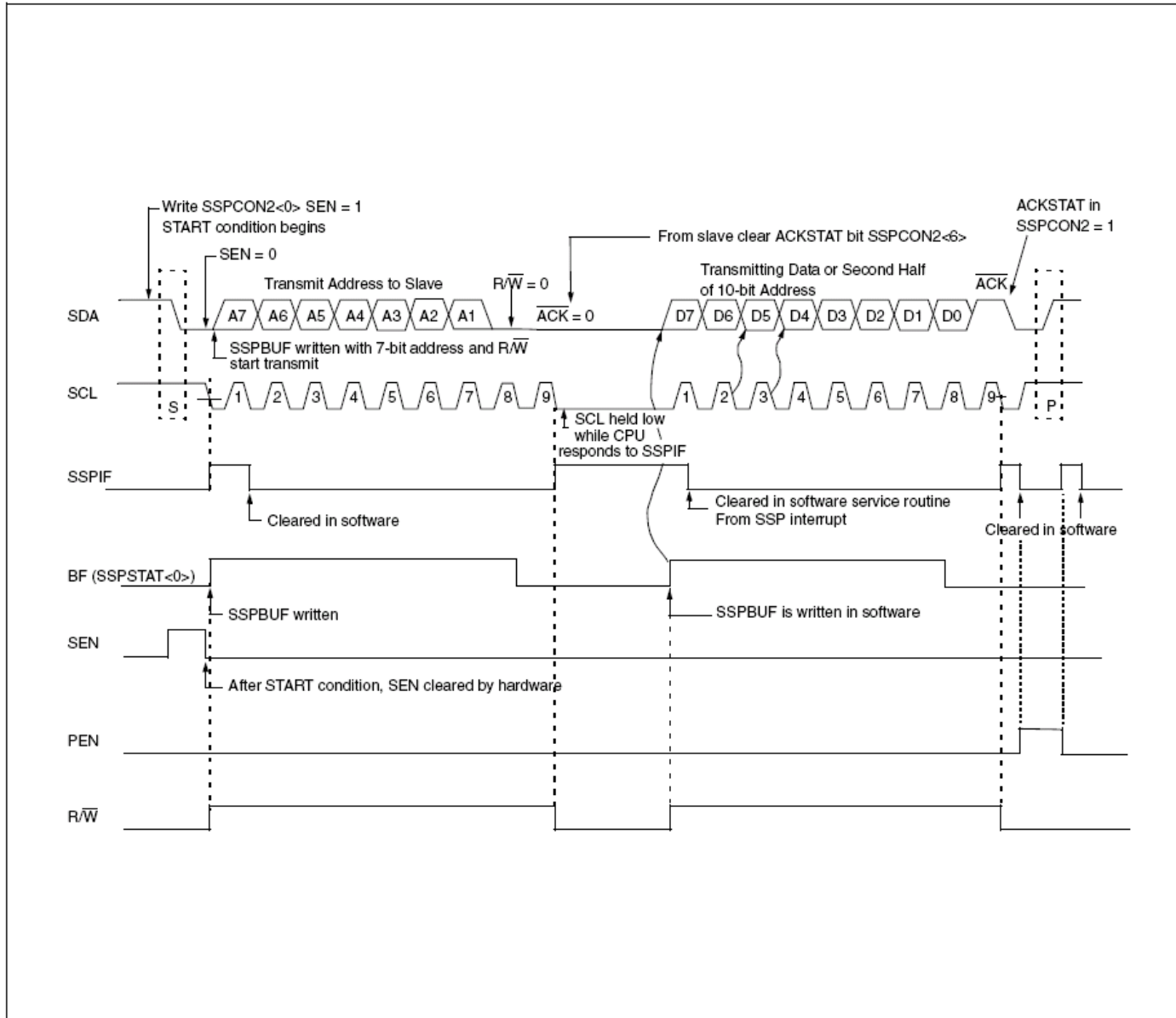


FIGURE 15-21: I²C MASTER MODE WAVEFORM (TRANSMISSION, 7 OR 10-BIT ADDRESS)

I2C Write phases

- **Start (S) event**
SSPCON2bits.SEN = 1;
while (SSPCON2bits.SEN == 1);
- **Write (address, command, data)**
SSPBUF = DEVICE_ADDRESS;
while (SSPSTATbits.R_W == 1);
- **Slave ACK status**
In SSPCON2bits.ACKSTAT
- **Stop (P) event**
SSPCON2bits.PEN = 1;
while (SSPCON2bits.PEN == 1);

I2C Read (Master side)

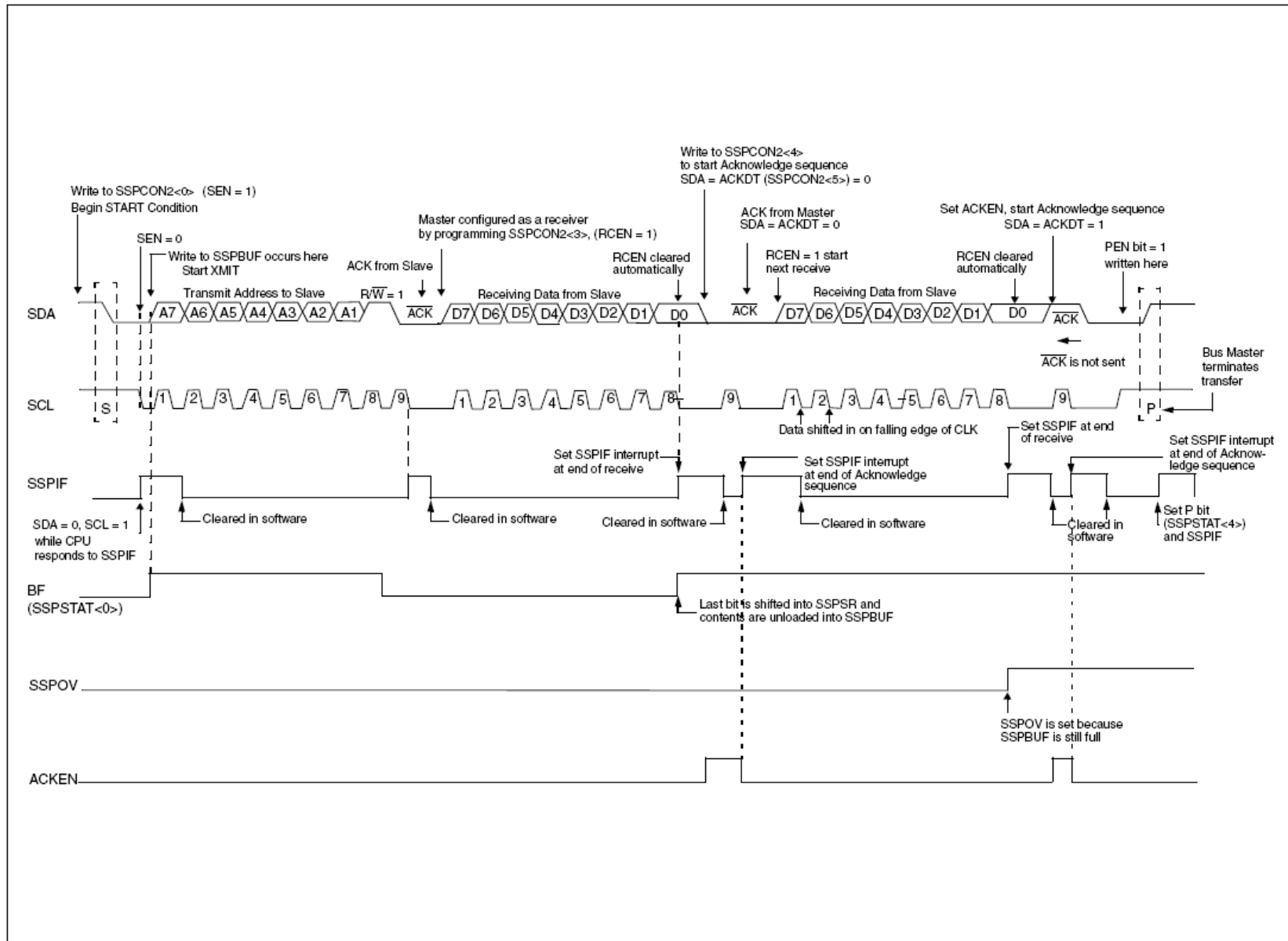


FIGURE 15-22: I²C MASTER MODE WAVEFORM (RECEPTION, 7-BIT ADDRESS)

I2C read phases

- **Start (S) event**
SSPCON2bits.SEN = 1;
while (SSPCON2bits.SEN == 1);
- **Write (address, command, data)**
SSPBUF = DEVICE_ADDRESS;
while (SSPSTATbits.R_W == 1);
- **Slave ACK status**
In SSPCON2bits.ACKSTAT
- **Read**
SSPCON2bits.RCEN = 1;
while (SSPCON2bits.RCEN == 1);
result = SSPBUF;
- **Master ACK**
SSPCON2bits.ACKDT = 0;
SSPCON2bits.ACKEN = 1;
while (SSPCON2bits.ACKEN == 1);
- **Master NACK (last)**
SSPCON2bits.ACKDT = 1;
SSPCON2bits.ACKEN = 1;
while (SSPCON2bits.ACKEN == 1);
- **Stop (P) event**
SSPCON2bits.PEN = 1;
while (SSPCON2bits.PEN == 1);

Assignment

- Show the current temperature on HyperTerminal
- Build a simple thermostat system
 - Setting using the potentiometer
 - Action simulated using LED, printf...
- Check with the oscilloscope