"MSSP" – SPI
(Master Synchronous Serial Port)

COMMUNICATION

SYSTEM

USING

HITECH - PIC - 'C'

What is MSSP?

- MSSP module is a serial interface useful for communicating with other Peripheral or Microcontroller devices.

- These peripheral devices may be
  - Serial RTCs Interface,
  - EEPROMs,
  - Display drivers,
  - A/D converters, etc.

- Easy 2 or 3 wire Communication Method

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What is SPI?

- SPI is a synchronous serial data link

- The SPI interface supports the following modes in
  - Master mode
  - Multi-Slave mode
  - Slave mode.

- Easy 3 or 4 wire Communication System

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Comparison of Serial Interfaces

	Synchronous		Asynchronous
Peripheral	**SPI**	**I²C**	**UART**
Max Bit Rate	10Mbit/s	1Mbit/s	500kbit/s
Max Bus Size	Limited by no. of pins	128 devices	Point to point (RS232) 256 devices (RS485)
Number of pins	3 + n x CS	2	2
Pros	Simple, low cost, high speed	Small pin count, allows multiple masters	Longer distance, improved noise immunity (requires transceivers)
Cons	Single master, short distance	Slowest, short distance	Requires accurate clock frequency
Typical Application	Direct connection to ASICs and other peripherals on same PCB	Bus connection with peripherals on same PCB	Interface with terminals, personal computers and other data acquisition systems
Examples	Serial EEPROMs (25CXXX series), MCP320X A/D converter, ENC28J60 Ethernet controller, MCP251X CAN controller...	Serial EEPROMs (24CXXX series), MCP98XX temperature sensors, MCP322x A/D converters...	RS232, RS422, RS485, LIN bus, MCP2550 IrDA interface...

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Advantages of SPI

- Full duplex communication
- Higher throughput than I2C
- Complete protocol flexibility for the bits transferred
- Extremely simple hardware interfacing
- Slaves use the master's clock, and don't need precision oscillators
- Not limited to 8-bit words

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SPI Communication:

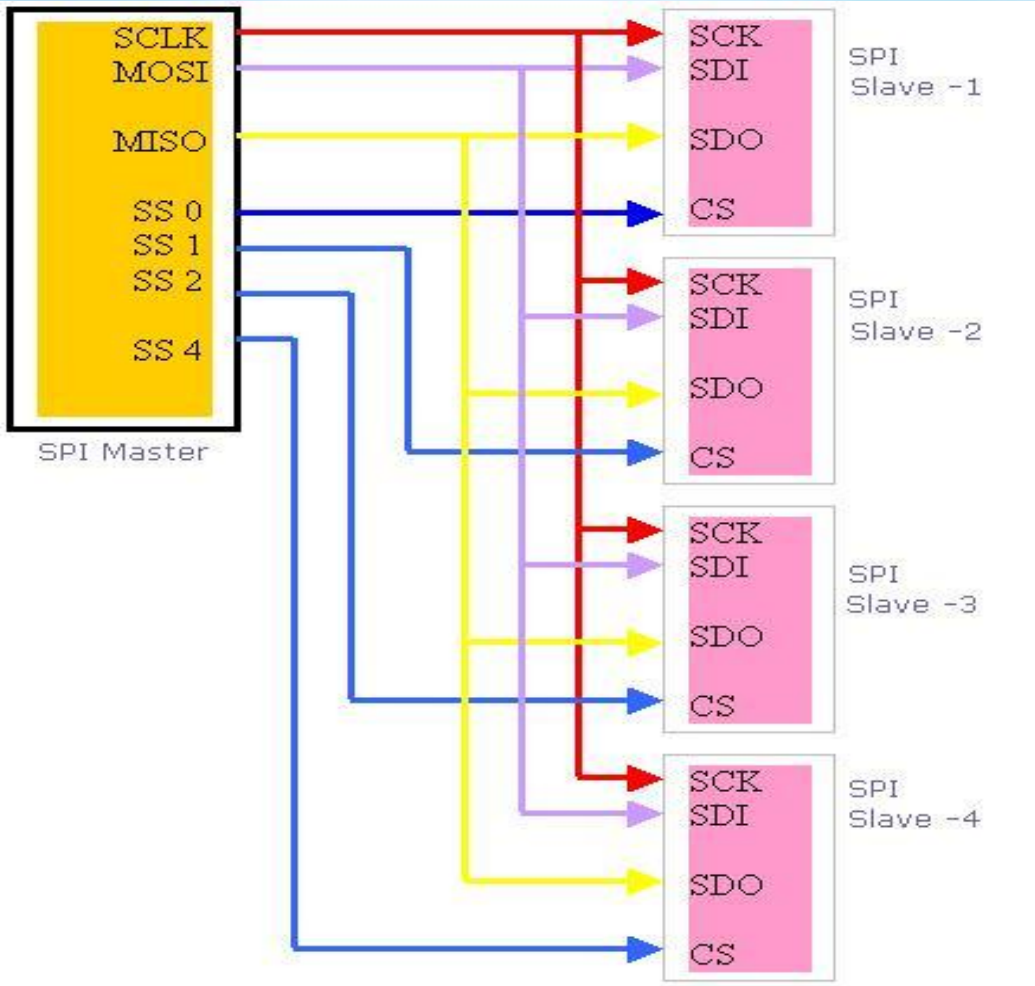

Fig – 4 (SPI bus in independent slave configuration)

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MSSP Registers?

- SSPSTAT (Status Register)
- SSPCON (Control Register – 1)
- SSPBUF (Buffer Register)
- PIR (Interrupt Register)

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SPI-Master Mode

- SSPSTAT-SSP Status Register

1	1	0	0	0	0	0	0

- SSPCON-SSP Control Register

0	0	1	0	0	0	0	0

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SPI-Slave Mode

- SSPSTAT-SSP Status Register

0	1	0	0	0	0	0	0

- SSPCON-SSP Control Register

0	0	1	0	0	1	0	1

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Master & Slave Selection

Master:

SDI=1; →Serial Data In

SDO=0; →Serial Data Out

SCK=0; →Serial Clock out

Slave:

SDI=1; →Serial Data In

SDO=0; →Serial Data Out

SCK=1; →Serial Clock in

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SPI Master Write Function:

```
void spi_write_hw(unsigned int val)        //        Data send
 {
   SPEN=1;
   SSPBUF=val;            //        Value assign to SSPBUF register
   while(!SSPIF);         //        Data transfering
   SPEN=0;
 }
```

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SPI Slave Read Function:

```
void spi_Read_hw()      //        Read function
 {
   while(!SSPIF);        //        Receiving Data
   val=SSPBUF;          //     Data Transfer to Val
 }
```

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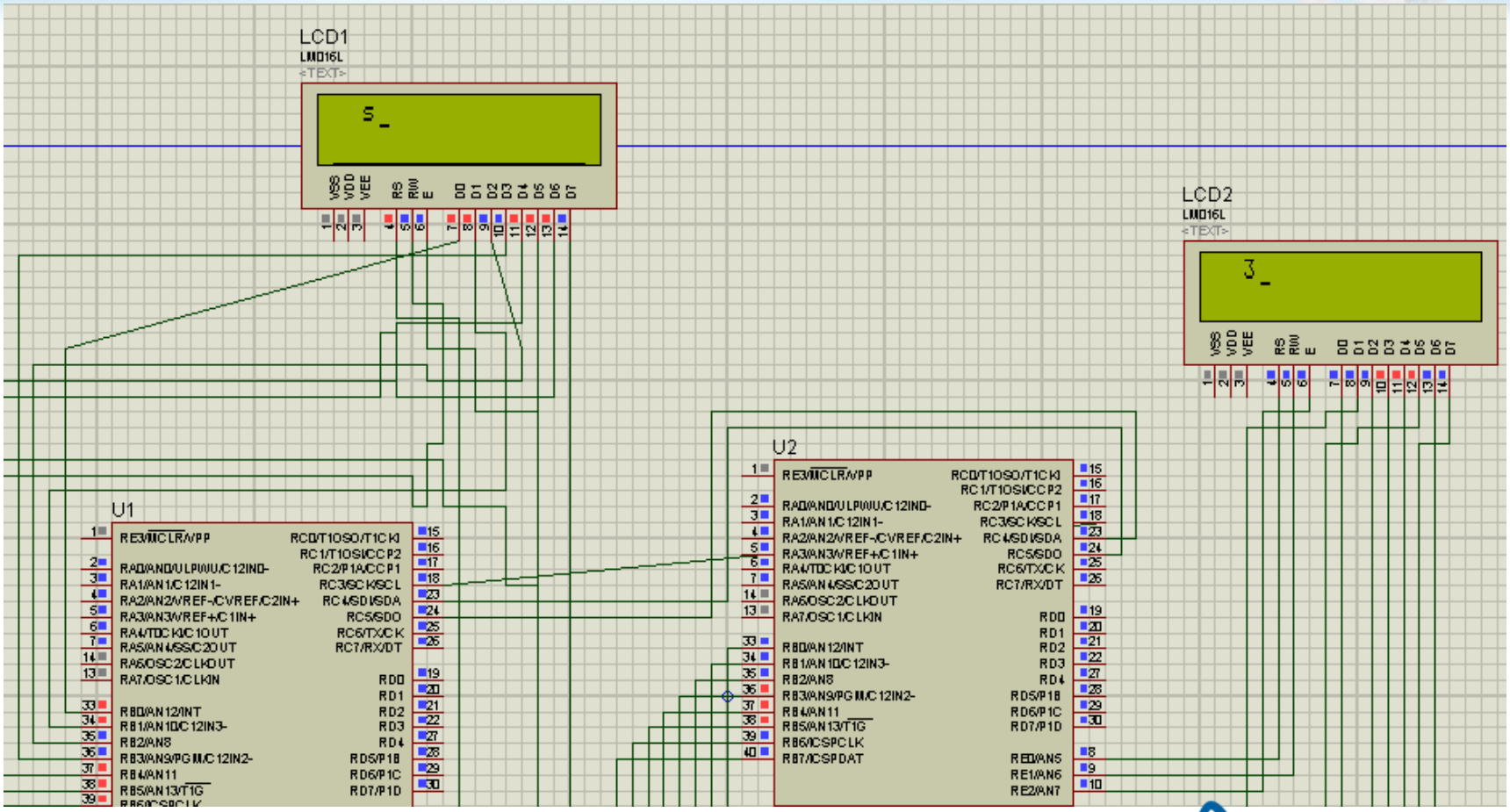
SPI-Data Transmitting:



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QUERIES??

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