

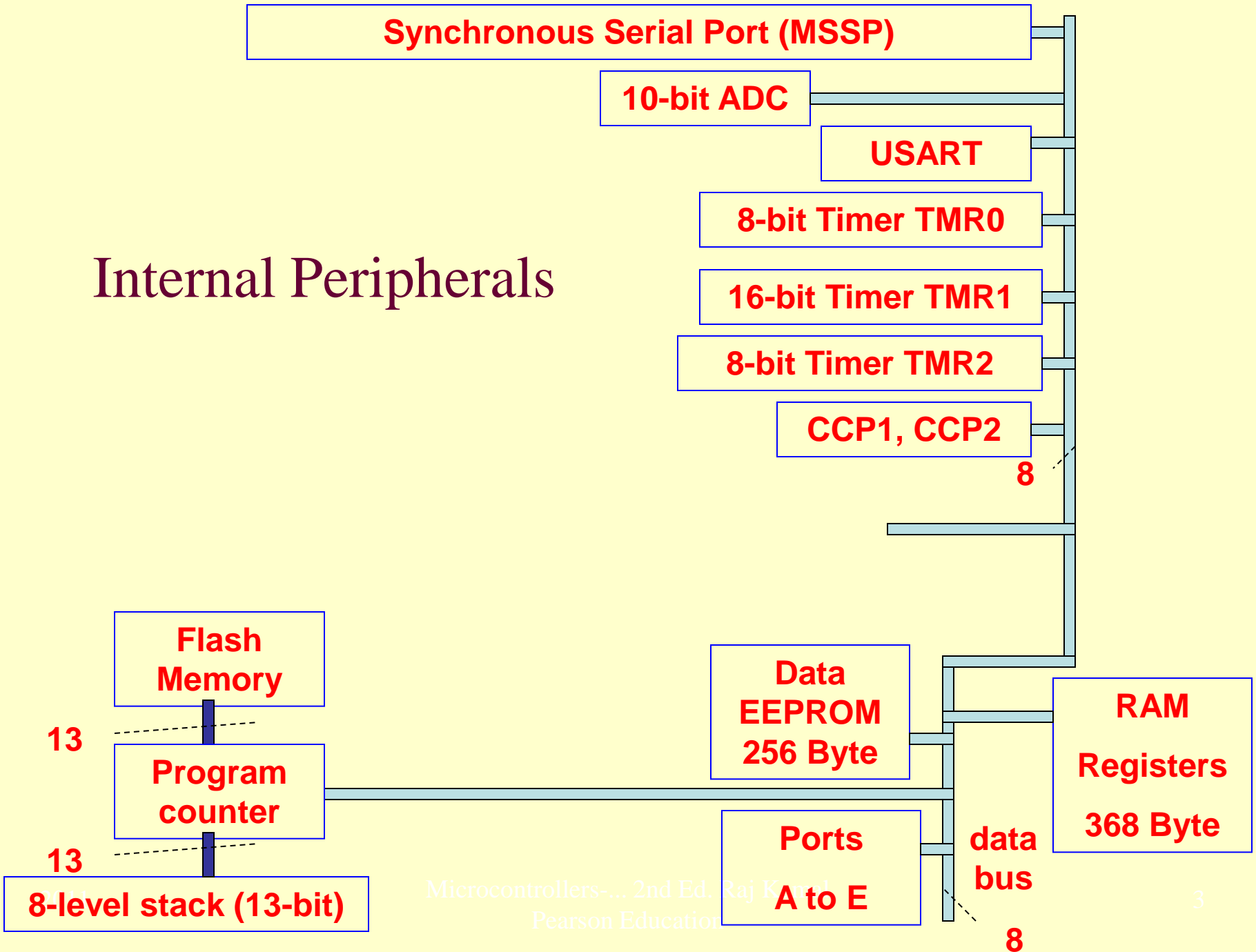
Chapter 13

PIC Family Microcontroller

Lesson 08

Universal synchronous asynchronous Receiver and Transmitter (USART)

Internal Peripherals



USART Modes

- Full duplex for serial asynchronous communication to CRT terminal or personal computer or
- Half duplex synchronous master communication to DAC or ADC ICs, serial EEPROMS or
- half duplex synchronous slave communication from external peripherals

USART SFRs

- TxREG (USART transmit data register) at 0x019 Bank 0
- RCREG (USART receive data register) at 0x01A Bank 0
- TxSTA USART transmitter status register 0x098
- SPBRG SCI (baud rate select register) at 0x099

USART Asynchronous Mode

- Selectable high/low baud rate in asynchronous mode
- 8-bit BRG (Baud Rate Generator) for USART
BRGH = 0 (low speed asynchronous baud rate = $f_{OSC}/(64(X+1))$ when SYNC bit = 0) and
BRGH = 1 (high speed asynchronous baud rate = $f_{OSC}/(16(X+1))$ when SYNC bit = 0)

USART Synchronous Mode

- Synchronous mode bit rate = $f_{OSC}/(4(X+1))$
when SYNC = 1

Port C USART Pins RC6 and 7

- RC6 also as synchronous clock
- RC7 also as asynchronous receive pin

Port C USART Pins RC6 and 7

- RC6 also as asynchronous data transmit pin
- RC7 also as asynchronous receive pin

Summary

We learnt

- USART two modes
- Full duplex for serial asynchronous communication to CRT terminal or personal computer or
- Half duplex synchronous master communication to DAC or ADC ICs, serial EEPROMS or
- half duplex synchronous slave communication from external peripherals

We learnt

- USART two pins RC6 and RC7
- TxREG (USART transmit data register)
- RCREG (USART receive data register)
- TxSTA USART transmitter status register
- SPBRG SCI (baud rate select register) for asynchronous mode

End of Lesson 08 on

**Universal synchronous
asynchronous Receiver and
Transmitter (USART)**