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CHAPTER 11

MC68HC12 SERIAL I/O

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OBJECTIVES

This chapter discusses the M68HC12 serial I/O capabilities. The Asynchronous Serial Communications Interfaces, SCIO and SCII, and the Synchronous Serial Peripheral Interface, SPI, are covered. We briefly describe the Byte Data Link Communications Module available in the MC68HC912B32.

- 11.1 Introduction
- 11.2 Port S Serial I/O
- 11.3 Asynchronous Serial Communications Interface - SCI
 - SCI Data
 - SCI Initialization
 - SCI Status Flags
 - SCI Interrupts
 - SCI Wake Up
 - SCI Break Character
 - Port S SCI I/O
 - SCI Programming Example
- 11.4 Synchronous Serial Peripheral Interface - SPI
 - Interprocessor Serial Communications
 - SPI Data Register
 - SPI Initialization
 - SPI Master and Slave Modes
 - SPI Data Rate and Clock Formats
 - SPI Status Register and Interrupts
 - SPI Interrupts
 - SPI Programming Example
- 11.5 MC68HC912B32 Byte Data Link Communications Module
 - BDLC Modes
 - BDLC Loopback Testing
 - BDLC Control Registers
 - BDLC J1850 Bus Errors

11.6 Conclusion and Chapter Summary Points

The serial interfaces in the M68HC12 support asynchronous data transfer between "normal" serial devices such as terminals, printers, and other computers. It also has a high speed, synchronous data transfer mode for communications with other M68HC12s in a multiple-processor system.

- ! The SCIs gives the M68HC12 UART capabilities.
- ! The SCIs can send and receive 8- or 9-bit data.
- ! There can be hardware parity generation.
- ! Each SCI has its own programmable baud rate generator.
- ! The SCI status registers provides the following bits:
 - ! TDRE - Transmit Data Register Empty
 - ! TC - Transmission Complete
 - ! RDRF - Receive Data Register Full
 - ! IDLE - Idle Line Detect
 - ! OR - Receiver Overrun Error
 - ! NF - Noise Detected During Last Character
 - ! FE - Framing Error
 - ! PF - Parity Incorrect Flag
 - ! RAF - Receiver Active Flag
- ! The SCI can generate interrupts for the following conditions:
 - ! Transmit Data Register Empty
 - ! Transmission Complete
 - ! Receiver Data Register Full and Receiver Overrun Error
 - ! Idle Line Detected
- ! The software must poll the status register to see which of the receiver interrupts has occurred.
- ! The SPI is a high speed synchronous serial peripheral interface.
- ! The SPI can transfer serial data at up to 4 Mbit/second.
- ! The SPI status register provides the following bits:
 - ! SPIF - SPI transfer complete flag
 - ! WCOL - Write collision error flag
 - ! MODF - Mode-fault error flag
- ! The SPI can generate interrupts for the following conditions:
 - ! SPI Transfer Complete and Mode Fault Error
- ! The SPI status register must be checked to see which of the two interrupting sources has occurred.
- ! The MC68HC912B32 has a serial port that supports the SAE J1850 protocol.