

IrDA Board C & Assembly Strategy

Introduction

This document will suggest basic strategies for creating 'C' and Assembly code for the IrDA E-Block. Because this E-Block can be used with a variety of upstream boards (e.g. PICmicro multi-programmer board), this document will not provide all of the information required. See the "further reading" section for more complete reference information.

This E-Block can be used in 3 different ways:

- 1) As a IrDA secondary device (e.g. for communicating with a Palm handheld device)
- 2) To implement the physical layer of IrDA for peer-to-peer communications
- 3) For direct Infrared transmission and reception

The first way involves using a MCP2150 device to implement a large part of the IrDA protocol. The MCP2150 handles most of the complexities of the IrDA protocol. To use this device, you need to have an IrDA device capable of acting as a "primary device" - e.g. a PC laptop or Palm handheld. The primary device must initiate communication, and once this has happened, the upstream device can communicate with the primary device using its UART.

Peer-to-peer communications can be achieved by using the MCP2120 device on this E-Block. In this mode, data comes from an upstream device via its UART into the MCP2120. This chip then converts the data byte into Infrared signals which are (hopefully) received by a MCP2120 on another IrDA E-Block which then communicates the data byte to another upstream device.

The third way is to implement direct Infrared communication, e.g. for mimicking a television remote controller.

Implementing a strategy

The following strategy is specific for a PICmicro microcontroller, but should be adaptable to any upstream device. It will rely on a PICmicro's internal UART module and will not implement any flow control.

Remember that the correct jumper setting on the patch system of the E-Block must be selected so that the "tx" and "rx" lines are connected to the correct TX and RX lines on the PICmicro.

MCP2150 initialisation

The following things need to be initialised to use the UART appropriately:

- 1) The BAUD rate must be configured appropriately
- 2) The USART needs to be enabled, including the transmit and receive sections
- 3) The CTS and RTS lines need to be set appropriately.
- 4) Optionally, the PICmicro can be configured to interrupt on successful transmission or reception

The E-block itself needs to be set up appropriately. The MCP2150 device needs to be enabled and its BAUD rate needs to be set to that used by the upstream device's UART. Also, don't forget to use appropriate patch settings.

MCP2150 communication

Once a primary IrDA device has initiated communication, the "CD" LED will come on to indicate that communication can commence. Now, data can be transmitted between the primary device (e.g. Palm) and the upstream device (e.g. PICmicro) using the upstream device's UART.

The "RS232 Board C & Assembly Strategy" document covers this in more detail.

MCP2120 initialisation

This is similar to the initialisation required for the MCP2150 device above, except that hardware flow control is not available (and so the CTS and RTS pins are not used). Note also that the E-Block board jumper settings for the MCP2120 BAUD rates are not necessarily the same as those for the MCP2150.

MCP2120 communication

Basically, the MCP2120 device converts data on the TX line of an upstream device's UART into IrDA data that can be received by a similar MCP2120 device and converted to data that is presented to another upstream device's UART. More simply, data can be exchanged between 2 UARTs via Infrared by connecting the UARTs to 2 MCP2120 devices.

Again, more information can be found in the "RS232 Board C & Assembly Strategy" document.

Direct Infrared communication

By disabling both the MCP2120 and MCP2150 devices and connecting TXIR and RXIR to the patch system, direct Infrared communication can be attempted. The specifics of Infrared communication are beyond the scope of this document.

Further reading

There is a vast amount of information regarding Infrared and IrDA available which should be the first port of call for anyone interested in implementing these data communication protocols. The datasheets for Microchip's MCP2120 and MCP2150 devices are also important reference documents.

Also see the "RS232 Board C & Assembly Strategy" document, which covers the basics of RS232 communication.