TB049

Connecting The MCP2150 To The Palm™ Operating System

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INTRODUCTION

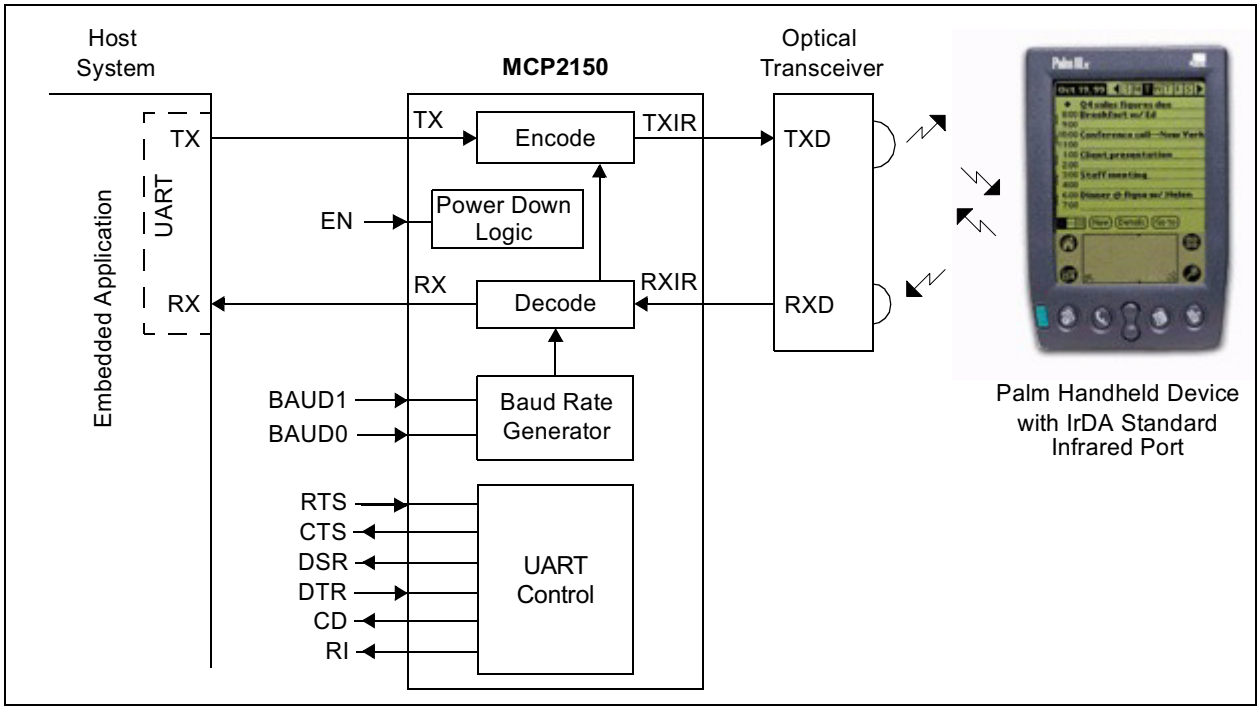
This technical brief demonstrates the operation of the MCP2150 with the Palm Operating System (OS). The MCP2150 is a protocol handler supporting IrDA® standards plus an encoder/decoder. This allows the MCP2150 to be used as a "Virtual Connector", a wireless link between an embedded application and an IrDA standard host. This host can be a handheld device using the Palm OS®. Personal Digital Assistants (PDA) devices are an excellent host platform for use with the MCP2150 because of the light weight, low cost, ease of use, and portability of these devices. Figure 1 shows typical implementation of the MCP2150 in an embedded system.

Note: Full IrDA standard support was introduced with Palm OS, version 3.5. IR communication was possible starting with Palm OS, version 3.0, but these earlier versions required the developer to accomplish opening, maintaining, and closing the link manually.

Palm handheld devices are made by Palm Computing, Handspring, Sony, and some cell phone manufacturers are integrating the Palm OS into their high end phones. Some devices have color screens, others have monochrome LCD displays. One common feature of all these models is that they all have an IrDA standard port.

This demonstration will use the MCP2150 Developer's Board. Optionally, the MCP2120 Developer's Board may be used. The MCP2120 is a simple encoder/decoder. The IrDA standard protocol handler would need to be implemented in the host system, such as a personal computer (PC) with IrDA standard drivers installed. These boards are available in the MCP2120/MCP2150 Developer's Kit (DV163008).

FIGURE 1: SYSTEM BLOCK DIAGRAM



IrDA is a registered trademark of the Infrared Data Association.

SETUP OF A PALM HANDHELD DEVICE

Palm handheld devices do not include a terminal client. Third party terminal clients are available for download. One such terminal client is called the Embedded Companion Suite, available from Palm-communications. This handy utility can be downloaded from **www.palm-communications.com**. Other terminal clients are available, but this product has been used by the author. See the Vendor Links section at the end of this document for more information.

Many Palm terminal clients support binary file transfers using Kermit, Xmodem, Xmodem 1K, Ymodem, Ymodem-G, and Zmodem. These file transfer protocols build packets, just like the IrDA standard specifies. The packet sizes are usually larger than the packet size used by the MCP2150. This difference in packet size creates delays as the host and the MCP2150 reconcile what has to be sent and when. Also, the file transfer protocols will send a packet and expect a response sooner than the minimum IrDA standard turnaround time. This will cause the file transfer protocol to abort. For example, Zmodem will require a response to a packet considerably faster than the minimum IrDA standard turnaround time. Zmodem will therefore immediately abort if you attempt to use it. The use of file transfer protocols is not recommended with the virtual serial link provided by the MCP2150. These protocols are not needed because the packets already have CRC-16 protection. If your embedded application does require handling a data packet, care should be taken to align the IrComm packet boundaries with your data packet boundary to maximize throughput.

THE EMBEDDED COMPANION

Palm handheld devices have a number of good attributes for portable data applications. These devices are small, light, relatively inexpensive, and there are a large number in the field. One of the obstacles to using a Palm handheld device for embedded applications is the Palm development environment is foreign to many embedded hardware developers. What is needed for Palm handheld devices are applications that allow embedded system designers to handle portable content with a minimum of development. This need has been filled by Palm-communications.com.

Palm-communications has developed a Palm OS compatible “Conduit” to move data from a Personal Computer (PC) to an embedded application using the MCP2150. This application is called the Embedded Companion Series (ECS). Figure 2 shows a diagram of how this product is used.

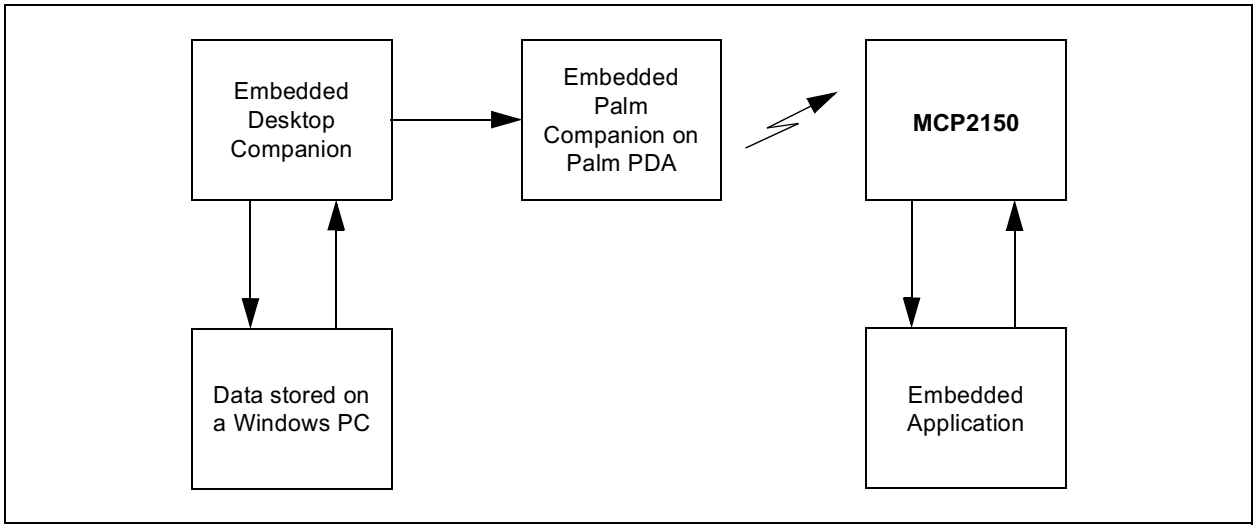
There are two fundamental components to the Embedded Companion series:

1. The Desktop Companion.
2. The Palm Companion.

The Desktop Companion creates a Palm OS compliant conduit through which files may be easily moved between PCs and Palm handheld devices. This application is used to maintain a database of local content. This content can then easily be moved to the Palm handheld device using an IrDA standard infrared link.

Note:	Many desktop PCs do not have an infrared port to communicate to a Palm handheld device. The MCP2120 Developer’s Board can be used to add an IrDA standard infrared port to a desktop PC. The Palm synchronization cradle can also be used to move the content stored on the PC to the Palm handheld device.

FIGURE 2: USING THE EMBEDDED COMPANION BLOCK DIAGRAM



Palm-communications provides their tools in both application and library form. The libraries are available in both Windows and Palm OS and give developers the option of adding MCP2150 communication functionality to their own applications. Popular tools such as Visual Basic®, Visual C++®, and CodeWarrior for Palm OS can use the Companion Series with very little programming and no Palm computing experience.

The content which has been moved to the Palm is completely portable. This content may be carried and used very easily at any time. The Palm Companion is used to move the content to the embedded application, through the MCP2150. The Palm Companion has three main functions. These are:

1. Local content management:
   a) Display file details including filenames, sizes, creations dates, etc.
   b) Download files from the Palm to an embedded host via the MCP2150.
   c) Delete local content from Palm.

Note 1: Embedded Companion, Version 1.0, establishes a Conduit for moving content from a PC to a Palm handheld device, then to an embedded application via the MCP2150.

2: Embedded Companion, Version 1.0, does not establish a conduit for moving data back to a PC, such as for data collection applications. This feature is planned for future versions of the Embedded Companion. Please contact Palm-communications for more information.

2. General Options, configuration of the infrared link, test of the link, etc.
3. TTY terminal applet
   This terminal applet is used to provide a simple user interface to the Palm which is generated by the embedded application.

All these functions of the Palm Companion are in the form of a Palm OS shared library, making these functions available for custom Palm applications.

SETUP OF MCP2150 DEVELOPER'S BOARD

To set up an IrDA standard wireless link to the MCP2150, make sure the MCP2150 Developer's Board is powered. Then open your terminal client on the Palm handheld device. The indicator on the MCP2150 Developer's Board will light when a valid infrared connection is available.

If IR data is sent to the MCP2150 and the embedded application prevents the MCP2150 from sending its data to the host controller, then the link will be shut down by the MCP2150. This is due to the limited available buffer space. Make sure that the Host device is able to receive data (i.e.: CTS/RTS signals in appropriate states) when the infrared communication begins.

REFERENCES

Microchip Documents

Reference documents may be obtained by contacting your nearest Microchip sales office (listed in the back of this document) or by downloading via the Microchip website (**www.microchip.com**).

- MCP2150 Data Sheet, DS21655
- AN758, "*Using the MCP2150 to Add IrDA Standard Wireless Connectivity*", DS00758
- MCP2120/MCP2150 Developer's Kit User Guide, DS51246

IrDA Information References

The IrDA Standards download page can be found at:

http://www.irda.org/standards/specifications

The Embedded Companion Suite (ECS), Desktop Companion, and Palm Companion can be found at:

http://www.palm-communications.com

Optical Transceiver Manufacturers

Manufacturers of common optical transceivers are shown in Table 1.

TABLE 1: COMMON OPTICAL TRANSCEIVER MANUFACTURERS

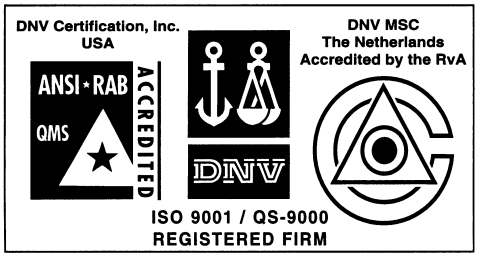
Company	Company Web Site Address
Infineon	www.infineon.com
Agilent	www.agilent.com
Vishay/Temic	www.vishay.com
Rohm	www.rohm.com

SUMMARY

The MCP2150 is an easy to use, low cost link between embedded systems and any portable device equipped with an IrDA standard communications port and the Palm OS. Third party tools and materials are available to help the developer add IrDA standard wireless connectivity with a minimum lead time and learning curve.

NOTES:

Trademarks



Microchip received QS-9000 quality system certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona in July 1999. The Company's quality system processes and procedures are QS-9000 compliant for its PICmicro® 8-bit MCUs, KEELOQ® code hopping devices, Serial EEPROMs and microperipheral products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001 certified.

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