Harris Semiconductor

APPNOTE

Harris Wireless Products

Wireless LAN Evaluation Kit SW Installation and Usage

Authors: Mike Paljug and Eric Turner (Squires Engineering)

™ Introduction

This Application Note describes the driver and application software necessary to demonstrate the 802.11 network capabilities of the PC Card WLAN Evaluation Kit cards. These cards are based on the Harris PRISM™ Chip Set and the AMD Am79C930 Media Access Controller. Ad hoc network connectivity is provided via alpha 802.11 firmware and an alpha NDIS3 driver. In addition, Windows® 95 application software is provided for evaluating the performance of the physical layer in terms of Packet Error Rate (PER). *At this time, the alpha firmware and driver are only able to support 1 Mbit/second operation. Updates will be provided (as they become available) via the Harris Semiconductor World Wide Web page at http://www.harris.com.*

Wireless LAN Connectivity

Installation

Before installing the adapter it is strongly recommended that you update the BIOS for your PC. The new BIOS should ease the task of resource management for Windows95 and maximize your chances of having a clean installation. First, determine the PC's current BIOS revision. The BIOS revision number is usually displayed during system start-up or in the CMOS Setup. Consult your PC documentation for more information on determining the BIOS revision. Once the current BIOS revision number is known, scan the PC Manufacturer's Website or call the PC Manufacturer in order to determine the most recent BIOS revision for your PC model. If the Manufacturer has a newer revision, download/order it and follow the Manufacturer's instructions for loading it onto your system.

Initial installation of the hardware and software is described in Chapter 2 of the "PC Card Wireless LAN User Guide [1]." During initial installation, Windows95 will attempt to automatically assign the hardware resources required by the adapter (i.e., IRQ, I/O, etc.). Windows95's Resource Manager usually assigns resources appropriately. However, the task is complicated by the absence of a Plug 'n Play BIOS, lack of a PCI bus, and/or the presence of legacy hardware. Error messages encountered during installation should be taken seriously. Consult Microsoft™ Windows95 Resource Kit, call Microsoft Technical Support, or visit the Microsoft Website at http://www.microsoft.com.

If there are no error or warning messages during installation, you may verify that the card is operating properly by viewing the adapter setup in System Manager. Open Control Panel and then double-click the System icon. This opens up the System Manager. Select the Device Manager index tab. One of the listed items should be Network adapters. If Windows95 thinks there's a problem with the adapter, the adapter will be listed under Network adapters and there will be a yellow exclamation visible next to it. Whether there is a yellow exclamation visible or not, you may view Windows95's resource allocation for the adapter by double clicking its listing. (If the adapter listing isn't visible, double-click the Network adapters listing to toggle between expanding and collapsing the Network adapters list.) *If you choose to change the settings for the assigned resources then you do so at your own risk. Harris does not assume any liability for hardware or software malfunction.*

If a problem exists as evidenced by the yellow exclamation or by an inability to connect or sporadic behavior in Windows95 (machine locks-up during normal operation, screen displays errant behavior, etc.) then you might be experiencing a problem with Windows95 resource management. The minimal testing that has been performed suggests that certain platforms are at less risk than others for these types of problems. *Since the software and firmware are in alpha form, Harris Semiconductor is unable to support resource management problems at this time.* However, the solution to the majority of problems that have been experienced to date involve changing the Input/Output Range setting. Usually changing this setting to 0200-020F is successful. To do this open Control Panel and double click the System icon. Select the Device Manager tab and then double click the 'Network adapters' listing. Now double click the 'AMD...' adapter listing. Select the 'Resources' tab and highlight Input/Output Range setting. Uncheck the box titled "Use automatic settings" and then select "Change Setting..."

Another rare problem involves the configuration accepted by Windows95's Resource Manager. Two configurations are possible, but in this alpha release both do not work equally well. Configuration 0000 is preferred. To view which configuration has been selected by resource management, open Control Panel and select the System icon. Select the Device Manager tab and then select 'Network Adapters'. Select the 'AMD...' adapter listing and select the 'Resources' tab. The configuration is shown in this window. You may select it by

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clicking the arrow next to the configuration listing box. If you have to change this make certain that the memory range is usable. It should range somewhere between C0000h and FFFFFh. If it doesn't, you must find an area in this range that does not conflict with any other device. Take the steps outlined in the paragraph above only change the memory setting instead of the Input/Output setting.

Usage

After installing the hardware and software as outlined in the User Guide, verify your Windows95 Network setup via the Network icon in Control Panel. Be sure to configure each computer with a unique Computer Name but identical Workgroup. Also, be sure that a client is configured with at least the TCP/IP protocol and that File Sharing is selected. After installation, my setup included the Microsoft Network client with the IPX/SPX, NetBEUI, and TCP/IP protocols and File Sharing.

Once installed and configured properly, the PCs should be visible to each other. Since all networks need time to establish a link database, it is suggested that you wait about 1 minute after entering Windows95 so that the network has time to synchronize. After waiting for this period, double click on Network Neighborhood. You should be able to see the other computer. If the other computer is not visible, try refreshing the view (F5) in Network Neighborhood a few times on both computers.

Now that the other computer is visible, you must share its resources in order to access its hard drive. This is accomplished by entering Explorer, highlighting the drives, folders, or files that you wish to share and right clicking. This will bring up a context menu with a "Sharing..." option. Click the sharing option and make the appropriate selections to give restricted or unrestricted access. The other machine is now able to "see" these shared items and access them according to your wishes.

Wireless LAN Evaluation Software

Introduction

The Wireless LAN Evaluation Software provides the capability to evaluate the performance of the Physical Layer of the radio in terms of PER and Throughput.

There are two modes: Packet Broadcast and TCP Stream Point-to-Point. The latter mode will gauge throughput under normal full 802.11 protocol conditions. Packet Broadcast mode is used to evaluate PER performance. This mode configures a transmit node and one or more receive nodes to perform PER measurements. The receive nodes can be placed at various distances and areas relative to the transmitter. In addition, these receivers can be subjected to various sources of interference. An experiment with multiple receivers will provide data to compare radio PER performance of the various topologies and with different sources of interference.

It should be noted that current revisions of the firmware and driver do not implement MAC management features and thus attempt transfers at a 1 MBPS rate only without *dynamic fragmentation. Furthermore, the current driver defaults to a maximum packet size of 1000 bytes.*

Installation

Initial installation of the Evaluation software is described in Chapter 2 of the PC Card Wireless LAN User Guide.

Before running the application, you must first verify that the TCP/IP protocol software is installed. To determine this, select "Network" from the "Control Panel". Under the configuration page, the TCP/IP protocol should be present. If it is not present, add it by pressing the "Add" button, selecting "Protocol", selecting "Microsoft" and "TCP/IP".

To configure the TCP/IP protocol, select "Network" from the "Control Panel". Under the configuration page, select the TCP/IP protocol and press the "Properties" button. Under the "IP Address" page, select the "Specify an IP Address" radio button. Enter a valid IP address (we suggest "1.1.1.x," where x = 2 through 200) and a valid subnet mask (we suggest 255.255.255.0). The IP address that you select must not conflict with any other Wireless LAN IP address. The LAN Evaluation software will not establish point-to-point communication if the nodes are not on the same subnet. This requires that the first three fields of the IP address be identical on all Units Under Test (UUTs).

Usage

The Lan Evaluation software allows the user to test performance of the 802.11 Wireless Lan evaluation cards. There are two basic modes of operation and under each mode the user must elect to be a transmitter or a receiver. The user must also select the "Test Port". The default value (1025) is usually appropriate and the transmitter must match the receiver.

The two operational modes are:

Packet Broadcast

Under this mode, the transmitter continuously broadcasts packets with embedded sequence numbers and the receiver automatically synchronizes to the data stream. Missing packets are detected by comparing the embedded sequence number with the expected sequence number. Packet error rate is also continuously calculated and displayed.

Stream Point-to-Point

Under this mode, the receiver must be set up to listen for incoming connections and the transmitter must specify the target address before beginning transmission. Once the connection is established, the transmitter begins transmitting data. When using this mode (which relies on the TCP protocol), data is not separated into packets (hence the name "stream") so a measurement of "Packet Error Rate" is meaningless. Instead, what is displayed is a throughput rate. This mode simulates network traffic such as would be encountered during normal network operations (such as file/printer sharing).

Once you have selected a test mode and a test port, you must be a receiver or a transmitter. This calls up the appropriate window.

Common Characteristics

Both the "Receive Data" and the "Transmit Data" windows have a section at the top which display static information. This information includes the local host name and address, the test mode and test port as selected from the main window, and the remote host address. The remote host address field represents the identity of the remote side of the communication link once it is established. During broadcast transmission, it remains blank since there is no specific destination.

In addition, there is a field which indicates the current state of the communication link. Possible values for this field are:

1. Idle

2. Listening

3. Connecting

4. Sending

5. Receiving

Receive Data Window

Below the common section, the receive data window contains two columns of metrics. The number of metrics displayed depends on whether packet or stream mode was selected. The first column of metrics represent "Current" values and the second column represents the "Cumulative" values. The current values are a snapshot of the metrics over the last two seconds and the cumulative values are the metrics since the start of the test.

The following metrics are displayed (only the first three are displayed for stream mode):

1. Elapsed Time

2. Byte Count

3. Kbit/Second

4. Good Packet Count

5. Bad Packet Count

6. Total Packet Count

7. Packets/Second

8. Packet Error Rate %

To begin receiving data, press the "Start Rx" button. Note that the "Start Rx" button and the "Done" button are disabled and the "Stop Rx" button is enabled. You must press the "Stop Rx" button to terminate the test before you can close the window.

Transmit Data Window

Below the common section, the transmit data window contains an input section. In the input section are two input fields:

1. Remote Address

2. Packet Size

Below the input section, the transmit data window contains two columns of metrics. The number of metrics displayed depends on whether packet or stream mode was selected. The first column of metrics represent "Current" values and the second column represents the "Cumulative" values. The current values are a snapshot of the metrics over the last two seconds and the cumulative values are the metrics since the start of the test.

The following metrics are displayed (only the first three are displayed for stream mode):

1. Elapsed Time

2. Byte Count

3. Kbit/Second

4. Packets/Second

5. Packet Error Rate %

To begin transmitting data, press the "Start Tx" button. Note that the "Start Tx" button and the "Done" button are disabled and the "Stop Tx" button is enabled. You must press the "Stop Tx" button to terminate the test before you can close the window.

Reference

[1] Need reference. See Technical Literature Standards manual, pp 1-87.