Exhibit E............... User's Manual

CableFREE™ Hub

Installation Guide

P/N.: 85-506610-00
Revision A2
October 1998

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i *CableFREE Hub*

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FCC INFORMATION

The Federal Communication Commission Radio Frequency Interference Statement includes the following paragraph:

The equipment has been tested and found to comply with the limits for a Class B Digital Device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction, may cause harmful interference to radio communication. However, there is no grantee that interference will not occur in a particular installation. If this equipment dose cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on , the user is encouraged to try to correct the interference by one or more of the following measures:

--Reorient or relocate the receiving antenna.
--Increase the separation between the equipment and receiver.
--Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--Consult the dealer or an experienced radio/TV technician for help.

Notice:

1. **The Changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**
2. **For complying with all requirements of the FCC rules, the connection of the RJ-45 port shall use a shielded cable.**

Table Of Contents

Packing List

The package should contain the following items:

✓ One CableFREE Hub

✓ Three CableFREE Hub System Manager Diskettes

✓ One CableFREE Hub Firmware diskette

✓ One AC Power Adapter

✓ One Power Cord

✓ This Installation Guide

Introduction

Congratulation on choosing one of NDC's CableFREE products family. CableFREE Hub was one of the first IEEE 802.11 wireless standard compliant products in the industry and was designed with a *"Maximizing the Convenience of Networking"* philosophy in mind. You will find CableFREE products very easy to setup and use.

The User's Guide gives comprehensive instructions on installing and using the CableFREE Hub. The CableFREE Hub provides a transparent bridged connection between a wired network and a wireless network and allows your wireless stations to communicate with devices attached to your wired network. It manages the flow of data packets from the wired LAN to the wireless LAN and vice versa. The CableFREE Hub Management System performs wireless network configuration management and diagnostic functions.

CableFREE Family

The CableFREE Hub is part of a family of easy to use high performance wireless communication products. The family products include:

- CableFREE Hub (NW668)
- CableFREE ISA card
- CableFREE PC card

System Requirements

System requirements to install and operate the CableFREE Hub are:

- An RS-232 null modem cable
- An Ethernet drop (UTP)
- A PC

Cabling

Connecting the CableFREE Hub to an Ethernet network requires a Shielded Twisted-Pair (10Base-T) cable. The CableFREE Hub fits into the network just as any other node would do. An LED will light to indicate the UTP connection and the cable length should follow Ethernet standards in each case.

CableFREE Hub Hardware Setup

Overview

CableFREE Hub Hardware Setup explains how to quickly setup the CableFREE Hub for use via a wired Ethernet connection using the factory default settings. For installation in networks using other than the default settings, i.e. into existing networks, complete the Hardware Setup and refer to CableFREE COMFig Tool section. For networks requiring SNMP management control, complete the Hardware Setup and refer to SNMP Configuration and Management section. To setup a wireless station, refer to the ISA/PC Card User's Guide.
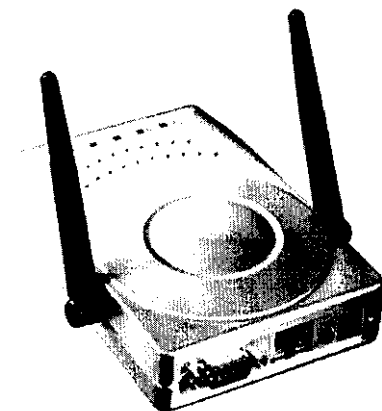
Figure 1. CableFREE Hub

step1. Connect the Ethernet network cable to the UTP port.

step2. Connect the power adapter to the electricity outlet and then to the CableFREE Hub DC-In port

step3. Turn on the CableFREE Hub power switch

The CableFREE Hub is now ready to communicate with the wireless stations using its factory default settings. Refer to the CableFREE ISA/PC Card User's Guide for card setup instructions.

Note: A Reset button is provided on the CableFREE. Pressing the reset button causes the CableFREE Hub to reboot (equivalent to the reset button on a PC).

Software Installation

step1. Insert the first CableFREE Hub setup disk into drive A:

step2. From the *Start* menu select *Run*, and type
A:\CableFREE\SETUP.EXE

step3. Click the *OK* button to start the setup program. Setup will prepare the InstallShield Wizard and then show the CableFREE Hub setup screen

step4. Choosing *Custom* opens another screen with the option to install only selected parts of the management program. To install the full program, choose *Typical*. Click the *Next* button to advance to the *Choose Destination Location* screen

step5. From the *Choose Destination Location* dialog box accept the program files default location, C:\Program Files\CableFREE Hub\, or click *Browse* to choose another location. Then click *Next*. The setup program will copy the necessary files into the specified directory. The setup program will ask you to insert the diskettes as required. File copying progress will be displayed in the setup screen. You can stop the process anytime by clicking *Cancel*

step6. After the program files have been copied, click *Start/ Programs/CableFREE*

If you selected a full installation, you should find the CableFREE Hub COMFig program, the CableFREE Hub Management System Program, and the Trap Server program.

- *The CableFREE Hub COMFig Tool.* A simple Windows 95/NT-based CableFREE configuration tool working through a direct COM port connection to the CableFREE Hub. The CableFREE COMFig tool is intended for simple first time configuration of CableFREE Hub parameters, or to be used as a last resort to communicate with a CableFREE Hub

- **CableFREE Management System.** The CableFREE NMS is a Windows 95/NT, SNMP based management tool for users to configure and monitor CableFREE Hubs through an Ethernet, wireless, or PPP connection. The CableFREE NMS management tool is intended for performing full blown wireless network configuration and management

- **Trap Server.** The Trap Server program allows you to manage and view Trap information, and to switch monitoring ON and OFF. Trap configuration cannot be set from the Trap Server program.

Uninstalling

Should you wish to uninstall a CableFREE program from a Windows environment, click *Start/ Programs/CableFREE*. The CableFREE programs menu will be shown.

Click *Uninstall CableFREE Hub*. A confirmation box will ask if you are sure you wish to remove the program. Click *Yes* to uninstall the program.

CableFREE COMFig Tool

Overview

The CableFREE COMFig tool is a Windows 95/NT based utility that is used via a COM port connection between the CableFREE Hub and a PC.

It provides the following functions:

- Sets necessary CableFREE Hub parameters (e.g., IP address, Domain name, etc.)

- Diagnoses the CableFREE Hub hardware and shows the diagnostic results

- Updates the CableFREE Hub firmware

- Manages the CableFREE NMS Host table

Click ***Start/Programs/CableFREE/CableFREE COMFig Tool*** to start the program. The program opens with the CableFREE COMFig Tool *Connect* screen

step1. Connect the null modem cable to the serial port on the CableFREE Hub and connect the other end to a serial port on the PC

step2. Select the COM port

step3. Power on the CableFREE Hub and CableFREE COMFig will connect with the CableFREE Hub automatically

Using the CableFREE COMFig Tool

CableFREE COMFig Password

Click on the *Password* tab to open the *Password* screen. Here you can set a password if so desired. Setting a password prevents unauthorized changes to the CableFREE Hub configuration settings.

Note: The password will be shared with the CableFREE NMS program.

CableFREE COMFig Service

Click on the *Service* tab to open the *Service* screen. The *Service* screen provides access to the basic management features

Click the *View and Modify AP Configuration* button. The *Configuration* screen will open.

General

Clicking on the *General* tab opens the *General* card. Here you may:

Add an alias name for the CableFREE Hub	Assign the CableFREE Hub a unique name
Change the Domain Name (Extended Service Set ID)	This is more commonly called the Domain Name but is defined in the 802.11 Wireless Standard as ESSID. Stations and CableFREE Hubs in the same group must use the same Domain Name
CableFREE Hub Firmware Version	Read-only
MAC Address	Read-only

After making any changes, click the *Apply* button to make the changes effective immediately, without closing the dialog box, or click *OK* to

accept the changes and close the box. Clicking **Add to CableFREE NMS Host Table** will add the information to the host table referred to by the CableFREE NMS program.

IP:

Click the *IP* tab to open the *IP* card. All CableFREE Hubs are delivered with a default IP of 203.70.128.63 and a default subnet mask of 255.255.255.0. If you wish to change the defaults, set each CableFREE Hub to its new IP address before introducing it to the open network.

From the IP tab you may view or modify the CableFREE Hub's TCP/IP address, configure its subnet mask, or add a default gateway (see the note below).

Note: The stations transfer data via the CableFREE Hub within the same LAN (the same subnet mask). If the data is destined for a station in another LAN then the station needs to go through a router. The default gateway is the path to that router.

After making any changes, click the **Apply** button to make the changes effective immediately, without closing the dialog box, or click **OK** to accept the changes and close the box. Clicking **Add to CableFREE NMS Host Table** will add the information to the host table referred to by the CableFREE NMS program.

Filter:

The next tab on the dialog box is *Filter* (Error! Reference source not found.). This is a one-way protocol filtering mechanism that prevents the CableFREE Hub from transmitting certain protocols from the Wired Ethernet LAN into the Wireless zone. If you do not require particular protocols on the wireless part of your network you can save bandwidth by enabling the protocol filter.

From the *Filter* tab, some, all, or none of the protocols listed may be selected for filtering out:

- IP protocol

- IPX protocol

- NetBEUI protocol

- AppleTalk protocol

- Other protocols

After selecting a protocol for filtering, click the *Apply* button to make the changes effective immediately, without closing the dialog box, or click *OK* to accept the changes and close the box. Clicking *Add to CableFREE NMS Host Table* will add the information to the host table referred to by the CableFREE NMS program.

Access Control:

Access Control is the next tab on the box. The CableFREE Hub's access control is managed by a control table on the CableFREE Hub.

The first time this box is opened the table will be empty. This means that there are no restrictions on who can access and reconfigure the CableFREE Hub and any user may modify the CableFREE Hub's operation. This is like going on vacation and leaving your front door open. To avoid chaos on the network, access to the CableFREE Hub configuration should be restricted to only those for whom it is absolutely necessary.

First click *Add* to open the *New Entry* dialog box. Enter your IP address and then set your own access rights to Read/Write (see the note on the following page). Two levels of access are available. To set access rights, enter a station's IP address and community string (the community string must be the same as the CableFREE Hub's in the Host Table) and choose Read or Read/Write.

Note: Do not set all the stations in the Access Control table to Read-only. Once this is set and enabled, it will be difficult to modify the CableFREE Hub.

Read   Read-only rights. The user may read everything except the Access Control settings, but cannot alter anything

Read/Write   The user may read and alter all settings

When all the settings are made, click **OK** to return to the *Access Control* card.

On the Access Control card click the **Apply** button to make the changes effective immediately, without closing the dialog box, or click **OK** to accept the changes and close the box. Clicking **Add to CableFREE NMS Host Table** will add the information to the host table referred to by the CableFREE NMS program.

Perform CableFREE Hub Self Diagnostic Test

On the Service card, click Perform CableFREE Hub Self Diagnostic Test. The Hardware Diagnosis screen will open.

Click **Start** and the tests will commence. As each item is tested a yellow arrow will appear alongside it. If the test is successful, the arrow will change to a green tick. You can click **Cancel** at any time to stop the tests. When the tests have completed the *Cancel* button changes to a *Close* button. Click **Close** to return to the *Service* card.

Update CableFREE Hub Firmware

The CableFREE Hub's embedded software is burned into the flash ROM. However, an updated CableFREE Hub code can be installed through a COM port via the CableFREE COMFig program. Click on *Update CableFREE Hub Firmware*. The *Update CableFREE Hub Firmware* dialog box will open.

Use the *Browse* button to choose the file to be uploaded to the CableFREE Hub, or type the file location and name in the *File Name* field.

The *Update* button will then become enabled. Click *Update* to start loading the file to the CableFREE Hub. The CableFREE COMFig tool will upload the new executable into the CableFREE Hub's flash memory area.

The flash memory area consists of two memory banks. The updated file is loaded into the one containing the oldest firmware version, leaving the current firmware still available in case the update fails. If the update does fail, a message will appear on your screen and the CableFREE Hub will boot from the most recent functional version.

When the file transfer is complete, click *Close* to close the window.

Manage CableFREE NMS Host Table

Click the *Manage CableFREE NMS Host Table* button to open the *CableFREE NMS Table* dialog box.

From here you can view/delete all host tables. Click the *Details* button to change from a normal to a detailed view. After making any changes click *OK* to return to the *Service* card.

SNMP Configuration and Management

Overview

SNMP Configuration and Management explains how to setup the CableFREE Hub for use in networks requiring more management control. It also describes the various ways in which the System Administrator can connect to the CableFREE Hub in order to manage it.

The CableFREE NMS is a Windows 95/NT, SNMP based management tool for users to configure and monitor CableFREE Hubs through an Ethernet, wireless, or PPP connection. The CableFREE NMS management tool is intended for performing full blown wireless network configuration and management.

When Do I Need the CableFREE NMS Program?
Users need the CableFREE NMS program when they need to:

- Install multiple CableFREE Hubs in the network and segment them in different domains
- Monitor wireless traffic
- Analyze network performance or detect problems
- Check the number of wireless Stations that are served by a particular CableFREE Hub

What Does the CableFREE NMS Program do?
The CableFREE CableFREE NMS management tool enables users to:

- Give a CableFREE Hub an Alias name
- Change a CableFREE Hub's IP address or set a subnet mask and community string
- Set a default gateway should a router exist in the network
- Set protocol filters to filter out unwanted traffic from the wired to wireless side
- Set wireless specific parameters--
  Domain name: Name to define a wireless Cell/Subnet

Aging timer: Time span for an inactive wireless Station's address to be kept in a CableFREE Hub's table
Data Rate: 1M, or 1M/2M

- Set the management access permission to configure or monitor the CableFREE Hubs through the *Access Control* menu item. This protection prevents unauthorized access to the CableFREE Hub's configuration parameters
- Monitor and Diagnose network problems
- View the number of wireless Stations that are connected to a particular CableFREE Hub
- View the wireless or Ethernet traffic statistics of a CableFREE Hub
- Save or load a specific CableFREE Hub's configuration parameters to/from a file
- Set a password for the CableFREE NMS program

How Do I Configure a CableFREE Hub Using the CableFREE NMS tool?

There are three methods of configuring a CableFREE:

1. Through an Ethernet network
2. Through a wireless Station
3. Locally, through a null modem cable, using the PPP protocol

The following sections describe how to setup and use the CableFREE NMS.

SNMP Configuration Requirements

In order to setup a CableFREE Management System terminal, you need the following:

- A PC running Windows 95/NT
  and
- The CableFREE NMS program (and the Trap Server program if trap monitoring is required)
  and
- An Ethernet card and a UTP Ethernet connection
  or

- A Wireless adapter
  or
- A Null modem cable

You need to complete the following steps to install the CableFREE NMS tool to the PC:

step1. Assign an IP address to the PC and bind the TCP/IP protocol to the CableFREE adapter
Note: Step 1 is not required if the PC already has TCP/IP setup on the network

step2. Install the CableFREE NMS package to the PC

step3. Click *Start/Programs/CableFREE/Management System* and you are ready to go

step4. Power on and configure the CableFREE Hubs in sequence in the first time setup of a multiple CableFREE Hub environment

Network Management Connection to the CableFREE Hub

To manage the wireless LAN with the CableFREE Hub Network Management tool, we strongly recommend the System Administrator makes a CableFREE NMS connection to the CableFREE Hub through a wired Ethernet connection.

The other options are a wireless connection from a wireless station (see the CableFREE ISA/PC Card User's Guide) or through a Point-to-Point Protocol (PPP) connection, via the serial port, using a null modem cable.

Making an Ethernet Connection

Choose a PC on the Ethernet LAN to which the CableFREE Hub is connected and carry out the following procedure: