

Chapter 8 *Spectrum24[®] RF Communications*

Introduction

Spectrum24 is Symbol Technologies' wireless LAN (Local Area Network). It provides high-level performance, featuring high throughput, expandable capacity, and superior immunity to interference, all of which enhance its use for mobile communications and real-time data access applications.

This network interface adapter allows wireless stations (e.g., suitably equipped PPT 41XX hand-held computers or other mobile units) to communicate among themselves in an ad hoc network or to join a network via wireless Access Points (APs) connected to a wired distribution system (e.g., a wired Ethernet LAN). See Figure 8 -1.

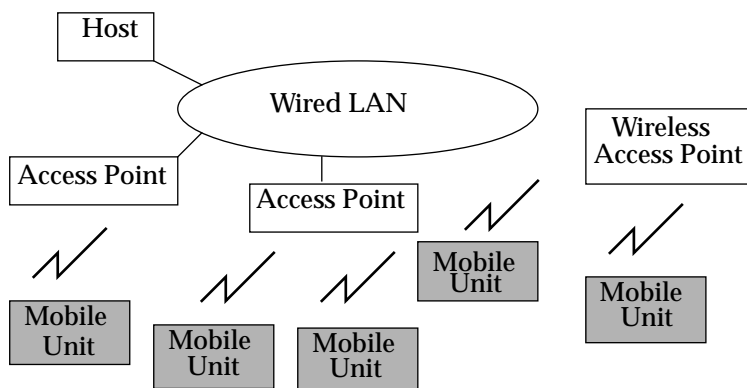


Figure 8-1. A Typical Spectrum24 Network Architecture

The mobile units have access via the APs to a host computer or to host computers, and can roam from AP to AP within the same subnet (e.g., all APs with the same Net ID on the same router). The host computers support one or more applications and may provide network management functions.

Symbol's Spectrum Access Point (AP) is an Ethernet device that provides transparent access between Ethernet-wired networks and radio-equipped mobile units (e.g., PPT 41XX terminals). The AP allows an associated MU (mobile unit) to roam freely through a facility while maintaining a continuous, seamless connection to the wired network. An MU communicating with an AP appears on the network as a peer to other network devices. The AP receives data from its wired or wireless interfaces and forwards the data to the appropriate interface.

Like other Ethernet devices, Spectrum24 devices have unique, hardware-encoded MAC (Media Access Control) addresses. These MAC addresses determine which network devices data packets are sent to or received from. A MAC address is a six-byte (48-bit) number separated into six hexadecimal fields by colons, for example:

00:A2:D6:F0:12:45

A PPT 41XX terminal is RF-communications capable when equipped with a Spectrum24 adapter card and an appropriate Spectrum24 adapter TSR or device driver program is loaded. The Spectrum24 Adapter is a Type II PC card that conforms to release 2.01 of the PCMCIA specification. It provides cordless connectivity between a mobile unit (MU) and other devices on a wireless network via an Access Point.

Symbol's adapter driver supports ODI (Open Data-link Interface) in PPT 4140 terminals, providing certain standard network services (Send Message, Receive Message, Control, Status, etc.) to higher level protocol layers. The adapter driver provides additional services (requests) that constitute an "extended" API (application programming interface) and are accessible via a "C" callable routine that enables an application program to access the adapter while the associated driver is loaded.

Features

Spectrum24 is a frequency-hopping spread-spectrum cellular network operating between 2400 and 2500 MHz (2.4 - 2.5 GHz). In contrast to narrow band systems, which communicate signals on a single frequency, spread spectrum technology spreads the radio signal over a set of frequencies. Stations in a cell using frequency-hopping spread spectrum change their communications frequencies at regular intervals determined by government regulations, causing the average signal strength on any given frequency to be relatively low. The system is also resilient to interference because of the short time it spends on any given frequency. Even constant interference on a particular frequency affects the radio for only a relatively short time.

Other Spectrum24 features include:

- bridging architecture to provide communications between multiple radio or wired network segments
- a 1.0 Mbps data rate
- seamless “roaming” for MUs like PPT 41XX terminals
- low power consumption for battery-powered devices

Spectrum24/PPT 41XX Interface Architecture

Figure 8-2 depicts the layered design of the RF communications application interface between a Spectrum24 network and a PPT 41XX equipped with the Spectrum24 PC card and antenna and the associated software.

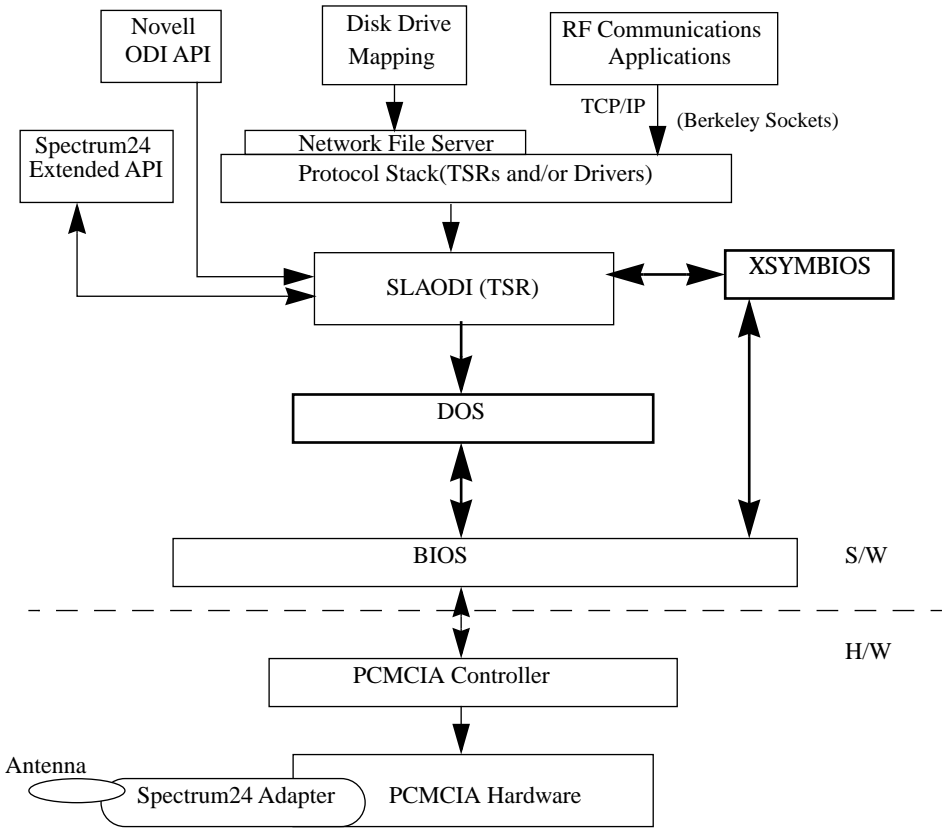


Figure 8-2. Spectrum24/PPT 41XX Application Interface

ODI (Open Data-link Interface) is Novell's standard interface for providing both media-independent and protocol-independent communications between client and server in a network. ODI-compliant drivers (TSRs) like SLAODI.COM translate network information or requests sent by other ODI-compatible protocols such as Novell LAN WorkPlace TCP/IP. Typically, the AUTOEXEC.BAT file loads SLAODI.COM on a PPT 41XX terminal as a TSR program. It uses the installation configuration parameters that are specified in a NET.CFG file.

Symbol supplies this device driver in the Spectrum24 NDK. Refer to the documentation in the Spectrum24 NDK for guidelines and to the *PPT 41XX Product Reference Guide* in the PPT 41XX SDK for installation procedures.

SLAODI provides compatibility to the communications API defined in Novell's ODI specification. See relevant Novell publications and commercially available reference manuals for information on these APIs.

Network Developer's Kit (NDK)

PPT 41XX terminals equipped with the Spectrum24 adapter card and antenna provide a Network Developer's Kit (NDK) to aid system software programmers writing RF communications applications for these terminals.

The Spectrum24 NDK includes terminal network drivers, ODI installation diskettes, the *Spectrum24 Network Terminal Technical Reference Guide*, and the *Novell LAN WorkPlace for DOS Socket Library API Reference Guide*.

This NDK is packaged as part of the SDK for appropriately-equipped PPT 41XX hand-held computers. Refer to the NDK for more detailed information on Spectrum24 and on the resources that are available for writing network-related applications for the PPT 41XX.

Related Publications

The following is a list of documents which provide more information on the Spectrum24 network and the tools and utilities available for writing RF-communications applications for PPT 41XX terminals.

Documents Provided by Symbol Technologies

The following document is included in the PPT 4100/4110/4140 Software Developer's Kit (SDK):

- *PPT 41XX Product Reference Guide*, p/n 70-11997-xx

The following documents are included in the Spectrum24 Network Developer's Kit (NDK):

- *Spectrum24 Network Terminal Technical Reference Guide*, p/n 70-20193-01
- *Novell LAN WorkPlace for DOS Socket Library API Reference Guide*, p/n 70-20288-01

External Documents and Publications:

- *Internetworking, A Guide to Network Communications*, Mark A. Miller, 1991, M&T Books, MIS Press, Henry Holt and Company, New York
- *net.speak, the internet dictionary*, Tom Fahey, 1994, Hayden Books, a Division of Macmillan Computer Publishing, Indianapolis, IN.
- *Network Protocol Handbook*, Matthew Naugle, 1994, McGraw-Hill, Inc., New York
- *Troubleshooting TCP/IP, Second Edition*, Mark A. Miller, 1996, M&T Books, MIS Press, Henry Holt and Company, New York
- *Wireless Local Area Networks*, Peter T. Davis and Craig R. McGuffin, 1994, McGraw-Hill, Inc., New York