



Laptop sold separately through Heathkit Company, Inc.

Wireless Networking

EBS-241



The world is going wireless. The number of wireless hotspots is growing by leaps and bounds. Why switch to wireless?

Wireless breaks the final tether: The Network Cable. Laptops are now being introduced with wireless capabilities built-in. This course will not only teach the fundamentals of wireless networking such as the differences between 802.11B and 802.11G IEEE wireless standards, but will also cover topics like security precautions, and instructions to install and configure wireless access points. Heathkit has developed this course to allow up to 3 wireless LANs to be operating in one classroom.

System Components (EBS-241)

- ▶ Textbooks (2)
- ▶ Parts Pack
- ▶ Workbooks (2)
- ▶ Instructor's Guide*

*EB-241-50 (Instructor's Guide) sold one per purchase order.

Required Equipment

- ▶ Two Desktop Computers with Windows XP Operating System*
- ▶ One Laptop Computer*
- ▶ Common Bench Tools
- ▶ Various Parts (see Workbook for information)

*Available through Heathkit Company, Inc.

Optional Support Material

Instructor Support Module (ISM)
EB-241-90

- ▶ Material Required for Lecture
- ▶ Material Required for Each Lab Station
- ▶ Material Covered (Required Support Material and Associated Reading Assignment)
- ▶ Course Objectives
- ▶ 23 Presentations (PowerPoint .ppt and .html versions)
- ▶ Lab Session

Classroom Hours

45 hours

Prerequisites

EZS-801A PC Systems Servicing
EZS-811A PC Systems Troubleshooting



Wireless Networking

Hands-On Experiments

Module 1 - Wireless Networking Basics and the Ad-Hoc Network

- ▶ Preparing for Wireless
- ▶ The Wireless PCI Network Adapter
- ▶ The Wireless PC Card
- ▶ Exploring Wireless Network Connection Properties
- ▶ The Ad-Hoc Network - Part 1
- ▶ The Ad-Hoc Network - Part 2
- ▶ The Ad-Hoc Network - Part 3

Module 2 - Exploring IEEE - 802.11B

- ▶ Working with Decibels - Part 1
- ▶ Working with Decibels - Part 2
- ▶ Simulating a Wired LAN
- ▶ The Infrastructure Mode - Part 1
- ▶ The Infrastructure Mode - Part 2
- ▶ The Infrastructure Mode - Part 3
- ▶ Can You Hear Me Now?
- ▶ Wireless Security

Module 3 - Exploring IEEE - 802.11G

- ▶ IEEE - 802.11G - Part 1
- ▶ IEEE - 802.11G - Part 2
- ▶ IEEE - 802.11G - Part 3
- ▶ The Extended Service Set (ESS)
- ▶ Troubleshooting the Wireless LAN
- ▶ Roaming the Wireless LAN
- ▶ IEEE - 802.11G - Part 4
- ▶ The Wireless Bridge

Course Objectives

General

- ▶ Explain the advantages and disadvantages of wireless LANs versus traditional wired LANs
- ▶ List a number of applications where wireless LANs are routinely used to advantage
- ▶ Given a networking scenario, determine if wireless or traditional wired technology is more appropriate.
- ▶ Define and explain the following concepts:
 - BSS
 - ESS
 - IBSS
 - SSID
 - Roaming
 - CSMA/CD versus CSMA/CA
 - Ad-hoc Mode
 - Infrastructure Mode
- ▶ Explain the niches in which the wireless LAN is most appropriate
- ▶ Define ISM band and identify those frequency bands used by wireless LAN technology

Course Objectives

General (continued)

- ▶ Explain the difference between a WLAN and a personal area network (PAN) and identify the technologies associated with each
- ▶ Identify the various names associated with the most common wireless LAN technologies
- ▶ Explain the hidden-node and the near-far problem and explain how the wireless LAN copes with these problems

Antennas

- ▶ Define the terms and concepts as they relate to antennas
- ▶ Define and work with the following as they apply to wireless LANs:
 - Decibels (dB)
 - dBm
 - dB_i
 - Power
 - Watts
 - Milliwatts
- ▶ Solve Decibel power gain and power loss problems
- ▶ Identify the cables and connectors most often used by wireless LAN equipment
- ▶ Describe the proper methods for selecting and installing wireless LAN antennas
- ▶ Explain the purpose of devices often associated with antennas including:
 - Amplifiers
 - Attenuators
 - Lightning arrestors
 - RF splitters
- ▶ Explain how environment conditions and weather can affect propagation characteristics

Modulation Technique

- ▶ Identify, compare and contrast frequency hopping spread spectrum (FHSS) and direct sequence spread spectrum (DSSS)
- ▶ Explain the principles of frequency hopping spread spectrum (FHSS)
- ▶ Explain the principles of direct sequence spread spectrum (DSSS)
- ▶ Explain the principles of orthogonal frequency division multiplexing (OFDM)
- ▶ Identify the modulation technique or techniques employed

Hardware Installation and Configuration

- ▶ Install and configure a wireless NIC in a desktop PC

Course Objectives

Hardware Installation and Configuration (continued)

- ▶ Install and configure a wireless PC Card in a laptop PC
- ▶ Install and configure a wireless access point (AP)
- ▶ Setup two or more computers to operate in the Ad-hoc mode
- ▶ Setup computers to operate in the Infrastructure mode
- ▶ Configure two access points to act as a bridge between two networks
- ▶ Demonstrate the proper method of installing external antennas
- ▶ Demonstrate the interoperability characteristics of 802.11B and 802.11G; Explain why a single "B" device can slow an entire "G" wireless network
- ▶ Configure an Extended Service Set (ESS) wireless LAN
- ▶ Explain how 802.11G devices coexist with 802.11B devices and explain the consequences of using both in a single wireless LAN

Troubleshooting Wireless LAN Problems

- ▶ Identify and correct common wireless LAN configuration problems
- ▶ Identify and correct common wireless LAN hardware problems
- ▶ Identify and correct wireless LAN antenna propagation problems

Wireless LAN Security

- ▶ Explain why the wireless LAN is particularly vulnerable to intrusion
- ▶ Identify several different methods of protecting the wireless LAN
- ▶ Compare and contrast security precautions

Wireless Standards

- ▶ List the basic characteristics of IEEE wireless standards
- ▶ List the basic characteristics of the Bluetooth and HomeRF wireless LAN standards
- ▶ Identify organizations related to the wireless industry and explain their roles

Support Materials and Consumables

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| EB-241 | Textbook |
| EB-241-30 | Parts Pack |
| EB-241-40 | Workbook |
| EB-241-50 | Instructor's Guide |