

Secure Wireless Home Networks

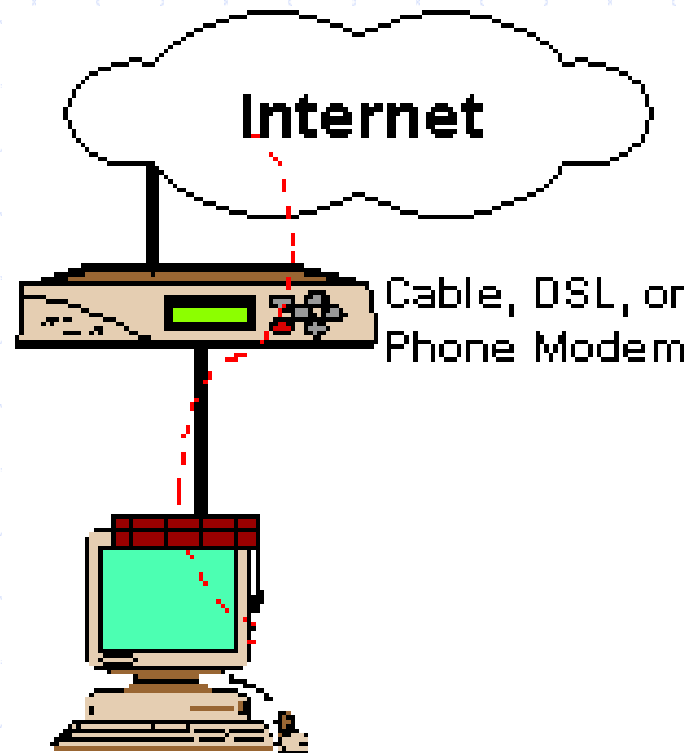
Area 2 SIR

Presentation

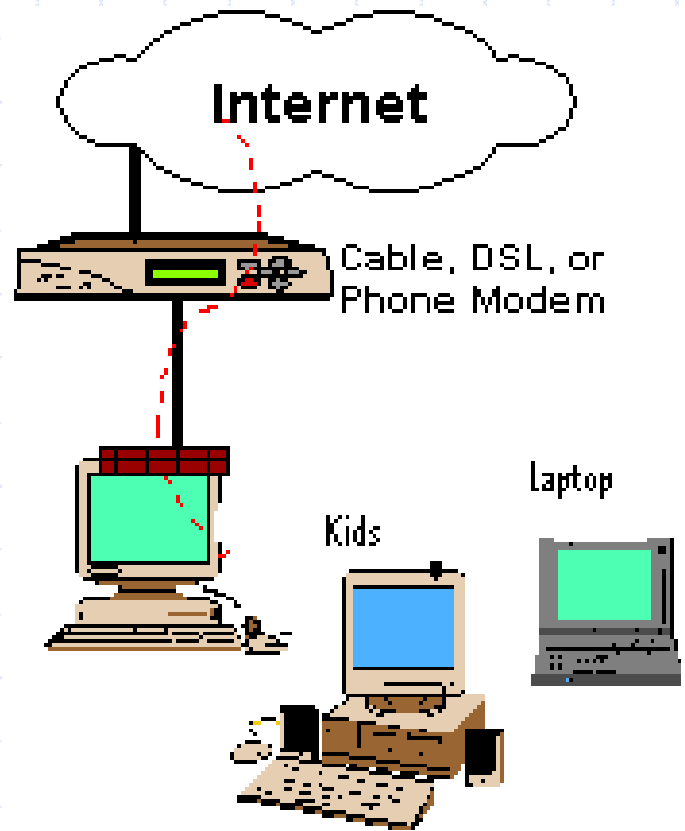
Nov. 18, 2004

Dean Steichen Br. 8

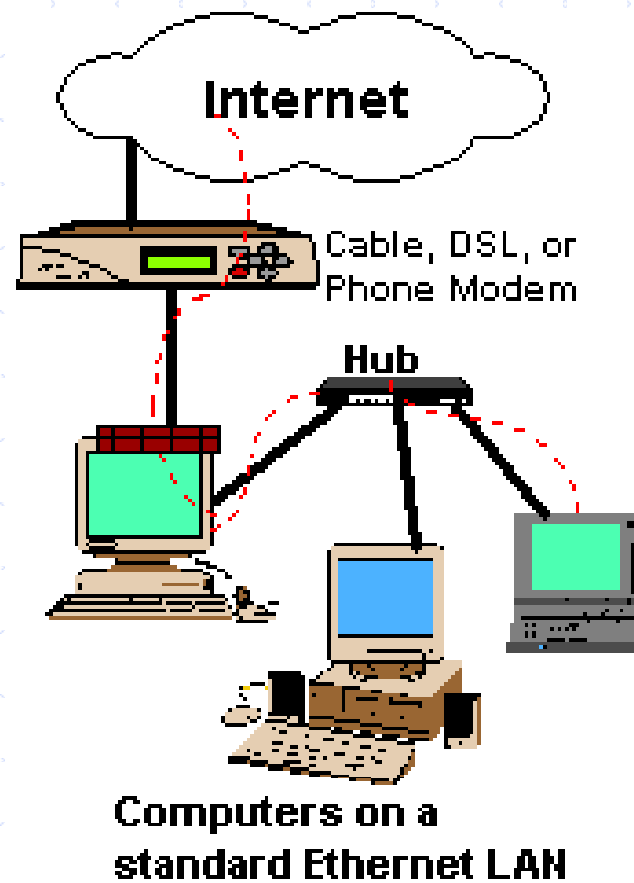
Typical Home Computer Setup



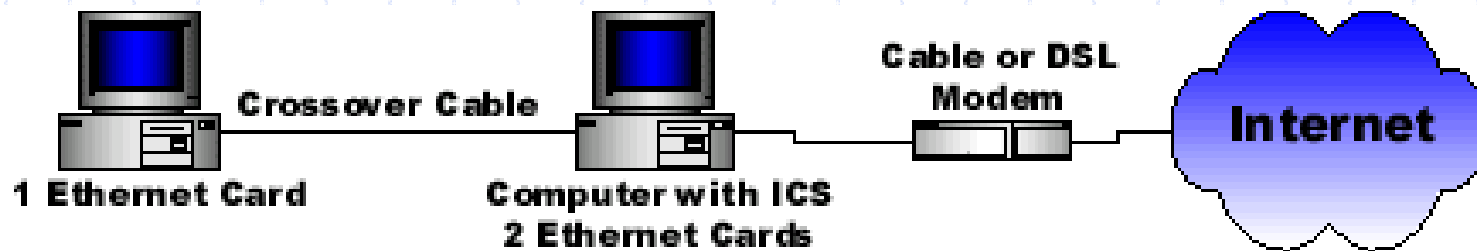
And Now - Two or more PC's



One way to connect them



Another Way to Connect



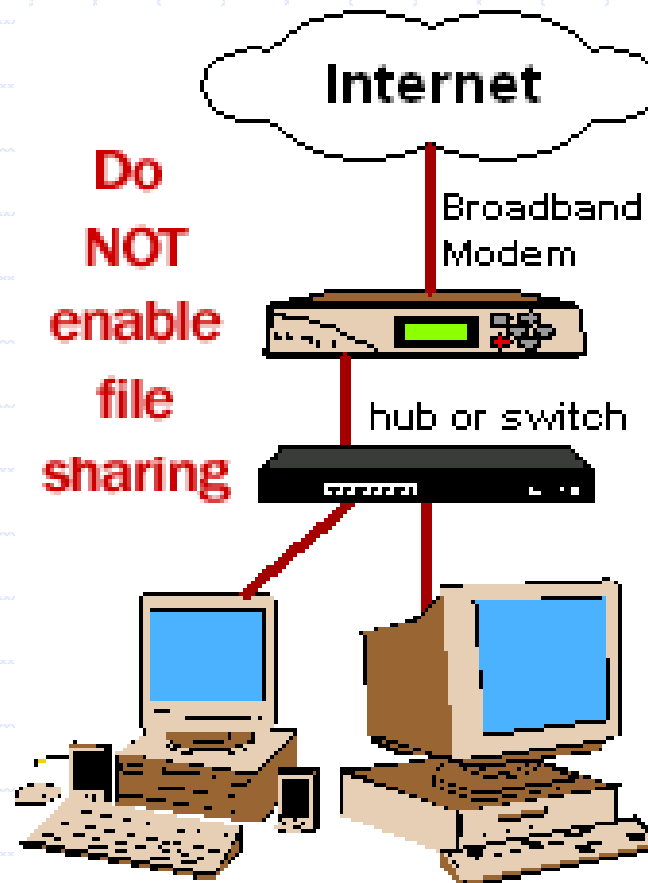
Internet Connection Sharing (ICS)

Yet another way to network

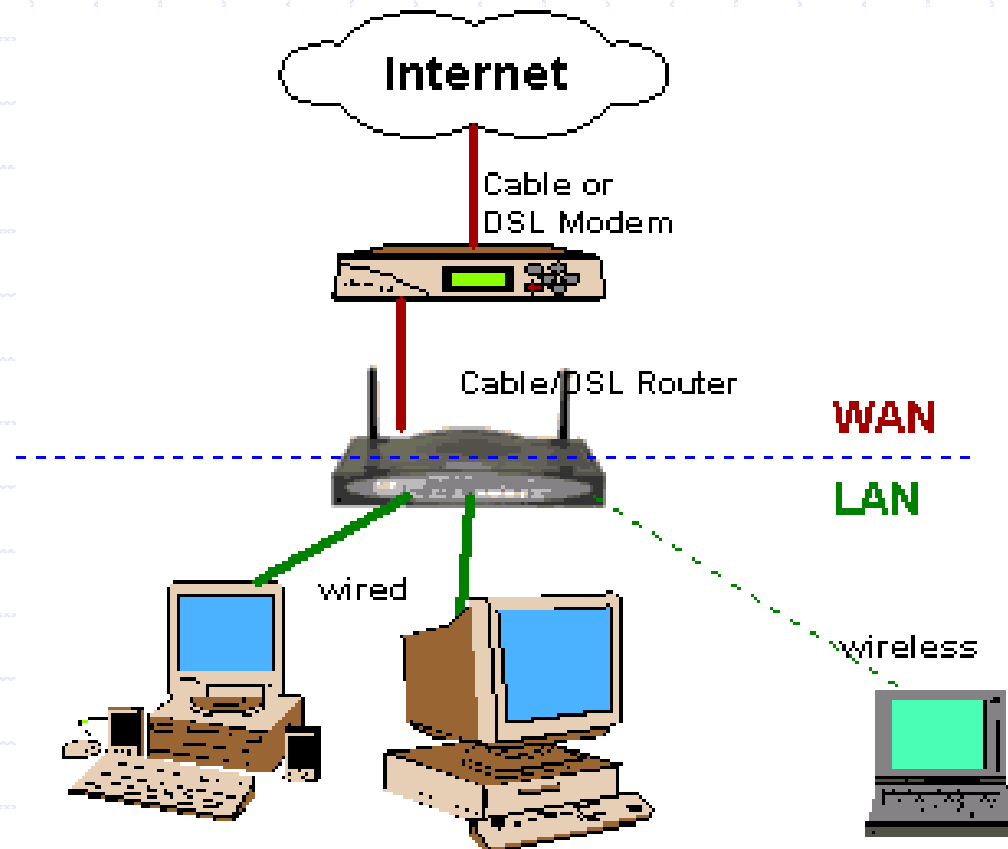
Why???



**Do
NOT
enable
file
sharing**



My Recommended Home Network Layout



Benefits of a Home Network

- ◆ Share Internet Access (2 or more PC's)
- ◆ Share devices (printers, webcams, scanners, CD & DVD drives, etc.)
- ◆ Share or exchange files and data storage
- ◆ Backup other computer's data
- ◆ Others

Typical Home Networks

◆ Wired (Ethernet)

- Two or More PC's
- Mixed PC Types (Mac, IBM, etc.) and Op Systems

◆ Wireless

- One or more computers
- Mixed PC Types and Op Systems

◆ Combination of Wired and Wireless

- One or more computers
- Mixed PC types and Op Systems

Essentials for Internet Access Sharing

- ◆ If you use my Recommended Layout and a Cable Modem, it should work “out of the box”. If you use a DSL Modem, you will have to program your Router with your account ID and Password so it can “login”
- ◆ The default settings provide you with Network Address Translation (NAT), DHCP, and usually implement minimal input or output filtering

Network Address Translation

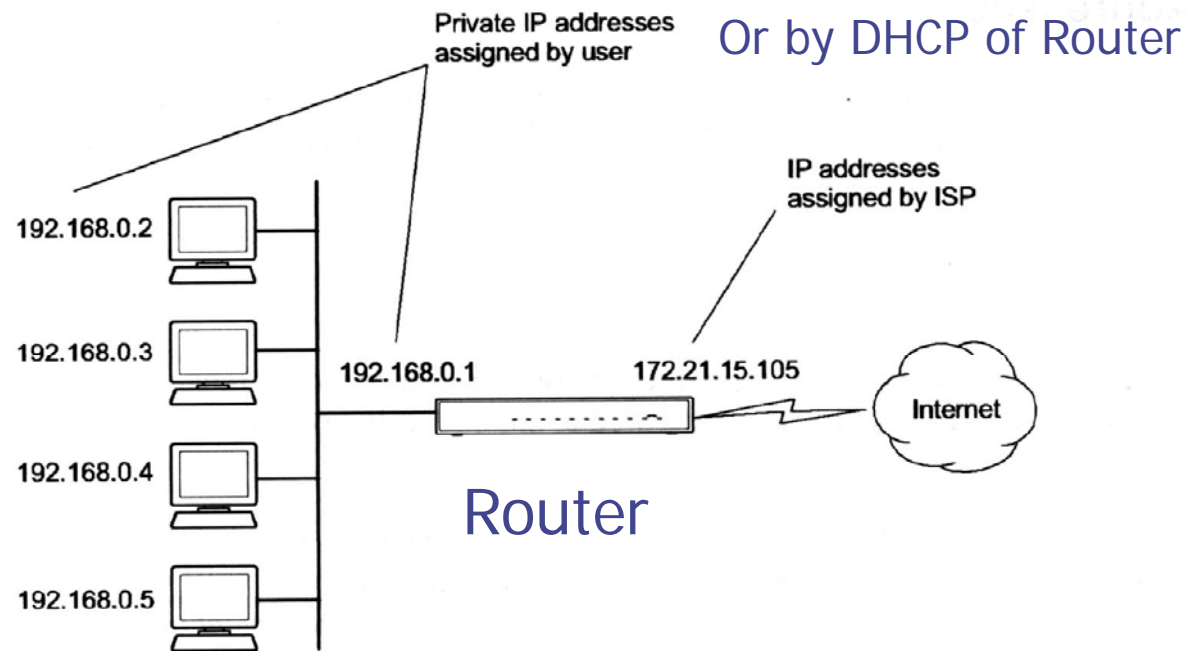


©2000 How Stuff Works

Share one Internet Address with several Local PC's

Typical Home Network NAT

The following figure illustrates a single IP address operation.



7786EA

Figure B-3. Single IP Address Operation Using NAT

Dynamic Host Configuration Protocol (DHCP)

- ◆ DHCP enables the residential gateway, 4-port Router or ICS to assign IP addresses to client computers automatically.
- ◆ By default, when a 4-port Router or ICS is installed, the DHCP service begins supplying addresses to computers on the network.

Essentials for Home Network

- ◆ Each computer must have a **unique name**
- ◆ Each computer must use the **same Workgroup name**
- ◆ Files and/or directories (folders) to be shared must be setup to be shared on the computer which hosts the file..each WIN xx does it a little differently
- ◆ Devices to be shared must be setup to be shared on the computer which hosts the device (e.g. printer)

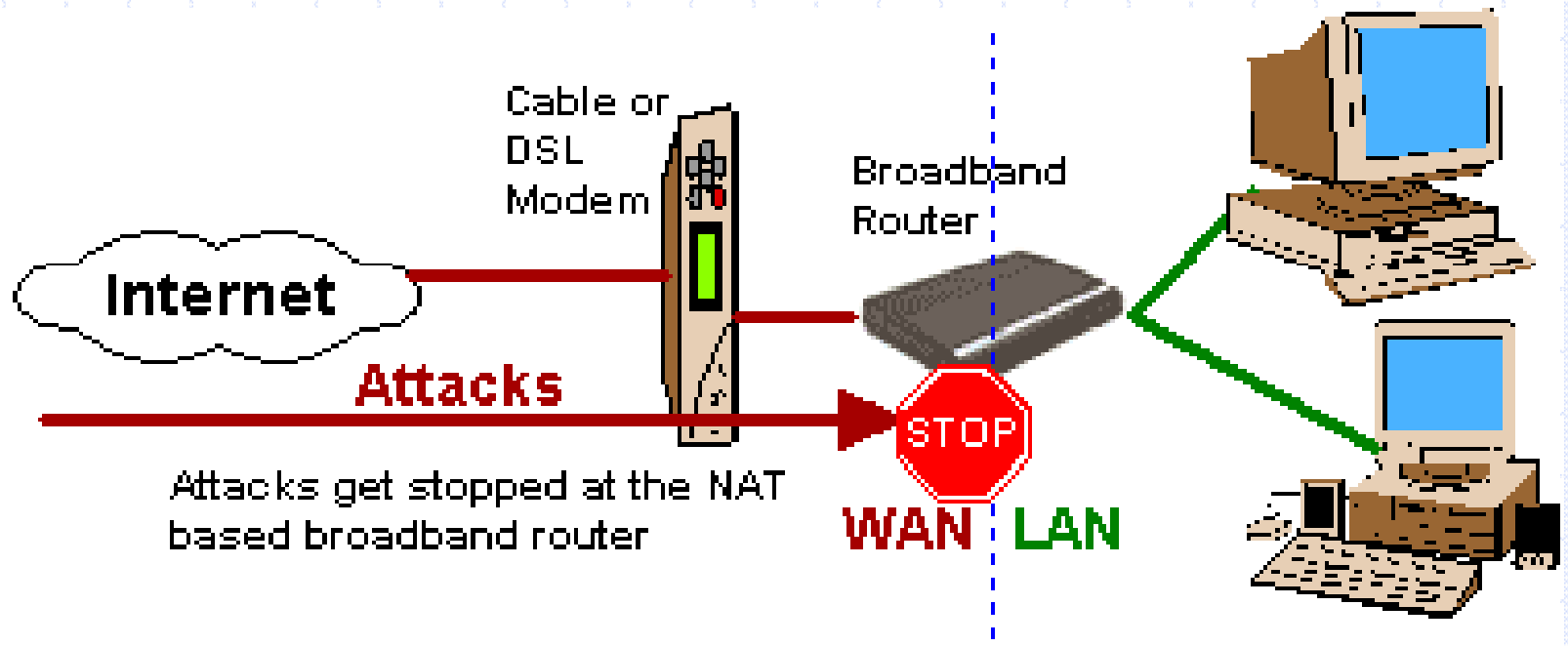
File and Print Sharing Setup

- ◆ WIN XP use "Network Setup Wizard"
- ◆ WIN 2000, and others ???
- ◆ WIN 98se use "Settings, Control Panel, Network, [Configuration, Identification and Access Control]"

Accessing Your Other Computer's Files & Devices

- ◆ WIN XP “Start, My Network Places, and select a file, directory, etc.”
- ◆ WIN 98se “Network Neighborhood, select Computer name and select shared files and directories”

Recommended Wired Home Network Security



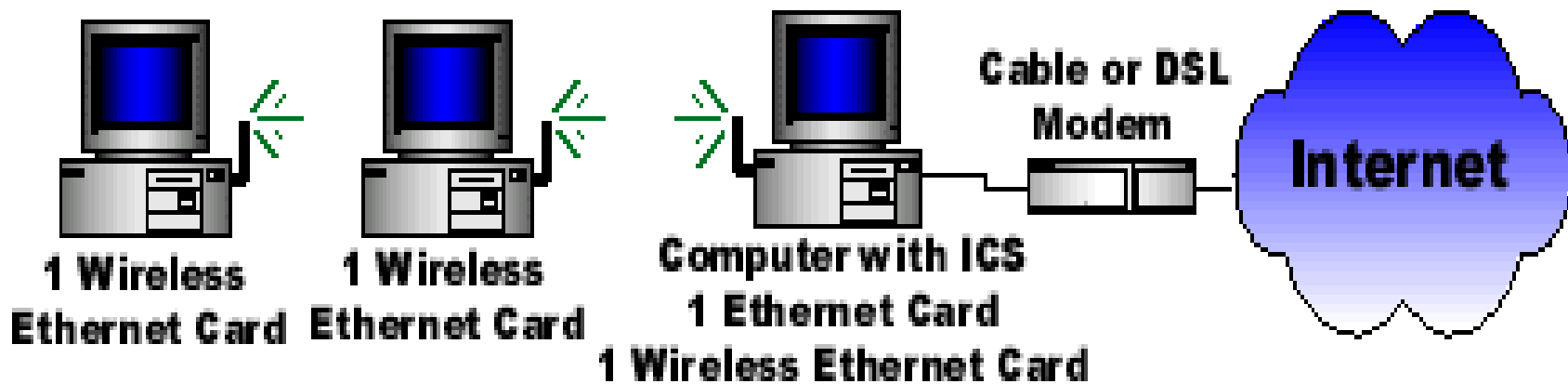
Why Wireless?

- ◆ Convenience
 - no wires to run to PC's, Easy to install
- ◆ Flexibility
 - full PC mobility throughout house & Laptops
- ◆ Cost (2 PC's)
 - Under \$50 for 802.11B (11Mb/sec)
 - Under \$100 for 802.11G (54 Mb/sec)
- ◆ Security
 - Adequate if configured correctly (change SSID, Use WEP and now WPA)

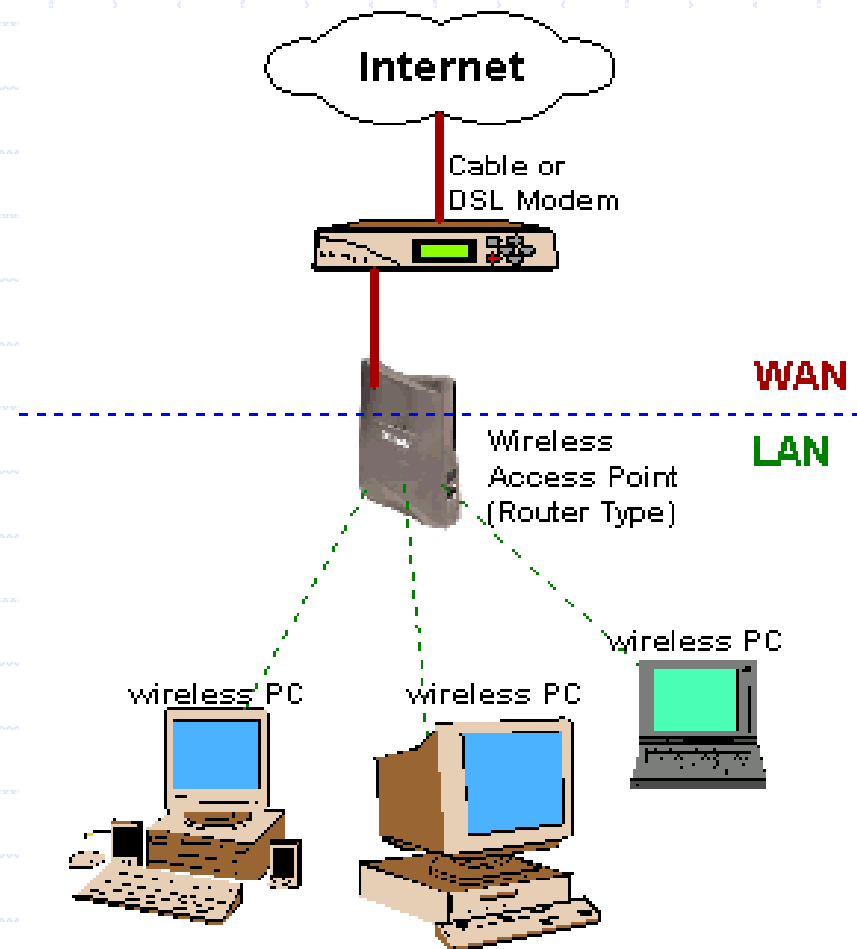
Wireless Requirements (Minimum)

- ◆ Broadband Network Service (Cable / DSL)
 - Cable/DSL Modem
- ◆ Wireless Network Adaptor for each remote PC/laptop
- ◆ Wireless Access Point
(usually USB connection for administration)
OR WIN XP with ICS

Minimum Wireless Setup



Typical Wireless Home Network



Common Types of Wireless

- ◆ 802-11A
- ◆ 802-11B (11Mbps - Most common)
- ◆ 802-11G (54Mbps - backwards compatible to B)
- ◆ 802-11 SuperG and variants
- ◆ Others
 - Bluetooth

Network Speeds

Approx Real Transfer Times:

Common Name	Used With	Time to Transfer 1 Megabyte	Time to transfer 50 Megabytes
28.8Kbps	Modems	6-12 Min	4.8-9.6 Hrs
56.6Kbps	Modems	3-6 Min	2.4-4.8 Hrs
128Kbps	ISDN	1-3 Min	1-2.1 hrs
460Kbps	Some Cable Modems	22-43 Sec	18-36 Min
1Mbps	HomePNA 1.0**, Some Cable Modes	10-20 Sec	8-16 Min
1.6Mbps	HomeRF**	6-13 Sec	5-10 Min
10Mbps	Ethernet, HomePNA 2.0**	1-2 Sec	50-100 Sec
100Mbps	Fast Ethernet	1 Sec	5-10 Sec*

How fast is it (real world)?

A full strength 802.11b signal will get you about 3.5-4.5 Mbps without WEP enabled. With WEP enabled, expect 2.5-3.5 Mbps. As you put walls and distance between your wireless adapter and your access point, your speed will drop. Don't expect to put more than a few walls between you and your access point.

Recommended Wireless Configuration

◆ 4 Port Wireless Router 802.11G

(Combination of Wireless Access Point and 4 Port Router for Wired Connections)

Provides Firewall Protections -- Address Translation (NAT), DHCP, VPN Pass-through, Content Filtering, Domain Blocking, Scheduling, WEP, and other security features.

Essential Wireless Hardware



© 2004 CNET Networks, Inc.

4-Port Router Front



© 2004 CNET Networks, Inc.

4-Port Router Rear



USB Wireless Adaptor

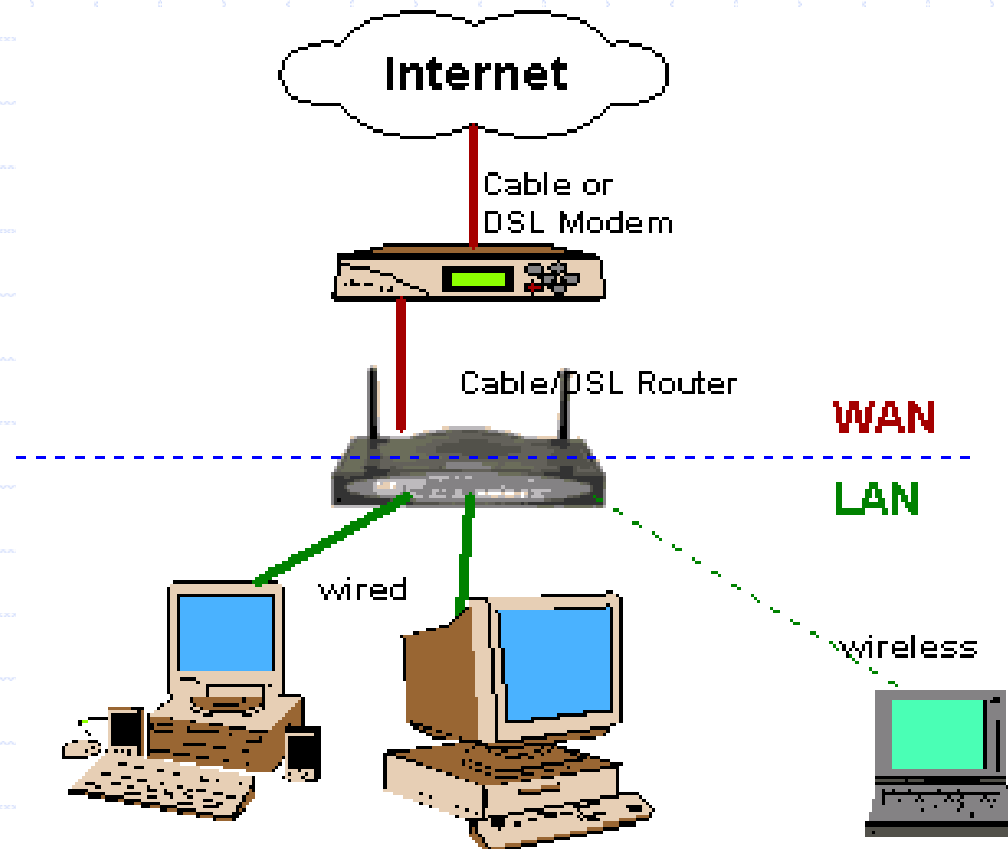


PCI Wireless Card



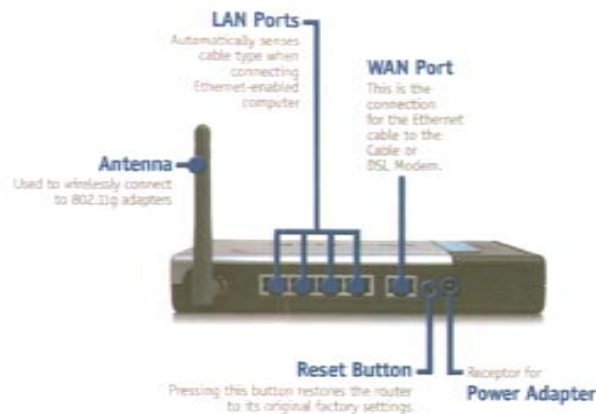
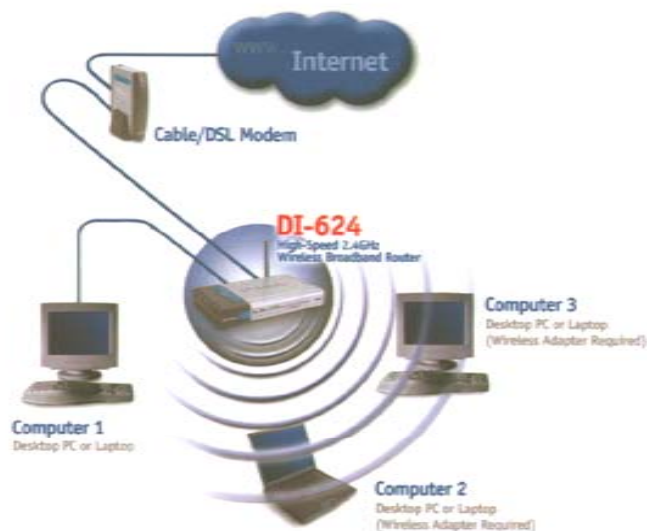
USB Wireless Adaptor

My Recommended Home Network Layout



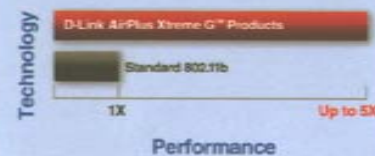
An Example of 4-Port Wireless Router

High-Speed 802.11g Wireless Router
AirPlus Xtreme G™



Advanced Firewall Features

Feature	Available
NAT with VPN Passthrough (Network Access Translation)	✓
MAC Filtering	✓
IP Filtering	✓
URL Filtering	✓
Domain Blocking	✓
Scheduling	✓
Encryption	64/128-bit



D-Link AirPlus Xtreme G™ networks can transfer data up to 54Mbps (Up to 5X faster than standard 802.11b networks). With its advanced firewall and security features, the DI-624 enables users to securely share an Internet connection with wired or wireless computers.

D-Link®
 Building Networks for People

Wireless Security Concerns

- ◆ Broadcast of your data for others to see
- ◆ Provide Internet Service to others in your neighborhood
- ◆ Access to your network and computers by outsiders thru your Wireless Access Point which is behind your Router (Firewall)
- ◆ Other ???

What can be done to Secure your Wireless Home Network

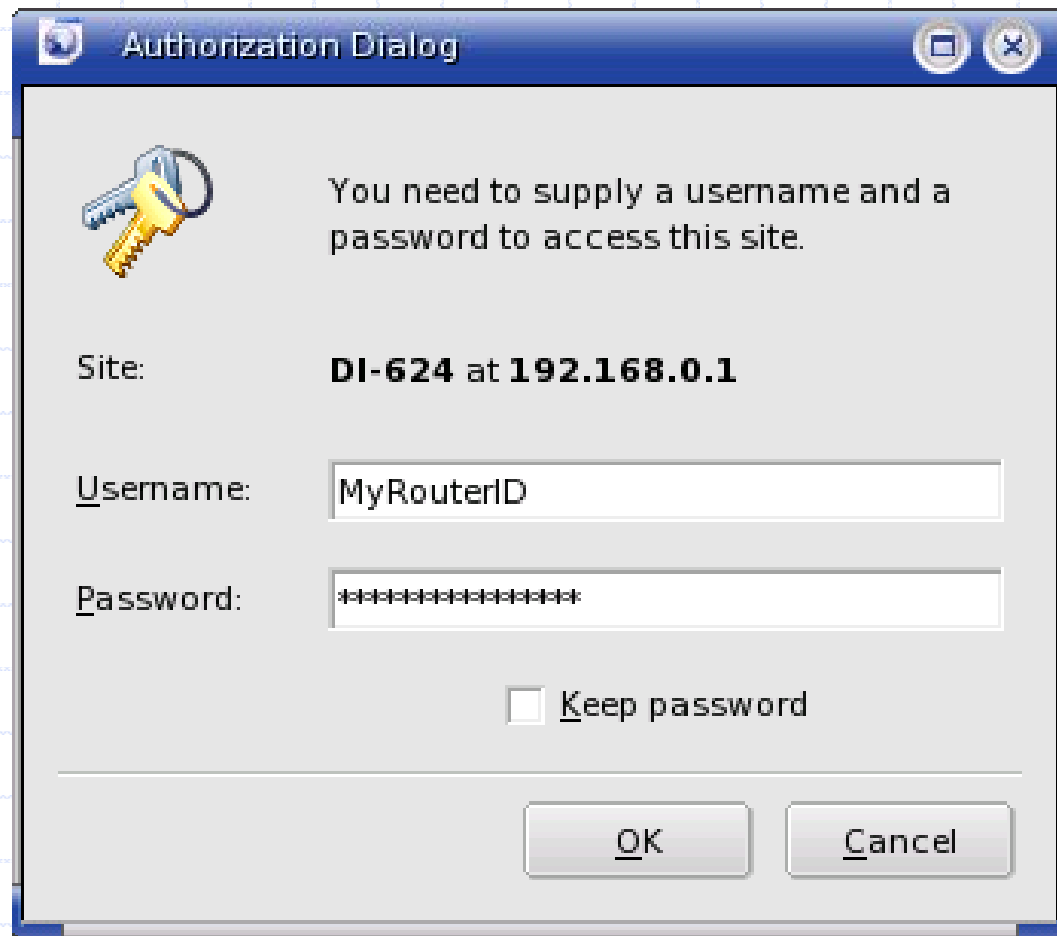
- ◆ Use a Wireless Router instead of just a Wireless Access Point
- ◆ Change the default SSID
- ◆ Disable Broadcast of the SSID
- ◆ Use 128 Bit or higher WEP encryption
- ◆ Use WPA encryption if available

Wireless Router Configuration

◆ READ THE MANUAL


- ◆ Router Usually accessed using your Browser (Internet Explorer, Netscape, etc.)
- ◆ Use address of <http://192.168.0.1> with Browser (usual default addr. for Router)
- ◆ Or "Telnet 192.168.0.1" at a cmd prompt

Sample Router Login



The image shows a Windows-style dialog box titled "Authorization Dialog". It features a key icon on the left and a message: "You need to supply a username and a password to access this site." Below the message, the "Site:" is identified as "DI-624 at 192.168.0.1". There are two input fields: "Username:" containing "MyRouterID" and "Password:" containing ten asterisks. A checkbox labeled "Keep password" is unchecked. At the bottom are "OK" and "Cancel" buttons.

Authorization Dialog

 You need to supply a username and a password to access this site.

Site: **DI-624 at 192.168.0.1**

Username: MyRouterID

Password: *****

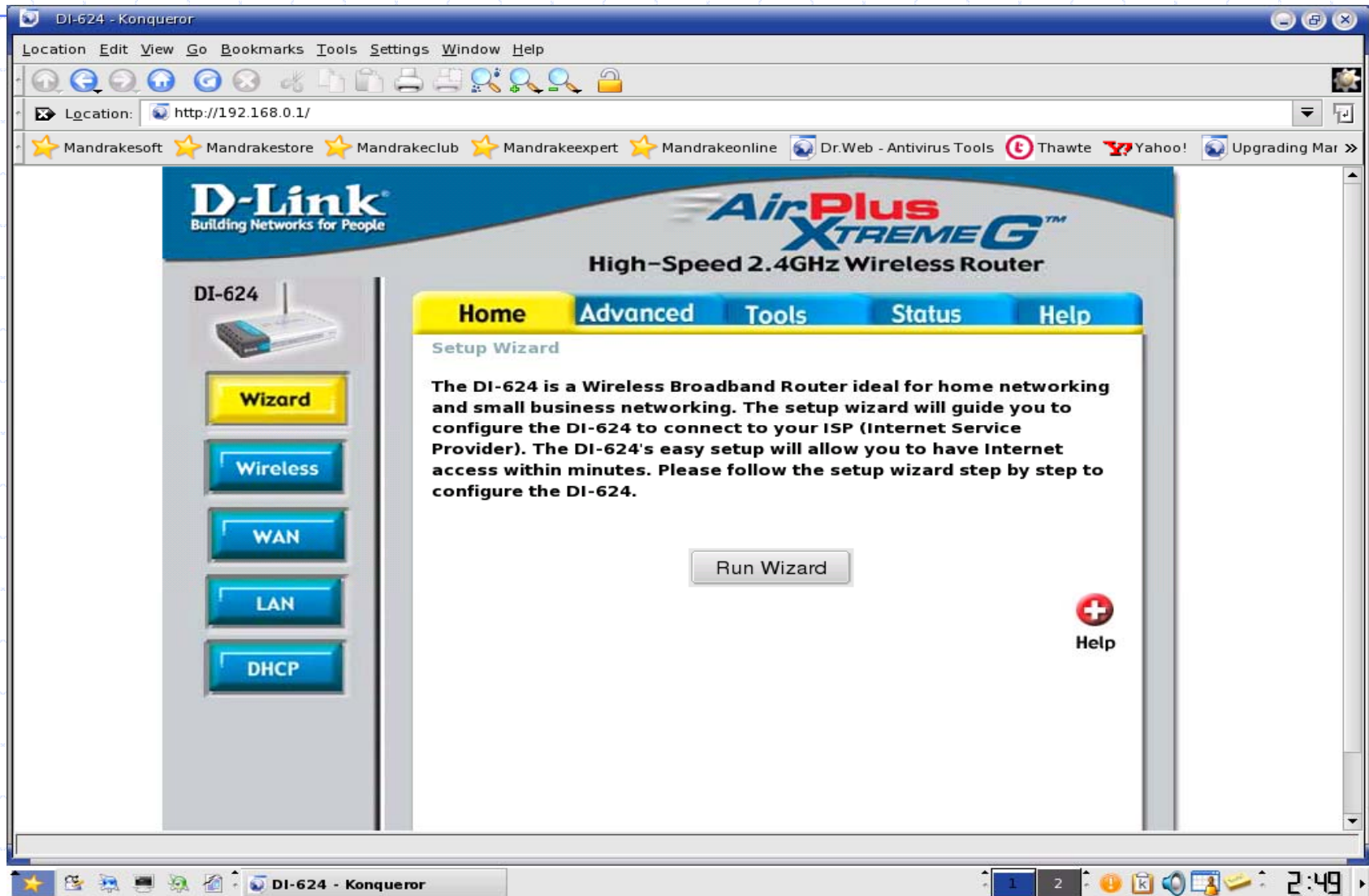
Keep password

OK Cancel

Router Configuration (cont. 2)

- ◆ Enter your default userid and password
 - My Netgear uses "admin" for the default userid and "1234" for the default password
- ◆ Use the Setup Wizard if it is available
- ◆ Follow the menu to change the userid and password
- ◆ Follow the menu to change the SSID and to enable WEP encryption and/or WPA

Sample Router Main Menu



Router Configuration (Cont. 3)

- ◆ Remember that **you must change each Wireless PC** to match the SSID and the WEP Encryption when you change them at the Router.
- ◆ I suggest you **not change** any of the defaults until you have at least one wireless PC working with the defaults.

Sample Wireless Router DHCP

DI-624 - Konqueror

Location Edit View Go Bookmarks Tools Settings Window Help

Location: http://192.168.0.1/h_dhcp.html

Mandrakesoft Mandrakestore Mandrakeclub Mandrakeexpert Mandrakeonline Dr.Web - Antivirus Tools Thawte Yahoo! Upgrading Mar >>

D-Link
Building Networks for People

AirPlus Xtreme G™
High-Speed 2.4GHz Wireless Router

DI-624

Wizard
Wireless
WAN
LAN
DHCP

Home Advanced Tools Status Help

DHCP Server
The DI-624 can be setup as a DHCP Server to distribute IP addresses to the LAN network.

DHCP Server Enabled Disabled

Starting IP Address 192 . 168 . 0 . 100

Ending IP Address 192 . 168 . 0 . 120 ←Note my choice of range

Lease Time 1 Week ▾

Static DHCP
Static DHCP is used to allow DHCP server to assign same IP address to specific MAC address.

Enabled Disabled

Name

IP 192 . 168 . 0 .

MAC Address - - - - -

DHCP Client Merlin,00-10-DC-4B-5D-73 ▾ Clone

Common Wireless Brands

- ◆ Linksys
- ◆ Netgear
- ◆ Dlink
- ◆ Belkin
- ◆ Microsoft
- ◆ others

Wireless Home Network Links

- ◆ <http://www.homenethelp.com/home-network.asp>
- ◆ <http://www.homenethelp.com/>
- ◆ <http://www.homenethelp.com/web/diagram/index.asp>
- ◆ <http://www.homenethelp.com/web/howto/net.asp>
- ◆ http://www.cert.org/tech_tips/home_networks.html

Questions?

