



## Computer Networking – High Speed Internet Setup

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### Implementing Networks Using Windows Is Fairly Easy

Home and small office users possessing one or more personal computers have probably already taken the first step in networking. If you use a CAT5 crossover cable between two computers with network interface cards (NIC's) or use a network hub to interface two or more computers, you should already be up and running with local area networking (LAN). With a LAN, users are able to print to another computer's printer, share files, play games, and use another computer's Internet access (such as a modem connection) using Microsoft's Internet Connection Sharing. For a simple TCP/IP network, only three settings are required: a unique IP address for each of the computers, a common subnet mask, and the workgroup. Implementing networks using Windows operating systems from version 3.11 through XP is fairly easy.

### Wired And Wireless Networks

Wireless and wired networking hardware provide the means and are quite similar in operation differing mainly in the medium – wireless uses radio communications while wired uses copper wires. The major differences between these two means are speed and security. Wired networks typically transfer data at 100 megabits per second (Mbps) while wireless networks typically transfer data at 10 mbps. Wireless networks use the airwaves and have excellent encryption technology but anyone within radio range and with enough technical skill can intercept your data. Where possible, hard-wired networking is more secure and therefore recommended.

### DSL And Broadband Cable

Digital Subscriber Line (DSL) and Broadband Cable Internet access are becoming widely available to the public at affordable prices. DSL service is typically offered by the phone company and uses the phone line to your home/office to carry the internet connection. Broadband Cable service is typically offered by your cable television company and uses the coaxial signal line to your home to carry the Internet connection. Typical cost for DSL service is \$30-40 per month for Internet download connection speeds up to 1.5 Mbps. Typical cost for Broadband Cable service is \$40-60 per month for download connection speeds up to 3 Mbps. Note: upload speeds are generally a fraction of the download speeds – on the order of 10%. So, what's the difference in performance? Downloading Microsoft's Media Player 9, a 13.3 MB download, takes about 72 seconds via DSL and 36 seconds via Cable. Your 56 kbps modem will take at least 32 minutes!

Both DSL and Cable services require an interface device that converts the Internet signal from the phone line/coax cable to a standard CAT5 network connection. You've probably heard of this device, known as a DSL modem or cable modem. Service providers have been favorably rated for user-friendly installation kits, including documentation, software, and hardware for connecting the CAT5 cable to your computer and setting up your internet connection.

### Use A Router For Multiple Computer Internet Access

If you have a home/office LAN, then setting up access for multiple computers to the Internet service provider requires additional effort but is actually quite simple. First, you need a Cable/DSL router, which replaces (if necessary) your network hub and provides a CAT5 uplink port for the DSL or cable modem.

Get your LAN up and running first. Then select one of your computers to set up high-speed Internet service per the provider's instructions. (For this step, disconnect this computer from your LAN and connect it directly to the cable modem.) Once Internet access has been established, connect the DSL or cable modem to your router's uplink port and reconnect your computer to the LAN. Now, set up the router per the manufacturer's instructions.

### Security Issues

Each installation is unique depending on the type of service and hardware used. We use a Linksys Cable/DSL router, which not only interfaces with our DSL service provider, but also can be configured with our user name and password so Internet access is always available. Set up is accomplished with the installation program but you may find it easier to use a web browser to navigate to the router, then selecting menus to enter user name, password, and optional features.

### Your DSL Service Provider's Installation Kit

Some notes on security. Modern Cable/DSL routers provide a function known as network address translation, which prevents outsiders (e.g. hackers) from seeing your true IP address. This is an effective firewall against external intrusion. To further guard against external attacks and undesired internal Internet access (e.g. spyware, e-mail worms, etc.), all computers connected to the LAN should have firewall and anti-virus software installed.

Should you choose DSL, your service provider will send an installation kit that includes the DSL modem, software, and telephone filters. Our kit arrived with three 2-line filters that easily install between the RJ11 (phone) jack on the wall and the plug that goes to your phone device (phone, fax, answering machine, etc.). The filter removes electronic noise from the DSL that may be audible on telephones and can affect the quality of your fax or modem devices. The Ringer Equivalent Number (REN) for each filter is quite low (ours is rated at 0.18) which means it has very little loading effect on your phone line. Instead of protecting one phone, you can install the DSL filter at a common point to filter several or all phones in your home/office. Just remember that the sum of REN ratings for all devices on the phone line should not exceed 5.

### DSL Filter Installation Note For Technicians

If you can gain access to the telephone line where it comes into your home/office, run a dedicated DSL modem phone line and connect directly to the telephone service panel. Find a suitable mounting location for two telephone RJ11 wall plates and wire your phone company's phone line to one of the wall plates. Wire your home's phone distribution line(s) to the other wall plate. (Hint – find that one telephone line inside your home, cut it and attach the wires from each end to the two wall plates taking care to ensure the wire color codes match the color codes on the wall plates.) Install the DSL filter to the service-side RJ11 plate and a short telephone cable from the DSL filter to the phone-side RJ11 plate. Test your phones, especially two-line service, to ensure the connections are sound.



Here, the telephone service comes in on the left plate, office phone lines are on the right plate, and the DSL filter is connected between the two. The DSL modem line is wired to the left plate.

### Don't Forget To Update Your Network Settings

Your network settings may need to be updated depending on your particular configuration. Our Linksys router required each computer's local area network connection to use automatic IP settings (DHCP) which allowed the router to assign IP's within a programmable range. This change was easily accomplished in the network settings under Control Panel. If your network previously had manually-assigned IP settings then you will need to update the new IP range in your firewall software.

If you desire to keep your modem e-mail service, check the provider's web site for a procedure to access mail via the internet. When your network is set up, each of your computers will have a fast, full-time Internet connection and you will soon forget the bygone era of modem technology.