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# LanSchool® 6.5

## *Installation Guide*

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## About LanSchool® 6.5

LanSchool® 6.5 is a software tool designed give a teacher full control of all computers in a training lab. With LanSchool installed on each computer in a lab, a teacher has the ability to:

- **Reduce Student Distractions**  
The teacher can reduce student distractions by **Blanking Screens** or **Disabling Web Browsing** on student computers. Ideal for helping direct student attention from their computer to the teacher.
- **Broadcast their computer screen to student computers**  
Ideal for showing students how to use computer applications and tools from one location. With the Start Broadcast feature on, students can watch what's happening at the teacher's computer—right from their own computers.
- **Monitor student computers from their own computer**  
Ideal for monitoring student activity within a lab setting, as well as troubleshooting problems on the student computer itself. From his own computer, a teacher can view any particular student's screen or a "thumb-nail" view of all students screens, as well as remotely control the functionality, from anywhere in the lab.

LanSchool 6.5 works with any combination of computers running Windows\* 95/98, Windows ME\*, Windows NT\*, Windows 2000\*, or Windows XP\*.

## Understanding how LanSchool works

LanSchool works by enabling a teacher to essentially control all student computers within a lab setting. It uses teacher "channels" to ensure that all lab computers see the same computer screen; much like a TV channel enables different TVs to see the same program. LanSchool has 255 teacher channels from which to choose, which means that you can have as many as 255 different labs using LanSchool at any given time.

The most logical way to set up LanSchool is for each lab or room to have its own teacher channel, as well as just one teacher computer. This setup enables all of the computers in the same lab to interact with each other and one teacher to control the entire room.

## Features

**LanSchool 6.5 is more reliable than ever, and includes the following features:**

- **TCP/IP support**  
Early versions of LanSchool used the IPX\* protocol. Now that TCP/IP is ubiquitous, LanSchool no longer uses IPX. This shift to TCP/IP makes LanSchool more efficient on larger networks.
- **Multicast support**  
One of the benefits of using TCP/IP is the availability of Multicast. Multicast lets networking hardware keep LanSchool traffic local to LanSchool computers. Because some network routers or switches don't support Multicast, this option is disabled by default, but can easily be enabled.
- **Support for all Windows 32-bit environments**  
LanSchool 6.5 has been written to take full advantage of a 32-bit Windows environment. This version works with teacher or student computers running any combination of Windows 95/98, Windows ME, Windows NT, Windows 2000, or WindowsXP.
- **Screen mark-up**  
The teacher can now mark on the screen to draw student attention to a particular part of the screen.
- **Improved Cursors**  
To allow the students to better see the teacher's cursor, large red cursors appear in the student view. These cursors are the same shape as the real cursor, but are 4 times the size and are highly colored.
- **Full Screen or Windowed Broadcast**  
The teacher can select between a "full screen" or a "windowed" broadcast. In Full Screen mode, the teacher's broadcast will take over the entire student's screen and lock-out the student's mouse and keyboard. In Windowed mode, the teacher's broadcast will appear in a window on the student's machine. The students can then follow along with the teacher and work on the machine while the teacher is broadcasting.
- **Additional Teacher Channels**  
The original 16 channels have been expanded to 255 channels. The base 15 channels now have additional functionality so that a teacher can control any or all of these channels simultaneously.

- **View Students Mode**

The teacher can view all students at once. Every student screen will appear as a “thumb-nail” view on one monitor window. This makes it easy to make sure all students are using their computers as they should.
- **Student Screen Capture**

If any student is misusing the computer, the teacher can easily save that student’s screen to a standard graphic file. (.bmp). This file can easily be imported by most popular Windows applications.
- **Windows XP Support**

Windows XP is ideal for the school environment. LanSchool v6.5 fully supports this new operating system, including Service Pack 2.
- **NetWare Support**

If the computer is using the NetWare client software, LanSchool 6.5 will always use the NetWare login name instead of the Microsoft login name.
- **Student Unload Controls**

LanSchool 6.5 does not allow a student to mischievously “unload” the student.exe program via the TaskManager application.
- **Student Power-Off**

The teacher can use LanSchool 6.5 to “power-off” all student computers. This can be a great time saver in a computer-lab environment. *This feature might experience problems on Windows 9x machines. Microsoft states that this will not work on certain hardware. While it has been tested successfully on Compaq, Dell, and IBM computers, it may not be able to properly power down all brands or models of computers running the Windows 95, 98, or ME operating system. (Please see Microsoft Knowledge Base Article Q220706.)*
- **Teacher Messaging**

The teacher can now send a message to any or all students. This is often an effective way to get a distracted student back on-task.
- **Wake-On-LAN**

If your student computers are configured to take advantage of Wake-On-LAN technology, the LanSchool Teacher can “power-on” all student PC’s. This can be a great time saver in the mornings!
- **Disable Student Web Browsing**

The teacher can remove the Internet temptation by temporarily disabling all student access to Internet Explorer, Netscape, Mozilla, or most other popular browsers. In addition to browsers, this option will also temporarily disable e-mail clients (Outlook

and Outlook-Express) and popular Instant Messengers (Microsoft, AOL, Yahoo!, and Google).

- **File Distribute and Collect**

The teacher can distribute and collect files to student computers.

- **Update Student LanSchool Software**

The teacher can update the LanSchool Software on student computers.

## About your LanSchool package

Your LanSchool 6.5 product CD includes the executable file needed to install the LanSchool application, as well as electronic copies of this *LanSchool 6.5 Installation Guide* (INSTALL.PDF) and the *LanSchool 6.5 User's Guide* (USERS.PDF). Both guides are in Adobe Acrobat\* .PDF file format and require version 4.x or newer of Acrobat Reader\* to view or print from. Acrobat Reader is available on your LanSchool CD in the Acrobat folder, or free off of the Adobe Web site at <http://www.adobe.com>.

### Technical support

Technical support is included as part of the LanSchool product. You have three options for getting support:

- **World Wide Web**

For the latest information about LanSchool, as well as FAQs, white papers, and much more, visit the Web site at <http://www.lanschool.com>.

- **E-mail**

Send your questions via e-mail to [support@lanschool.com](mailto:support@lanschool.com).

- **Phone**

Call Toll-Free (877) 370-5546 or (801) 319-6365 during business hours (U.S. Mountain Time).

- Our technical support policy is one of the best in the industry. If we cannot find and fix a LanSchool problem with a few phone calls or e-mails, we will fly a technician anywhere in North America (at our expense) to solve the issue. We stand behind the quality of our software!

## Installing LanSchool 6.5

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Before installing LanSchool 6.5, review the following requirements and ensure your network and lab computers are running smoothly. Doing so will prevent problems during installation.

### System requirements

These are the minimum requirements necessary to run LanSchool on both the teacher and student computers.

- **Operating system**  
Windows 95/98, Windows ME, Windows NT 4.0 with Service Pack 6 or later, Windows 2000, or Windows XP.
- **Processor**  
166 MHz Intel Pentium\* processor or faster.
- **RAM**  
32 MB for Windows 95, 48 MB for Windows 98 and Windows ME, 64 MB for Windows NT 4.0, 96 MB for Windows 2000, and 128 MB for Windows XP.
- **Screen resolution**  
LanSchool is optimized for 800x600, 1024x768, and 1280x1024 screen resolutions.
- **Protocol stack**  
All LanSchool computers must be configured to have a TCP/IP protocol stack. LanSchool works equally well with Static IP or DHCP addresses.

## Before you begin

By taking a few minutes to plan out your installation, you should be able to install LanSchool on each computer in two minutes or less. Consider these issues before beginning installation:

- **Choose a unique teacher channel for each lab**  
LanSchool is designed to work with as many as 255 different training labs on the same network. It uses **teacher channels** to broadcast the contents of a teacher's computer to student computers on the same channel. To simplify installation, **each lab should have its own unique channel**, as well as just one teacher computer.  
  
Think of a teacher channel as a TV channel: All TVs tuned to a certain channel receive the same program. In the same way, all students configured to a certain teacher channel receive the screen broadcasts from the teacher configured to that same channel. If only one LanSchool lab is on your network, you can choose any number from 1 to 255. If you have multiple LanSchool labs, each requires its own unique teacher channel number. Generally, it is best to choose a channel in the 1 to 14 range. These channels have extra grouping options available.
- **For each lab, decide which computer will be the teacher computer**  
Generally, you want to set up one teacher computer per lab. The teacher will use this computer control all student computers in the same lab. During installation, you'll have to specify if the computer is a "teacher" or "student" computer.
- **Configure a valid TCP/IP protocol stack for all student and teacher computers**  
If the computers are using DHCP, then DHCP must be working properly. Its best of the teacher and student computers are all on the same IP subnet.
- **Set all teacher and student computers to the same screen resolution**  
It's recommended that you set all computers to the same physical screen size. LanSchool has been tested on 800x600, 1024x768, and 1280x1024 screen resolutions. Any one of these resolutions works well with LanSchool.
- **Use good networking hardware and software**  
If your computer lab already experiences network errors, LanSchool will only make things worse. If you are experiencing problems logging onto computers or copying files over the network, fix these issues before installing LanSchool.

## Running the Setup program

You must run the LanSchool 6.5 Setup program (LS\_SETUP.EXE) on each teacher and student computer that will use LanSchool.

LanSchool 6.5 installs to the C:\Program Files\LanSchool folder on each computer and stores all files locally on each computer.

Once the installation is complete (it takes about than ten seconds to run), the student or teacher program will start. The program will also re-start every time someone logs on to the computer.

### If your computers don't have a CD-ROM drive...

The LanSchool 6.5 file (LS\_SETUP.EXE) is small enough that you can copy it to a floppy diskette from the product CD. Also, if you have received an e-copy of LanSchool, you can “unzip” the file directly to a floppy disk. You can also copy the file to any shared location on your network and run it from there.

### To install LanSchool 6.5 on a teacher or student computer

- 1 Insert the product CD into the computer's CD-ROM drive.  
  
Or
- 2 Insert a floppy diskette (that you've copied LS\_SETUP.EXE to) into the A: drive.
- 3 In My Computer, go to your CD-ROM drive or A: drive and double-click **LS\_SETUP.EXE**.
- 4 Read the license agreement that appears, then click **I Agree**.
- 5 Select which type of installation you want (**teacher** or **student**), then click **Continue**. Remember, it's best to select just one teacher computer per lab or room.
- 6 Choose a teacher channel number (1 to 255), then click **OK**. Remember to choose a unique number for each lab or room.
- 7 Click **OK** to finish the installation. Every time someone logs on to the computer, LanSchool will auto-load all of its files and will be ready to use.

## Scripting LS\_SETUP.EXE

If you wish to run LS\_SETUP.EXE from a script, there are some command-line options which will facilitate this.

- #x
  - Installs LANSchool with the Teacher Channel x. “x” must be an integer number from 1 to 254.
- StUdEnT
  - Installs the LANSchool Student software
- TeAcHeR
  - Installs the LANSchool Teacher software
- QuleT
  - Disables all User Interface. Run LS\_SETUP.EXE in “quiet” mode. This option must be specified LAST in the command line.
- UNINSTALL
  - Uninstalls the LanSchool software from this machine
- NoLoAd
  - Does NOT auto-start the software after installation. The software will start on a teacher machine after the next login. On student machines it will start after the next reboot.

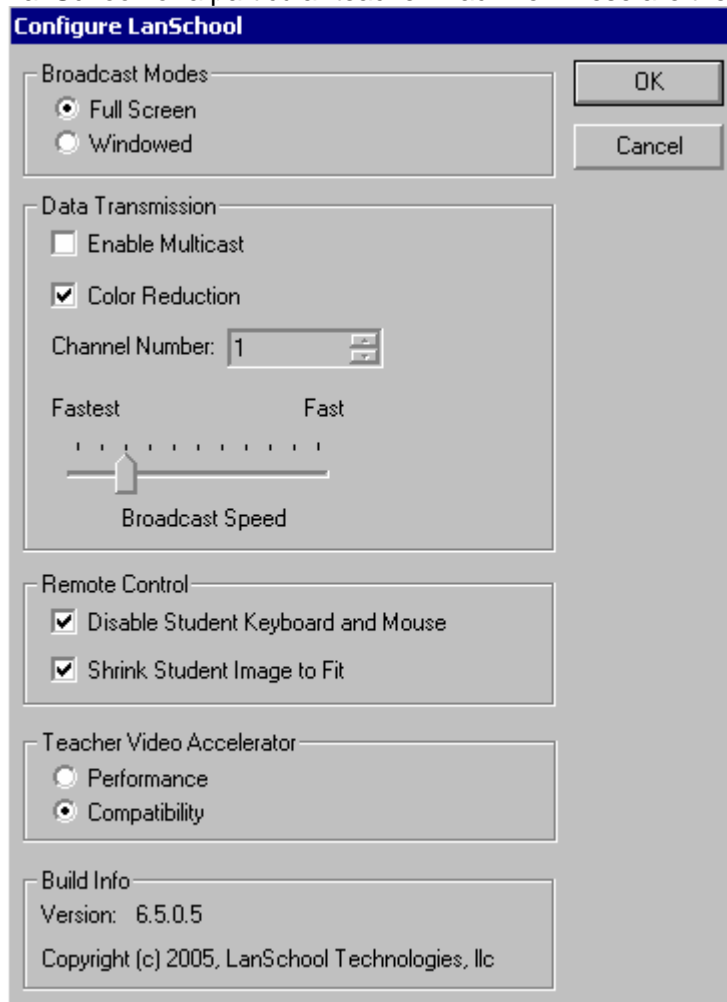
## Once LanSchool is installed

On the teacher computer, a LanSchool teacher icon will appear in the system tray at the bottom right corner of the computer screen. It is a small, greenish “circle of circles.” To begin using LanSchool, right-click or double-click the icon to open the LanSchool menu.

On student computers, a LanSchool student icon will appear in the system tray at the bottom right corner of the computer screen. If you place your cursor over the icon, it will tell you the teacher channel the student computer is using.

## Configuring custom options

LanSchool is easy to configure. It's made up of one main menu that's visible only from the teacher computer. From the teacher computer, you can customize LanSchool for a particular teacher machine. These are the available options:



## Broadcast Modes

- **Full Screen**  
The teacher's broadcasted screen will take over the students' screens. The students will lose control of their mice and keyboards during the teacher's Broadcast.
- **Windowed**  
The teacher's broadcasted screen will appear in a window on the students' screens. This way the students can "follow along" with the teacher and use their computers during the teacher's broadcast session.

## Data Transmission

- **Enable Multicast**  
Transports LanSchool data to students via TCP/IP-Multicast. Multicast allows networking hardware keep LanSchool traffic local to LanSchool computers. If your network hardware supports this option, it's highly recommended. However, some older network switches did not support IP-Multicast, so by default, this option is OFF.
- **Color Reduction**  
To decrease network traffic, this option will reduce the number of colors sent from the Teacher's machine. Unless EXACT color matches are needed, this is highly recommended. With this enabled, the teacher's "Wallpaper" is also removed during a screen broadcast.
- **Channel Number**  
This feature is normally disabled. It is a quick way to tell which Teacher Channel has been configured for this machine. There is a free utility available which will enable this option if your school has a need to change the Teacher Channel often. This utility can be found on the LanSchool CDROM in the **Utilities** folder. You may also request this utility by sending e-mail to [support@lanschool.com](mailto:support@lanschool.com).
- **Broadcast Speed**  
Allows you to control the LanSchool broadcast speed. There is generally no need to alter this. Starting with LanSchool v6.2, a "self-tuning" feature was added to constantly optimize the Broadcast Speed for the current network conditions.

### Remote Control

- **Disable Student Keyboard and Mouse**  
This option allow the teacher to “lock-out” the student’s inputs while the teacher is Remotely Controlling a student computer.
- **Shrink Student Image to Fit**  
This option will force the student’s screen to fit within the teacher’s window. In some cases, the teacher’s view of the student screen will appear “fuzzy”. If this occurs, you can disable the option and use scroll-bars to see the student’s screen at its real size.

### Teacher Video Accelerator

- **Performance**  
This option **enables** the Teacher Video Accelerator. It will give substantially better Teacher-Broadcast performance. This option is only available on Windows2000 or Windows XP teacher machines.
- **Compatibility**  
This option **disables** the Teacher Video Accelerator. This should only be selected if the Teacher-Broadcast mode does not work properly with OpenGL or DirectX applications.

### Build Info

- This is an easy way to tell the EXACT version of the product you are using. LanSchool will at times add small features or bug fixes without making a major new release. The Version specified here can help LanSchool Technical Support tell what version of the software you are using.

### To configure custom options

- 1 In the system tray at the bottom right corner of the computer screen, double-click the LanSchool icon and the menu appears.
- 2 Click **Configure...** Check the options you want to enable, change the broadcast speed if necessary and then click **OK**. Repeat this procedure for each teacher channel that you set up.

LanSchool should now be ready to use. Refer to the *LanSchool 6.5 User’s Guide* (USERS.PDF on the product CD or in C:\Program Files\LANSchool on the teacher’s machine) for additional details.

## Uninstalling LanSchool

If you need to uninstall LanSchool at any time, it's easy to do. The following procedure removes all LanSchool files from a teacher or student computer.

### To uninstall LanSchool 6.5 from a teacher or student computer

- 1 From the Start menu, click **Run...** and Browse to the **LS\_SETUP.EXE** program. (It's on the LanSchool CDRom or was downloaded from [www.lanschool.com](http://www.lanschool.com))
- 2 Double-click **LS\_SETUP.EXE**
- 3 In the Uninstall LanSchool dialog, click **Yes** to uninstall the program.
- 4 You might have to reboot the computer to successfully delete all LanSchool files.

Note: This is NOT performed by the usual **Add-Remove Programs** option on the Control Panel. Since LanSchool is designed for a student lab environment, care must be taken to keep students from "uninstalling" LanSchool.

## Reinstalling LanSchool

To reinstall LanSchool, simply run the LS\_SETUP.EXE again. It will automatically update the files which are used. As long as the original LanSchool is at least v6.0, there is no need to uninstall the old version before installing the new version. If the old version is previous to v6.0, uninstalling is not required, but is a good idea. You can obtain an uninstall utility by asking for it from [support@lanschool.com](mailto:support@lanschool.com).

## Updating LanSchool Student Software

Improvements to the LanSchool software are released as needed. If you ever wish to update the student PC's to the latest build of LanSchool, there is an automated way to do this. **It is no longer necessary to re-install the software on all student computers.** Begin by reinstalling the latest build of LanSchool onto the teacher machine (see "Reinstalling LanSchool" section above.) Now copy the LS\_SETUP.EXE file to the C:\Program Files\LANSchool folder on the teacher's machine.

*NOTE: if you are using Deep Freeze or some similar "lock-down" software on the student computers, you will have to disable it during this update procedure to allow the new software to be installed onto the student computers.*

Select the "View Students..." teacher menu option. You will now see all student computers along with the current version of LanSchool they are running. You can multiple-select the desired student computers to upgrade, right-click, and select the "Update LanSchool on Selected Students" option. This will take a few seconds for every student selected. When it is done, you may have to press the "Refresh List" button to see the newly installed version on the student computers.

This is an ideal way to update student computers from the **30-day demo** version to the latest **retail** version.

By default, the LS\_SETUP.EXE file is not copied to the C:\Program Files\LANSchool folder. Most schools do not want teachers updating student computer software. For these schools, an administrator can copy the LS\_SETUP.EXE file, perform the update and then remove the LS\_SETUP.EXE file.

*NOTE: This method will only work if there already is a v6.5 student.exe running on the student computer. This method cannot be used to upgrade a v6.2 student to v6.5 student: that requires a reinstallation of the software, as noted in the previous section.*

## LanSchool security

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With a tool as easy to use and as powerful as LanSchool, there's always a possibility for misuse. A student may be tempted to load the teacher software and disrupt a class. While it's possible to add layers of security to LanSchool to discourage misuse, clever students can usually find ways around these, and stringent security layers would make LanSchool difficult to use and prone to software errors.

It is generally more effective for schools to set policies about appropriate behavior in the training lab and set punishments for policy abuse. LanSchool has a feature that facilitates the enforcement of these policies. Every time you broadcast, view, or blank-out a student screen, as well as remove a student from the teacher channel list, an entry is made in the registry of the affected student computer.

The entry is a "digital fingerprint" that tells what action was done, when it occurred, and who did it. If someone is suspected of misusing LanSchool, use the Windows utility REGEDIT to look at any student's local registry and quickly identify the person.

### To use REGEDIT to view a LanSchool action

- 1 At a student computer, click **Start | Run**.
- 2 In the text box, type **regedit**. Click **OK**. A Registry Editor window will appear, with several folders.
- 3 Look at the key **HKEY\_LOCAL\_MACHINE\Software\LanSchool** for information about any LanSchool actions that took place on this computer.

If this is not enough, there is a **Security Monitor** application available in the **security** folder on the LanSchool CDROM. This application runs on any machine and will capture a log of ALL LanSchool activity, including the installation or un-installation of any LanSchool program. With this utility, many schools have quickly been able to pinpoint students who are abusing the "appropriate use policy" of their computer lab. There is a **Security.pdf** file in the same folder which describes this utility in detail.

Students downloading and installing a demo version of LanSchool caused the largest security problem with the previous versions. Starting with LanSchool v6.1, the demo version cannot interact with the released version. It is doubtful that students will be interested in purchasing a full version, just to play a prank. However, if they do, the above-mentioned steps will allow you to quickly locate the offending students.

There is also a utility in the Utilities folder of the LanSchool CDROM which will "Freeze" the LanSchool Teacher's configuration (**LskFreeze.exe**). You can apply this to the teacher's machine if you wish to keep teachers from altering their LanSchool Configuration. There is a corresponding **LskThaw.exe** utility to un-freeze things.

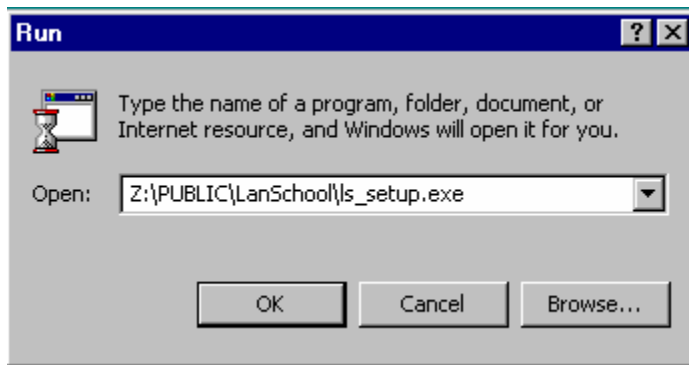
## LanSchool in a NAL environment

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NAL (Netware Application Launcher) is part of the **Novell ZEN Works** package. NAL can be used to control the student desktop, giving students access to only administrator-approved applications. In its most restrictive mode (and perhaps most useful mode for schools), **ONLY** the applications specified can be run. This can create a problem for the installation of LanSchool.

LanSchool can be configured to run properly in a NAL environment. While it is possible to create a ZEN package and have LanSchool installed automatically on each PC, that generally takes more time and effort than it is worth. LanSchool takes less than a minute per PC, so an entire lab is generally installed in under 45 minutes. It will often take that long to build the ZEN package. We have found that the easiest way to install LanSchool in a NAL lab is to:

1. Copy the LS\_SETUP.EXE file from the LanSchool CDROM to a location on the fileserver accessible to all. (i.e. SYS:\PUBLIC\LSK\_CDROM)
2. Login as an administrator on each PC and run the LS\_SETUP.EXE from that shared location. Install LanSchool as a Student or Teacher depending on the PC.



### Note for Teacher Machines:

If the teacher's machine is also locked-down by NAL, the teacher will not have a System Tray and will not be able to click the LanSchool Teacher Icon to control LanSchool. Instead, the hot-key sequence "<Ctrl><Alt><L>" can be used to bring up the LanSchool Teacher's menu.

## Testing and Verifying

Once LanSchool has loaded, you can see the LanSchool icon in the System Tray on all student machines.



You can check to see what channel it is by hovering the mouse over this icon.



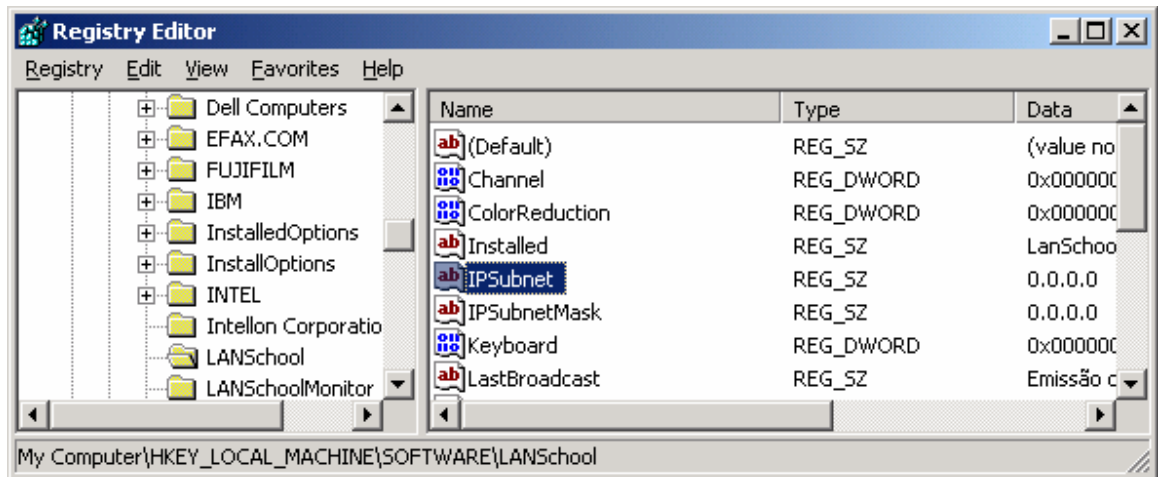
If the Teacher machine and the student machines are all set to the same Teacher Channel, all should work properly.

## Multi-Homed Computers

Some computers actually have more than one Network Interface card (NIC) and/or multiple IP addresses (i.e. a router). LanSchool would always use the “first” NIC, but that is not always the desired NIC or network. You can specify which NIC to use. Generally, this is not needed, but in some specific sites, it has been requested. On the teacher or student machine, you can edit a registry key to specify the IP Subnet to use.

HKEY\_LOCAL\_MACHINE\Software\LanSchool\IPSubnet and  
HKEY\_LOCAL\_MACHINE\Software\LanSchool\IPSubnetMask

By default, both of these values are set to 0.0.0.0. This will tell LanSchool to use the “first” NIC it finds (which has always been the default). If you wished LanSchool to use the NIC assigned to the subnet 192.168.1.0, you would edit the IPSubnet to “192.168.1.0” and the IPSubnetMask to “255.255.255.0”.

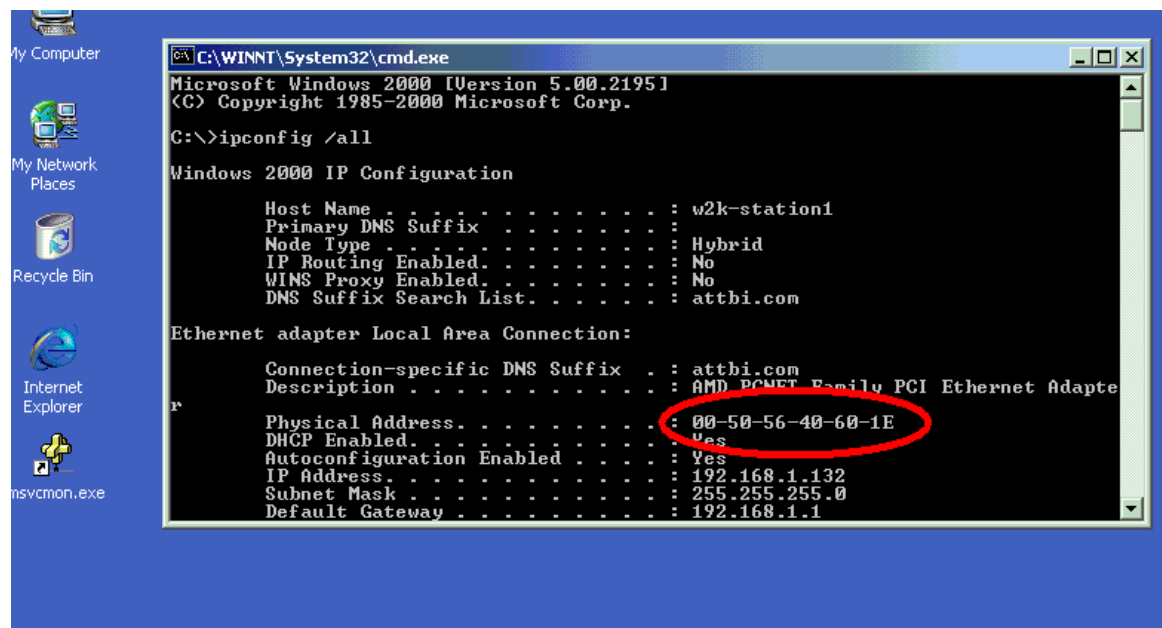


## Wake-On-LAN Support

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Wake-On-LAN (WOL) technology can be used to remotely “power-on” student computers. However, student computers must be configured to enable WOL. The steps needed to do this vary with every computer model. Generally, the computer needs special hardware to support this and there is a BIOS switch which needs to be enabled. It is best to consult with your computer supplier to determine the actual steps needed.

On the LanSchool v6.5 CDROM, there is a utility, WakeUp.exe, which can test compliance of WOL. You can also get this utility by asking for it via e-mail from [support@lanschool.com](mailto:support@lanschool.com). This utility will send a WOL “Wake Up” signal to a specified target computer. To use this utility, you will need two computers: the target machine and a console machine. Both will need to belong to the same IP subnet. You will have to determine the Physical MAC Address of the target machine. If this machine is a win9x machine, you can use the Window’s winipcfg.exe utility. Otherwise, you can, from a DOS box, run the IPCONFIG /ALL command.



```
C:\WINNT\System32\cmd.exe
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.

C:\>ipconfig /all

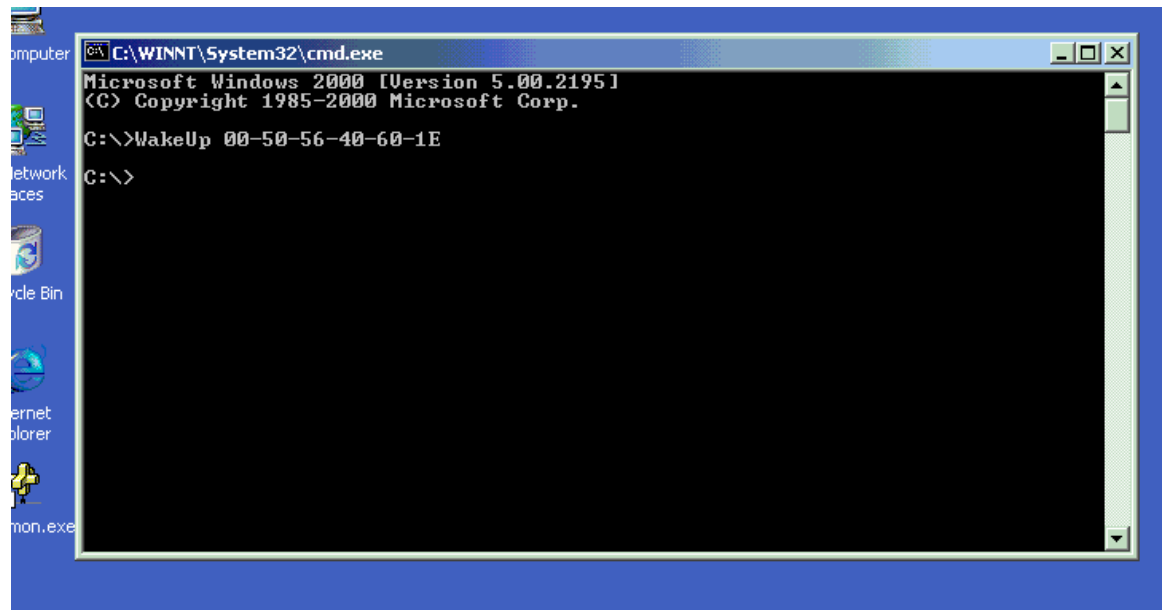
Windows 2000 IP Configuration

    Host Name . . . . . : w2k-station1
    Primary DNS Suffix . . . . . :
    Node Type . . . . . : Hybrid
    IP Routing Enabled. . . . . : No
    WINS Proxy Enabled. . . . . : No
    DNS Suffix Search List. . . . . : attbi.com

Ethernet adapter Local Area Connection:

    Connection-specific DNS Suffix . : attbi.com
    Description . . . . . : AMD PCNET Family PCI Ethernet Adapte
    Physical Address. . . . . : 00-50-56-40-60-1E
    DHCP Enabled. . . . . : Yes
    Autoconfiguration Enabled . . . . : Yes
    IP Address. . . . . : 192.168.1.132
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1
```

Once you have the Physical MAC address of the target machine, shut down that machine and from a DOS box on the other (console) machine you can run the WakeUp.exe utility. This will send the WOL Wake Up packet to the target machine.



If WOL is properly configured on the target machine, it will then power-on. If not, you will have to check with the hardware manufacturer to see what additional steps need to be taken. If WOL is not properly configured on a student machine, the LanSchool teacher machine will NOT be able to perform a WOL Wake-Up on that machine.

## 802.11 Wireless Support

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Starting with build 6.5.2.0 of LanSchool, 802.11 wireless networking is supported. All LanSchool features (except for Wake-On-LAN which is not supported in the 802.11 specs) are supported.

### Special Hardware Requirements

Please make sure that all computers are using the latest NIC (Network Interface Connector) drivers available from the NIC vendor. The “world of wireless” is similar to the LAN environment of a decade ago. Wireless network drivers are being updated and improved almost monthly. Also, there are two basic types of Access Points: Residential and Industrial. The easiest way to differentiate is with the price. A “Residential” Access Point will generally sell for around \$100 (i.e. LinkSys, DLink, Belkin, etc...). They work fine in a home environment where several computers will be sharing an Internet link and perhaps a printer. The “Industrial” Access Point is designed to truly support 50 or more clients at the same time. They generally sell for around \$300. Unless you really have less than five student computers, you want an “Industrial” class Access Point. (Our favorite is the HP 420, but similar products are produced by Dell, Cisco (NOT the LinkSys division), IBM, etc...) This will benefit not only LanSchool, but general student computing as well.

### Installation

It is assumed that all student and teacher machines will be using 802.11 wireless NIC's; mixed environments don't work as well. Also, it is assumed that all wireless computers are associated to the same Access Point. Other than this, there are no other special installation concerns. Simply run the LS\_SETUP.EXE program on the teacher and student computers, as specified earlier in this installation guide.

## Performance

The speed of the teacher's screen broadcasts to student computers will NOT be as good over a wireless network when compared to the performance over a wired network. There is no way to overcome this. A wired network can send broadcast and multicast data at 100Mbits per second. An 802.11 wireless network generally sends broadcast and multicast data at 1MBit per second (a mere 1% of the wired speed). In addition to the drastic bandwidth reduction of wireless networks, the Access Point architecture of 802.11 will quite often add significant propagation delays to broadcast and multicast data. (This is due to the Power Save architecture of the 802.11 world...) However, the LanSchool Teacher Broadcast feature will still work reasonably well. Even complex teacher screens should appear on student screens within three seconds. Simple teacher screen changes should appear almost immediately.

## Wireless Performance Tweaks

If you optionally wish to improve performance, you can attempt to configure your Access Point. Since this differs from vendor to vendor, we can only give general guidelines. You'll have to consult your Access Point's manual to see how to actually make the change on your particular Access Point.

1. Drop the Beacon Interval as low as possible (generally, this can go down to 50ms).
2. Set the DTIM to ZERO. (This allows broadcast and multicast packets to be sent after EVERY beacon packet.)
3. Increase the Broadcast or Multicast speed. (Not all AP's allow this to be set)

## **Additional LanSchool Utilities**

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LanSchool is constantly being improved. Many small and useful utilities can be found in the **Utilities** folder on the LanSchool CDROM. In addition to these utilities, there will also be documentation in .pdf format in that same folder. If you wish to let a teacher control more than one classroom at the same time, “freeze” or “thaw” the teacher configuration, quickly change the student’s channel number, etc..., please look into the contents of that folder.