

Using NDIS with LANtastic Training Workbook

EQUIPMENT

1. A 386/16 or better IBM compatible computer equipped with a hard drive and two floppies, one 5-1/4 and one 3-1/2 inch.
2. Network access to a LANtastic server running either version 5.0 or 6.0.
3. An NDIS-compatible ethernet adapter and driver diskette. For this workshop use 3COM's model 509, the Etherlink III.
4. An Eagle NE2000+ or 100% compatible and driver diskette. For this workshop use an Eagle NE2000+ and a copy of PLUSDIAGS.
5. A copy of LANtastic 6.0.
6. An AI (Adapter Independent) copy of LANtastic 5.0.

LANtastic 5.0AI is no longer sold but many copies are still installed and older, unused copies may be on dealer's shelves. The software comes with a single-node license controlled by a serial number on REDIR.EXE and SERVER.EXE. Regular versions of LANtastic will not work with a third-party adapter. **The AI version of LANtastic 4.1 does not support NDIS.**

7. The NDIS support file, AINDIS.EXE.

Users must download this file from the Artifacts BBS. Yours is supplied on the disk labeled AINDIS INSTALL DISK.

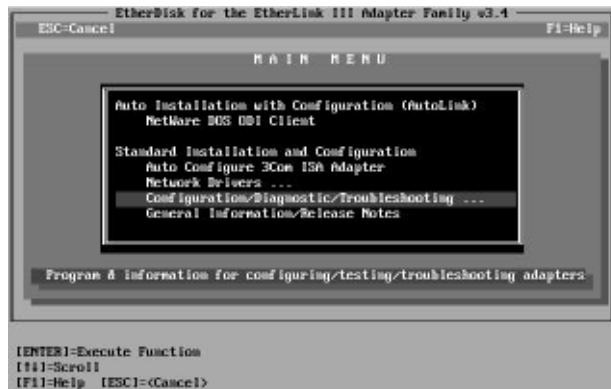
AINDIS is a self-extracting executable. Instruct a user to copy the file to a blank, high-density floppy and run the executable there. There will be enough room if the disk is blank. The floppy becomes the NDIS installation disk. **Don't extract and run the install from a hard drive. The program is designed to use a floppy and will not install correctly from a hard drive.**

NOTE: ARTIDOCs, in the directory of the same name, contains complete instructions for running the install program. It also discusses NDIS and is a good reference for customers with additional questions.

PROCEDURE

1. Verify that LANtastic is not loaded on the computer. Use DELTREE to delete the directories, if necessary.
2. Build a vanilla CONFIG.SYS consisting of HIMEM.SYS, FILES, BUFFERS, LASTDRIVE, and FCBS with the appropriate settings.
3. Install the 3C509 adapter in the computer. Cable the adapter to another computer running LANtastic 5.0 or higher.

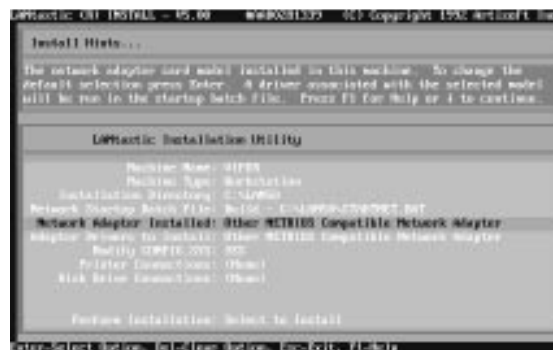
- Run the INSTALL program on 3COM's EtherDisk. The **MAIN MENU** appears.



- Select *Configuration/Diagnostic/Troubleshooting ...* then *Configuration and Diagnostic Program*. The **ADAPTER CONFIGURATION** screen appears.



- Configure the card for IOBASE 320 and IRQ 15. Save the settings and exit back to the command prompt.
- Install LANTastic version 5.0AI into a subdirectory called C:\LAN50. Configure the machine as a workstation. Choose Other NetBIOS Compatible Network Adapter.



8. After the install has completed, edit and examine the new STARTNET.BAT file.

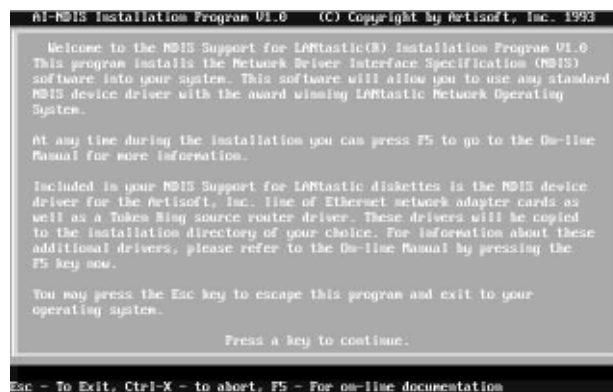
```
@ECHO OFF
SET LAN_CFG=C:\LAN50
PATH C:\LAN50;%PATH%

REDIR VIPER LOGINS=2

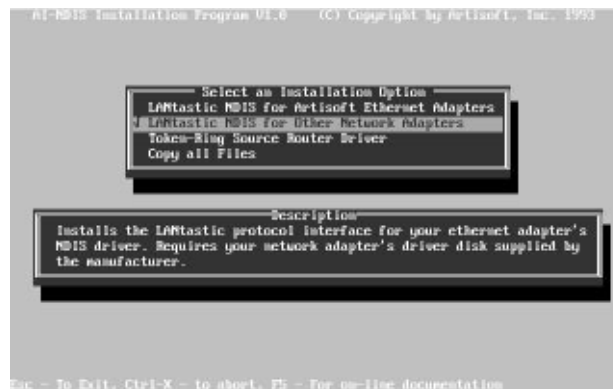
NET LPT TIMEOUT 10
NET POSTBOX
```

Notice that Install did not put an adapter driver nor ALANBIO in the file. These will be added by the NDIS install program.

9. Put the AINDIS INSTALLATION DISK in the floppy drive and run INSTALL from the appropriate drive letter. A big purple welcome screen appears.



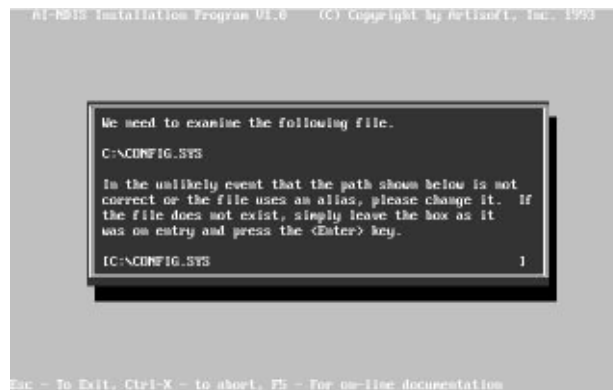
10. Press *Enter* to get to the main installation menu.



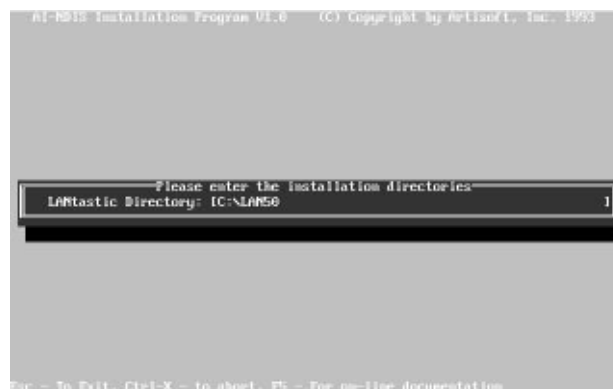
11. Highlight *LANtastic NDIS for Other Network Adapters* and press *Enter*. You'll be prompted for the boot drive.



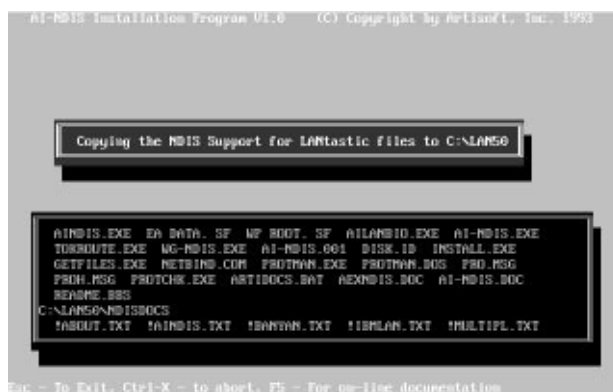
12. Accept the default of C by pressing *Enter*. You'll be prompted for the path to CONFIG.SYS.



13. Press *Enter* to accept the default. You'll be prompted for a path to the LANtastic directory.



14. Change the default to C:\LAN50. When you press *Enter*, the program will begin copying files to the hard drive.



AI-NDIS Installation Program V1.0 (C) Copyright by ArtisanIT, Inc. 1993

Copying the NDIS Support for LANTastic files to C:\LAN50

```
AINDIS.EXE  EA.BAT  SF  MF  BOOT.SF  AILANBIO.EXE  AI-NDIS.EXE
TDRROUTE.EXE  NG-NDIS.EXE  AI-NDIS.001  DISK.ID  INSTALL.EXE
GETFILES.EXE  NETBIND.COM  PROTMAN.EXE  PROTMAN.DOC  PRO.MSG
PROH.MSG  PROCHK.EXE  ASTIDOC.BAT  AEXNDIS.DOC  AI-NDIS.DOC
README.BBS
C:\LAN50\NDISDOCS
*ABOUT.TXT  *AINDIS.TXT  *BANYAN.TXT  *EMLAN.TXT  *MULTIPL.TXT
```

Esc - To Exit, Ctrl-X - to abort, F5 - For on-line documentation

15. You'll be prompted to insert the manufacturer's driver disk. Remove the AINDIS INSTALLATION DISK from the drive and insert the 3COM EtherDisk.



AI-NDIS Installation Program V1.0 (C) Copyright by ArtisanIT, Inc. 1993

Insert the manufacturer's driver disk for your adapter into a drive, specify the drive letter and/or path and press Enter.

IA:\

Esc - To Exit, Ctrl-X - to abort, F5 - For on-line documentation

16. Install will search for the files that it needs to build the configuration files. Install also builds a STRTNDIS.BAT file that loads AI-NDIS and AILANBIO. You'll be instructed to put a call to this file in your STARTNET.BAT or in AUTOEXEC.BAT prior to the call to STARTNET. You could also put the two lines directly into the STARTNET file and not use the STRTNDIS.BAT file.



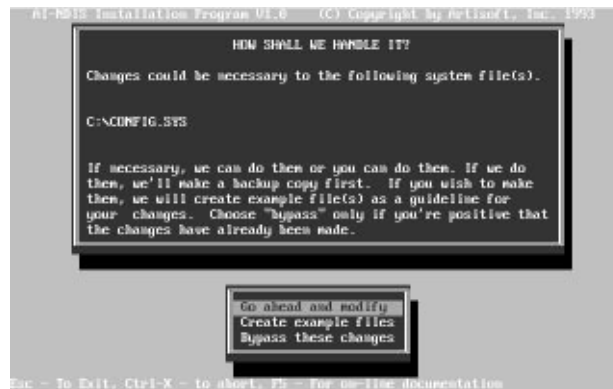
AI-NDIS Installation Program V1.0 (C) Copyright by ArtisanIT, Inc. 1993

An example batch file, C:\LAN50\STRTNDIS.BAT, has been created to start the interface between LANTastic and NDIS. Please insert a call to this batch file in your STARTNET.BAT or AUTOEXEC.BAT in place of the low-level driver and ALLOWED commands and in front of the batch command line that invokes the LANTastic NDIS redirector program.

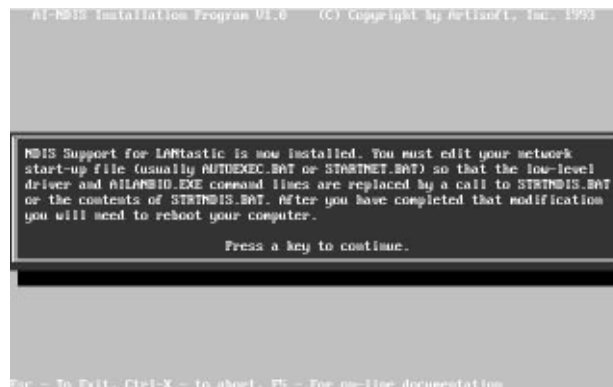
Press a key to continue.

Esc - To Exit, Ctrl-X - to abort, F5 - For on-line documentation

17. You'll be prompted whether you want install to change the CONFIG.SYS file. Install must modify CONFIG.SYS to add the NDIS drivers. Press *Enter* to let it do its thing.



18. When the files are updated, you'll be told that the install has completed. When you press *Enter* you'll be returned to the command prompt.



19. Don't reboot yet. First edit and examine CONFIG.SYS. An example file follows. Yours may not match exactly. The NDIS-related lines added by INSTALL are shown below in bold.

```
rem DEVICE=C:\DOS\SETVER.EXE
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
FILES=100
STACKS=9,256
LASTDRIVE=Z
BUFFERS=30
DEVICE=C:\LAN50\PROTMAN.DOS /I:C:\LAN50
DEVICE=C:\LAN50\ELNK3.DOS
```

The first device line loads PROTMAN.DOS and points it at the directory where PROTOCOL.INI file resides. LANtastic uses Protocol Manager version 2.0. You can verify this by watching the screen as the drivers load. You will see the message

MS DOS LAN Manager Protocol Manager v2.0.

The next device is the NDIS MAC driver, ELNK3.DOS. Install copied it from the driver disk.

IMPORTANT: Loading PROTMAN.DOS or the MAC driver high can cause erratic behavior. Microsoft is aware of this problem and they recommend loading both NDIS drivers in low memory.

20. Close the file and go to the LAN50 directory and edit the STRTNDIS.BAT file.

```
AI-NDIS  BIND_TO=ELNK3_NIF
AILANBIO
```

Recall that AI-NDIS is the shim that permits AILANBIO and the NDIS MAC driver to talk to each other. The BIND_TO statement points at a square-bracketed heading in the PROTOCOL.INI file.

The name itself is unimportant. It could say RUMPLESTILTSKIN or GROUCHO. What matters is that the spelling, syntax, and sometimes the case of the name on the BIND_TO switch matches the heading in the PROTOCOL.INI file exactly.

If a user types this information by hand, it's important not to put spaces around the equal sign. Also, watch out for the dashes and underscores. They can be confusing.

21. Close this file and edit the PROTOCOL.INI file.

```
:[PROTMAN]
    DRIVERNAM = PROTMAN$
    DYNAMIC = YES
;
;   3c509 3Com EtherLink III adapter
;
[ELNK3_NIF]
    DRIVERNAM = ELNK3$
;   2nd driver name = ELNK32$
;   IOADDRESS = 0x300
;   adapter base address (optional, no default)
;   This parameter is only used to specify a single adapter
;   in a multi-adapter configuration in an ISA computer.
;   Use 0x200 - 0x3E0 in steps of 0x10
;   MAXTRANSMITS = 40
;   number of transmit queue elements (optional, default = 6)
;   Min = 2, Max = 50
;   Use the default for DOS and normal OS/2 clients
;   Set MAXTRANSMITS = 40 for OS/2 servers
;   NETADDRESS = "00608C123456"
;   network address (optional, default = network
;   address EEPROM value) the network address is 12 hex
;   digits enclosed in quotes
;   SLOT = 5
;   EISA slot number (optional, no default)
;   This parameter is only used to specify a single adapter
;   in a multi-adapter configuration in an EISA computer.
;   Use 0 - 15
```

You've seen this file before. Remember the sample `PROTOCOL.INI` on the 3COM driver disk? That's where Install got this information. Note that the `[ELNK3_NIF]` header matches the `BIND_TO` switch in `STARTNET`.

Also note that only two lines of the treatise under the heading are used. The `IOBASE` is only required if there are multiple adapters. This is similar to the way `NR` works. The remainder of the switches have applicability only in specialized situations.

The `DYNAMIC = YES` line has a special function. (The following explanation is a quote from the Microsoft Technical Support Database:

If your workstation is using only ONE protocol driver (for example, `NETBEUI`) and one MAC driver, the Protocol Manager does not remain resident after the binding process takes place. If, however, you are using multiple protocol drivers (for example, `NETBEUI` and `TCP/IP`) and/or multiple MAC drivers, the Protocol Manager remains resident and installs a multiplexing module called `VECTOR`. The Protocol Manager substitutes `VECTOR`'s entry points for the existing entry points in each device driver's characteristics table. `VECTOR` can then multiplex and demultiplex calls and packets transparently, relieving the MAC driver of this task.

If one MAC driver is installed with several protocol drivers, one `VECTOR` module is installed to handle the multiple protocol drivers. If more than one MAC driver binds to multiple protocol drivers, a `VECTOR` module is installed for each MAC driver.

If your configuration implements "dynamic binding," (such as *LANtastic* - *ed*) the `VECTOR` function is always installed at startup time, and thus the Protocol Manager remains resident.

Dynamic binding is [as in the case of 3Com's DPA (Demand Protocol Architecture)] implemented to allow loading of a secondary protocol(s) "on demand." For example, in 3Com's DPA (in MS-DOS), once the Protocol Manager has installed the `VECTOR` function, an MS-DOS command such as `TCPON` or `XNSON` is issued to "demand load" a secondary `TCP/IP` or `XNS` protocol. Corresponding MS-DOS commands such as `TCPOFF` and `XNSOFF` are issued to dynamically unload the secondary protocol. These commands may be issued as standard MS-DOS commands (from the command line, a batch file, or programmatically).

22. Close the `PROTOCOL.INI` file and edit the `STARTNET.BAT` file.

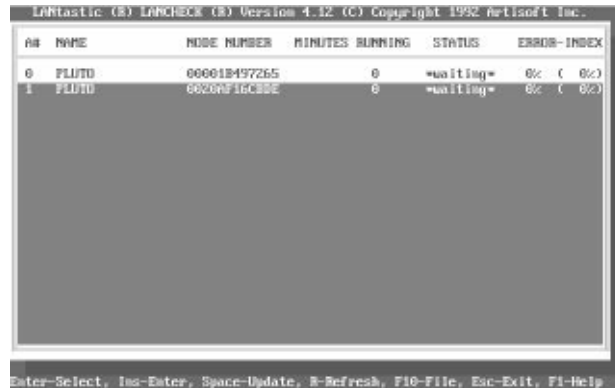
23. Add a call to the `STRTNDIS.BAT` file as shown in bold:

```
PATH C:\LAN50;%PATH%

CALL C:\LAN50\STRTNDIS.BAT
REDIR VIPER LOGINS=3
```

24. Save the file and reboot. Make sure the network drivers load without error.

25. Run Lancheck on this machine and at least one other to make sure you have network connection.



Because Protocol Manager does not report error information, Lancheck will not display errors in this screen or the Detailed Information Screen.

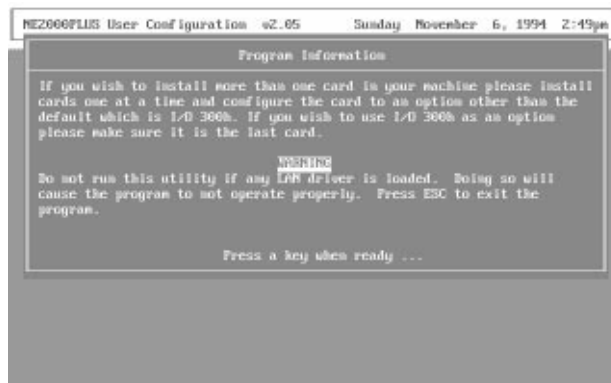


26. This is the end of this section. Perform the following steps to prepare the computer for the next section:
 - a. Leave the 3COM card in the machine.
 - b. Use DELTREE to delete the LAN50 directory.
 - c. Edit the CONFIG.SYS file and delete the two NDIS drivers.
 - d. Power down the machine.
 - e. Proceed to the next section.

Installing Multiple Third-Party Adapters in a LANtastic Server

1. Install an Eagle NE2000+ adapter in the machine with the 3COM card.
2. Power up the machine and use F5 to bypass the CONFIG.SYS and AUTOEXEC.BAT.

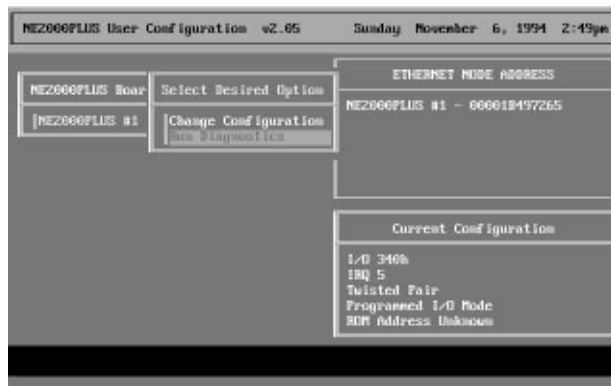
3. Insert the PLUSDIAG DISK in the floppy drive and run PLUSDIAG.



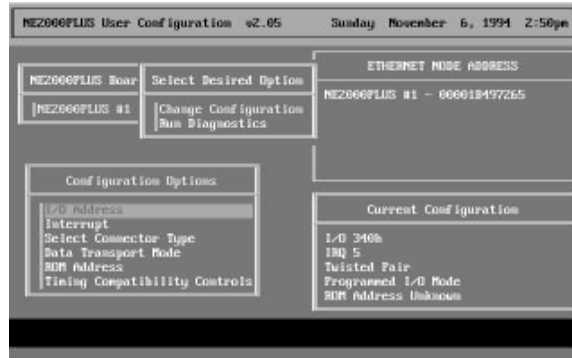
4. This is a standard warning. Press *Enter* to get the main screen.



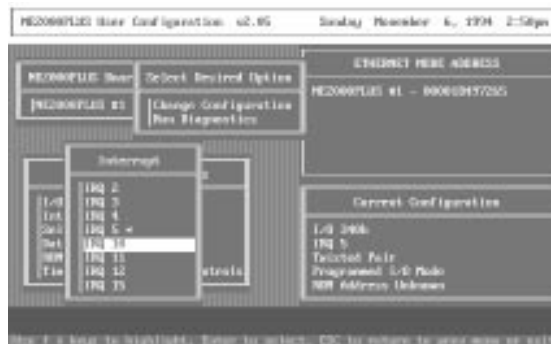
5. There's only one NE2000 in the machine, so it is the only one listed. Press *Enter* to get the configuration screen.



- Highlight the *Change Configuration* selection and press *Enter*. The existing configuration is listed along with a menu of possible changes.

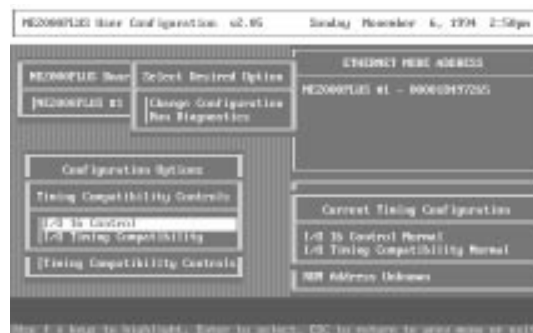


- Configure the card for IOBASE of 340 and IRQ 10.



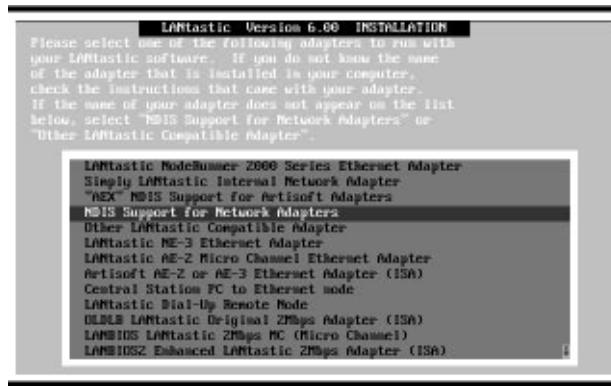
The shared memory option is only used if you want the slight performance increase that a RAMbase affords over programmed I/O. Leave the card in programmed I/O mode.

- While we're in this program, although it doesn't affect what we're doing with dual adapters, note that this adapter has two settings for timing. This helps get it working in odd machines where a simple IOCS16 timing change might not do the trick.



- When you're finished configuring the card, exit PLUSDIAG and save your changes.

10. Perform a DOS installation of LANtastic version 6.0 on the machine. When prompted to choose a driver, pick *NDIS Support for Network Adapters*.



11. When prompted to insert the driver disk for the adapter, insert 3COM's EtherDisk.



12. The rest of the install should proceed as usual. Configure the machine as a server.
13. When the installation has completed, prior to rebooting, edit the CONFIG.SYS. Note that the contents are the same as when you installed NDIS support from the downloaded file.

14. Close CONFIG.SYS and edit the STARTNET.BAT file. Note that the AI-NDIS driver and ALLANBIO are included directly in the file rather than in a separate batch file.

```
@echo off
rem LANTastic Version 6.00 installed 94/11/04 07:32:44
rem (for DOS)
C:
cd C:\LANTASTI
SET LAN_CFG=C:\LANTASTI
rem If LANTastic is disabled, skip everything.
IF EXIST DISABLED GOTO :STARTNET_DONE
@echo ===== Begin LANTastic configuration =====
PATH C:\LANTASTI;%PATH%
SET LAN_DIR=C:\LANTASTI.NET
LOADHIGH AI-NDIS BIND_TO=ELNK3_NIF
AILANBIO @STARTNET.CFG
```

15. Close this file and edit the PROTOCOL.INI file. Note that, except for the introductory remarks, the file is identical to the one constructed for version 5.0.
16. Close this file and reboot. Make sure the drivers load without error.
17. Run Lancheck on this machine at one other to verify communications.
18. There is no facility to install a second adapter automatically, so we will need to make the necessary changes to the files by hand to use the NE2000 card. Because a LANTastic driver, NEX000.EXE, exists for this card, we will not need to use NDIS.
19. Extract the NEX000 file from the installation disks as follows:
 - a. Boot the machine vanilla using the F5 key.
 - b. Insert install disk 1 in the floppy drive. Type **A: INSTALL/DOS/EXTRACT**. The extract script will prompt you for a target drive. Pick drive C and then, when prompted, the LANTASTI directory. The extraction menu screen appears.



- c. Highlight the *Adapter Drivers* line and press the spacebar to toggle the selection to YES. Press *Enter* to accept the selection. The driver list appears.
 Insert EXTR-2 here.

- d. Page down and highlight the *NEX016 Novell NE2000 16-bit ISA bus or Compatible* line. Press the spacebar to toggle the selection to *YES*. Press *Enter* to accept the selection.
- e. Install will prompt you one final time to make absolutely sure you want to do this, then it will go find the driver. The file is on disk 2, so you will be prompted to swap disks. Do so.
- f. When the extraction has completed, you will be returned to the command prompt. Change directory to the LANTASTI directory and to a DIR NEX*. * to make sure you got the file.
- g. Notice that the file is NEX000.EXE, not NEX016 like the extract menu said. This is the correct driver. The menu was wrong.
- h. While the machine is still vanilla, hand-load the driver to make sure it works. Use the following driver line:

NEX000 IRQ=10 IOBASE=340 16-BIT VERBOSE

The driver should load with no errors.

20. Edit STARTNET.BAT and put a pause right after the AILANBIO line. You'll use this to break out of the file for testing.
21. Reboot the machine and use *Cntl-Break* to break out of the batch file when you get the *Press any key to continue...* prompt.
22. Change directory to the LANTASTI directory and hand-load the NEX000 driver with the same parameters as before. This time you will get an error:

ERROR: MPX number C7 already in use - Try another number
---- NEX000 driver NOT installed ----

You got this error because the 3COM card already took the default MPX number.

23. Tap the F3 key to regain the line (don't use DOSKEY, we'll be swapping TSRs in a few minutes). Add the switch *MPX=C8* to the end of the line. Press *Enter*.
24. The driver should load. You also got some interesting information from the VERBOSE switch. This can be handy sometimes when you're troubleshooting a configuration problem.

```
C:\LANTASTI>nex000 irq=10 iobase=340 16-bit mpx=c8 verbose
AI-LANBIO Novell (NEX000) Driver V4.01 - (C) Copyright 1993 ARTISOFT Inc.

Command line:      irq=10 iobase=340 16-bit mpx=c8 verbose
IEEE 802.3 mode address 00001B497265  Network packet size 1500
MPX interface number  C8             ID base address 0340
Interrupt request (IRQ) 10           Network buffer size 16384
Packet type          XEROX           Bytes of memory used 3104

----- NEX000 driver installed -----

C:\LANTASTI>
```

25. Attempt to remove the NEX000 driver from memory using the /REM switch as follows:

```
NEX000/REM
```

You get an error: `ERROR: NEX000 is not loaded.` Use MEM/C/P to verify that the driver is in memory.

26. Now specify the MPX number on the line as follows:

```
NEX000 MPX=C8 /REM
```

This time the driver is removed. (By the way, the "/" is not necessary.)

27. Reload NEX000 with the appropriate command-line switches.

28. Type AILANBIO and pressing *Enter*. You will get the following error:

```
ERROR: A NETBIOS with this adapter number is already installed.  
---- AI-LANBIOS(R) NOT installed ----
```

AILANBIO can only talk to one adapter at a time and the first TSR is already in use by the 3COM card.

29. Load another copy of AILANBIO and point it at the second adapter using the ADAPTER= switch as follows:

```
AILANBIO ADAPTER=1
```

Specify adapter 1 because the first adapter took logical adapter 0.

30. You get an error as follows:

```
ERROR: AI-LANBIOS(R) low level driver is already in use by  
another NETBIOS.  
---- AI-LANBIOS(R) NOT installed ----
```

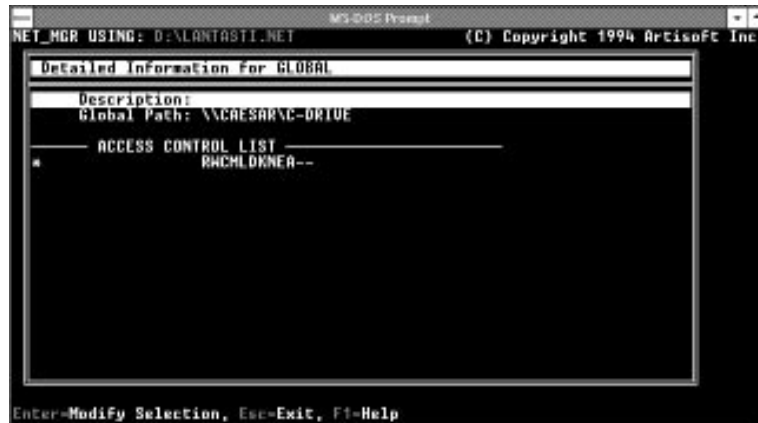
You got this error because AILANBIO needs the MPX number so that it knows which of the two physical adapters it's supposed to talk to. Remember that the ADAPTER number points at a logical, not a physical, device (something like PRN pointing at LPT1).

31. Enter the following line and let's see if we can't get past the errors:

```
AILANBIO ADAPTER=1 MPX=C8
```

32. Cable the NE2000 card to a server running NOS 5.0 or higher.
33. Run Lancheck on all three machines. (Specify a name. REDIR isn't loaded yet.) You should see communication between the server and the card on each segment but no communication between the machines on the two segments.
34. Success? Good. If Lancheck fails to initialize, try loading REDIR MCZPLK. If you get the error `Name is already in use on the network`, you have encountered an undocumented feature. There is a trouble report on this feature in Folios. Remove the cable from one of the NICs and run Lancheck again. This time it should work.
35. Now comes the fun part. You must now get communication between the two so that a workstation on segment 0 can access the files on a server on segment 1. You cannot do this directly because the two segments can't see each other. You also cannot use a Global resource. Verify this as follows:

- a. At the two-NIC server (call her CLEO), run NET_MGR and select *Shared Resources Management* from the menu.
- b. At the Resource List menu, tap *Ins* to add a resource.
- c. When prompted, give the resource the name of *GLOBAL*.
- d. When prompted, fill in a true path that points to the C-DRIVE resource on the server on one of the segments (call him CAESAR.)
- e. When the resource is built, highlight and press *Enter* on the resource line. The **DETAILED INFORMATION** screen appears.



Note that the *Path* and *Drive Type* lines now just say *Global Path*.

- f. Go to the machine in Segment 1 (opposite of CAESAR). Call this machine ANTONY.
- g. From ANTONY, attempt to log into server CAESAR. You will get an error:

ERROR: Cannot locate network name.

You got this error because machines in two different network segments can't talk directly to each other. You already knew this.

- h. At ANTONY, log into server CLEO and use NET to redirect a drive to the GLOBAL resource. You will get the error again:

ERROR: Cannot locate network name.

A global resource is a short cut. You aren't really using any resources on the intermediate server. You're simply passing the login over to the machine on the true path. You've already proven that the machines can't talk to one another. **Global resources do no function as routers.**

36. The only method method for sharing files between segments is to use a double-redirection. This can also be used when the target machine is not a LANTastic server.
 - a. At CLEO, redirect a drive to the C-DRIVE resource on server ANTONY. For example:


```
NET USE S: \\ANTONY\C-DRIVE
```
 - b. At CLEO, run NET_MGR and select *Shared Resources Management* from the menu.

- c. Tap *Ins* to add a new resource. Name the resource SPHINX.
- d. When prompted for a true path, enter the drive letter you designated for the NET USE statement; in our example, that would be S:.
- e. Highlight the driver line and press *Enter*. The **DETAILED INFORMATION** screen appears. Select the *Disk Drive Type* option then the *Other* option from the popup menu. _



This designates this resource as a non-DOS resource. If necessary, Net Manager will set up a file lookup cache with at least 100 handles. As the message says, you must remove and reinstall SERVER to enable this cache. **The resource will not work without a file lookup cache.**

- f. Escape back to the command prompt. If necessary, remove Server from memory using SERVER/REM then run SERVER again.
- g. At server CAESAR, redirect a drive to the SPHINX resource on server CLEO as follows:

```
NET USE X: \\CLEO\SPHINX
```
- h. Change to the X drive and do a DIR. You will see the files on server ANTONY's disk.
- i. Run NET SHOW. Note that the drive shows redirected to server CLEO, not the true server containing the drive. This means that server ANTONY thinks that the request came from CLEO, not CAESAR. **For this reason, file and record locking is not supported on double-redirected drives.**

This is the end of this exercise.

Using LANtastic with Third Party and Multiple Adapters

**Training Workbook
Module NOS11
Revision 1
11/08/94**

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