Installing the Forum-Compliant LAN Emulation Driver for NetWare Server

An addendum to *TURBOWAYS 155 ATM Micro Channel Adapter Installation and Testing Instructions*, GC30-3824.

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1 Installing the Driver

Before you install the NetWare LE client driver, make sure that the following conditions exist.

- The adapter is installed correctly.
- The adapter is connected to an ATM switch.
- The LES is installed and is connected to your ATM network.
- The 20-byte (40-character) LES ATM address is written down.

If the previous conditions do not exist, the driver cannot be loaded.

If you are using NetWare 4.01 or higher, follow the instructions under "Automated Installation of the NetWare LE Client Driver." If you are using NetWare Version 3.12 or higher, see "Manual Installation of the NetWare LE Client Driver".

1.1 Automated Installation of the NetWare LE Client Driver

Perform the following steps to install the NetWare LE client driver.

1. Copy the TURBOWAYS 155 Adapter NetWare Server driver files onto the DOS partition from which the NetWare Server is loaded.
2. Type **server** at the DOS prompt and press **Enter** to start the NetWare Server.

   If this is the first time the server is being set up, follow the instructions in the NetWare documentation for installing the NetWare Server code, and then continue with step 3.

   If this is not the first time the server is being set up, you must start the NetWare installation program. To start the NetWare installation program, perform the following steps:

(a) At the console prompt, type **load install** and press **Enter**.
(b) Select **Driver options** from the Installation Options menu list shown on the display and press **Enter**.
(c) Select **Configure network drivers** from the Driver options and press **Enter**.
(d) Select **Select a driver** from the Additional Driver Actions box and press **Enter**.

3. From the Select a Driver menu, press **Insert** to load a LAN driver not listed. A default directory path (A:\) will appear on your display.

4. Press **F3** to specify the source drive or directory. Specify the correct source drive and directory and press **Enter**.

5. Select **TURBOWAYS 155 MCA ATM FC Ethernet NetWare ODI Driver** if the workstation will be connected to an emulated Ethernet network or **TURBOWAYS 155 MCA ATM FC Token-Ring NetWare ODI Driver** if the workstation will be connected to an emulated token-ring network. Press **Enter** to load the LAN driver listed. At the "Do you want to copy driver?" prompt, answer Yes.

   A panel will now appear that lists parameter entry fields.

6. Cursor to the Protocols box and press **F3** to display a list of IPX frame types. Select the appropriate frame types with the Enter key. Press **F10** to save values and return to the previous menu.

7. Cursor down to highlight the Parameters box and type the number of the slot in which the TURBOWAYS 155 Adapter is installed in the first entry field. Press **Enter** to move to the LES ATM High Address entry field.

8. In the LES ATM High Address entry field, type in the first 20 characters of the LES ATM Address. (The LES ATM address must be broken into two numbers because of NetWare command-line limitations.) Press **Enter** to move to the LES ATM Low Address entry field.

9. Type in the second 20 characters of the LES ATM Address. Press **Enter**. Press **F10** to save the parameter settings.

10. Verify that all of the information displayed on this panel is correct. If any of the information is not correct, you will receive an error when you load the server driver.

11. When you are sure that all of the information displayed is correct, cursor to **Save parameters and load driver** and press **Enter**.

    If you receive any errors while the driver is being loaded, note the error numbers. See "Driver Messages" for a list of error codes and suggested actions.

12. If no errors occur while the driver is being loaded, you will see a panel that specifies the network address to bind IPX. Press **Enter** to accept the default and continue.

    If you do not want to accept the default, type in the address you prefer and press **Enter** to continue.

    At the "Do you want to select an additional network driver?" prompt select No.

    A panel will now appear showing the new driver under the selected Network Drivers list.

13. If this is the first time the server is being set up, the installation program will automatically take you through the steps to create the AUTOEXEC.NCF file. Follow any instructions listed on the panels. When the AUTOEXEC.NCF file is created, press **F10** to save it and exit the program.

If this is not the first time the server is being set up, you must manually change the AUTOEXEC.NCF file. To do so, press **Esc** until you return to the Installation Options menu and continue with step 13.

14. From the Installation Options menu, select **NCF Files Options** and press **Enter**.

15. From the Available NCF Files Options menu, select **Create AUTOEXEC.NCF File** and press **Enter**. A panel will appear displaying the current NCF file and the suggested NCF file with the new server driver information included.

16. The help text displayed at the bottom of the panel lists the commands for marking and moving text. No editing is required if you want to use the suggested changes.

17. Press **F10**. Select Yes to save the new AUTOEXEC.NCF file, or select No to abort the changes. Press **Esc** three times and select Yes to exit the installation.

1.2 Manual Installation of the NetWare LE Client Driver

The following procedure must be used to install the NetWare LE client driver if you are using NetWare Version 3.12 or higher. It can also be used to install the NetWare LE client driver if you are using NetWare Version 4.01 or higher and if you do not want to use the automated procedure described in "Installing the LAN Emulation Client Driver for NetWare Server".

Note: This process is only valid if you are binding one frame type. If you are binding more than one frame type, you need to make a configuration file, as described in Creating a Configuration File for the NetWare LE Client Driver.

Perform the following steps to install the NetWare LE client driver:

1. From your computer's DOS partition, create an *x*:\nws directory, where *x* is the drive on which you want to install the NetWare Server files and *nws* is the directory.

2. Copy the NetWare Server files to the x:\nws directory.

3. Type **server** at the DOS prompt and press **Enter** to start the NetWare Server.

4. If the console prompt does not appear, press **Alt** and **Esc** together to get to the panel containing the console prompt.

5. At the console prompt, type **search** and press **Enter** to see the server's search path. If the directory to which you copied the NetWare Server files is not listed, you must add it to the search path.

   For example, if `c` is the drive and `nws` is the directory that you created in step 1, to add your directory to the search path you would type **search add 1 c:\nws**.

6. Load the NetWare ATM LAN 155-Mbps driver.

   If you are working in an Ethernet network, type the following command at the command line. Note that the command should be typed as one line. Make sure to leave a space before each of the keywords.

   ```
   load atmenfc slot=x laha=xxxxxxxxxxxxxxxxxxxx lala=xxxxxxxxxxxxxxxxxxxx
   ```

   where:

`slot=` the number of the slot in which the adapter is installed.
`laha=` the high-order bytes (first 20 characters) of the LES ATM address.
`lala=` the low-order bytes (last 20 characters) of the LES ATM address.

If you are working in a token-ring network, type the following command at the command line. Note that the command should be typed as one line. Make sure to leave a space before each of the keywords.

```
load atmtrfc slot=x laha=xxxxxxxxxxxxxxxxxxxx lala=xxxxxxxxxxxxxxxxxxxx
```

where:

`slot=` the number of the slot in which the adapter is installed.
`laha=` the high-order bytes (first 20 characters) of the LES ATM address.
`lala=` the low-order bytes (last 20 characters) of the LES ATM address.

Each of the keywords listed in the preceding chart is required when loading the NetWare LE client driver.

Note: The LES ATM address must be broken into two numbers because of NetWare command-line limitations.

7. Bind needed protocol stacks to the ATMENFC or ATMTRFC LAN driver. For example, to bind IPX to the ATMENFC driver with an IPX network number of 1234, you would add the following line to your AUTOEXEC.NCF file:

   ```
   bind ipx to atmenfc net=1234
   ```

   Refer to your NetWare documentation for more information about binding protocol stacks and a description of the IPX protocol.

8. If you want the NetWare LE client driver to be loaded automatically when you start the NetWare Server, perform the following steps:

   (a) Edit the AUTOEXEC.NCF file as a user with supervisor rights. If you can log into the server from a workstation, you can access the AUTOEXEC.NCF file through the SYSTEM subdirectory. Otherwise, type **load edit sys:system\autoexec.ncf** at the server console prompt and press **Enter** to access the AUTOEXEC.NCF file.
   (b) Once you have access to the file, go to the bottom of the file and add the same commands you entered to load the server driver. The following lines are representative of the commands you might add to your AUTOEXEC.NCF file to load the NetWare LE client driver. The path, directory, and keyword values should be changed to match those you used when loading the NetWare LE client driver on your network. Note that the load command should be typed as one line. Make sure to leave a space before each of the keywords.

   If you are installing the NetWare LE client driver in an emulated Ethernet network, add the following three lines of text:

   ```
   search add 1 c:\nws
   load atmenfc slot=x laha=xxxxxxxxxxxxxxxxxxxx lala=xxxxxxxxxxxxxxxxxxxx
   bind ipx to atmenfc net=1234
   ```

   If you are installing the NetWare LE client driver in an emulated token-ring network, add the following three lines of text:

```
search add 1 c:\nws
load atmtrfc slot=x laha=xxxxxxxxxxxxxxxxxxxx lala=xxxxxxxxxxxxxxxxxxxx
bind ipx to atmenfc net=1234
```

(c) Save the changes and exit the AUTOEXEC.NCF.

(d) The NetWare LE client driver will now be loaded automatically when you start the NetWare Server.

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2 Configuring the Driver

2.1 Creating a Configuration File for the NetWare LE Client Driver

The NetWare LE client driver parameters listed under "Manual Installation of the NetWare LE Client Driver" are the only parameters required when you load the driver. However, if you are installing more than one protocol on a card or using another customized setting, you may want to create a configuration file to specify some of the other parameters or to configure values other than the defaults.

If this is the case and you must specify several parameters each time you load the NetWare LE client driver, it is possible that you will use more characters than the server command line can accept.

For that reason, you might need to create a configuration file and load it when you load the server driver. To create and load a configuration file, perform the following steps:

1. If you are working in an Ethernet network, at the server console prompt, type **load edit c:\nws\atmen155.cfg** where `c` is the drive, `nws` is the directory where you installed the NetWare LE client driver, and `atmen155.cfg` is your configuration file name. Press **Enter**.

   If you are working in a token-ring network, at the server console prompt, type **load edit c:\nws\atmtr155.cfg** where `c` is the drive, `nws` is the directory where you installed the NetWare LE client driver, and `atmtr155.cfg` is your configuration file name. Press **Enter**.

2. Add the parameters you need to specify when you load the driver. Each parameter and its value should be listed on a separate line. For example, a configuration file using the parameters listed in "Manual Installation of the NetWare LE Client Driver" would look like this:

   ```
   slot=x
   laha=xxxxxxxxxxxxxxxxxxxx
   lala=xxxxxxxxxxxxxxxxxxxx
   ```

3. When you have listed all the parameters that you need to use, save the configuration file.

4. If you are working in an Ethernet network, type the following at the console prompt to load the NetWare LE client driver:

   ```
   load atmenfc @atmen155.cfg
   bind ipx to atmenfc net=1234
   ```

   Substitute `atmen155.cfg` with the configuration file name you specified when you created it. If you want the NetWare LE client driver to be loaded automatically, add the above lines to the AUTOEXEC.NCF file.

   If you are working in a token-ring network, type the following at the console prompt to load the NetWare LE client driver:

```
load atmtrfc @atmtr155.cfg
bind ipx to atmenfc net=1234
```

Substitute `atmtr155.cfg` with the configuration file name you specified when you created it. If you want the NetWare LE client driver to be loaded automatically, add the above lines to the AUTOEXEC.NCF file.

Typing **config** will display loaded cards, drivers, and bound protocols.

2.2 Sample ATM.CFG Configuration File for NetWare Server

The following lines are an example of how the configuration file might look. Any valid command-line keyword parameter can be specified in the configuration file. Specify only one keyword per line.

```
SLOT=3
NODE=020000002222L
LAHA=0123456789ABCDEF0123
LALA=456789ABCDEF01234567
```

Note: A semicolon ";" will **not** comment out a line in a NetWare CFG file.

2.3 ATM Forum-Compliant LAN Emulation NetWare Server Driver Parameters

Table 1. TURBOWAYS 155 Adapter NetWare Server Driver Keywords

Required Keywords

Parameter	Description
SLOT=	This keyword defines the slot number of the corresponding IBM TURBOWAYS 155 Adapter in the computer. To avoid being prompted to enter a slot number when the ATMENFC or ATMTRFC LAN driver is loaded, specify this keyword either in the AUTOEXEC.NCF file, the NetWare CFG file you created, or on the command line. This keyword must be within the range of 1-8.
LAHA=	This keyword defines the high-order bytes of the ATM address of the LAN Emulation Server that will service this end system. This keyword is specified as 20 hexadecimal digits. The entire (40 hexadecimal digits) LAN Emulation Server ATM address can be obtained either from the LAN Emulation Server console screen or from your system administrator.
LALA=	This keyword defines the low-order bytes of the ATM address of the LAN Emulation Server that will service this end system. This keyword is specified as 20 hexadecimal digits. The entire (40 hexadecimal digits) LAN Emulation Server ATM address can be obtained either from the LAN Emulation Server console screen or from your system administrator.

Optional Keywords

FRAME=

This keyword defines the frame type to be used with the IBM TURBOWAYS 155 Adapter when loading the ATMENFC LAN driver. This default value is ETHERNET_802.2.

- ETHERNET_802.2
- ETHERNET_802.3
- ETHERNET_II
- ETHERNET_SNAP

This keyword defines the frame type to be used with the IBM TURBOWAYS 155 Adapter when loading the ATMTRFC LAN driver. This default value is TOKEN-RING.

- TOKEN-RING
- TOKEN-RING_SNAP

NODE=

This keyword is used to set a locally administered address for the IBM TURBOWAYS 155 Adapter. A local address must contain 12 hexadecimal characters and can be specified in either MSB (Most Significant Bit) or LSB (Least Significant Bit) format.

To specify a MSB node address the letter "M" immediately follows the last digit of the node address. If an "M" or "L" is not specified after the last digit of the node address, the default format for the address is LSB for Ethernet. This keyword is specified on the command line or in the ATM.CFG as NODE for the NetWare Server. See "Sample ATM.CFG Configuration File for NetWare Server" for a sample ATM.CFG file. If a node address is specified in MSB format, the characters must be within the range 400000000000-7FFFFFFFFFFF (for example, 400000000001M). This same address specified in LSB format would be 020000000080L with an "L" optionally appended to the end.

Notes:

1. Do not assign the same local address to 2 or more stations. Severe station communication or network failures may occur when 2 or more stations are assigned the same address.
2. If you do not assign a locally administered address, the adapter uses the universally administered address permanently embedded on the adapter.

RXBUFFERS=

This keyword defines the number of receive buffers used by the ATMENFC or ATMTRFC LAN driver.
The range for this keyword is 5 to 64. The default is 10. (Receive buffer size is defined by the server SET command. See NOVELL NETWARE SYSTEM ADMINISTRATION for more information.)

TXBUFFERS=

This keyword defines the number of transmit buffers used by the ATMENFC or ATMTRFC LAN driver.
The range for this keyword is 1 to 32. The default is 5. Maximum transmit frame size is defined by the server SET command. See NOVELL NETWARE SYSTEM ADMINISTRATION for more information.)

MCONN=

This keyword defines the number of connections that driver can maintain. The range for this keyword is 6 to 1024. The default value is 260.

MMA=

This keyword defines the maximum number of multicast addresses that the ATMENFC or ATMTRFC LAN driver can use. The range for this keyword is 8 to 64. The default is 8.

BEPR=

This keyword defines the data rate for data plane connections in Kbps. The range for this keyword is 1000 to 155500. The default is 25000.
NOTE: This value should be set to the same value in the client machines.

CPPR=

This keyword defines the data rate for control plane connections in Kbps. The range for this keyword is 1000 to 155500. The default is 25000.
NOTE: This value should be set to the same value in the client machines.

AT=

This keyword defines the maximum time that an ARP table entry is maintained without verification. The range for this keyword is 10 to 300 seconds. The default is 300.

CCT=

This keyword defines the time period in which data or a READY_IND message is expected from the calling party. The range for this keyword is 1 to 10 seconds. The default is 4.

CTO=

This keyword defines the time out period for most request/response control frame interactions. The range for this keyword is 10 to 300 seconds. The default is 120.

ELN=

This keyword defines the name of the emulated LAN that this end station attempts to join. This keyword can be 1 to 32

characters long.

EM=

This keyword defines an Enhanced Mode in which this end station can continue to communicate with other stations with other stations also using the Enhanced Mode during certain types of network failure. A 1 enables the Enhanced Mode. The default is 0 which disables the Enhanced Mode.

ELART=

This keyword defines the maximum time the LE_ARP_REQUEST/LE_ARP_RESPONSE cycle is expected to complete. The range for this keyword is 1 to 30 seconds. The default is 1.

FT=

This keyword defines maximum time to wait to receive an LE_FLUSH_RESPONSE after the LE_FLUSH_REQUEST has been sent before taking recovery action. The range is 1 to 4 seconds. The default is 4.

FDT=

This keyword defines maximum time that an ARP entry for a non-local MAC address is maintained without verification. The range is 4 to 30 seconds. The default is 15.

ACS=

This keyword defines the number of entries in the ARP table that maintains the ATM addresses for LAN destinations. The range is 16 to 50.

LAC=

This keyword defines the configuration mode that determines how the adapter obtains the LES ATM address. A 0 directs the driver to use the user-defined value of the LES_ATM_ADDR parameter for the LES ATM address. If your network has an LECS, a 1 directs the adapter to contact the LECS to determine the LES ATM address automatically.

MCR=

This keyword defines the maximum number of times that a CONFIG_REQUEST is resent to the LECS and a JOIN_REQUEST is resent to the LES in the absence of a response during the join process. The range for this keyword is 0 to 2. The default is 1.

MRC=

This keyword defines the maximum number of times the LE_ARP_REQUEST is retried. The range for this keyword is 0 to 2. The default is 1.

```
MUFC=
       This keyword defines the maximum number of frames for a given
       unicast MAC address that can be sent to the Broadcast and
       Unknown Server (BUS).  The range for this keyword is 1 to
       100.  The default is 10.

PSD=
       This keyword defines the time allowed from the sending of a
       frame to the BUS until the LEC assumes that the frame either
       has been discarded or has been delivered to the recipient.
       The range for this keyword is 1 to 8 seconds.  The default is
       6.

VCCTO=
       This keyword defineds the time that the adapter maintains
       inactive data connections.  The range for this keyword is 30
       to 99999999 seconds.  The default is 1200.
```

3 Tuning the Driver

3.1 ATMENFC or ATMTRFC LAN Driver Performance Tuning

This section describes how to get the best performance from the IBM TURBOWAYS 155 Adapter and ATMENFC or ATMTRFC LAN driver.

3.2 NetWare Server

The maximum frame size that can be sent or received by the Ethernet LAN driver is 1516. For the Token-Ring LAN driver, the maximum frame size is 18190.

Note: The maximum frame size for Token Ring is also limited by the LES. Depending on the LES configuration, the maximum frame size can be set at 18190, 9234, 4544, or 1516.

Since frame sizes are typically negotiated between the NetWare server and workstations, it is best to configure receive buffer sizes at the server that equal the maximum transmit buffer size at workstations. For this reason, increasing your receive buffer size to a value that is too big only increases the amount of memory that is used by NetWare and may not increase the performance of the IBM TURBOWAYS 155 Adapter, the ATMENFC/ATMTRFC LAN driver or NetWare.

Since the ATMENFC.LAN or ATMTRFC.LAN driver uses NetWare receive buffers to receive frames, the size of receive buffers used by the ATMENFC.LAN or ATMTRFC.LAN driver is configurable by changing the size of the NetWare receive buffers. To obtain the best performance from the ATMENFC or ATMTRFC LAN driver edit the STARTUP.NCF file and modify the following NetWare parameter according to your configuration as indicated in the example below:

ATMENFC.LAN Set Maximum Physical Receive Packet Size = 1516

ATMTRFC.LAN Set Maximum Physical Receive Packet Size = 18190

If the above parameter is not found in the STARTUP.NCF, use the NetWare set command to view system parameters and ensure that the default for this parameter is greater than the values appropriate for your configuration. If it is less, specify the above parameter in the STARTUP.NCF.

4 Driver Messages

This appendix contains messages that can be received from the NetWare NDIS MAC drivers and the NetWare ODI-to-NDIS mapper.

4.1 NetWare Driver Messages

This section contains messages that can be received from the NetWare NDIS MAC driver and the NetWare ODI-to-NDIS mapper. The messages are either displayed or logged to a file. See Table 2 to determine where you should go for more information on the messages you are receiving.

Table 2. Driver Messages

Message	For More Information
Message prefix ATMENFC or ATMTRFC	Go to the appropriate section
Other messages	Refer to your network application documentation: for example, your NetWare documentation.

4.2 ATMENFC/ATMTRFC LAN Driver Messages

This section contains the messages for the TURBOWAYS 155 ATM Ethernet LAN Driver (ATMENFC) and the TURBOWAYS 155 ATM Token-Ring LAN Driver (ATMTRFC). If you receive a message that is not listed here, contact your IBM representative.

ATMENFC/ATMTRFC-NW-200
Initializing the TURBOWAYS 155 ATM Adapter...please wait.
Explanation: The TURBOWAYS 155 ATM Adapter initialization process has started.
User Action: No action is required.

ATMENFC/ATMTRFC-NW-202
TURBOWAYS 155 ATM Adapter requires a computer with a Micro Channel bus.
Explanation: The TURBOWAYS 155 ATM Adapter works only in a computer that supports the IBM Micro Channel architecture.
User Action: Install the TURBOWAYS 155 ATM Adapter in a computer that supports the IBM Micro Channel architecture.

ATMENFC/ATMTRFC-NW-204
TURBOWAYS 155 ATM Adapter hardware failure.
Explanation: There is a problem with the TURBOWAYS 155 ATM Adapter.
User Action: Reload the ATMENFC/ATMTRFC driver. If the error persists, run the adapter diagnostic tests located on the Option diskette that was shipped with the TURBOWAYS 155 ATM Adapter. If there are no problems with the adapter, reload the ATMENFC/ATMTRFC driver. If a problem is found, follow the instructions supplied with the diagnostic tests to correct the problem.

ATMENFC/ATMTRFC-NW-208
TURBOWAYS 155 ATM Adapter driver allocate memory failure.
Explanation: The NetWare operating system was unable to allocate memory for the ATMENFC/ATMTRFC driver. The ATMENFC/ATMTRFC driver did not load.
User Action: Unload the NetWare Loadable Modules (NLMs) that are loaded but are not being used, and then load the ATMENFC/ATMTRFC driver. If the error persists, power off and then restart the server. Load the ATMENFC/ATMTRFC driver before loading the NLMs. This might require you to edit the AUTOEXEC.NCF file before restarting the server. Refer to your NetWare documentation

for information about the AUTOEXEC.NCF file. The NetWare Server requires a minimum of 16 MB of memory.

ATMENFC/ATMTRFC-NW-210

TURBOWAYS 155 ATM Adapter not found.

Explanation: No TURBOWAYS 155 ATM Adapter is installed in this computer. The ATMENFC/ATMTRFC driver did not load.

User Action: Install a TURBOWAYS 155 ATM Adapter in this computer (if it has a 486 or higher processor), and then reload the ATMENFC/ATMTRFC driver.

ATMENFC/ATMTRFC-NW-212

TURBOWAYS 155 ATM Adapter could not be reset.

Explanation: The ATMENFC/ATMTRFC driver timed out while waiting for the TURBOWAYS 155 ATM Adapter to complete a hardware reset. The ATMENFC/ATMTRFC driver did not load.

User Action: Restart your computer and try to load the ATMENFC/ATMTRFC driver again. If the error persists, contact your network administrator.

ATMENFC/ATMTRFC-NW-214

The slot to use for the TURBOWAYS 155 ATM Adapter was not specified.

Explanation: The ATMENFC/ATMTRFC driver prompted the user to select a slot number that has a TURBOWAYS 155 ATM Adapter installed, but no choice was made.

User Action: No action is required.

ATMENFC/ATMTRFC-NW-216

TURBOWAYS 155 ATM Adapter driver configuration error.

Explanation: The ATMENFC/ATMTRFC driver could not be loaded because of a configuration error.

User Action: Check the keywords specified and reload the ATMENFC/ATMTRFC driver.

ATMENFC/ATMTRFC-NW-218

TURBOWAYS 155 ATM Adapter could not register with ATM switch.

Explanation: The ATMENFC/ATMTRFC driver failed to make connections with the ATM switch.

User Action: Make sure that the ATM switch is working correctly. Make sure that the cables are connected correctly. Reload the ATMENFC/ATMTRFC driver.

ATMENFC/ATMTRFC-NW-220

TURBOWAYS 155 Adapter Adapter microcode load failure.

Explanation: One or more of the required microcode files (RIC_BASE.REL, RIC_KERN.REL, DDIF155.OUT, ATM155.CFG) is either not in the same directory as the ATMENFC/ATMTRFC driver module, or the microcode files have become corrupted.

User Action: Copy the four microcode files (RIC_BASE.REL, RIC_KERN.REL, DDIF155.OUT, ATM155.CFG) from the original program diskettes that were shipped with the TURBOWAYS 155 ATM Adapter into the same directory where the ATMENFC/ATMTRFC driver module resides.

ATMENFC/ATMTRFC-NW-224

TURBOWAYS 155 ATM Adapter driver could not connect with the LAN Emulation Server.

Explanation: The ATMENFC/ATMTRFC driver could not make a connection with the LES.

User Action: Make sure that the LES ATM address is entered correctly using the LAHA and LALA keywords. Make sure that the ATM switch is working correctly. Make sure that the LES is loaded. Reload the ATMENFC/ATMTRFC driver.

ATMENFC/ATMTRFC-NW-226

TURBOWAYS 155 ATM Adapter was not loaded because the LES ATM address was missing.

Explanation: The LES ATM address was not entered when the driver was loaded.

User Action: Use the keywords LAHA and LALA to enter the address.

ATMENFC/ATMTRFC-NW-230

TURBOWAYS 155 ATM Adapter driver non-valid custom keyword value.

Explanation: A non-valid value for one of the keywords was entered.

User Action: Correct the keyword value and reload the ATMENFC/ATMTRFC driver.

ATMENFC/ATMTRFC-NW-232
TURBOWAYS 155 ATM Adapter driver successfully loaded.
Explanation: The ATMENFC/ATMTRFC driver is now loaded.
User Action: No action is required.

ATMENFC/ATMTRFC-NW-233
TURBOWAYS 155 ATM Adapter duplicate ATM address detected by the switch.
Explanation: The LES ATM address already is registered with the switch.
User Action: Verify that the locally administered address is unique in the ATM network.

TURBOWAYS 155 Adapter fiber cable disconnected or loss of light detected.
Explanation: The TURBOWAYS 155 ATM Adapter detected a loss of light in the fiber cable.
User Action: Make sure that the cable is connected correctly to the adapter. If the cable is connected, then verify that the ATM switch is working and that the cables are connected correctly.

TURBOWAYS 155 Adapter fiber cable reconnected or light detected.
Explanation: The TURBOWAYS 155 ATM Adapter detected light in the fiber cable. Either the cables were reconnected or the ATM switch was restored to working order.
User Action: No action is required.

TURBOWAYS 155 Adapter connection to LAN Emulation Server failed.
Explanation: The ATMENFC/ATMTRFC driver's connection to the LES was broken.
User Action: Make sure that the ATM switch is working correctly. Make sure that the LES is loaded. Reload the ATMENFC/ATMTRFC driver.

TURBOWAYS 155 Adapter connection to LAN Emulation Server is released (retrying...)
Explanation: The ATMENFC/ATMTRFC driver's connection to the LES was broken.
User Action: Make sure that the ATM switch is working correctly. Make sure that the LES is loaded. Reload the ATMENFC/ATMTRFC driver.

TURBOWAYS 155 Adapter connection to LAN Emulation Server is established.
Explanation: The connection to the LES was reestablished.
User Action: No action is required.

TURBOWAYS 155 Adapter connection to the switch is not established (retrying...).
Explanation: The driver has been loaded successfully, but no connection has been established with the ATM switch.
User Action: Check that the ATM switch is working correctly and that the ATM switch port on which the adapter is connected is enabled.

TURBOWAYS 155 Adapter connection to the switch is established.
Explanation: The TURBOWAYS 155 ATM Adapter has established a connection with the ATM switch.
User Action: No action is required.

5 TURBOWAYS 155 Adapter Custom Statistic Counters

The custom statistic counters provide the user with information that is specific to the TURBOWAYS 155 Adapter and the ATMENFC and ATMTRFC drivers. This appendix contains explanations of the custom statistic counters and what action, if any, you should take.

Errors reported by adapter
Description: This counter indicates the number of hardware errors reported by the TURBOWAYS 155 Adapter.
Cause/User Action: If the server is switched on for a long time, accumulated network errors (especially from the concentrator) can cause this counter to become large. If this is the case, the TUR-

BOWAYS 155 Adapter and the ATMENFC or ATMTRFC driver recover from these errors. Check other devices that are attached to the network.

If this counter continues to increase, run the adapter diagnostic test located on the Option diskette that was shipped with the TURBOWAYS 155 Adapter. If there are no problems with the adapter, reload the ATMENFC or ATMTRFC driver. If a problem is found, follow the instructions supplied with the diagnostic tests to correct the problem.

All queued RCBs in use count

Description: This counter indicates the number of times the LAN driver had all of the available receive control blocks (RCBs) in use when a frame was thrown away because there was not an RCB available.

Cause/User Action: The number of RCBs specified when the LAN driver was loaded is too small. If this count continues to increase, unload the driver and reload it with more RCBs. Use RXBUFFERS to increase the number of RCBs.

Total CRC errors

Description: This counter indicates the number of cyclic redundancy check (CRC) errors detected.

Cause/User Action: The TURBOWAYS 155 Adapter and the ATMENFC or ATMTRFC driver might recover from these errors.

If this counter continues to increase, run the adapter diagnostic test located on the Option diskette that was shipped with the TURBOWAYS 155 Adapter. If there are no problems with the adapter, reload the ATMENFC or ATMTRFC driver. If a problem is found, follow the instructions supplied with the diagnostic tests to correct the problem.