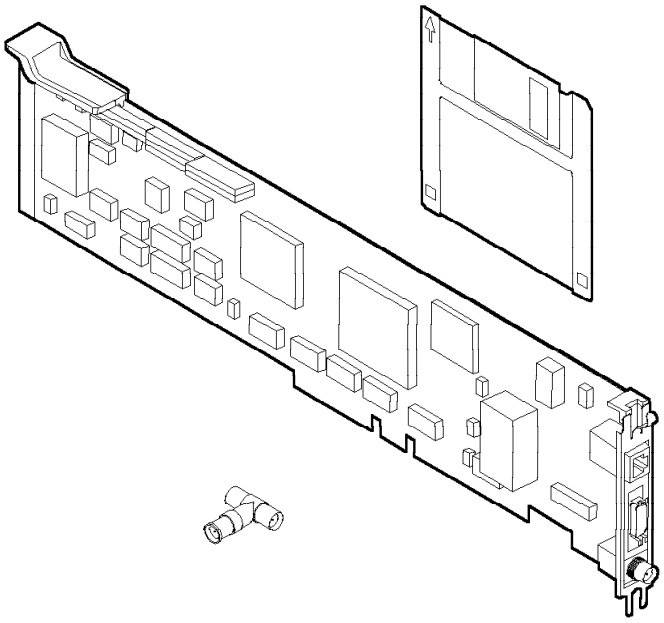
Ethernet Auto Busmaster MC 32 Adapter—Installation and Testing Instructions



This adapter kit consists of:

- The Ethernet Auto Busmaster MC 32 Adapter
- The Ethernet Auto Busmaster MC 32 Adapter Option diskette
- A BNC T-connector
- This document

If any item is missing or damaged, contact your place of purchase.

The Ethernet Auto Busmaster MC 32 Adapter is for use with a personal computer equipped with Micro Channel architecture.

Part Number: 13H8425

First Edition (June 1993)

Contents

Electronic Emission Notices

The following statements apply to this product. The statement for other products intended for use with this product will appear in their accompanying manuals.

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. This company is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Canadian Department of Communications Compliance Statement

This equipment does not exceed Class A limits per radio noise emissions for digital apparatus, set out in the Radio Interference Regulation of the Canadian Department of Communications. Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps are necessary to correct the interference.

Avis de conformité aux normes du ministère des Communications du Canada

Cet équipement ne dépasse pas les limites de Classe A d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Règlement sur le brouillage radioélectrique établi par le ministère des Communications du Canada. L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions radio et télé, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

Telecommunications Safety Requirements in the United Kingdom

This product is made of high safety standards. It complies inherently with telecommunications safety standard BS6301. It is not designed to provide protection from excessive voltages appearing externally at its interfaces. Therefore, when this product is connected to a public telecommunications network via any other equipment, and you connect to this product items not supplied by this company, you must comply with mandatory telecommunications safety requirements.

You may do this either by choosing products which also are approved as complying to BS6301 or British Telecom Technical Guide No. 26, or by the use of approved safety barriers. Consult the local office of your public telecommunications operator for advice and permission to make the connections.

Japanese Voluntary Control Council for Interference (VCCI) Statement (Class 1 Equipment)

This equipment is Class 1 Equipment (information equipment to be used in commercial and industrial districts) which is in conformance with the standard set by Voluntary Control for Interference by Data Processing Equipment and Electronic Office Machines (VCCI) with an aim to prevent radio interference in commercial and industrial districts.

This equipment could cause interference to radio and television receivers when used in and around residential districts.

Please handle the equipment properly according to the instruction manual.

情報処理装置等電波障害自主規制協議会
(VCCI)表示

電波障害自主規制届出装置の記述

この装置は、第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）基準に適合しております。
従って、住宅地域またはその隣接した地域で使用すると、ラジオ、テレビジョン受信機等に受信障害を与えることがあります。

関連マニュアルに従って正しい取り扱いをしてください。

System Security

This product is intended for use within a single establishment and within a single homogeneous user population. For sensitive applications requiring isolation from each other, management may wish to provide isolated cabling or to encrypt the sensitive data before putting it on the network.

Trademarks

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IBM	IBM Corporation
Micro Channel	IBM Corporation
Microsoft	Microsoft, Inc.
NetWare	Novell, Inc.
Novell	Novell, Inc.
Operating System/2	IBM Corporation
OS/2	IBM Corporation

Related Publications

The following publications are related reading for the use of this adapter.

Publications shipped with your computer:

- The computer's instruction manual

Local Area Network publications:

- *IBM Local Area Network Technical Reference*, SC30-3383, or equivalent
- *IBM Local Area Network Administrator's Guide*, GA27-3748, or equivalent.

Software publications:

- *IBM Local Area Network Support Program User's Guide* (supplied with the IBM Local Area Network Support Program)
- *IBM Operating System/2 Local Area Network Server Network Administrators Reference Volume 1: Planning and Installation (Version 3.0)*, S96F-8428
- Any of the publications that were supplied with the network operating systems you are using.

For assistance in obtaining publications, contact your place of purchase.

The Ethernet Auto Busmaster MC 32 Adapter

The Ethernet Auto Busmaster MC 32 Adapter allows you to attach personal computers equipped with Micro Channel* architecture to an Ethernet Network.

The Ethernet Auto Busmaster MC 32 Adapter transmits and receives data at a rate of 10 Mbps over IEEE 802.3 Standard 10BASE-T (unshielded twisted-pair[UTP]), IEEE 802.3 Standard 10BASE2 (thin coaxial), or AUI (thick coaxial or fiber) media.

Installing the Adapter

There are some exceptions to the following instructions for installing and testing the Ethernet Auto Busmaster MC 32 Adapter. Please review the topics discussed in Appendix A before continuing with the installation. Situations may be referenced in the appendix that apply to the installation and testing procedures you will need to follow.

To install the Ethernet Auto Busmaster MC 32 Adapter:

1. Read the information under “Items Needed to Install the Adapter” on page 3 to make sure that you have everything you need to install the adapter.
2. Read the information under “Software Prerequisites” on page 6 to make sure that you have the programs necessary to use the adapter.
3. Follow the instructions under “Updating the Backup Copy of the Reference Diskette” on page 7.
4. Follow the instructions under “Placing the Adapter in an Expansion Slot” on page 8.
5. Follow the instructions under “Connecting the Adapter to the Network” on page 8.

6 Follow the instructions under “Configuring the Adapter” on page 13 to make sure that the adapter is configured to work with your network.

7 Follow the instructions under “Testing the Adapter” on page 20 to make sure that you have installed the adapter correctly.

8 Follow the instructions under “Installing Network Program Device Drivers” on page 24 to install the device driver for your network.

Note: If you are installing more than one Ethernet Auto Busmaster MC 32 Adapter, install the first and be sure it is working before you begin installing the next adapter.

Items Needed to Install the Adapter

To install the Ethernet Auto Busmaster MC 32 Adapter, you need:

- The Ethernet Auto Busmaster MC 32 Adapter
- The Ethernet Auto Busmaster MC 32 Adapter Option Diskette packaged with the following:

Filename:	File Description:
Root directory	
@8FA8.ADF	adapter definition file
@8FA8.DGS	adapter diagnostic file
READ.ME	additional information about this product; exceptions and hints
UPDATE_M.EXE	FLASH update program
UPDATE.MSG	Message file for FLASH update program
SC.EXE	configuration program
DIAGS.COM	Support for Reference Diskette diagnostics
CMD.COM	Support for Reference Diskette diagnostics
MPC.OS2	OS/2 NDIS MAC device driver
MPC.NIF	OS/2 network information file
LTC.MSG	OS/2 message file
LTCH.MSG	Help Text for OS/2 Messages
MPC.DOC	NDIS device driver documentation
DOS directory	
MPC.DOS	DOS NDIS MAC device driver
MPC.NIF	DOS network information file
LTC.MSG	DOS message file
MPC.DOC	NDIS device driver documentation
ODI2NDI\DOS directory	
PROTMAN.DOS	DOS Protocol Manager
NETBIND.COM	DOS NDIS bind module
ODI2NDI.COM	DOS ODI to NDIS enabler

Filename:	File Description:
ODI2NDI.DOC	ODI2NDI documentation
LT8.MSG	DOS ODI2NDI message file
PROTOCOL.INI	Sample PROTOCOL.INI file
CONFIG.SYS	Sample CONFIG.SYS file
NET.CFG	Sample NET.CFG file
ODI2NDI\OS2 directory	
PROTMAN.OS2	OS/2 Protocol Manager
NETBIND.EXE	OS/2 NDIS bind module
ODI2NDI.OS2	OS/2 ODI to NDIS enabler
ODI2NDI.DOC	ODI2NDI documentation
LT8.MSG	OS/2 ODI2NDI message file
LT8H.MSG	Help text for OS/2 ODI2NDI messages
NOVELL\NETWARE directory	
MPCO.LAN	NetWare* server ODI LAN driver
MPCO.LDI	Installation information file
MSM31X.NLM	Media Support Module for NetWare 3.X
ETHERTSM.NLM	Ethernet Support Module
PATCHMAN.NLM	NetWare Patch Manager
LSLENH.NLM	NetWare LSL Patch
MONITOR.NLM	NetWare Monitor program
MPCO.DOC	NetWare LAN driver documentation
MSLANMAN.DOS\DRIVERS\NIF	
MPC.NIF	DOS LAN Manager network information file
MSLANMAN.DOS\DRIVERS\STREAMER\MPC	
MPC.DOS	DOS NDIS Device Driver
MPC.NIF	DOS NDIS network information file
PROTOCOL.INI	DOS NDIS Device Driver configuration parameters
LTC.MSG	DOS message file
MPC.DOC	NDIS device driver documentation
MSLANMAN.OS2\DRIVERS\NIF	
MPC.NIF	OS/2 LAN Manager network information file

Filename:	File Description:
MSLANMAN.OS2\DRIVERS\STREAMER\MPC	
MPC.OS2	OS/2 NDIS Device Driver
MPC.NIF	OS/2 NDIS network information file
PROTOCOL.INI	OS/2 NDIS Device Driver configuration parameters
LTC.MSG	OS/2 message file
LTCH.MSG	Help text for OS/2 messages
MPC.DOC	NDIS device driver documentation

- One of the following cables (not furnished with this adapter; see the figure on page 8):
  - A Category 3, 4, or 5 cable with RJ-45 connectors, for use with the unshielded twisted-pair (10BASE-T) media in your Ethernet network.

    The maximum length of twisted-pair cable between the concentrator and the workstation is 328 feet (100 meters).
  - An RG-58 standard coaxial cable (IEEE standard 802.3 10BASE2) with bayonet connectors (BNCs), if your Ethernet network uses thin coaxial media (the BNC T-type connector that was shipped with this package is also required).

    The maximum length of thin coaxial cable between each repeater is 606.8 feet (185 meters).
  - A shielded-twisted-pair drop cable with AUI connectors, if your Ethernet network uses external transceivers. (A Mini AUI-to-AUI adapter cable, IBM P/N 59G9004, is also required.)

    The maximum length of drop cable between each transceiver is 164 feet (50 meters).
- A personal computer equipped with Micro Channel architecture, and the backup copy of the Reference Diskette (that was packaged with the computer).

  Note: A full length 16- or 32-bit expansion slot must be available in your computer.
- The instruction manual supplied with the computer.

Software Prerequisites

The software needed for the Ethernet Auto Busmaster MC 32 Adapter to operate on the Ethernet Network differs according to the operating system environment you are using.

The different environments and the software needed to operate the Ethernet Auto Busmaster MC 32 Adapter are:

- DOS workstation environment
  - DOS 3.3 or later
  - IBM LAN Support Program Version 1.33 or later
- DOS server environment
  - DOS 3.3 or later
  - IBM LAN Support Program Version 1.33 or later
  - IBM PC LAN Program (PCLP) Version 1.34
- OS/2 LAN Server environment
  - IBM OS/2 LAN Server Version 2.0 or later
- OS/2 Extended Services environment
  - IBM Extended Services for OS/2 Version 1.0
- Novell* NetWare* environment
  - Novell NetWare Version 3.11 or Version 4.0
- Microsoft* LAN Manager environment
  - Microsoft LAN Manager Version 3.0

The option diskette provides the device drivers required to support the environments listed above. Other operating systems are also supported through the Ethernet Auto Busmaster MC 32 Adapter's NDIS device drivers. Consult your operating system documentation to verify that your operating system supports the NDIS interface.

Updating the Backup Copy of the Reference Diskette

1 Before installing the adapter in your computer, **you must update your backup copy of the Reference Diskette.**

Note: In the instruction manual that came with your computer, the term *option* refers to the adapter, as in "Installing Options," and "option diskette." The *option diskette* is the diskette that came with the adapter.

a Insert the backup copy of your computer's Reference Diskette into the `A:` drive and turn on the computer.

Note: Some models of computers have the Reference Diskette stored on the hard drive. To load the Reference Diskette for these computers, press and hold the **Ctrl**, **Alt**, and **Insert** keys when the cursor appears in the upper right-hand corner of your computer's display.

b Select the item from the **Main Menu** that allows you to copy an option (adapter) diskette, and follow the instructions on the panel. (**Do not use the DOS COPY command.**) This operation copies files from the option diskette onto the backup copy of the Reference Diskette.

2 Turn off your computer, and continue with "Placing the Adapter in an Expansion Slot" on page 8.

Placing the Adapter in an Expansion Slot

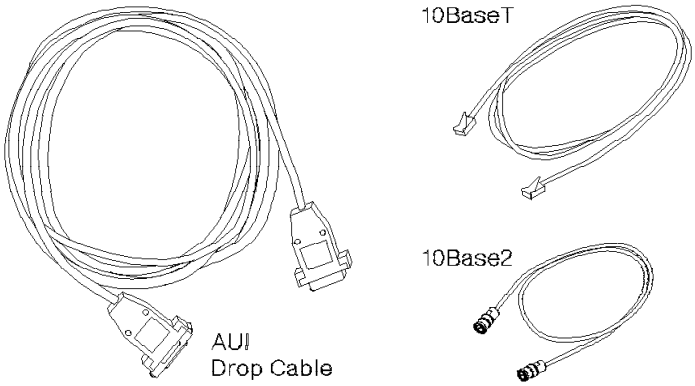
1 Ensure that the computer is turned off, and go to the computer's instruction manual for instructions on installing the adapter. Install the adapter in any available full length 16- or 32-bit expansion slot, and then go to step 2.

2 In the space provided across the top of the chart on page 15, record the slot number of the adapter installed.

3 Continue with "Connecting the Adapter to the Network."

Connecting the Adapter to the Network

1 Determine the type of cable to be connected to the adapter (see the following figure):



Note: Only one cable can be connected to the Ethernet Auto Busmaster MC 32 Adapter at any time. If you have attached multiple cables, the adapter will attempt to communicate through only the first detected calbe, based on the following order:

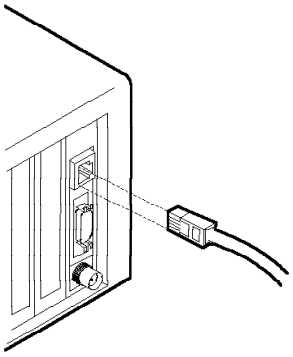
a. UTP (10BASE-T)
b. COAX (10BASE2)
c. AUI

For example, if you have attached both a UTP and a COAX cable, the adapter will only attempt to communicate through the UTP cable.

a Cabling the Ethernet Auto Busmaster MC 32 Adapter to a 10Base-T network

You need a Category 3, 4, or 5 cable with RJ-45 connectors. Connect the modular plug at one end of the cable to the adapter. (See the following figure.)

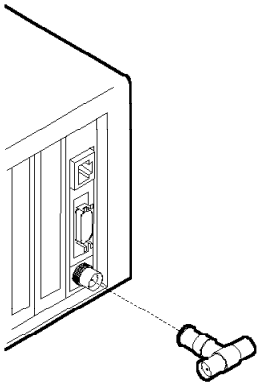
Note: The maximum length of twisted-pair cable between the concentrator and the workstation is 328 feet (100 meters).



Connect the other end of the cable to the network.

b **Cabling the Ethernet Auto Busmaster MC 32 Adapter to a 10BASE2 network**

You need an RG-58 standard coaxial cable with BNC connectors. Connect the BNC T-type connector (shipped with the adapter) to the adapter. (See the following figure.)

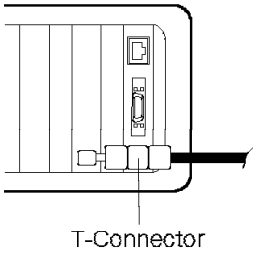


Notes:

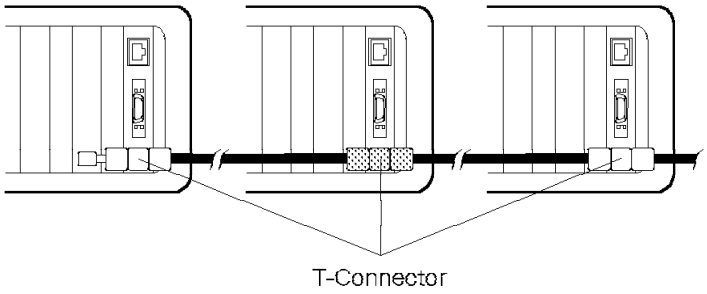
1) There may be a clearance problem on some personal computers when putting on the BNC T-connector and attaching to the 10BASE2 network. If you encounter this problem, rotate the BNC T-connector 90 degrees to allow more clearance.

2) The maximum length of thin coaxial cable between each repeater is 606.8 feet (185 meters).

If the computer you are installing is the last in the Ethernet network, attach the cable from the Ethernet network to one end of the BNC T-connector. Attach a 50-ohm terminator to the other end of the BNC T-connector. (See the following figure.)

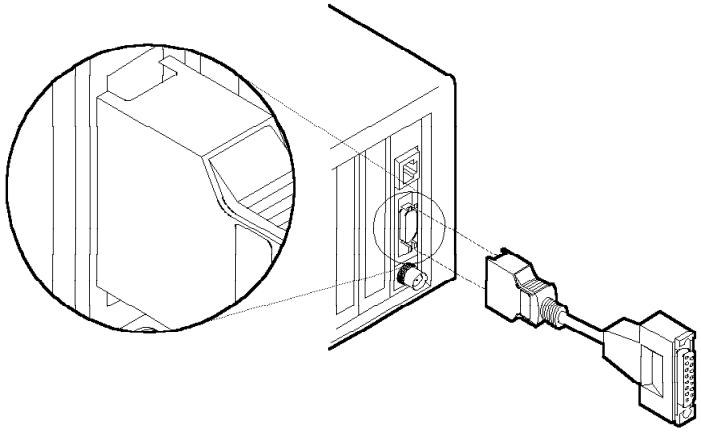


If the computer you are installing is not the last in the Ethernet network, attach cables from the Ethernet network to both ends of the BNC T-connector. (See the following figure.)



C Cabling the Ethernet Auto Busmaster MC 32 Adapter to a network using drop cable

Connect the smaller end of the Mini AUI-to-AUI cable (IBM P/N 59G9004) to the adapter. (See the following figure.)



Connect the other end of the Mini AUI-to-AUI adapter cable to the AUI drop cable connected to the network.

Note: The maximum length of drop cable between each transceiver is 164 feet (50 meters).

2 Continue with “Configuring the Adapter” on page 13.

Configuring the Adapter

1 Insert your backup copy of the computer's Reference Diskette into the `A:` drive and turn on the computer.

Note: Some models of computers have the Reference Diskette stored on the hard drive.

You will receive a 165 adapter configuration error. This is a normal error when installing a new adapter. At the end of the error description, you will be presented with the choice of whether or not to automatically configure the system.

2 Press **Y (Yes)** to allow the system to automatically configure itself.

The following message is displayed: `Automatic configuration is being run.`

Another message will then be displayed when `Automatic configuration is complete.`

3 Press **Enter** to activate the configuration and to restart the computer.

Note: For those models of computers that have the Reference Diskette stored on the hard drive, press and hold the **Ctrl**, **Alt**, and **Insert** keys when the cursor appears in the upper right-hand corner of your computer's display.

4 From the **Main Menu**, use the arrow keys to select **Set Configuration**. Press **Enter**.

The following message is displayed: `Set configuration files being loaded. Please wait.`

The **Set Configuration Menu** appears.

5 Use the arrow keys to select **View Configuration**.

From the **View Configuration** screen, ensure that the slot number and the adapter name (Ethernet Auto Busmaster MC 32 Adapter) are correct for each adapter installed. The adapter name should appear beside the correct slot number. If the adapter name does not appear or the slot number is incorrect, make sure that all of the steps under "Updating the Backup Copy of the Reference Diskette" on page 7 and "Placing the Adapter in an Expansion Slot" on page 8 were performed correctly. Then, return to step 1 of this procedure. If the adapter name and slot number are still not correct when they are displayed, have your computer serviced.

6 Consult Figure 1 on page 16 for a brief description of each configuration parameter and a list of the valid options for each parameter.

7 From the **View Configuration** screen, review the parameters that have been configured.

If a conflict occurs with a previously installed adapter, an asterisk (*) will appear beside the conflicting parameter.

If you do not wish to change any of the parameter values shown for the adapter, continue with the next step.

If the adapter default parameters need to be changed, press **F3** to exit **View Configuration** and continue with step 4 under Changing a Configuration on page 18.

8 Copy the information shown in the space provided in the chart on page 15 for later use.

9 Press **F3** to exit **View Configuration** and press **F3** again to exit **Set Configuration**.

10 Continue with "Testing the Adapter" on page 20.

Ethernet Auto Busmaster MC 32 Adapter Parameter Record								
	Slot Numbers (up to 8)							
Parameters:								
Adapter Media Type Selection								
System Interrupt Level								
Micro Channel I/O Address								
Streaming Data Select								
Fairness								
Arbitration Level								
Parity Enable/Monitor Feedback								
Adapter Address								
Code Level								

Adapter Media Type Selection

Description: This parameter allows you to select the media type which is used to attach the Ethernet Auto Busmaster MC 32 Adapter to the network.

When **Autosense** is selected, the adapter automatically determines the correct media type to be configured. The adapter determines the cable connection you are using and configures for that media type.

Available Options:

- Autosense
- UTP (10BASE-T)
- COAX (10BASE2)
- AUI (Thick Ethernet)

System Interrupt Level

Description: This parameter establishes the priority by which the adapter can interrupt the computer. The lowest value is given the highest priority.

If there is more than one Ethernet Auto Busmaster MC 32 Adapter installed, each one must be configured for the same interrupt level.

Available Options: Interrupt 3, Interrupt 2, Interrupt 10, Interrupt 11

Micro Channel I/O Address

Description: This adapter requires that an address range be selected for the Micro Channel I/O. This parameter selects that address range.

Available Options: 1C00-1CFF, 2000-20FF, 2400-24FF, 2800-28FF, 2C00-2CFF, 3000-30FF, 3400-34FF, 3800-38FF, 3C00-3CFF, 4000-40FF, 4400-44FF, 4800-48FF, 4C00-4CFF, 5000-50FF, 5400-54FF, 5800-58FF, 5C00-5CFF, 6000-60FF, 6400-64FF, 6800-68FF, 6C00-6CFF, 7000-70FF, 7400-74FF, 7800-78FF, 7C00-7CFF, 8000-80FF, 8400-84FF, 8800-88FF, 8C00-8CFF, 9000-90FF, 9400-94FF, 9800-98FF, 9C00-9CFF, A000-A0FF, A400-A4FF, A800-A8FF, AC00-ACFF, FC00-FCFF.

Figure 1 (Part 1 of 2). Configuration Parameters

Streaming Data Select

Description: This parameter enables the adapter to operate with or without data streaming. For maximum performance, select `Enabled`.

Available Options: Enabled, Disabled

Fairness

Description: This parameter establishes whether or not the adapter will share the bus with other devices or retain control of the bus as needed. Under normal conditions, `Fairness ON` is preferable.

Available Options: Fairness ON, Fairness OFF

Arbitration Level

Description: This parameter selects the arbitration level on which the Ethernet Auto Busmaster MC 32 Adapter will operate.

Available Options: Level 1, Level 2, Level 3, Level 4, Level 5, Level 6, Level 7, Level 8, Level 9, Level A, Level B, Level C, Level D, Level E.

Parity Enable/Monitor Feedback

Description: This adapter can check data and address parity and can monitor a slave device's Selected Feedback Return Exception signals during DMA operations. This parameter selects whether or not parity checking and monitoring are on or off.

Available Options: Parity OFF/Monitor OFF, Parity ON /Monitor OFF, Parity OFF/Monitor ON, Parity On /Monitor ON.

Figure 1 (Part 2 of 2). Configuration Parameters

Changing a Configuration

If you have configured an adapter and sometime later you want to change its configuration, follow these steps.

1. Turn off your computer.
2. Insert the backup copy of the Reference Diskette into the `A:` drive and turn on the computer.

Note: Some models of computers have the Reference Diskette stored on the hard drive. To load the Reference Diskette for these computers, press and hold the **Ctrl**, **Alt**, and **Insert** keys when the cursor appears in the upper right-hand corner of your computer's display.

3 From the **Main Menu**, use the arrow keys to select **Set Configuration**.

The following message will appear: `Set Configuration files being loaded. Please wait.`

4 From the **Set Configuration** menu, use the arrow keys to select **Change Configuration**.

5 From the **Change Configuration** menu, use the arrow keys to select the Ethernet Auto Busmaster MC 32 Adapter parameter you want to change. When the parameter is selected, use **F5** or **F6** to change the value of the parameter. Press **Enter** to move to the next parameter.

6 When you have changed all the parameters you wish to change, copy the information shown onto the chart on page 15 for later use.

7 Press **F10** to save the configuration.

The following message will appear: `Saving configuration. Please wait.` This message will be replaced with: `Save configuration complete..` Press **Enter** to continue.

8 Press **F3** to exit **Change Configuration**.

9 Press **F3** to exit **Set Configuration**.

The following message will appear on your computer's display: `Configuration changes have been made. Press Enter to restart the computer and activate the changes.`

10 Remove the backup copy of the Reference Diskette from the `A:` drive and press **Enter**.

11 If you are installing an adapter for the first time, continue with “Testing the Adapter” on page 20.

If you are changing the configuration for a previously installed adapter, the procedure is complete.

Testing the Adapter

To test the Ethernet Auto Busmaster MC 32 Adapter, you **must** be connected to the Ethernet network.

1 If your computer is already turned on and the **Main Menu** of your backup copy of the Reference Diskette is displayed, skip this step and continue with step 2. Otherwise, insert your backup copy of the Reference diskette in the `A:` drive and turn on the computer.

Note: For those models of computers that have the Reference Diskette stored on the hard drive, press and hold the **Ctrl**, **Alt**, and **Insert** keys when the cursor appears in the upper right-hand corner of your computer's display.

2 From the **Main Menu**, press and hold the **Ctrl** key. Press the **A** key while you are still holding the **Ctrl** key.

The **Advanced Diagnostic Menu** will appear on your computer's display.

3 From the **Advanced Diagnostic Menu**, select **System checkout**.

A list of all the devices installed in your computer will appear on the display.

4 If the Ethernet Auto Busmaster MC 32 Adapter appears in the list, press **Y** to confirm that the list is correct.

If the Ethernet Auto Busmaster MC 32 Adapter does not appear in the list, make sure that all of the steps under "Updating the Backup Copy of the Reference Diskette" on page 7, "Placing the Adapter in an Expansion Slot" on page 8, and "Configuring the Adapter" on page 13 were performed correctly. If the Ethernet Auto Busmaster MC 32 Adapter still does not appear in the list, have your computer serviced.

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1 The Adapter Address is a 12-character address that is unique to each adapter.

2 The Code Level is the version of microcode on the adapter.

5 From the **Test Selection Menu**, select **Run tests one time**.

The list of installed devices will appear again.

6 Use the arrow keys to select the Ethernet Auto Busmaster MC 32 Adapter and press **Enter**.

A screen will appear with the name `Ethernet Auto Busmaster MC 32 Adapter` and the slot number where the adapter is installed. Any questions or information regarding the adapter in that slot will also be displayed at this time.

Another screen will appear with similar information for each Ethernet Auto Busmaster MC 32 Adapter installed in your computer.

A different screen will appear on your display with a set of instructions. Read and follow the instructions, pressing **F8** to page down.

7 Press **Enter** to continue.

A list of the parameters configured for the Ethernet Auto Busmaster MC 32 Adapter will appear on your computer's display.

Note: The Adapter Address [1] and Code Level [2] parameters are displayed only during step 7 of this procedure. When they are displayed, record them in the chart on page 15.

8 Verify that the values recorded in the chart on page 15 match those shown on your display.

If the values recorded in the chart do not match those shown on your display, make sure that all the steps under "Configuring the Adapter" on page 13 were performed correctly. If the values still do not match, have your computer serviced.

If the values recorded in the chart match the values shown on your display, press **Enter**.

9 A screen will appear asking whether or not the previous parameter matched the ones you had recorded in the chart.

Press **Y** to confirm that the values matched and to start testing the adapter.

10 A screen should now appear with a message that the adapter is being tested.

If a different screen appears, follow any instructions that are listed. You will then see the screen with the message that the adapter is being tested.

11 If the test runs without errors, the Ethernet Auto Busmaster MC 32 Adapter is ready for use.

If an error occurs, record any messages that appear and go to “Problem Solving” on page 23 for more information.

12 Report Adapter Addresses to the network administrator.

13 Continue with “Installing Network Program Device Drivers” on page 24.

For future reference, store these instructions with the instruction manual supplied with your computer.

Problem Solving

If an error occurs during testing of the Ethernet Auto Busmaster MC 32 Adapter, refer to the following instructions.

The format of the the 8-digit error code on your computer's display is 0269*nnx*0, where:

- The first and last digit is always 0.
- 269 is the decimal equivalent of the device ID
- *nn* represents the type of error
- *x* represents the slot number of the adapter in error

For example, the error code 02695010 means an error occurred for the adapter installed in slot 1.

1 Check that the following conditions have been met:

a. The cable is firmly attached to the adapter.

b. The adapter is firmly seated in the option slot.

c. You have correctly configured the adapter so that no conflicts exist. (Conflicts are displayed with an asterisk [*] on the **View Configuration** or **Change Configuration** screens.)

d. You have correctly followed all instructions for updating your backup copy of the Reference Diskette for your computer.

2 If any of the conditions listed above have not been met, correct any problems and run the test again, starting at "Testing the Adapter" on page 20.

If all the above conditions have been met, call your place of purchase.

Installing Network Program Device Drivers

The network operating system software **must** be installed before you install the device driver.

A device driver for an adapter provides a software interface to enable an application program to communicate with the adapter. The option diskette contains device drivers needed for the Ethernet Auto Busmaster MC 32 Adapter to support network programs.

Refer to the following chart and find the network operating system environment you are running on your computer. Go to the section indicated in the column beside the operating system environment for instructions on installing the device driver you need.

If your network operating system environment is:	**Go to:**
NetWare environment	
Novell NetWare Server Version 3.X or 4.0	"Installing NetWare Server LAN Driver" on page 25.
Novell NetWare DOS ODI workstation	"Installing the ODI to NDIS Mapper for DOS" on page 27.
Novell NetWare OS/2 ODI workstation	"Installing the ODI to NDIS Mapper for OS/2" on page 32.
Other environments	
DOS workstation or DOS server	"Installing DOS NDIS MAC Device Drivers" on page 33.
OS/2 LAN Server or OS/2 Extended Services	"Installing OS/2 NDIS MAC Device Drivers" on page 34.
Microsoft LAN Manager with DOS or OS/2	"Installing NDIS MAC Device Drivers for LAN Manager" on page 35.

Installing NetWare Server LAN Driver

The NetWare Server LAN Driver is needed to support the Ethernet Auto Busmaster MC 32 Adapter in a NetWare 3.X or NetWare 4.0 Server environment. The option diskette contains the NetWare Server LAN Driver file named `MPCO.LAN` located in the `\NOVELL\NETWARE` directory.

To install the NetWare Server LAN Driver on NetWare 3.X, perform the following steps:

1. Choose a target directory path on the diskette or the fixed disk (`C:\NETWARE`, for example) for installation of the NetWare Server LAN Driver and its associated files.

2. Copy the following files from the `\NOVELL\NETWARE` directory on the option diskette to the target directory:

   - MPCO.LAN
   - MPCO.LDI

     Note: The following files are also included on the option diskette for your convenience. These files should also be copied to the target directory unless you have obtained more recent copies directly from Novell.

   - PATCHMAN.NLM
   - LSLENH.NLM
   - MSM31X.NLM
   - ETHERTSM.NLM
   - MONITOR.NLM

3. If NetWare is not already installed on your computer, create a STARTUP.NCF file in the same directory as SERVER.EXE and add the following line:

   ```
   Set Minimum Packet Receive Buffers = 64
   ```

   If NetWare is already installed on your computer, add the above line to the existing STARTUP.NCF file.

Note: If the Ethernet Auto Busmaster MC 32 Adapter is installed in a 16-bit expansion slot in your computer, the following line must also be added to the STARTUP.NCF file:

```
Set Reserved Buffers Below 16 Meg = 64
```

4 If NetWare is already installed on your workstation, continue with step 5.

To install the NetWare Server LAN Driver on NetWare 3.11, follow the instructions in Chapter 3, "File Server Installation" from the *NetWare Version 3.11 Installation* manual. To complete step 2 of the "Load LAN drivers and other loadable modules" section, insert the Ethernet Auto Busmaster MC 32 Adapter Option Diskette and enter the following commands:

```
LOAD A:\NOVELL\NETWARE\PATCHMAN.NLM
LOAD A:\NOVELL\NETWARE\LSLENH.NLM
LOAD A:\NOVELL\NETWARE\MPCO.LAN
```

Return to the *NetWare Version 3.11 Installation* manual and continue with step 3 of the "Load LAN drivers and other loadable modules" section.

To install the NetWare Server LAN Driver on NetWare 4.0, follow the instructions listed in steps 1 through 3 above. Continue the installation by following the instructions in Chapter 2, "Load LAN Drivers", from the *NetWare Version 4.0 Installation and Upgrade* manual.

Additional installation information may be found in the `MPCO.DOC` file in the `\NOVELL\NETWARE` directory on the option diskette.

5 After the above steps have been completed, edit the STARTUP.NCF file and the AUTOEXEC.NCF file to contain statements similar to those shown in the following examples:

- STARTUP.NCF

  ```
  Set Minimum Packet Receive Buffers = 64
  Load PS2SCSI
  ```

  (Or an equivalent statement that will load the disk driver for your computer.)

- AUTOEXEC.NCF

```
MOUNT ALL
;These statements load the LAN drivers
;and replace the load statement generated
;by the NetWare installation process.
;The path from which the drivers are loaded
;may vary in your computer.
LOAD C:\NETWARE\PATCHMAN.NLM
LOAD C:\NETWARE\LSLENH.NLM
LOAD C:\NETWARE\MPCO.LAN
BIND IPX TO MPCO NET=1
```

(The `BIND` statement **must** follow the load instructions.)

The installation of the NetWare Server LAN Driver is now complete.

Installing the ODI to NDIS Mapper for DOS

The ODI to NDIS Mapper for DOS is needed to run in a DOS ODI workstation environment. The option diskette contains the mapper file named `ODI2NDI.COM`, located in the `\ODI2NDI\DOS` directory. The mapper is a transparent link between the NetWare Link Support Layer (LSL) and the DOS NDIS MAC device driver.

The ODI to NDIS Mapper for DOS is a Terminate and Stay Resident (TSR) program and is sensitive to the order in which the NDIS modules and the NetWare modules are loaded.

The NDIS modules (with the exception of the NDIS NETBIND) are the device drivers that are loaded when the CONFIG.SYS file is processed. The NetWare modules are TSR programs that are loaded during or after the AUTOEXEC.BAT is processed. Therefore, the NDIS modules (with the exception of the NDIS NETBIND) are loaded before the mapper and the NetWare modules are loaded.

The required load order of the ODI to NDIS Mapper for DOS, ODI2NDI.COM, with the NetWare modules and the NDIS NETBIND is:

1. Load the NetWare LSL.COM.
2. Load the ODI to NDIS Mapper for DOS (ODI2NDI.COM)
3. Load the NDIS NETBIND
4. Load the IPXODI.COM

The following instructions detail the necessary steps to install and configure the ODI to NDIS Mapper for DOS.

Before you install the ODI to NDIS Mapper for DOS, you must first install the DOS NDIS MAC device driver. See "Installing DOS NDIS MAC Device Drivers" on page 33 to do that before continuing.

Once you have installed the DOS NDIS MAC device driver, perform the following steps to complete the device driver installation:

1. Create an `ODI2NDI` directory on your workstation. Copy all the files from the `ODI2NDI\DOS` directory on the option diskette to the `ODI2NDI` directory on the workstation.

2. Copy the NetWare workstation files into a directory on your workstation (`C:\NETWARE`, for example). Refer to the "Installing the NetWare ODI Shell for DOS (IPX)" chapter in the *ODI Shell for DOS* manual for additional information on the files that should be copied.

3. Edit the AUTOEXEC.BAT file so that it looks like the following example:

```
;These statements will load the ODI to
;NDIS Mapper for DOS and bind the Mapper
;to the DOS NDIS MAC device driver
;loaded earlier.
C:\NETWARE\LSL.COM
C:\ODI2NDI\ODI2NDI.COM
C:\ODI2NDI\NETBIND
C:\NETWARE\IPXODI.COM

C:\NETWARE\NETX
C:\NETWARE\LOGIN
```

   Note: If you used DXMAID to install the DOS NDIS MAC device driver, there will be another NETBIND statement at the beginning of AUTOEXEC.BAT. Comment out that statement at this time.

   If you used DXMAID to install the DOS NDIS MAC device driver skip step 4.

4 Edit the CONFIG.SYS file on your workstation and insert a line similar to the following example:

```
DEVICE=C:\ODI2NDI\PROTMAN.DOS /i:C:\ODI2NDI
```

The `/i` in the example is an option that indicates to the Protocol Manager to search for the PROTOCOL.INI file in the `ODI2NDI` directory.

Note: It is possible that a PROTMAN.DOS statement already exists in the CONFIG.SYS file. If that is the case, comment out the statement at this time.

5 Edit the PROTOCOL.INI file on your workstation to add a protocol stack section for the ODI to NDIS Mapper for DOS. (See the following example.)

```
[ODI2NDI_NIF]
Drivername = ODI2NDI$
NetAddress = "028000000080"
Bindings = MPC_NIF
Ethernet_802.3 = "yes"
```

Notes:

a. The `NetAddress` parameter is not required.

b. You must specify an Ethernet parameter (`Ethernet_802.3`, for example) to use your Ethernet Auto Busmaster MC 32 Adapter.

c. The value for the `Bindings =` statement **must** be the same as the name shown in brackets ([]) in the driver entry section of the PROTOCOL.INI file. The Ethernet Auto Busmaster MC 32 Adapter will have a driver entry section similar to the following example.

```
[MPC_NIF]
Drivername = MPC$
NetAddress = "02008040C020"
MaxTransmits = 4
MaxTxFrameSize = 4096
MinRcvBuffs = 8
SizWorkBuf = 1120
MulticastNum = 16
EnableTxEofInt = “Yes”
LoopBack = “Yes”
```

6 Edit the NET.CFG file on your workstation to add a link driver section for the ODI to NDIS Mapper for DOS. (See the following example.)

```
LINK DRIVER MPC
NODE ADDRESS 028000000080
FRAME ETHERNET_802.3
```

Note: The NET.CFG file is not required. All configuration can be done through the PROTOCOL.INI file.

The mapper reads the NET.CFG file first, then reads the PROTOCOL.INI file. Therefore, the keywords in the PROTOCOL.INI file will override the keywords in the NET.CFG file. The NET.CFG file is optional, but the PROTOCOL.INI file is required and must contain a mapper section with a DRIVERNAME, an Ethernet frame type keyword, and a BINDINGS keyword.

The installation of the ODI to NDIS Mapper for DOS is now complete.

The ODI to NDIS Mapper for DOS supports three keywords in the NET.CFG file and seven keywords in the PROTOCOL.INI file. Below is a list of the keywords for each file and a short description of the keyword.

- **Keywords for NET.CFG**

  NODE ADDRESS — The workstation node address can be configured to a Locally Administered Address (LAA). The default workstation node address is the Universally Administered Address (UAA) of the adapter.

  FRAME — There are four frame types for Ethernet that are supported by the mapper. One of these frame types **must** be specified for your Ethernet Auto Busmaster MC 32 Adapter.

  Those frame types are:

  ETHERNET_802.3
  ETHERNET_802.2
  ETHERNET_II
  ETHERNET_SNAP

  The following example shows how to specify the value for this keyword.

  ```
  FRAME ETHERNET_802.3
  ```

  or

  ```
  FRAME ETHERNET_SNAP
  ```

  PROTOCOL — This keyword allows the mapper to be configured to support various other protocols. The default protocol used by the mapper is IPX.

- **Keywords for PROTOCOL.INI**

DRIVERNAME	This keyword must be present for the mapper to function properly. It is included in the protocol stack section for ODI2NDI and is followed by the device driver file name.
BINDINGS	This keyword must be present for the mapper to function properly. The mapper for DOS can only be loaded once and bound to one NDIS MAC driver.
NETADDRESS	The mapper requires that the NETADDRESS be configured as the same address used in all of the NDIS protocol stacks that will be binding to the NDIS MAC device driver.
ETHERNET_802.3	The value for this keyword can be either “yes” or “no”. A value of “yes” specifies that this frame type be used.
ETHERNET.802.2	The value for this keyword can be either “yes” or “no”. A value of “yes” specifies that this frame type be used.
ETHERNET_II	The value for this keyword can be either “yes” or “no”. A value of “yes” specifies that this frame type be used.
ETHERNET_SNAP	The value for this keyword can be either “yes” or “no”. A value of “yes” specifies that this frame type be used.

Installing the ODI to NDIS Mapper for OS/2

The ODI to NDIS Mapper for OS/2 is needed to run in a NetWare with OS/2 environment. The option diskette contains the ODI to NDIS Mapper for OS/2 under the name `ODI2NDI.OS2` in the `\ODI2NDI\OS2` directory.

In addition to NetWare Requester for OS/2 software, OS/2 Version 1.3 or later must be installed on the workstation. If you are using

OS/2 Version 2.0, you must also have NetWare Requester for OS/2 Version 2.0 installed.

You can use the OS/2 device driver installation tool, the LAN Services installation/configuration program (LAPS) to install the ODI to NDIS Mapper for OS/2. Refer to the *IBM Extended Services for OS/2 2.0 LAN Adapter and Protocol Support Configuration* guide, the *IBM Operating System/2 Local Area Network Server Network Administrator Reference Volume 1: Planning and Installation* (Version 2.0) guide, or the *LAPS Configuration Guide* for instructions on using LAPS.

For specific instructions on installing the ODI to NDIS Mapper for OS/2 using LAPS, refer to Appendix I, "Configuring NetWare Requester Support," of the *LAPS Configuration Guide*.

Upon leaving the LAPS program, you must edit the PROTOCOL.INI file (in the same directory as LAPS) before re-starting your computer. Change the **Token-Ring = "yes"** statement to **Token-Ring = "no"**. Change one of the Ethernet statements to **"yes"**. You must also add a **NetAddress** parameter, as shown in the following example:

```
NetAddress = "028000000040"
```

The installation of the ODI to NDIS Mapper for OS/2 is now complete.

If you cannot or do not wish to use LAPS to install the ODI to NDIS Mapper for OS/2, see "Manual Installation of the ODI to NDIS Mapper for OS/2" on page 50.

For additional information, refer to the *NetWare Requester for OS/2* manual or the *NetWare Requester for OS/2 Version 2.0* manual.

Installing DOS NDIS MAC Device Drivers

The DOS NDIS MAC device driver is needed to run in a DOS workstation environment or a DOS server environment. The option diskette contains the DOS NDIS MAC device driver under the name `MPC.DOS` in the `\DOS` directory.

If you are using the LAN Support Program, you can use the IBM LAN Support Program's device driver installation tool, DXMAID, to install the DOS NDIS MAC device driver. Refer to the *IBM Local Area Network Support Program User's Guide* for instructions on using DXMAID.

Note: Make sure you answer with **Yes** when DXMAID presents you with the question `Do you have adapter option diskettes?`.

If you need to use the manual procedure for installing the DOS NDIS MAC device driver, see "Manual Installation for the NDIS MAC Device Driver" on page 37. The manual procedure is recommended only if you cannot use DXMAID.

For information on errors and messages that can be received from the NDIS MAC device drivers, see "NDIS MAC Device Driver Messages" on page 42.

Installing OS/2 NDIS MAC Device Drivers

The OS/2 NDIS MAC device driver is needed to run in an OS/2 LAN Server environment or an OS/2 Extended Services environment. The option diskette contains the OS/2 NDIS MAC device driver under the name `MPC.OS2` in the root directory.

You can use the OS/2 device driver installation tool, LAPS, to install the OS/2 NDIS MAC device driver. Refer to the *IBM Extended Services for OS/2 2.0 LAN Adapter and Protocol Support Configuration* guide or the *IBM Operating System/2 Local Area Network Server Network Administrator Reference Volume 1: Planning and Installation* (Version 2.0) guide for instructions on using LAPS.

Once LAPS is installed on the hard drive of your computer, invoke the program from the hard drive by entering the **LAPS** command from the directory where you installed the program.

Choose the **INSTALL** option from the **Main Menu** of the LAPS program to add the Ethernet Auto Busmaster MC 32 Adapter to the list of adapters recognized by LAPS.

When the adapter has been added to the list, choose the **CONFIGURE** option from the **Main Menu** to continue with the device driver installation.

Select the **ADD** option from the **Configure Workstation Menu** of the LAPS program to add the Ethernet Auto Busmaster MC 32 Adapter. Choose the protocol(s) to be used and press **ADD**. Select **OK** to configure the adapter and then **EXIT** LAPS.

The installation of the OS/2 NDIS MAC Device Driver is now complete.

If you need to use the manual procedure for installing the OS/2 NDIS MAC device driver, see "Manual Installation for the NDIS MAC Device Driver" on page 37. The manual procedure is recommended only if you cannot use the LAPS program.

For information on messages and errors that can be received from the NDIS MAC device drivers, see "NDIS MAC Device Driver Messages" on page 42.

Installing NDIS MAC Device Drivers for LAN Manager

The NDIS MAC device drivers can be installed in a Microsoft LAN Manager environment for either DOS or OS/2. To operate in this environment, the option diskette contains the necessary device driver module and other files in the `\MSLANMAN.DOS\DRIVERS\STREAMER\MPC` directory and in the `\MSLANMAN.OS2\DRIVERS\STREAMER\MPC` directory. In each directory there is a PROTOCOL.INI file that contains the configuration parameters and an MPC.NIF file with information on each parameter.

The Microsoft LAN Manager Setup program uses its own network information files, also named MPC.NIF. These files are located in the `\MSLANMAN.DOS\DRIVERS\NIF` directory and the `\MSLANMAN.OS2\DRIVERS\NIF` directory on the option diskette.

To install the Ethernet Auto Busmaster MC 32 Adapter NDIS MAC device drivers, follow the instructions in the *Microsoft LAN Manager Installation and Configuration Guide* for using the LAN Manager

Setup program. At the **Workstation Configuration** window, select the **ADD NEW CONFIG** option. When the **Network Adapter Drivers** window appears, select the **OTHER DRIVER** option. When prompted, insert the option diskette into the diskette drive and press **Enter**. When the device driver name appears, press **Enter**.

Continue with the instructions in the *Microsoft LAN Manager Installation and Configuration Guide*.

If you need to use the manual procedure for installing the NDIS MAC device drivers, see “Manual Installation for the NDIS MAC Device Driver” on page 37.

Appendix A. Manual Installations

Manual Installation for the NDIS MAC Device Driver

The network operating system software **must** be installed before you follow this procedure.

When manually installing the NDIS MAC device drivers, the DEVICE= statement must be manually inserted into the CONFIG.SYS file on your workstation.

The DEVICE= statement for the NDIS MAC device driver must follow the DEVICE= statement for the Protocol Manager (PROTMAN.DOS or PROTMAN.OS2).

Copy the DOS or OS/2 NDIS MAC device driver files from the option diskette to the directory on your workstation that contains the network operating system software. (See “Items Needed to Install the Adapter” on page 3 for the list of files.)

Add the DEVICE= statement in the CONFIG.SYS file in the root directory to start the NDIS MAC device driver during system initialization. Examples of DEVICE= statements for the CONFIG.SYS file are:

1. **DOS:**

   ```
   DEVICE=C:\..path..\MPC.DOS
   ```

2. **OS/2:**

   ```
   DEVICE=C:\..path..\MPC.OS2
   ```

NDIS MAC Device Driver Stack Requirements

When manually configuring for the NDIS MAC device driver, **do not** code **STACKS=0,0** in CONFIG.SYS. If you have no **STACKS=** value specified, or if you have a value other than **STACKS=0,0** specified, you do not have to change that value.

Manual NDIS MAC Device Driver Configuration

The NDIS MAC device driver must be configured to match the Ethernet Auto Busmaster MC 32 Adapter's configuration. The NDIS MAC device driver can be configured using DXMAID for LAN Support Program, LAPS for OS/2, or by manually editing the PROTOCOL.INI file.

To configure the NDIS MAC device driver manually, edit the PROTOCOL.INI file on your workstation and add an NDIS MAC device driver section.

The following examples show all of the configurable parameters for the PROTOCOL.INI file. All of the parameters are set to their default value. (The exception is the `NetAddress` parameter. Specifying a value for `NetAddress` overrides the default burned-in address of the adapter.)

Note: The `LoopBack` parameter default shown is for a 32-bit system slot. This parameter can be omitted and the NDIS MAC device driver will determine the setting based on the system slot type in which the adapter is installed (16- or 32-bit).

- **Default parameter values for DOS**

```
;Only the two lines immediately
;following this comment are
;required.
[MPC_NIF]
Drivername = MPC$
NetAddress = "02008040C020"
MaxTransmits = 4
MaxTxFrameSize = 4096
MinRcvBuffs = 8
SizWorkBuf = 1120
MulticastNum = 16
EnableTxEofInt = “Yes”
LoopBack = “Yes”
```

- **Default parameter values for OS/2**

```
;Only the two lines immediately
;following this comment are
;required.
[MPC_NIF]
Drivername = MPC$
NetAddress = "02008040C020"
MaxTransmits = 31
MaxTxFrameSize = 18000
MinRcvBuffs = 20
SizWorkBuf = 2048
MulticastNum = 16
EnableTxEofInt = “Yes”
LoopBack = “Yes”
```

The desired protocol drivers must then be *bound* to the NDIS MAC device driver by manually editing the BINDINGS= statement of those protocol drivers. (See the following examples.)

1 DOS:

```
[DXME0_NIF]
Drivername = DXME0$
Bindings = MPC_NIF
```

2 OS/2:

```
[LANDD_NIF]
Drivername = LANDD$
Bindings = MPC_NIF
```

The following section lists and describes all of the valid configurable parameters for the Ethernet Auto Busmaster MC 32 Adapter.

Keyword Parameters for the Ethernet Auto Busmaster MC 32 Adapter PROTOCOL.INI File

NetAddress This parameter overrides the network burned-in address of the network adapter card. The value of this parameter is a hexadecimal string of 12 digits in canonical format (enclosed in quotes), as in “02008040C020”.

Do not set the multicast address bit in the NetAddress parameter. For the Ethernet Auto Busmaster MC 32 Adapter, this bit is bit 0 of the first byte, which can be illustrated as “010000000000”.

The NetAddress must be unique among all other network adapter addresses on the network.

EXAMPLE: NetAddress = “02008040C020”

MaxTransmits This parameter specifies the maximum number of transmit queue entries. The value of this parameter may be set from 2 to 512, but should be high enough to accommodate the sum of all MaxTransmits for all protocol drivers using the Ethernet Auto Busmaster MC 32 Adapter concurrently.

MaxTxFrameSize This parameter specifies the maximum frame size that can be transmitted on the LAN, and may be set to a value from 14 to 18000. This parameter value serves as an upper limit, but the actual frame size maximum may be smaller. The maximum frame size supported by the NDIS MAC device driver is the **lesser** of one of the following values:

- this MaxTxFrameSize parameter
- Total Receive Buffer Area (less 4 bytes for CRC)
- the physical frame size capacity of the network (1514 bytes for Ethernet)

Do not count the 4 bytes of CRC defined for a frame when setting this parameter value.

MinRcvBuffs

This parameter specifies the minimum number of receive buffers that are allocated. The value of this parameter may be between 2 and 512. The Total Receive Buffer Area for the adapter is calculated from the following parameters:

Total Receive Buffer Area=
MinRcvBuffs × SizWorkBuf

Note: In order to receive the maximum length frame that is supported by the attached network, the Total Receive Buffer Area must be larger than the maximum frame size (including the 4 byte CRC) that is allowed for the network you are using, which is 1518 bytes for Ethernet.

A smaller Total Receive Buffer Area will use less system memory but will correspondingly reduce the size of the largest frame that can be received by the device driver.

The maximum frame size supported by the device driver can be further limited by the MaxTxFrameSize parameter.

SizWorkBuf

This parameter specifies the size of each receive buffer. The allowed range for Ethernet is from 64 to 2048 bytes.

If this parameter is not specified, or if the value for the parameter is set outside of the valid

range, a default of 2048 bytes will be assigned for OS/2 and 1120 bytes for DOS.

MulticastNum This parameter specifies the maximum number of multicast addresses supported by the device driver. The value of this parameter may be between 1 and 256. Approximately 16 bytes of system memory are required for each multicast address.

EnableTxEofInt This parameter specifies whether or not the transmit end of frame interrupt is enabled. A value of **"Yes"** indicates that the transmit end of frame interrupt will be recognized by the interrupt handler. A value of **"No"** indicates that the transmit end of frame interrupt should not be recognized by the interrupt handler. The **"No"** value may be preferable in some environments to reduce the number of times that interrupt handler is invoked, as in a server environment.

LoopBack This parameter determines whether loopback is supported by the adapter or handled by the protocol stack. A value of **"No"** indicates that frames transmitted by this station that should be received by this station are looped back by the protocol stack. A value of **"Yes"** indicates that frames transmitted by this station that should be received by this station will be received.

NDIS MAC Device Driver Messages

The following list of messages can all be received from the NDIS MAC device drivers. Some of the messages are error messages and some are only informational messages. Each message is followed by a description of the message and actions you can take to correct any problem that may be causing the message.

LTC0008

Description: The parameter specified in PROTOCOL.INI for keyword xx is not the proper character type.

Possible Cause: The value provided for the keyword in the MPC module in PROTOCOL.INI is not the correct type.

User Action: Change the value in PROTOCOL.INI to the correct type for the parameter.

LTC0009

Description: An unrecoverable error occurred in the Ethernet Auto Busmaster MC 32 Adapter NDIS device driver program.

Possible Cause: An internal software error occurred.

User Action: Contact your place of purchase.

LTC0010

Description: All Ethernet Auto Busmaster MC 32 Adapter must be set to the same interrupt level.

Possible Cause: One or more Ethernet Auto Busmaster MC 32 Adapters are set to a different interrupt level. To function properly, these adapters must all be set to the same interrupt level.

User Action: View the adapter's configuration and make sure that all Ethernet Auto Busmaster MC 32 Adapters are set to the same interrupt level.

LTC0011

Description: Slot *n*: Ethernet Auto Busmaster MC 32 Adapter universally administered address is xxxxxxxxxxxx.

Possible Cause: This is an informational message only.

User Action: No action is required by the user.

LTC0012

Description: Slot *n*: Ethernet Auto Busmaster MC 32 Adapter is using a locally administered address of xxxxxxxxxxxx.

Possible Cause: This is an informational message only.

User Action: No action is required by the user.

LTC0014

Description: The parameter values have forced the control-block size to exceed the allowable limit.

Possible Cause: The parameter values specified in the PROTOCOL.INI file require more space for processing than can be handled.

User Action: Reduce the value specified for either the MaxTransmits, MinRcvBuffs, or the MulticastNum parameters to reduce the amount of storage required for the control-blocks.

The control-block area can be computed using the following formula:

1698 + (192 * MaxTransmits) + (256 * MinRcvBuffs) + (16 * MulticastNum)

The control-block work area must be less than 64KB.

LTC0015

Description: Slot *n*: Ethernet Auto Busmaster MC 32 Adapter is not responding.

Possible Cause: The adapter is not responding to a request to initialize.

User Action: Run the diagnostics for the Ethernet Auto Busmaster MC 32 Adapter. If the diagnostics run without error, contact your place of purchase.

LTC0025

Description: Duplicate device driver statements exist in CONFIG.SYS.

Possible Cause: There are two device driver statements in the CONFIG.SYS file.

Only one occurrence of the device driver statement for the Ethernet Auto Busmaster MC 32 Adapter NDIS MAC device driver is required to support multiple adapters. Additional occurrences of the device driver statement in the CONFIG.SYS file will be ignored.

User Action: Remove any duplicate device driver statements from the CONFIG.SYS file.

LTC0026

Description: The required parameter DRIVERNAME was not found in the PROTOCOL.INI file.

Possible Cause: The parameter specifying the driver name (DRIVERNAME) was not found in the PROTOCOL.INI file.

User Action: Add the proper DRIVERNAME to the PROTOCOL.INI file.

LTC0027

Description: The protocol manager could not be opened.

Possible Cause: An unexpected error occurred when the program attempted to open the protocol manager. The Ethernet Auto Busmaster MC 32 Adapter NDIS MAC device driver has been removed.

User Action: Check the diskette drive and the directory to ensure that the protocol manager is located in the specified path.

LTC0028

Description: An unrecoverable error occurred while attempting to register the Ethernet Auto Busmaster MC 32 Adapter NDIS device driver program with the protocol manager.

Possible Cause: The device driver was unable to register with the protocol manager.

User Action: Re-install the protocol manager and try the operation again. If you still receive an error, call your place of purchase.

LTC0029

Description: No adapter was found in the machine that is supported by this device driver.

Possible Cause: There was no Ethernet Auto Busmaster MC 32 Adapter found in this machine. The Ethernet Auto Busmaster MC 32 Adapter is required to run the NDIS MAC device driver.

User Action: Install a Ethernet Auto Busmaster MC 32 Adapter in this machine or remove the device driver statement from the CONFIG.SYS file.

LTC0030

Description: The unrecognized parameter xx was found in the PROTOCOL.INI file.

Possible Cause: An unrecognized parameter was found while processing the Ethernet Auto Busmaster MC 32 Adapter section of the PROTOCOL.INI file.

User Action: Correct the parameter or remove it from the PROTOCOL.INI file.

LTC0031 • LTC0039

LTC0031

Description: The value specified for network address in PROTOCOL.INI if not valid.

Possible Cause: The value specified for the network address parameter (NetAddress) in the PROTOCOL.INI file is not valid for one of the following reasons:

- Invalid local station address
- Address too long
- Address too short
- Contains non-hexadecimal characters
- Not enclosed in double quotes

User Action: Remove or correct the network address parameter (NetAddress). A valid value for this parameter is 12 characters long and is enclosed in quotes (“”). The address must also be entered in Canonical format, such as `02008040C020`.

LTC0032

Description: Ethernet Auto Busmaster MC 32 Adapter NDIS device driver Version xx

Possible Cause: This is an informational message only.

User Action: No action is required by the user.

LTC0035

Description: Slot *n*: A hardware failure occurred while attempting to open the adapter.

Possible Cause: A hardware error occurred when the adapter tried to open onto the network.

User Action: Run the disagnostics for the Ethernet Auto Busmaster MC 32 Adapter. If no errors are found, call your place of purchase.

LTC0039

Description: Initialization proceeding for section xx in PROTOCOL.INI.

Possible Cause: This is an informational message only.

User Action: No action is required by the user.

LTC0044

Description: The configuration values have forced the control-block size to exceed the available memory.

Possible Cause: The configuration parameters specified require more space for processing than can be handled with the available system memory.

User Action: Reduce the value specified for either the MaxTransmits or the MinRcvBuffs parameters to reduce the amount of storage required.

The following formula can be used to compute the maximum value:

H(i) = RCVAREA(i) + ALLOCSIZECB(i)

Where:

H is the value computed for each Ethernet Auto Busmaster MC 32 Adapter. The sum of all H(i) values must be less than 1 MB.

i is the total number of Ethernet Auto Busmaster MC 32 Adapters installed in your computer.

RCVAREA = MinRcvBuffs * SizWorkBuf

ALLOCSIZECB = 1698 + (192 * MaxTransmits) + (256 * MinRcvBuffs) + (16 * MulticastNum)

The value of ALLOCSIZECB(i) must be less than 64KB.

LTC0047

Description: Could not determine the system I/O bus type.

Possible Cause: The Ethernet Auto Busmaster MC 32 Adapter NDIS MAC device driver was unable to determine the type of I/O bus designed into the computer system. It is looking for a Micro Channel bus.

User Action: Make sure your system is based on a Micro Channel bus and contains an industry standard BIOS. Contact your place of purchase.

LTC0053

Description: Slot *n*: Ethernet Auto Busmaster MC 32 Adapter opened for: Ethernet, UTP.

Possible Cause: This is an informational message only. The message tells the user how the adapter was opened based on current configuration information.

User Action: No action is required by the user.

LTC0054 • LTC0061

LTC0054

Description: Slot *n*: Ethernet Auto Busmaster MC 32 Adapter opened for: Ethernet, COAX.

Possible Cause: This is an informational message only. The message tells the user how the adapter was opened based on current configuration information.

User Action: No action is required by the user.

LTC0055

Description: Slot *n*: Ethernet Auto Busmaster MC 32 Adapter opened for: Ethernet, AUI.

Possible Cause: This is an informational message only. The message tells the use how the adapter was opened based on current configuration information.

User Action: No action is required by the user.

LTC0061

Description: Slot *n*: A media error has occurred. Check the connection between the adapter card and the network.

Possible Cause: The Ethernet cable is not properly connected between the adapter card and the LAN.

User Action: Check that your Ethernet cable is:

- Connected to the proper UTP, COAX, or AUI port on the adapter card.
- Connected to the Ethernet network.
- Properly terminated (if using an AUI or COAX connection)

NDIS MAC Device Driver Support for Two or More Adapters

When two or more Ethernet Auto Busmaster MC 32 Adapters are installed in the same system, there must be a DEVICE= statement in the CONFIG.SYS file on the workstation and two or more NDIS MAC device driver sections in PROTOCOL.INI. (See the following examples.)

1 CONFIG.SYS:

```
DEVICE=C:\..path..\MPC.OS2
```

2 PROTOCOL.INI:

```
[MPC_NIF]
Drivername = MPC$
NetAddress = "028000000040"

[MPC2_NIF]
Drivername = MPC$

[PROTOCOL_DRIVER_ABC]
Bindings = MPC_NIF, . . . , MPC2_NIF
```

When two or more Ethernet Auto Busmaster MC 32 Adapters are installed and configured (as shown in the preceding examples), the NDIS MAC device driver will search the system, beginning with slot number one, and assign the first Ethernet Auto Busmaster MC 32 Adapter it finds to the first driver section in the PROTOCOL.INI file. The NDIS MAC device driver will then continue searching and assign the second Ethernet Auto Busmaster MC 32 Adapter found to the second driver section in the PROTOCOL.INI file. The device driver will search the system in this manner and will stop when there are no more driver sections in the PROTOCOL.INI file, or when a maximum of eight system slots have been checked.

Manual Installation of the ODI to NDIS Mapper for OS/2

Perform the following steps to manually install the ODI to NDIS Mapper for OS/2.

1. Install the OS/2 NDIS MAC device driver. See “Installing OS/2 NDIS MAC Device Drivers” on page 34 for instructions.

2. Create an ODI2NDI directory on your workstation. Copy all the files from the ODI2NDI\OS2 directory on the option diskette to the ODI2NDI directory on the workstation.

3. Edit the CONFIG.SYS file and make the following changes:

   a. Add the ODI2NDI directory you created on your workstation to the **DPATH=\..path** statement.

   b. Add **DEVICE=C:\ODI2NDI\ODI2NDI.OS2** after the **DEVICE=\..path..\LSL.SYS** driver statement but before the **DEVICE=\..path..\IPX.SYS** driver statement.

   c. Make sure that the **DEVICE=\..path\PROTMAN.OS2** statement appears prior to the **DEVICE=\..path..\LSL.SYS**.

   d. If not already present, add a **DEVICE=\..path..\MPC.OS2** statement after the **DEVICE=\..path..\PROTMAN.OS2** statement.

      Note: The following example shows a sample PROTMAN.OS2 statement. The `/i` shown in the example is an option that indicates to the Protocol Manager to search for the PROTOCOL.INI file in the `ODI2NDI` directory.

      ```
      DEVICE=C:\ODI2NDI\PROTMAN.OS2 /i:C:\ODI2NDI
      ```

   e. If not already present add the **RUN=\..path..\NETBIND.EXE** statement.

4. Edit the PROTOCOL.INI file on your workstation to include an NDIS protocol stack section. (See the following example.)

```
[ODI2NDI_NIF]
Drivername = ODI2NDI$
Bindings = MPC_NIF
NetAddress = "028000000040"
Ethernet_802.3 = "YES"
```

The installation of the ODI to NDIS Mapper for OS/2 is now complete.

The ODI to NDIS Mapper for OS/2 supports three keywords in the NET.CFG file and seven keywords in the PROTOCOL.INI file. Below is a list of the keywords for each file and a short description of the keyword.

- **Keywords for NET.CFG**

  NODE ADDRESS — The mapper requires that the NODE ADDRESS be configured as the same address used in all of the NDIS protocol stacks that will be binding to the NDIS MAC device driver.

  FRAME — There are four frame types that are supported by the mapper.

  Those frame types are:

  ETHERNET_802.3
  ETHERNET_802.2
  ETHERNET_II
  ETHERNET_SNAP

  The following example shows how to specify the value for this keyword.

  ```
  FRAME ETHERNET_802.3
  ```

  or

  ```
  FRAME ETHERNET_SNAP
  ```

PROTOCOL	This keyword allows the mapper to be configured to support various other protocols. The default protocol used by the mapper is IPX.

- **Keywords for PROTOCOL.INI**

DRIVERNAME	This keyword must be present for the mapper to function properly. It is included in the protocol stack section for ODI2NDI and is followed by the device driver file name.
BINDINGS	This keyword must be present for the mapper to function properly.
NETADDRESS	The mapper requires that the NETADDRESS be configured as the same address used in all of the NDIS protocol stacks that will be binding to the NDIS MAC device driver.
ETHERNET_802.3	The value for this keyword can be either “yes” or “no”. A value of “yes” specifies that this frame type be used.
ETHERNET_802.2	The value for this keyword can be either “yes” or “no”. A value of “yes” specifies that this frame type be used.
ETHERNET_II	The value for this keyword can be either “yes” or “no”. A value of “yes” specifies that this frame type be used.
ETHERNET_SNAP	The value for this keyword can be either “yes” or “no”. A value of “yes” specifies that this frame type be used.

The mapper reads the NET.CFG file first, then reads the PROTOCOL.INI file. Therefore, the keywords in the PROTOCOL.INI file will override the keywords in the NET.CFG file. The NET.CFG file is optional, but the PROTOCOL.INI file is required and must contain a mapper section and a BINDINGS keyword.

A locally administered address must be configured for the ODI to NDIS Mapper for OS/2. This address can be configured through either the NODE ADDRESS keyword in the NET.CFG file or through the NetAddress keyword in the PROTOCOL.INI file. All NDIS protocol stacks that bind to the same NDIS MAC device driver as the mapper will also need to be configured for this same locally administered address to function properly.