AT&T

AT&T UNIX™ PC

Enhanced TCP/IP
WIN™/3B
LAN Interface

Installation and
Diagnostic Guide

NOTICE

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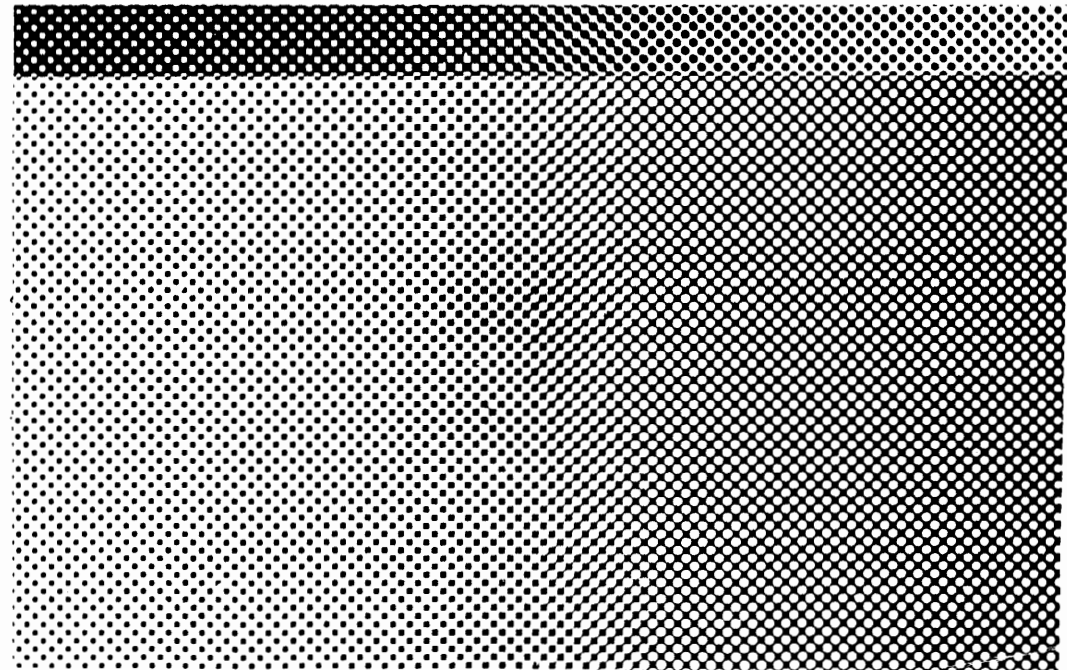
WARNING

The Ethernet board generates, uses, and can radiate
radio frequency energy and if not installed and used in
accordance with the instructions manual, may cause
interference to radio communications. It has been
tested and found to comply with the limits of a Class A
computing device pursuant to Subpart J of Part 15 of
FCC Rules, which are designed to provide reasonable
protection against such interference when operated in a
commercial environment. Operation of this equipment in
a residential area is likely to cause interference in
which case the user at his own expense will be required
to take whatever measures may be required to correct
the interference.

Contents

This guide explains, in a step-by-step fashion, how to install the Ethernet board, how to make the necessary hardware connections to the Ethernet network, and how to use the Ethernet board diagnostics to insure that the board is functioning properly. By following the guidelines prescribed in this document, you can accomplish the installation and diagnostics of your Ethernet board quite easily.

Installing the Ethernet Board

The Ethernet board can be installed in any of the three slots available in the UNIX PC. Follow the steps in this section to install the board.

Expansion Slots

The UNIX PC has three expansion slots in the back of the system. Each slot is covered by a metal plate located on the rear of the unit (see Figure 1). They are numbered as 1, 2, and 3 from left to right as viewed from the rear of the machine.
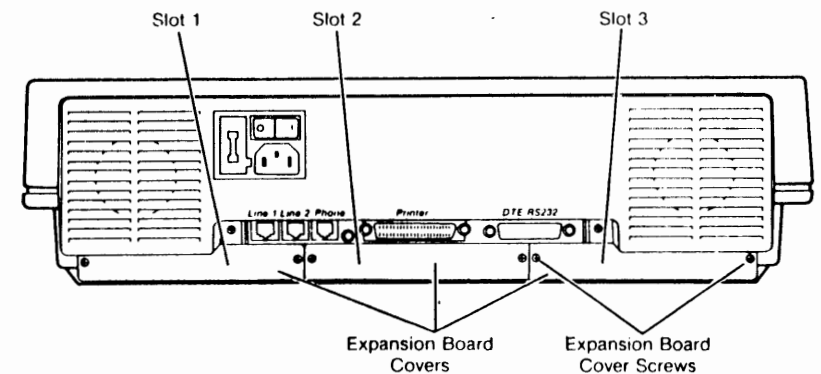
Figure 1 Rear View of UNIX PC

The only tool needed to install an Ethernet board is a small Phillips-head screwdriver with a blade diameter of about 3/16".

Board Installation Procedures

To install the Ethernet board in the UNIX PC:

1 Shut down the UNIX PC using the Shutdown command from the Office Commands menu. When you see:

   Ready to turn power off or reset the machine. Press RETURN to reboot.

   Turn the UNIX PC off, but leave it plugged in. Since many of the components are static sensitive, this keeps the equipment continually grounded.

2 Remove the two screws from the cover of the expansion slot you have selected. **(Be careful not to strip the screws.)** The cover comes off easily. Retain the cover and screws; you will use the screws to hold the Ethernet board in place.

3 Grasp the board from the component side, allowing your fingers to rest on the edges only.

4 With the edge connector entering the slot first, component side up, fit the board edges into the grooves in the side tracks of the expansion slot, and slide the board into the slot (see Figure 2).

   It should slide in easily. If it binds, there may be a defect in the board or slot, or you may have inserted the board incorrectly.

5 Using your thumbs, put pressure on the back edge of the board until the board snaps into place.

When properly seated, the screw holes in the board's cover plate line up with the screw holes in the expansion slot.
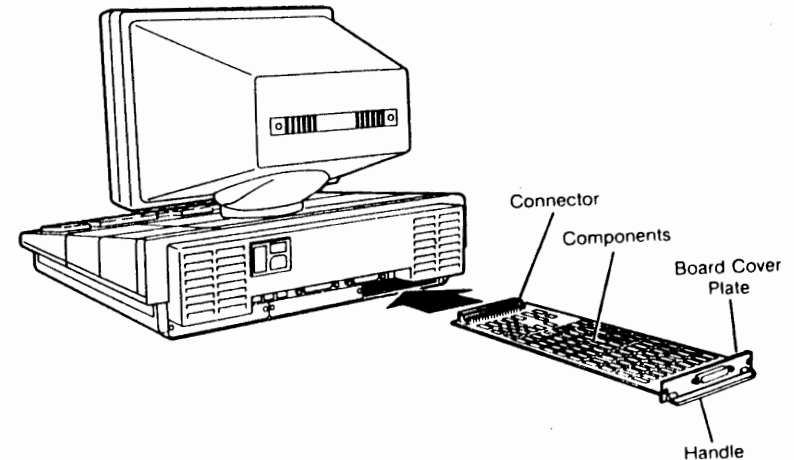

Figure 2   Inserting the Ethernet Board

6 Replace the cover screws (being careful not to strip the screws) to hold the Ethernet board in place. Retain the expansion board cover for future use.

7 Turn the power on.

   Your system should power up normally, and after a few moments you should see:

   Please Login:

Note

If you do not see the **Please Login:** prompt, or you receive a panic error message, you may have installed a defective Ethernet board. Repeat the installation process. If problems persist, select another slot in the **UNIX** PC for the Ethernet board and repeat the process.

Removing the Ethernet Board

To remove the Ethernet board:

1 Shut down the UNIX PC using the Shutdown command from the Office Commands menu. When you see:

Ready to turn power off or reset the machine. Press RETURN to reboot.

Turn the **UNIX** PC off.

2 Remove the Ethernet board cover screws. Be careful not to strip the screws.

3 Grasp the expansion board handle and pull gently to unseat the board.

4 Slide the board out of the slot.

5 Replace the expansion slot cover and screws.

Be sure to tighten the screws ensuring good contact between the cover plate and the PC chassis.

Hardware Connections

The cable used for networking with Ethernet is a 15-pin, D type cable. One end is attached to the Ethernet board installed in the **UNIX** PC. The other end is attached to the transceiver.

The cable used must be either an AT&T-supplied cable, or any cable which conforms to the IEEE Ethernet specification #802.3-1985, section 7.6. If such a cable is not used, radio frequency interference may increase and system performance may be degraded.

The cable should correspond exactly to the pin-out specification below.

Ethernet 15-Pin D Connector

Pin	Signal	Pin	Signal	Pin	Signal
1	GND	6	GND	11	Not used
2	COL+	7	Not used	12	RCVR-
3	TRANS+	8	Not used	13	PLUS12
4	Not used	9	COL-	14	Not used
5	RCVR+	10	TRANS-	15	Not used

Loading the Ethernet Board Diagnostics Floppy Disk

The Ethernet board diagnostics floppy disk is loaded in the same manner as the diagnostics floppy disk for the **UNIX** PC. You can accomplish this procedure from a system that is turned off or from one that is up and running.

To load the Ethernet diagnostics floppy disk:

1 Insert the Ethernet diagnostics floppy disk into the floppy drive with the label up and secure the floppy drive latch.

2 If the **UNIX** PC is turned OFF, turn the power switch ON (toward the I).

or,

If the **UNIX PC** is already ON, shut it down using the Shutdown command from the Office Commands menu. When you see:

Ready to turn power off or reset the machine. Press RETURN to reboot.

Press <Return>.

The Ethernet board diagnostics floppy disk
loads and the following is displayed:

SYSTEM CONFIGURATION

1048575 bytes On-board memory.
1048574 bytes Expansion memory.
ENET Controller board at slot 3

> Ethernet diagnostic initialization is in progress.
> Initialization is completed.
> Type any key to continue.

This information varies depending on the
amount of memory, where the Ethernet board is
located, and other expansion boards you have
installed in your UNIX PC.

3   Press the space bar to continue to the
    Ethernet diagnostics menu.

Ethernet Board Diagnostics Procedures

You run the Ethernet board tests by typing the
corresponding test number and pressing the Enter key.
The following screen is displayed when the Ethernet
board diagnostics floppy disk is loaded. (The address
number is specific to each individual Ethernet board.)

ETHERNET TEST
The Ethernet Address is: 404009094040

Available Ethernet tests are:
        0 - Restart Ethernet Tests
        1 - Internal Loopback Test
        2 - Transmitter CRC Test
        3 - Receiver CRC Test
        4 - Force Collision without retry
        5 - Force Collision with 16 retries
        6 - External Loopback Test
        7 - Time Domain Reflectometry Test
        8 - Send a Test Packet
        9 - System Reboot
Choose test number:

Ethernet Board Tests

The following is a list of the Ethernet board tests.
Tests 6, 7, and 8 assume that your Ethernet network is
properly configured. See the documentation
accompanying your Ethernet software for network setup
instructions.

Test 0   Restart Ethernet Tests

         Selecting Test 0 restarts the Ethernet tests.
         The original Ethernet test menu is displayed.

Test 1   Internal Loopback Test

         Selecting Test 1 performs an internal
         loopback test. In this test, the Ethernet
         chip internally transmits, loops back, and
         receives an Ethernet packet. Since all
         signals in this test are internal to the
         Ethernet board, it can be executed without
         having the Ethernet network attached. For a
         successful test, the following is displayed:

         Internal loopback test.
         Internal loopback test successfully
         completed.

Test 2   Transmitter CRC Test

         Selecting Test 2 performs a transmitter CRC
         test. In this test, a CRC (Cyclic Redundancy
         Check) is done on a test packet being
         transmitted to see if it is correct. This
         test is also internal to the Ethernet board.
         For a successful test, the following is
         displayed:

         Transmitter CRC Test.
         Transmitter CRC successfully completed.

Test 3   Receiver CRC Test

Selecting Test 3 performs a receiver CRC
test. In this test, receipt of a test packet
is simulated. A CRC is done on this data to
see if it is correct. This test is internal
to the Ethernet board. For a successful
test, the following is displayed:

Receiver CRC Test.
Receiver CRC successfully completed.

Test 4   Force Collision without retry

Selecting Test 4 performs a collision
detection test with no retries. This test
simulates a collision of data and checks to
see if it is detected. This test is
internal to the Ethernet board. For a
successful test, the following is displayed:

Force Collision Test. - one attempt
Force Collision without retry successfully
completed.

Test 5   Force Collision with 16 retries

Selecting Test 5 performs a collision
detection test with 16 retries. This test
simulates a collision of data and checks to
see if it is detected. The process is
repeated 16 times. This test is internal to
the Ethernet board. For a successful test,
the following is displayed:

Force Collision Test. - 16 attempts
Force Collision with 16 retries successfully
completed.

Test 6   External Loopback Test

Selecting Test 6 performs an external
loopback test. In this test, the Ethernet
chip sends a loopback packet to the
transceiver and checks to see whether it
comes back. Since this test is not internal
to the Ethernet board, it requires that the
board be connected to a transceiver. For a
successful test, the following is displayed:

External Loopback Test.
External Loopback test successfully
completed.

Test 7   Time Delay Reflectometry Test

Selecting Test 7 performs a time delay
reflectometry test. Using a counter that is
internal to the Ethernet chip, this test
checks for discontinuity in the cable leading
to the transceiver. This test is not
internal to the Ethernet board and can be
successfully executed only while the board is
connected to a transceiver. For a successful
test, the following is displayed:

No discontinuity detected

Test 8   Send a Test Packet

Selecting Test 8 prompts you for the
following information:

Enter destination (default = 0):
Enter destination #2 (default = end):
Enter message:

This test sends a simulated packet to the
destination **address** given. In response to
Enter Destination (default = 0):, enter the
Ethernet **Address.** The Ethernet Address is
displayed during the boot of the diagnostic
disk and also when 0 (Restart Ethernet Tests)
is selected. You can enter several
destination addresses if you want.

When you have completed the test message, press <Ctrl>-<d> to send the message to the specified destination(s). Keep in mind that the sending and receiving machines must both be running diagnostics in order for the message to be displayed.

The success of this test is determined by receipt of the message on the destination machine(s). Once you have verified the integrity of the message, press <Return> to choose another test from the menu.

Note

In the event of failure, press <Ctrl>-<d> followed by <Return> to return to the diagnostics menu.

This test is not internal to the Ethernet board and can be successfully completed only while the board is connected to a working Ethernet network.

Test 9   **System Reboot**

Selecting Test 9 reboots the **UNIX** PC.

Exit   To exit the Ethernet test menu and resume normal **UNIX** PC operations, remove the Ethernet Board diagnostics floppy disk and select Test 9. The system reboots, and after a few moments you see:

Please Login:

Test Failures and Error Messages

As each of the Ethernet board diagnostics is run successfully, the messages listed in the previous section are displayed. If a test runs unsuccessfully, some type of failure or error message is displayed.

The following is an example of what might be displayed if a test fails:

```
External Loopback Test.
Transmit Error - Carrier Lost, carrier input (RENA) to the chip
                is lowered during a chip-initiated transmission.

                ** ERROR **
Error  : Unexpected transmit descriptor: TMD1 = 4302, TMD3 = 800

        Enter y [Y] to Abort, Return to continue:
```

In this example, entering **y** returns you to the Ethernet test menu. Pressing the Return key runs the test a second time.

The following is a list of possible errors:

Timeout - No interrupt occurred within a specific amount of time after the test was started.

Receive Message Size Error - The received message size is not correct.

Receive Data Error - A compare performed on the incoming data against the transmitted data failed.

CRC Error - During the CRC generation test, the transmitted CRC is checked against the internal software's CRC. If the two do not match, the error occurs.

Collision Not Detected Error - No collision was detected during a collision detection test.

Collision Error - Collision failed to activate within 2 microseconds.

Missed Packet Error - Silo overflow due to receive buffer not available.

Memory Error - READY signal not received within 25.6 microseconds.

Receiver Error - Silo overflow due to host memory buffer not available.

Receiver Error - Ethernet chip does not own the next buffer while data chaining a received packet.

Receiver Error - CRC Error on the incoming packet.

Receiver Error - Framing Error.

Transmit Error - End of Packet (ENP) bit not set in the transmit buffer ring, or Ethernet chip not owning the next buffer.

Transmit Error - Underflow error, the transmitter has truncated a message due to data not received from host memory.

Transmit Error - Late Collision, a collision has occurred after the slot time of the channel has elapsed.

Transmit Error - Carrier Lost, carrier input (RENA) to the chip is lowered during a chip-initiated transmission.

Transmit Error - Retry error, transmitter failed in 16 attempts to successfully transmit a message due to repeated collisions on the medium.

If you receive an error message, first check all cable connections and try the test again. Many of the tests report errors if the Ethernet board is not properly connected to a working Ethernet network.

If you continue to receive the error message:

1   Shut down the UNIX PC using the Shutdown command from the Office Commands menu and turn off the UNIX PC.

2   Remove the Ethernet board.

3   Press down on all of the socketed ICs to insure that they are properly seated.

4   Replace the Ethernet board.

5   Insert the Ethernet board diagnostics floppy disk.

6   Turn on the **UNIX** PC and repeat the test.

If problems persist, select another slot in the UNIX PC for the Ethernet board and repeat the test. If you are still unable to successfully test the Ethernet board, the board must be replaced.