

Follow the instructions in this section to connect your Ethernet adapter to thin Ethernet cable.

1. Attach the BNC "T" connector (included with your adapter) to the BNC network port at the rear of the computer.
2. Attach one end of the coaxial cable to an open end of the "T" connector on the first computer. Align the notches in the cable-end with the posts on the "T" connector, and push the cable in, and twist it about one-quarter turn. Avoid severe bending or kinking of the cable. Attach the other end of the cable to an open end of the "T" connector at the rear of the second computer. Continue making connections to the rest of the computer. The interconnection cable must not exceed the recommended length (185 meters for 10Base2 or 300 meters for the extended length option) prescribed by the protocol used. The interconnection cable can be attached to signal repeaters to extend the network.
3. When all computers have been connected, attach a 50-ohm cable terminator to each end of the entire segment.

THIN ETHERNET SEGMENT

A thin Ethernet cable segment is the length of the cable between repeaters. The Ethernet adapter functions with 185-meter (IEEE 10Base2) or 300-meter (extended length option) cable segments without any jumper changes. Pick one specification and consistently obey the protocol of what type throughout your network. If you mix the rules--for example, using the two repeater links permitted by 10Base2 with 100 nodes per segment permitted under the extended length option--your network might have an excessive number of errors or might not operate at all.

If your network uses standard 185-meter cable segments, all thin Ethernet cable segments in the network can be up to 185 meters long. Five standard length cable segments can be connected in line using commercially available repeaters. The total network span with five standard length segments is 925 meters. No more than four repeaters can be on the signal path from one node to any other node. The standard 185-meter segment length is recommended because it allows you to use common thin Ethernet components that conform to the IEEE standard.

If your network is using extended-length 300-meter segments, all thin Ethernet cable segments in the network can be up to 300 meters long. Three 300-meter cable segments can be connected in line using repeaters. The total network span with three extended length segments is 900 meters. No more than two repeaters can be in the signal path from one node to any other node. If you are using extended length segments, all repeaters and transceivers must be designed for 300-meter operation. In additions, all LAN adapter boards (other than this adapter) must be configured to the extended segment length, if a configuration choice is required.

Note that you cannot use Ethernet adapters to extend 185-meter segments to 300-meter cable segments unless all LAN adapters and repeaters used in the network can operate on the extended segment length.

INTERCONNECTING THIN AND THICK ETHERNET

Thin Ethernet cable segments can be connected to thick Ethernet cable seg-

ments through a signal repeater or a BNC-to-N type adapter. If you interconnecting through a repeater, attach the repeater to the Ethernet cable through a transceiver. (This must be done when connecting any cable segments in an Ethernet network.

STANDARD	THICK IEEE 802.3 10Base5	THIN IEEE 802.3 10Base2	UTP IEEE 802.3 10BaseT	THIN (EXTENDED) IEEE 802.3 10Base2
Data rate	10MB per sec.	10MB per sec.	10MB per sec.	10MB per sec.
Segment length	500 meters	185 meters	100 meters	300 meters
Max. number of segments between nodes	3 coaxial* + 2 repeater links	3 coaxial* + 2 repeater links	5	3 coaxial*; no repeater links
Max. number of repeaters between nodes	4 when using 2 repeater links	4 when using 2 repeater links	4	2
Network span	2500 meters	925 meters	500 meters	900 meters
Max. number of nodes per segment	100	30	1	100
Max. number of nodes per network	100 MAUs	1024	1024	1024
Minimum space between nodes	2.5 meters	0.5 meter	---	0.5 meter
Cable type	Standard Ethernet	RG58 A/U or C/U 50-ohm single-shield, BNC connectors	AT&T D-inside wire (D/W& PDS) IBM Type 3	RG58 A/U or C/U, 50-ohm single-shield BNC connector

* A coaxial segment contains nodes. A repeater link segment does not. A repeater link segment is used for extending the distance between coaxial segments.

THICK ETHERNET

Follow the instructions in this section to connect your Ethernet adapter to thick Ethernet cable.

The AUI port is used to attach a thick Ethernet AUI drop-cable to your Ethernet adapter. The adapter board will operate on an Ethernet network by attaching an AUI drop-cable to the AUI ports and to a trunk coaxial cable through a media attachment unit (MAU) transceiver. The MAU acts as the interface to an Ethernet network using thick cable or any other Ethernet medium. The adapter board's AUI port can also be used for operation with other types of cabling such as fiber-optic.

THICK ETHERNET NETWORK

A thick Ethernet cable segment is a continuous thick coaxial cable up to 500 meters in length. Typically, a thick Ethernet network is composed of a main cable segment, or "spine," with additional segments, or "ribs," attached to the main cable segment through repeaters. Computers are generally attached to the rib segments, but can also be attached to the spine segment.

Thick Ethernet network connections are made through AUI drop cables. The AUI drop cable can be up to 50 meters in length. One end of the drop cable is attached to the AUI port on the Ethernet adapter. The other end of the drop cable is attached to the thick Ethernet cable segment through a transceiver.

UNSHIELDED TWISTED PAIR

Follow the instructions in this section to connect your Ethernet adapter to an unshielded twisted pair (UTP) hub.

The twisted-pair network port on the Ethernet adapter board is a modular, RJ-45 eight-pin socket. Each end of the twisted-pair network interface cable has a mating, RJ-45 type, eight-pin modular plug. Table 9 defines the function of each pin.

10BaseT Twisted-Pair Interconnection

The following items are required to interconnect the network computers to a 10BaseT twisted-pair network:

- * a twisted-pair interface cable for each computer.
- * a local concentrator or hub for interconnecting computers.

A wall jack can be wired for 10BaseT twisted-pair cable leads to a concentrator in a wiring closet.

1. Insert the modular plug at one end of the interface cable into the RJ-45 twisted-pair network port at the rear of the computer.
2. Attach the other end of the interface cable to an input port of a 10BaseT compatible concentrator.

LINK STATUS

When the computer is connected to a concentrator port and both systems are powered on, verify the connection by observing the green link integrity LED indicator provided above the twisted-pair network port on the adapter board. If the link status light is off, it is assumed that you are using coaxial cable and that port will be enabled. When a valid connection exists via twisted-pair cable, the link status LEDs at the adapter board and at the concentrator are lit. If the computer and the concentrator are powered on and the LEDs are not lit, check the modular plug connection at the adapter board and at the concentrator and all wiring.

The polarity status LED is ON if the polarity of the twisted pair receive wires is normal. It is OFF if the polarity is reversed. The adapter will automatically correct for reversed polarity.

USING EXISTING PHONE CABLE

The existing telephone wiring in your building can be used for network interconnection if the wiring meets minimum standards and any wall jacks are wired correctly. Before starting the installation, verify that all twisted-pair wires meet the requirements described in Appendix A, "Network Components and Setup."

The existing telephone wiring may consist of a separate eight-conductor, twisted-pair cable routed to each wall jack, or it may consist of dozens of twisted-pair conductors in a cable bundle. If a cable bundle is used, the conductors for each phone line have been separated from the bundle and attached to the wall jack.

In either case, the arrangement of twisted-pairs at the wall jack in a typical telephone installation is usually not acceptable for network signal transmissions. The two twisted-wire pairs required for network signals must be wired to the wall jack in the following arrangement:

Pair 1-- attach to Pins 1 and 2.

Pair 2-- attach to Pins 3 and 6.

The twisted-wire pairs for telephone signals (if used) are attached to the remaining pins.

Determine which conductors are twisted together, record the wire colors for each pair and note the pin to which each wire is attached. For example, an eight-conductor cable may have the color and wire-pair configuration show in Table 9.

Network interconnections are usually made in a wiring closet. You must be able to identify and separate the conductors that are carrying network signals from the conductors that are used for telephone operation. The color code and wire-pair arrangement of telephone cable will vary from one manufacturer to another.

WIRE PAIR	COLOR CODE	FUNCTION	MODULAR WALL PIN NUMBER
1 1	orange/white band white/orange band	network signals network signals	2 1
2 2	green/white band white/green band	network signals network signals	6 3
3 3	blue/white band white/blue band	telephone telephone	4 5
4 4	solid gray solid orange	telephone telephone	8 7

INTERFACE CABLE WIRING

The twisted-pair interface cable provided has an eight-pin modular plug at each end that mates with the twisted-pair network port on the LAN adapter board and with an RJ-45 modular wall jack. If you are making your own

interface cables to use as dedicated network wiring, or as extension cables, refer to Figure 10 for wiring information.

WIRING CLOSET TERMINATION

If you are using the existing wiring in the building, concentrators are typically mounted inside the wiring closet, where the telephone conductors are terminated at a wiring panel. Refer to the notes you made to identify the conductors used for network signals. If you are installing a new network cable, the wire pairs for each computer can be attached directly to an RJ-45 plug and connected to a concentrator port. The wire pairs can also be terminated at a wiring panel (or other termination device) and then connected to a 10BaseT concentrator port through a twisted-pair wire segment that has an RJ-45 plug at one end. Connect each set of twisted-pair wires to a concentrator port in the same manner.

Most concentrator manufacturers provide a means for connecting concentrators in a daisy-chain fashion. Refer to the concentrator's installation guide for specific information.

CONCENTRATORS

The Ethernet adapter when used with twisted-pair cable must always connect to a concentrator. This results in a star-wired network with the concentrator at the center of the star. The Ethernet adapter is compatible with 10BaseT concentrators from a variety of vendors such as Tandy, SynOptics Communications, David Systems, NetWorth, and Cabletron.

USING StarLAN 10 Concentrators

AT&T and Hewlett Packard StarLAN 10-compatible adapters operate over StarLAN type wiring and use 10 Mbps Ethernet speeds and protocols, but original StarLAN 10 products did not provide the Link Integrity feature required by the 10BaseT standard. Your Ethernet 10BaseT adapter can operate with StarLAN 10 products that do not have Link Integrity, providing that you disable the Link Integrity test function on the adapter. To disable the Link Integrity test function, run the software setup program and select Link_Int=D.

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