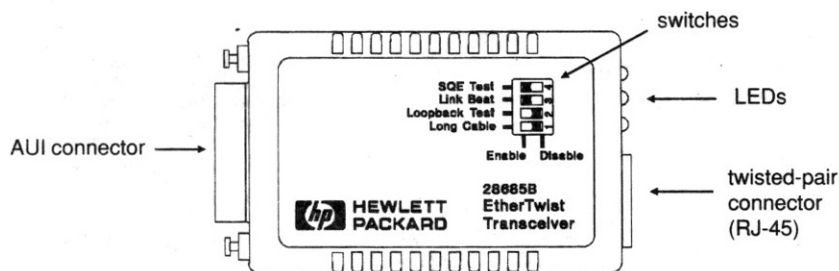


HP 28685B EtherTwist Transceiver User's Guide



Introduction

The HP 28685B EtherTwist Transceiver is a medium attachment unit (MAU) that attaches directly to the AUI port on an IEEE 802.3 or Ethernet "network device" such as a hub, bridge, or router, or a network adapter card in a PC or workstation. The transceiver connects that device to unshielded twisted-pair (UTP) cable.

Features

- Compatible with the IEEE 802.3 Type 10Base-T standard.
- Has a standard 15-pin AUI connector for direct attachment to the AUI port on a network device, or to a standard AUI cable.
- Has an 8-pin RJ-45 connector for attachment of UTP cable.
- Has six LEDs indicating power, receive and transmit activity, polarity of the UTP "receive" pair of wires, link status, and collision conditions.
- Has four easily accessible external switches to enable or disable SQE test, the link beat (also called link test pulse) signal, a loopback test mode, and a long cable mode.
- Automatically detects and corrects for reversed polarity on the UTP "receive" pair of wires.

Included Parts

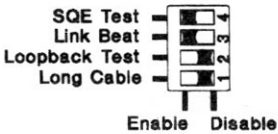
Your transceiver product includes:

- HP EtherTwist Transceiver (p/n 28685-93101)
- AUI retainer (p/n 5062-3351)
- this manual, *HP 28685B EtherTwist Transceiver User's Guide* (p/n 28685-90101)

Installation

1. Set the switches

The HP EtherTwist Transceiver has four switches so it can be configured for use in a wide variety of twisted-pair network environments.



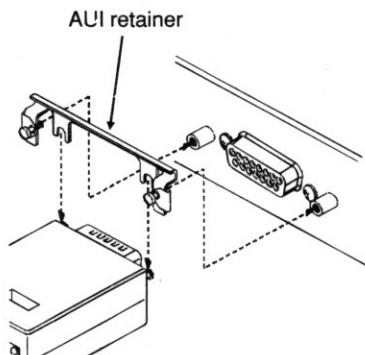
SQE Test	<p>Enables or disables the signal quality error (SQE) test signal. The factory setting is ENABLE.</p> <ul style="list-style-type: none">– Keep at ENABLE if attaching the transceiver to a LAN card in a computer, or to another device that expects the SQE test signals such as a bridge or router. Also ENABLE if running a loopback test. See “Troubleshooting”.– Set to DISABLE if attaching the transceiver to a hub’s or repeater’s AUI port.
Link Beat	<p>Enables or disables the link beat signal. The factory setting is ENABLE.</p> <ul style="list-style-type: none">– Keep at ENABLE if the transceiver is used in a 10Base-T network.– Set to DISABLE if the transceiver is used in a network that is not compatible with the 10Base-T standard (for example HP StarLAN 10).
Loopback Test	<p>Enables or disables a loopback test mode for troubleshooting the transceiver. The factory setting is DISABLE.</p> <ul style="list-style-type: none">– Set to ENABLE <i>only</i> for troubleshooting with a loopback test. See “Troubleshooting”.
Long Cable	<p>Allows the transceiver to be used with twisted-pair cable lengths of over 100 meters (<i>when used with high-grade, low-crosstalk cable</i>). The factory setting is DISABLE.</p> <ul style="list-style-type: none">– Keep at DISABLE if high-grade twisted-pair cable is <i>not</i> being used to connect the transceiver to another device.– Set to ENABLE <i>only</i> if high-grade twisted-pair cable is used. See “Using the Long Cable Option” for more information.

2. Install the transceiver

Secure the transceiver to the AUI port:

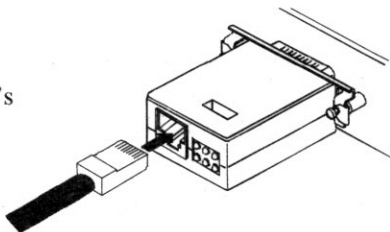
1. Switch the network device's power off and attach the transceiver to its AUI port.
2. If the port has a slide latch, slide it so the mounting posts on the transceiver are captured and the connection is secure.

If the port does not have a slide latch (as on an HP EtherTwist hub, for example), use the AUI retainer included with the transceiver, as shown in the illustration.



Attach the twisted-pair cable:

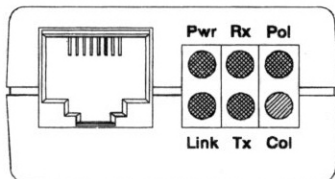
Push the twisted-pair cable's 8-pin plug into the transceiver's jack until it clicks into place.



3. Check the LEDs on the end of the transceiver

Switch the network device's power back on and look at the LEDs on the end of the transceiver. When the transceiver is used in a 10Base-T network, and the devices at both ends of the UTP cable are operating correctly:

- **Pwr**, **Link**, and **Pol** should go ON, and
- **Rx** and **Tx** should begin FLASHING when network traffic is received and transmitted by the device on the AUI port.



If you see this pattern, the network segment is ready to use.
See "LED Meanings" on the next page for more information.

LED Meanings

The descriptions in this table assume that the network device supplying power to the transceiver is powered on and is functioning properly.

LED	State	Meaning
Pwr Power (green)	ON	Power is being received from the network device.
	OFF	Power is not being received. See "Troubleshooting".
Link Link Beat (green)	ON	If in a 10Base-T network (the Link Beat switch is set to ENABLE), a good link has been established with a functioning 10Base-T device over the twisted pair cable. If in a non-10Base-T network (the Link Beat switch is set to DISABLE), this LED is always ON.
	OFF	The Link Beat switch is set to ENABLE and for some reason the link beat signal is not being received. See "Troubleshooting".
Rx Receive (green)	FLASH	Data is being received on the twisted-pair port. Under many normal LAN traffic loads, this LED may appear ON continuously.
	OFF	No data is being received.
Tx Transmit (green)	FLASH	Data is being transmitted on the twisted-pair port. In heavy traffic, this LED may appear ON continuously.
	OFF	No data is being transmitted.
Pol Polarity (green)	ON	The UTP cable is wired correctly with respect to the polarity of the "receive" pair of wires.
	OFF	The polarity of the "receive" pair of wires is reversed from normal. The LED indicates this wiring error, but the transceiver automatically corrects for the error.
Col Collision (yellow)	FLASH	A collision has been detected on the twisted-pair port. (A collision occurs when two or more devices try to transmit on the twisted-pair network at the same time.) If the collisions are infrequent (which is normal), this LED will blink very faintly with each collision. If it appears ON continuously, there may be a problem with the twisted-pair cable segment attached to the transceiver. See "Troubleshooting".
	OFF	No collisions are being detected.

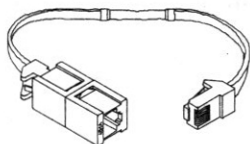
Troubleshooting

LED Error Indications*

LED	State	Troubleshooting Tips
Pwr	OFF	<ul style="list-style-type: none">– Check that the device supplying power to the transceiver is powered on.– Check that the AUI connection is secure.
Link	OFF	<ul style="list-style-type: none">– Check that the device at the other end of the twisted-pair cable is powered on, and that it is configured to send the link beat signal.– Check that all the connections in the twisted-pair cable are secure and the cable is not broken.
Col	ON (continuous)	<ul style="list-style-type: none">– Either the device attached to the AUI port or the device at the other end of the twisted-pair cable is causing or propagating continuous collisions. Check the functioning of these devices.– During a loopback test (described below), collisions appear if you did not enable the Loopback Test switch.

Using a Loopback Test*

1. Enable both the Loopback Test switch and the SQE Test switch.
2. Attach a loopback connector to the RJ-45 port.



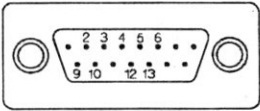
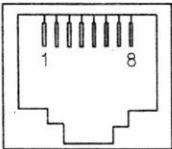
HP twisted-pair loopback connector
(HP p/n 5061-4977)

Can be obtained from an HP authorized LAN dealer or HP representative.

3. Run a loopback test from the attached network device—such as a hub, bridge, or computer—through its AUI port (where the transceiver is attached). If the test fails, the transceiver may be faulty. You should also verify that the error is not caused by faulty operation of the attached network device. One way to do this is to try the test again with a known good transceiver. If this test fails, then the original transceiver may be good; the network device may be faulty.

*Contact your HP authorized LAN dealer or HP representative if you suspect that your transceiver is faulty. See the warranty statement included with the product.

Connectors and Cables

AUI Connector		RJ-45 Connector	
			
male connector			
Pin	Signal	Pin	Signal
2	Control In circuit A	1	Transmit+ (Tx+)
3	Data Out circuit A	2	Transmit – (Tx –)
4	Data In circuit Shield (common drain)	3	Receive+ (Rx+)
5	Data In circuit A	4	<i>not used</i>
6	Voltage Common	5	<i>not used</i>
9	Control In circuit B	6	Receive – (Rx –)
10	Data Out circuit B	7	<i>not used</i>
12	Data In circuit B	8	<i>not used</i>
13	Voltage Plus		

Twisted-Pair Cables

Application	Cable Type	Diagram	
transceiver-to-hub	straight-through	transceiver end pins 1 2 3 6	hub end pins 1 2 3 6
transceiver-to-transceiver	crossover	transceiver 1 end pins 1 2 3 6	transceiver 2 end pins 1 2 3 6

Using the Long Cable Option

The transceiver has a switch-selectable, twisted-pair receiver threshold. When the Long Cable switch is set at **DISABLE**, the transceiver operates at standard 10Base-T levels. A maximum of 100 meters of UTP cable can be used.

Note

The following discussion describes the conditions under which the long cable option can be used. To understand this discussion, you should have a knowledge of measurement of signals within UTP cable. If you need to use a UTP cable longer than 100 meters, and you do not have the necessary measurement equipment and background, consult your LAN cabling installer for assistance.

There are two requirements to use this option:

- The device at the other end of the UTP cable must have the long cable capability (for example, another HP EtherTwist Transceiver).
- High-grade, low-crosstalk cable must be used. Crosstalk attenuation (pair-to-pair or multiple disturber) must be greater than 27.5 dB.

Use the long cable option only if both of these conditions are met.

To use UTP cable lengths of over 100 meters, set the Long Cable switch to **ENABLE**. With the switch in this position, the transceiver's twisted-pair receiver threshold is lowered by 4.5 dB, allowing the transceiver to be used with the extended cable lengths. With this option enabled, you should be able to use cable lengths of up to approximately 200 meters.

Comparison of cabling limits:

	Normal 10Base-T Limits	Long Cable Limits
Attenuation between devices (5–10 MHz)	< 11.5 dB	< 16 dB
Crosstalk attenuation (pair-to-pair or multiple disturber)	> 23 dB	> 27.5 dB

The HP 28687A Wire Test Instrument can be used to measure the attenuation between the devices and the crosstalk attenuation.



Part Number: 28685-90101
Edition 1, E0192
Printed in Taiwan