

# EtherWORKS Hub 16T

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## Installation and Configuration

Part Number: EK-DEL16-IN. B01

**July 1996**

This manual describes how to install and configure the EtherWORKS Hub 16T repeater.

**Revision/Update Information:**      This is a revised manual.

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**Warning!**

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

**Achtung!**

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

**Attention!**

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées.

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# EtherWORKS Hub 16T

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## Preface

This manual describes how to install an EtherWORKS Hub 16T repeater, hereafter referred to as the Hub 16T. It also describes how to configure networks using the Hub 16T. It is intended for use by personnel who will install and use the Hub 16T.

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## Hub 16T Features

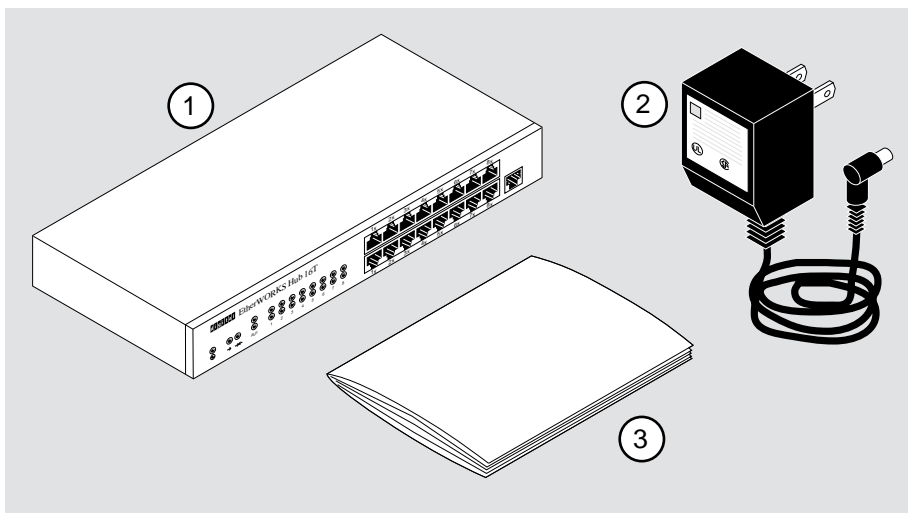
The main features of the Hub 16T are as follows:

- Ethernet 802.3-compliant repeater with eighteen ports and nineteen connectors.
  - Fifteen ports with 8-pin MJ twisted-pair, crossover-wired connectors, using Category 3 or better UTP or Screened Twisted Pair (ScTP) cable
  - One port with both an 8-pin MJ crossover-wired connector for station configurations and a straight-wired connector for multiple repeater configurations
  - One port with an Attachment Unit Interface (AUI) connector for media adaptation through a Media Attachment Unit (MAU)
  - One ThinWire connector
- Conforms to the IEEE 802.3 repeater specification and the 10BaseT standard
- LED panel includes power, activity, collision, and port status indicators
- Automatically partitions bad ports to protect the network system
- Easy desktop installation
- External 20-VAC, .9A, power adapter
- Transmits data at 10 Mb/s
- Ready to run with all network operating systems and protocols

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## Package Contents

The following figure shows the items you should find in the Hub 16T's package.



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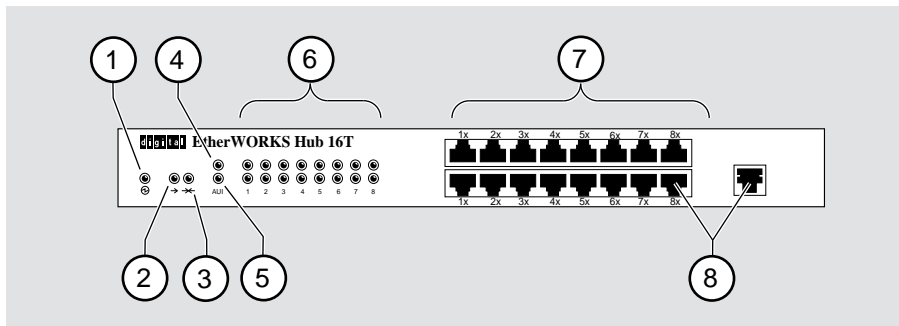
The package contents are as follows:

Number	Item
1	Hub 16T
2	External 20-VAC, .9A Power adapter
3	This manual

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## Front Panel Description

The following figure shows the Hub 16T's front panel.



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The following items are on the front panel:

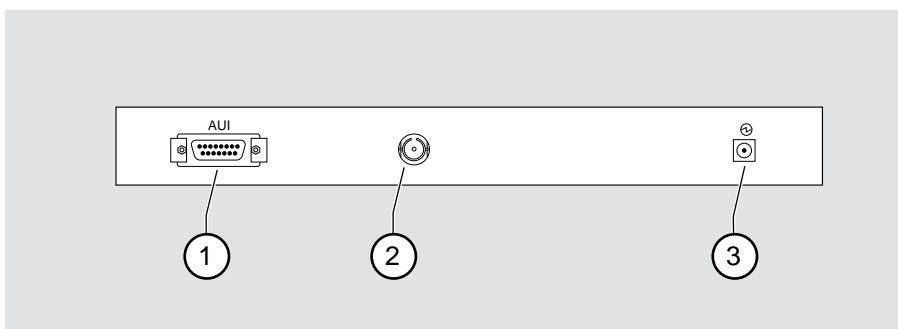
Number	Function
1	Power LED
2	Network activity LED
3	Collision detected LED
4	AUI port status LED <ul style="list-style-type: none"><li>• On - Enabled and available for connection</li><li>• Off - Disabled or unavailable for connection</li></ul>
5	ThinWire Port LED
6	10BaseT Port status LEDs <ul style="list-style-type: none"><li>• Blinking - Link but autopartitioned</li><li>• Off - No link</li><li>• On - Link and not autopartitioned</li></ul>
7	Crossover-wired 8-pin MJ connectors
8	Port 8 includes 1 straight-wired 8-pin MJ connector and 1 crossover-wired 8-pin MJ8. (Cannot be used simultaneously.)

When the Hub 16T is powered up, all the LEDs come on momentarily.

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## Back Panel Description

The following figure shows the Hub 16T's back panel.



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The following items are on the back panel:

Number	Function
1	AUI connector
2	ThinWire connector
3	Power connector

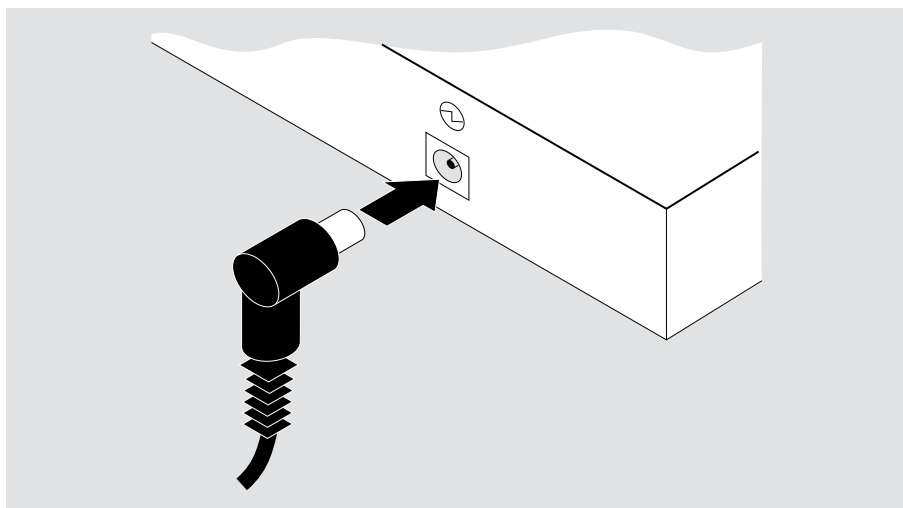


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## Connecting the Power Adapter

Perform the following steps to connect the power adapter:

Step	Action
1	Connect the barrel plug end of the power adapter cord to the power receptacle on the back panel.



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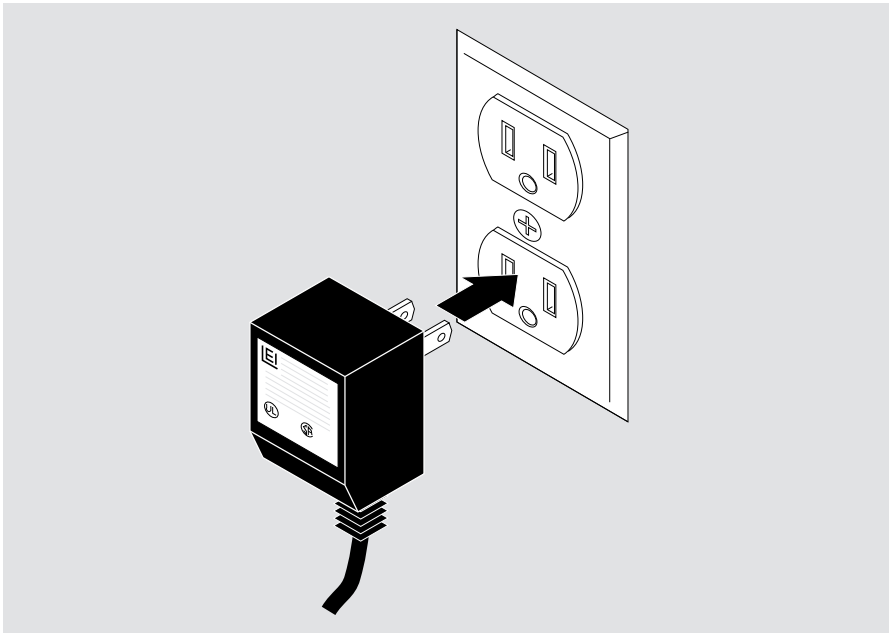
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**NOTE**

Ensure that the environment in which you are using the Hub 16T conforms to the specifications, including the specifications for your electric power source, listed in the Product Specifications section.

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Step	Action
2	Connect the body of the power adapter into an electric outlet.



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**Result:** The power LED on the front panel lights.

You are now ready to make your network connections.

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## Rules for Repeater Configurations

Observe the following rules for all network configurations using the Hub 16T.

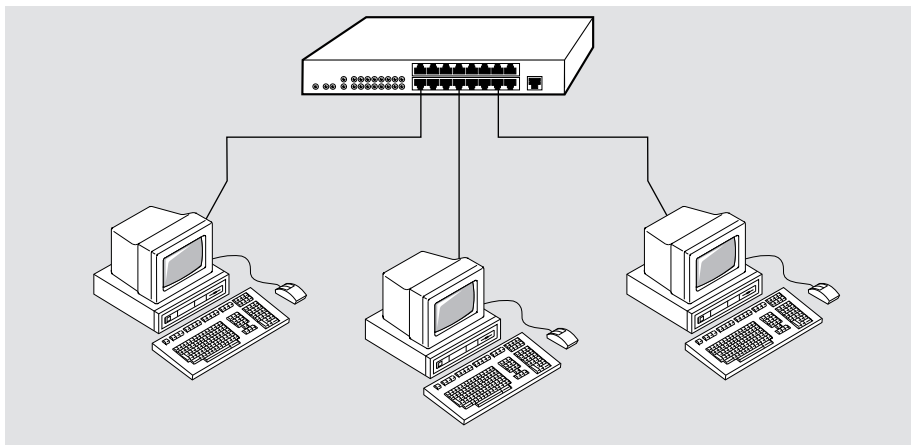
- The maximum length of a UTP segment is 100 meters.
- AUI drop cables can be no longer than 50 meters.

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## Single-Repeater Configurations

You can attach sixteen Ethernet stations to the 8-pin MJ connectors using straight-wired cable.

The following figure illustrates a typical single-repeater configuration.



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## Rules for Multiple Repeater Configurations

Observe the following rules, when you use the Hub 16T to create network configurations with more than one repeater.

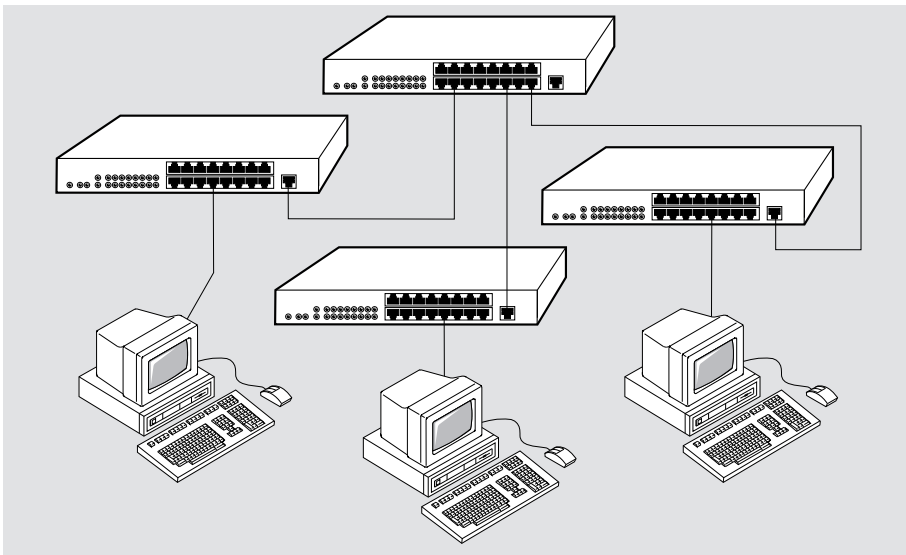
- The maximum number of repeaters between any two network nodes is four. Additional repeaters must be connected by a switch or router.
- In a daisy-chain configuration, the maximum number of cable segments between any two network nodes is five.
- You cannot use the straight-wired connector (8//) and port 8's crossover-wired connector (8X) at the same time.

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## Tree Configurations

You can connect up to sixteen repeaters to a Hub 16T using a tree configuration. Use straight-wired UTP cables to connect crossover-wired connectors on the root Hub 16T to straight-wired connectors on the other repeaters.

The following figure illustrates a tree configuration.



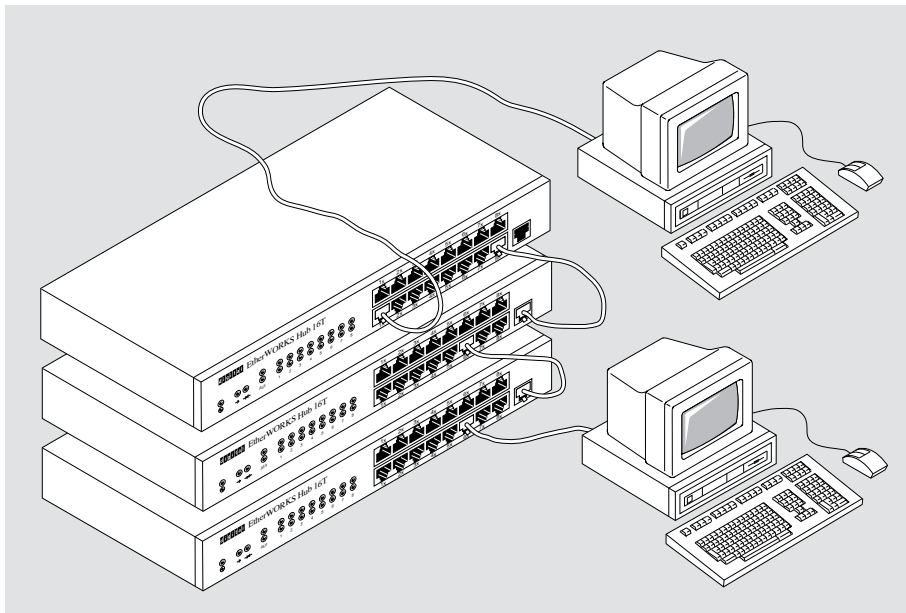
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## Daisy-Chain Configurations

You can use the Hub 16T's straight-wired connector (8//) to create a daisy-chain configuration of compatible 10BaseT repeaters. Use a straight-wired UTP cable to connect connector (8//) to a crossover-wired connector on the other repeater.

The following figure illustrates a daisy-chain configuration.



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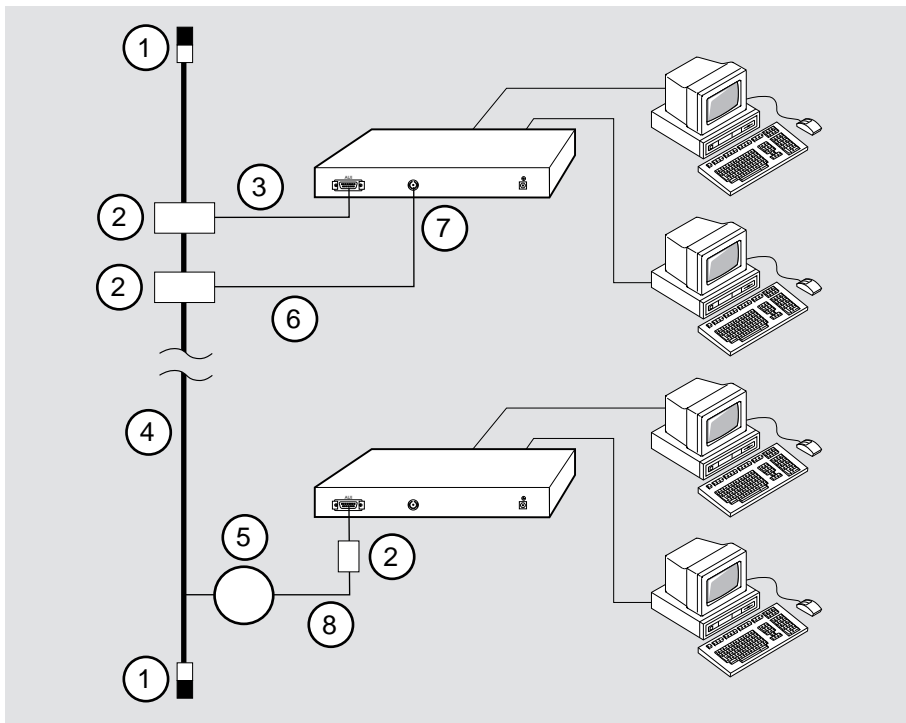
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## Backbone Configurations Using the AUI or ThinWire Port

You can connect the AUI port to an AUI drop cable or to an Ethernet MAU. Using AUI connections, you can interconnect repeaters through a backbone network connection.

You can connect the ThinWire port to a ThinWire drop cable.

The following figure illustrates a typical backbone configuration using the AUI or ThinWire port.



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The components of this configuration are as follows:

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<b>Number</b>	<b>Component</b>
1	Terminator
2	MAU
3	AUI cable
4	Backbone Ethernet cable
5	Repeater
6	ThinWire coaxial cable
7	ThinWire port
8	UTP, fiber optic, or ThinWire coaxial cable

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**NOTE**

For proper network operation, you must disable the SQE (Signal Quality Error) test on a MAU before connecting it to a Hub 16T's AUI port directly or with an AUI drop cable.

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## **Straight-Wired UTP Cable**

The Digital order number for the industry-standard, straight-wired UTP cable required by the Hub 16T is BN26S. Contact your Digital representative for more information.

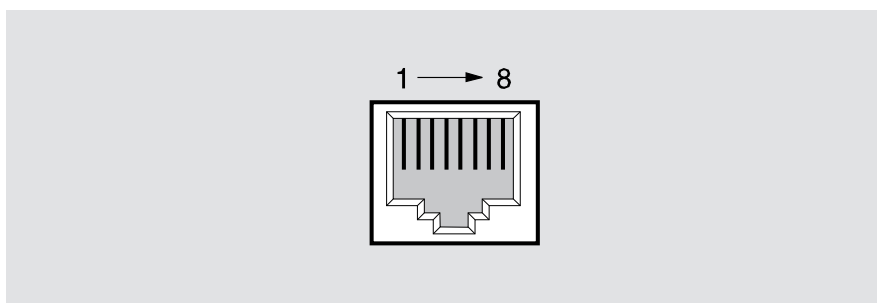
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## 8-Pin MJ Connector Pin Assignments

The EtherWORKS Hub 16T uses industry-standard crossover-wired and straight-wired 8-pin MJ ports. For your reference, crossover-wired and straight-wired connectors have the following pin assignments:

Pin	Crossover-wired Signaling (X)	Straight-wired Signaling (//)	Pin
1	RD +	TD +	1
2	RD -	TD -	2
3	TD +	RD +	3
4	Not used	Not used	4
5	Not used	Not used	5
6	TD -	RD -	6
7	Not Used	Not used	7
8	Not used	Not used	8

The 8-pin MJ connector pin locations are as follows:



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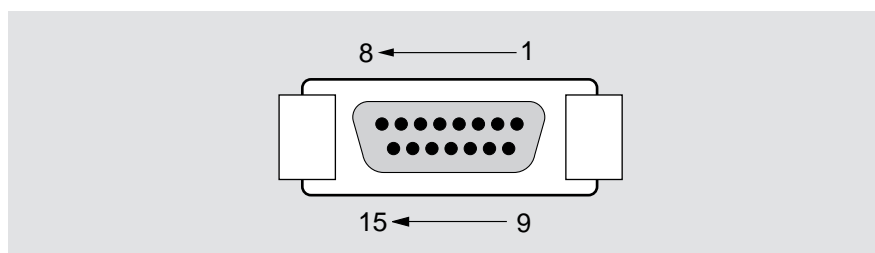
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## AUI Connector Pin Assignments

Industry-standard AUI pin assignments are as follows

Pin	Assignment
1	Ground
2	CI +
3	DO +
4	Ground
5	DI +
6	Power rtn
7	NC
8	Ground
9	CI -
10	DO -
11	Ground
12	DI -
13	Power (12V)
14	Ground
15	NC

The AUI pin locations are as follows:



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## Operating Specifications

The following table lists the product specifications for the module.

Parameter	Specifications
<b>Environment</b>	
Operating Temperature <sup>1</sup>	10°C to 40°C (50°F to 104°F)
Relative Humidity	10% to 90% noncondensing
Altitude	
• Operating	Sea level to 2400 m (8,000 ft)
• Non-operating	Sea level to 4900 m (16,000 ft)
Power	6.6 W, total power
<b>Physical</b>	
Height	4.9 cm (1.933 in)
Width	27.3 cm (10.75 in)
Depth	13.5 cm (5.3 in)
Weight	1.5 kg (3.3 lb)
<b>Shock (Class A/B for products weighing under 100 lbs)</b>	
10 G / 10 ms half sine pulse in three orthogonal axes	
<b>Vibration (Class C)</b>	
5 to 2000 Hz sine sweep @ 0.25 G limited by 0.02" (0.5mm) displacement DA*	
200 to 500 Hz sine sweep @ 0.10G	
<b>Certification</b>	CE, CSA, FCC, TÜV, UL, VCCI

<sup>1</sup> For sites above 4900 m (16,000 ft), decrease the operating temperature specification by 1.8°C for each 1000 m or 3.2°F for each 3200 ft.

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## Acoustical Specifications

The following table lists the acoustical specifications for the module.

### Declared values per ISO 9296 and ISO 7779<sup>1</sup>

Product	Sound Power Level $L_{WAd}$ , B	Sound Pressure Level $L_{pAm}$ , dBA (bystander positions)
	<b>Idle/Operate</b>	<b>Idle/Operate</b>
DEL16	No measureable noise emissions	No measureable noise emissions

<sup>1</sup> Current values for specific configurations are available from Digital Equipment representatives.  
1 B = 10 dBA.

### Schallemissionswerte - Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779<sup>2</sup>

Produkt	Schalleistungspegel $L_{WAd}$ , B	Schalldruckpegel $L_{pAm}$ , dBA (Zuschauerpositionen)
	<b>Leerlauf/Betrieb</b>	<b>Leerlauf/Betrieb</b>
DEL16	keine meßbaren Schallemissionen	keine meßbaren Schallemissionen

<sup>2</sup> Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich  
1 B = 10 dBA.

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## Correspondence

### Documentation Comments

If you have comments or suggestions about this document, send them to the Network Products Business Organization.

Attn: Documentation Project Manager  
FAX: (508) 486-6093  
E-MAIL: [doc\\_feedback@lkg.mts.dec.com](mailto:doc_feedback@lkg.mts.dec.com)

### Online Services

To locate product specific information, refer to the following online services:

- BBS** To read the Bulletin Board System, set your modem to 8 bits, no parity, 1 stop bit and dial 508-486-5766 (U.S.)
- WWW** The Digital Equipment Corporation Network Products Business Home Page on the World Wide Web is at the following addresses:
- North America: <http://www.networks.digital.com>
- Europe: <http://www.networks.europe.digital.com>
- Australia: <http://www.digital.com.au/networks>

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## How to Order Additional Documentation

To order additional documentation, use the following information:

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<b>To Order:</b>	<b>Contact:</b>
By Telephone	USA (except Alaska, New Hampshire, and Hawaii): 1-800-DIGITAL (1-800-344-4825) Alaska, New Hampshire, and Hawaii: 1-603-884-6660 Canada: 1-800-267-6215
Electronically (USA. only)	Dial 1-800-DEC-DEMO (For assistance, call 1-800-DIGITAL)
By Mail (USA and Puerto Rico)	DIGITAL EQUIPMENT CORPORATION P.O. Box CS2008 Nashua, New Hampshire 03061 (Place prepaid orders from Puerto Rico with the local Digital subsidiary: 809-754-7575)
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