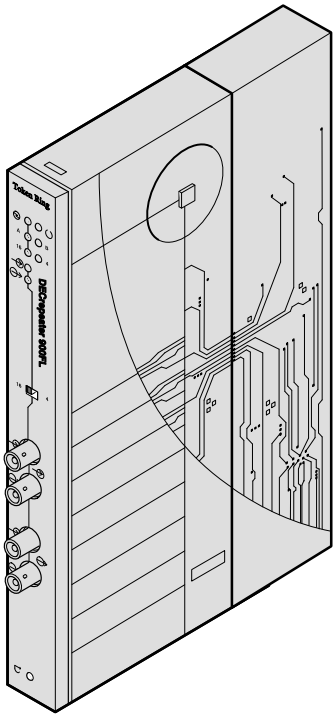
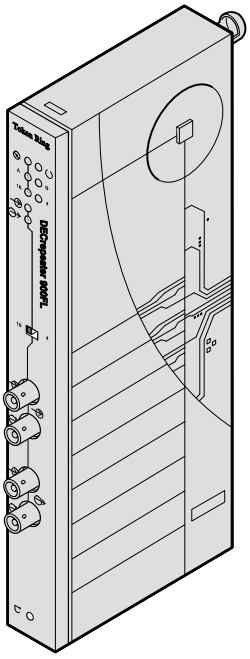
digital™

DECrepeater 900FL INSTALLATION



DEChub ONE Repeater 900FL



LKG–9189-94I

DECrepeater 900FL

The DECrepeater 900FL is a Token Ring fiber-optic repeater that operates at a speed of 4 or 16 Mb/s. It provides conversion between fiber-optic and copper media and it extends trunk distances using fiber-optic cable. As a member of Digital's Token Ring product family, it operates in a DEChub 900 MultiSwitch, or as a standalone unit (DEChub ONE Repeater 900FL).

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October 1994

FCC NOTICE – Class A Computing Device:

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference; in which case, measures taken to correct the interference are at the user's expense.

VCCI NOTICE – Class 1 Computing Device:

This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers, etc.

Read the instructions for correct handling.

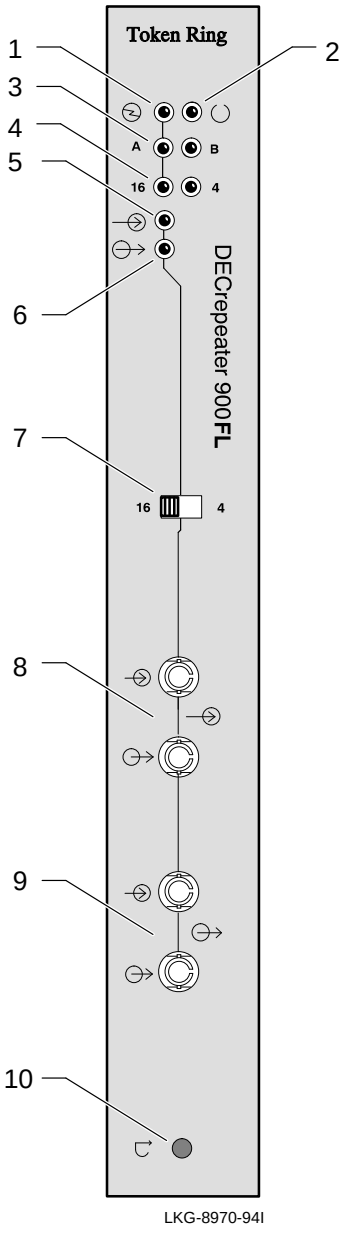
CE NOTICE – Class A Computing Device:

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 environment domestique, ceproduit risque de créer des interférences radioélectriques, il appartiendraalors à l'utilisateur de prendre les mesures spécifiques appropriées.

Front Panel



1) **Power LED.** Lights when the repeater has power.

2) **Module OK LED.** Lights when the repeater passes self-test. If the repeater fails self-test, the Module OK LED is off.

3) **Ring A/B LEDs.** In a DEChub 900 MultiSwitch, when either the A LED or the B LED is on, the respective A or B ring is active. In a standalone repeater, both Ring LEDs are always off.

4) **Speed LEDs.** Either the 16 LED or the 4 LED is on to show the repeater speed.

5) **Fiber-optic Ring In LED.** Lights when a fiber-optic Ring In connection is active.

6) **Fiber-optic Ring Out LED.** Lights when a fiber-optic Ring Out connection is active.

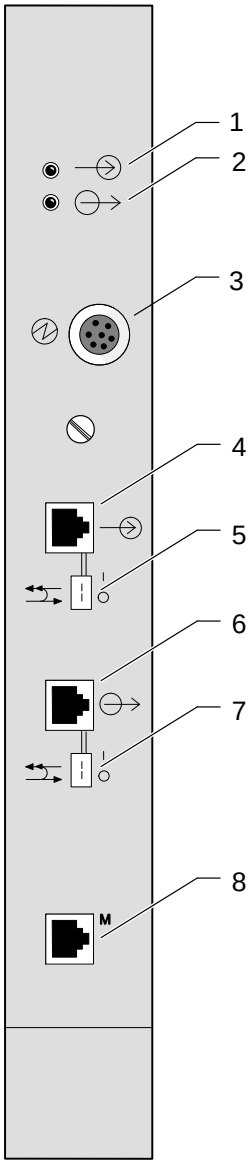
7) **Speed Switch.** Sets speed. Set to 16 when the network speed is 16 Mb/s. Set to 4 when the network speed is 4 Mb/s. Network management cannot override speed switch settings.

8) **Fiber-optic Ring In Port.** Connects the receive (Rx) and transmit (Tx) fiber-optic Ring In port to the fiber-optic Ring Out port of a remote repeater.

9) **Fiber-optic Ring Out Port.** Connects the receive (Rx) and transmit (Tx) fiber-optic Ring Out port to the fiber-optic Ring In port of a remote repeater.

10) **Reset Switch.** Resets all settings, except for the speed switch setting, to their factory defaults. To reset while turning on the power, press the reset switch with a pen or screwdriver.

Rear Panel of DEChub ONE Repeater 900FL



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Note:
The rear panel shown here is used only when the repeater is in a single-slot hub configuration.

1) Copper Ring In LED. Lights with a Ring In connection.

2) Copper Ring Out LED. Lights with a Ring Out connection.

3) Power Connector. Provides power connection for the repeater.

4) Copper Ring In Connector. Connects Ring In to the Ring Out connector of a MAU or repeater.

5) Copper Ring In Autowrap Switch. Determines whether the repeater automatically loops back when it detects a disconnected link on Ring In. If the Ring In port connects to a device with Digital's Autowrap, set the switch to 1 to enable Autowrap. If the Ring In port connects to a device without Digital's Autowrap, set the switch to 0 to disable Autowrap.

6) Copper Ring Out Connector. Connects Ring Out to the Ring In connector of a MAU or repeater.

7) Copper Ring Out Autowrap Switch. Determines whether the repeater automatically loops back when it detects a disconnected link on Ring Out. If the Ring Out port connects to a device with Digital's Autowrap, set the switch to 1 to enable Autowrap. If the Ring Out port connects to a device without Digital's Autowrap, set the switch to 0 to disable Autowrap.

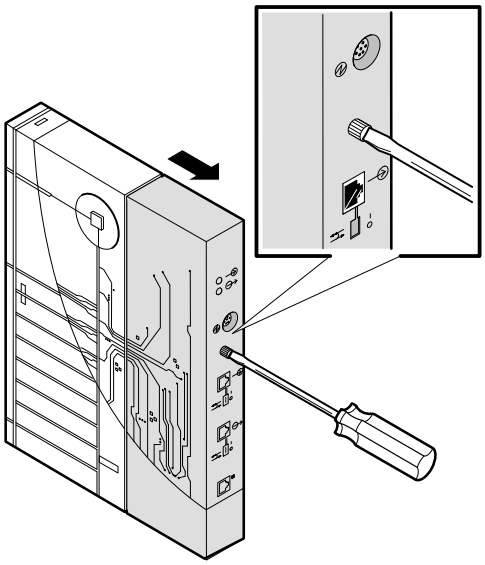
8) Not used. Reserved for out-of-band network management.

Installing a Repeater in a DEChub 900 MultiSwitch

When you install a repeater in the DEChub 900 MultiSwitch, you do not have to turn off the hub power.

1 Remove the rear cover (if necessary).

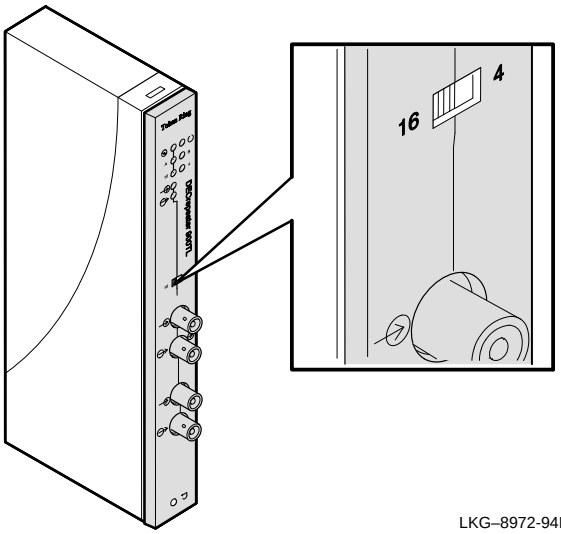
If you want to install a DEChub ONE Repeater 900FL in a hub, you need to remove the rear cover.



a. Loosen the screw on the single-slot hub until it disengages.

b. With one hand holding the front of the MAU, and your other hand holding the single-slot hub, carefully pull the two units apart.

2 Set Speed switch.



Set the speed switch to 16 when the network speed is 16 Mb/s or 4 when the speed is 4 Mb/s.

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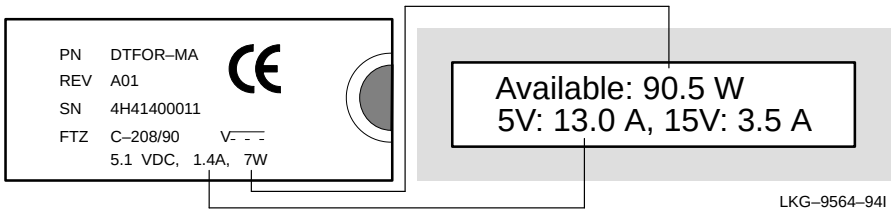
Installing a Repeater in a DEChub 900 MultiSwitch (continued)

3 **Compare your module's power requirements with the values shown in the Hub Manager status display (see example).**

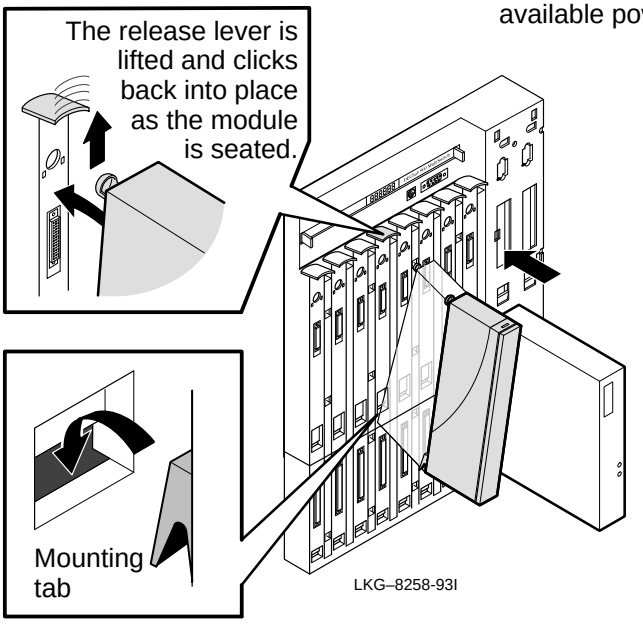
If any of the module's power ratings exceed the values shown in the status display, add another power supply (see the *DEChub 900 MultiSwitch Owner's Manual).*

Module's Manufacturing Label (Example)

Hub Manager Status Display (Example)



4 **Install the repeater on the hub.**



Note:
Before installing the module in a hub, verify that the module's input power rating does not exceed the available power that the Hub Manager LCD displays.

a. Align the repeater's 48-pin connector with any available 48-pin slot in the hub.

b. Place the repeater's bottom mounting tab into the mounting slot on the hub.

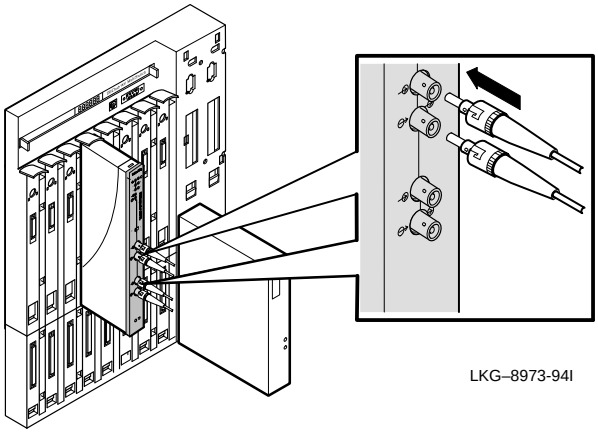
c. Pivot the repeater into place. You hear a click when the repeater is seated.

d. Press down on the release lever to ensure that it is locked.

e. With power on in the hub, verify that the Power, Module OK, and Speed LEDs are on. If there is traffic on the network, the Ring A or B LED is also on.

Installing a Repeater in a DEChub 900 MultiSwitch (continued)

5 Connect repeater ports.



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To connect a repeater in a DEChub 900 to a repeater in an adjacent DEChub 900, or to a standalone repeater, perform the following steps:

a. Connect the repeater's Ring In and Ring Out cables as follows:

From a repeater in a DEChub 900	To adjacent repeater
Ring In (Rx) Ring In (Tx)	Ring Out (Tx) Ring Out (Rx)
Ring Out (Rx) Ring Out (Tx)	Ring In (Tx) Ring In (Rx)

b. Once the ring becomes active, verify that the fiber-optic Ring In and Ring Out LEDs are on.

Installing a DEChub ONE Repeater 900FL

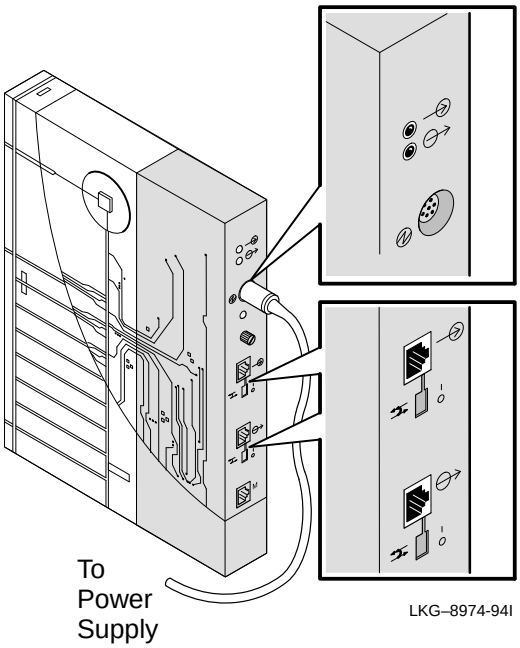
Note: The repeater is not manageable in standalone DEChub ONE configuration.

1 Mount Repeater (optional).

You can place the repeater on a table, mount it on a wall, or mount it in a standard 19-inch rack using a shelf assembly, Digital part number H9544-MS.

For a wall mounting, position two screws 19.7 centimeters (7.75 inches) apart on the wall. Turn screws until tight and then back off two turns. Hang the repeater using the keyholes.

2 Set Autowrap switches.



a. Set the Copper Ring In and the Copper Ring Out Autowrap switches to 1 or 0. Set the switch to 1 to enable Autowrap when the Copper Ring In or Copper Ring Out port connects to a device with Digital's Auto wrap, or the port is not connected to the network. Otherwise, set the switch to 0 to disable Autowrap.

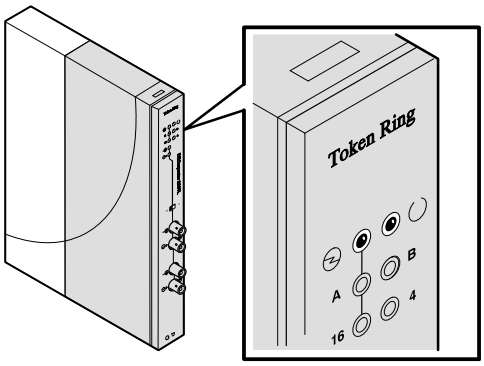
3 Connect power supply.

a. Connect the power supply cable to the power connector.

b. Plug the power supply into a wall outlet.

Installing a DEChub ONE Repeater 900FL (continued)

4 Check LEDs.



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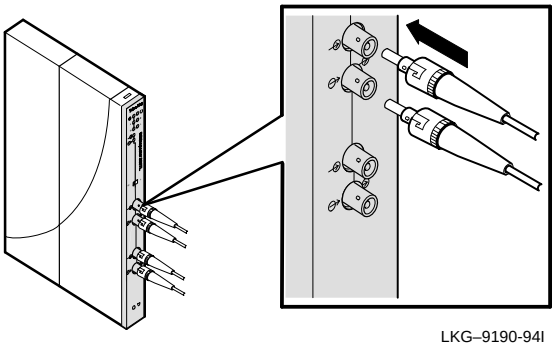
With power on, verify that the Power and Module OK LEDs are on.

5 Connect fiber-optic ports.



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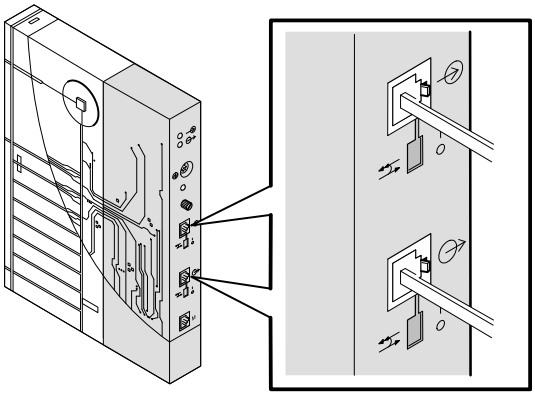
a. Connect the repeater's fiber-optic Ring In and Ring Out trunk cables as follows:

From DEChub ONE repeater	To adjacent repeater
Ring In (Rx)	Ring Out (Tx)
Ring In (Tx)	Ring Out (Rx)
Ring Out (Rx)	Ring In (Tx)
Ring Out (Tx)	Ring In (Rx)

b. Once the ring becomes active, verify that the fiber-optic Ring In and Ring Out LEDs are on.

6 Connect copper ports.



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a. Connect the repeater's copper Ring In and copper Ring Out cables as follows:

From repeater	To adjacent MAU
Copper Ring In	Ring Out
Copper Ring Out	Ring In

b. Once the ring becomes active, verify that the copper Ring In and Ring Out LEDs are on.

Removing a Repeater from a DEChub 900 MultiSwitch

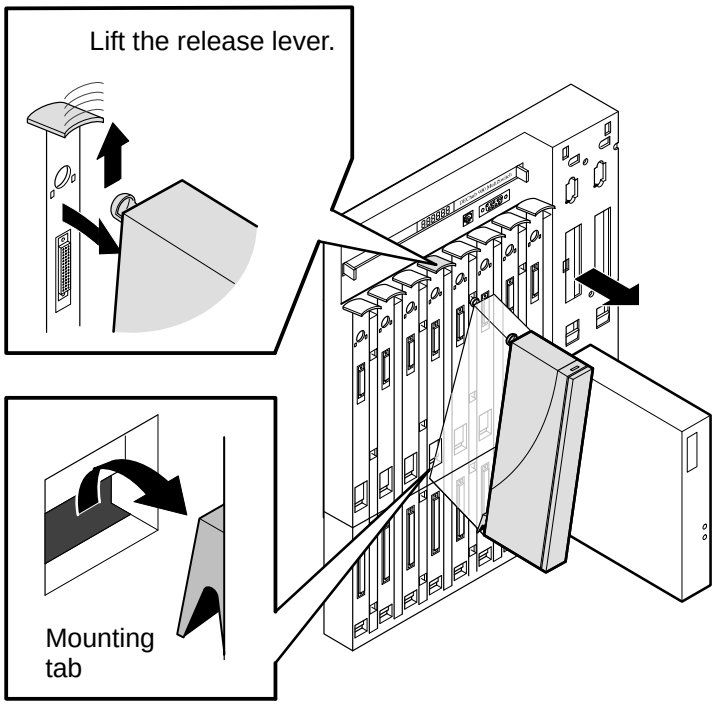
1 **Disconnect the trunk connector cables from the repeater.**

2 **Remove the repeater from the hub.**

Note:
When you remove a repeater from the DEChub 900 MultiSwitch, do not turn off the hub power.

a. Lift up the release lever on the hub.

b. Pivot the repeater back on its bottom mounting tab until it disengages from the hub.



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LED Summary

The LEDs indicate status by being on, off, and flashing. Flashing LEDs indicate special situations. There is one flashing pattern and a scroll pattern. When an LED indicates a continuous single-flash pattern, network management has disabled the port. In a scroll pattern, the LEDs turn on and off in a set order.

LED[1]	Off	On	Flashing
Power	No power	Power OK	N/A
Module OK	Self-test failed or not operating	Self-test OK	N/A
Speed (4/16 Mb/s) (See Ring A/B LEDs.)	No power, or repeater needs an upgrade.	Valid speed	N/A
Fiber-optic Ring In/ Ring Out	Inactive	Connected to network	Continuous single flash: network management disabled port.
Copper Ring In/ Ring Out	Inactive or wire fault	Connected to network	Continuous single flash: network management disabled port.
Hub Repeater ONLY:			
Ring A/B	Not connected	Connected to Ring A or Ring B	Continuous single flash: network management disabled port. A and B alternately flash: repeater needs an upgrade or an upgrade is in progress.

[1] Scroll: During powerup self-tests, all LEDs (except for the Power LED) indicate a scrolling pattern.

Repeater Cabling

Table 1 lists the maximum distances of 62.5/125 micron multimode fiber optic cable between two adjacent repeaters.

Table 1 Maximum Fiber Optic Cable Length

Speed	Fiber–optic Cable
4 Mb/s	2 kilometers
16 Mb/s	2 kilometers

Table 2 lists the maximum distances between the repeater's copper ring in and copper ring out ports and an adjacent MAU using 100-ohm Unshielded Twisted Pair (UTP) cable.

Table 2 Maximum UTP 100-Ohm Cable Length[1]

	100-Ohm UTP Cable	
Speed	**Level 3**	**Level 5**
4 Mb/s	150 m (491 ft)	213 m (697 ft)
16 Mb/s	60 m (196 ft)	100 m (327 ft)

[1] All distances include patch cables and hub connections.

Problem Solving

If ...	Then ...	Do This ...
DEChub 900 MultiSwitch and DEChub ONE		
Power LED is off.	Repeater does not have power.	Verify that outlet has power. Check power connection to repeater. Replace power supply. Replace repeater.
Module OK LED is off.	Repeater failed self-test.	Replace repeater.
Ring A and B LEDs alternately flash.	Repeater needs an upgrade or an upgrade is in progress.	If you have network management, do a downline load; otherwise, replace repeater. Wait for upgrade to complete.
Fiber-optic Ring In or Ring Out LED has single flash pattern.	Network management disconnected the repeater's fiber-optic RI or RO port.	To change settings, you can use network management commands or the repeater's reset switch.
Repeater does not make a fiber-optic connection to non-Digital equipment.	Fiber-optic ports are not compatible with non-Digital devices.	Use a Digital fiber-optic repeater to make connections.

Problem Solving (continued)

If ...	Then ...	Do This ...
DEChub 900 MultiSwitch ONLY		
Ring In, Ring Out, and Ring A/B LEDs flash together.	Network management has disabled repeater.	To change settings, you can use network management commands or the repeater's reset switch.
Repeater does not connect to the hub.	Network management will not connect repeater to hub.	Check speed and hub settings for incorrect network management overrides.
Repeater does not work in a DEChub 90.	DEChub 90 only supports Ethernet networks.	A DEChub 900 MultiSwitch supports Token Ring networks.
DEChub ONE ONLY		
Vendor's MAU or repeater causes loopback on ring.	Vendor's unit is incompatible with Digital's Autowrap.	Set Autowrap switches to 0 on the DECmau or DECrepeater adjacent to the vendor's unit.
Network crashes when a MAU or repeater fails.	Vendor's unit does not have Digital's Autowrap.	Set Autowrap switches to 1 on the DECmau or DECrepeater adjacent to the failed unit.

Product Specifications

This table provides operating specifications for the DECrepeater 90FL module. Note the additional parameters (listed in the table) to consider when the module is installed as a standalone unit.

Operating Specifications

Parameter	Specification
Operating Environment	
Operating Temperature[1]	5º C to 50º C (41º F to 122º F)
Relative Humidity	10% to 95% noncondensing
Altitude	Sea level to 4900 m (16,000 ft)
Power – in a DEChub 900	7.0 W, total power 1.4 A, 5Vdc 0.0 A, 12Vdc
Power – in a standalone DEChub ONE with the back cover installed.	7.0 W, total power 1.4 A, 5Vdc 0.0 A, 12Vdc
Connectors	
In a DEChub 900	2 fiber-optic (ST-type)
In a standalone DEChub ONE	2 fiber-optic (ST-type), 2 8-pin MJ
Physical	
Height	27.3 cm (10.8 in)
Width	3.2 cm (1.2 in)
Depth	11.2 cm (4.4 in); 17.0 cm (6.7 in) when installed as a standalone unit.
Weight	0.56kg (1.25 lb); 0.81kg (1.8 lb) when installed as a standalone unit.
Certification	
CE, CSA, FCC, TÜV, UL, VCCI	

[1] 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.

Product Specifications

This table provides acoustical specifications for the DECrepeater 900FL module.

Acoustical Specifications

Acoustics – Declared values per ISO 9296 and ISO 7779[1]

Product	Sound Power Level L_{WAd}, B	Sound Pressure Level L_{pAm}, dBA (bystander positions)
	Idle/Operate	***Idle/Operate***
DTFOR	No acoustic noise	No acoustic noise
DTFOR + H7082–AB	No acoustic noise	No acoustic noise

Schallemissionswerte — Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779[2]

Produkt	Schalleistungspegel L_{WAd}, B	Schalldruckpegel L_{pAm}, dBA (Zuschauerpositionen)
	Leerlauf/Betrieb	***Leerlauf/Betrieb***
DTFOR	keine meßbaren Schallemissionen	keine meßbaren Schallemissionen
DTFOR + H7082–AB	keine meßbaren Schallemissionen	keine meßbaren Schallemissionen

[1] Current values for specific configurations are available from Digital Equipment Corporation representatives. 1 B = 10 dBA.

[2] Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 B = 10 dBA.

Associated Documents

The following documents provide related information about the module.

Document	Description
DEChub 900 MultiSwitch Owner's Manual EK-DH2MS-OM	Provides installation, use, security, and troubleshooting information.
HUBwatch Installation and Configuration AA-Q0FXB-TE	Provides information for installing and configuring HUBwatch for Windows V2.0.
HUBwatch Use AA-PW4BC-TE	Provides network management and DEChub 900, DEChub 90 and DEChub ONE functionality information for HUBwatch for Open VMS V3.0.
Using DECndu Plus (MS–DOS) AA-PYVVA-TE	Provides instructions to upgrade the firmware in an MS-DOS environment in selected network devices using Digital's Network Device Upgrade (DECndu) Plus utility.
Using DECndu Plus (OPENVMS VAX) AA-PYVRA-TE	Provides instructions to upgrade the firmware in an OPEN VMS VAX environment in selected network devices using Digital's Network Device Upgrade (DECndu) Plus utility.
OPEN DECconnect Applications Guide EC-G2570-42	Contains general descriptions to help plan and install networking systems based on Digital Equipment Corporation's OPEN DECconnect system and networking products.

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