



DECbridge™ 900MX Release Notes

Firmware Version V1.4.0

August 1994

These release notes contain firmware and software requirements, and list known conditions and restrictions that apply to the operation of the DECbridge 900MX (also referred to in this document as the module).

Additional release notes can be found online. For information about retrieving online release notes, refer to the section titled Accessing Online Information.

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Firmware Requirements

DEChub 900 MultiSwitch firmware version V3.1, or higher, must be installed to manage the module.

Software Requirements

If you are using HUBwatch to manage the module, you must install HUBwatch software version V3.0 (or higher).

Hardware Requirements

The minimum hardware revision level required to support the features of this release is: DECbridge 900MX Hardware version V0/1.


The DECbridge 900MX hardware and firmware revision levels can be displayed by selecting menu item 3 ([3] Show Current Settings) from the DECbridge 900MX INSTALLATION MENU (refer to the *DECbridge 900MX Installation* manual for additional information). The revision levels are also displayed in the revision field of the Bridge Summary window when you are using HUBWatch (version V3.0 or higher), and in the MIB-II sysDescr using a generic SNMP manager.

The revision level for the DEChub 900 MultiSwitch Hub Manager can be displayed by selecting item 3 ([3] Show Current Settings) of the DEChub 900 MultiSwitch INSTALLATION MENU (refer to the *DEChub 900 MultiSwitch Owner's Manual* for more information).

Power Requirements

When configuring a DECbridge 900MX module in standalone mode, a 90-watt DEChub ONE docking station (Part Number: DEHUA-NB) must be used.

When configuring DECbridge 900MX modules in a DEChub 900 MultiSwitch, ensure that the DEChub 900 MultiSwitch firmware version is V3.0, or higher

CAUTION  Power calculations are not performed correctly with DEChub 900 MultiSwitch firmware version V2.2.

10BaseT Wiring

The DECbridge 900MX 10BaseT ports are straight-through wired station ports. To connect a straight-through port to a crossover port (for example, a repeater port), use a straight-through cable. To connect a straight-through port to another straight-through port (for example, a station), use a crossover cable. See the *DECbridge 900MX Installation* manual for more information.

Known Conditions and Restrictions

The following applies to the DECbridge 900MX module:

Connecting the FDDI Optical Bypass Relay (OBR)

If the module is powered on, and the FDDI cables are installed, connect the OBR device to the module in the following order:

1. Disconnect the module's FDDI port connectors from Port 1A and Port 1B.
2. Connect the OBR device to the module's OBR connector.
3. Reconnect the module's FDDI port connectors to Port 1A and Port 1B.

Problems Solved by this Version

The following problems are corrected by DECbridge 900MX firmware version V1.4.0:

1. FDDI Optical Bypass Relay (OBR) — is now supported.
2. FDDI Full Duplex operation — is now supported (on 2-node FDDI rings only).
3. FDDI MIBs — the following additional SNMP MIB variables are now supported:
 - fddimibSMTTimeStamp
 - fddimibSMTUserData
 - fddimibSMTStationAction
 - fddimibPORTLerCutoff
 - fddimibPORTLerAlarm
 - fddimibPORTAction
 - eMACRestrictedTokenTimeout
4. IP Fragmentation:
 - During certain conditions, IP fragmentation caused the module to crash.
 - The management switch for disabling IP fragmentation was inoperative.
5. Rate Limiting — when rate limiting was enabled, resetting the module caused the module to stop responding to ARPs.
6. Protocol Filter Mask — during certain conditions, when an existing protocol filter mask was modified, the previous values were restored after a module reset.
7. Don't-Fragment (DF) Flag — if the DF flag was set on large IP frames coming in from the FDDI ring, the ICMP message sent by the module to the source had an incorrect checksum.

Updating the DECbridge 900MX Firmware

This section includes the following subsections:

- **Downline Upgrade (DLU) Process Description**
The downline upgrade process is a four stage process that runs automatically when initiated. This section describes what happens during each stage of the DLU process.
- **Updating the DECbridge 900MX Firmware Using DECndu Plus**
You can use DECndu Plus to downline load new firmware to the module from a workstation running OpenVMS VAX or from a PC running MS-DOS. This section describes how use DECndu Plus to update the module's firmware.
- **Updating the DECbridge 900MX Firmware Using the Setup Port**
You can update the module's firmware by accessing the module's installation menu, from either a DEChub 900 or DEChub ONE setup port. This section describes how to use the module's installation menu to update the firmware.

Downline Upgrade (DLU) Process Description

The DLU process consists of four stages:

- Stage 1 — Transferring Firmware Image
- Stage 2 — Verifying Firmware Image
- Stage 3 — Writing New Firmware Image into Nonvolatile Storage
- Stage 4 — Module Reset and Self-Test



Table 1 describes what happens during each stage of the DLU Process (a detailed explanation of the DLU process is provided in the section titled Using the DLU Process):

Table 1 DLU Process Description

Stage	What Happens
1	<p>The new firmware image from the TFTP load host is transported across the network, and placed into a temporary storage buffer in the module.</p> <p>Indications that this stage is in progress include:</p> <ul style="list-style-type: none"> • Module status — functional, and manageable. • Module can respond to management requests. • LED display — normal operational. • HUB Manager display — <code>DECbridge 900MX up</code> <ul style="list-style-type: none"> • Typical time to complete this stage — normally 1 minute, however, because of variances in network configurations (load path, bit rate, and traffic levels), this stage of the DLU process can take up to 10 minutes to complete.
2	<p>The module verifies that the firmware image is correct after Stage 1 is complete.</p> <p>Indications that this stage is in progress include:</p> <ul style="list-style-type: none"> • Module status — functional. • Module can respond to management requests. • LED display — normal operational. • HUB Manager display — <code>DECbridge 900MX up</code> <ul style="list-style-type: none"> • Typical time to complete this stage — normally 1 second.

(continued on next page)

Table 1 (Cont.) DLU Process Description

Stage	What Happens
3	<p>The new firmware image is transferred from the module's temporary storage buffer to the Flash RAM, overwriting the old firmware image.</p> <p>CAUTION  If power is interrupted during Stage 3 of the DLU process, the firmware image can become corrupted. Do not turn off power to the unit or perform any action that can cause the unit to lose power during Stage 3 of the DLU process.</p> <p>Indications that this stage is in progress include:</p> <ul style="list-style-type: none"> • Module status — not functional. • Module cannot respond to management requests. • LED display — the following sequence is displayed: <ol style="list-style-type: none"> 1. Port State # LED 4 lights (green) for up to 1 minute. 2. Port State # LED 5 lights (green) for up to 2 minutes¹. 3. After Steps 1 and 2 are completed, all Port State # LEDs flash alternately (green/yellow) for 10 seconds². • HUB Manager display — <code>DECbridge 900MX unknown</code> • Typical time to complete this stage — normally 3 minutes.
4	<p>The module resets, runs self-test, and then begins executing the new firmware image.</p> <p>Indications that this stage is in progress include:</p> <ul style="list-style-type: none"> • Module status — not functional. • Module cannot respond to management requests. • LED display — (standard self-test pattern) Port State # LEDs flash, indicating various subroutines are running. • HUB Manager display — <code>DECbridge 900MX unknown</code> • Typical time to complete this stage — normally 1 minute. <p>After the successful completion of self-test, the Module OK  LED turns on and the module becomes fully manageable. Note also that the HUB Manager display indicates:</p> <p style="text-align: center;"><code>DECbridge 900MX up</code></p>

¹ If Port State # LEDs (4 and 5) do not light, the load did not succeed. Check that the load host is operational.

² If all Port State # LEDs turn on yellow (after Port State # LED 4 or 5 lights), a loading error has occurred. If this occurs, retry the loading process. If the problem persists, contact your Digital service representative.

Updating the DECbridge 900MX Firmware Using DECndu Plus

You can use DECndu Plus to downline load new firmware to the DECbridge 900MX from a workstation running OpenVMS VAX or a PC running MS-DOS.

The DECbridge 900MX firmware image name is defba140 .bin. This file is located in the DECchub Consolidated Firmware Kit V1.1 for OpenVMS and MS-DOS and in the firmware subdirectory of the Internet directory.

Before using this option, you must assign an IP address to the module that you are updating. You can do this by using the Set In-Band Interface IP Address option (option [8]) from the DECbridge 900MX INSTALLATION MENU.

Updating Firmware from an OpenVMS VAX Workstation

To downline load new firmware from an OpenVMS VAX workstation to the DECbridge 900MX when the community string is "public", use the following command:

```
$ download load/force=pcommon <IP address> <dir_spec>:<image_file>
```

Example:

```
$ download load/force=pcommon 16.20.168.45 mom$load:defba140.bin
```

(c) Digital Equipment Corporation. 1993. All Rights Reserved.

```
HOSTNAME: mario
```

```
Server: 16.20.216.48
```

```
DECNDU: (TFTP) Target address = 16.20.168.45
```

```
[PCOMMON] Getting sysDescr
```

```
DECbridge 900MX, 6-Ethernet/FDDI Bridge, HW=v0/1,RO=v0.2,SW=v1.2.1
```

```
[PCOMMON] Setting server IP address (pcomLoadIpHostAddr).
```

```
[PCOMMON] Getting Server IP Address
```

```
16.20.216.48
```

```
[PCOMMON] Setting filename (pcomLoadFilename).
```

```
[PCOMMON] Get filename.
```

```
MOM$LOAD:defba140.bin
```

```
[PCOMMON] Setting AdminStatus/trigger (pcomLoadAdminStatus).
```

```
[PCOMMON] TFTP serve.
```

```
DECNDU: (TFTP) Blocks sent = 1485
```

```
DECNDU: (TFTP) Transfer Complete.
```

```
[PCOMMON] TFTP server completed.
```

```
[PCOMMON] Polling for sysDescr
```

```
[PCOMMON] Getting sysDescr
```

```
DECbridge 900MX, 6-Ethernet/FDDI Bridge, HW=v0/1,RO=v0.2,SW=v1.4.0
```

To downline load new firmware from an OpenVMS VAX workstation to the DECbridge 900MX when the community string is other than "public", use the following command:

```
$ download load/force=pcommon/pass=<setcommunity> <IP address>
  <dir_spec>:<image_file>
```

where <setcommunity> is the read-write community string of the DECbridge 900MX.

Example:

```
$ download load/force=pcommon/pass="engineering" 16.20.168.45
mom$load:defba140.bin
```

NOTE: Enclose the community string with double quotes (" ") to preserve lowercase characters.

See the previous example for a display of the DECndu Plus messages that appear when you issue this command.

Updating Firmware from a PC

To downline load new firmware from a PC to the DECbridge 900MX when the community string is "public", use the following command:

```
A:\> decndup /u /f pcommon <IP address> <path>\<image_file>
```

Example:

```
A:\> decndup /u /f pcommon 16.20.168.45 C:\firmware\defba140.bin
```

```
(c) Digital Equipment Corporation. 1993. All Rights Reserved.
```

```
[PCOMMON] Getting sysDescr
  DECbridge 900MX, 6-Ethernet/FDDI Bridge, HW=v0/1,RO=v0.2,SW=v1.2.1
[PCOMMON] Setting server IP address (pcomLoadIpHostAddr).
[PCOMMON] Getting Server IP Address
  16.20.36.30
[PCOMMON] Setting filename (pcomLoadFilename).
[PCOMMON] Get filename.
  C:\firmware\defba140.bin
[PCOMMON] Setting AdminStatus/trigger (pcomLoadAdminStatus).
[PCOMMON] TFTP serve.
BLOCKNo = 1486   BYTES = 760320
[PCOMMON] TFTP server completed.
[PCOMMON] Polling for sysDescr
DEC - SUCCESS

[PCOMMON] Getting sysDescr
  DECbridge 900MX, 6-Ethernet/FDDI Bridge, HW=v0/1,RO=v0.2,SW=v1.4.0
DECnduPlus: SUCCESS
```

To downline load new firmware from a PC to the DECbridge 900MX when the community string is other than "public", use the following command:

```
A:\> decndup /u /f pcommon /p <setcommunity> <IP address>
<path>\<image_file>
```

where <setcommunity> is the read-write community string of the DECbridge 900MX.

Example:

```
A:\> decndup /u /f pcommon /p engineering 16.20.168.45
  C:\firmware\defba140.bin
```

See the previous example for a display of the DECndu Plus messages that appear when you issue this command.

Verifying the DECndu Plus Firmware Update

Once the firmware has been loaded into the device, it takes several seconds for the firmware to be written into the flash RAM and to perform a reset in order to begin running the new code. To verify that the new version of firmware is up and running after the reset, issue the following DECndu Plus command:

Using the OpenVMS command:

```
$ download show device <IP address>
```

Example:

```
$ download show device 16.20.168.45
(c) Digital Equipment Corporation. 1993. All Rights Reserved.
[SYSDESCR] Getting Device INFO (sysDescr)
    DECbridge 900MX, 6-Ethernet/FDDI Bridge, HW=v0/1,RO=v0.2,SW=v1.4.0
```

Using the MS-DOS command:

```
A:\> decndup /s <IP address>
```

Example:

```
A:\> decndup /s 16.20.168.45
(c) Digital Equipment Corporation. 1993. All Rights Reserved.
[SYSDESCR] Getting Device INFO (sysDescr)
    DECbridge 900MX, 6-Ethernet/FDDI Bridge, HW=v0/1,RO=v0.2,SW=v1.4.0
DECnduPlus: SUCCESS
```

Consult your DECndu Plus documentation if you need more detailed information on using the utility.

Getting Help on DECndu Plus

To get help while using DECndu Plus, type the following:

For OpenVMS VAX:

```
$ HELP DOWNLOAD
```

For MS-DOS:

```
A:\> decndup /?
```

Updating the DECbridge 900MX Firmware Using the Setup Port

You can use the DEChub 900 or DEChub ONE setup port to access the module's installation menu. Selecting option [10] from the DECbridge 900MX INSTALLATION MENU allows you to update the module firmware.

Once the firmware is loaded into the module, you can verify that you have version V1.4.0 installed by selecting the Show Current Settings option (option [3]) from the module's installation menu (refer to the section titled Verifying the Setup Port Firmware Update).


The DECbridge 900MX firmware image load filename is defba140.bin. This file is located in the DEChub Consolidated Firmware kit V1.1 for Open VMS and MS-DOS and in the firmware subdirectory of the Internet directory.

Before using this option, you must assign an IP address to the module that you are updating. You can do this by using the Set In-Band Interface IP Address option (option [8]) from the DECbridge 900MX INSTALLATION MENU.

This option prompts you to enter the firmware image load filename and the IP address of your TFTP (Trivial File Transfer Protocol) load host (see the following example):

```
defba140.bin and 16.20.54.156
```

The format of the firmware image load file name is specified according to the conventions used by your TFTP load host.

CAUTION  If power is interrupted during Stage 3 of the DLU process, the firmware image can become corrupted. Do not turn off power to the unit or perform any action that can cause the unit to lose power during Stage 3 of the DLU process.

The following section explains how to use the downline upgrade option to update your module's firmware. An (expanded) example of the screen displays follows the description.

Updating Firmware from the DECbridge 900MX Installation Menu

When you select the Downline Upgrade option (option [10]) from the DECbridge 900MX INSTALLATION MENU, the initial setup screen display appears (see the following example display). This screen identifies the option and alerts users not to interrupt power during the downline load.

NOTE: The screen display prompts can vary, depending on whether the module is installed into a DEChub 900 or into a DEChub ONE docking station.

The following is an example of the dialog associated with this option (user response is shown in **boldface type**):

```

Enter selection : 10

DECbridge 900MX
=====
                                DOWNLINE UPGRADE

This process upgrade's the device's firmware (in
nonvolatile Flash memory). Enter the IP address of
your TFTP (Trivial File Transfer Protocol) load host
and the image file name when prompted.

* * * * *
*   IMPORTANT!           IMPORTANT!           IMPORTANT!   *
* * * * *
* If power is interrupted during the downline load, the   *
* firmware image can be corrupted. Do not turn off power  *
* to the unit or perform any action that can cause the   *
* unit to lose power during a downline upgrade.           *
* * * * *
=====

... Press Return Key to Continue ...

```

After you press **Return**, the screen display prompts you to Enter the Load Filename:

- If the firmware image load file is located in the default TFTP directory, enter only the firmware image load filename.
- If the firmware image load file is Not located in the default TFTP directory, enter the complete pathname along with the firmware image load filename.

The following screen display example shows the entry of a firmware image load file that is located in the default TFTP directory (pathname not required):

```

Enter the Load Filename [ ] defba140.bin Return

```

After you enter the firmware image load filename and press **Return**, the screen prompts you to enter the IP address of the TFTP server (load host):

```
Enter the Load Host IP Address [ ] :16.20.54.156 
```

After you enter the IP address of the TFTP server and press , do the following:

IF the module is installed into a...	THEN Go to...
DEChub 900	① DEChub 900 Configuration
DEChub ONE	② DEChub ONE Configuration

① DEChub 900 Configuration

The following screen and dialog appear when the module is installed into a DEChub 900:

```
Load will be initiated over the In-Band network interface.

The device becomes nonfunctional for up to 10 minutes during the
time that the flash load is in progress.

When the load is complete the screen displays the message:
(Device Not Responding!) This is normal.

... Press Return Key to Start Load [Ctrl/C to abort]...
```

If you press , the DLU process is initiated over the in-band network interface.

Go to the section titled Starting the DLU Process if you have pressed for this selection.

② DEChub ONE Configuration

When the module is installed into a DEChub ONE docking station, two network interfaces are available for selection: the module's in-band network interface, and the OBM interface that resides on the DEChub ONE docking station.

Each network interface has its own IP address. When the firmware reads more than one IP address (therefore, more than one network interface), it prompts you to select a network interface to use for the load request.

NOTE: If the module's firmware reads only one IP address, the display screen does not prompt you to select a network interface. Pressing initiates the load over the default In-Band interface.

The following screen and dialog appear when the module is installed into a DEChub ONE:

```
Load will be initiated over the In-Band network interface.

Would you like to use a different interface? Y/[N]: 
```

If you select the default [N] , the setup screen displays the following message:

```
The device becomes nonfunctional for up to 10 minutes
during the time that the flash load is in progress.

... Press Return Key to Start Load [Ctrl/C to Abort]...
```

If you press , the DLU process is initiated over the in-band network interface.

Go to the section titled Starting the DLU Process if you have pressed for this selection.

If you selected Y at the screen prompt, the setup screen displays the following:

Interface	Description
1	In-Band
8	OBM port

Enter the network interface to be used [1]:

If you select 8, then press , the setup screen displays the following message:


```
The device becomes nonfunctional for up to 10 minutes
during the time that the flash load is in progress.

... Press Return Key to Start Load [Ctrl/C to Abort]...
```

Pressing for this selection initiates the DLU process over the DEChub ONE docking station's OBM port.

Go to the section titled Starting the DLU Process if you have pressed for this selection.

Starting the DLU Process

CAUTION  If power is interrupted during Stage 3 of the DLU process, the firmware image can become corrupted. Do not turn off power to the unit or perform any action that can cause the unit to lose power during Stage 3 of the DLU process.

NOTE: Because of variances in network configurations (load path, and traffic levels), this initial stage of the DLU process can take up to 10 minutes to complete.

After you initiate the process (by pressing at the screen prompt), the screen displays the following message:

```
DLU process started!
.....
.....
```

The series of dots (.) that appear on the screen indicate that the load is in progress.

When the series of dots end, the screen displays the following message:

```
Transfer complete.
```

After the firmware image is loaded into the module's temporary storage buffer and the new firmware image is validated, the DLU process overwrites the old firmware image, in the module's Flash RAM, with the new firmware image.

Because the module is nonfunctional during the Flash load process, communications between the module and the Hub Manager cannot take place. Therefore, the Hub manager status display and the setup screen display show the following messages:

NOTE: The following displays do not appear if you are initiating the load process from a DEChub ONE docking station.

Hub Manager Status Display

```
4: DEChubridge 900MX
unknown
```


This is normal.

The following message is displayed on the setup screen (only if the module is installed into a DEChub 900):

```
Device not Responding! Connection closed!
```

This is normal.

DLU Process Completion

When the DLU process is complete, the module resets and initiates self-test. After self-test completes successfully, the module exits from the DLU process and begins the execution of the new firmware image. The Module OK  LED turns on and the module becomes fully operational.

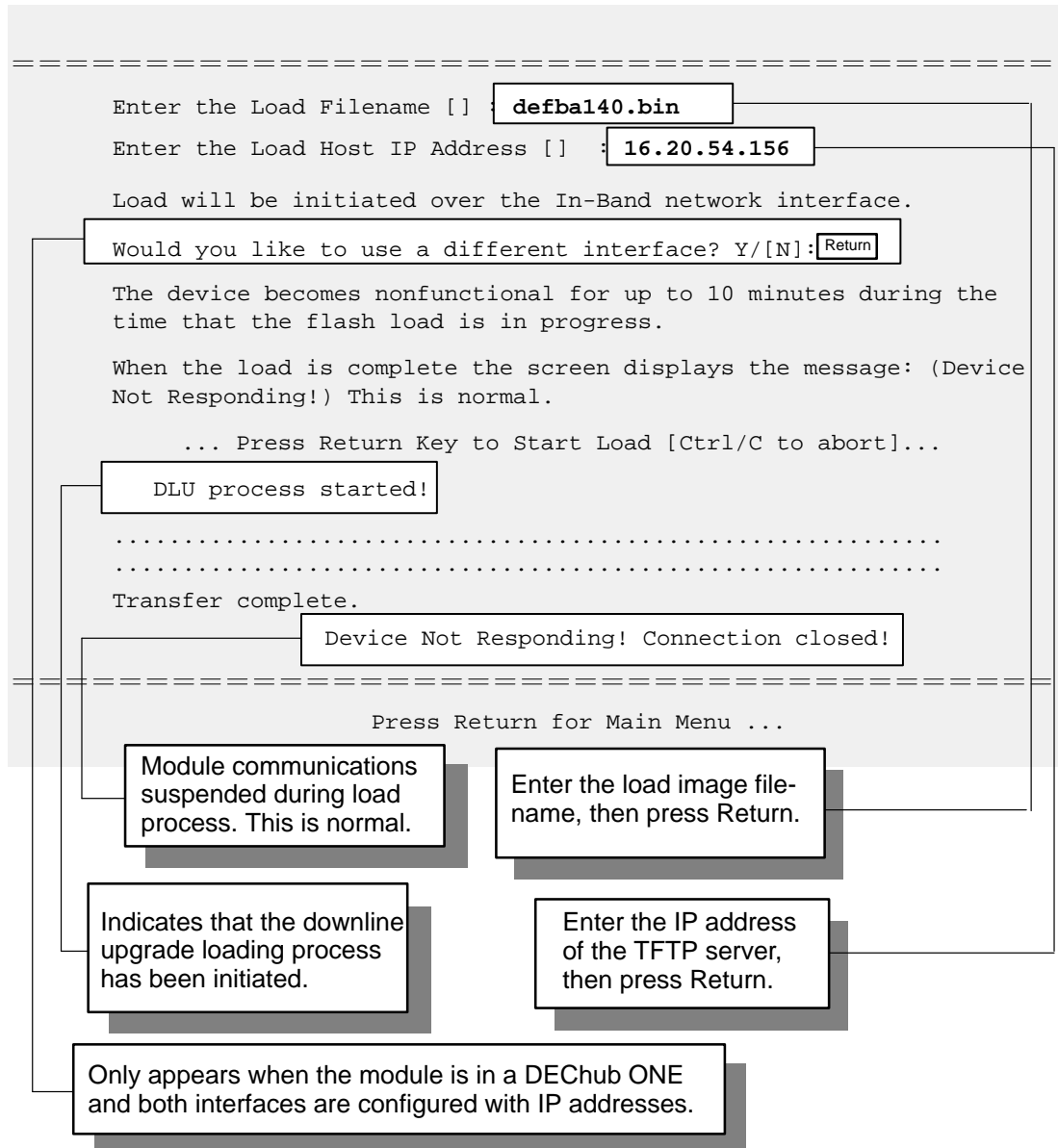
The screen displays one of the following:

- If the module is installed into a DEChub ONE docking station, the screen displays the DEChubridge 900MX INSTALLATION MENU.
- If the module is installed into a DEChub 900, the screen displays the following message:

```
Press Return for Main Menu ...
```

When you press Return, the screen displays the DEChubridge 900MX INSTALLATION MENU.

The following illustration shows an (expanded) example of the setup screen displays:



Verifying the Setup Port Firmware Update

You can verify the firmware update by selecting option [3] Show Current Settings, from the DECbridge 900MX INSTALLATION MENU. This option displays the current version of firmware installed in the module.

The following is an example of the screen display.

Example : Show Current Settings Display

```

Enter selection : 3
DECbridge 900MX - slot 3
=====
DECbridge 900MX, 6-Ethernet/FDDI Bridge, HW=v0/1,RO=v0.2,SW=v1.4.0
SysUpTime                : 01:39:11      14 resets
SNMP Read/Write Community : public
SNMP Trap Addresses       : Not Configured
Status of Last Downline Upgrade : TFTP Read
                               00:00:44  28 resets
                               Transfer Complete.
In-Band Interface Hardware Address : 08-00-2B-A3-4C-70
In-Band Interface IP Address   : 16.20.216.181
In-Band Interface Default Gateway Address : Not Configured
=====
Press Return for Main Menu ...

```

The current firmware version is displayed here.

MIB and RFC Information

The DECbridge 900MX module supports the following:

- SNMP management (RFC-1157)
- MIB II (RFC-1213)
- Bridge MIB (RFC-1493)
- FDDI MIB (RFC-1512)
- Ethernet MIB (RFC-1398)
- Digital ELAN MIB Extensions V2.9, May 1994
- DEChub 900 Common MIB Extensions V1.1, May 1994

Accessing Online Information

This section describes how to access this product's online release notes, public MIBs, Digital's private MIBs, firmware images, and requests for comments (RFCs).

You can access this information from Digital's Internet ftp server at:

`ftp.digital.com (16.1.0.2)`.

To Access...	Use...
MIBs, release notes, firmware update files, and the DECndu Plus Load utility	Anonymous ftp
MIBs and release notes	ftpmail
RFCs	Electronic mail

Using Anonymous ftp

You can access any of Digital's DEChub MIBs, firmware update files, release notes, and DECndu Plus Utility over the Internet by using FTP.

When you use FTP, you must include the following parameters:

- connect to `ftp.digital.com`
- for a user name, enter `anonymous`
- for a password, enter your Internet mail address, for example:

`name@system.company.com`

- change directory to:

`/pub/DEC/hub900/<directory_name>`

(see Table 2 for a list of directory names)

Table 2: Directory Names Available

Name	Contents¹
mibs	DEChub MIBs
firmware	DEChub firmware images
firmware/ndu	DECndu Plus Load Utility
release	DEChub product release notes

¹ Digital suggests reading the README file in each directory to understand the contents of that directory.

You can also access these directories from the World-Wide Web using a browser, such as Mosaic. The Universal Resource Locator (URL) is: `file://ftp.digital.com/pub/DEC/hub900/`

The following example shows how to copy a README file. User input in the example is shown in **bold** text.

NOTE: User input is case sensitive; you must type it as shown.

```
% ftp ftp.digital.com
Connected to ftp.digital.com
220 FTP.DIGITAL.COM FTP Service Process
Name: anonymous
331 ANONYMOUS user ok, send real ident as password.
Password: milano@netman.stateu.edu
230 User ANONYMOUS logged in at Tue 10-May-1994 10:24-EST, job 54.
ftp> cd /pub/DEC/hub900/<directory_name> (See Table 2 for directory names.)
331 Default name accepted. Send password to connect to it.
ftp> ascii (see note below)
220 Type A ok.
ftp> get README
200 Port 19.54 at host nnn.nn.nn.nn accepted.
150 ASCII retrieve of /pub/DEC/hub900/mibs/README started.
226 Transfer completed. 40239 (8) bytes transferred.
40239 bytes received in 23.65 seconds (5.8 Kbytes/s)
ftp> quit
%
```

NOTE: To transfer binary files, such as firmware updates, replace the `ascii` command shown in this example with `binary` or `image`.

Using ftpmail

Digital offers Internet ftpmail access to private MIB and release note information, in ASCII text form, at ftp.digital.com, with up-to-date documents stored in:

```
/pub/DEC/hub900/<directory_name>
```

(see Table 2 for a list of directory names)

To use ftpmail, follow these instructions:

1. Send a mail message to ftpmail@ftp.digital.com.
2. Ignore the subject line.
3. Include the word `connect` in the first line of the body.
4. Include `get` commands for each document required, for example:

```
get /pub/DEC/hub900/<directory_name>/README
```

(see Table 2 for a list of directory names)

5. `quit`

Requests are acknowledged, then queued and processed every 30 minutes. Because of the number of requests, it may take a day or two before you receive a reply.

NOTE: For more timely access, consider using anonymous ftp (refer to the section titled Using Anonymous ftp).

Using Electronic Mail

The DDN Network Information Center (NIC) of SRI International provides automated access to NIC documents and information through electronic mail. This is especially useful for people who do not have access to the NIC from a direct Internet link, such as BITNET, CSNET, or UUCP sites.

To use the mail service, follow these instructions:

1. Send a mail message to SERVICE@NIC.DDN.MIL.
2. In the SUBJECT field, request the type of service that you want, followed by any needed arguments.

Normally the message body is ignored, but if the SUBJECT field is empty, the first line of the message body is taken as the request.

The following are example SUBJECT lines to obtain DDN NIC documents:

HELP

RFC 822

RFC INDEX

RFC 1119.PS

FYI 1

IETF 1IETF-DESCRIPTION.TXT

INTERNET-DRAFTS 1ID-ABSTRACTS.TXT

NETINFO DOMAIN-TEMPLATE.TXT

SEND RFC: RFC-BY-AUTHOR.TXT

SEND IETF/1WG-SUMMARY.TXT

SEND INTERNET-DRAFTS/DRAFT-IETF-NETDATA-NETDATA-00.TXT

HOST DIIS

Requests are processed automatically once a day. Large files are broken down into separate messages.

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