

Ethernet Switch Enterprise RMON Upgrade

Configuration

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This manual describes the process for upgrading the DECswitch 900EF, DECswitch 900EE, and DECswitch 900FO with Remote MONitoring (RMON) firmware.

Revision/Update Information: This is a new manual.

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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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Preface

Overview

About this Manual

This manual lists the steps required to upgrade Ethernet switch products with Enterprise Remote MONitoring (RMON) firmware. It also describes how to configure the firmware to use the RMON Manager to access the RMON Management Information Bases (MIBs) on Ethernet switch modules, such as the DECswitch 900EF, DECswitch 900EE, and the DECswitch 900FO.

Intended Audience

This manual is intended for personnel who will perform the Enterprise RMON firmware downline upgrade process for switch products.

Organization

This manual is organized as follows:

Chapter	Description
1	Provides a description of RMON, a list of RMON features, defines the nine RMON groups, and lists the products that are supported.
2	Provides information on how to configure the RMON groups.

Associated Documents

To order any of the following documents, refer to the section titled How to Order Additional Documentation..

Title and Order Number	Description
DECswitch 900EF Installation and Configuration manual EK-DEFBA-IN	Provides procedures for installing the DECswitch 900EF module in a DEChub 900 MultiSwitch and procedures for configuring the module in either a DEChub 900 MultiSwitch or a DEChub ONE.
DECswitch 900EE Installation and Configuration manual EK-DEBMP-IN	Provides procedures for installing the DECswitch 900EE module in a DEChub 900 MultiSwitch and procedures for configuring the module in either a DEChub 900 MultiSwitch or a DEChub ONE.
DECswitch 900FO Installation and Configuration manual EK-DEFBB-IN	Provides procedures for installing the DECswitch 900FO module in a DEChub 900 MultiSwitch and procedures for configuring the module in either a DEChub 900 MultiSwitch or a DEChub ONE.
<i>DEChub 900 MultiSwitch Owner's Manual</i> EK-DH2MS-OM	Provides installation, use, security, and troubleshooting information for the DEChub 900 MultiSwitch.
<i>DEChub ONE Installation</i> EK-DEHU2-IN	Provides installation and operation guidelines for standalone module configuration, including mounting options and cabling.
<i>DEChub ONE-MX Installation</i> EK-DEF1H-IN	Provides installation and operation guidelines for standalone module configuration, including mounting options and cabling.
<i>clearVISN Installation</i>	Describes how to install clearVISN software. It includes a list of distribution kit contents, system requirements, pre-installation considerations, and the installation procedure.
<i>clearVISN Product Overview</i>	Provides an overview of clearVISN, an explanation of each clearVISN application, and descriptions of all concepts necessary to understand and use the application efficiently.

Continued on the next page

Title and Order Number	Description
<i>clearVISN Configuration and Use</i>	Provides information for starting each application, configuring then (when necessary), and general use information.
<i>DEChub Network Modules 900-Series Switch Reference</i> EK-SWTCH-HR	Describes the functions and features of Digital's HUB-based 900-Series switching products.
<i>Bridge and Extended LAN Reference</i> EK-DEBAM-HR	Describes how bridges are used to create extended local area networks (LANs). This includes the use of bridges in extended LAN configurations, information on LAN interconnections, overall bridge operation, spanning tree, and solving bridge-related problems in a network.

Conventions

Overview

This book uses the following conventions.

Convention	Description
Bold Monospace Type	Indicates user input
Monospace Type	Indicates system output
16.20.54.156	The format of an IP address is the standard 4-octet dotted decimal notation, where each octet of the address is represented as a decimal value, separated by a decimal point (.).
<i>Italics</i>	In examples, indicates user input.
[]	Contain default responses to the installation menu prompts.
<Return>	Indicates that you press the Return Key.
Ethernet	Digital's term for its product's compatibility with the ISO 8801-3/ANSI/IEEE 802.3 standards and the Ethernet standards for Carrier Sense Multiple Access with Collision Detection (CSMA/CD) local area networks (LANs).

Correspondence

Documentation Comments

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

Attn.: Documentation Project Manager
FAX: (508) 486-6093
E-MAIL: 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>

How to Order Additional Documentation

To order additional documentation, use the following information:

To Order:	Contact:
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)
By Mail (Canada)	DIGITAL EQUIPMENT of CANADA LTD. 940 Belfast Road Ottawa, Ontario, Canada K1G 4C2 Attn.: A&SG Business Manager
Internationally	DIGITAL EQUIPMENT CORPORATION Attn.: A&SG Business Manager c/o local Digital subsidiary or approved distributor
Internally	U.S. Software Supply Business (SSB) DIGITAL EQUIPMENT CORPORATION 10 Cotton Road Nashua, New Hampshire 03063

Chapter 1

Product Description

Overview

Introduction

This chapter provides an overview of Digital's Enterprise Remote MONitoring (RMON) upgrade and describes the products supported with this upgrade.

In this chapter

This chapter consists of the following topics:

Topic	Page
What is RMON?	1-2
RMON Groups	1-3
Supported Products	1-5
Upgrading Modules	1-6
Performance Consideration	1-7

What is RMON?

What is RMON?

RMON is Remote Network Monitoring. RMON gathers a wide variety of statistical information about network operation. A typical network consists of multiple network segments with one RMON agent connected to each segment. RMON gathers this information by examining each packet passed on a network segment. Segment statistics are stored in counters within the module. The counters are continuously updated and reset at powerup.

RMON also captures and stores network traffic information. You can examine these captured packets or sequences of packets to identify and isolate network operational software or hardware problems.

The RMON upgrade option supports the Ethernet Remote Network Monitoring Information Base (RMON MIB), RFC 1757. The following RMON features and options are available:

- RMON functions are performed concurrently with the switching function.
- Multiple RMON monitors within the switch (one for each Ethernet), are accessible by multiple managers.
- GUI Management with clearVISN RMON Manager/PROBEwatch
- RMON capability for a variety of network protocols and applications.

There are two levels of RMON for the DECswitch 900 products:

Basic RMON	Provides support for the Statistics, History, Alarms and Events RMON groups.
Enterprise RMON	Provides support for Statistics, History, Alarms, Host Table, HostTopN, Packet Capture, Matrix, Filters, and Events RMON groups

NOTE

The online help includes management tasks and information for the RMON Manager application.

For instructions on starting, configuring, and monitoring traffic with RMON Manager, refer to the *clearVISN Configuration and Use* manual.

RMON Groups

This section defines the nine RMON groups that are supported with the Ethernet RMON MIB.

The RMON MIB is a standard that provides a data object base that is compatible with the widest range of network needs, and permits independent developers to design network interoperative monitoring equipment.

The following table lists the nine RMON MIB groups for Ethernet and describes the purpose of each group.

This group . . .	Allows you to . . .
Statistics	Obtain an array of operational statistics including: <ul style="list-style-type: none"> • Packets • Octets • Broadcasts • Collisions • Dropped packets • Fragments • CRC alignment errors • Undersize/oversize packets • Multicasts • Jabbers • 64 octet packets • 65 to 127 octet packets • 128 to 255 octet packets • 256 to 511 octet packets • 512 to 1023 octet packets • 1024 to 1518 octet packets
History	Obtain historical statistics for individual ports for customized trend analysis and capture periodic statistical samples for later retrieval and analysis by the manager.
Alarms	Set a wide variety of thresholds and sampling intervals on any statistic to create an alarm condition. An event will cause an alarm. You may set threshold values as: <ul style="list-style-type: none"> • An absolute value • A rising value • A falling value • A delta value

RMON Groups

This group . . .	Allows you to . . .
Events	Create entries in the monitor log and generate SNMP traps for selected events. You can initiate events by setting an alarm on any counter. The log includes a description and the time of each event.
Filters	Define specific packet match filters that serve as a stop/start mechanism for all packet capture functions and events. You may combine filters with AND, NOT, or OR functions to capture either broad or unique network events.
Matrix	Obtain a matrix that shows the amount of traffic and the number of errors between any pair of nodes retrieved by either source or destination address.
Host Table	Gathers information for all nodes that are retrievable under SNMP, including non-SNMP devices, by means of a host table. A table for each node contains a variety of node statistics for each active node, including the relative time the node was discovered.
HostTopN	Perform a user-defined study of sorted host statistics that lists detailed information on the top n occurrences (where n is a number supplied by you). Performed locally by the agent, this function substantially reduces network traffic.
Packet Capture	Perform further analysis using matched packets that are captured and stored under the control of selected filters. Buffer sizes may be user-selected and may wrap or stop when full. You can upload captured packets to a centralized client that, if equipped with protocol decode software, will allow you to perform complete protocol analysis.

NOTE

The Enterprise RMON Upgrade option does not collect all the Collision statistics. Collisions are counted only when the port encounters a collision while attempting to transmit.

Supported Products

The Enterprise RMON Upgrade is available for the modules listed in the following table. The standard Statistics, History, Alarms and Events groups are also supported on these devices.

Module	Description
DECswitch 900EF and DECbridge 900MX	<p>These modules provide the interconnection between six 10 Mb/s Ethernet LANs and a high-speed 100 Mb/s Fiber Distributed Data Interface (FDDI) network backbone.</p> <p>For Installation and configuration information refer to the module's installation and configuration manual.</p>
DECswitch 900EE	<p>The DECswitch 900EE provides the interconnection between six 10 Mb/s Ethernet workgroups. As a self-learning IEEE 802.1d Media Access Control (MAC) bridge, the module performs standard functions such as filtering and forwarding.</p> <p>For Installation and configuration information refer to the <i>DECswitch 900EE Installation and Configuration</i> manual.</p>
DECswitch 900FO	<p>The DECswitch 900FO provides the interconnection between six 6 10BaseFL 10Mb/s Ethernet LANs using ST-type connectors and a high-speed 100 Mb/s Fiber Distributed Data Interface (FDDI) network backbone.</p> <p>For Installation and configuration information refer to the <i>DECswitch 900FO Installation and Configuration</i> manual.</p>

Upgrading Modules

This section describes where to locate upgrade procedures for modules.

Module Installed in a DEChub ONE or DEChub ONE-MX

If you need to perform Downline Upgrade procedures on a module installed in a DEChub ONE or DEChub ONE-MX docking station, refer to the Downline Upgrade information in Chapter 4 of the installation and configuration manual for your product. Prior to performing the Downline Upgrade, you must assign an IP address must be assigned to the module. This is described in the same chapter as the Downline Upgrade procedure.

Module Installed in a DEChub 900

If you need to perform Downline Upgrade procedures on a module installed in a DEChub 900 MultiSwitch, refer to the Downline Upgrade information in Chapter 5 of the installation and configuration manual for your product. Prior to performing the Downline Upgrade, you must assign an IP address must be assigned to the module. This is described in the same chapter as the Downline Upgrade procedure.

Performance Consideration

When Enterprise RMON Data Gathering is enabled on a port, switching performance will be affected. However, switching always takes priority over Enterprise RMON Data Gathering in a high traffic situation. Refer to Online help in the clearVSN MultiChassis Manager for instructions on how to enable and disable Enterprise RMON Data Gathering on a per-port basis.

Chapter 2

Accessing RMON Groups

Overview

Introduction

This chapter describes how to access the RMON Groups that are supported by this release.

In this chapter

This chapter consists of the following topics:

Topic	Page
How to Access RMON Groups	2-2
Using the RMON Manager to Access RMON Groups	2-3
Using the MultiChassis Manager to Access Statistics and History Groups	2-4
Using SNMP to Access Alarms and Events Groups	2-5

How to Access RMON Groups

The following table describes which application to use to access the RMON groups in Ethernet switch modules.

To Access ...	Use ...
All Nine Groups	clearVISN RMON Manager V3.3 (PROBEwatch).
Standard Statistics and History	clearVISN MultiChassis Manager V5.0, or clearVISN RMON Manager V3.3.
Standard Alarms and Events	SNMP or clearVISN RMON Manager V3.3.

The remainder of this chapter describes how to use these applications to access RMON groups.

Using the RMON Manager to Access RMON Groups

To access all nine groups, it is recommended that you use clearVISN RMON Manager (previously named PROBEwatch).

NOTES

1. The IP addresses of the module and clearVISN RMON Manager New Agent must match.
2. To use clearVISN RMON Manager with a DECswitch that has only Basic RMON, you must use the "RMON Domain", in RMON Manager.

The following procedure describes how to access the nine groups using clearVISN RMON Manager.

Step	Action								
1	Run clearVISN RMON Manager.								
2	Select New Agent.								
3	Assign an Agent Name.								
4	Add the Interface number of the Ethernet port to be monitored. <table border="1"><thead><tr><th>Interface numbers</th><th>Use with . . .</th></tr></thead><tbody><tr><td>2 through 7</td><td>DECswitch 900EF</td></tr><tr><td>2 through 7</td><td>DECswitch 900FO</td></tr><tr><td>1 through 6</td><td>DECswitch 900EE</td></tr></tbody></table>	Interface numbers	Use with . . .	2 through 7	DECswitch 900EF	2 through 7	DECswitch 900FO	1 through 6	DECswitch 900EE
Interface numbers	Use with . . .								
2 through 7	DECswitch 900EF								
2 through 7	DECswitch 900FO								
1 through 6	DECswitch 900EE								
	Notes: 1. Interface number 1 is dedicated to FDDI (900EF and 900FO only). 2. Interface numbers 2 through 7 are used for Ethernet (900EF and 900FO only). 3. Interface numbers 1 through 6 are used for Ethernet (900EE only).								
5	Add the IP Address of the module.								
6	Add an -rmon suffix after the Read Community of the switch. For example: public-rmon								
7	Add an -rmon suffix after the Write Community of the switch. For example: public-rmon								
8	Repeat Steps 2 through 7 for each additional port on the module.								

Using MultiChassis Manager to Access Statistics and History Groups

You can access only the Statistics and History groups using the clearVISN MultiChassis Manager as follows:

Step	Action
1	Run clearVISN MultiChassis Manager, specifying the: a. IP address, <i>or</i> b. Name of the DECswitch module, <i>or</i> c. The hub in which it resides.
2	Double-click on the switch module in hub front panel window. (The switch summary window displays.)
3	Click on the RMON button in the Information box to display the Statistics window.
4	Click on the History button at the bottom of the Statistics window to display the History window.

For additional Statistics and History information refer to the clearVISN MultiChassis Manager online Help.

Using SNMP to Access Alarms and Events Groups

This section describes procedures used with the Basic RMON MIBs rather than the Enterprise RMON MIBs. To access the Alarms and Events groups for RMON MIB Objects, you can use SNMP, as described in this section or clearVISN RMON Manager. You can also use the RMON Manager to set alarms on RMON specific counters.

Accessing Alarms and Events

This section describes how to set up a condition to be monitored (an alarm) and an event to be generated once that condition has occurred. You use an SNMP network manager to set up conditions and events. For a more complete description of the alarmTable and eventTable, refer to RFC 1757: S. Waldbusser, "Remote Network Monitoring Management Information Base", 02/10/1995.

The event group consists of the eventTable and the logTable. The alarmTable contains configuration entries that define a variable, polling period, and threshold parameters.

If an entry is found to have crossed the threshold value, an event is generated that is processed as specified by your entries in the eventTable. Thus, the eventTable controls the generation and notification of events from the device.

The MIB object eventCommunity supports up to 32 characters. MIB objects eventDescription, alarmOwner, and eventOwner support up to 127 characters. The maximum number of entries that can be placed in the alarmTable is 20. For the eventTable, the maximum is 32.

Alarm and Event Table Entries

Alarm table entries can only be created for SNMP Integer MIB variables of the following types:

- INTEGER
- Counter
- Gauge
- TimeTicks

The following tables list and define the fields that make up an alarm table entry and an event table entry.

Using SNMP to Access Alarms and Events Groups

Table 2-1: Alarm Table Entry Fields

Alarm Table Entry Fields	Definition
alarmIndex	An index that uniquely identifies an entry ¹ .
alarmInterval	The interval, in seconds, over which the data is sampled and compared with the rising and falling threshold.
alarmVariable	The object identifier of the particular variable to be sampled.
alarmSampleType	The method of sampling the selected variable and calculating the value to be compared against the thresholds.
alarmValue	The value of the statistic during the last sampling period ¹ .
alarmStartupAlarm	The alarm that may be sent when this entry is first set to valid.
alarmRisingThreshold	Rising (increasing) a threshold for the sampled statistic.
alarmFallingThreshold	Falling (decreasing) a threshold for the sampled statistic.
alarmRisingEventIndex	The index of the eventEntry that is used when a rising threshold is crossed.
alarmFallingEventIndex	The index of the eventEntry that is used when a falling threshold is crossed.
alarmOwner	The person who configured this entry and is therefore using the resources assigned to it.
alarmStatus	The status of this alarm entry.

¹The alarmIndex and alarmValue objects are read-only. You cannot set these fields. The alarmIndex is implicitly specified when the entry is created. The alarmValue is made available after the current sampling period.

Using SNMP to Access Alarms and Events Groups

Table 2-2: Event Table Entries

Event Table Entry Fields	Definition
eventIndex	An index that uniquely identifies an entry ¹ .
eventDescription	A comment describing this event.
eventType	The type of notification that will occur when the threshold is reached.
eventCommunity	If an SNMP trap is to be sent, it will be sent to the SNMP community specified.
eventLastTimeSent	The value of sysUpTime at the time this event entry last generated an event ¹ .
eventOwner	The person who configured this entry and is therefore using the resources assigned to it.
eventStatus	The status of this event entry.

¹The eventIndex and eventLastTimeSent objects are read-only. You cannot set these fields. The eventIndex is implicitly specified when the entry is created. The eventLastTimeSent is made available after the current sampling period.

Using SNMP to Access Alarms and Events Groups

How Traps Work

SNMP-managed devices are able to send trap messages to network management stations. You configure the IP addresses of NMS “trap sinks” that are to receive the RMON trap messages. For additional information on traps, refer to RFC 1215: M. Rose, "A Convention for Defining Traps for use with the SNMP", 03/27/1991.

You can specify that when an alarm condition is reached, a trap is generated and sent to the trap specified sinks. For additional information on how to specify trap generation, refer to eventType RFC 1757: S. Waldbusser, "Remote Network Monitoring Management Information Base", 02/10/1995.

Enhanced RMON. Lets you configure the trap IP address using the RMON Manager (or PROBEwatch).

Basic RMON. Lets you configure the trap IP address on all DEChub 900 modules through the device’s set-up port. With the exception of the DECserver 900 products, the trap IP address can also be added via SNMP set-requests to the device’s private MIB (pcomSnmpAuthTrapAddressTable).