Lucent Technologies
Bell Labs Innovations

WaveStar® ITM-SC Release 8.0

Provisioning Guide for *WaveStar* AM 1 PLUS

Notice

Every effort was made to ensure that the information in this Information Product (IP) was complete and accurate at the time of printing. However, information is subject to change. This IP describes certain hardware, software, features, and capabilities of Lucent Technologies products that may not be the same as the equipment that you have. The IP is for information purposes, and you are cautioned that it may not describe your specific equipment

Mandatory Customer Information

Overview EMC/ESD Safety

The EMC/ESD boundary has been defined at Rack/Subrack level. The principle is based on the "Faraday Cage" theory. If there are doors, then the doors must be closed. With every rack/subrack an ESD (electrostatic discharge) earth socket and an ESD sticker are supplied. On the Rack frame ETSI an ESD bonding point for an ESD wrist strap is present. It is mounted in a way that it's always accessible for installation, normal operation and maintenance activity.

Wrist Strap

Wrist Strap The wrist strap must be worn when opening the Subrack doors.

Electrostatic Sensitive Devices

The equipment described in this guide contains static sensitive devices. Electrostatic Discharge Precautions should be taken when operating or working on this equipment.

Special handling precautions apply whenever installing or removing parts of the equipment include:

* Leaving components or equipment in original packaging until required for use.
* Removing plug-in units with previously discharged hands (e.g. using grounded wrist straps connected to the ESD Bonding Point on the Cabinet).
* Returning items for repair in suitable antistatic packaging.

Trademarks

UNIX is a registered trademark of UNIX Systems Laboratories, Inc.

HP-UX is a registered trademark of Hewlett-Packard, Inc.

HP-VUE is a registered service mark of Hewlett-Packard, Inc.

INFORMIX is a registered trademark of Informix Software, Inc

OSF/Motif is a registered trademark of Open Software Foundation.

Microsoft is a registered trademark of Microsoft Corp.

Windows is a registered trademark of Microsoft Corp.

Netscape is a trademark of Netscape Communications Corp.

Netscape Navigator is a trademark of Netscape Communications Corp.

Netscape Communicator is a trademark of Netscape Communications Corp.

Pentium is a registered trademark of Intel Corp.

QuickTime is a registered trademark of Apple Computer Inc.

Adobe is a trademark of Adobe Systems Inc.

Acrobat is a trademark of Adobe Systems Inc.

PostScript is a trademark of Adobe Systems Inc.

Ordering Information

The order number of this document can be found on the frontpage.

Support

Technical support

Please contact your Lucent Technologies Local Customer Support Team (LCS) for technical questions about the information in this document.

Information product support

Lucent Technologies values your comments!

Lucent Technologies
Bell Labs Innovations

WaveStar® ITM-SC Release 8.0
Provisioning Guide for *WaveStar* AM 1 PLUS

365-312–521   Issue a   June 2001

Lucent Technologies welcomes your comments on this information product. Your opinion is of great value and helps us to improve.

1. Was the information product:

	Yes	*No*	*Not applicable*
In the language of your choice?	☐	☐	☐
In the desired media (paper, CD-ROM, etc.)?	☐	☐	☐
Available when you needed it?	☐	☐	☐

Please provide any additional comments:

_____

_____

2. Please rate the effectiveness of this information product:

	Excellent	*More than satisfactory*	*Satisfactory*	*Less than satisfactory*	*Unsatisfactory*	*Not applicable*
Ease of use	☐	☐	☐	☐	☐	☐
Level of detail	☐	☐	☐	☐	☐	☐
Readability and clarity	☐	☐	☐	☐	☐	☐
Organization	☐	☐	☐	☐	☐	☐
Completeness	☐	☐	☐	☐	☐	☐
Technical accuracy	☐	☐	☐	☐	☐	☐
Quality of translation	☐	☐	☐	☐	☐	☐
Appearance	☐	☐	☐	☐	☐	☐

If your response to any of the above questions is "*Less than satisfactory*" or "*Unsatisfactory,*" please explain your rating.

_____

_____

3. If you could change one thing about this information product, what would it be?

_____

_____

4. Please write any other comments about this information product:

_____

_____

Please complete the following if we may contact you for clarification or to address your concerns:
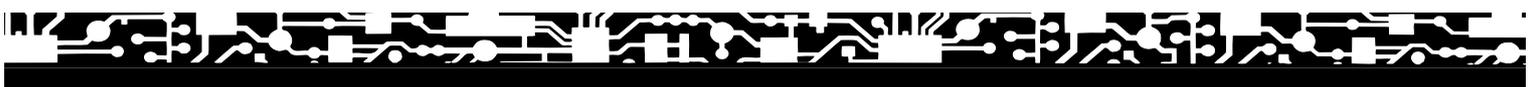
Name: _____   Date: _____

Company/organization: _____   Telephone number: _____

Address: _____

Email address: _____   Job function: _____

If you choose to complete this form online, go to http://www.lucent-info.com/comments
Otherwise fax to 407 767 2760 (U.S.) or +1 407 767 2760 (outside the U.S.) or email comments to ctiphotline@lucent.com

Lucent Technologies
values your comments!

Lucent Technologies
Bell Labs Innovations

WaveStar® ITM-SC Release 8.0
Provisioning Guide for *WaveStar* AM 1 PLUS

365-312–521   Issue a   June 2001

Lucent Technologies welcomes your comments on this information product. Your opinion is of great value and helps us to improve.

1.   Was the information product:

	Yes	*No*	*Not applicable*
In the language of your choice?	☐	☐	☐
In the desired media (paper, CD-ROM, etc.)?	☐	☐	☐
Available when you needed it?	☐	☐	☐

Please provide any additional comments:

_____
_____

2.   Please rate the effectiveness of this information product:

	Excellent	*More than satisfactory*	*Satisfactory*	*Less than satisfactory*	*Unsatisfactory*	*Not applicable*
Ease of use	☐	☐	☐	☐	☐	☐
Level of detail	☐	☐	☐	☐	☐	☐
Readability and clarity	☐	☐	☐	☐	☐	☐
Organization	☐	☐	☐	☐	☐	☐
Completeness	☐	☐	☐	☐	☐	☐
Technical accuracy	☐	☐	☐	☐	☐	☐
Quality of translation	☐	☐	☐	☐	☐	☐
Appearance	☐	☐	☐	☐	☐	☐

If your response to any of the above questions is "*Less than satisfactory*" or "*Unsatisfactory,*" please explain your rating.

_____
_____

3.   If you could change one thing about this information product, what would it be?

_____
_____

4.   Please write any other comments about this information product:

_____
_____

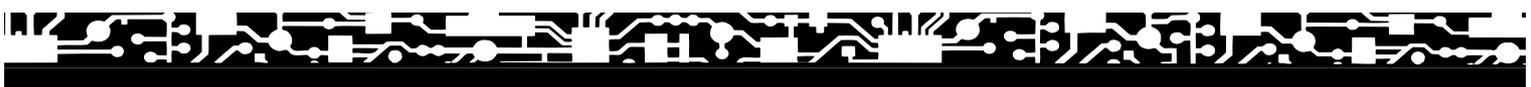**Please complete the following if we may contact you for clarification or to address your concerns:**

Name: _____   Date: _____

Company/organization: _____   Telephone number: _____

Address: _____

Email address: _____   Job function: _____

If you choose to complete this form online, go to http://www.lucent-info.com/comments
Otherwise fax to 407 767 2760 (U.S.) or +1 407 767 2760 (outside the U.S.) or email comments to ctiphotline@lucent.com

Contents

About this information product

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

C O N T E N T S
v i i

C O N T E N T S
v i i i
Lucent Technologies - Proprietary
See notice on first page
365-312–521
Issue a, June 2001

3   Topology management

4   Provisioning Timing

Section: Provision Timing Sources.

Section: Provision System Timing

Section: Provision Station Clock Output

Section: Provision Output Port Timing

5   Path Provisioning and Protection

6   Maintenance Settings for Transmission

7   **NE Software Upgrade**

....

....

....

List of Figures

8   Concepts

About this information product

....

Purpose	The ITM-SC Provisioning Guide (PG) is a network management oriented guide. The guide instructs the user how to use the ITM-SC to provision network equipment.
Reason for reissue	First issue.
Safety labels	Not applicable for the Provisioning Guide.
Intended audience	Network operators and other personnel who need to provision equipment with an management system (ITM-SC).

Provisioning personnel have to perform the tasks:

- Collect information of provisioning data (e.g. check shelf layout, units list)
- Put ports in-service and out-service
- Assign timeslots (Cross Connections)
- Assign service to network units
- Configure the network according to the required adjustments
- Download and upload the provisioning data to and from the network elements
- Recognize, interpret, analyze or correct failures, caused by provisioning data that is configured incorrectly.

....

How to use this information product

The ITM-SC Provisioning Guide (PG) for the network element is divided into a number of chapters. Through this readers can quickly select the subject of their interest and need.

This guide is divided into the chapters:

- About this Information Product (IP). This chapter describes the structure and organization of the Provisioning Guide (PG).

- Management communication setup. This chapter, the user gets support for subjects such as:

  - Set network element address

  - Set network element name (TID)

  - Change management area

  - Set date and time.

- Equipment provisioning. The user would come to this chapter either with a network element that has no information about the equipment or only has default information. This chapter provides instructions to move from that state to a network element with complete provisioning information on that equipment, including the equipment protection according to the user's needs. Examples are:

  - Modify equipping information

  - Modify equipping defaults

  - Provision equipment protection

  - Define automatic laser shutdown settings

  - Provision miscellaneous discrete inputs and outputs.

- Topology management. This chapter explains to the user of a management system how to:

  - Define connections between network elements

  - Create network element groups (aggregates).

- Timing provisioning. This chapter explains to the user how to deliver a timing signal with predefined quality.
  The user gets support on tasks as:

  - Provisioning the timing of a network element

  - Provision the timing marker settings.

- Traffic provisioning. This chapter explains how to set up the network traffic, including paths and cross connections. This chapter needs to be used in conjunction with the next chapter (Traffic Maintenance).

Examples tasks are:

- Set up a path

- Create low level cross connection

- Modify an existing path

- View the present cross connections and protection

- Create new cross connections with or without the different types of protection

- Change existing cross connections and/or existing protection.

- Traffic maintenance. This chapter explaines how to set up the maintenance for paths and check the path including its protection. The user starts with a path through the network, including its protection. The user ends with a tested path including its protection, and complete performance monitorin and alarm thresholds settings.
Examples tasks are:

- Set termination points to be monitored

- Create Traffic Ports, both physically and logically

- Create Termination points

- Verify the path using trail trace

- Set the signal degradation threshold for the path (the signal degradation thresholds determines whether or not to generate an alarm and whether or not a protective switch will take place)

- Switch the protection of the path

- Verify the protection path using trail trace

- Start performance monitoring.

- Software upgrade. This chapter explains how to manage and upgrade the network element software.
Examples are:

- Find out what software versions are loaded in the network element

- Download the new software image

- Check whether software download was successful

- Switch stores.

- Concepts. The concepts chapter(s) contains all the knowledge information. The user can use this chapter(s) when they don't understand a task.

- ITM-SC tutorial. This chapter provides instruction on common system functions.

For example:

- View alarms
- Distinguish network element alarms from ITM-SC alarms (ITM-SC alarms need to be forwarded to the Administrator)
- Display alarm reports

• Back matter. Glossary, Index, Abbreviations, and so on.

Conventions used

The samples of windows shown in this guide are examples of typical windows. The text on a window as well as the window itself may differ slightly from the window displayed on the ITM-SC.

This guide uses the following notations:

⚠ **DANGER**

Suggests the possibility of a personal injury

⚠ **CAUTION**

Suggests the possibility of service interruption

⚠ **WARNING**

Suggests the possibility of equipment damage or software corruption

Important! Gives supplementary information

Approval mark

The following CE approval mark applies to this product.

CE

CE Marking is the indicator for products conform with relevant European Community (EC) Directives. CE stands for Conformité Européenne. The CE-marked transmission equipment is compliant with one EC Directive: 89/336/EEC - Electro-magnetic compatibility

x x v i **Lucent Technologies - Proprietary**
See notice on first page
365-312–521
Issue a, June 2001

(EMC). In this manual you will find several chapters in relation with the CE-marking, for example the use of EMC closed connector Hoods, filtered connectors, and warnings to use a wrist strap when handling equipment.

Customer Documentation network element (NE) Related

The following documents are NE related:

- The APPLICATION AND PLANNING GUIDE provides an understanding of what the network element is and how to plan to use and order it.

- The NETWORK ELEMENT INSTALLATION GUIDE provides an understanding on physical installation of the network element and for connecting the cabling to the NE.

- The USER OPERATIONS GUIDE instructs the user how to operate the network element using an ITM-CIT, including provisioning and maintenance tasks.

- The ALARM MESSAGES AND TROUBLE CLEARING GUIDE instructs the user how to respond to alarms and fix problems with the network element using the ITM-CIT.

Customer Documentation Subnetwork Controller Related

The following documents are Subnetwork Controller related:

- The ITM-SC APPLICATION AND PLANNING GUIDE provides an understanding of what the ITM-SC is and how and how to plan to use and order it.

- The ITM-SC INSTALLATION GUIDE instructs the user how to install the ITM-SC and configure the running environment.

- The ITM-SC ADMINISTRATION GUIDE instructs the user how to administer the ITM-SC.

- The ITM-SC MAINTENANCE GUIDE Instructs the user how to maintain the ITM-SC and network.

- The ITM-SC PROVISIONING GUIDE for the network element instructs the user how to use the ITM-SC to provision network equipment.

- The ITM-SC ALARM MESSAGES AND TROUBLE CLEARING GUIDE instructs the user how to respond to alarms and fix problems with the ITM-SC.

How to comment A feedback form has been placed after the title page for your comments or suggestions about this information product. Please copy this feedback form and follow the instructions on the form to submit your feedback.

How to order Copies of this document can be obtained from the Customer Training and Information Products organization within Lucent Technologies, which can be found at URL http://www.lucent-info.com/

1   DCN Management

Overview

....

Purpose	The purpose of DCN Management is provisioning the DCN parameters for a network element.
Objective	The objective of provisioning the DCN parameters is to optimize the communication between network elements and the ITM-SC.
Outcome	An optimized DCN in which the exchange of routing data is minimized with full management of NEs.
Intended use	This chapter explains the concepts of provisioning the DCN. After the concepts the procedures used for DCN Management are described.

                                             □

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

1 - 1

Section : Edit General Network Element Information

Overview

Purpose	The purpose of this procedure is to edit the general network element Information containing the location, address and DCN parameters.

□

Edit General Network Element Information

When to use   Use this procedure to change:

- The network element location.

- The NSAP address of the network element (Area Identifier or SID).

- Management Connection settings.

- IS-IS Level settings.

- Designated Router Priority.

- Additional Manual Area Addresses.

Before you begin   Before changing network element information notice the following precautions and prerequisites:

- If the Association State has changed after the Edit screen was displayed, the changes are discarded and an error message is displayed.

- When the IS-IS parameters are changed this may cause the network element to restart, resulting in a temporary loss of association. If the network element is participating in a GR scheme this may cause an automatic protection switch. A warning message is displayed.

- If the values of the IS-IS parameters are incorrect this may cause instabilities in the DCN and may result in many network elements becoming unmanageable. A warning message is displayed.

- Do not create an area with the area ID 0000, because this is already the default area ID for all newly ceated NEs.

- Choosing the Static value for the Connection Type option makes the Gateway network element a single point of failure in the management of the network element.

- When the *LAN IS-IS Level* is set to *None* (NO-IS-IS) a network element cluster that is not directly connected to the ITM-SC Q-LAN may become unmanageable when *None* is chosen for the cluster gateway. *None* also prevents traffic from one cluster from being routed to another cluster over the Q-LAN.

- The value of the designated router priority is composed in a specialized plan, so do not change it unless this plan is available.

- If an additional Manual Area Address is provisioned when the Computed Area Address Table (CAAT) is full, this may cause a loss of entries in the CAAT which results in a loss of association. If the network element is participating in a GR scheme this may cause an automatic protection switch. A warning message is displayed.

- Before starting to change the provisioned network element information, all information about the Data Communications Network (DCN) must be available: the network element name, location, NSAP address, the type of management connection, the IS-IS level parameters, the designated router priority and Additional Manual Area Addresses.

Related information

The following procedures are related:

- Provision a network element from a template

- Create a MIB image from an network element

- Create a pre-provisioned network element

- Section DCN Management Concepts in chapter Concepts.

Procedure

Follow these steps to change the general information of a network element:

....

1 Select *Provisioning --> Equipment --> NE Information.*

   Result:

   The *EMS - Provisioned NE Information* window appears.

....

2 To select an NE or to switch to another NE, click the Selection Dialog Button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

....

3 Click Edit.

   Result:

   The *EMS - Edit Provisioned NE Information* window appears.

....

4 Fill in the new NE Location, the IS-IS Level of the NE, and LAN IS-IS Level fields, also set the Designated Router Priority.

   Result:

   All the information to change is filled in.

....

5 Click OK to confirm the current changes.

     Result:

     The changes are now stored.

....

6 Confirm the current changes if an Edit confirmation window displaying the consequence of the changes to the network appears.

     Result:

     The changes are confirmed.

....

7 Click Close to exit the *EMS - Edit Provisioned NE Information* window and click Close again to exit the *EMS - Provisioned NE Information* window.

     Result:

     All windows disappear.

E N D   O F   S T E P S

☐

Parameters for Editing General Network Element Information

Provisioned NE   Name of the network element. The name must be unique across management domains. The value can be up to 20 uppercase or lowercase characters.

Association State   The possible association states between the ITM-SC and the network element are described below:

Association State	Description
Closed	No active association.
Connected	An association is active.
Associating	An association is being attempted.
Maintaining	An association failed, regularly a new attempt is made.
Released (12NC failure)	An association was released because ITM-SC did not recognize the NE software version.
Released (Interface Error)	An association was not established because the ITM-SC NE interface failed.
Released (Manually Disabled)	An association was manually disconnected.
Released (GR Switched/Retrieved)	An association was released after a manual geographic redundancy switch/handback.
Released (Association Failed)	The link association the ITM-SC and NE failed.

NE Type   Shows the type of network element, for example SLM, ISM, ADM155C, WaveStar® ADM 16/1, etc.

NE Location   The NE location field shows the geographical location of the provisioned network element. The value can be up to 20 uppercase or lowercase characters.

The NE location field is grayed out when the association state between the ITM-SC and the NE is *Released*.

Automatic Power Down   Enables/disables automatic power down function. Only applicable for OLS80G network elements.

Single End Terminal Type   Type of single end terminal configuration. Only applicable for OLS80G network elements.

OA Mode   Configuration mode of the OAs (Optical Amplifiers) of the OLS80G network element.

OA State   The actual operation mode of the OA of the network element. Only applicable for OLS80G network elements.

NSAP format   The NSAP address of a node is its DCN wide identifier which uniquely identifies the node in the network. The different formats are described in the table below:

NSAP format	Description
Fixed 20 byte	40 hexadecimal digits.
Fixed 10 byte	20 hexadecimal digits.
Flexible	Else (16 - 40 hexadecimal digits).

Area ID   The Area ID indicates the area to which a node belongs and thus its logical location in the network.

Area ID for fixed 20 byte and fixed 10 byte NSAP format: 4 hexadecimal digits (2 bytes).

Area Address   Area address for flexible NSAP format: 2 - 26 hexadecimal digits (1-13 bytes).

SID Entry Format   **Important!** The *Short* code is only applicable for ISM NEs. Grayed out otherwise.

Format of the network element address. The values are described in the table below:

SID Entry Format	Description
SID	System Identifier (12 hexadecimal digits).
Short	2 hexadecimal digits.

NE SID   Identifies the network element. Consists of 12 hexadecimal digits (6 bytes).

Connection type   Controls network management data routing. The connection type field is grayed out when the association state between the ITM-SC and the NE is *Connected*. The possible connection type values are described

in the table below:

Connection type	Description
Dynamic	Management data is routed dynamically. The ITM-SC chooses the most suitable Intermediate System (IS) on the Q-LAN through which it communicates with this network element.
Static	The management data route is forced. The management system uses a user-defined network element (Ethernet) address to select one Intermediate System (IS) via which the ITM-SC communicates with a node. This network element is referred to as the Gateway network element.

NE Connected   The NE connected field determines how the network element is connected. The possible values are described in the table below:

NE Connected	Description
Via Gateway	The network element is connected via a gateway node through which it is managed by the ITM-SC.
on LAN	The ITM-SC manages the network element directly through a Q-LAN connection.

The NE connected field is grayed out when:

- The association state between the ITM-SC and the NE is *Connected*.

- The connection type is set to *Dynamic*.

Gateway Format   The gateway format field determines the format of the gateway via which this network element is managed. The possible gateway format values are described in the table below:

Gateway Format	Description
Ethernet	12 Hexadecimal digits.
Short	2 Hexadecimal digits.

The gateway format field is grayed out when:

- The association state between the ITM-SC and the NE is *Connected*.

- The connection type is set to *Dynamic*.

- The NE connected option is set to *on Lan*.

Gateway Ethernet Address Address of the gateway via which this network element is managed. The format depends on setting of Gateway Format field.

The gateway ethernet address field is grayed out when:

- The association state between the ITM-SC and the NE is *Connected*.

- The connection type is set to *Dynamic*.

- The NE connected option is set to *on Lan*.

Designated Router Priority The designated router priority is a value which indicates the priority of the Designated Router connected to the Q-LAN. A higher number has priority over a lower one. Valid values are 0-127. The default value is 64.

This value is composed in a specialized plan, so do not change it unless this plan is available.

The designated router priority field is grayed out when:

- The association state between the ITM-SC and the NE is *Released*.

- The NE is a TM1 node.

Additional Manual Area Addresses A synonymous Area Address associated with an Intermediate System. Together with the SID and SEL fields, it is a valid synonymous NSAP address for an Intermediate System. The Manual Area Address can be used to connect subnetworks to the OSI-DCN with nodes having a different NSAP format than the formats supported.

The additional manual area address field is grayed out when:

- The association state between the ITM-SC and the NE is *Released*.

- The NE is a TM1 node.

IS-IS Functionality of NE The IS-IS functionality of NE field changes the IS-IS level of the network element.

The IS-IS level of NE field is grayed out when:

- The association state between the ITM-SC and the NE is *Released*.

- The NE is a TM1 node.

The possible IS-IS level values for an NE are described in the table below:

IS-IS Functionality of NE	Description
Level 1	Provides interconnectivity between network elements in the same area.
Level 1+2	Provides interconnectivity between areas and between network elements in the same area.
Level 1+2 Area Repair Access	Provides interconnectivity between areas and between network elements in the same area and enables Area Partition Repair Access.

Note: The option Level 1+ 2 + Area Repair Access is only applicable for AM1 NEs.

LAN IS-IS Level on LAN The LAN IS-IS level on LAN field changes the IS-IS level on the Q-LAN port.

The LAN IS-IS level on LAN field is grayed out when:

- The association state between the ITM-SC and the NE is *Released*.

- The NE is a TM1 node.

Important! *Level 2* is grayed out if the IS-IS Level of NE is set to *Level 1*!

The possible LAN IS-IS level values are described in the table below:

LAN IS-IS Level on LAN	Description
Normal IS-IS	The LAN IS-IS level is the same as the level of the network element provisioned in IS-IS Level of NE. Under normal circumstances the network element should use this value.

LAN IS-IS Level on LAN	Description
Level 2	The LAN IS-IS level is set to level 2. This value should only be used temporarily during upgrade activities.
No IS-IS	Disables the Q-LAN port of an network element for the IS-IS protocol (NO-IS-IS). This value is used in combination with static routing to the management system.

□

Section: Data Communications Channel (DCC)

Overview

Purpose   The purpose of this procedure is to change the DCC status in the Regenerator Section (RS) and Multiplexer Section (MS) of each STM-N port.

☐

Provisioning the Data Communications Channel (DCC)

....

When to use
Use this procedure to reduce the exchange of routing data between network elements. Reduction of the exchange of management data is done in order to optimize the Data Communications Network (DCN). The DCC status can be set to enabled or disabled in order to achieve this.

Before you begin
Pay attention to the following:

- Disabling DCC can cause permanent loss of association between the ITM-SC and the network element. In that case the DCC ports can be enabled by a local login with the Local Workstation

- Enabling DCC can cause instability in the Data Communications Network (DCN)

- A data communications network plan must be available.

Related information
Related procedures and information are:

- Change general Network Element information

- Manage Network Element associations

- Section DCN Managment Concepts in chapter Concepts.

Procedure
Follow this procedure to provision the DCC:

....

1 Select *Management --> Overlay Comms Network --> DCC List*.

Result:

The *EMS - DCC List* window appears.

....

2 To select an NE or to switch to another NE, click the Selection Dialog Button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

Result:

The *EMS - DCC List* window is updated with the information of the selected network element.

....

3 Select the port for which the DCC parameter must be changed and click Edit.

Result:

The *EMS - Edit DCC* window for this port appears.

....

....

4   Select the DCC status for the selected port.

   Result:

   The DCC status is selected.

....

5   Click OK.

   Result:

   The new setting is confirmed and the *EMS - DCC Edit* window
   disappears.

   E ND OF S TEPS

   □

....

Lucent Technologies - Proprietary
See notice on first page

Parameters for Provisioning Data Communications Channel (DCC)

Port Shows the line and tributary ports on which DCC is available.

DCC Shows the current status of the DCC. This can be enabled or disabled. When not applicable, ″-″ is displayed.

☐

Section: Data Communication Test

Overview

....

Purpose   The Data Communication Test checks the association between the network element and the ITM-SC to ensure that they communicate successfully.

□

....

      Lucent Technologies - Proprietary

Performing the Data Communication Test
....

When to use   Use this procedure when assuming bad or no association between the ITM-SC and the network element.

Before you begin   The network element is provisioned and has a association with the ITM-SC.

Related information   Related procedures and information are:

- Disabling/enabling association
- NE status list
- MIB update
- MIB download
- MIB upload
- Provisioning NE information
- Section DCN Management Concepts in chapter Concepts.

Procedure   To perform the Data Communications Test follow this procedure:
....

1   Select *Management --> Overlay Comms Networks --> Data Comms Test*.

   Result:

   The EMS - Data Communications Test window appears.

....

2   Click Edit to prepare a new Data Communications Test.

   Result:

   The *EMS - Edit Data Communications Test* window appears.

....

3   Select one or more network elements from the list, or click the Select All button to perform the test on all network elements.

   Result:

   This selects the NEs on which the test will be performed.

....

4   Click Apply.

   Result:

   The test is started.

....

....

5   Click Cl ose on the EMS - *Edit Data Communications Test* window.

Result:

The EMS - *Edit Data Communications Test* window disappears.

....

6   Click Cl ose on the Data Communications Test window.

Result:

The *EMS - Data Communications Test* window disappears.

E N D   O F   S T E P S
....

☐

Parameters for Performing the Data Communication Test

Last Tested Shows the time and date of the last performed test.

Test Status Use this table to decide the status of the Data Communication Test:

Test status	Description
No Test	No test has been made.
Test Passed	There is communication between the ITM-SC and the network element.
Test Failed	No communication could be established between the ITM-SC and the network element during the test.

2 Equipment Provisioning

Overview

Objectives Equipment provisioning provides the configuration data for the WaveStar® AM 1. Provisioning is the preparatory work that is done to ensure that a network element (NE) properly functions and so that the NE may be included in a network. After initial provisioning, any subsequent changes in the NE's equipment mean that provisioning must once more be performed.

Through provisioning, the correct configuration data is provided for the *WaveStar*® AM 1.

Outcome The objective of equipment provisioning is to eventually include a network element in an SDH network. To enable the *WaveStar*® AM 1 to become a functioning part of a network, it must first be provided with the correct configuration data.

Intended use This chapter provides all procedures needed to provision the equipment of a *WaveStar*® AM 1 network element when using the ITM-SC. The chapter begins with the conceptual information necessary to properly execute the procedures. After these concepts, the procedures are presented.

☐

Section: Creating an NE Template

Overview

Purpose   Creating an NE template provides a basis for provisioning or pre-provisioning several similar NEs.

☐

Create NE Template

....

When to use	Creating a network element template provides a basis for provisioning or pre-provisioning several similar network elements.
Before you begin	Before starting to create a network element template be sure to have information about:

- The name the template must have
- Which template (default or user-defined) to use as a basis for the new template.

Related information The following procedures and information are related:

- View NE Template Slot Information
- Modify an NE Template
- Delete an NE Template
- Provision an NE from a Template
- Create a Pre-Provisioned NE
- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure Follow these steps to create a network element template.

....

1 Select *Templates -> Equipment -> Create*.

> **Result:**
>
> The EMS - Create NE Template window is displayed. It is possible to create a network element template with an existing network element template (default or user-defined) as the basis.

....

2 Enter the name for the new template in the field *User NE Template Name*.

....

3 Click the selection dialog button, and select the desired template (default or user-defined) from the EMS - NE Template Selection Dialog window. Then, click OK.

> **Result:**
>
> The EMS - Create NE Template is updated with the information from the selected template. The new template will use the selected template as a basis.

....

4 Click Appl y to create the new network element template.

....

....

5   Click Close to exit this window.

Result:

The EMS - Create NE Template window disappears.

E ND   OF   S TEPS
....

☐

Lucent Technologies - Proprietary
See notice on first page

Parameters for Creating an NE Template

Base NE Template   The name of the template being used as a basis for the creation of the new template.

Base NE Type   The type of NE associated with the base NE template.

Base NE Template Type   This lists the type of template being used as the basis. It may be *Default*, a template existing in the system software; or it may be *User Defined*, a template previously created by a user.

User NE Template Name   This is the name given to the new template being created.

☐

Section: Viewing NE Template Slot Information

Overview

Purpose   This procedure allows the user to see exactly how the slots are configured for any existing NE template.

☐

View NE Template Slot Information

....

When to use   It is useful to view the slot configuration of a template:

- When choosing an existing template to serve as a basis in creating a new template

- After creating a user-defined template to see what must be modified to adapt this template to the user's needs.

The slots of a template are configured in a certain way in each template. This procedure allows the user to see how each slot is provisioned.

Before you begin   No prerequisites or precautions are needed when performing this procedure.

Related information   The following procedures and information are related:

- Create an NE Template

- Modify an NE Template

- Delete an NE Template

- Provision an NE from a Template

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure   Follow these steps to view network element template slot information.

....

1   Select *Templates -> Equipment -> NE Inventory*.

> **Result:**
>
> The EMS - NE Template Inventory window is displayed.

....

2   Click the selection dialog button and select the required template (default or user-defined) from the EMS - NE Template Selection Dialog window. Then, click OK.

> **Result:**
>
> The EMS - NE Template Inventory window is updated with the units associated with the selected template.

....

3   To view details for a particular slot, select the *Slot* and click Details.

....

Result:

The EMS - NE Template Slot Information window displays
information for the selected slot.

....

4 To view information for a different slot, either in the selected template
or in another template, return to step 2.

....

5 Click Close.

Result:

The EMS - NE Template Slot Information window disappears.

....

6 Click Close.

Result:

The EMS - NE Template Inventory window disappears.

E N D   O F   S T E P S

☐

Parameters for Viewing Template NE Slot Information

....
2 - 9

NE template name	This is the name of the selected template.
NE type	The type of NE associated with the template.
NE template type	There are two types of templates. The first is *Default*, a template that is part of the system software. The other is *User Defined*, a template custom designed by the user.
Slot	The slot position is listed here.
Unit item code	The special alphanumeric code associated with a particular unit is listed.
Unit type	The type of unit provisioned in the listed slot is shown.
Slot state	Displays the status of the listed slot. The different slot states are given in the table below.

Slot State	Description
Assigned	Slot is assigned.
Unassigned	Slot is unassigned.
Auto	Slot is provisioned but waiting for unit. Once the provisioned unit is present, the slot state will automatically change to *Assigned*.

Cards	This is a list of the possible units that may be provisioned.

☐

Section: Modifying an NE Template

Overview
....

Purpose   The slot configuration for an existing user-defined template can be
edited.

☐

....

Lucent Technologies - Proprietary

Modify NE Template

....

When to use   After creating a user-defined template, this template still is configured in the same way as the basis template. This configuration can be altered using this procedure. Moreover, any existing user-defined template can be changed to suit the user's needs.

Before you begin   Before modifying an NE templater determine the following:

- The selected template to be modified must be a user-defined template: default templates cannot be modified.

- The desired configuration of the template"s slots should be known

- For the *WaveStar®* AM 1, it is possible to modify slot TS2 and to change the slot states

- Before starting to assign units to a slot, be sure that it is possible to assign a particular unit type to the selected slot. For each slot, a unit may be selected from the list ″Cards″. All possible units for the *WaveStar®* AM 1 appear in the ″Cards″ list; however, not all units may be provisioned in the available slot. If an incorrect unit is provisioned in any of the template slots, then no error message appears. Only later, when this template is used for provisioning, will the error message be shown. The creation of the NE from this template will fail and a slot configuration error will be displayed.

Related information   The following procedures and information are related:

- Create an NE Template

- View NE Template Slot Information

- Provision an NE from a Template

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure   Follow these steps to modify a network element template.
....

1   Select *Templates -> Equipment -> Slot*.

> **Result:**

> The EMS - NE Template Slot Information window is displayed.

....

2   Click the selection dialog button to select a particular slot. Select the required template from the list of NE Templates, then select a slot from the list of slots. Confirm by clicking OK.

....

Result:

The *EMS - NE Template Slot Information* window is updated with the information for the selected slot.

....

3 Click Edit to modify the slot information.

> **Result:**
>
> The EMS - Edit NE Template Slot window appears.

....

4 Select the unit for the slot from the list *Cards*. Then, if necessary, change the *Slot State*.

Important! If it is not possible to select the required unit from the list *Cards*, contact the system administrator.

> **Result:**
>
> For the selected slot, the correct unit with the proper slot state are displayed.

....

5 Click OK to confirm the current settings.

> **Result:**
>
> The modified slot information is entered, and the EMS - Edit NE Template Slot window disappears.

....

6 Click Close to exit this window.

> **Result:**
>
> The EMS - NE Template Slot Information window disappears.

E N D   O F   S T E P S
....

☐

Parameters for Modifying an NE Template

NE template type There are two types of templates. The first is *Default*, a template that is part of the system software. The other template type is *User Defined*, a template designed by the user.

Slot The slot position is listed here.

Unit item code The special alphanumeric code associated with a particular unit is listed.

Unit type The type of unit provisioned in the listed slot is shown.

Slot state Displays the status of the listed slot. The different slot states are given in the table below.

Slot State	Description
Assigned	Slot is assigned.
Unassigned	Slot is unassigned.
Auto	Slot is provisioned but waiting for unit. Once the provisioned unit is present, the slot state will automatically change to *Assigned*.

Cards This is a list of the possible units that may be provisioned.

☐

Section: Deleting an NE Template

Overview

Purpose Deleting an NE template removes the template from the ITM-SC database.

☐

Delete NE Template

....

When to use	A template can be deleted from the ITM-SC database when it is no longer necessary for provisioning.
Before you begin	Only user defined templates can be deleted. Attempts to delete a factory defined template will result in an error message.
Related information	The following procedures and information are related:

- Create an NE Template
- View NE Template Slot Information
- Modify an NE Template
- Provision an NE from a Template
- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure   Follow these steps to delete a template.

....

1   Select *Templates -> Equipment -> Delete*.

> **Result:**
>
> The EMS - Delete NE Template window is displayed.

....

2   Click the selection dialog button and select the desired template (user-defined) from the EMS - NE Template Selection Dialog window. Then, click OK

> **Result:**
>
> The EMS - Delete NE Template window displays the selected template.

....

3   Click Apply to delete the network element template. Note that default templates may not be deleted.

....

4   Click Close to exit this window.

> **Result:**
>
> The EMS - Delete NE Template window disappears.

E N D   O F   S T E P S

....

☐

....

Parameters for Deleting an NE Template

NE template name   This is the name of the selected template.

NE type   The type of NE associated with the displayed NE template.

NE template type   This is the type of template. It may be *Default*, a template existing in the system software; or it may be *User Defined*, a template previously created by a user.

□

Section: Creating a Pre-Provisioned NE

2 - 17

Overview

Purpose   Creating a pre-provisioned NE involves completing the initial provisioning work to include a network element in the network. Obviously, since pre-provisioning may be done before the NE is operational, the NE may be more quickly placed into service.

☐

Lucent Technologies - Proprietary
See notice on first page

Create a Pre-Provisioned NE

....

When to use   A pre-provisioned NE is generally created when the network element is not yet operational. It could be the case, for instance, that the configuration and management information is known but the NE has not been installed yet.

Before you begin   To create a pre-provisioned NE, the following information must be available: the NE name and location, the NSAP address, the management connection information, and the template to be used as the basis for the pre-provisioned NE.

Related information   The following procedures and information are related:

- Edit Pre-Provisioned NE Information

- View the Pre-Provisioned NE Slot Configuration

- Edit Pre-Provisioned NE Slot Information

- Delete a Pre-Provisioned NE

- Provision an NE from a Pre-Provisioned NE

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure   ....

1   Select *Pre-Provisioning -> Create*.

   Result:

   The EMS - Create Pre-Provisioned NE window appears. This window allows creation of a pre-provisioned network element in the ITM-SC database using a selected network element template.

   ....

2   Click the selection dialog button and select the desired template (default or user-defined) from the EMS - NE Template Selection Dialog window. Then, click OK.

   Result:

   The EMS - Create Pre-Provisioned NE window is updated with the information from the selected template.

   ....

3   Enter the *NE Name*, and if desired, click in the *ITM-NM Style* box.

   Important! If the network element is managed by the ITM-NM, select the *ITM-NM Style* box. If this box is selected, then the name format can fail at two levels. It may be completely ITM-NM incompatible, or it may be compatible but not the preferred format.

....

See the parameters section for a complete explanation of how to choose an ITM-NM compatible name.

Result:

The network element name appears in the field *NE Name*.

....

4 Enter the *NE Location*.

....

5 Enter the information in *Address to Connect to NE*.

Result:

The NSAP address of the network element is entered.

....

6 Enter the *Initial Management Connection* fields.

....

7 Click Appl y.

Result:

The pre-provisioned network element is now created.

....

8 Click Cl ose.

Result:

The EMS - Create Pre-Provisioned NE window disappears.

E N D   O F   S T E P S
....

☐

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

2 - 1 9

Parameters for Creating a Pre-Provisioned NE

NE name   The network element's name is listed. The name must be unique across management domains. If the NE is not managed by the ITM-NM, then the name may be up to 20 characters in length. If the NE will be managed by the ITM-NM, then the name must be 3 to 10 characters long with the last three characters a slash and two digits. Only *A-Z*, *0-9*, *_*, */*, and - are permitted for network elements managed by the ITM-NM. An example of an ITM-NM compatible name is LONDON/02.

NE location   The location of the network element is given. The location may have up to 20 uppercase or lowercase characters.

Address to connect to NE   The address of the selected NE is indicated. There are various parts of the address; the table below describes these different parts and their possible values.

Field Name	Description	Possible Values
NSAP Format	The format of the NSAP address.	*Fixed 20 Byte*, *Fixed 10 Byte*, or *Flexible*.
Area	Indicates the area to which an NE belongs.	*Area ID* for fixed 20 byte and fixed 10 byte NSAP format: 4 hexadecimal digits (2 bytes). *Area Address* for flexible NSAP format: 2 - 26 hexadecimal digits (1-13 bytes).
SID Entry Format	The format of the NE address.	*SID*: System Identifier. *Short*: Not applicable.
NE SID	Identifies the NE.	12 hexadecimal digits (6 bytes).

Initial management connection   Like the address, the initial management connection has several different parts. These are described in the table below. Note that the three fields NE Connected, Gateway Format and Gateway Ethernet Address are only valid if the connection type is *Static*. When

Lucent Technologies - Proprietary
See notice on first page   Issue a, June 2001

connection type is set to *Dynamic* these fields are grayed out.

Field Name	Description	Possible Values
Connection Type	Controls network management data routing.	*Dynamic*: Management data is routed dynamically by the network using ES-IS/IS-IS protocols. *Static*: The management data route is forced. The management system uses a user-defined network element (Ethernet) address to select one Intermediate System (IS) via which the ITM-SC communicates with a node.
NE Connected	Determines how the NE is connected.	*via Gateway*: The network element is connected via a gateway node through which it is managed by the ITM-SC. *on LAN*: The ITM-SC manages the network element directly through a Q-LAN connection.
Gateway Format	Determines the format of the gateway via which this NE is managed.	*Ethernet* (12 Hexadecimal digits) or *Short* (2 Hexadecimal digits): only if the gateway is an ISM.
Gateway Ethernet Address	Address of the gateway via which this NE is managed.	Address format depends on setting of *Gateway Format* field.

Management connection options

There are several ways in which the management connection can be provisioned. Use the table below to complete the *Initial Management Connection* parameter and thus set the desired management connection.

If...	then...
Dynamic routing is to be used. This is preferable when using IS-IS areas.	Set the *Connection Type* to *Dynamic*.

If...	then...
The NE is to be managed via a gateway NE using long addressing, Note this introduces IS-IS clustering. The routing is static. If the gateway network element fails, no alternative route is sought to the NE.	Set the *Connection Type* to *Static*.Set *NE Connected* to *via Gateway*. Set *Gateway Format* to *Ethernet*. Enter the full *Gateway Ethernet Address* (12 Hex digits).
The NE is to be managed via a gateway NE using short addressing, Note this is only possible if the gateway is an ISM. This introduces IS-IS clustering. If the gateway network element fails, no alternative route is sought to the NE.	Set the *Connection Type* to *Static*. Set *NE Connected* to *via Gateway*. Set *Gateway Format* to *Short*. Enter the short *Gateway Ethernet Address* (2 Hex digits).
The NE is to be managed via a Q-LAN connection, (The network element is connected on the Q-LAN of the ITM-SC.)	Set the *Connection Type* to *Static* and *NE Connected* to *on LAN*.

☐

Section: Editing Pre-Provisioned NE Information

2 - 23

Overview

Purpose   The purpose of this procedure is to change the location, the address, or the management connection information of an existing pre-provisioned network element.

☐

Lucent Technologies - Proprietary
See notice on first page

Edit Pre-Provisioned NE Information

When to use   Follow this procedure when:

- Changing the location of the pre-provisioned NE

- Changing the DCN design.

Before you begin   Before starting to edit pre-provisioned network element information, all information about DCN must be available, such as:

- The network element name and location

- The NSAP address

- The information related to the management connection

- If the values of the IS-IS parameters are incorrect this may cause instabilities in the DCN and may result in many network elements becoming unmanageable. A warning message is displayed

- Choosing the static value for the connection type option makes the Gateway network element a single point of failure in the management of the network element

- If the LAN IS-IS level is set to 'None' (NO-IS-IS) a network element cluster that is not directly connected to the ITM-SC Q-LAN may become unmanageable when 'None' is chosen for the cluster gateway. 'None' also prevents traffic from one cluster from being routed to another cluster over the Q-LAN.

Related information   The following procedures and information are related:

- Create a Pre-Provisioned NE

- View the Pre-Provisioned NE Slot Configuration

- Edit Pre-Provisioned NE Slot Information

- Delete a Pre-Provisioned NE

- Provision an NE from a Pre-Provisioned NE

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure

1   Select *Pre-Provisioning -> NE Information*.

   Result:

   The EMS - Pre-Provisioned NE Information window appears.

....

2   Click the selection dialog button to select a pre-provisioned network
element. Select the required network element from the EMS - NE
Selection Dialog window, and click OK.

> **Result:**
>
> The EMS - Pre-Provisioned NE Information window is updated
> with the information from the selected pre-provisioned network
> element.

....

3   Click Edit.

> **Result:**
>
> The EMS - Edit Pre-Provisioned NE Information window
> appears.

....

4   Modify, as necessary, the displayed information for *NE Location*,
Address to Connect to NE, and *Initial Management Connection*.

> **Result:**
>
> The correct information appears in the appropriate fields.

....

5   Click OK.

> **Result:**
>
> The changes for the pre-provisioned network element are now
> confirmed, and the window EMS - Edit Pre-Provisioned NE
> Information disappears.

....

6   Click Close.

> **Result:**
>
> The EMS - Pre-Provisioned NE Information window disappears.

E N D   O F   S T E P S
....

□

Parameters for Editing Pre-Provisioned NE Information

NE name The network element's name is listed. The name must be unique across management domains. If the NE is not managed by the ITM-NM, then the name may be up to 20 characters in length. If the NE will be managed by the ITM-NM, then the name must be 3 to 10 characters long with the last three characters a slash and two digits. Only *A-Z*, *0-9*, *_*, */*, and - are permitted for network elements managed by the ITM-NM. An example of an ITM-NM compatible name is LONDON/02.

NE location The location of the network element is given. The location may have up to 20 uppercase or lowercase characters.

Address to connect to NE The address of the selected NE is indicated. There are various parts of the address; the table below describes these different parts and their possible values.

Field Name	Description	Possible Values
NSAP Format	The format of the NSAP address.	The default value is *Fixed 20 Byte*.
Area	Indicates the area to which an NE belongs.	*Area ID* for fixed 20 byte and fixed 10 byte NSAP format: 4 hexadecimal digits (2 bytes). *Area Address* for flexible NSAP format: 2 - 26 hexadecimal digits (1-13 bytes).
SID Entry Format	The format of the NE address.	*SID*: System Identifier. *Short*: Not applicable.
NE SID	Identifies the NE.	12 hexadecimal digits (6 bytes).

Initial management connection Like the address, the initial management connection has several different parts. These are described in the table below. Note that the three fields NE Connected, Gateway Format and Gateway Ethernet Address are only valid if the connection type is *Static*. When

connection type is set to *Dynamic* these fields are grayed out.

Field Name	Description	Possible Values
Connection Type	Controls network management data routing.	*Dynamic*: Management data is routed dynamically by the network using ES-IS/IS-IS protocols. *Static*: The management data route is forced. The management system uses a user-defined network element (Ethernet) address to select one Intermediate System (IS) via which the ITM-SC communicates with a node.
NE Connected	Determines how the NE is connected.	*via Gateway*: The network element is connected via a gateway node through which it is managed by the ITM-SC. *on LAN*: The ITM-SC manages the network element directly through a Q-LAN connection.
Gateway Format	Determines the format of the gateway via which this NE is managed.	*Ethernet* (12 Hexadecimal digits) or *Short* (2 Hexadecimal digits): only if the gateway is an ISM.
Gateway Ethernet Address	Address of the gateway via which this NE is managed.	Address format depends on setting of *Gateway Format* field.

Management connection options

There are several ways in which the management connection can be provisioned. Use the table below to complete the *Initial Management Connection* parameter and thus set the desired management connection.

If...	then...
Dynamic routing is to be used, This is preferable when using IS-IS areas.	Set the *Connection Type* to *Dynamic*.

Parameters for Editing Pre-Provisioned NE
Information

If...	then...
The NE is to be managed via a gateway NE using long addressing, Note this introduces IS-IS clustering. The routing is static. If the gateway network element fails, no alternative route is sought to the NE.	1. Set the *Connection Type* to *Static*. 2. Set *NE Connected* to *via Gateway*. 3. Set *Gateway Format* to *Ethernet*. 4. Enter the full *Gateway Ethernet Address* (12 Hex digits).
The NE is to be managed via a gateway using long addressing. Note this is only possible if the gateway is an ISM. This introduces IS-IS clustering. If the gateway network element fails, no alternative route is sought to the NE.	1. Set the *Connection Type* to *Static*. 2. Set *NE Connected* to *via Gateway*. 3. Set *Gateway Format* to *Short*. 4. Enter the short *Gateway Ethernet Address* (2 Hex digits).
The NE is to be managed via a Q-LAN connection. (The network element is connected on the Q-LAN of the ITM-SC.)	Set the *Connection Type* to *Static* and *NE Connected* to *on LAN*.

Section: Viewing Pre-Provisioned NE Slot Information

2 - 29

Overview

Purpose   Use this procedure to view how the slots of a pre-provisioned network element are configured.

□

View Pre-Provisioned NE Slot Configuration

When to use   This procedure is useful for checking:

- The unit assigned to a certain slot

- The state of a particular slot (assigned, unassigned or auto).

Before you begon   No prerequisites or precautions are needed when performing this
procedure.

Related information   The following procedures and information are related:

- Create a Pre-Provisioned NE

- Edit Pre-Provisioned NE Information

- Modify the Subrack Slots

- Delete a Pre-Provisioned NE

- Provision an NE from a Pre-Provisioned NE

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure

1   Select *Pre-Provisioning -> NE Card Inventory*.

> **Result:**
>
> The EMS - Pre-Provisioned NE Inventory window is displayed.
> This window lists the units associated with a selected
> pre-provisioned network element.

2   Click the selection dialog button to select a pre-provisioned network
element. Select the required network element from the EMS - NE
Selection Dialog window, and click OK.

> **Result:**
>
> The EMS - Pre-Provisioned NE Inventory window is updated
> with the information from the selected pre-provisioned network
> element.

3   Select the desired slot from the list *Slot*, and click Details.

> **Result:**
>
> The EMS - Pre-Provisioned NE Slot Information window is
> displayed. This window displays detailed information for the
> selected slot. Note that the procedure to change the slot

information is described in the subsection "Modify Subrack Slots."

....

4   Click Close.

> **Result:**
>
> The EMS - Pre-Provisioned NE Slot Information window disappears.

....

5   Click Close.

> **Result:**
>
> The EMS - Pre-Provisioned NE Inventory window disappears.

E N D   O F   S T E P S

....

☐

Parameters for Viewing Pre-Provisioned NE Slot Configuration

Pre-provisioned NE   The name of the pre-provisioned NE is listed.

NE type   The type of the selected pre-provisioned NE is shown.

Slot   The slot position is given here.

Unit item code   The special alphanumeric code associated with the provisioned unit is displayed.

Unit type   The type of unit provisioned in the listed slot is shown.

Slot state   Displays the status of the listed slot. The different slot states are given in the table below.

Slot State	Description
Assigned	Slot is assigned.
Unassigned	Slot is unassigned.
Auto	Slot is provisioned but waiting for unit. Once the provisioned unit is present, the slot state will automatically change to *Assigned*.

Section: Editing Pre-Provisioned NE Slot Information

2 - 33

Overview

Purpose   Use this procedure to modify the subrack slots of a pre-provisioned NE.

☐

Lucent Technologies - Proprietary
                    See notice on first page

Edit Pre-Provisioned NE Slot Information

When to use   Follow this procedure when:

- Assigning new units to the pre-provisioned network element

- Making changes in the slot occupation of the NE subrack.

- Changing the slot state of a unit.

Before you begin   Before editing pre-provisioned NE slot information determine the following:

- the nformation concerning the desired subrack slot assignments for the pre-provisioned NE should be available

- For the *WaveStar*® AM 1, it is possible to provision, and thus edit, slot TS2. Changes to any of the other units should not be made

- If it is not possible to select the desired unit from the list of cards contact the system administrator.

Related information   The following procedures and information are related:

- Create a Pre-Provisioned NE

- Edit Pre-Provisioned NE Information

- View the Pre-Provisioned NE Slot Configuration

- Delete a Pre-Provisioned NE

- Provision an NE from a Pre-Provisioned NE

- Section Equipment Provisioning Concepts in chapter Concepts.

Important! For the *WaveStar*® AM 1, it is only possible to provision, and thus edit, slot TS2. When selecting *Pre-Provisioning -> Slot* to access the EMS - Pre-Provisioned NE Slot Information window, begin with step 4 of this procedure.

Procedure

1   Select *Pre-Provisioning -> Subrack*.

        Result:

        The EMS - Pre-Provisioned NE Subrack Information window appears. This window graphically displays the contents of the subrack, with the subrack layout corresponding to the selected network element.

....

2 Click the selection dialog button to select a pre-provisioned network
element. Select the required network element from the EMS - NE
Selection Dialog window, and click OK.

> **Result:**
>
> The EMS - Pre-Provisioned NE Subrack Information window is
> updated with the information from the selected pre-provisioned
> network element.

....

3 On the subrack layout, click on the desired slot.

> **Result:**
>
> The EMS - Pre-Provisioned NE Slot Information window
> appears with information concerning the selected slot.

....

4 Click Edit.

> **Result:**
>
> The window EMS - Edit Pre-Provisioned NE Slot Information
> appears.

....

5 Select the appropriate *Slot State*.

Important! If the *Slot State* is *Unassigned*, then no selection will be
possible form the list *Cards*.

....

6 Select the proper unit from the list *Cards*.

Important! Verify that the *Unit Item Code* of the selected unit
corresponds with that of the actual unit. If the values do not match, or
if it is not possible to select the required unit from the list of cards
contact the system administrator.

> **Result:**
>
> The proper unit and the appropriate slot state are selected.

....

7 Click OK.

> **Result:**
>
> The slot is modified, and the EMS - Edit Pre-Provisioned NE
> Slot Information window disappears.

....

....

8   Click Close in the EMS - Pre-Provisioned NE Slot Information
window, and then click Close in the EMS - Pre-Provisioned NE
Subrack Information window.

   Result:

   The windows disappear.

E N D   O F   S T E P S

....

□

Parameters for Editing Pre-Provisioned NE Slot Information

Pre-provisioned NE   The name of the pre-provisioned NE is listed.

NE type   The type of the selected pre-provisioned NE is shown.

Slot   The slot position is listed here.

Unit item code   The special alphanumeric code associated with a particular unit is listed.

Unit type   The type of unit provisioned in the listed slot is shown.

Slot state   Displays the status of the listed slot. The different slot states are given in the table below.

Slot State	Description
Assigned	Slot is assigned.
Unassigned	Slot is unassigned.
Auto	Slot is provisioned but waiting for unit. Once the provisioned unit is present, the slot state will automatically change to *Assigned*.

Cards   This is a list of the possible units that may be provisioned.

☐

Section: Deleting a Pre-Provisioned NE

Overview

....

Purpose   The purpose of this procedure is to remove a pre-provisioned network element from the management system database.

☐

....

    Lucent Technologies - Proprietary
See notice on first page   Issue a, June 2001

Delete a Pre-Provisioned NE

....

When to perform When the pre-provisioned network element is no longer needed, it can be deleted. For example, if the network element is not going to be installed or if the NE will be placed elsewhere in the network and configured in a different way, then obviously the pre-provisioned NE is not useful.

Before you begin The name of the pre-provisioned NE to be deleted must be known.

Related information The following procedures and information are related:

- Create a Pre-Provisioned NE
- Edit Pre-Provisioned NE Information
- View the Pre-Provisioned NE Slot Configuration
- Edit Pre-Provisioned NE Slot Information
- Provision an NE from a Pre-Provisioned NE
- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure ....

1 Select *Pre-Provisioning -> Delete*.

   Result:

   The EMS - Delete Pre-Provisioned NE window appears.

....

2 Click the selection dialog button and select the desired pre-provisioned network element from the EMS - NE Template Selection Dialog window. Then, click OK.

   Result:

   The EMS - Delete Pre-Provisioned NE window is updated with the information from the selected pre-provisioned NE.

....

3 Click Apply.

   Result:

   A window appears asking for confirmation of deletion.

....

4 Click Yes in the confirmation window.

   Result:

   The pre-provisioned network element is now deleted.

....

....

5   Click Close.

> **Result:**
>
> The EMS - Delete Pre-Provisioned NE window disappears.

E N D   O F   S T E P S

....

☐

Section: Creating an NE from a Template

2 - 4 1

Overview

Purpose The provisioning of a network element will be completed using a template.

□

Create an NE from a Template

When to use	When a new network element becomes operational and an association with the management system can be made, a network element can be provisioned.

Before you begin Before starting to provision a network element the following information must be available:

- The network element name
- Location and NSAP address
- The type of management connection, and
- The network element template used as a basis for configuration
- The provisioned configuration data will override any configurations provided via the Craft Interface Terminal (ITM-CIT).
- Be careful with selecting the management connection type (static/dynamic). This can be changed afterwards only by deleting the provisioned network element and creating it again.

Related information The following procedures are related:

- Create an NE Template
- Modify an NE Template
- View NE Template Slot Information
- Delete an NE Template
- Section Equipment Provisioning Concepts in chapter Concepts.

Important! Also, a node cannot be created with the ITM-SC if it is in an isolated state. This can only be checked with the ITM-CIT. If the node is isolated, then it must be created with the ITM-CIT. A node is not capable of any type of remote management if it is in the isolated state.

Procedure

1 Select *Provisioning -> Equipment -> Create -> NE From Template*.

   Result:

   The EMS - Create Provisioned NE from Template window appears. This window allows creation of a provisioned network element using a selected network element template.

....

2   Click the selection dialog button and select the desired template
        (default or user-defined) from the EMS - NE Template Selection
        Dialog window. Then, click OK.

> **Result:**
>
> The EMS - Create Provisioned NE from Template window is
> updated with the information from the selected template.

....

3   Enter the *NE Name*, and if desired, click in the *ITM-NM Style* box.

Important! If the network element is managed by the ITM-NM,
select the *ITM-NM Style* box. If this box is selected, then the name
format can fail at two levels. It may be completely ITM-NM
incompatible, or it may be compatible but not the preferred format.
See the parameters section for a complete explanation of how to
choose an ITM-NM compatible name.

> **Result:**
>
> The network element name and location are entered.

....

4   Enter the information in *Address to Connect to NE*.

> **Result:**
>
> The NSAP address of the network element is entered.

....

5   Enter the *Initial Management Connection* fields.

....

6   Click Appl y.

> **Result:**
>
> The network element has been created, and it is now
> provisioned.

....

7   Click Cl ose.

> **Result:**
>
> The EMS - Create Provisioned NE from Template window
> disappears.

E ND   OF   S TEPS

....

☐

....

Parameters for Creating an NE from a Template

NE template name   Indicates the name of the selected template.

NE type   The type of NE associated with the template.

Template type   There are two types of NE templates. The first is *Default*, a template that is part of the system software. The other is *User Defined*, a template custom designed by the user.

NE name   The network element's name is listed. The name must be unique across management domains. If the NE is not managed by the ITM-NM, then the name may be up to 20 characters in length. If the NE will be managed by the ITM-NM, then the name must be 3 to 10 characters long with the last three characters a slash and two digits. Only *A-Z*, *0-9*, *_*, */*, and - are permitted for network elements managed by the ITM-NM. An example of an ITM-NM compatible name is LONDON/02.

NE location   The location of the network element is given. The location may have up to 20 uppercase or lowercase characters.

Address to connect to NE   The address of the selected NE is indicated. There are various parts of the address; the table below describes these different parts and their possible values.

Field Name	Description	Possible Values
NSAP Format	The format of the NSAP address.	The default value is *Fixed 20 Byte*.
Area	Indicates the area to which an NE belongs.	*Area ID* for fixed 20 byte and fixed 10 byte NSAP format: 4 hexadecimal digits (2 bytes). *Area Address* for flexible NSAP format: 2 - 26 hexadecimal digits (1-13 bytes).
SID Entry Format	The format of the NE address.	*SID*: System Identifier. *Short*: Not applicable.
NE SID	Identifies the NE.	12 hexadecimal digits (6 bytes).

Section: Creating an NE from a Template
Parameters for Creating an NE from a
Template

Equipment Provisioning

Initial management connection

Like the address, the initial management connection has several different parts. These are described in the table below. Note that the fields NE Connected, Gateway Format and Gateway Ethernet Address are only valid if the connection type is *Static*. When connection type is set to *Dynamic* these fields are grayed out.

Field Name	Description	Possible Values
Connection Type	Controls network management data routing.	*Dynamic*: Management data is routed dynamically by the network using ES-IS/IS-IS protocols. *Static*: The management data route is forced. The management system uses a user-defined network element (Ethernet) address to select one Intermediate System (IS) via which the ITM-SC communicates with a node.
NE Connected	Determines how the NE is connected.	*via Gateway*: The network element is connected via a gateway node through which it is managed by the ITM-SC. *on LAN*: The ITM-SC manages the network element directly through a Q-LAN connection.
Gateway Format	Determines the format of the gateway via which this NE is managed.	*Ethernet* (12 Hexadecimal digits) or *Short* (2 Hexadecimal digits): only if the gateway is an ISM.
Gateway Ethernet Address	Address of the gateway via which this NE is managed.	Address format depends on setting of *Gateway Format* field.

Management connection options

There are several ways in which the management connection can be provisioned. Use the table below to complete the *Initial Management Connection* parameter and thus set the desired management

Section: Creating an NE from a Template
Parameters for Creating an NE from a
Template

Equipment Provisioning

connection.

If...	then...
dynamic routing is to be used, Note: This is preferable when using IS-IS areas.	set the *Connection Type* to *Dynamic*.
the NE is to be managed via a gateway NE using long addressing. Note: This introduces IS-IS clustering. The routing is static. If the gateway network element fails, no alternative route is sought to the NE.	1. Set the *Connection Type* to *Static*. 2. Set *NE Connected* to *via Gateway*. 3. Set *Gateway Format* to *Ethernet*. 4. Enter the full *Gateway Ethernet Address* (12 Hex digits).
the NE is to be managed via a gateway NE using short addressing, Note: This is only possible if the gateway is an ISM. Note: This introduces IS-IS clustering. If the gateway network element fails, no alternative route is sought to the NE.	1. Set the *Connection Type* to *Static*. 2. Set *NE Connected* to *via Gateway*. 3. Set *Gateway Format* to *Short*. 4. Enter the short *Gateway Ethernet Address* (2 Hex digits).
the NE is to be managed via a Q-LAN connection, (The network element is connected on the Q-LAN of the ITM-SC.)	set the *Connection Type* to *Static* and *NE Connected* to *on LAN*.

□

Section: Creating an NE from a Pre-Provisioned NE

Overview

Purpose   All initial provisioning of the NE will be completed, and the NE will be placed into service in the network under the management of the ITM-SC.

☐

Create an NE from a Pre-Provisioned NE

When to use
This procedure should be performed after a pre-provisioned network element becomes operational and an association with the management system can be made.

Before you begin
Before completing the provisioning of a pre-provisioned network element:

- Check to verify that the network element is installed and that it has been properly pre-provisioned

- The ITM-SC must be installed and connected to the network element

- Check if the node is in an isolated state, because a node cannot be created with the ITM-SC if it is in an isolated state. This can only be checked with the ITM-CIT. If the node is isolated, then it must be created with the ITM-CIT. A node is not capable of any type of remote management if it is in the isolated state

- The management connection type setting (dynamic or static) completed during pre-provisioning cannot be changed after the NE is created. Therefore it should be checked before completing the procedure in this section.

Related information
The following procedures are related:

- Create a Pre-Provisioned NE

- Edit Pre-Provisioned NE Information

- View Pre-Provisioned NE Slot Information

- Edit Pre-Provisioned NE Slot Information

- Delete a Pre-Provisioned NE

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure

1   Select *Provisioning -> Equipment -> Create -> NE From Pre-Provisioned.*

Result:

The EMS - Create NE from Pre-Provisioned NE window appears. This window allows creation of a provisioned network element through the use of a pre-provisioned NE.

2   To select a pre-provisioned NE or to switch to another pre-provisioned NE, click the selection dialog button.

Section: Creating an NE from a
Pre-Provisioned NE
Create an NE from a Pre-Provisioned NE

Equipment Provisioning

....

3   A list of possible NEs then appears in the the *EMS - NE Selection Dialog window*. Select the desired pre-provisioned NE and click OK.

> **Result:**
>
> The EMS — Create NE from Pre-Provisioned window reappears with the information for the selected pre-provisioned NE.

....

4   Click Apply.

> **Result:**
>
> The network element is now configured.

....

5   Click Close.

> **Result:**
>
> The EMS - Create NE from Pre-Provisioned NE window disappears.
>
> E ND   OF   S TEPS

....

□

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

2 - 4 9

Section: Creating an MIB Image from an NE

Overview

....

Purpose   The purpose of creating a MIB image of the network element is to provide the management system with the configuration data of the network element.

☐

....

Lucent Technologies - Proprietary
See notice on first page

Create an MIB Image from an NE

....

When to use Creating a MIB image assumes management of a network element that is already provisioned (for example via the Craft Interface Terminal).

Before you begin Before creating a MIB image from an network element, it is assumed that:

- A check has been made to verify that the network element is installed and provisioned, so that the MIB of the network element contains the correct configuration data

- The ITM-SC is installed and connected to the network element

- The network element name, location, NSAP address, and the type of management connection are known

- Check if the node is in an isolated state, because a node cannot be created with the ITM-SC if it is in an isolated state. This can only be checked with the ITM-CIT. If the node is isolated, then it must be created with the ITM-CIT. A node is not capable of any type of remote management if it is in the isolated state

- The management connection type setting (dynamic or static) cannot be changed after creating the MIB image, therefore it must be correct.

Related information The following procedures and information are related:

- Provision an NE from a Template

- Create an NE from a Pre-Provisioned NE

- View NE Slot Information

- View Card Inventory

- Edit NE Information

- Edit NE Slot Information

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure ....

1 Select *Provisioning -> Equipment -> Create -> MIB Image from NE*.

> **Result:**
>
> The EMS - Create MIB Image from NE window appears. This window allows creation of an image of a network element MIB in the ITM-SC database.

....

2 Set the *NE Type* to the correct network element type.

....

....

3   Enter the *NE Name*, and if desired, click in the *ITM-NM Style* box.

Important! If the network element is managed by the ITM-NM, select the *ITM-NM Style* box. If this box is selected, then the name format can fail at two levels. It may be completely ITM-NM incompatible, or it may be compatible but not the preferred format. See the parameters section for a complete explanation of how to choose an ITM-NM compatible name.

Result:

The network element name appears in the field *NE Name*.

....

4   Enter the information in *Address to Connect to NE*.

Result:

The NSAP address of the network element is entered.

....

5   Enter the *Initial Management Connection* fields and click Apply.

Result:

The network element is selected and the MIB image of the network element is created.

....

6   Click Close

Result:

The EMS - Create MIB Image from NE window disappears.

E ND OF S TEPS
....

□

....

Lucent Technologies - Proprietary   365-312–521
          See notice on first page   Issue a, June 2001

Parameters for Creating an MIB Image from an NE

NE name The network element's name is listed. The name must be unique across management domains. If the NE is not managed by the ITM-NM, then the name may be up to 20 characters in length. If the NE will be managed by the ITM-NM, then the name must be 3 to 10 characters long with the last three characters a slash and two digits. Only *A-Z, 0-9, _, /,* and - are permitted for network elements managed by the ITM-NM. An example of an ITM-NM compatible name is LONDON/02.

NE location The location of the network element is given. The location may have up to 20 uppercase or lowercase characters.

Address to connect to NE The address of the selected NE is indicated. There are various parts of the address; the table below describes these different parts and their possible values.

Field Name	Description	Possible Values
NSAP Format	The format of the NSAP address.	The default value is *Fixed 20 Byte*.
Area	Indicates the area to which an NE belongs.	*Area ID* for fixed 20 byte and fixed 10 byte NSAP format: 4 hexadecimal digits (2 bytes). *Area Address* for flexible NSAP format: 2 - 26 hexadecimal digits (1-13 bytes).
SID Entry Format	The format of the NE address.	*SID*: System Identifier. *Short*: Not applicable.
NE SID	Identifies the NE.	12 hexadecimal digits (6 bytes).

Initial management connection Like the address, the initial management connection has several different parts. These are described in the table below. Note that the fields NE Connected, Gateway Format and Gateway Ethernet Address are only valid if the connection type is *Static*. When connection type

---

Section: Creating an MIB Image from an
NE
Parameters for Creating an MIB Image from
an NE

Equipment Provisioning

is set to *Dynamic* these fields are grayed out.

Field Name	Description	Possible Values
Connection Type	Controls network management data routing.	*Dynamic*: Management data is routed dynamically by the network using ES-IS/IS-IS protocols. *Static*: The management data route is forced. The management system uses a user-defined network element (Ethernet) address to select one Intermediate System (IS) via which the ITM-SC communicates with a node.
NE Connected	Determines how the NE is connected.	*via Gateway*: The network element is connected via a gateway node through which it is managed by the ITM-SC. *on LAN*: The ITM-SC manages the network element directly through a Q-LAN connection.
Gateway Format	Determines the format of the gateway via which this NE is managed.	*Ethernet* (12 Hexadecimal digits) or *Short* (2 Hexadecimal digits): only if the gateway is an ISM.
Gateway Ethernet Address	Address of the gateway via which this NE is managed.	Address format depends on setting of *Gateway Format* field.

Management connection options

There are several ways in which the management connection can be provisioned. Use the table below to complete the *Initial Management Connection* parameter and thus set the desired management connection.

If...	then...
dynamic routing is to be used, Note: This is preferable when using IS-IS areas.	set the *Connection Type* to *Dynamic*.

Section: Creating an MIB Image from an
NE
Parameters for Creating an MIB Image from
an NE

Equipment Provisioning

If...	then...
the NE is to be managed via a gateway NE using long addressing, Note: This introduces IS-IS clustering. The routing is static. If the gateway network element fails, no alternative route is sought to the NE.	1. Set the *Connection Type* to *Static*. 2. Set *NE Connected* to *via Gateway*. 3. Set *Gateway Format* to *Ethernet*. 4. Enter the full *Gateway Ethernet Address* (12 Hex digits).
the NE is to be managed via a gateway NE using short addressing, Note: This is only possible if the gateway is an ISM. Note:This introduces IS-IS clustering. If the gateway network element fails, no alternative route is sought to the NE.	1. Set the *Connection Type* to *Static*. 2. Set *NE Connected* to *via Gateway*. 3. Set *Gateway Format* to *Short*. 4. Enter the short *Gateway Ethernet Address* (2 Hex digits).
the NE is to be managed via a Q-LAN connection, (The network element is connected on the Q-LAN of the ITM-SC.)	set the *Connection Type* to *Static* and *NE Connected* to *on LAN*.

□

Section: Viewing NE Slot Information

Overview

Purpose Use this procedure to view how the slots of a provisioned network element are configured.

☐

Lucent Technologies - Proprietary
See notice on first page

View NE Slot Information

....

When to use	When additional units are to be added or units are to be changed, it is useful to have a complete overview of the network element's slots.

Before you begin Before viewing the network element slot configuration it is assumed that:

- The management system is installed and connected to the network element

- The name and type of the network element are known.

Related information The following procedures and information are related:

- Create an MIB image from an NE

- Modify Subrack Slots

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure

....

1 Select *Provisioning -> Equipment -> NE Card Inventory*.

> **Result:**
>
> The EMS - Provisioned NE Card Inventory window is displayed.

....

2 To select an NE or to switch to another NE, click the selection dialog button.

....

3 To view more detailed information for a particular slot, select the slot and click Details.

> **Result:**
>
> The *EMS - Provisioned NE Slot Information* window is displayed. This window shows all detailed information of the selected slot.

....

4 Click Close.

> **Result:**
>
> The *EMS - Provisioned NE Card Inventory* window disappears.

ᴇɴᴅ ᴏꜰ Sᴛᴇᴘs

....

◻

Parameters for Viewing NE Slot Information

....

Provisioned NE	Indicates the name of the provisioned NE.
NE type	The type of the selected NE is given.
Subrack	Displays the subrack type for the selected NE.
Slot	The slot position is given here.
Expected Item code	The special alphanumeric code associated with the provisioned unit is displayed.
Actual item code	The special alphanumeric code associated with the actual unit present is displayed.
Unit type	The type of unit provisioned in the listed slot is shown.
Slot state	Displays the status of the listed slot. The different slot states are given in the table below.

Slot State	Description
Assigned	Slot is assigned.
Unassigned	Slot is unassigned.
Auto	Slot is provisioned but waiting for unit. Once the provisioned unit is present, the slot state will automatically change to *Assigned*.

Interchangeability marker	This is an identification mark retrievable from any hardware component in the system. This marker indicates the interchangability among circuit packs. A circuit pack can be replaced by another pack that has the same *Item Code* and the same or a subsequent *Interchangeability Marker*.
Com code	Indicates the code identifying the component.
Hardware serial number	The serial number of the displayed hardware component.
Equipment alarm status	The equipment alarm status of the displayed unit. Possible values are *Not Alarmed*, *Prompt*, *Deferred*, and *Info*.

....

Transmission alarm status The transmission alarm status of the displayed unit. This is grayed out for units not involved in transmission. Possible values are *Not Alarmed*, *Prompt*, *Deferred*, and *Info*.

□

Section: Viewing Card Inventory

Overview

Purpose   This procedure gives an overview of the network elements in which
equipment with a specific Item Code is provisioned.

☐

Lucent Technologies - Proprietary
See notice on first page

View Card Inventory

....

When to use   Follow this procedure to see where in the network a specific unit is provisioned.

Before you begin   Before viewing the card inventory it is assumed that:

- The management system is installed and connected to the NEs

- The correct item code of the unit to be viewed is known.

Related information   Related procedure and information include:

- Modify Subrack Slots

- View NE Slot Information

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure   ....

1   Select *Provisioning -> Equipment -> Card Inventory*.

Result:

The EMS - Card Inventory window is displayed.

....

2   To select a unit or to switch to another unit, click the selection dialog button. Select the NE Type and a list of possible units appears in the *EMS- Card Selection Dialog* window. Select the desired unit and click OK.

Result:

The EMS - Card Inventory window reappears with the information for the selected unit.

....

3   Click Close.

Result:

The EMS - Card Inventory window disappears.

E N D   O F   S T E P S

□

....

365-312–521   **Lucent Technologies - Proprietary**   2 - 6 1
Issue a, June 2001   See notice on first page

Parameters for Viewing Card Inventory

....

Item code   The special alphanumeric code associated with the desired unit.

Physical unit type   The unit with the selected item code is displayed.

Node name   Indicates the name of the NE containing the unit with the selected item code.

NE type   The type of the NE is given.

Subrack   Displays the subrack type for the NE.

Slot   The slot position is given here.

Protection function   Displays the protection status of the listed unit. The different possible values and their meanings are given in the following table.

Protection Function	Description
Worker	This unit is a working unit in an equipment protection group.
Protection	This unit is a protection unit.
Not Protected	This unit is not protected
Not Applicable	Protection is not applicable for this unit.

Slot state   Displays the status of the listed slot. The different slot states are given in the table below.

Slot State	Description
Assigned	Slot is assigned.
Unassigned	Slot is unassigned.
Auto	Slot is provisioned but waiting for unit. Once the provisioned unit is present, the slot state will automatically change to *Assigned*.

Hardware actual item code   The item code for the unit actually occupying the particular slot.

☐

....

Section: Editing General NE Information

2 - 6 3

Overview

Purpose The purpose of this procedure to change general network element
Information concerning the location, address, and DCN.

☐

Lucent Technologies - Proprietary
See notice on first page

Edit General NE Information

....

When to use   When any of the following must be changed, perform the editing
procedure in this section.

- The network element location

- The NSAP address of the network element (Area Code or SID)

- The Management Connection settings

- The IS-IS Level settings

- The Designated Router Priority

- The Additional Manual Area Addresses.

Before you begin   Before editing provisioned network element information detremine the
following:

- The network element name

- Location and the NSAP address

- The type of management connection

- The IS-IS level parameter,

- The designated router priority and

- The additional manual area addresses

- If the Association State has changed after the Edit screen was
  displayed, the changes are discarded and an error message is
  displayed

- When the IS-IS parameters are changed this may cause the
  network element to restart, resulting in a temporary loss of
  association

- If the network element is participating in a GR scheme this may
  cause an automatic protection switch. A warning message is
  displayed

- If the values of the IS-IS parameters are incorrect this may result
  in many network elements becoming unmanageable. A warning
  message is displayed

- If the LAN IS-IS level is set to 'None', then a network element
  cluster that is not directly connected to the ITM-SC Q-LAN may
  become unmanageable when 'None' is chosen for the cluster
  gateway. 'None' also prevents traffic from one cluster from being
  routed to another cluster over the Q-LAN

- The value of the designated router priority is composed in a
  specialized plan, so do not change it unless this plan is available

....

- If an additional Manual Area Address is provisioned when the Computed Area Address Table (CAAT) is full, this may cause a loss of entries in the CAAT which results in a loss of association

- If the NSAP format or the SID are changed, then management will be lost so long as these parameters are different than the ITM-SC settings

Related information   The following procedures are related:

- Create an NE from a Template

- Create an NE from a Pre-Provisioned NE

- Create an MIB Image from an NE

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure

....

1   Select *Provisioning -> Equipment -> NE Information*.

Result:

The EMS - Provisioned NE Information window appears.

....

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

Result:

The EMS - Provisioned NE Information window reappears with the information for the selected NE.

....

3   Click Edit.

Result:

The EMS - Edit Provisioned NE Information window appears.

....

4   Modify, as necessary, the displayed information for *NE Location*, *IS-IS Level of NE*, *LAN IS-IS Level*, *NSAP Format*, *SID*, and the *Designated Router Priority*.

Result:

The correct information appears in the appropriate fields.

....

5   Click OK.

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

2 - 6 5

Result:

A window appears asking for confirmation of the changes.

....

6 Click Yes.

Result:

The changes for the network element are now confirmed, and the window EMS - Edit Provisioned NE Information disappears.

....

7 Click Close.

Result:

The EMS - Provisioned NE Information window disappears.

E ND OF S TEPS
....

☐

....

2 - 6 6

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

Parameters for Editing General NE Information

....

NE name   The network element's name is listed. The name must be unique
across management domains. If the NE is not managed by the
ITM-NM, then the name may be up to 20 characters in length. If the
NE will be managed by the ITM-NM, then the name must be 3 to 10
characters long with the last three characters a slash and two digits.
Only *A-Z, 0-9,* _, /, and - are permitted for network elements managed
by the ITM-NM. An example of an ITM-NM compatible name is
LONDON/02.

NE location   The location of the network element is given. The location may have
up to 20 uppercase or lowercase characters.

Address to connect to NE   The address of the selected NE is indicated. There are various parts of
the address; the table below describes these different parts and their
possible values.

Field Name	Description	Possible Values
NSAP Format	The format of the NSAP address.	The default value is *Fixed 20 Byte*.
Area	Indicates the area to which an NE belongs.	*Area ID* for fixed 20 byte and fixed 10 byte NSAP format: 4 hexadecimal digits (2 bytes). *Area Address* for flexible NSAP format: 2 - 26 hexadecimal digits (1-13 bytes).
SID Entry Format	The format of the NE address.	*SID*: System Identifier. *Short*: Not applicable.
NE SID	Identifies the NE.	12 hexadecimal digits (6 bytes).

Initial management connection   Like the address, the initial management connection has several
different parts. These are described in the table below. Note that the
fields NE Connected, Gateway Format and Gateway Ethernet Address
are only valid if the connection type is *Static*. When connection type

....

is set to *Dynamic* these fields are grayed out.

Field Name	Description	Possible Values
Connection Type	Controls network management data routing.	*Dynamic*: Management data is routed dynamically by the network using ES-IS/IS-IS protocols. *Static*: The management data route is forced. The management system uses a user-defined network element (Ethernet) address to select one Intermediate System (IS) via which the ITM-SC communicates with a node.
NE Connected	Determines how the NE is connected.	*via Gateway*: The network element is connected via a gateway node through which it is managed by the ITM-SC. *on LAN*: The ITM-SC manages the network element directly through a Q-LAN connection.
Gateway Format	Determines the format of the gateway via which this NE is managed.	*Ethernet* (12 Hexadecimal digits) or *Short* (2 Hexadecimal digits): only if the gateway is an ISM.
Gateway Ethernet Address	Address of the gateway via which this NE is managed.	Address format depends on setting of *Gateway Format* field.

Designated router priority

The designated router priority is a value which indicates the priority of the designated router connected to the Q-LAN. A higher number has priority over a lower one. Valid values are *0-127*. The default value is *64*. This value is composed in a specialized network plan, so it should not be changed unless this plan is available.

Designated Router Priority is grayed out when the association state between the ITM-SC and the NE is *Released*.

Additional manual area addresses

This is a synonymous area address associated with an Intermediate System. Together with the SID and SEL fields, it is a valid synonymous NSAP address for an Intermediate System. The manual area address can be used to connect subnetworks to the OSI-DCN with nodes having a different NSAP format than the formats supported.

Additional Manual Area Address is grayed out when the association state between the ITM-SC and the NE is released.

IS-IS functionality of NE

This field changes the IS-IS level of the network element. The *IS-IS Functionality of NE* field is grayed out when the association state between the ITM-SC and the NE is released.

The possible IS-IS level values for an NE are described in the table below

IS-IS Functionality of NE	Description
Level 1	Provides inter connectivity between network elements in the same area.
Level 1+2	Provides inter connectivity between areas and between network elements in the same area.
Level 1+2 Area Repair Access	Provides inter connectivity between areas and between network elements in the same area and enables Area Partition Repair Access.

IS-IS level on LAN

The LAN IS-IS level field changes the IS-IS level on the Q-LAN port. The LAN IS-IS level field is grayed out when the association state between the ITM-SC and the NE is released.

Important! Note: *Level 2* is grayed out if the IS-IS Level of NE is set to *Level 1*.

The possible LAN IS-IS level values are described in the table below:

LAN IS-IS Level	Description
Follow NE IS-IS	The LAN IS-IS level is the same as the level of the network element provisioned in IS-IS Level of NE. Under normal circumstances the network element should use this value.

LAN IS-IS Level	Description
Level 2	The LAN IS-IS level is set to level 2. This value should only be used temporarily during upgrade activities.
None	Disables the Q-LAN port of an network element for the IS-IS protocol (NO-IS-IS). This value is used in combination with static routing to the management system.

□

Section: Editing NE Slot Information

2 - 71

Overview

....

Purpose   The slot information for the NE is edited.

☐

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

2 - 7 1

Edit NE Slot Information

When to use   Use this procedure to modify subrack slots of provisioned network elements when:

- Assigning new units to the provisioned network element

- Changing the slot occupation of the network element subrack

- Changing the slot state of a unit.

Before you begin   Before editing the NE slot information determine the following:

- Before modifying a provisioned network element be certain that information concerning the units' slot assignments is known

- If it is not possible to select the desired unit from the list of units contact the system administrator

- For the *WaveStar*® AM 1, the only slot which may be edited is TS2. The slot information can also be accessed by selecting *Provisioning -> Equipment -> Slot*. When making this selection, begin with step 4 of the following procedure.

Related information   The following procedures and information are related:

- View the NE Slot Information

- View the Card Inventory

- Edit the Card Type Inventor

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure

1   Select *Provisioning -> Equipment -> Subrack*.

> **Result:**
>
> The EMS - Provisioned NE Subrack Information window appears. This window graphically displays the contents of the subrack, with the subrack layout corresponding to the selected network element.

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

> **Result:**
>
> The EMS - Provisioned NE Subrack Information window reappears with the information for the selected NE.

....

3 On the subrack layout of the *WaveStar*® AM 1, click on the slot *TS2*.

Result:

The EMS - Provisioned NE Slot Information window appears with information concerning the selected slot.

....

4 Click Edit.

Result:

The window EMS - Edit Provisioned NE Slot Information appears.

....

5 Select the appropriate *Slot State*.

Important! If the *Slot State* is *Unassigned*, then no selection will be possible form the list *Cards*.

....

6 Select the proper unit from those listed under *Units List*.

Important! Verify that the *Expected Unit Item Code* of the selected unit corresponds with that of the actual unit. If the values do not match, or if it is not possible to select the required unit from the list of cards contact the system administrator.

Result:

The proper unit and the appropriate slot state are selected.

....

7 Click OK.

Result:

The slot is modified, and the EMS - Edit Provisioned NE Slot Information window disappears.

....

8 Click Close in the EMS - Provisioned NE Slot Information window, and then click Close in the EMS - Provisioned NE Subrack Information window.

Result:

The windows disappear.

E N D   O F   S T E P S

□

Parameters for Editing NE Slot Information

Provisioned NE	The name of the selected NE is displayed.
NE type	The type of the selected NE is shown.
Slot	The slot position is given here.
Expected item code	The special alphanumeric code associated with the provisioned unit is displayed.
Actual item code	The special alphanumeric code associated with the actual unit present is displayed.
Unit type	The type of unit provisioned in the listed slot is shown.
Slot state	Displays the status of the listed slot. The different slot states are given in the table below.

Slot State	Description
Assigned	Slot is assigned.
Unassigned	Slot is unassigned.
Auto	Slot is provisioned but waiting for unit. Once the provisioned unit is present, the slot state will automatically change to *Assigned*.

Interchangeability marker	This is an identification mark retrievable from any hardware component in the system. This marker indicates the interchangability among circuit packs. A circuit pack can be replaced by another pack that has the same *Item Code* and the same or a subsequent *Interchangeability Marker*.
Com code	Indicates the code identifying the component.
Hardware serial number	The serial number of the displayed hardware component.
Equipment alarm status	The equipment alarm status of the displayed unit. Possible values are *Not Alarmed*, *Prompt*, *Deferred*, and *Info*.
Transmission alarm status	The transmission alarm status of the displayed unit. This is grayed out for units not involved in transmission. Possible values are *Not Alarmed*, *Prompt*, *Deferred*, and *Info*.

☐

Section: Viewing and Editing MDI Information

2 - 75

Overview

Purpose   Use this procedure to view and edit MDI names and statuses.

☐

View and Edit MDI Information

....

When to use   Whenever Miscellaneous Discrete Inputs are a part of the network operation, names must be given to MDIs to allow for identification when an alarm is raised. Should a discrete be changed, then the name must also be changed.

Before you begin   The following precautions and prerequisites should be noted.

- The MDO name can be no longer than 26 characters

- There are four MDIs that may be provisioned for an NE

- The user should select names for the Miscellaneous Discrete Outputs that are both well-chosen and unique

- The *WaveStar*® AM 1contains 4 MDIs

- Also, the miscellaneous discrete input must be connected to the NE.

Related information   The procedure "View and Edit MDO Information" is related.

....

1   Select *Provisioning -> Equipment -> MDI*.

        Result:

        The EMS - Provisioned NE MDI Information window appears.

....

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

        Result:

        The EMS - Provisioned NE MDI Information window reappears with the information for the selected NE.

....

3   Select an MDI from the list under *ID* and *Name*.

        Result:

        The appropriate MDI is selected.

....

4   Click Edit.

....

Result:

The EMS - Edit Provisioned NE MDI Information window is displayed. The current name of the selected MDI is displayed on the name line of this window.

....

5 Enter the *MDI Name* (max. 26 characters) and click OK

Result:

The new MDI name is entered and the EMS - Edit Provisioned NE MDI Information window is closed.

....

6 Click Close.

Result:

The EMS - Provisioned NE MDI Information window disappears.

E N D   O F   S T E P S

□

Parameters for Viewing and Editing MDI Information

....

Provisioned NE   The name of the selected NE is displayed.

NE type   The type of the selected NE is shown.

Id   The number associated with the MDI.

Name   Indicates the name of the MDI.

☐

Lucent Technologies - Proprietary
See notice on first page

Section: Viewing and Editing MDO Information

Overview

Purpose   Use this procedure to view and edit MDO names and statuses.

□

View and Edit MDO Information

....

When to use   Whenever Miscellaneous Discrete Outputs are a part of the network operation, names must be given to MDOs to allow for identification when an alarm is raised. Should a discrete be changed, then the name must also be changed.

Before you begin   The following precautions and prerequisites should be noted.

- The MDO name can be no longer than 26 characters

- The user should select names for the Miscellaneous Discrete Outputs that are both well-chosen and unique

- The *WaveStar*® AM 1 contains 4 MDOs

- The miscellaneous discrete output must be connected to the NE.

Related information   The procedure "View and Edit MDI Information" is related.

Procedure   ....

1   Select *Provisioning -> Equipment -> MDO*.

        Result:

        The EMS - Provisioned NE MDO Information window appears.

....

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

        Result:

        The EMS - Provisioned NE MDO Information window reappears with the information for the selected NE.

....

3   Select an MDO from the list under *ID* and *Name*.

        Result:

        The appropriate MDO is selected.

....

4   Click Edit.

        Result:

        The EMS - Edit Provisioned NE MDO Information window is displayed. The current name of the selected MDI is displayed on the name line of this window.

....

....

5   Enter or change the *MDO Name* (max. 26 characters).

....

6   Set the Status of the MDO to *MDO Active* (closed loop) or *MDO
Inactive* (open loop).

Result:

The status field is defined.

....

7   Click OK.

Result:

The new MDO name is entered, and the EMS - Edit Provisioned
NE MDO Information window is closed.

....

8   Click Close.

Result:

The EMS - Provisioned NE MDO Information window
disappears.

E ND OF S TEPS

....

□

....

Parameters for Viewing and Editing MDO Information

Provisioned NE The name of the selected NE is displayed.

NE type The type of the selected NE is shown.

Id The number associated with the MDO.

Name Indicates the name of the MDO.

MDO status Indicates the status of the MDO. The possible values are *MDO Active* and *MDO Inactive*.

□

Section: Viewing Optical Information

2 - 83

Overview

Purpose   This procedure should be used to view various optical parameters related to the STM-1 line ports and the STM-4 line ports of the *WaveStar®* AM 1.

☐

Lucent Technologies - Proprietary
See notice on first page

View Optical Information

When to use	Key optical parameters can be inspected, and by so doing more pro-active maintenance may be possible.
Before you begin	The user should possess information concerning the proper values for the various optical parameters given the NE's provisioned optical components.
Related information	The following procedure and information are related:

- The procedures port provisioning in the chapter ″Transmission Provisioning.

- Section Equipment Provisioning Concepts in chapter Concepts.

Procedure

1   Select Provisioning -> Equipment -> Port.

   Result:

   The *EMS - Provisioned NE Port Information* window appears.

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

   Result:

   The EMS - Provisioned NE Port Information window reappears with the information for the selected NE.

3   Click Optics.

   Result:

   The window *EMS - NE Optics Information* appears. Optical information for the selected port is displayed here.

4   Click Close.

   Result:

   The window *EMS - NE Optics Information* disappears.

5   Click Close.

Result:

The window *EMS - Provisioned NE Port Information* disappears.

E ND   OF   S TEPS

□

Parameters for Viewing Optical Information

....

Selection   Displays the selected port.

Port mode   The *Port Mode* controls whether input signals should be monitored or not. The following values can be set.

Value	Description
Monitored	The port is configured to provide service and the port signal is monitored.
Auto	The port is not yet configured to provide service. Use this mode when the signal source in the remote NE is not operational yet. As soon as the NE establishes the continuous presence of a fault-free signal for a certain period (*Port Mode Time*), the port automatically changes to *Monitored*.
Not Monitored	The port is not configured to monitor the port signal on the port. No alarms are generated for this port. If there still is a signal present on a not monitored port it is possible to receive a Not Expected Input Signal (NES) alarm.

Port mode time   The time in minutes during which a fault-free signal must be received continuously before the *Port Mode* switches from *Auto* to *Monitored*. The default is 10 minutes.

The *Port Mode Time* can be set between 0 and 30 minutes while the default is 10 minutes.

Optical wavelength   Displays the optical wavelength at the selected port. If this cannot be determined, *Unknown* will be shown.

STM level   Indicates the STM level of the signal at the selected port. For the *WaveStar*® AM 1, the only possible values are *STM-1* and *STM-4*.

☐

....

Lucent Technologies - Proprietary

Section: Deleting a Provisioned NE

2 - 87

Overview

....

Purpose   The purpose of this procedure is to remove a provisioned network
element from the management system. In other words, the MIB image
of the selected NE is removed from the management system database.

☐

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

2 - 8 7

Delete a Provisioned NE

When to use

Use this procedure when:

- The NE will no longer be managed with this management system
- Removing a MIB image from a failed "Create an MIB Image" operation.

Before you begin

Before deleting a provisioned NE determine the following:

- The name of the NE to be deleted must be known
- After deleting the MIB image there is no longer an association with the management system. It is no longer possible manage the network element with the management system. To get the association back, a MIB image must be created from the network element.

Related information

The following procedures are related:

- Create an NE from a Pre-Provisioned NE
- Create an NE from a Template
- Create an MIB Image from an NE

Procedure

1 Select *Provisioning -> Equipment -> Delete MIB Image*.

   Result:

   The EMS - Delete MIB Image window appears.

2 To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

   Result:

   The EMS - Delete MIB Image window is updated with the information from the selected NE.

3 Click Apply.

   Result:

   A window appears asking for confirmation of deletion.

4 Click Yes in the confirmation window.

Result:

The MIB image is now deleted.

....

5 Click Close.

Result:

The EMS - Delete Provisioned NE window disappears.

E ND OF S TEPS

....

☐

3 Topology management

Overview

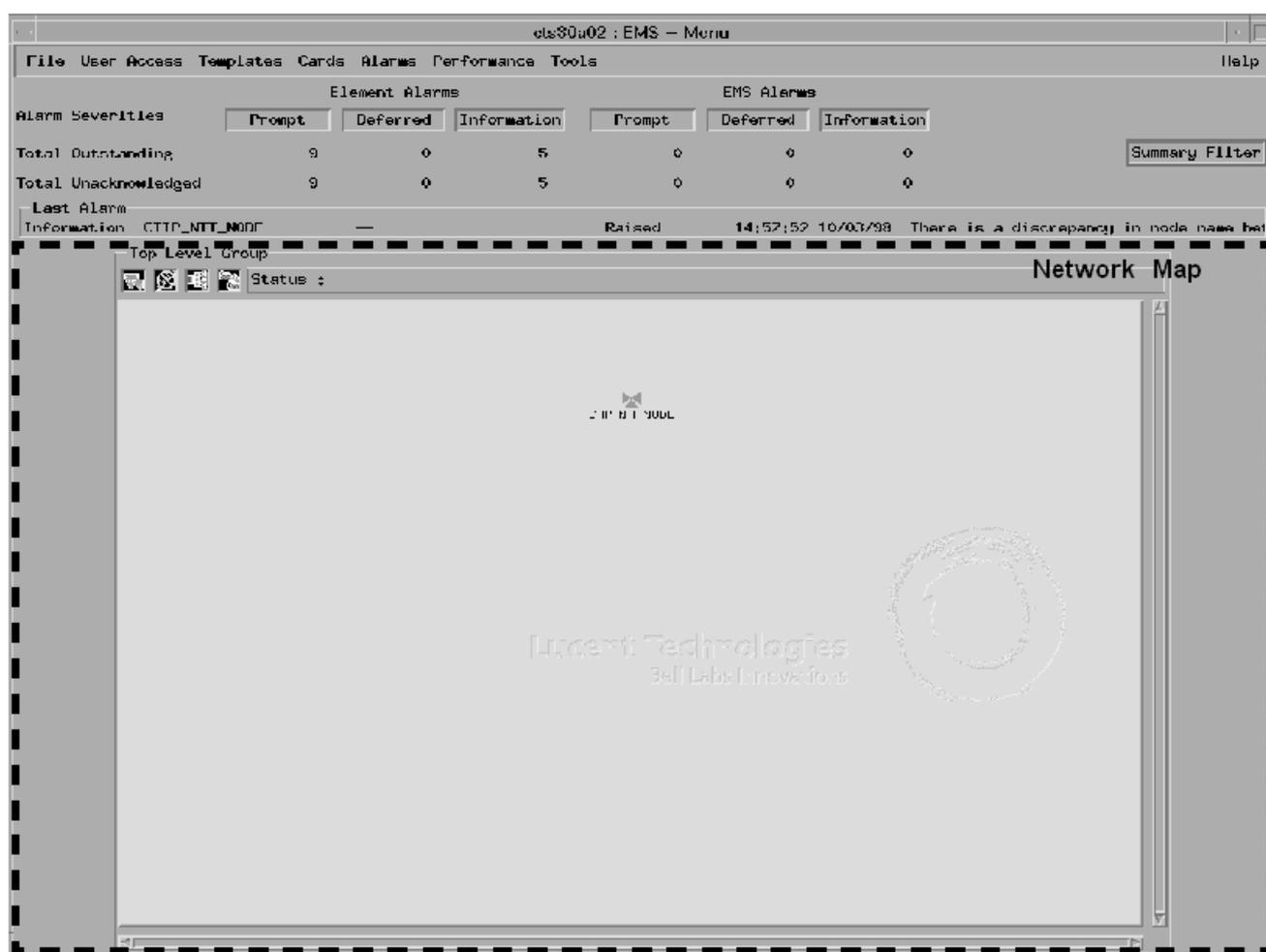|	
Purpose	Using the ITM-SC interface provides information on how to use the Integrated Transport Management-Subnetwork Controller.
Objectives	To customize or change network map settings of the ITM-SC Interface according to the users needs.
Outcome	Be able to work with the ITM-SC Interface.
Intended Use	N.A..

□

Lucent Technologies - Proprietary
See notice on first page

Section: Network Map

Overview

....

Purpose   After activating Network Element Management from the Management Module, the Subnetwork Map window is displayed. This window is the main window for managing all network elements within the subnetwork and gives direct information about network elements, their status and Map groups.

Example of Network Map   An example of the Network Map is shown below.

....

Network Map Icons   The Network Map icons are described in the table below:

Icon	Name	Description
	Up	To go up a group from the current group (unless at top-level already). Changes the display to show the group.
	Con-nec-tions	This button will toggle the display of the RR connectivity lines. Note: only applicable for Radio Relay NEs.
	Display groups	Toggles the display between the contents of groups and the group icon. This also can be done by pressing control (CTRL) and selecting the Group or NE.
	Modify groups	Used to modify the grouping of network elements. This also can be done by selecting and NE or Group together with the right mouse button. Select from the pop up menu Modify Map Grouping of Nodes

Network Element Icons   The following icons represent the different types of network elements:

Group Icon   The following icon represents a group of nodes:

NE Status The color of each icon on the window represents the current status of the network element or connection. If two conditions exist for the same network element or connection, the network element icon or line is colored to indicate the condition with the highest severity. All alarms of the entire subnetwork are shown in one window; this is sometimes called the Alarm Map.

Colors of Alarms The list below describes alarm colors and severity or status.

Color	Meaning
White	The NE or Connection is currently selected.
Grey	No current 'associations' exist with the NE or Connection. An association exist when there is communication between an ITM-SC and an NE.
Red	A 'Prompt Alarm' is currently on the NE or Connection.
Yellow	A 'Deferred Alarm' is currently on the NE or Connection.
Orange	An 'Information Alarm' is currently on the NE or Connection.
Green	No alarms currently on the NE or Connection.
Blue	The node has been pre-provisioned.

Additional Alarm Information Additional information about an alarm can be given by the flashing square or "outlined" icon:

Action	Description
Flashing square	The alarm is not acknowledged yet. This is valid to each NE type but not for connections.
Outline	The network element is protected under Geographic Redundancy by this ITM-SC, but is not managed currently by this ITM-SC. This ITM-SC is not associated with this network element, so the outline is shown in grey. Valid for each NE type.
Short Beep	Indicates the arrival of a new alarm.

Specific Actions on the Network Map Information about network elements or connections can easily be obtained using the Network Map. The alarms display can be filtered in such a way that only alarms of the selected network element or connection are shown.

To ...	Do this ...

Select an NE or group of NEs	Click once on the specific item.
Select multiple NEs	Press shift and draw using the cursor to make a rectangle over all NEs to select. This can also be done by pressing Ctrl and clicking with left mouse button on the desire NEs
Clear all selections	Click once on the Network Map outside any node or group.
Retrieve the alarm list of a NE or connection	Double click left-button on the specific NE or connection.
Drag selected nodes/groups	select nodes/groups and hold middle mouse button and drag to new position.

Pop-up Menus   The following pop-up menus can be accessed via selecting an item using the right mouse button.

Selecting item	provides shortcut to
NE	Alarm ListShelf Display
background	Change the Groupings

Customizing the Network Map

....

Introduction   To prevent the Network Map from appearing cluttered when several network elements occupy a small space, those network elements can be grouped together into a map group which is represented by a single icon. For example network elements can be grouped in a geographical of functional way. It is possible that a map group contains another map group.

Customizing Features   In order to customize the Network Map three features are provided:

- Creating of Map Groups.

- Modifying of Map Groups.

- Placing NEs in Map Groups.

These features are described in more detail in the procedures in this section.

Icons for Customizing the Network Map   Four icons are provided to customize the Network Map. When network elements are mentioned, this is irrespective of network element type or whether the network element is associated or not. Non-associated network elements are called nodes. Within Map Groups nodes are treated in the same way as network elements.

Icon	Name	Description
	Up	To go up a group from the current group (unless at top-level already). Changes the display to show the group.
	Con-nec-tions	This button will toggle the display of the RR connectivity lines. Note: only applicable for Radio Relay NEs.
	Display groups	Toggles the display between the contents of groups and the group icon. This also can be done by pressing control (CTRL) and selecting the Group or NE.
	Modify groups	Used to modify the grouping of network elements. This also can be done by selecting a NE or Group together with the right mouse button. Select from the pop up menu Modify Map Grouping of Nodes

Moving icons   To move a node or Map Group icon, select the node/group icon and drag the icon to the new position while holding the middle mouse button.

☐

....

Creating Map Groups

Purpose   The purpose of this procedure is to group NEs in a geographical of functional way.

☐

Parameters for Creating Map Groups

Background Image File   This is the name of the background GIF filename used for the background image when the group is displayed. By default for a new group, it will be the Lucent logo file. The files available are the files in the directory:../lib/map_data. To make a new file available, the file must be placed in this directory.

New Group Name   When creating a group: this is the name of the group to be created.

When modifying a group: this is the new group name.

Old Group Name   Displays the old name of a group. This field is grayed out when creating a map group.

Parent Group Name   This is the name of the group's parent in the hierarchy.

When creating a group: specifies where in the hierarchy the group appears.

When modifying a group: provides a mechanism for moving the group to a different parent.

☐

Create Map Groups

....

When to use	Use this procedure to create a network element group and display a background image file in this Map Group.
	The background image file can display e.g. a geographical map to offer geographical navigation. The background image file must be placed in the ..../lib/map_data directory.
Before you begin	The items below gives information on tasks to perform before beginning the procedure:

- No prerequisite are needed when performing this procedure.

- No precaution are needed when performing this procedure.

Related information	The items below list other relevant information to this procedure:

- The related procedures are *Modifying Group Maps* and *Placing NE's in Map Groups*. Note that there is no correlation between Map Groups and NE Groups. Map groups only re-arrange the graphical presentation of NEs and Nodes on the Network Map.

- The related concepts are explained in the Section*: Concepts of Topology Management*.

Procedure	Follow these steps to create a network element group and apply a background image file:

....

1 Click with the `right mouse button` on Network Map (NOT on a node!) or click on the Modify groups icon.

> **Result:**
>
> When using the first option the The Network Map Background Pop-up menu appears.
>
> When using the Modify groups icon the *EMS - Map Group Create/Change* window appears. Proceed with step 3!

....

2 Select `Change the Groupings`.

> **Result:**
>
> The *EMS - Map Group Control* window appears, showing a hierarchical view of the Network map's Map Groups.

....

3 Select Create Group.

....

Result:

The *EMS - Map Group Create/Change* window appears.

....

4   Fill in *New Group Name*.

....

5   Select the *Parent Group Name* when the created Group has to be placed in a other Map Group.

....

6   Select the appropriate filename in *Background Image File* and click Apply.

Result:

A new Map Group is created and is displayed in the *EMS - Map Group Control* window. Double click on the Map Group to display the content of the Map Group with the selected background image file as background.

....

7   Click on the Close button.

Result:

The *EMS - Map Group Control* window appears. It is possible to continue to modify Map Groups.

....

8   Click the Close button in the *EMS - Map Group Control* window when the Map Groups modifications is completed.

Result:

The *EMS - Map Group Control* window disappears.

E ND OF S TEPS

....

□

....

Lucent Technologies - Proprietary

Modifying Map Groups

Purpose   The purpose of this procedure is to group NEs in a geographical of functional way.

☐

Parameters for Modifying Map Groups

Background Image File This is the name of the background GIF filename used for the background image when the group is displayed. By default for a new group, it will be the Lucent logo file. The files available are the files in the directory:../lib/map_data. To make a new file available, the file must be placed in this directory.

New Group Name When creating a group: this is the name of the group to be created.

When modifying a group: this is the new group name.

Old Group Name Displays the old name of a group. This field is grayed out when creating a map group.

Parent Group Name This is the name of the group's parent in the hierarchy.

When creating a group: specifies where in the hierarchy the group appears.

When modifying a group: provides a mechanism for moving the group to a different parent.

□

Modify Map Groups

....

When to use   Use this procedure to modify or change the arrangement or names of map groups as they are displayed on windows.

Before you begin   The items below gives information on tasks to perform before beginning the procedure:

- No prerequisite are needed when performing this procedure.

- No precaution are needed when performing this procedure.

Related information   The items below list other relevant information to this procedure:

- The related procedures are *Creating Map Groups* and *Placing NE's in Map Groups*.

- The related concepts are explained in the Section*: Concepts of Topology Management*.

Procedure   Follow these steps to modify network element groups:

....

1   Click with the `right mouse button` on Network Map (NOT on a node!) or click on the Modify groups icon.

> **Result:**
>
> When using the first option the The Network Map Background Pop-up menu appears.
>
> When using the Modify groups icon the *EMS - Map Group Create/Change* window appears. Proceed with step 3!

....

2   Select `Change the Groupings`.

> **Result:**
>
> The *EMS - Map Group Control* window appears. This window provides a hierarchical presentation of the Network map's Map Groups.

....

3   Select a Map Group.

....

4   Click the `Modify Group` button.

> **Result:**
>
> The *EMS - Map Group Create/Change* window appears.

....

....

5   Select the Map Group to modify, enter the modifications and click
Apply to activate the changes.

....

6   Click Close.

> **Result:**
>
> The *EMS - Map Group Control* window appears.

....

7   Click Close in the *EMS - Map Group Control* window.

> **Result:**
>
> The changes made are activated and accessible and the Map
> Groups are updated with the changes to complete the procedure.

E N D   O F   S T E P S
....

□

Placing NEs in Map Groups

Purpose   The purpose of this procedure is to group NEs in a geographical of functional way.

☐

Place NEs in Map Groups

When to use	Use this procedure to (re)arrange the network elements in the created map groups. As result network elements are placed in the appropriate Map Group.

Before you begin   The items below gives information on tasks to perform before beginning the procedure:

- No prerequisite are needed when performing this procedure.

- No precaution are needed when performing this procedure.

Related information   The items below list other relevant information to this procedure:

- The related procedures are *Modifying Group Maps* and *Creating Map Groups*.

- The related concepts are explained in the Section*: Concepts of Topology Management*.

Procedure   Follow these steps to rearrange network elements in network element groups:

1   Click with the `right mouse button` on Network Map (NOT on a node!) or click on the Modify groups icon.

> **Result:**
>
> When using the first option the The Network Map Background Pop-up menu appears.
>
> When using the Modify groups icon the *EMS - Map Group Create/Change* window appears. Proceed with step 3!

2   Select `Change the Groupings`.

> **Result:**
>
> The *EMS - Map Group Control* window appears. This window provides a hierarchical view of the network map's Map Groups. All NEs, whether or not a member of a Map group, are shown.

3   To add an NE to a group, use the mouse to drag the node to the hierarchy display. Select an NE with the left mouse button, and drag it with the middle mouse button to the group. Release the button.

Lucent Technologies - Proprietary

....

4 When an NE is difficult to find, select the NE number or name in the *Name of Node to Locate* field.

Result:

The requested node is highlighted.

....

5 Continue to move the nodes until they are arranged within the Map Groups as wanted.

....

6 Click Cl ose.

Result:

Modifications are activated for the Map groups and the procedure is completed.

E N D   O F   S T E P S

4 Provisioning Timing

Overview

Purpose The purpose of provisioning timing is to synchronize the network element with a timing reference and to distribute this timing reference to SDH and non-SDH equipment.

Outcome The outcome of provisioning timing is a synchronized network element working according to the timing network plan.

Intended use This chapter consists of the procedures that are necessary to provision timing and the explanation of the different parameters that are to be used.

☐

Section: Provision Timing Sources.

Overview

Purpose The purpose of provisioning timing sources is to provide a timing source with a defined quality level (QL), and to assign a valid physical timing reference to the logical timing source used to synchronize the network element.

□

Provision Timing Sources

....

When to perform   In the following two cases this procedure must be performed:

- As the first procedure to complete when provisioning the network element timing.

- If the network element system timing will operate in the locked mode.

Before you begin   Before starting this procedure, make sure that:

- A network element synchronization plan must be available.

Pay attention to the following items:

- An MSP transmission protection pair is considered as a single timing reference. Thus in the case of MSP on the lines, only one line port is available as a timing reference.

- Incorrect settings for worker/protection references and quality level-provisioning can cause a timing loop.

Related information   Related procedures are:

- ″Provision System Timing″

- ″Provision Output Port Timing″

- ″Provision MSP.″

Procedure   To edit the provisioned timing source information follow this procedure:

....

1   Select *Provisioning --> Synchronization -->AM 1/AM 1 Plus Synchronization --> Timing Source*

> **Result:**
>
> The EMS-Provisioned NE Timing Sources Information window appears.

....

2   To select a network element or to switch to another network element, click the Selection Dialog Button. A list of possible network elements then appears in the *EMS- NE Timing Source Selection Dialog* window. Select the desired network element and timing source and click OK.

> **Result:**
>
> The EMS - Provisioned NE Timing Sources Information window is updated with the information of the selected timing source in the selected network element.

....

....

3 Click Edit.

> ### Result:
>
> The EMS-Edit Provisioned NE Timing Source Information window appears.

....

4 Select a *Working Reference* from the list and, if desired, a *Protection Reference.*

You can now edit the following fields:

- *QL Provisioned*
- *Monitored*
- *Global Wait to Restore Time*
- *Switch Request*(If a *Protection Reference* is assigned)
- *Clear Wait To Restore State.*

Important! A *Protection Reference* can only be assigned if the optional STM-1 tributary card is present.

....

5 Click OK to confirm the settings.

> ### Result:
>
> The *EMS-Edit Provisioned NE Timing Source Information* window disappears and the *EMS-Provisioned NE Timing Sources Information* window is updated with the latest settings.

....

6 Click Close.

> ### Result:
>
> The *Provisioned NE Timing Source Information* window disappears.

E N D   O F   S T E P S

....

☐

....

Parameters to Provision Timing Sources

....

Introduction The procedure for provisioning timing sources defines the timing sources for network element synchronization.

The diagram below gives an overview of the relationship between the physical timing references and the logical timing sources. The physical timing references are indicated on the left side, the logical timing sources on the right side. Physical references can be assigned to the timing sources, therefore parameters are used. The parameters are indicated in the functional diagram. The arrows pointing towards the block indicate the parameters that can be provisioned. The arrows that point away from the block indicate read only parameters. The dotted arrows indicate that arrows apply to more references or sources.

Important! The *WaveStar*® AM 1 Plus can have an optional STM-1 tributary board present when working in the STM-4 mode. In that case some of the screens and parameters are slightly different from the default version. This is because of the possibility to then provision a protection reference.

Functional Diagram A functional diagram of the timing sources functionality
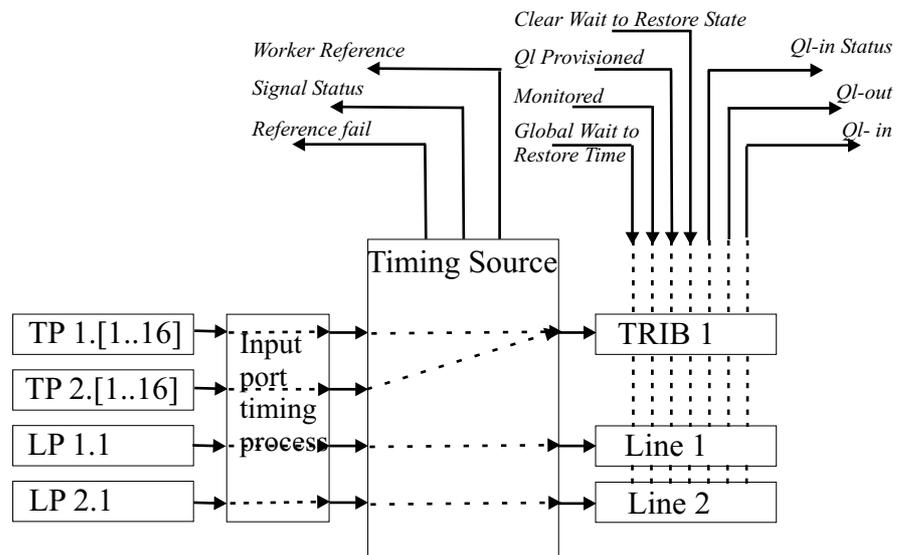
Clear Wait to Restore State *Clear Wait to Restore State* resets the wait to restore timer and the signal status will revert to normal.

Possible values of the *Clear Wait to Restore State* are *Yes* and *No.*

....

Section: Provision Timing Sources.
Parameters to Provision Timing Sources

Provisioning Timing

Global Wait to Restore Time   In case of a failure the system switches to a valid reference. When the failure is no longer present, the system switches back, after a certain waiting period (the switching is revertive). This waiting period is called the *Global Wait to Restore Time*. It can range from *0* minutes to *60* minutes. The signal status will become *Wait to Restore*.

The *Global Wait to Restore Time* setting holds for all the timing in the network element. That is, for the Timing Sources, for the System Timing, and for the Station Clock Output Timing.

Monitored   The user can enable or disable the option for monitoring a timing source. If a timing source is monitored, the timing source will forward the *Reference Fail* and *Reference Unequipped* alarms to the management system when applicable.

Monitored can have the values *Yes* or *No*.

Protection Reference   The protection ports that can be assigned to the timing sources:

Timing Sources	Possible Timing References
TRIB-1	TP2.1 to TP2.2
TRIB-2	TP2.1 to TP2.2

QL-in   When the quality level is read from the S1-byte from the timing references, it is reflected in the *QL-in* parameter. This parameter can have all of the defined quality level values. See subsection ″Timing Quality Levels.″

QL-in Status   The user can view the status of the incoming quality level (*QL-in Status*) for each timing source. The possible values are:

QL-in status	Description
Valid	The received quality level is in the valid range.
Invalid	The received quality level falls outside the valid range or is unstable.
Not Supported	The corresponding input port does not provide S1-byte extraction.
Not Applicable	No reference is assigned to the timing source, or the assigned signal experiences a reference fail.

QL-out The *QL-out* parameter indicates the actual quality level value of the timing source that is used by the system timing block and the station clock output block. The *QL-out* value, is the quality level that enters the system timing and station clock output blocks. When *QL-Provisioned* is *AUTO*, *QL-out* equals *QL-in*. When *QL-Provisioned* has a value which is different from *AUTO*, *QL-out* equals *QL-Provisioned*.

QL-Provisioned The quality level of timing references can be provisioned by the user. The provisioned quality level is called *QL-Provisioned*. In case of a timing reference without an S1-byte, *QL-Provisioned* allows the user to provision a quality level.

When a timing reference does have an S1-byte (*QL-in* can be read by the system), this *QL-Provisioned*. can be set to *AUTO*; in this case the S1–byte will be read from the incoming signal and will be sent to the System Timing function.

Reference Fail When the incoming signal cannot provide a timing reference, the timing reference is considered to fail. *Reference Fail* can take the values *Yes* or *No*.

Signal Status The signal status is received in the timing sources block and forwarded to the system timing block and the station clock output timing block. The possible values are:

Signal Status	Description
Not Connected	No reference is assigned to the timing source.
Failed	A timing link fail is declared for the assigned timing link.
Wait to Restore	The assigned reference signal will be available again when the Wait to Restore timer has expired.
Normal	The logical timing source is assigned to a valid timing reference.

Switch Request Switch requests are shown in the table in order of priority, together with their description.

Switch Request	Description
No Request	This is the default value. The system timing is operating under normal conditions.

Switch Request	Description
Clear Switch	Replaces the status by the normal status (in case of a previous switch).
Forced Switch	Unconditional switch, issued by the user, even if it is service degrading.
Manual Switch	A conditional switch, which is issued by the user. The switch will not be performed if it is service degrading. If *QL=Enabled*, the switch will not be performed if it is service degrading. If *QL=Disabled*, the switch will be performed even if it is service degrading.

Switch request   Switch requests are shown in the table, together with their description and priority.

Priority	Switch Request	Description
	No Request	This is the default value. The system timing is operating under normal conditions.
1	Clear	Replaces the status by the normal status (in case of a previous switch).
2	Forced to Working	Unconditional switch, issued by the user, even if this is service degrading.
3	Forced to Protection	Unconditional switch, issued by the user, even if this is service degrading.
4	Reference Failure	Initiates a switch to protection. This request is not issued by the user, but by the node itself.
5	Manual to Working	A conditional switch, which is issued by the user. The switch will not be performed if it is service degrading.
6	Manual to Protection	A conditional switch, which is issued by the user. The switch will not be performed if it is service degrading.

Section: Provision Timing Sources.
Parameters to Provision Timing Sources

Provisioning Timing

Switch Status   This parameter indicates the latest switch request. When no protection reference is provisioned, this parameter is not available. The possible values of this parameter are listed in the table below:

Switch Status	Description
No Request	No switch request has been issued.
Forced to Worker	A forced switch has been made to the timing reference that is provisioned as the worker timing reference.
Forced to Protection	A forced switch has been made to the timing reference that is provisioned as the protection timing reference.
Manual to Worker	A manual switch has been made to the timing reference that is provisioned as the worker timing reference.
Manual to Protection	A manual switch has been made to the timing reference that is provisioned as the protection timing reference.
Failed	No switch could be made.
Not Applicable	No protection has been provisioned

Timing Source   Physical timing references can be assigned to logical timing sources. Once a timing reference is assigned to a timing source, no other reference can be assigned to the same source.

Transmission Protected   Transmission Protected indicates whether the timing reference is MSP-protected for transmission. The values for Transmission Protected are *Yes* and *No*.

Worker Reference   The worker references that can be assigned to the timing sources:

Timing Source	Possible Timing Reference
Line_1	LP1.1, LP2.1
Line_2	LP1.1, LP2.1
TRIB_1	TP1.1 .. TP1.16 TP2.1 .. TP2.16, if an optional 2 Mbit/s board is present TP2.1 .. TP 2.2, if an optional STM-1 board is present

Section: Provision Timing Sources.
Parameters to Provision Timing Sources

Provisioning Timing

Timing Source	Possible Timing Reference
TRIB_2	TP1.1 .. TP1.16
	TP2.1 .. TP2.16, if an optional 2 Mbit/s board is present
	TP2.1 .. TP 2.2, if an optional STM-1 board is present

□

Section: Provision System Timing

Overview

Purpose   The purpose of ″Provision System Timing″ is to lock the network element synchronization and outgoing timing signals to a timing source with the highest quality level.

☐

Provision System Timing

....

| **When to perform** | This procedure should be performed in the following cases: |

- As the second procedure in network element timing provisioning.
- If the network element system timing is required to operate in the locked mode.

| **Before you begin** | Before starting this procedure, make sure that: |

- The ″Provision Timing Sources″ procedure is completed.
- The network element synchronization plan must be available.

Pay attention to the following items:

- When used, do not forget to clear the lockout condition after maintenance.

| **Related information** | Related procedures are: |

- ″Provision Timing Sources″
- ″Provision Output Port Timing.″

| **Procedure** | To edit the provisioned timing source information follow this procedure: |

....

1   Select *Provisioning --> Synchronization --> AM 1/AM 1 Plus Synchronization --> System Timing*.

> **Result:**
>
> The *EMS-Provisioned NE System Timing Information* window appears.

....

2   To select a network element or to switch to another network element, click the Selection Dialog Button. A list of possible network elements then appears in the *EMS- NE Selection Dialog* window. Select the desired network element and click OK.

> **Result:**
>
> The *EMS-NE System Timing Information* window is updated with the information of the selected timing source in the selected network element.

....

3   Click Edit.

....

Result:

The *EMS-Edit Provisioned NE System Timing Information* window appears.

....

4   Select a timing source and select the required *Timing Mode*. If *Free Running* or *Hold-over* must be selected go to step 6, else set the *Timing Mode* to *Locked*

Select a timing source in top window; now you can edit the following fields:

- *Priority*
- *Lock Out Request*
- *Switch Request*
- *System and Timing QL mode*
- *Timing Source to Switch to*

Note that the *System and Timing QL mode* can also be set in the *Station Clock Output* window. This is the *same* parameter!

....

5   If you want to provision another timing source from the selected network element, click OK to confirm the changes. The *EMS-Edit Provisioned NE System Timing Information* window is updated with the changes you have made.

....

6   To provision another Timing Source go to step 4, otherwise go to step 7.

....

7   Click Close

Result:

The *EMS-Provisioned NE System Timing Information* window disappears.

E ND OF S TEPS
....

☐

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

4 - 1 3

Parameters to Provision System Timing

....

Introduction   The system timing functional block in the network element is
responsible for:

- Selecting the timing sources to synchronize the system.

- Selecting the timing mode for the system

- Translating the quality level into the S1-byte of the outgoing
  signal.

The different parameters that can be set in the system timing
functionality are indicated in the figure below.

Functional Diagram   A functional diagram of the System Timing functionality

Active System Timing Source   The *Active System Timing Source* indicates the timing source currently
used to synchronize the system, together with the *Switch Status* of the
source and the latest issued *Switch Request*.

Lock out   The user can disable a specific timing source that enters the timing
source selection without changing the priority settings. If a timing
source is locked out, it will not take part in the timing source
selection.

Whether a timing source is locked out is indicated by the Lockout
parameter. The possible values for the Lockout parameter are: *Yes* and
No.

Lock Out Request   The *Lock out* state can be changed with the *Lock Out Request*
parameter. This can be set to *No Request, Clear* or *Set*.

....

The *Lock Out Request* is for maintenance purposes. A Timing Source, which has a priority value assigned to it, can be temporarily locked out. When the Timing Source is already disabled, *Set* is rejected. A *Lockout Request* is set to *No Request* automatically when the Timing Source is disabled.

To turn off a Locked Out state, the Lock Out Request must be set to *Clear*.

When *Priority = Disabled* the *Lock Out Request* field is greyed out.

When a timing source is locked out, the network element is in the Abnormal State.

Priority The priority can be set for each timing source. For a network element with N timing sources provisioned, the priority can have values from *1* to *N*.

The *Priority* parameter can also have the value *Disabled*. A disabled timing source will not be taken into account in the Timing Source Selection for the system timing.

Important! Make sure not to provision identical Priority values to multiple timing sources.

QL The quality level of a timing source, that is used for automatic timing mode selection is indicated in the Provisioned NE System Timing Information window. This QL is identical to the QL-out as described in ″Parameters to Provision Timing Sources.″

Signal Status The signal status is received in the timing sources block and forwarded to the system timing block and the station clock output timing block. The possible values are:

Signal Status	Description
Not Connected	No reference is assigned to the timing source.
Failed	A timing link fail is declared for the assigned timing link.
Wait to Restore	The assigned reference signal will be available again when the Wait to Restore timer has expired.
Normal	The logical timing source is assigned to a valid timing reference.

Switch Request Switch requests are shown in the table in order of priority, together with their description.

Switch Request	Description
No Request	This is the default value. The system timing is operating under normal conditions.
Clear Switch	Replaces the status by the normal status (in case of a previous switch).
Forced Switch	Unconditional switch, issued by the user, even if it is service degrading.
Manual Switch	A conditional switch, which is issued by the user. The switch will not be performed if it is service degrading. If *QL=Enabled*, the switch will not be performed if it is service degrading. If *QL=Disabled*, the switch will be performed even if it is service degrading.

Switch status This parameter indicates the latest switch request. When no protection reference is provisioned, this parameter is not available. The possible values of this parameter are listed in the table below:

Value	Description
No Request	No switch request has been issued.
Clear	The former switch request is cleared. Switching will be system controlled after this request.
Forced Switch	A forced switch has been made to a timing source as indicated by the user.
Manual Switch	A manual switch has been made to a timing source as indicated by the user.

System and Output Timing QL Mode The *Timing Reference Switch* can operate in two modes: *QL-Enabled* and *QL-Disabled*.

- If the *Timing Reference Switch* is set to *QL-Enabled*, itselects the source according to the quality level and the source priorities (if two or more sources have equal, highest quality levels)

- If the *Timing Reference Switch* is set to *QL-Disabled*, it selects the best source according to the signal status and the priorities (if several sources have equal signal status).

System QL   This parameter shows the quality level value of the timing signal used to clock the system. Possible values are the quality levels as described in the section ″Timing Concepts.″

Timing Mode   This parameter is used to set one of the three timing modes: *Locked*, *Holdover*, and *Free Running*. The nature of the modes is discussed in the Section Concepts

Timing   If, while operating in the *Locked* mode, the incoming reference becomes unacceptable, the timing mode selector switches to *Holdover*. This is reflected in the *Timing* parameter. When the system stays in the *Locked* mode, the timing status remains *Normal*.

In the *Free Running* mode, the *Timing* parameter always reflects *Normal*.

□

Section: Provision Station Clock Output

Overview

....

Purpose The purpose of this procedure is to specify the timing source to be used as a reference for the station clock output signals.

☐

....

Lucent Technologies - Proprietary
See notice on first page

Provision Station Clock Output

....

When to perform	The procedure must be executed when:

- A timing reference needs to be provided to external "in station" equipment.
- A regenerator loop is needed.

Before you begin	Before starting this procedure, make sure that:

- The ″Provision Timing Source″ procedure is completed
- The network timing plan is available

Related information	Related procedures are:

- ″Provision Timing Sources″
- ″Provision System Timing″
- ″Provision Output Port Timing.″

Procedure	To edit the station clock output timing follow this procedure:

....

1 Select *Provisioning --> Synchronization --> AM 1/AM 1 Plus Synchronization --> Output Timing*.

> **Result:**
>
> The *EMS-Provisioned NE Station Clock Output Timing Information* window appears.

....

2 To select an network element or to switch to another network element (NE), click the Selection Dialog Button. A list of possible network elements then appears in the *EMS- NE Selection Dialog* window. Select the desired network element and click OK.

> **Result:**
>
> The *EMS-Provisioned NE Station Clock Output Timing Information* window is updated with the information of the selected timing source in the selected network element.

....

3 Click Edit.

> **Result:**
>
> The *EMS-Edit Provisioned NE Station Clock Output Timing Information* window appears.

....

4   Set *STCLK Output*. If *Disabled* is selected, go to step 11, else go to step 5.

5   Set the *Acceptance QL.*

6   Set *Source Selection.*

7   If Source selection is *System Timing* go to step 11. Else go to step 9.

8   Select a Timing Source in the top window, and set its

- *Priority*
- *Lock Out Request*
- *Switch Request*
- *Timing Source to Switch to*

9   To change the *System and Output Timing QL* mode, click the diamonds.

Important! Note that this parameter can be set also in the *System Timing* window. This is the same parameter!

10   Click OK to confirm the changes.

Result:

The *EMS-Edit Provisioned NE Station Clock Output Timing Information* window disappears. The *EMS-Provisioned NE Station Clock Output Timing Information* window becomes visible again and is updated with changes that are made.

11   To provision another timing source go to step 6, else go to step 12.

12   Click Close.

Result:

The *EMS-Provisioned NE Station Clock Output Timing Information* window disappears.

E N D   O F   S T E P S

☐

Lucent Technologies - Proprietary
See notice on first page

Parameters to Provision Station Clock Output

Introduction   The station clock output functional block in the network element is responsible for selecting the timing source for the station clock output.

The different parameters in the station clock output timing block are indicated graphically in the figure below.

Functional Diagram   A functional diagram of the station clock output functionality
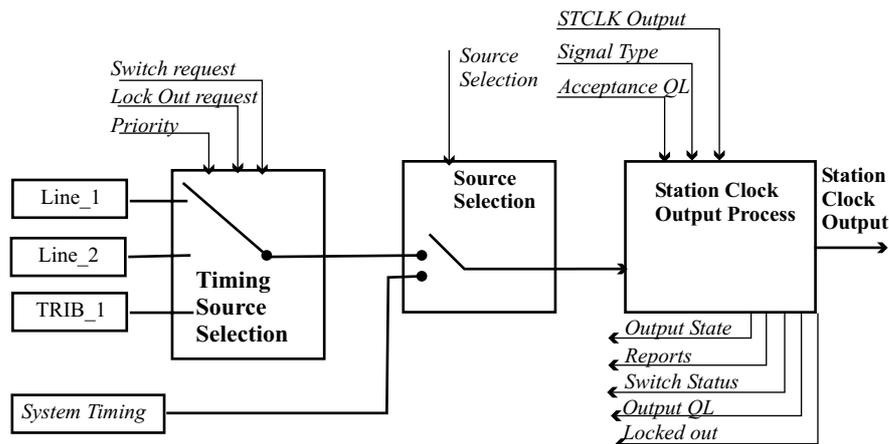
Acceptance QL   The user can provision an *Acceptance QL*, applicable to all station clock output ports (if more than one). This quality level is the minimal quality level value that is accepted by the station clock output process. If the quality level of the signal for the station clock output falls below the *Acceptance QL*, the network element "squelches" the station clock output signal.

Active System Timing Source   The *Active System Timing Source* indicates the timing source currently used to synchronize the system, together with the *Switch Status* of the source and the latest issued *Switch Request*.

Lock out   The user can disable a specific timing source that enters the timing source selection without changing the priority settings. If a timing source is locked out, it will not take part in the timing source selection.

Whether a timing source is locked out is indicated by the Lockout parameter. The possible values for the Lockout parameter are: *Yes* and *No.*

Lock Out Request   The *Lock out* state can be changed with the *Lock Out Request* parameter. This can be set to *No Request, Clear* or *Set.*

The *Lock Out Request* is for maintenance purposes. A Timing Source, which has a priority value assigned to it, can be temporarily locked out. When the Timing Source is already disabled, *Set* is rejected. A *Lockout Request* is set to *No Request* automatically when the Timing Source is disabled.

To turn off a Locked Out state, the Lock Out Request must be set to *Clear*.

When *Priority = Disabled* the *Lock Out Request* field is greyed out.

When a timing source is locked out, the network element is in the Abnormal State.

Output State The user can view the *Output State* of the signal generated by the station clock output(s). Possible values are *Normal*, *Disabled*, and *Unacceptable*.

- *Normal:* indicates that the output is not disabled and has a quality level equal to or above the *Acceptance QL*

- *Disabled:* indicates that the station clock output is disabled

- *Unacceptable:* indicates a quality level below the *Acceptance QL*, or a signal status is failed.

Priority The priority can be set for each timing source. For a network element with N timing sources provisioned, the priority can have values from *1* to *N*.

The *Priority* parameter can also have the value *Disabled*. A disabled timing source will not be taken into account in the Timing Source Selection for the system timing.

Important! Make sure not to provision identical Priority values to multiple timing sources.

Signal Type The *Signal Type* for the station clock outputs is always 2 MHz.

Source Selection The station clock output timing can be derived from one of the system clock processes or from the independent station clock output timing *Source Reference Selector*. This is provisioned by the user. Two options are available:

- *System Timing*

- *Independent Station Clock Timing*.

STCLK Output The user can enable or disable the *Station Clock Output*. If it is disabled it forwards no signal at all and can not be used.

Switch Request Switch requests are shown in the table in order of priority, together with their description.

Switch Request	Description
No Request	This is the default value. The system timing is operating under normal conditions.
Clear Switch	Replaces the status by the normal status (in case of a previous switch).
Forced Switch	Unconditional switch, issued by the user, even if it is service degrading.
Manual Switch	A conditional switch, which is issued by the user. The switch will not be performed if it is service degrading. If *QL=Enabled*, the switch will not be performed if it is service degrading. If *QL=Disabled*, the switch will be performed even if it is service degrading.

Switch status This parameter indicates the latest switch request. When no protection reference is provisioned, this parameter is not available. The possible values of this parameter are listed in the table below:

Value	Description
No Request	No switch request has been issued.
Clear	The former switch request is cleared. Switching will be system controlled after this request.
Forced Switch	A forced switch has been made to a timing source as indicated by the user.
Manual Switch	A manual switch has been made to a timing source as indicated by the user.

System and Output Timing QL Mode The *Timing Reference Switch* can operate in two modes: *QL-Enabled* and *QL-Disabled*.

- If the *Timing Reference Switch* is set to *QL-Enabled*, itselects the source according to the quality level and the source priorities (if two or more sources have equal, highest quality levels)

- If the *Timing Reference Switch* is set to *QL-Disabled*, it selects the best source according to the signal status and the priorities (if several sources have equal signal status).

Timing Source   Physical timing references can be assigned to logical timing sources. Once a timing reference is assigned to a timing source, no other reference can be assigned to the same source.

□

Section: Provision Output Port Timing

4 - 2 5

Overview

Purpose   The purpose of output port timing provisioning is to provision the timing properties for the 1.5 Mbit/s, 2 Mbit/s and X.21 output ports and the station clock output ports.

☐

Provision Output Port Timing

....

When to perform   If a 1.5 Mbit/s, 2 Mbit/s or Mbit/s tributary port has to be used as a timing reference for other equipment. This can be done for both SDH and non-SDH equipment.

Before you begin   Pay attention to the following:

- Use of retiming on the 1.5 Mbit/s or 2 Mbit/s tributary ports can affect the data integrity of the signal. This is not so in case of X.21 retiming.

- When quality level information must be sent out on the 2 Mbit/s station clock output ports the *Signal Type* must be *2 Mbit/s Framed*.

- The provisioned *Signal Type* for the station clock output is the same for both station clock output ports.

Related information   Related procedures are:

- ″Port Provisioning″

- ″Provision Station Clock Output.″

Provision 1.5 Mbit/s, 2   To provision the output port timing follow this procedure:
Mbit/s or X.21 Output Port
Timing

....

1   Select Provisioning --> Equipment --> Port.

  Result:

  The *EMS-Provisioned NE Port Information* window appears.

....

2   To select a network element or to switch to another network element, click the Selection Dialog Button. A list of possible network elements then appears in the *EMS- NE Selection Dialog* window. Select the desired network element and click OK.

  Result:

  The *EMS-Provisioned NE Port Information* window is updated with the information for the selected network element.

....

3   Select a 1.5 Mbit/s, 2 Mbit/s, X.21 or a station clock output port (indicated in the list by *Portname (2Mb)* in the column named *Port*.

....

Lucent Technologies - Proprietary
            See notice on first page

Result:

The contents of the *EMS-Provisioned NE Port Information* window are changed according to the properties of the selected point.

....

4   Click Edit.

Result:

The *EMS-Edit Provisioned NE Port Information* window appears.

....

5   Set the *Timing Alarm Reporting* and the *Timing Mode.*

When the timing mode is *Self-timed*, the fields *Fallback mode* and *Acceptance QL* are greyed out. In that case, go to step 7.

....

6   Set the *Fallback Mode* and the *Acceptance QL.*

....

7   Select OK to confirm the settings.

Result:

The *EMS-Edit Provisioned NE Port Information* window disappears.

....

8   If you want to provision another output port go to step 2, else click Close

Result:

The *EMS-Provisioned NE Port Information* window disappears.

END OF STEPS
....

Force DNU on STM-1 Output Port Timing   To force a DNU timing marker on an outgoing SDH signal follow this procedure:

....

1   Select *Provisioning --> Transmission --> Trail Terminations --> RS and MS.*

Result:

The *EMS-Provisioned NE RS and MS Termination Point Information* window appears.

....

....

2   To select a network element or to switch to another network element, click the Selection Dialog Button. A list of possible network elements then appears in the *EMS- NE Selection Dialog* window. Select the desired network element and click OK.

   Result:

   The *EMS-Provisioned NE RS and MS Termination Point Information* window is updated with the information of the selected network element.

....

3   Select an STM-1 port from the port list and click Edit.

   Result:

   The *EMS-Edit Provisioned NE RS and MS Termination Point Information* window appears.

....

4   Select a *Force DNU* value.

....

5   Click Close

   Result:

   The *EMS-Edit Provisioned NE RS and MS Termination Point Information* window disappears.

....

6   Click Close

   Result:

   : The *EMS-Provisioned NE RS and MS Termination Point Information* window disappears.

   E N D   O F   S T E P S
....

□

....

4 - 2 8

Parameters to Provision Output Port Timing
....

Introduction The 1.5 Mbit/s, 2 Mbit/s and X.21 transmission ports are managed by a number of parameters, which are related to timing. These parameters are shown in the functional diagram below.

Functional diagram The functional diagram of the Output Port Timing functionality
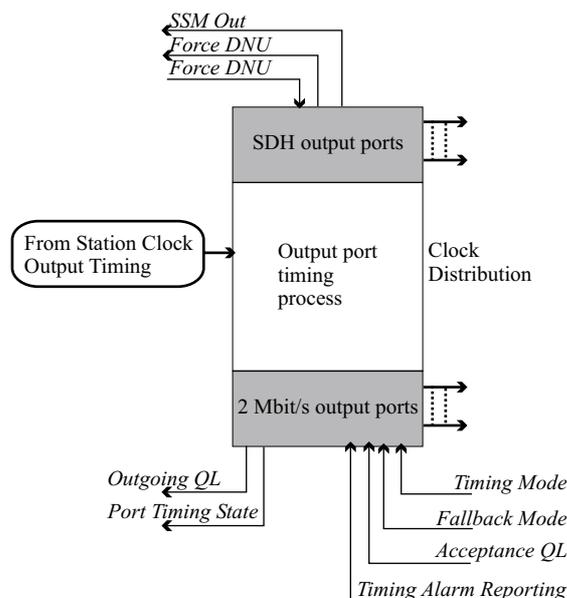
Acceptance QL For each individual 1.5 Mbit/s, 2 Mbit/s or X.21 tributary output port in the *Re-Timed* mode, an *Acceptance QL* can be provisioned.

If the *System QL* (in case of system timing) or the *QL-out* (in case of independent timing) falls below the *Acceptance QL*, the timing will go into the *Fallback* mode.

Fallback mode If a 2 Mbit/s port is operating in the *Re-timed* mode and if the *System and Output QL mode* is enabled, the output is automatically switched to the provisioned *Fallback* mode, if the quality level of the system timing drops below the *Acceptance QL*.

The three *Fallback* modes are:

- *Re-timed AIS:* A Re-timed AIS is sent out.
- *Self-timed:*The signal is sent out, from the port in the *Self-timed* mode
- *None:* no Fallback applies.

Force DNU *Force DNU* allows to force an S1–byte value: *DNU* into an outgoing signal.

....

The values for *Force DNU* are given below:

Option	Description
Yes	A DNU is forced on the outgoing signal
No	No DNU is forced on the outgoing signal
No Request	This option resets a force DNU setting. It is the default value for *Force DNU*.

When an outgoing signal is forced to carry DNU, this signal can not be used for synchronization by another network element.

Forced DNU *Forced DNU* is a read only parameter. It indicates whether a DNU is forced on an outgoing signal.

When an outgoing signal is forced to carry DNU, this signal cannot be used for synchronization by another network element.

Outgoing QL *Outgoing QL* indicates the quality level that is sent out on a given transmission output port which supports S1-byte quality level information carriage.

SSM Out *SSM Out* displays the quality level corresponding to the current S1-byte value that is sent out from the selected port.

Timing Mode The timing mode of each individual 1.5 Mbit/s, 2 Mbit/s and X.21 tributary output port can be set to the *Self-Timed* or *Re-Timed* mode:

- In the *Self-Timed* mode the 2 Mbit/s signal is extracted from the container contents of the VC-12.

- In the *Re-Timed* mode, the timing of the 2 Mbit/s output signal is derived from the network element system timing; the 2 Mbit/s signal is routed through the elastic buffer.

If the *ISDN mode* of a 2 Mbit/s ISDN port is set to Leased Line (*LL*), the default value of the *Timing Mode* parameter will be *Re-Timed*.

For more information see the section ″Timing Concepts.″

Timing Alarm Reporting When the *Timing State* of a 1.5 Mbit/s, 2 Mbit/s or X.21 tributary output port is *Fallback*, a defect is declared. The reporting of this *Timing Alarm* can be *Enabled* or *Disabled* for each individual 2 Mbit/s tributary output port. This is done with the *Timing Alarm Reporting* parameter.

(Port) Timing State   The *(Port) Timing State* of each individual 1.5 Mbit/s, 2 Mbit/s and X.21 tributary output port can be viewed. The *(Port)Timing State* can have two values:

- *Normal:* The port operates as specified in the timing mode

- *Fallback:*The timing mode has fallen back as specified in the *Fallback Mode*parameter.

☐

Section: Provision with Timing Templates.

Overview

Purpose To speed up the provisioning and to limit the chance of making mistakes in provisioning several network elements with the same timing configuration, timing templates are used.

☐

Lucent Technologies - Proprietary
See notice on first page

Provision with Timing Templates

....

When to perform   When several network elements within the network must have identical timing configurations.

Before you begin   Before the procedure is performed, make sure that the following prerequisites are met:

- The *Licence Key* for the timing templates must be set.
- The network timing plan must be available and contain several network elements with an identical timing configuration.

Beware of the fact that when a timing template is used, it is not possible to provision any port.

Related information   Related procedures are:

- "Provision Timing Source"
- "Provision System Timing"
- "Provision Station Clock Output".

Create a Timing Template   To create a timing template follow this procedure:

....

1   Select Templates --> Synchronization --> Create.

> **Result:**
>
> The *EMS-Create Timing Template* window appears.

....

2   Select a *System Type* and a *Timing Template Name*, using the Selection Dialog Button, as the base for the "to-be-created" template

....

3   Type the *User Template Name* in the *User Template Name* field.

....

4   Click Appl y

> **Result:**
>
> The creation of a new template is confirmed.

....

5   To create another timing template go to step 2, else click Cl ose.

> **Result:**
>
> The *EMS-Create Timing Template* window disappears.
>
> E ND   OF   S TEPS

....

....

Edit a Timing Template   To edit the timing templates perform this procedure:

....

1   Select *Templates --> Synchronization -->AM 1/AM 1 Plus Information*.

       Result:

       The *EMS-AM 1/AM 1 Plus Timing Template Information* window appears. No values are filled in.

....

2   Use the Selection Dialog Button to select a timing template name.

       Result:

       The *EMS-Timing Template Selection Dialog* window appears.

....

3   Select a template of the *User Defined* type and click OK.

       Result:

       The *EMS-AM 1/AM 1 Plus Timing Template Information* window is filled with values from the selected template.

....

4   Set *Timing Template Details to Edit* to one of the following

- *Timing Source*
- *System Timing*
- *Output Timing*

and click Edit.

       Result:

       The corresponding *EMS-Edit AM 1/AM 1 Plus Timing Template* window appears.

....

5   Select the required *Timing Source* and set the parameters by selecting the required diamonds. When you are finished selecting the diamonds click OK

For output timing, a timing source must only be selected when the *Source Selection* is *Independent.*

       Result:

       The *EMS-Edit AM 1/AM 1 Plus Timing Template* window is filled with the new values.

....

6   Click Close.

....

Result:

The *EMS-Edit Timing Template* window disappears.

....

7   To edit other timing template details go to step 3. Else go to step 7.

....

8   To edit another template go to step 2. Else go to step 8.

....

9   Click Cl ose to leave the *EMS-AM 1/AM 1 Plus Timing Template Information* window.

   Result:

   The *AM 1/AM 1 Plus Timing Template Information* window disappears.

   E N D   O F   S T E P S
....

Configure from Template   To configure timing from a template follow this procedure:
....

1   Select *Provisioning --> Synchronization --> AM 1/AM 1 Plus Synchronization --> Configure from Template*.

   Result:

   The *EMS-Configure NE Timing from Template* window appears. The first time the window is opened, all fields are empty.

....

2   To select a network element or to switch to another network element, click the Selection Dialog Button. A list of possible network elements then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

   Result:

   The *Configure EMS-NE Timing from Template* window reflects the available templates.

....

3   Select the required *Timing Source*, and set the parameters by clicking the diamonds. When finished click OK to confirm.

   Result:

   The *EMS-Configure NE Timing from Template* window is filled with the new values.

....

4   Click Close.

> **Result:**
>
> The *EMS-Configure NE Timing from Template* window
> disappears.
>
> E ND OF S TEPS

Delete a Timing Template   To delete a timing template follow this procedure:

1   Select Templates --> Synchronization -->Delete

> **Result:**
>
> The *EMS-Delete Timing Template* window appears.

2   Use the selection dialog button to select a timing template to delete.

3   Click Apply to confirm the deletion of the timing template.

> **Result:**
>
> In the message window, the ITM-SC reflects the deletion
> process.

4   If you want to delete another Timing Template go to step 2. Else click
Close to exit.

> **Result:**
>
> The *EMS-Delete Timing Template* window disappears.
>
> E ND OF S TEPS

☐

Parameters to Provision with Timing Templates

Introduction   A timing template is a model of an network element for which only the timing parameters are configured. This model can be copied onto real network elements, thus provisioning all timing parameters at once.

Before you can configure timing from template, a template must be present. Default templates are available, but you can also create your own user defined templates by modifying an existing template.

Within a user defined timing template you can set the parameters for:

* *Timing Source*

* *System Timing*

* *Output Timing*

The information window shows information about parameters from all these three functionalities. To edit a template you must use three different edit-windows corresponding to the three functionalities. The three edit options are identified by the *Timing Template Details to Edit* parameter.

When a user defined template is not needed any more it can be deleted.

Base Timing Template Name   This is the name of an already existing template. It can be a default template which is presented by the ITM-SC, or a template which was created before.

A default template can be used as a base template for the creation of a new template. The edited template must be saved then with a new timing template name. This name must be unique within the system type.

Base Timing Template Type   This is the type of template. Two types of templates exist:

* *User Defined:*A template which is created by a user.

* *Default:*A template as it is presented by the ITM-SC

Default Templates   Different default timing templates are available in the ITM-SC, for the different system types.

No editing is allowed in default templates.

Timing Template Details to Edit   This parameter indicates for which functional block a timing template is provided to edit. When a default template is used to provision timing, this option is not available.

Section: Provision with Timing Templates.
Parameters to Provision with Timing
Templates

Provisioning Timing

The available *Timing Templates Types* are:

Timing Template Details to Edit	Allows to edit the parameters shown in
Timing Source	The *Edit AM 1/AM 1 Plus Timing Template Timing Details* window. See also "Parameters to Provision Timing Source".
System Timing	The *Edit AM 1/AM 1 Plus Timing Template System Timing Details* window. See also "Parameters to Provision System Timing".
Output Timing	The *Edit AM 1/AM 1 Plus Timing Template Station Clock Output Timing Details* window. See also "Parameters to Provision Station Clock Output".

Section: Use the Timing Event Log .

4 - 39

Overview

....

Purpose   The purpose of the timing event log is to gain insight in the history of timing events throughout the whole network.

☐

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

4 - 3 9

Use the Timing Event Log

When to perform	When network element alarms occur, the timing event log can help to locate their origin.
Before you begin	Make sure that the timing event log is enabled, when it is to be used.
	If the timing event log is disabled, the complete event history is deleted.
Related information	″View the Synchronization Summary″.
Enable / Disable Timing Event Log	To enable or disable the timing event log an administrator user must follow this procedure:

1   Select File --> Logging --> Synchronization Logs --> Synchronization Control.

> **Result:**
>
> The *EMS-Timing Event Log Information* window appears.

2   To enable/disable the timing event log, click Edit.

> **Result:**
>
> The *EMS-Edit Timing Event Log Control* window appears.

3   Select *Disable* or *Enable*.

4   Click OK to confirm the change.

> **Result:**
>
> When you are disabling the timing event log a warning window appears.

5   If a warning window appears, select Yes when you are sure you want to disable the timing event log, and go to step 7. Else select *No*, and go to step 6.

6   Click Close

> **Result:**
>
> The *EMS-Control Timing Event Log* window disappears.

....

7   Click Close.

> **Result:**
>
> The *EMS-Timing Event Log Information* window disappears.

E ND OF S TEPS
....

View the Timing Event Log   To view the timing event log follow this procedure:

....

1   Select File --> Logging -->Synchronization Logs --> Synchronization Logs.

> **Result:**
>
> The *EMS-Timing Event Log* window appears.

....

2   Now you can view the timing events.

- If you are satisfied with the way the events are presented, you can read or print the event log and go to step 5.

- If you want to change the presentation go to step 3.

....

3   If you want to change the order of the event list you set the *Sort By* parameter to *Node Name* or *Time Occurred.*

> **Result:**
>
> The order of the events list is adjusted.

....

4   If you want to delete the listed timing events click Delete and then click Apply.

> **Result:**
>
> The timing event log is cleared.

....

5   Click Close.

> **Result:**
>
> The *EMS-Timing Event Log* window disappears.

E ND OF S TEPS
....

☐

....

Parameters to Use the Timing Event Log

Introduction The timing event log reflects a list of the timing events that have taken place in the network. A timing event is a change in the settings of a timing provisioning parameter. The timing event log is available to all users. It can be enabled or disabled by the administrator users.

Delete Log To delete the timing event log-list, the *delete*-check box must be selected. This parameter is only accessible for administrator users.

Node Name The name of the node in the network where a timing event has occurred.

Sort by The *Sort by* parameter indicates the parameter that must be used to sort the list of timing events in the *EMS-Timing Event Log* window. It can be:

- *Node Name*
- *Time Occurred.*

Time Occurred The time and day at which a timing event occurred.

The format is: *hh:mm:ss dd/mm/yy*.

Timing Event The system stores in its Timing Event Log all timing events sent by the NEs under its management. A timing event stored in the log reflects a notification related to the following :

- Changes in Reference assignments related to a timing source enabled in at least one timing link switch
- Changes in the Reference Switch Status related to a timing source enabled in at least one timing link switch.
- Changes in the Signal status of a timing source enabled in at least one timing link switch.
- Changes in the incoming QL value and status of a timing source enabled in at least one timing link switch.
- Changes in the provisioned QL of a timing source enabled in at least one timing link switch.
- Changes in the Timing Mode.
- Changes in the Timing State.
- Changes in source priorities in both timing link switches.
- Changes in lockout status in both timing link switches.
- Changes in Link Switch status in both timing link switches.
- Changes in the System & Output Timing QL mode.

- Changes in the System QL.

- Changes in the Source Selection for the Station Clock Output.

- Changes in Acceptance QL for the Station Clock Output.

- Changes in the STCLK Output.

- Changes in the Output State for the Station Clock Output.

- Changes in the Output QL for the Station Clock Output.

- Changes in the application of forced DNU in a transmission output port.

Timing Event Log   This parameter indicates whether the timing event log records the timing events. The *Timing Event Log* parameter can have two values:

Timing Event Log	Indicates that...
Enabled	All timing events in the network are recorded
Disabled	No timing events are recorded. When you set this value, all timing event records are deleted.

□

Section: View the Synchronization Summary.

Overview

Purpose   The purpose of the Synchronization Summary is to provide insight in the timing configuration of the whole network.

☐

View the Synchronization Summary

....

When to perform When you need to know the timing configuration of the network the *Synchronization Summary* is the first window to use.

Before you begin There are no prerequisites or precautions to be taken for this procedure.

Related information ″View the Timing Event Log″.

Procedure To view the Synchronization Summary perform the following procedure:

....

1 Select Provisioning --> Synchronization --> Summary.

Result:

The *EMS-Synchronization Summary* window appears.

....

2 Now you can view the synchronization summary.

This screen is *NOT* automatically updated!

....

3 Click Refresh.

Result:

The information in the *EMS-Synchronization Summary* window is updated.

....

4 Click Close.

Result:

The *EMS-Synchronization Summary* window disappears.

E ND OF S TEPS

....

☐

....

Parameters to View the Synchronization Summary

Introduction   The synchronization summary provides an overview of the timing parameter settings throughout the network.

Only the parameters that are relevant for this network element are explained in this subsection.

Node Name   This parameter indicates the name of the node for which the timing parameters are shown. This is the name of a node in the network. It is shown together with the type of network element.

Output QL   *Output QL* gives the output quality level of the timing signal which is generated by the station clock outputs.

Output Ref.   The *Output Ref.* parameter identifies the timing source which is used to synchronize the station clock output.

System QL   *System QL* indicates the quality level of the timing signal which is used to synchronize the system.

System Ref.   The *System Ref.* parameter identifies the timing source which is used to synchronize the system.

☐

5   Path Provisioning and Protection

Overview

Purpose   Path Provisioning and Protection sets up the network elements to route the traffic through the network.

Objective   To create transmission paths through the network with or without protection. The protected transmission path can maintain the transmission signal in case of transmission failures.

Outcome   The outcome of transmission provisioning is:

- all traffic can be transported through the network according to the transmission plan
- if protection is used, the traffic that is routed through the network is protected against failures.

Protection Types   The following protection types can be used:

- SNC: Sub Network Connection protection protects a specific transmission path in a ring.
- MSP: Multiplex Section Protection protects the transmission path in a point-to-point connection.

Intended use   This chapter describes setting up traffic on VC-4, VC-3 and VC-12 level in a network with WaveStar® AM 1 network elements.

The following table shows the tasks that can be performed and the type of protection they are related to:

Task	Protection
Provision Ethernet over SDH	No
Display the cross connections of a network element	No Protection
Provision and delete Cross Connections without protection	No protection
Provision and delete Cross Connections with SNC protection	SNC
View SNC protection	SNC
View MSP protection	MSP
Edit MSP protection	MSP

□

Section: Provision Ethernet over SDH

5 - 3

Overview

....

Purpose To connect remote PC LAN network sites via an SDH network without the need for intermediate bridges or routers and enable the transport of ethernet packets across the SDH network.

☐

Lucent Technologies - Proprietary
See notice on first page

Procedures to Provision LAN groups

When to use   Perform these procedures to create, modify or delete LAN groups.

Before you begin   Before provisioning LAN groups it is assumed that the following items are known:

- the LAN group name
- the LAN group label
- the LAN group mode.

Related information   Related information can be found in section Traffic Provisioning Concepts.

Procedure to Create a LAN Group

1   Select *Provisioning —> Packet over SDH —> LAN Group.*

    Result:

    The *EMS —Provisioned NE LAN Groups Information* window appears with a list of existing LAN groups

2   Click *Create LAN Group.*

    Result:

    The *EMS - Edit LAN Group Information* window appears.

3   Enter a name of maximum 20 characters in the *LAN Group Label* field.

4   Select the *LAN Group Mode*; this can be Point-to Point, LAN, LAN-Interconnect or LAN-VPN and click *Apply*.

    Result:

    TS2 will be automatically selected (there is only one slot available). The LAN group is created.

5   Click *Close*.

    Result:

    The *EMS — Provisioned NE LAN Groups Information* window reappears. The created LAN group is now displayed in the list.

From this window LAN and WAN ports can be attached to the
LAN group.

E N D   O F   S T E P S
....

**Procedure to Modify or
Delete a LAN group**

....

1 Select *Provisioning —> Packet over SDH —> LAN Group.*

   Result:

   The *EMS —Provisioned NE LAN Groups Information* window
   appears with a list of existing LAN Groups.

   ....

2 Select the LAN group to modify or to remove and click *Edit LAN
   Group.*

   Result:

   The *EMS - Edit LAN Group Information* window appears. The
   LAN ports and WAN ports assigned to the selected LAN group
   are displayed in the lower part of the window.

   ....

3

To	Then
Modify the LAN group label	Select *Modify* in the *Operation* field. Change the name of the LAN group in the *LAN Group Label* field (maximum 20 characters). The slot can not be modified. Click *Apply*. **Result:** The label of the LAN group is modified.
Modify the LAN group mode	Select *Modify* in the *Operation* field and select the LAN group mode; this can be Point-to-Point, LAN-Interconnect or LAN-VPN. The slot can not be modified. Click *Apply*. **Result:** The LAN mode is modified.

....
365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

5 - 5

To	Then
Delete a LAN group	Select *Delete* in the *Operation* field and click *Apply*.
	Result:
	A warning message is displayed stating that deleting the LAN group may disrupt traffic. Click *Yes* to proceed.

4   Click *Close*.

> **Result:**
>
> The *EMS — Provisioned NE LAN Groups Information* window reappears. The modifications are displayed in the LAN group list. The deleted LAN group is removed from the list.

E N D   O F   S T E P S

☐

Procedures to Provision LAN ports and WAN ports

....

When to use

Perform these procedures to:

- attach or detach LAN ports to or from a LAN group and how to modify LAN ports details
- attach or detach WAN ports to/from a LAN group.

Before you begin

Before provisioning LAN ports and WAN ports it is assumed that the LAN group has been created and the following items are known:

- the LAN group name
- the LAN port name
- the LAN port details, such as CID and CIR
- WAN port name.

Related information

Related information can be found in section Traffic Provisioning Concepts.

Procedure to attach/detach LAN ports and how to modify LAN port details.

....

1 Select in the main menu: *Provisioning —> Packet over SDH —> LAN Group*.

> **Result:**
>
> The *EMS — Provisioned NE LAN Groups Information* window appears with a list of all the created LAN Groups.

....

2 Select a LAN group

> **Result:**
>
> In the lower area of the window, lists of LAN ports and WAN ports that are members of the selected LAN group appear.

....

3 Click *Edit LAN Port Details*.

> **Result:**
>
> The *EMS — Edit LAN Port Information* window appears with a list of all LAN ports that are either members of the current selected LAN Group or unassigned LAN Ports available for use within the selected LAN Group.

....

....

4 Select a LAN port from the list.

> **Result:**
>
> The fields of the lower part of the window are filled in with
> details of the selected LAN port.

....

5

To	Then
Attach a LAN port to the LAN group	Select *Attach* in the *Assignment* field.
Detach a LAN port to the LAN group	Select *Detach* in the *Assignment* field.
Modify LAN port details.	Change the parameters in the *LAN Port Details* area, such as LAN port label, the CID and the CIR.
Select the operation mode.	Change the operation mode (Strict Policing or Oversubscription).

....

6 Several LAN Ports may be selected in turn and their details and/or
assignment changed. Click *OK* to apply the changes to all the selected
LAN ports.

Important! If a LAN port is detached from a LAN group, a warning
message is displayed stating that this may disrupt traffic on the LAN
group. Click yes to confirm.

E N D   O F   S T E P S
....

**Procedure to attach/detach
WAN ports to/from a LAN
group.**

....

1 Select in the main menu: *Provisioning —> Packet over SDH —>
LAN Group*.

> **Result:**
>
> The *EMS — Provisioned NE LAN Groups Information* window
> appears with a list of all the created LAN Groups.

....

2 Select a LAN group.

> **Result:**
>
> In the lower area of the window, lists of LAN ports and WAN
> ports that are members of the selected LAN group appear.

....

....

3 Click *Edit WAN Port Details*.

> **Result:**
>
> The *EMS — Edit WAN Port Information* window appears with a list of all WAN ports that are either members of the current selected LAN Group or unassigned WAN Ports available for use within the selected LAN Group.

....

4

To	Then
Attach a WAN port to the LAN group	Select *Attach* in the *Assignment* field.
Detach a WAN port to the LAN group	Select *Detach* in the *Assignment* field.

....

5 Several WAN ports may be selected in turn and their assignment changed. Click *OK* to apply the changes to all the selected WAN ports.

Important! If a WAN port is detached, a warning message appears, stating that detaching the WAN port may disrupt the traffic. Click *Yes* to confirm

E N D   O F   S T E P S
....

☐

Procedure to Provision SDH Channels

When to use
Perform these procedures to select the required channel capacity and to enable or disable monitoring the SDH channel.

Before you begin
Before provisioning SDH channels it is assumed that the following items are known:

- the TTP of the SDH channel

- the required capacity of the SDH channel

- the SDH channel TTP mode.

Related information
Related information can be found in section Traffic Provisioning Concepts.

Procedure

1 Select from the main menu: *Provisioning —> Packet over SDH —> SDH Channels*.

Result:

The *EMS — NE SDH Channel Information* window appears with a list of SDH channels configured for the network element. In this list the capacity of the channel is displayed and whether the TTP (Trail Termination Point) of the channel is monitored or not.

2 Select an SDH channel from the list.

Result:

In the lower part of the window a list of all termination points associated with the selected SDH channel appears. These are the VC-TTPs to make the cross connections. The capacity of the VCs is also displayed.

3 Click *Edit*.

Result:

The *EMS — Edit NE SDH Channel Information* window appears. Here the capacity of the selected SDH channel can be changed. Monitoring on the SDH channel can be enabled or disabled in the *SDH Channel TTP Mode* field.

4 Select the required VC capacity from the SDH Channel Capacity list.

....

5 Set the SDH Channel TTP Mode to Monitored or Not Monitored to enable or disable monitoring of the SDH channel.

....

6 Click *OK*.

> **Result:**
>
> The *EMS — NE SDH Channel Information* window reappears with the updated SDH Channel information.

....

7 Click *Close*

to exit.

E N D   O F   S T E P S

....

□

Procedure to Check the Sequence Number of a Virtually Concatenated VC-12 or VC-3

When to use   Perform this procedure to check the sequence number of a virtual concatenated VC-12 or VC-3.

Before you begin   No prerequisites or precautions are needed when performing this procedure.

Related information   Related information can be found in section Traffic Provisioning Concepts.

Procedure

1   Select Provisioning -> Transmission -> Trail Terminations and then select *VC12* or *VC3*.

   Result:

   The *EMS - Provisioned NE TP Information* window is displayed.

2   Fill in the type of termination point in the *TP Type* box and select the termination point, to be checked, from the list.

   Result:

   The information about the selected termination point is displayed. In the *TP Numbering* field the Transmitted and Accepted (received) Sequence number are displayed.

   E ND OF S TEPS

   □

Lucent Technologies - Proprietary

Parameters for provisioning LAN groups

LAN Group A LAN group is a set of LAN/WAN ports on a LAN unit that is used by one or more end users who can share the common WAN bandwith. There are more then one LAN group. The end users in the same LAN group are recognizable by a Customer Identifiers (CID).

LAN group name This is a fixed name for the LAN group: LANGRP2.x, where LANGRP2 is the slot name and x is the number of the LAN group.

LAN group label A label can be created for each LAN group. This label can be any character string of maximum 20 characters. The label is not used as an identifier, it is only for convenience of the user. The system does not check its uniqueness.

LAN group mode The LAN group mode can be set to:

- Point to point LAN. In this mode the ethernet interfaces are connected in a point-to-point manner across the SDH network. The LAN group supports 1 LAN port and 1 WAN port. The principle of the TransLAN is described in section Traffic Provisioning Concepts.

- LAN-Interconnect. . In this mode a LAN group contains multiple LAN ports and multiple WAN ports. Only one end user is connected to one or up to four LAN port(s). The NE functions as a learning bridge; Spanning Tree algorithms are supported. The principle of the TransLAN+ type is described in section Traffic Provisioning Concepts.

- LAN-VPN (Virtual Private Network), also mentioned as M-LAN. In this mode a LAN group contains multiple LAN ports and multiple WAN ports. The LAN port(s) can be shared by multiple end users. The NE functions as a learning bridge; Spanning Tree algorithms are supported.. The principle of the M-LAN type is described in section Traffic Provisioning Concepts.

LAN port name LAN port name The LAN Port name is a fixed name: LAN2.x, where LAN2 is the slot name and x is the number of the LAN port. x can be up 1 up to 4.

LAN port label The label can be created/changed for each LAN port. The label can be up to 20 characters long.

Customer Identity (CID)   Customer Identity for a LAN group. This is an integer between 0 and 4094. The Customer Identifier separates the end users. If the CID is 0, the system implicitly disables the functions of the corresponding LAN port. Only the values between 1 and 4094 are used to identify a customer in a network.

Committed Information Rate (CIR)   The CIR represent the bandwith being allocated to a customer in the range: 0 kBit/s, 64 kBit/s ... 100 Mbit/s in steps of 12 kBit/s. The default value is 64 kBit/s.

Mode of operation (PIR)   There are two options to select the Peak Information Rate (PIR).

- Strict Policing; the PIR is set to the same value as the CIR

- Oversubsription; the PIR is set to infinity.

WAN port name   The WAN Port name is a fixed name: WAN2.x, where WAN2 refers to the slot and x is the number of the WAN port. The number of the WAN Port can be 1 up to 4.

SDH Channel   The name of the SDH channel associated with the WAN port is fixed: SDHChann2.x, where SDHChann2 refers to the slot and x is the number of the SDH channel. This is the same number as the WAN port associated to the SDH Channel.

Auto-Negotiation   It is possible to enable or disable the Auto-negotiation function at the physical layer of the LAN port by setting the mode to enabled respectively disabled. Setting the mode to disabled will be done when the TransLAN board interworks with equipments not supporting the auto-negotiation function. In this case the user can force the port speed (10 Mbit/s or 100 Mbit/s) and select the half duplex or full duplex mode.

Ethernet Port Parameters   The following ethernet port parameters can be set when the auto-negotiation is disabled:

- port speed; set to 10 Mbit/s or 100 Mbit/s

- duplex mode; set to half duplex or full duplex

- pause mode; this fuction can be set to enabled or disabled only when the duplex mode is full duplex.

□

Parameters for Provisioning SDH Channels

SDH Channel
The name of the SDH channel associated with the WAN port is fixed: SDHChann2.x, where SDHChann2 refers to the slot and x is the number of the SDH channel. This is the same number as the WAN port associated to the SDH Channel.

SDH Channel Capacity
The Capacity of the SDH channel. This can be VC-12, VC-12–2v,–3v-,4v,–5v, VC-3, VC-3–2v or none.

SDH Channel TTP Mode
Indicates whether the signal on the TTP (Trail Termination Point) of the SDH channel will be monitored.

When *Monitored* alarms are generated related to the selected termination point. When *Not Monitored* no alarms are generated for the selected termination point.

VC-TTP Name
The mapping relationship between WAN ports and TPs is fixed. On a LAN unit the TUs for the 4 ports are together within a single VC-4.

When a virtually concatenated VC-12 is used (capacity is 10 Mbit/s) then the first 4 TU-12s in the VC-4 are used and TU-12#1 (WAN port 1) to TU-12#4 (WAN port 4) are used.

When a virtually concatenated VC-3 is used (capacity on WAN port 1 is 100 Mbit/s) then the first 2 TU-3s in the VC-4 are used. In this situation the first 3 TU-12s in the VC-4 are used and TU-12#1 (WAN port 2) to TU-12#3 (WAN port 4) are used.

When a virtually concatenated VC-3 are used (capacity is 50 Mbit/s) and either TU-3#1 (WAN port 1) or TU-3#2 (WAN port 2) or both are used. In this situation the first 2 TU-12s in the VC-4 are used and TU-12#1 (WAN port 3) to TU-12#2 (WAN port 4) are used.

The name of the termination point associated with the selected SDH channel. This termination point is a VC-TTP. These TPs are used to make the cross connections. The TPs used are TP2.1100 and TP2.1200, where TP2 refers to the slot, the first digit of the number is always 1 and the other 3 digits is the klm number. .

WAN capacity
The capacity of the WAN port is depending on which mode is selected as shown in the table.

Mode	Capacity WAN port 1	Capacity WAN port 2	Capacity WAN port 3	Capacity WAN port 4
1	100 Mbit/s	2 Mbit/s	2 Mbit/s	2 Mbit/s

Mode	Capacity WAN port 1	Capacity WAN port 2	Capacity WAN port 3	Capacity WAN port 4
2	50 Mbit/s	50 Mbit/s	2 Mbit/s	2 Mbit/s
3	2 Mbit/s	2 Mbit/s	2 Mbit/s	2 Mbit/s

□

Section: Display Cross Connections

5 - 17

Overview

Purpose To get an overview of the cross connections present in a network element.

☐

Procedure to Display Cross Connections

When to use To get an overview of the cross connections present in a network element for example when a new traffic plan is implemented or the existing traffic plan is changed.

Before you begin Before displaying cross connections determine the following:

- the capacity of the cross connection
- the connection type of the cross connection
- the termination points of the cross connection.

Related information Related procedures and information are:

- provision cross connections without protection.
- provision cross connections with SNC protection
- Traffic Provisioning Concepts.

Procedure Follow these steps to display the cross connect protection:

1 Select Provisioning -> Transmission -> AM1/AM1 Plus Cross Connects ->List.

> **Result:**
>
> The *EMS - Provisioned AM1/AM1 Plus Cross Connect List* window is displayed.

2 To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

> **Result:**
>
> The window closes and reverts to the previous window which displays the requested information of the selected NE.

3 Select the Capacity for the to be viewed cross connection or select the option All to view all cross connections present in the NE.

> **Result:**
>
> The *EMS - Provisioned AM1 Cross Connections* window shows the cross connections according to the settings.

4 Click Close to exit.

E N D   O F   S T E P S

☐

Lucent Technologies - Proprietary
See notice on first page

Parameters for Displaying Cross Connections

Overview

The following parameters are used to display cross connections without protection.

Capacity

The capacity of the cross connection: This can be VC-4, VC-3 or VC-12.

Connection Type

The following types of cross connections are possible:

- <-------->: an unprotected bidirectional cross connection or a working cross connection (SNC/N protection)

- <- - - - ->: a bidirectional protection cross connection (SNC/N protection)

- —- - - - ->: an unidirectional cross connection (loopback connection).

From, To and Protection Termination Points

The cross connections are made between termination points. The *From, To* and *Protection* columns are used to view these termination points.

- For unprotected biderctional cross connections it makes no difference which TP is in the From and which TP is selected in the To list.

- For protected biderectional cross connections the tributary TP is always in the To area. The TP used for protection is always in the Protection area.

- For a loopback connection the termination points (TP) in the *From* and *To*columns are the same.

A cross connection is made between termination points (TP). On the tributary units a VC-12 termination point is selected. On the line units, the TU number inside the VC-4 must be selected. The TU number consists of 3 numbers:

- k: the number of the TUG-3 inside the VC-4

- l: the number of the TUG-2 inside the TUG-3

- m: the TU-12 number inside the TUG-2.

Example:

LP1.1,1.112   **TP1.12**

Line Slot   Port   TU number   Trib Slot   Port

AU number

Fixed   The cross connection is fixed by the network element hardware. These
cross connections can not be modified. The *WaveStar®* AM-1 does
not have fixed cross connections.

□

Section: Provision Cross Connections without Protection

5 - 2 1

Overview

Purpose   To provide traffic over the network, cross connections must be provisioned in the network elements. The cross connection settings can be modified if the traffic demand changes. The following changes can be made:

- add a new cross connection.

- delete a cross connection.

□

Procedure to Add Cross Connections

....

| **When to use** | When a new traffic plan is implemented or the existing traffic plan is changed. |

Before you Begin   To make a cross connection first determine the following:

- What is the capacity of the cross connection; VC-12, VC-3 or VC-4.

- Is the TUG Structure provisioned in such a way that the capacity can be selected? The procedure to check and change the TUG Structure is described in the section ″Provision TUG Structure″.

- Check if this cross connection require no protection

- Before *adding* a cross connection be sure to have information regarding the design of the transmission path.

- Before *deleting* a cross connection or part of a cross connection be sure to know whether the cross connection to be removed still carries traffic? If yes this traffic will be lost after removing the cross connection

- Deleting or changing a cross connection is traffic affecting if the current existing cross connection is carrying traffic.

Related information   This section describes the provisioning of unprotected transmission paths. The provisioning of paths with SNC/N protection is described in the following separate section ″Provision Cross Connections with SNC/N Protection″.

The following procedures are used for test and maintenance of the provisioned path. These procedures are described in the chapter ″Maintenance Settings for Transmission″.

- port provisioning.

- provisioning termination points

- path trace provisioning.

More information about provisioning cross connection can be found in section Traffic Provisioning Concepts.

Procedure   Use the following procedure to add a cross connection in the *WaveStar*® AM 1 plus network element.

....

1   Select Provisioning -> Transmission -> AM1/AM1 Plus Cross Connects.

....

> **Result:**
>
> The *EMS - Provisioned AM1 and AM1 Plus Cross Connect List*
> window is displayed.

....

2 To select an NE or to switch to another NE, click the selection dialog
button. A list of possible NEs then appears in the *EMS- NE Selection
Dialog* window. Select the desired NE and click OK.

> **Result:**
>
> The window closes and reverts to the previous window which
> displays the requested information of the selected NE.

....

3 Set the Operation to *Add* and select the *Capacity.*

....

4 Set the Protection Type to *Unprotected.*

The direction in the Direction field is always set to *Bidirectional.*

....

5 Select the *Line Port* or *Cross Connect unit* in the upper list and select
the VC or *TU* in the lower list for each termination point in the From
and To columns.

If not all available termination points appear check if the TUG
structure is provisioned to make the cross connections on the desired
level. Change the TUG Structure if necessary. The procedure to
change the TUG Structure is described in the section ″Provision TUG
structure″.

....

6 Click Apply and verify in the message box if the operation is
successful (Operation Successful).

> **Result:**
>
> A cross connection is made between the termination points
> selected in the From and To columns.

....

7 Click Close to return to the previous window.

> **Result:**
>
> The new cross connections appear in the *EMS - Provisioned
> AM1 Cross Connect List* window.

....

8 Click Close to exit.

E N D   O F   S T E P S

....□

Procedure to Delete a Cross Connection

Procedure Follow these steps to delete cross connections.

1 Select Provisioning -> Transmission -> AM1/AM1 Plus Cross Connects.

Result:

The *EMS - Provisioned AM1 and AM1 Plus Cross Connect List* window is displayed.

2 To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

Result:

The window closes and reverts to the previous window which displays the requested information from the selected NE.

3 Set the Operation to *Delete* and select the *Capacity*.

4 Select the *Line Port* or *Cross Connect unit* in the upper list and select the VC or *TU* in the lower list for each termination point in the From and To columns.

Important! If the cross connection to be deleted still carries traffic, this traffic will be lost.

5 Click Apply and verify in the message box if the operation is successful (Operation Successful).

Result:

The selected cross connection is deleted.

6 Click Close to return to the previous window.

Result:

The deleted cross connection no longer appears in the *EMS - Provisioned AM1 Cross Connect List* window.
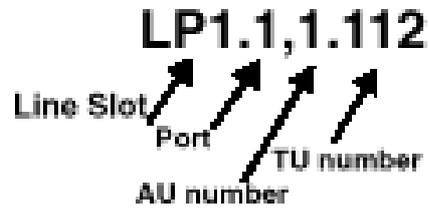
7 Click Close to exit.

E N D   O F   S T E P S

□

Parameters for Provisioning Cross Connections without Protection

Overview   The following parameters are used to provision cross connections without protection.

Operation   In this field, select one of the operation options to perform provisioning cross connection without protection.

Capacity   The capacity of the cross connection: This can be VC-4, VC-3 or VC-12.

Direction   The following types of cross connections are possible:

- uni-directional cross connection or VCn loopback connection

- bi-directional cross connections.

From and To Termination Points   The cross connections are made between the termination points. The From and To columns are used to select these termination points. For a VCn loopback connection the termination points in the From and To columns are the same.

For unprotected cross connections it makes no difference which TP is selected in the From list and which TP is selected in the To list.

The termination point is selected from a list of available termination points.

- In the Upper List all available Line Ports and Tributary unit are listed.

- In the Lower List all available VC's (Tributary) or TU's are listed.

□

Section: Provision Cross Connections with SNC Protection

Overview

Purpose To provide traffic over the network, cross connections must be provisioned in the network elements. The cross connection settings can be modified if the traffic demands changes. The following changes can be made:

- add a cross connection with SNC protection

- add protection to or remove protection from an existing cross connection

- delete a cross connection with SNC protection

□

Procedure to Add Cross Connections with SNC Protection

When to use

When a new traffic plan is implemented or the existing traffic plan is changed.

Before you begin

To make a cross connection first determine the following:

- What is the capacity of the cross connection? VC-12, VC-3 or VC-4?

- Is the TUG Structure provisioned in such a way that the capacity can be selected? The procedure to check and change the TUG Structure is described in the section ″Provision TUG Structure″.

- Does the cross connection require SNC/N protection or is it unprotected ?

- Between which termination points is the cross connection made and which termination point is used for the SNC/N protection path

- Before *adding* a cross connection or a part of a cross connection be sure to have all information regarding the design of the transmission path

- Before *deleting* a cross connection or part of a cross connection be sure that the cross connection to be removed doesn't still carry traffic? After removing the cross connection this traffic will be lost

- Deleting or changing a cross connection is traffic affecting if the current existing cross connection is carrying traffic.

Related information

This section describes the provisioning of SNC protected transmission paths. The provisioning of paths without protection is described in the following separate section:

- section ″Provision Cross Connections without Protection″

The following procedures are used for test and maintenance of the provisioned path.

- port provisioning.

- provisioning termination points

- path trace provisioning

These procedures are described in the chapter ″Maintenance Settings for Transmission″.

Procedure   Use the following procedure to add a cross connection in the
WaveStar ®AM 1 network element.

....

1   Select Provisioning -> Transmission -> AM1/AM1 Plus Cross
Connects.

Result:

The *EMS - Provisioned AM1 and AM1 Plus Cross Connect List*
window is displayed.

....

2   To select an NE or to switch to another NE, click the selection dialog
button. A list of possible NEs then appears in the *EMS- NE Selection
Dialog* window. Select the desired NE and click OK.

Result:

The window closes and reverts to the previous window which
displays the requested information of the selected NE.

....

3   Set the Operation to *Add* and select the *Capacity.*

....

4   Set the Protection Type to *Protected.*

The direction in the Direction field is always set to *Bidirectional.*

....

5   Select the *Slot* or *Port* in the upper list and select the VC or *TU* in the
lower list for each termination point in the From, To and Protection
columns.

If not all available termination points appear check if the TUG
structure is provisioned to make the cross connections on the desired
level. Change the TUG Structure if necessary. The procedure to
change the TUG Structure is described in the section ″Provision TUG
structure″.

....

6   Click Appl y and verify in the message box if the operation is
successful (Operation Successful).

Result:

A cross connection is made between the termination points
selected in the From, To and Protection columns.

....

7   Click Cl ose to return to the previous window.

....

Result:

The new cross connections appear in the *EMS - Provisioned AM1 Cross Connect List* window.

....

8 Click Cl ose to exit.

E N D O F S T E P S

....

☐

Procedure to Add Protection to an Unprotected Cross Connection

When to use   When a new traffic plan is implemented or the existing traffic plan is changed.

Before you begin   To make a cross connection first determine the following:

- What is the capacity of the cross connection? VC-12, VC-3 or VC-4.?

- Is the TUG Structure provisioned in such a way that the capacity can be selected? The procedure to check and change the TUG Structure is described in the section ″Provision TUG Structure″.

- Does the cross connection require SNC/N protection or is it unprotected ?

- Between which termination points is the cross connection made and which termination point is used for the SNC/N protection path

- Before *adding* a cross connection or a part of a cross connection be sure to have all information regarding the design of the transmission path

- Before *deleting* a cross connection or part of a cross connection be sure that the cross connection to be removed doesn't still carry traffic? After removing the cross connection this traffic will be lost

- Deleting or changing a cross connection is traffic affecting if the current existing cross connection is carrying traffic.

Related information   This section describes the provisioning of SNC protected transmission paths. The provisioning of paths without protection is described in the following separate section:

- section ″Provision Cross Connections without Protection″

- The section ″Provision TUG Structure″ describes how to check and if necessary change the TUG Structure.

The following procedures are used for test and maintenance of the provisioned path.

- port provisioning.

- provisioning termination points

- path trace provisioning

These procedures are described in the chapter ″Maintenance Settings for Transmission″.

Procedure   Follow these steps to add protection to an unprotected cross
connection.

....

1   Select Provisioning -> Transmission -> AM1/AM1 Plus Cross
Connects.

Result:

The *EMS - Provisioned AM1 and AM1 Plus Cross Connect List*
window is displayed.

....

2   To select an NE or to switch to another NE, click the selection dialog
button. A list of possible NEs then appears in the *EMS- NE Selection
Dialog* window. Select the desired NE and click OK.

Result:

The window closes and reverts to the previous window which
displays the requested information of the selected NE.

....

3   Select an unprotected cross connection from the list and click Edit.

Result:

The *EMS - Edit Provisioned AM 1 and AM1 Plus Cross
Connections* window appears. The selected cross connection is
preselected in the *To* and *From* list.

....

4   Set the Protection Type to *Protected.*

The direction in the Direction field is always set to *Bidirectional.*

....

5   Select a termination point in the *Protection* column, click Appl y and
verify in the message box if the operation is successful (Operation
Successful).

Result:

The cross connection appears with protection in the
EMS-Provisioned AM 1 Cross Connect List window

....

6   Click Cl ose to exit.

E N D   O F   S T E P S
....

☐

....
365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

5 - 3 1

Procedure to Remove a Protection from an SNC Protected Cross Connection

⚠ **WARNING**

Removing the protection of the cross connection degrades the transmission path. The transmission path is no longer protected. A failure in the signal results in loss of traffic.

Procedure   Follow these steps to remove the protection of an existing SNC protected cross connections

1   Select Provisioning -> Transmission -> AM1/AM1 Plus Cross Connects.

> **Result:**
>
> The *EMS - Provisioned AM1 and AM1 Plus Cross Connect List* window is displayed.

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

> **Result:**
>
> The window closes and reverts to the previous window which displays the requested information of the selected NE.

3   Select an SNC protected cross connection from the list and click Edit.

> **Result:**
>
> The *EMS - Edit Provisioned AM1 and AM1 Plus Cross Connect* window appears. The selected cross connection is pre-selected in the *From*, *To* and *Protection* lists.

4   Select `Delete Protection` in the Operation area. De-select the termination point in either the *From* or *Protection* list. Low order cross connections (VC-12 or VC-3 level) must be deselected in the lower list, high order cross connections (VC-4 level) in the upper list.

Important! When removing the protection from low order cross connections, check if it the high order cross connection made from the

Section: Provision Cross Connections with
SNC Protection
Procedure to Remove a Protection from an
SNC Protected Cross Connection

Path Provisioning and Protection

protection line port to the cross connect unit should also be removed
(delete the VC-4 cross connection).

....

5   Click Appl y and verify in the message box if the operation is
successful (Operation Successful).

Result:

The cross connection appears in the *EMS-Provisioned AM1
Cross Connect List* window without protection.

....

6   Click Cl ose to exit.

E ND   OF   S TEPS
....

□

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

5 - 3 3

Procedure to Delete a Cross Connection with SNC Protection

Procedure   Follow these steps to delete cross connections.

1   Select Provisioning -> Transmission -> AM1/AM1 Plus Cross Connects.

Result:

The *EMS - Provisioned AM1 and AM1 Plus Cross Connect List* window is displayed.

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

Result:

The window closes and reverts to the previous window which displays the requested information from the selected NE.

3   Select Delete in the Operation field and the cross connection to be deleted from the list and click Edit.

Important! If the cross connection to be deleted still carries traffic, this traffic will be lost.

Result:

The *EMS - Edit Provisioned AM1 and AM1 Plus Cross Connect* window appears. The delete option is preselected.

4   Click Appl y and verify in the message box if the operation is successful (Operation Successful).

Result:

The selected cross connection is deleted.

5   Click Cl ose to return to the previous window.

Result:

The deleted cross connection no longer appears in the *EMS - Provisioned AM1 Cross Connect List* window.

6   Click Cl ose to exit.

E N D   O F   S T E P S

□

Parameters for Provisioning Cross Connections with SNC Protection

Overview The following parameters are used to provision cross connections with protection.

Operation In this field, select one of the operation options to perform provisioning cross connection with protection.

Capacity The capacity of the cross connection: This can be VC-4, VC-3 or VC-12.

Connection Type The following types of cross connections are possible:

- *From <-> To*: an unprotected cross connection

- *From <-> To <-> Protection*: a cross connection with SNC/N protection.

From, To and Protection Termination Points The cross connections are made between termination points. The *From*, *To* and *Protection* columns are used to select these termination points.

For protected cross connections the tributary TP must always be in the To area. The TP used for protection is always selected in the Protection area

The termination point is selected by the *Slot* and *Port* where the termination point belongs to. The *AU4#* is 1 when the line port carry STM-1 signals and 4 when the line port carry STM-4 signals.

- In the Upper List (Tributary/Line) a line port or tributary unit can be selected from a list of available ports/units.

- In the Lower List (VC/TU) a VC (on tributary ports) or TU (on line ports) is selected from a list of available VC/TUs.

Example:

Section: Provision Cross Connections with
SNC Protection
Parameters for Provisioning Cross
Connections with SNC Protection

Path Provisioning and Protection

LP1.1,1.112

Line Slot

Port

AU number

TU number

TP1.12

Trib Slot   Port

☐

Section: View SNC Protection

5 - 37

Overview

Purpose   To view the SNC connectivity Information in the selected network.

☐

Viewing SNC Information

When to use To view the SNC connevtivity information in the selected network. The SNC connectivity information can be used to check line capacity in the ring and to determine if existing protection is provisioned correctly.

Before you begin NO prerquisites or precautions are needed when performing this procedure.

Related information Section Traffic Provisioning Concepts provides information about SNC protection.

Procedure

1 Select *Protection -> Transmission -> AM-1 VC# SNC*.

   Result:

   The *EMS - Provisioned AM-1 SNC Protection Information* window is displayed.

2 To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

   Result:

   The window closes and reverts to the previous screen which will display the requested information of the selected NE..

3 Click Close to exit this window.

   Result:

   The window closes.

   E ND OF S TEPS

   ☐

Parameters for Viewing SNC

Selection   Displays the selected Provisioned NE and its configuration.

Capacity   This selection allows the user to filter on particular cross connect capacities. Values are: All, VC-4, VC-3 and VC-12.

SNC list   Lists the SNC pairs and switch state. Displays the current state of the protection switch.

□

Section: View MSP Protection

Overview

Purpose   To view the MSP connectivity information for established MSP
protection pairs in the selected network element.

☐

Viewing MSP Information

....

When to use	To view the MSP connectivity information for established MSP protection pairs in the selected network element. The MSP connectivity information can be used to check availability and to determine if existing protection is provisioned correctly according the transmission plan.
Before you begin	No prerquisites or precautions are needed when performing this procedure.
Related information	Section Traffic Provisioning Concepts provides information about MSP protection.

Procedure

....

1   Select *Protection -> Transmission -> MSP*.

> **Result:**
>
> The *EMS - MSP Protection Information* window is displayed.

....

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

> **Result:**
>
> The window closes and reverts to the previous screen which will display the requested information of the selected NE.

....

3   Click Close to exit this window.

> **Result:**
>
> The window closes.

E ND OF S TEPS

....

□

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

5 - 4 1

Parameters for viewing MSP

....

Selection   Displays the selected Provisioned NE and its configuration.

MSP list   Lists the MSP protection pairs and the Operation State. The operation state indicates the current operation state for MSP pair.

Communication Mode   Displays whether the protection is Unidirectional or Bidirectional. In the case of failure with Unidirectional mode the receive side switches. In the Bidirectional mode both sides are switched. When the Unidirectional mode is displayed the Far End selections are greyed out.

Service Reference   Displays what the service of the selected reference is. This can be Working, Protection or Unclear.

Switch State   Shows the current state of the MSP pair.

Wait to Restore Time   If MSP mode is ETSI, then WTR is the wait to restore time after the failure on the active section has cleared in the revertive mode. Values are 0..60.

Near End   Displays the service reference at the Near end. This can be Working, Protection or Unclear.

Last switch request   Displays the last switch MSP request.

□

....
Lucent Technologies - Proprietary   365-312–521
Issue a, June 2001

Section: Edit MSP Protection

Overview

Purpose   To set or change protection on a point-to-point connection.

Editing MSP Information

When to use
To set or change protection on a point-to-point connection. MSP protection should be established when the transmission plan calls for a protection of a particular point to point connection.

Before you begin
Before editing MSP information determine the following:

- A protected switch is always traffic affecting.

- If the physical timing reference of units is assigned to a single logical timing references then these units are no longer available for MSP protection.

- If a port loopback is set on a port, then this port is not available for MSP protection.

- MSP pair must be present and physically set up on the Near End and Far End Network Elements. In other words, a MSP card inserted and fiber pairs connected on both Network Elements.

Related information
Related procedures and information are:

- Slot provisioning

- Port provisioning

- Section Traffic Provisioning Concepts provides information about MSP protection.

Procedure

1 Select *Protection -> Transmission -> MSP*.

   Result:

   The *EMS - MSP Protection Information* window is displayed.

2 To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS - NE Selection Dialog* window. Select the desired NE and click OK.

   Result:

   The window closes and reverts to the previous screen which will display the requested information of the selected NE.

3 Click Edit.

   Result:

   The *EMS - Edit MSP Protection Information* window is displayed.

....

4 First select Add, Modify or Delete and make a selection from the list.

> **Result:**
>
> The parts that are not applicable for a certain selection are greyed out.

....

5 Add: Allows the creation of a MSP pair (selecting the working and protection section) and filling in the MSP parameters. Modify: Allows only entering WTR for a selected pair. Delete: Deletes the selected pair. Make the selections with usage of the above parameter information and click OK.

> **Result:**
>
> If Delete is chosen the message: This operation may be service affecting will be displayed. After confirming the operation statue can be verified in the message box . If the operation is accepted the message Operation Successful will be displayed. Otherwise Operation failed will be displayed. The window will close and returns to the previous screen.

....

6 Click Close to exit this window.

> **Result:**
>
> The window closes.

E ND   OF   S TEPS

....

□

Parameters for Editing MSP

....

Operation	The possible operations which can be performed on MSP protection. Values are Add, Modify, Delete or Switch.
MSP list	Lists the MSP protection pairs and the Operation State. The operation state indicates the current operation state for MSP pair.
Working/Protection Section	Working section shows the available ports on assigned cards supporting MSP that can be protected. Protection section will be filled in with the associated protection port once the working section has been selected.
Communication Mode	Displays whether the protection is Unidirectional or Bidirectional. In the case of failure with Unidirectional mode the receive side switches. In the Bidirectional mode both sides are switched. When the Unidirectional mode is displayed the Far End selections are greyed out.
Switch Mode	Displays whether the protection is Revertive or Non-Revertive. In the case of failure with Revertive mode the traffic switches to the protected line and switches back when the failure is solved. In the Non-Revertive mode the traffic switches to the protected line and remains even when the failure is solved.
Switch Request	Selection of the switch requests that can be performed on the MSP.
Wait to Restore Time	If MSP mode is ETSI, then WTR is the wait to restore time after the failure on the active section has cleared in the revertive mode. Values are 0..60.

☐

....

6   Maintenance Settings for Transmission

Overview

Purpose	In this chapter each section describes a task which can be executed to test or monitor an existing path or to perform maintenance on an existing path. In this chapter it is assumed that a path is already created. The chapter ″Path Provisioning and Protection″ describes hoe to create these transmission paths.
Objective	To set up the network element for testing, monitoring and maintenance of the transmission paths.

Outcome   The outcome of the maintenance settings can be:

- traffic that is transported through the network element can be tested and/or monitored
- if protection is used, a switch can be performed when a path has to be rerouted due to maintenance activities
- alarm messages come up if the traffic contains errors.

Intended Use   The following table describes the tasks that are described in this chapter.

Task	Purpose
Port Provisioning	Configures, whether input signals are monitored or not, specifies the type of signal
Provision Termination Points	Configures the logical ports
Provision Path Trace	Test the established path

Task	Purpose
Provision Signal Degrade Thresholds	Define the values at which the signal is considered of degraded quality, so that an alarm is raise or a SNC protection switch is performed
Switch SNC Protection	Switch traffic for maintenance
Switch MSP	Switch traffic for maintenance

Each task is described in a separate section. The first section of this chapter describes the concepts of the maintenance settings for transmission.

□

Section: Port Provisioning

Overview

Purpose The purpose of port provisioning is to get an overview of all the physical ports of the network element or a specific unit, and to change the settings of these ports. The provisioning of timing ports is described in the chapter "Provisioning Timing" of this guide.

☐

Procedure for Port Provisioning

When to use   Use this procedure to:

- know which ports are provisioned in an NE and how they are provisioned
- change the port mode for the alarm handling
- enable or disable test loops.

Before you begin   Before starting to modify NE ports it is assumed that:

- information about the port is available: what is the port name? on which unit is it?
- there is no traffic on the ports that you want to test with a loopback.
- take care that loopbacks are disabled for normal operations. No normal traffic is possible when a loopback is enabled.

Related information   For more information reference is made to:

- Provisioning timing ports
- Traffic maintenance concepts in chapter Concepts.

Procedure   The following procedure describes the steps to provision a port of a network element.

1   Select *Provisioning -> Equipment -> Port*.

> **Result:**
>
> The *EMS - Provisioned NE Port Information* window is displayed.

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

> **Result:**
>
> The window closes and the *EMS - Provisioned NE Port Information* window lists all ports of the selected NE.

3   Select a port from the *EMS - Provisioned NE Port Information List* and click Edit. Only one port can be selected at the same time, therefore each port must be provisioned separately.

Result:

The *EMS - Edit Provisioned NE Port Information* window is
displayed.

....

4 Set the desired parameters for the selected port. Then, click OK.

Important! If Inloop is enabled, normal traffic via this port is no
longer possible. Only enable Inloop or Outloop for testing.

Result:

The status can be verified in the message box. If the operation is
accepted the message Operation Successful will be displayed.
The window closes.

....

5 Click Close to exit the *EMS - Provisioned NE Port Information*
window

E N D   O F   S T E P S

□

Parameters for Port Provisioning

Introduction   For each port type there is a special window to provision the ports. The WaveStar® AM 1 always has two STM-1 or STM-4 line ports and sixteen 2Mbit/s ports. If an additional tributary board is installed the following ports can also be available:

- 1.5 Mbit/s
- 2 Mbit/s ports, which can be used for ISDN PRI interface
- 34 Mbit/s ports
- 45 Mbit/s ports
- X.21 ports
- Ethernet ports
- STM-1 ports

Port Types

The following table shows the port types and which parameters are valid for each port.

Para-meters	1.5 Mbit/s	2 Mbit/s	34 Mbit/s	45 Mbit/s	X.21	Ether-net	STM 1 (trib)	STM 1 or 4 (line)
Physical Interface Type	—	—	—	—	—	—	—	x
Port Mode	x	x	x	x	x	x	x	x
Auto Mode Time	x	x	x	x	x	x	x	x
Loop-back State	x	x	x	x	x	—	—	—
Cable length	x	—	—	x	—	—	—	—
Auto-negotiation	—	—	—	—	—	x	—	—
Eth-ernet port parameters	—	—	—	—	—	x	—	—

Port   The name of the physical ports consist of two parts separated by a dot. The first part is related to the (logical) slot name, the second part is the port number within that slot.

Example: LP2.1, TP1.3, LAN2.1

Between brackets the type of signal, for which the port is an interface point, is indicated.

Example: 2 Mbit/s, 34 Mbit/s, STM-1.

Port Mode The *Port Mode* controls whether input signals should be monitored or not monitored. The following values can be set.

Value	Description
Monitored	The port is configured to provide service and the port signal is monitored.
Auto	The port is configured not to provide service yet. Use this mode when the signal source in the remote NE is not operational yet. As soon as the NE establishes the continuous presence of a fault-free signal for a certain period (*Port Mode Time*), the port automatically changes to *Monitored*.
Not Monitored	The port is configured to not monitor the port signal on the port. No alarms are generated for this port. If there still is a signal present on the not monitored port it is possible to receive a Not Expected Input Signal (NES) alarm. The alarm status of NES must then be provisioned to be *Reported*.

Auto Mode Time The time in minutes during which a fault-free signal must be received continuously before the *Port Mode* switches from *Auto* to *Monitored*.. The default is 10 minutes.

The *Port Mode Time* can be set from 0-30 minutes in steps of 1 minute.

Loopback State Loopbacks are used to test the physical ports.

- No Loop is set for normal use of the physical port. The port is not looped back for testing

- An Inloop is a loopback that routes an input signal, received at the physical port, directly back to its corresponding output without altering the signal format. The inloop can be used to test the connectors. Only one inloop can be set at the same time.

- An Outloop is a loopback that routes an output signal, coming from the cross connect, at the physical port back to the corresponding input port. The Outloop can be used to test the signal passes through the system.

Cable Length   For 1.5 Mbit/s (DS1) and 45 Mbit/s (DS3) signals.

For 1.5 Mbit/s signal a cable length of 0 to 200 metres can be provisioned in steps of 40 metre.

For 45 Mbit/s a cable length can be up to 136 metres (450 feet). Two levels can be provisioned, covering the following cable lengths:

- 0 - 35 metres (0-120 feet)

- 35 - 136 metres (120 - 450 feet).

Auto-Negotiation   It is possible to enable or disable the Auto-negotiation function at the physical layer of the LAN port by setting the mode to enabled respectively disabled. Setting the mode to disabled will be done when the TransLAN board interworks with equipments not supporting the auto-negotiation function. In this case the user can force the port speed (10 Mbit/s or 100 Mbit/s) and select the half duplex or full duplex mode.

Ethernet Port Parameters   The following ethernet port parameters can be set when the auto-negotiation is disabled:

- port speed; set to 10 Mbit/s or 100 Mbit/s

- duplex mode; set to half duplex or full duplex

- pause mode; this fuction can be set to enabled or disabled only when the duplex mode is full duplex.

☐

Section: Provisioning Termination Points

6 - 9

Overview

Purpose   The termination points enable the user to set or view parameters derived from data stored in the overhead bytes of the signals.

☐

Procedure to Provision Termination Points

When to use   Termination points should be set after provisioning the transmission path according to the transmission plan.

Before you begin   If the Trace Identifier Mismatch detection (TIM) is enabled, traffic will be lost when a mistake in the trace string is made. Upon mismatch Alarm Indication Signal (AIS) is inserted in the downstream signal and Remote Defect Indicator (RDI) is inserted in the upstream signal

Related information   The following procedures and information are related:

- Provision Cross Connections: in ″Path Provisioning and Protection″ chapter
- Path Trace Provisioning
- Provision Degraded Signal Thresholds
- Section Traffic Maintenance Concepts in chapter Concepts.

Procedure   Follow this procedure to provision termination points. The following termination point types can be provisioned: PDH signal, VC-12, VC-3, VC-4, TU-12, TU-3, AU-4, RS and MS.

1   Select Provisioning -> Transmission -> Terminations Points and then select one of the listed signals.

To provision RS and MS termination points select RS and MS.

> **Result:**
>
> The _EMS - Provisioned NE TP Information_ window is displayed.

2   To select a port or to switch to another port or to another NE, click the selection dialog button. Select the correct slot, port and NE in the _Provisioned Port Selection Dialog_ window

> **Result:**
>
> The _EMS - Provisioned NE TP Information_ window appears with a list of termination points on the selected port.

3   Select the type of termination point in the _TP Type_ box and the termination point to be provided from the TP list.

Result:

The information about the selected termination point is displayed.

....

4 Check the current settings and click Edit to modify it.

Result:

The *EMS - Edit Provisioned NE Termination Point Information* window appears.

....

5 Make the required changes and Click OK.

Result:

A confirmation window appears, stating that changes in this window may be traffic affecting.

....

6 Click Yes to confirm.

Result:

The Edit window closes and the changed termination point settings are displayed in the *EMS - Provisioned NE Termination Point Information* window.

....

7 Click Close to exit.

E N D   O F   S T E P S
....

□

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

6 - 1 1

Parameters for Provisioning Termination Points

....

Introduction   The following Termination Points can be provisioned for the *WaveStar®* AM 1plus: VC-12, VC-3, VC-4, TU-12, TU-3, AU4 and PDH signal.

The following list shows which parameter can be set for which termination points

- TP mode: VC-12, VC-3, VC-4 and PDH signal

- Path trace: VC-12, VC-3, VC-4, TU-12, TU-3.

- Signal label: VC-12, VC-3, VC-4

- TUG structure: VC-4

- Degraded Signal Threshold: VC-12, VC-3, VC-4, TU-12, TU-3

Selected TP   The name of the selected termination point.

The termination point is selected by the *Slot* and *Port* where the termination point belongs to. The AU4# is 1 when the line ports carry STM-1 signals and 4 when the line ports carry an STM-4 signal.

The name of the termination points consist of the physical port name (slot name and port number) followed by the AU-4 number and for low order signals, the VC number (VC-12 or VC-3). The VC number consists of:

- the number of the TUG-3 inside the VC-4

- the number of the TUG-2 inside the TUG-3

- the TU-12 number inside the TUG-2.
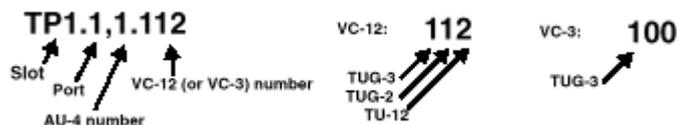
Example:

TP Type   The termination point type indicates where the signal is terminated.

Example: VC-12, TU-3, AU-4

TP Mode   Indicates whether the signal on the termination point will be monitored.

....

    Lucent Technologies - Proprietary
See notice on first page   365-312–521
Issue a, June 2001

When *Monitored* alarms are generated related to the selected termination point. When *Not Monitored* no alarms are generated for the selected termination point.

Path Trace   This area is used to provision a path trace. Provisioning a path trace is described in the section ″Path Trace Provisioning″.

TP Numbering   The Transmitted and Accepted (received) sequence number of a VC-3 that is part of a virtually concatenated VC-3 (VC-3–2v). The sequence number is either 1 or 2. The VC-3–2v is used to map Ethernet packets over SDH signals. The concept section of this chapter describes virtually concatenated VC-3s.

Signal Label   The signal label is part of the path overhead of a VC-n signal and indicates what type of signal is carried by the container.

Example: Unequipped, Asynchronous, TUG structure, ATM

- Signal Label Transmit is the signal label of the transmitted signal
- Signal Label Accepted is the signal label of the received signal
- Signal Label Accepted Status is the status of the received signal label.

Example: Normal, *Unavailable*, *Unequipped*, *AIS*

TUG Structure   Displays the TUG structure of the VC-4. This is described in the section ″ Provisioning TUG Structure″.

Degraded Signal Threshold   Indicates the number of errors (EB: Errored Blocks) that are allowed to occur during the given period before the signal is declared degraded. If this number is exceeded and the *Port Mode* is set to Monitored, a signal degrade alarm is generated. A choice can be made between 2 thresholds. The section ″Provision Degraded Signal Thresholds″ describes the setting of these thresholds.

☐

Section: Path Trace Provisioning

Overview

....

Purpose   The purpose of provisioning a path trace is to make sure the traffic is not delivered to the wrong destination.

                                                                                                    ☐

....

Lucent Technologies - Proprietary

Procedure to Provision a Path Trace

When to use A path trace can be set at any time. Path trace provisioning can be done once, after provisioning a path, to check whether the path is correctly provisioned. Path trace can also be used continuously to check if the traffic is delivered to the correct destination. When provisioning a path trace on a path with traffic on it, take notice of the precautions.

Before you begin Before provisioning a path trace determine the following:

- in which termination point is the path trace inserted and in which termination points is it monitored?
- which label is used as path trace?
- if the Trace Identifier Mismatch (TIM) detection is enabled, traffic will be lost when a mistake in the trace string is made. Upon mismatch, an Alarm Indication Signal (AIS) is inserted in the downstream signal and Remote Defect Indicator (RDI) is inserted in the upstream signal.

Related information Related procedures and information are:

- Provisioning Cross Connections in the chapter Path Provisioning and Protection
- Provisioning Termination Points
- Traffic Maintenance Concepts.

Procedure Use the following procedure to provision a path trace. For the *WaveStar*® AM 1 plus a path trace can be set on the VC-12, VC-3 and VC-4 and STM-N signals.

1 Select Provisioning -> Transmission -> Termination Points and then select the termination point type

> **Result:**
>
> The *EMS - Provisioned NE TP Information* window is displayed.

2 To select a port or to switch to another port or to another NE, click the selection dialog button. Select the correct slot, port and NE in the *Provisioned Port Selection Dialog* window

Result:

The *EMS - Provisioned NE Termination Point Information* window appears with a list of termination points on the selected port.

....

3 Select the type of termination point in the *TP Type* box and the termination point, where the path trace is inserted or received, from the list.

Result:

The path trace information of the selected termination point is displayed in the *path trace* area of the *EMS - Provisioned NE TP Information* window.

....

4 Check the current settings and click Edit to modify them.

Result:

The *EMS - Edit Provisioned NE Termination Point Information* window appears.

....

5 Fill in the path trace (API transmit and/or API expected) and/or set the other parameters. Click OK.

Important! If the Trace Identifier Mismatch (TIM) detection is enabled, traffic will be lost when a mistake in the trace string is made. Upon mismatch, an Alarm Indication Signal (AIS) is inserted in the downstream signal and Remote Defect Indicator (RDI) is inserted in the upstream signal

Result:

A confirmation window appears, stating that changes in this window may be traffic affecting. If the Transmit and/or Expected Access Point Identifier are blank another confirmation window is opened.

....

6 Click Yes to confirm.

Result:

The Edit window closes and the changed path trace settings are displayed in the *EMS - Provisioned NE Termination Point Information* window.

....

....

7   Check if the Access Point Identifier Accepted equals the Access Point
Identifier Expected. Click Close to exit.

E N D   O F   S T E P S
....

☐

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

6 - 1 7

Parameters for Path Trace Provisioning

....

Introduction To make sure the traffic is not delivered to the wrong destination, a path trace can be set. A label (TI), for example a word, is inserted in the path overhead. To check if the path is correctly provisioned the received path trace is compared with the expected value. For the *WaveStar*® AM 1 a path trace can be set on the STM-N, VC-12, VC-3 and VC-4 signals.

Example of a Path Trace
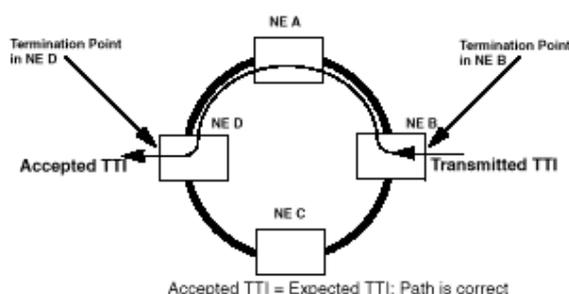
Trace Identifier (TI) The Trace Identifier (TI) is inserted in the path overhead. For STM-N signals the J0 byte in the RSOH is used, for VC-4/VC-3 signals byte J1 is used and for VC-12 signals byte J2 is used. For the TI a 16 byte frame is composed which includes one CRC-7 byte for error detection. therefore the TI can be 15 bytes long (15 characters or 30 hexadecimal digits). There are 3 TI values:

- TI Transmit: The TI inserted in the path overhead is sent to the other side of the path.

- TI Expected: The TI expected from the other side of the path.

- *TI Accepted*: The TI actually received.

TI Mode The TI Mode can be set for TI Transmit and *TI Expected* and can have the following values:

- *Specific String*: The TI is a string with maximum length of 15 bytes. This string is identified in the Access Point Identifier (API). In *Alphanumeric* mode any alphanumeric character can be used, in *HEX* mode only 00 .. 7F can be used.

- *Non Specific Byte*: The Trace Identifier matches if it is any constant byte value within the range 00 .. FF. If the byte value is not constant, Trace Identifier Mismatch is assumed. No check between Accepted API and Expected API is performed.

....

Access Point Identifier   The Access Point Identifier (API) is the label that is inserted in the path overhead. This is not valid if the *TI Mode* is set to *Non Specific Byte*.

There are 3 API values:

- Access Point Identifier Transmit: The API that is sent to the other side of the path.

- Access Point Identifier Expected: The API expected from the other side of the path.

- Access Point Identifier Accepted: The API actually received.

Access Point Identifier Format   The format can be set for Access Point Identifier Transmit and Access Point Identifier Expected.

The format can be set to alphanumeric *(ASCII)* or hexadecimal *(HEX)*.

TIM Detection   TIM is Trace Identifier Mismatch comparison between the expected and accepted API. If this is enabled and the APIs do not match, a Path Trace Identifier Mismatch alarm is raised.

Important! If the Trace Identifier Mismatch (TIM) detection is enabled, traffic will be lost when a mistake in the trace string is made. Upon mismatch, an Alarm Indication Signal (AIS) is inserted in the downstream signal and Remote Defect Indicator (RDI) is inserted in the upstream signal

□

Section: Provision Degraded Signal Thresholds

Overview

Purpose   The purpose of provisioning degraded signal thresholds is to define how many errors a signal may have before it is considered degraded. A degraded signal causes a *Moderate Block Error Rate* alarm. A degraded signal can cause an SNC/N protection switch if the path for that signal is SNC/N protected, or an MSP switch if MSP protection is used.

☐

Lucent Technologies - Proprietary
See notice on first page

Procedure to Select a Threshold Value for a Signal

....

When to use Changing the degraded signal thresholds is only done according to a change in the transmission plan.

Before you begin Before you begin determine the following:

- The threshold values (number of errored blocks and number of seconds) must be known.

- Changing the values of the Signal Degrade Thresholds can degrade the transmission path. Depending on these values alarms are generated and SNC/N or MSP protection switches are made.

Related information Related Procedures are:

- Port Provisioning

- Provisioning Termination Points

- Section Traffic Maintenance Concepts in chapter Concepts.

Procedure This procedure describes how to select a threshold value for a specific signal. A choice can be made between two threshold values. Modifying the values of these two thresholds is described in the ″Procedure to Set or Modify the Threshold Values″. .

....

1 Select Provisioning -> Transmission -> Termination Points and then select the termination point type for which the signal threshold value must be selected.

....

2 To select another NE, click the selection dialog button. Select the correct NE in the *Provisioned Port Selection Dialog* window and click Edit.

Result:

The *EMS - Edit Provisioned NE RS and MS Termination Point Information* window appears for the STM-1 or STM-4 signal, the *EMS - Edit Provisioned NE Termination Point Information* window for the VC-4, VC-3, TU-3, VC-12 and TU-12 termination points and the *EMS - Edit Provisioned NE PDH Information* window for the PDH signal.

....

3 In the Degraded Value Selection box make a choice between Value 1 and Value 2 and click OK.

....

Result:

The new threshold is set and its values are displayed in the concerning windows.

....

4 Click Cl ose to exit.

E N D   O F   S T E P S

....

□

Procedure to Set or Modify the Threshold Values for a Signal

When to use   Changing the degraded signal thresholds is only done according to a change in the transmission plan.

Before you begin   Before you begin determine the following:

- The threshold values (number of errored blocks and number of seconds) must be known.
- Changing the values of the Signal Degrade Thresholds can degrade the transmission path. Depending on these values alarms are generated and SNC/N or MSP protection switches are made.

Related information   Related Procedures are:

- Port Provisioning
- Provisioning Termination Points
- Section Traffic Maintenance Concepts in chapter Concepts.

Procedure   This procedure describes how to set or modify the threshold values 1 and 2 for a specific signal.

1   Select Provisioning -> Transmission -> Termination Points and then select Signal Degrade Threshold.

   Result:

   The *EMS - Signal Degrade Thresholds* window appears.

2   To select another NE, click the selection dialog button and select the correct NE in the *Provisioned NE Selection Dialog* window

   Result:

   The *EMS - Signal Degrade Thresholds NE* window appears with a list of termination points on the selected NE.

3   Select the termination point type for which the threshold values must be set or modified and click Edit.

   Result:

   The *EMS - Edit Signal Degrade Thresholds* window appears.

4   Fill in the Value One and Value Two fields the amount of Errored Blocks/Second and the Time Interval in seconds and click OK.

Section: Provision Degraded Signal
Thresholds
Procedure to Set or Modify the Threshold
Values for a Signal

Maintenance Settings for Transmission

Important! An error message popped up if values entered are out of range.

....

5 Click Close.

Result:

The new threshold is set and its values are displayed in the *EMS - Signal Degrade Thresholds* window.

....

6 Click Close to exit.

E N D   O F   S T E P S

□

Parameters for Provisioning Degraded Signal Thresholds

....

Introduction

A degraded signal is a signal with more Errored Blocks (EB) per second than the defined *Errored Blocks* value during a period of consecutive seconds. A degraded signal causes a *Moderate Block Error Rate* alarm. A degraded signal can cause an SNC/N or MSP protection switch.

Degraded Values Selection

Two Thresholds can be defined for each signal level to declare a signal degraded. The thresholds are called *Value 1* and *Value 2*. A choice between these two thresholds can be made in the following windows:

- the *EMS - Edit Provisioned NE RS and MS Termination Point Information* window for the STM-1 and STM-4 signals

- the *EMS - Edit Provisioned NE Termination Point Information* window for the VC-4, VC-3 and VC-12 signal.

- the *EMS - Edit Provisioned NE PDH Information* window for PDH signals (ISDN PRI interfaces).

TP Type

The termination points on which the degraded signal thresholds can be set are *RS and MS* of the STM-1 signal and STM-4 signal, *VC-4 , VC-3 , TU-3, VC-12* or *TU-12*.

Errored Blocks /Second

In the termination points the signal is terminated and a Bit Interleaved Parity (BIP) check is performed on the received data. The result of this BIP check is compared to the values in the B or V5 bytes in the overhead of the signal. When there is a difference, an errored block is detected. The *Errored Blocks/Second* value determines how many Errored Blocks are allowed per second, before the second is declared a bad second.

The following table shows the range for the values for each signal type.

Signal Type	Range
MS for STM-N (N=1 or 4)	*1 to N x 24 x 8000 EB/s*
AU-4, AU-4c, VC-4	*1 to 8000 EB/s*
TU–3, VC–3	*1 to 8000 EB/s*
TU–12, VC–12, VC–11	*1 to 2000 EB/s*
2 Mbit/s (PDH to SDH)	*1 to 1000 EB/s*
2 Mbit/s (SDH to PDH)	*1 to 1000 EB/s*

....

Parameters for Provisioning Degraded
Signal Thresholds

Seconds   The number of consecutive bad seconds to declare a signal degraded.

□

Section: Switch SNC Protection

Overview

Purpose   To switch protection for individual paths on VC-4, VC-3 or VC-12 level.

☐

Switching SNC Protection

....

When to use Follow these steps to switch lines for individual paths on VC-4, VC-3 or VC-12 level.

Before you begin This switch should be requested when a number of specific path has to be rerouted due to maintenance activities.

- A switch is always traffic affecting

- An SNC path should have been provisioned.

Related information Related information are

- Set cross connections and their protection

- Traffic Maintenancs Concepts

Procedure ....

1 Select *Protection -> Transmission -> AM-1 VC# SNC*.

   Result:

   The *EMS - Provisioned AM-1 SNC Protection Information* window is displayed.

   ....

2 To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

   Result:

   The window closes and reverts to the previous screen which will display the requested information of the selected NE.

   ....

3 Make a selection from the list and click Edit.

   Result:

   The *EMS - Edit Provisioned AM-1 SNC Protection Information* window is displayed.

   ....

4 Fill in the fields *Switch Request* and *Hold Off Time (Seconds)* with usage of the above parameter information and click Apply.

   Result:

   Message: This operation may be service affecting will be displayed.

....

Lucent Technologies - Proprietary

....

5 Click Yes to continue.

Result:

In the messages box can be verified what the status is. If the operation is accepted the message Operation Successful will be displayed. Otherwise Operation failed will be displayed. The window will close and returns to the previous screen.

....

6 Click Close to exit.

Result:

The window closes.

E ND OF S TEPS
....

□

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

6 - 2 9

Parameters for Switching SNC Protection

Hold Off Time Provides the delay between the moment that the signal fail or degrade condition is set, and the start of the execution of the switch-over. The default value is 0.0 seconds. Values are 0.0 ... 10.0.

Switch Request The Switch Request descriptions and values are:

Description	Values
No change is made to the current state of the protection switch	*No Request*
Executing Clear on a line will undo only the previous switch request that is initiated on that specific line.	*Clear*
Will switch the traffic to the working regardless of the state of that leg. This will override a hardware protection switch. This is canceled with the clear command.	*Forced To Working*
Will switch the traffic to the protection regardless of the state of that leg. This will override a hardware protection switch. This is canceled with the clear command.	*Forced To Protection*
Will switch traffic to the working only when that working is error free and is not satisfying an equal or higher priority request. A hardware protection switch will override.	*Manual To Working*
Will switch traffic to the protection only when that protection is error free and is not satisfying an equal or higher priority request. A hardware protection switch will override.	*Manual To Protection*

□

Section: Switch MSP Protection

Overview

Purpose   To perform a switch on a transmission signal in a point-to-point connection. In executing this request, the signal will be switched from the worker to the protection or the other way around.

☐

Switching MSP

When to use   Follow these steps to switch MSP:

Before you begin   A MSP protection switch should be made if maintenance operations force traffic over a specific point-to-point connection to be rerouted. Before switching MSP determine the following:

- A switch is always traffic affecting

- MSP pair must be present and physically set up on the Near End and Far End Network Elements. In other words, a MSP card inserted and fiber pairs connected on both Network Elements.

Related information   Related procedures and information are:

- Slot provisioning.

- Port provisioning.

- Add MSP protection

- Section Traffic Maintenance Concepts in chapter Concepts.

Procedures

1   Select *Protection -> Transmission -> MSP*.

   Result:

   The *EMS - MSP Protection Information* window is displayed.

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

   Result:

   The window closes and reverts to the previous screen which will display the requested information of the selected NE.

3   Click Edit.

   Result:

   The *EMS - Edit MSP Protection Information* window is displayed.

4   First select Switch and select an MSP pair from the list.

Result:

The parts that are not applicable for a certain selection are
greyed out.

....

5 Make the selections with usage of the above parameter information
and click OK.

Result:

In the message box can be verified what the status is. If the
operation is accepted the message Operation Successful will be
displayed. Otherwise Operation Failed will be displayed. Switch
priority to low will be displayed if the switch request can not be
processed because another one with higher priority is active.
Invalid action parameters will be displayed if the switch request
is not allowed for the current MSP selections.

....

6 Click Close to exit this window.

Result:

The window closes.

E ND OF S TEPS
....

☐

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

6 - 3 3

Parameters for Switching MSP

....

Operation The possible operations which can be performed on MSP protection. Values are Add, Modify, Delete or Switch.

MSP list Lists the MSP protection pairs and the Operation State. The operation state indicates the current operation state for MSP pair.

Working/Protection Section Working section shows the available ports on assigned cards supporting MSP that can be protected. Protection section will be filled in with the associated protection port once the working section has been selected.

Communication Mode Displays whether the protection is Unidirectional or Bidirectional. In the case of failure with Unidirectional mode the receive side switches. In the Bidirectional mode both sides are switched. When the Unidirectional mode is displayed the Far End selections are greyed out.

Switch Mode Displays whether the protection is Revertive or Non-Revertive. In the case of failure with Revertive mode the traffic switches to the protected line and switches back when the failure is solved. In the Non-Revertive mode the traffic switches to the protected line and remains even when the failure is solved.

Switch Request Selection of the switch requests that can be performed on the MSP.

Description	Value
No request to switch has been issued.	*No Request*
Switch request which conditionally switches service to the working TP. In case a failure is detected an automatic switch will take place to the protection TP. If a failure exist manual switch is rejected because the switch priority is to low.	*Manual Switch to working*
Switch request which conditionally switches service to the protecting TP. In case a failure is detected an automatic switch will take place to the working TP. If a failure exist manual switch is rejected because the switch priority is to low.	*Manual Switch to protection*

....

Description	Value
Switch request which forces switching service to the working TP. It prevents automatic switching to the protecting TP even in case a failure is detected.	*Forced Switch to working*
Switch request which forces switching service to the protecting TP. It prevents automatic switching to the working TP even in case a failure is detected.	*Forced Switch to protection*
The last protection switch is cleared.	*Clear*

Wait to Restore Time   If MSP mode is ETSI, then WTR is the wait to restore time after the failure on the active section has cleared in the revertive mode. Values are 0..60.

☐

7   NE Software Upgrade

Overview

Purpose	A software upgrade provides the network element with a new version of controller software.
Objective	A software upgrade enhances the functionality of the network element by running new software.
Outcome	The previous software in the network element is inactive and the newly installed software is active.
Intended use	The first section of this chapter explains the concepts of software upgrade of a network element. The remaining sections describe the procedures related to software upgrade.

In this chapter it is assumed that the required controller software is available on the management system.

☐

Section: View Software stored in the Network Element

Overview

Purpose Use the inventory information to:

- check which software is stored in a particular network element
- check if a specific software load is *active*
- retrieve certain codes of the software in the network element
- make an inventory of all network elements that contain a specific software load.

□

Procedure to View Software stored in the Network Element

When to use   When performing this procedure the user will known the current type of software stored in the NE.

Before you begin   There are two ways to view an inventory of the software stored in the NE. Use the following table to select the required window.

Purpose	Select	Window
View software loaded in a network element	Provisioning -> Equipment -> NE Software Inventory	*EMS - Provisioned NE Software Inventory*
View list of NEs with particular software load	Provisioning -> Equipment -> Software Inventory	*EMS - Software Inventory* (first a selection window appears where the NE type and the software version can be selected)

Before viewing the software inventories it is assumed that the:

- names and types of the network elements are known
- correct Item Code of the software you want to view is known (only for a Software Inventory).

Related information   Theoretical information can be found in section Software Upgrade in chapter Concepts.

Procedure   Use the following procedure to find information about the software installed in the network elements.

1   Select the required command as described in the table above.

> **Result:**
>
> The requested inventory window appears.

2   Click the selection dialog button to update the:

- *EMS - Provisioned NE Software Inventory* window for another network element,
- *EMS - Software Inventory* window for another software version.

Section: View Software stored in the
Network Element
Procedure to View Software stored in the
Network Element

NE Software Upgrade

....

3   Click the Close button to close the window.

E N D   O F   S T E P S

....

☐

....

7 - 4

Parameters for Viewing Software stored in the Network Element

....

Introduction   It is possible to view the following information about the network element controller software:

- the software version now stored in the active and backup store.

- the store state shows whether the software in the store is valid.

Active Store   The software version of the executing code of the software loaded in the network elements active store is described by four codes. In the Software Inventory window only the Item Code is displayed.

Code	Description
Actual Item Code	A code used to uniquely identify any system component.
Interchangeability Marker	An identification mark to indicate interchangeability among components.
Serial Number	A number that indicates the sequence number and the year, date and location of manufacture.
Com Code	A code which identifies the component.

Backup Store   The same codes as those listed for the Active Store are used to describe the software stored in the backup store.

Active Store State   The active store contains valid software if the store state is: *Store Active*.

Backup Store State   The backup store contains valid software if the store state is: *Store Inactive*.

□

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

7 - 5

Section: Download Software into a Network Element

Overview

Purpose   Use this procedure to download new software from the management system into the backup store on the system controller of the network element.

□

Parameters: Download Software into a Network Element

....

Introduction Before downloading new software it is possible to check the following information about the backup store:

- the state of the System Controller

- the software versions stored

- the state of the active and the backup stores.

Controller Overall State The Controller Overall State shows whether the System Controller unit is available to perform a software update. This state can have two values:

Value	Description
Controller Busy	The controller card is busy. Software download cannot be done until the controller becomes available.
Controller Available	The controller card is available for updates.

Active Store Shows the software load that is now active, stored in the active store.

Backup Store Shows the software load that is now stored in the backup store.

Active Store State The state of the active store of the network element can have two values:

Value	Description
Store Active	Memory contains a valid code that is being executed.
Store Active Not Committed.	If no association is made between the management system and the network element after a software switch. The software that was active before the switch is now in the backup store. If the association is not made within 2 hours after the switch, the system will switch the stores back so that the previous active software is made active again. Therefore it is not wise to download software while the active store is in this state.

....

Section: Download Software into a Network
Element
Parameters: Download Software into a
Network Element

NE Software Upgrade

Backup Store State   The state of the backup store can have the following values:

Value	Description
Store Error	Memory has corrupted data.
Store Clearing	After the download command the inactive store is cleared.
Store Empty	The clearing of the store has been successful and new software will now be downloaded.
Store Downloading	Code is being downloaded to the memory.
Store Inactive	Memory contains valid code that is not being executed.

□

Procedure to Download Software into a Network Element

When to use Follow this procedure when a new software version must be available on the network element.

Before you begin Before starting to download new software check the following:

- The procedures for downloading software can only be performed with supervisor privileges. Contact the system administrator to have these privileges set

- The required controller software is available on the management system. If not contact the system administrator

- There is sufficient time to complete the procedure. The procedure lasts about one hour

- The management system is installed and able to communicate with the network element. When the management system cannot communicate with the network element it is only possible to download new software into the network element on a local basis, such as by using a ITM-CIT

- Do not download software into the backup store while the active store is not committed. As long as the active store is not committed the network element may perform an automatic switch.

Related information The following procedure and information are related:

- The procedure to switch to new software in a network element is related

- Section Software Upgrading Concepts in chapter Concepts.

Procedure Follow these steps to download new software to the backup store of the network element.

1 Select Provisioning -> Equipment -> NE Software Inventory.

> **Result:**
>
> The *EMS - NE Software Inventory* window displays the contents and states of the software stores of the selected network element.

2 To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

Section: Download Software into a Network
Element
Procedure to Download Software into a
Network Element

NE Software Upgrade

Result:

The *EMS - NE Software Inventory* window is updated with
software inventory information of the selected network element.

....

3   Select Edit to download software into the network element.

Result:

The *EMS - S/W Download and Switching* window appears. Use
this window to download a new MEC file into a network
element. After a successful download, the same window is used
to switch to the new software.

....

4   Select one of the available MEC files from the list of loaded files.

Result:

The loaded file contains the software for the network element.

....

5   Select Start Software Download to start downloading and
click Apply.

Result:

All operation buttons on this window apart from Abort
Software Download become inactive during the download
and an Operation Started message appears in the message box at
the bottom of the window. After the download, the operation
buttons become active again and an Operation Successful
message appears in the message box.

....

6   To stop the download operation select Abort Software
Downloadand clickApply.

Result:

Communications between the network element and the
management system are maintained during an abort. Traffic
carried by the network element is not interrupted. All operation
buttons on this window become inactive and an Operation
Started message appears in the message box. When the
download is aborted, the relevant operation buttons become
active again and an Operation Successful message appears in the
message box.

....

7   Click Close to exit the window.

E N D   O F   S T E P S
....

□
....

Lucent Technologies - Proprietary
                    See notice on first page

Parameters: Download Software into a Network Element

Introduction

Before downloading new software it is possible to check the following information about the backup store:

- the state of the System Controller
- the software versions stored
- the state of the active and the backup stores.

Controller Overall State

The Controller Overall State shows whether the System Controller unit is available to perform a software update. This state can have two values:

Value	Description
Controller Busy	The controller card is busy. Software download cannot be done until the controller becomes available.
Controller Available	The controller card is available for updates.

Active Store

Shows the software load that is now active, stored in the active store.

Backup Store

Shows the software load that is now stored in the backup store.

Active Store State

The state of the active store of the network element can have two values:

Value	Description
Store Active	Memory contains a valid code that is being executed.
Store Active Not Committed.	If no association is made between the management system and the network element after a software switch.
	The software that was active before the switch is now in the backup store. If the association is not made within 2 hours after the switch, the system will switch the stores back so that the previous active software is made active again. Therefore it is not wise to download software while the active store is in this state.

Section: Download Software into a Network
Element
Parameters: Download Software into a
Network Element

NE Software Upgrade

Backup Store State   The state of the backup store can have the following values:

Value	Description
Store Error	Memory has corrupted data.
Store Clearing	After the download command the inactive store is cleared.
Store Empty	The clearing of the store has been successful and new software will now be downloaded.
Store Downloading	Code is being downloaded to the memory.
Store Inactive	Memory contains valid code that is not being executed.

Section: Switch the Stores in a Network Element

7 - 1 3

Overview

....

Purpose   Use this procedure to switch between the active and backup stores and thus switch the network element from one software version to another.

☐

Procedure to Switch the Stores

....

When to use   Follow this procedure when new software is loaded into the backup store, and the backup store must become active to execute the new software.

Before you begin   Before starting to switch to new software check the following:

- the procedures for switching to new software can only be performed with supervisor privileges. Contact your system administrator to have these privileges set

- the correct software is stored in the backup store.

- the management system is installed and able to communicate with the network element

- the management system has the software version that can communicate with the new software on the network element. If no association can be made after the switch, the network element will switch the stores back automatically

- the Management Information Base (MIB) must be compatible with the new software. If not chose Switch (MIB clear) and download a new MIB into the network element when the new software is active and an association with the ITM-SC is made. In this case the ITM-SC must also have had a software upgrade

- if active and backup stores are switched over, the network element will reset using the software that was previously in the backup store. If this software is invalid, it may not be possible to continue to manage the network element

- the switch operation may cause an interruption of traffic. This depends on the software that is in the backup stor.

- after the confirmation of the switch command the management system loses its association with the network element for approximately 1 minute. If geographic redundancy (GR) is enabled a GR switch may occur.

Related information   The following procedures and information are related:

- Download New Software to a Network Element

- View Software Stored in the Network Element

- Section Software Upgrading Concepts in chapter Concepts.

....

Lucent Technologies - Proprietary   365-312–521
Issue a, June 2001

Section: Switch the Stores in a Network
Element
Procedure to Switch the Stores

NE Software Upgrade

Procedure   Follow these steps to switch to the software in the backup store of the network element:

....

1   Select Provisioning -> Equipment -> NE Software Inventory.

Result:

The *EMS - NE Software Inventory* window displays the contents and states of the software stores of the selected network element.

....

2   To select an NE or to switch to another NE, click the selection dialog button. A list of possible NEs then appears in the *EMS- NE Selection Dialog* window. Select the desired NE and click OK.

Result:

The *EMS - NE software inventory* window is updated with software inventory information of the selected network element.

....

3   Select Edit to switch to the new software in the selected network elements.

Result:

The *EMS - S/W Download and Switching* window appears. Use this window to switch the active and backup stores.

....

4   Chose one of two switching modes as described earlier.

....

5   A confirmation window appears. Click No to return to the *EMS - S/W Download and Switching* window or Yes to confirm the software switch.

Result:

After approximately two minutes the ITM-SC loses its association with the network element. One minute later the association is re-established and the network element works with the new software. If the association is not re-established the stores will switch back after two hours.

....

6   Click Close to exit the *EMS - S/W Download and Switching* window.

E N D   O F   S T E P S

□

....

Parameters to Switch the Stores

Introduction
Before switching the stores of the network element it is possible to view the following information about the network element:

- the state of the system controller,
- which software version is now stored in both the stores,
- the state of both stores.

Controller Overall State
The Controller Overall State shows whether the System Controller unit is available to perform a software update. This state can have two values:

Value	Description
Controller Busy	The controller card is busy. Software download cannot be done until the controller becomes available.
Controller Available	The controller card is available for updates.

Active Store
Shows the software load that is now active, stored in the active store.

Backup Store
Shows the software load that is now stored in the backup store. This software version will become active after the switch.

Active Store State
The state of the active store of the network element can have two values:

Value	Description
Store Active	Memory contains a valid code that is being executed.
Store Active Not Committed.	If no association is made between the management system and the network element after a software switch. The software that was active before the switch is now in the backup store. If the association is not made within 2 hours after the switch, the system will switch the stores back so that the previous active software is made active again. Therefore it is not wise to download software while the active store is in this state.

Backup Store State
The backup store contains valid software if the store state is *Store Inactive*.

Section: Switch the Stores in a Network
Element
Parameters to Switch the Stores

NE Software Upgrade

Switching modes   The possible switching modes are described in the table below:

Select	Result
Switch (No MIB Clear)	During the switch the MIB in the network element remains unchanged.
Switch (MIB Clear)	During this switch the network elements MIB is cleared. At the end of the procedure the networks elements MIB is cleared and a new MIB must be downloaded from the management system to the network element.

□

8 Concepts

Overview

Purpose This chapter describes all the concepts related to WaveStar® Network Elements.

Topics The main topics covered in this chapter are:

- Management Communication Setup concepts
- Equipment Provisioning concepts
- Alarm Management concepts
- Timing concepts
- Path Provisioning and Protection concepts
- Traffic Maintenance concepts
- Performance Monitoring concepts
- Software Upgrade concepts

□

Section: DCN Management Concepts

Overview

Purpose   This section explains the concepts of provisioning the Data Communications Network (DCN). To complete the procedures in this chapter, the user should first be acquainted with the concepts contained in this section.

SDH Data Communications Network

....

SDH management network   The SDH management network is an overlay of the transmission
network. The Element Management System (EMS) and the Network
Elements (NEs) together are the nodes of this network. The Q-LAN
and Data Communication Channel (DCC) provide the physical
connection between the nodes.

DCN physical components   The figure below illustrates a Data Communications Network (DCN)
as defined by the Open Systems Interconnection (OSI) model. This
figure refers to the physical components and connections in the DCN.
It does not give information on the logical configuration of the DCN.

Figure 8-1   OSI-DCN
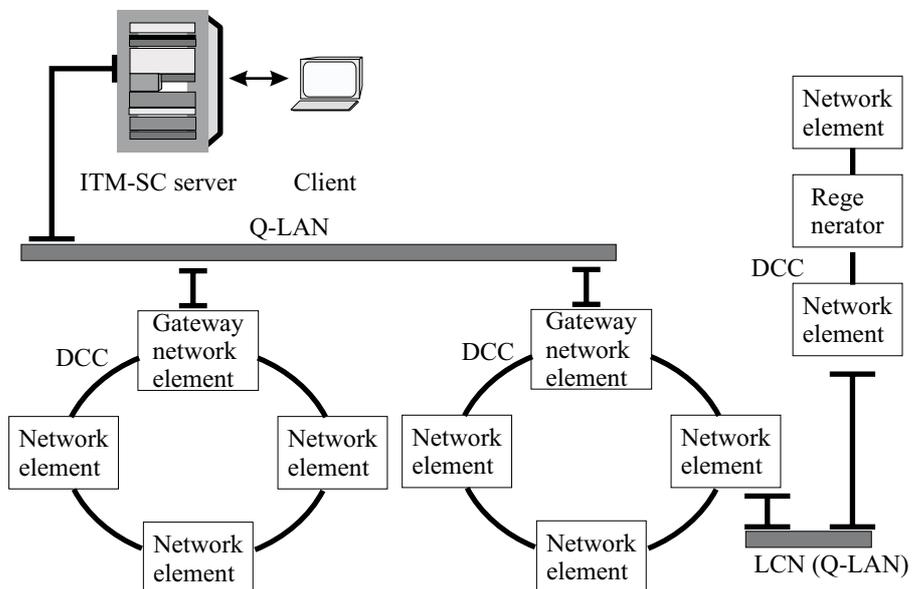
The figure of the OSI-DCN consists of 2 Q-LANs and a number of
DCC channels in an SDH transmission network with point-to-point
configuration and two rings connected to an EMS. The ITM-SC server
is used as an EMS. The ITM-SC is connected to the transmission
network via Gateway Network Elements (GNEs) by Q-LAN. The
network elements are connected to each other by DCC channels.

LCN   In the case where there is no DCC connectivity between nodes, a
Local Communications Network (LCN) can be used to connect the
nodes to each other. See the LCN on the right side of the figure.

DCN communication protocols

Communication protocols used in the Data Communications Network (DCN) between the nodes include:

- Ethernet (on the Q-LAN) LAPD (on the DCC channels)
- OSI Network Protocol (DCN wide)

The OSI Network Protocol (OSI-DCN) is used for routing management data between nodes in the DCN.

☐

OSI Network Protocol

Network protocol used   The network protocol used between nodes is the ISO-OSI Network Protocol (ISO/IEC 8648). According to this protocol a node in the network can behave as an End System (ES) or as an Intermediate System (IS), sometimes called a router.

End Systems   Nodes behaving as End Systems perform no forwarding of data packets. They communicate with each other on an end-to-end basis via Intermediate Systems.

Intermediate Systems   Intermediate Systems are used for routing data between nodes and (sub) networks. The End System - Intermediate System (ES-IS) protocol is responsible for the exchange of data between an End System and Intermediate System. A network element can act both as an End System as well as an Intermediate System. However, an ITM-SC, for example, can only act as End System.

IS - IS protocol   The Intermediate System to Intermediate System (IS-IS) protocol is used between Intermediate Systems in the DCN. The IS-IS protocol maintains the IS Routing Information Base (RIB). The information in this information base is used for the routing of management data packets in the DCN by the Intermediate Systems.

Routing Information Base and LSPs   Each RIB comprises a number of tables. These tables contain information on Network Service Access Point (NSAP) addresses of nodes in the network and ports of the IS through which these nodes can be reached. Intermediate Systems exchange routing information regularly with one another as part of the IS-IS protocol by the use of Link State Protocol Data Units (LSPs).

The LSPs contain the information on the NSAP addresses of nodes used in the tables of the RIBs.

☐

DCN Addresses

DCN addresses   The system has two addresses in the DCN:

- Ethernet address
- NSAP address

Ethernet address   The Ethernet address is the unique 6-byte address of a Network Element. Sometimes it is also referred to as the hardware or physical address of the node. The Ethernet address has only local meaning on the Q-LAN and can not be used for routing purposes. It does not contain the information on where the node is in the data communications network.

NSAP address   The Network Service Access Point (NSAP) address is used by the network protocol for location information. The NSAP address of a node is its DCN wide identifier which uniquely identifies the node in the network.

□

NSAP Address Format

....

Background   The following three NSAP formats can be distinguished:

- ISO-DCC NSAP address format. This format is used by most Lucent network element types in the network,

- Local-Lucent NSAP address format. This format is also used by some Lucent network element types in the network,

- Flexible NSAP address format. An alternative to the previous two formats.

Although different NSAP address formats exist, preferably all nodes in a network should use the same address format.

ISO-DCC NSAP address format   The ISO-DCC NSAP address format is presented below.

Figure 8-2 ISO-DCC NSAP address format

1 Byte	10 Bytes	2 Bytes	6 Bytes	1 Byte
AFI	Fixed part	Area ID	System ID	Sel

Area Address
13 Bytes

Node Address
20 Bytes
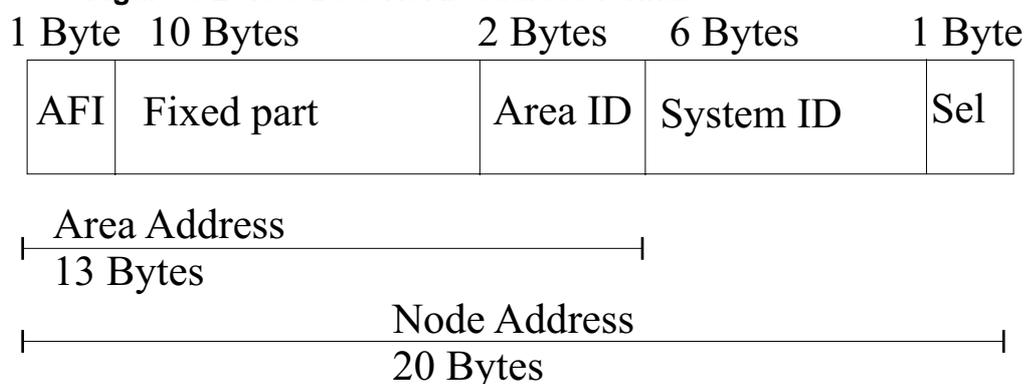
ISO-DCC NSAP address fields   This ISO-DCC NSAP address format is hierarchical and consists of the following fields:

Field	Function It Provides
Area Address	Has three parts: • AFI (Authority and Format Identifier) is equal to 39 (HEX). • The fixed part is equal to 00008000000000000000 (HEX). • Area Id indicates the area to which a node belongs and thus its logical location in the network.
System Identifier (SID)	Identifies the node. In most network element types, the Ethernet address is copied into the SID address field and this makes the NSAP address unique throughout the DCN.

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

8 - 7

Field	Function It Provides
Selector (Sel)	Set to 01 (HEX) for the network elements.

Local-Lucent NSAP address format

The Local-Lucent NSAP address format is presented below.

Figure 8-3 Local-Lucent NSAP address format
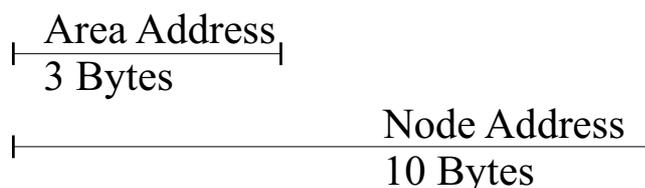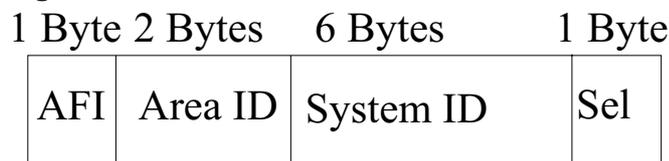
Local-Lucent NSAP address fields

The Local-Lucent NSAP address format has the following fields:

Field	Function It Provides
Area Address	Has two predefined parts: • AFI (Authority and Format Identifier) field, equal to 49 (HEX). • Area Id indicates the area to which a node belongs and thus its logical location in the network.
System Identifier (SID)	Identifies the node. In most network element types, the Ethernet address is copied into the SID address field and this makes the NSAP address unique throughout the DCN.
Selector (Sel)	Set to 01 (HEX) for the network elements.

There is no fixed part in this address type.

Flexible NSAP address format   The flexible NSAP address format is presented below.

Figure 8-4 Flexible NSAP address format

1 Byte	0-12 Bytes	6 Bytes	1 Byte
AFI	Flexible part	System ID	Sel

Area Address
1-13 Bytes

Node Address
8-20 Bytes
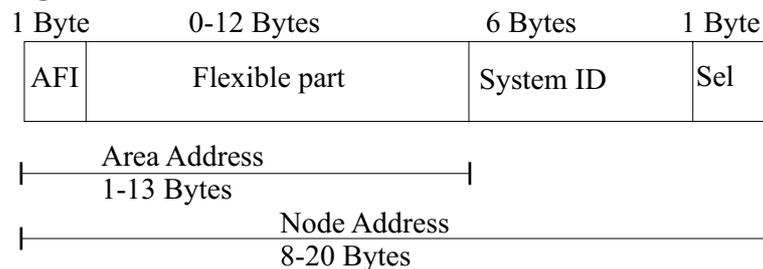
Flexible NSAP address fields   The flexible NSAP address has the following fields:

Field	Function It Provides
Area Address	Has two provisionable parts: • AFI (Authority and Format Identifier) field, which may vary between 10 and 99 (HEX). • Flexible part, which may vary from 0 to 12 bytes.
System Identifier (SID)	Identifies the node. In most network element types, the Ethernet address is copied into the SID address field and this makes the NSAP address unique throughout the DCN.
Selector (Sel)	Set to 01 (HEX) for the network elements.

In this way, the flexible NSAP address can vary from 8 to 20 bytes.

Notice that the flexible NSAP address format can be used to derive the other formats.

□

IS-IS Level 2

Background   Hierarchical routing is used for large networks when the number of NSAP entries in the RIB databases of the Intermediate Systems is too large. When this happens, it causes an exponential increase of exchanged LSPs between Intermediate Systems. This in turn causes the performance of the DCN to decrease due to the computation of the shortest path first algorithm.

Hierarchical routing Definition   In hierarchical routing, the DCN addressing domain is divided into a number of areas. Each area is assigned a unique identifier. The value of the Area Identifier of each node's NSAP address is set according to the area the node is part of.

Level 1, Level 2 Definition   Each area contains a number of:

- End Systems,

- first level (Level 1) Intermediate Systems and,

- second level (Level 2) Intermediate Systems.

Level 1 Intermediate Systems provide interconnectivity between nodes within the same area. Level 2 Intermediate Systems provide interconnectivity between nodes belonging to different areas.

Level 2 Subdomain   The complete set of Level 2 Intermediate Systems is also referred to as the Level 2 Subdomain. All areas in a network are connected via the Level 2 Subdomain.

□

Partitioning Networks into Areas

....

Definition   Partitioning is configuration of the DCN in such a way that the exchange of LSPs between Intermediate Systems is limited.

Partitioning use   When networks are partitioned into areas, the RIB database(s) in the systems are much smaller and hence the routing overhead is significantly reduced. Intermediate Systems in an area only exchange information (LSPs) on nodes with other systems in their own area. Information on other areas is exchanged by Level 2 Intermediate Systems only and maintained by the Level 2 Intermediate Systems of the area.

In this way, thedata management load in the network is strongly reduced, while keeping the dynamic re-routing capabilities of Intermediate Systems in case of failures intact. It is important to notice that although the DCN is divided into areas, ES-ES communication between all nodes in the DCN is still possible.

Network areas   The figure below illustrates how a network can be partitioned into areas, connected by Level 2 Intermediate Systems. Each area has at least one Level 2 Intermediate System assigned and can have a number of Level 1 Intermediate Systems and End Systems.

Figure 8-5 Network areas
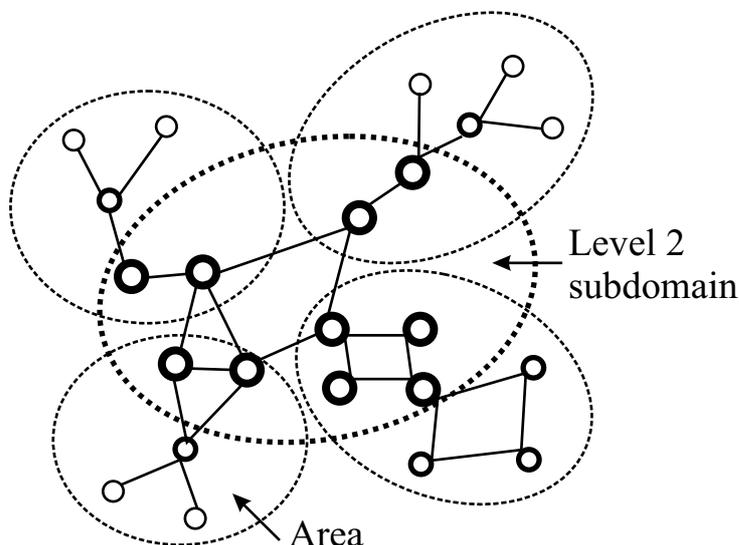
○ End system
◉ Level 1 Intermediate system
◉ Level 2 Intermediate system

....

Routing management data   The following scenario describes routing management data in a divisioned network. Suppose a node A wants to send messages to another node. If this node is in its own area (determined by the Area Id part in the Area Address field), the messages from A to this particular node (B) are routed directly using the Level 1 Intermediate System. (See previous figure)

Alternatively, if the required destination is in a different area (C), the messages are sent to a second, higher level (Level 2) Intermediate System. This Intermediate System routes the messages coming from node A to other Level 2 Intermediate Systems until they reach a Level 2 Intermediate System attached to the destination area of C. From there it is routed within the area using Level 1 Intermediate Systems to node C.

Notice that in both of the above cases the ES-ES communication between nodes in the same or in different areas is still possible.

□

DCN Configuration

....

OSI-DCN networks types   In general the OSI-DCN network can be classified in three types:

- Undivided
- IS-IS Clustered
- IS-IS Area Divided network

The three types are illustrated in the figure below:

Figure 8-6 Types of OSI-DCN networks

Undivided   IS-IS clusters   IS-IS Areas

□

....
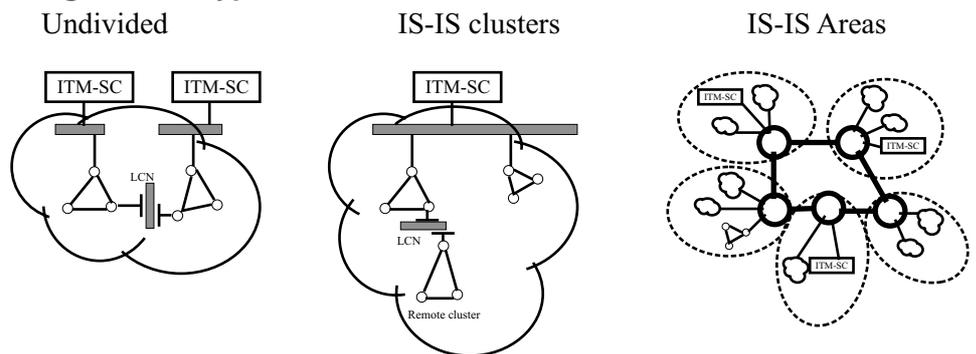
Undivided Data Communications Network

Undivided network definition

An undivided network consists of a single routing domain. There is no division between the nodes at the network protocol level. All nodes in the network and especially the Intermediate Systems can exchange routing information with each other. Although a network element can only be managed by one ITM-SC at a time, the IS-IS protocol is running between all nodes in the network. This leads to the exchange of LSPs between all Intermediate Systems of the network.

☐

IS-IS Clustered DCN

....

IS-IS LSP exchange	In order to avoid the decrease of performance, the exchange of LSPs over a certain port can be disabled in some nodes. A node can exchange LSPs over its DCC or Q-LAN ports. The exchange of LSPs over the DCC channel can be disbaled. However, this also prevents the exchange of management data over this port and prevents the use of this DCC port for re-routing in case of a failure of another port.
Disabling exchange of LSPs	Another option is to disable the exchange of LSPs over the Q-LAN port. This can be done by choosing the IS to have a NO-IS-IS port. This node is also referred to as a NO-IS-IS (gateway) node. If this is done for all Intermediate Systems on a Q-LAN, the Q-LAN becomes a NO-IS-IS Q-LAN. In NO-IS-IS LANs, the IS-IS protocol is not run on the Q-LAN. This prevents the exchange of LSPs between Intermediate Systems on a Q-LAN. This results in a network which comprises several clusters of nodes. Between the clusters there is no IS-IS traffic.
ES-ES communication	Within a cluster the ES-ES, ES-IS and IS-IS communication is still possible. There is however no communication possible between nodes in different clusters. For example a Craft Interface Terminal (CIT) can be connected to a node in a cluster for maintenance activities on nodes within a cluster. However, it is then not possible to do a remote login from this node to a node of another cluster.
ITM-SC connections	The ITM-SC connected to the Q-LAN can still communicate with all nodes in the clusters since the ES-IS protocol on the Q-LAN is not disabled. Important to notice is that the nodes in a Remote Cluster lose their association with the ITM-SC when NO-IS-IS is chosen on the gateway node of the remote cluster. It is advised to connect the ITM-SC to the Q-LAN that connects the clusters to each other and to assign NO-IS-IS only to nodes on this Q-LAN.

☐

....

IS-IS Area Divided DCN

Divided areas definition   The division of the DCN in areas by introducing Level 2 Intermediate Systems is similar to disabling the IS-IS protocol over the Q-LAN port of nodes, as described earlier.

Similar to clustering, the exchange of Level 1 LSPs between Intermediate Systems in different areas is prevented. However Level 2 LSPs are still exchanged between Level 2 Intermediate Systems.

□

Lucent Technologies - Proprietary

DCC Concepts

....

Data Communication Channels (DCC)

The Data Communication Channels (DCC) are part of the Data Communications Network (DCN). The channels are used to exchange management data between the ITM-SC and the Network Elements. The channels are also used for communication between the different Network Elements (for example remote logins). DCC channels (D1 - D12) are provided by reserved bytes in the regenerator section (RS) and the multiplexer section (MS) overhead of the STM-N signal.

☐

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

8 - 1 7

Dual Stack with Tunneling (DSwT)

....

Introduction   The Dual Stack with Tunneling (DSwT) feature provides a way to manage IP devices through the DCN network.

An IP EMS (Element Management System) is used to manage NEs which use IP based management protocols (IP NEs).

Dual Stack   Dual Stack means adding an IP Router stack to an existing OSI stack.

Tunnel   A tunnel is a unidirectional path through the OSI domain capable of transporting IP packets. The tunnel consists of an endpoint in the OSI domain (NSAP) and the encapsulation/decapsulation mechanism to transport an IP packet in an OSI network. The actual path taken by the encapsulated IP packet is completely determined by the normal OSI routing mechanisms.

Network Architecture   The network architecture in the figure is used in this example.

Figure 8-7   Network Architecture example

....

Lucent Technologies - Proprietary
See notice on first page
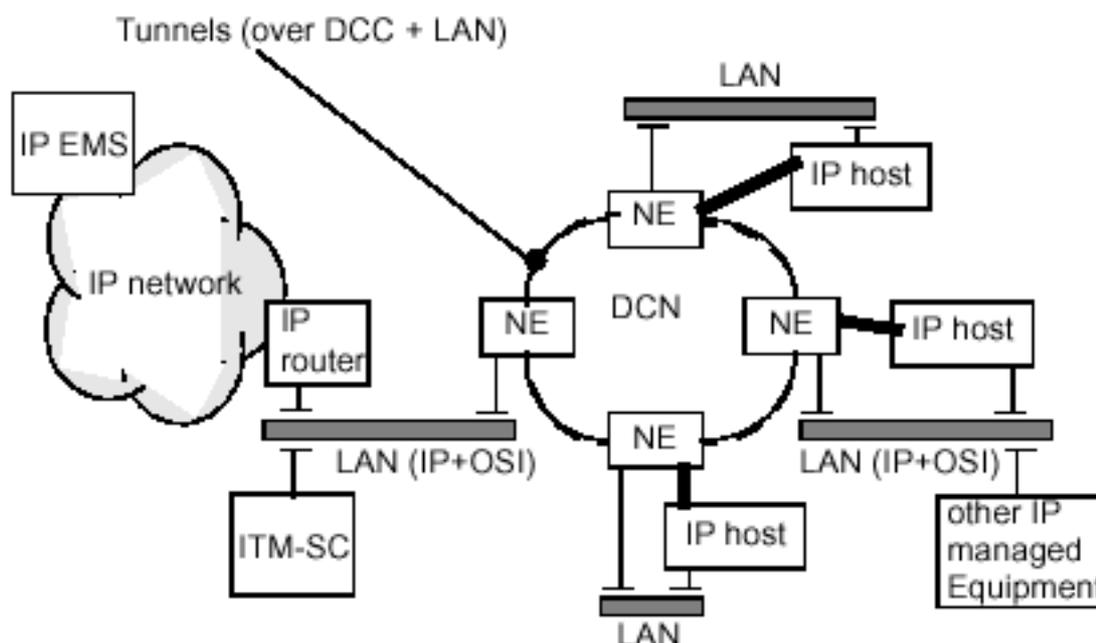
IP Tunnel Architecture   The IP Tunnel architecture in the figure is used in this example.

Figure 8-8 IP Tunnel example

ds NE = Network Element with dual stack
NE = Other Network Element
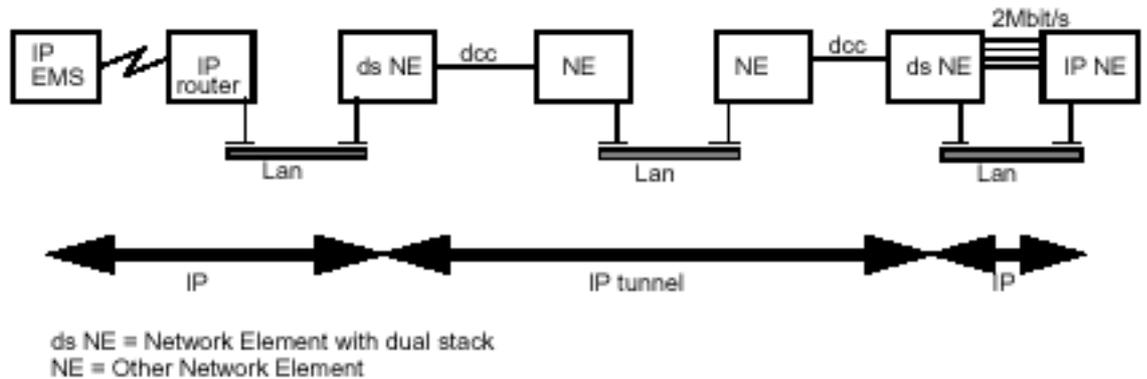
Tunnel Configuration   A tunnel can be seen as a set of two static routing entries in nodes on the edge of the OSI network and the corresponding static entries in the routing table. The term tunnel may be misleading because it is often associated with connections which must be set up in advance. In this case, only some routing and mapping information needs to be provisioned and no communication between two systems is needed to set up the "tunnel" between them. To avoid confusion, it is better to speak of encapsulation and to think of the OSI network as a NBMA (non broadcast multiple access) subnetwork within the IP network.

The NEs need to be configured with one IP address on the LAN side, connected to the IP subnet with the IP NEs.The LAN can be used for both OSI and IP traffic. The same ethernet address will be used for both protocols.

IP Encapsulation   The IP packets are encapsulated in CLNP (Connectionless Network Protocol) packets which are routed through the OSI-only node which routes the CLNP packets as normal, totally oblivious of the CLNP packets contents.

IP and DCC   A benefit of the tunneling approach, is that IP need not to be carried on the DCC. Only the CLNP packets (possibly carrying IP) go on to the DCC.

IP Routing   In the Dual Stack with Tunnelling configuration, a second network layer entity (the IP router) is added alongside the existing OSI network layer entity (CLNP). The CLNP entity has the routing tables and the mechanisms to automatically populate them - namely the IS-IS and ES-IS dynamic routing protocols.

This is not the case for the IP routing tables since there is no IP dynamic routing protocol to populate the IP routing tables. IP routing tables have to be manually provisioned by the operator.

DSwT Routing Table
A Routing Table, IP or OSI, is divided into 2 columns:

- "Final Destinations" of each Network Node,

- for each Final Destination, the identity of the "Next Hop" which is the next network node in the path towards the Final Destination.

The table below shows a simplified IP routing table for IP router in a DSwT stack. It is divided into 2 main columns. These two parts of the routing table will be discussed separately.

FinalDestination	Next Hop	
	Subnetwork	Node
130.44.5.0/24	LAN 0	<local>
120.23.4.0 / 24	LAN 0	130.44.5.8
150.35.10.0 / 24	DCC 1	-
150.35.20.0 / 24	DCC 2	-
160.22.0.0 / 16	CLNP-Tunnel	NSAP (node X)

Final Destination
This column of the Routing Table is a list of all the final destination nodes. When a packet is received at this node, then the destination address in that packet is checked against the list of destinations in the destination column of the routing table. If there is no entry in the table for the packet destination, then the node won't know how to route the packet and will execute the error procedure (which involves discarding the packet and trying to send an error message packet back to the source). If a match is found, the next hop towards the destination can be looked up in he "Next Hop" column.

IP Prefixes
An IP Prefix is a mechanism of identifying a collection of IP addresses with some common root. The general principle is to choose a mask which identifies a suitable first part of the IP address which summarizes a number of addresses. For example, the addresses 120.10.2.1, 120.10.2.5 and 120.10.2.13 can be summarized by the IP Prefix: 120.10.2.0 / 24. The 24 identifies the first 24 bits of the address. Summarizing IP addresses is a very powerful way to reduce the number of entries in a Routing Table.

Next Hop   Two pieces of information are needed in order to identify the next hop node:

- on which subnetwork (for example on which exit port) is the next hop node,
- which node on that subnetwork is the next hop.

This is shown in the figure below.

Figure 8-9 Next Hop Identification
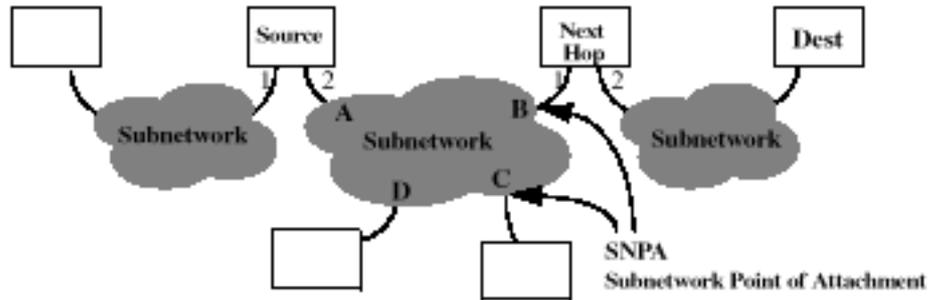
To send a packet to the destination Dest, the Source must identify the node Next Hop. This is identified by the subnetwork (on Port 2 of Source) and then the node on that subnetwork (identified by B). In OSI terminology the address B is known as a Subnetwork Point of Attachment (SNPA), which is the point that the node is attached to the subnetwork.

The second column in the Routing Table is the next hop and is divided into 2 parts:

- the Next Hop Subnetwork
- the Next Hop Node.

Next Hop Subnetwork   A router, by its nature, must be connected to multiple subnetworks. Each subnetwork is connected to a separate port on that router. The Next Hop Port identifies the subnetwork to exit this node for the next hop towards the destination.

For the DSwT IP router entity, there are 2 types of port/subnetwork:

1. LAN. This is the ethernet (common subnetwork type for IP routers).

2. CLNP-Tunnel. This is a logical subnetwork created by the OSI CLNP network itself. From the IP router perspective, this subnetwork is seen as a "Non-Broadcast Multiple Access" (NBMA) subnetwork. The IP router simply sees all the neighbour IP router entities connected together to this NBMA. It does not see any of the OSI CLNP nodes inside this network.

Next Hop Node

Once the correct exit port (subnetwork) has been identified, the correct node on that subnetwork must be identified by its SNPA. This could be an Ethernet address (for a LAN), or a X.121 address for a X.25 subnetwork. When the subnetwork is a point-to point link then there is no need to identify the Next Hop.There are various ways to identify the Next Hop Node, and they depend on the type of subnetwork that node is attached to. The following table provides an overview:

Subnetwork Type	Next Hop Node (Identity Type)
LAN	IP address or none if the destination is actually on this LAN (there is no Next Hop Node).
CLPN-Tunnel	NSAP

Example of Dual Stack with Tunneling

Network Architecture The network architecture in the figure is used in this example.

Figure 8-10 Example of an DSwT Network
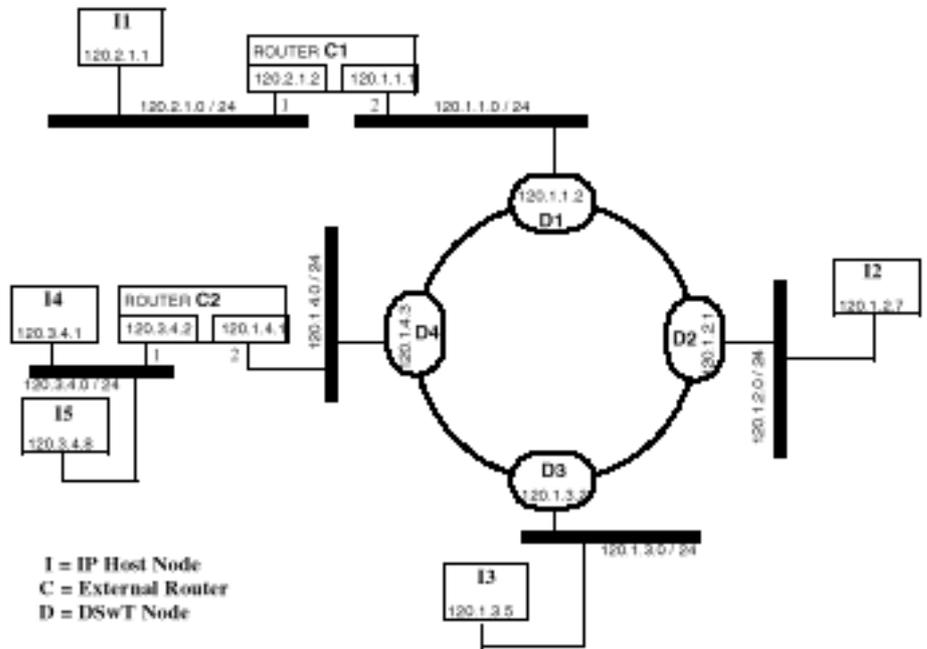
Routing Tables for IP Host Nodes Not only IP router nodes but also IP host nodes have Routing Tables. The Routing Table is used for every IP packet generated by this IP host. As can be seen in the table below, each node has 2 routing entries. These two routing entries will be discussed separately.

The routing tables for nodes I1, I2, I3, I4 and I5:

IP Host Node	FinalDestina-tion	Next Hop	
		Port	**Node**
I1	120.2.1.0 / 24	LAN	<local Subnet>
	0.0.0.0 / 0	LAN	120.2.1.2
I2	120.1.2.0 / 24	LAN	<local Subnet>
	0.0.0.0 / 0	LAN	120.1.2.1
I3	120.2.3.0 / 24	LAN	<Local Subnet>
	0.0.0.0 / 0	LAN	120.1.3.2
I4, I5	120.3.4.0 / 24	LAN	<Local Subnet>
	0.0.0.0 / 0	LAN	120.3.4.2

Local Route

The first routing entry in the IP host node routing table is called the Local Route and is often generated automatically after the node's interface is configured with an IP address and a subnet mask. This IP Prefix is simply the subnet address (IP address with subnet mask) of the locally attached subnet. This entry says that every packet generated with destination address of the local subnet will be sent out on the local LAN. There is no "Next Hop Node". Instead <Local Subnet> is simply a flag which says to take the destination IP address from the IP packet and resolve it directly on the local LAN. Notice this routing entry would be essential in nodes I4 and I5 if they wished to communicate with each other. There is one Local Route entry for each interface. These IP Hosts only have a single interface and so only a single Local Route entry.

Default Route

The second routing entry in the IP host node routing table is the IP Prefix 0.0.0.0 / 0, which is called the Default Route. This prefix will match every destination IP address and so in effect, this routing entry says that every packet generated will be sent to the specified next hop. In all cases, the specified next hop is the DSwT node which is identified by its IP address. Notice that routes for the local subnet also match the Default Route. Of course this is not the intention and so there is another essential rule for all routing tables, which says that match with the longest prefix route must be selected. This is fundamental to IP Routing Tables and must be followed in all cases.

Routing Table for External Routers

For external routers there are 2 possible hop ports (LAN 1 and LAN 2). The <Local subnet> routes can be added automatically when the router interfaces are configured (assigned IP address and subnet mask).

The routing tables for routers C1 and C2:

External Routers	FinalDestina-tion	Next Hop	
		Port	Node
C1	120.2.1.0 / 24	LAN 1	<Local Subnet>
	120.1.1.0 / 24	LAN 2	<Local Subnet>
	120.1.0.0 / 16	LAN 2	120.1.1.2
	120.3.0.0 / 16	LAN 2	120.1.1.2
C2	120.3.4.0 / 24	LAN 1	<Local Subnet>
	120.1.4.0 / 24	LAN 2	<Local Subnet>
	120.1.0.0 / 16	LAN 2	120.1.4.3
	120.2.0.0 / 16	LAN 2	120.1.4.3

Routing Table for DSwT Nodes

These Routing Tables have been completed with a specific application in mind: namely the management of IP based fringe equipment. In this example, only routes between I1 and I2, I3, I4, I5 are necessary: I3 does not need to communicate with I2 for example. This has been done to minimize the routes in the routing table and give a realistic indication of what the operator must provision to get the application to work.

The routing tables for DSwT nodes D1, D2, D3 and D4:

DSwT Nodes	FinalDestination	Next Hop	
		Port	**Node**
D1	120.1.1.0 / 24	LAN	\<Local Subnet\>
	120.2.0.0 / 16	LAN	120.1.1.1
	120.1.2.0 / 24	CLNP-Tunnel	NSAP (D2)
	120.1.3.0 / 24	CLNP-Tunnel	NSAP (D3)
	120.1.4.0 / 24	CLNP-Tunnel	NSAP (D4)
	120.3.4.0 / 24	CLNP-Tunnel	NSAP (D4)
D2	120.1.2.0 / 24	LAN	\<Local Subnet\>
	120.2.0.0 / 16	CLNP-Tunnel	NSAP (D1)
D3	120.1.3.0 / 24	LAN	\<Local Subnet\>
	120.2.0.0 / 16	CLNP-Tunnel	NSAP (D1)
D4	120.1.4.0 / 24	LAN	\<Local Subnet\>
	120.3.4.0 / 24	LAN	120.1.4.1
	120.2.0.0 / 16	CLNP-Tunnel	NSAP (D1)

In the Routing Tables for DSwT nodes, the Subnet CLNP-Tunnel is seen for next hops across the OSI (CLNP) DCN. Whenever the subnet is a CLNP-Tunnel, the Next Hop Node is identified by the NSAP address of that node. As can be seen, nodes D2, D3, D4 have routes (tunnels) back to D1 only and D1 has routes to D2, D3, D4.

Notice nodes D1 and D4 have an extra route. This is because another router is involved; the extra route points to the subnet at the far side of the router. This route must be added since, unlike the Local Route, there is no way to add this route automatically (without a full blown Dynamic Routing Protocol).

☐

DSwT Tunnel Auto Provisioning (TAP)

Introduction Provisioning all the entries in the Routing Tables of all the nodes can be considerable effort and is error prone, particularly when networks comprise hundreds of nodes. It would be desirable to have a mechanism which reduces some of the necessary provisioning to alleviate this problem. Such a mechanism has been designed. It is a Lucent proprietary mechanism called "Tunnel Auto Provisioning" (TAP).

TAP Principle The principle behind TAP is that IP routes known by DSwT nodes at the edge of the OSI network are advertised across the OSI network to the other DSwT nodes which can then insert these routes into their own Routing Tables. This basic principal is illustrated in the figure below.

Figure 8-11   Tunnel Auto Provisioning Principle (TAP)
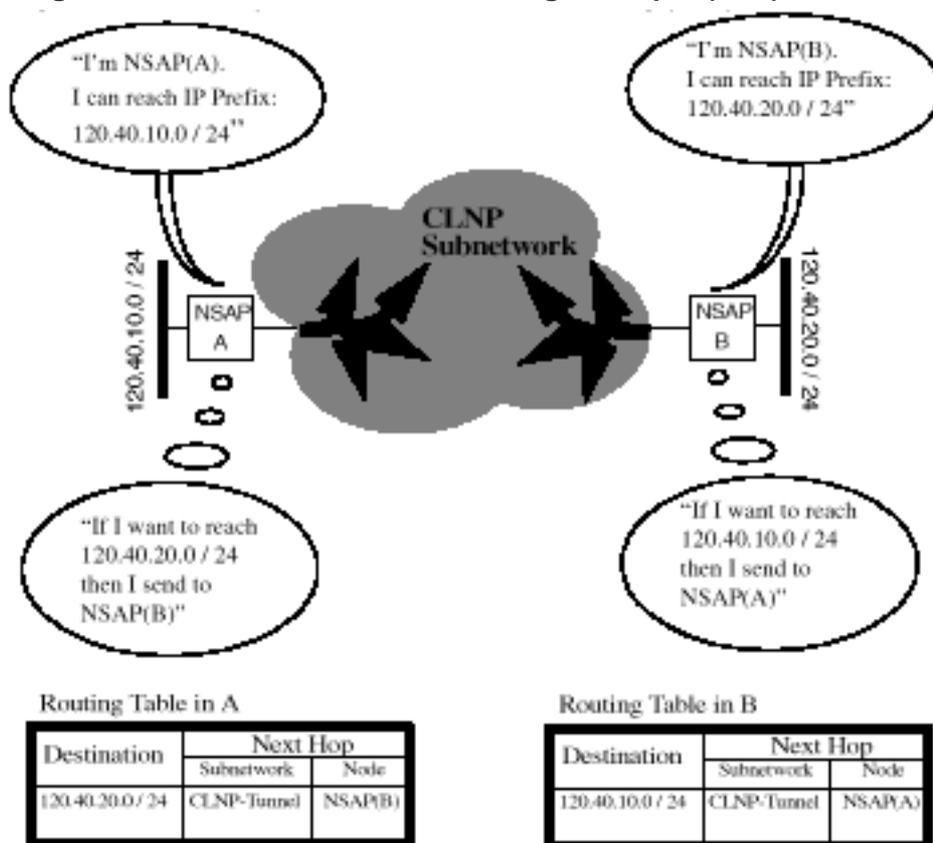
Example of 2 DSwT nodes advertising the IP networks they can reach. Each Node learns the others advertised routes it hears and places them in its Routing Table.

Notice that the advertising node is not limited to giving one IP prefix but could provide a list of all the IP prefixes it can reach, if appropriate, each one resulting in a routing table entry.

☐

DSwT Connecting Areas with Manual TAP Tunnels

Introduction   The TAP mechanism does not work across IS-IS Areas because it distributes information using IS-IS Level 1 LSPs. However, it is likely to have a considerable number of nodes in the OSI network and multiple areas.

Connecting Areas   To allow DSwT nodes to communicate across IS-IS Areas enjoying the benefits of the auto-provisioning, a pair of "tunnels" must be manually configured between the areas. This principle is illustrated in the figure below.

Connecting Areas Principle   A pair of provisioned "Tunnels" connecting any two nodes, one from each area, provides bi-directional communication between the Areas.

Figure 8-12 The principle of connecting IS-IS Areas with manual TAP Tunnels

NOTE: TAP "Tunnels" are not transitive. That is a "Tunnel" connecting Areas A and B, and a "Tunnel" connecting Areas B and C does NOT connect Areas A and C. A separate "Tunnel" between Areas A and C is needed.

☐

Section: Equipment Provisioning Concepts

Overview

Purpose   This section explains the concepts of equipment provisioning. The information in this section can be used as background information for equipment provisioning.

The following concepts are described in this section:

- Node creation
- Provisioning methods
- Addressing and management concepts
- *WaveStar*™ AM 1 configuration possibilities
- Miscellaneous discrete inputs and outputs.

□

Node Creation

....

Node   A node is literally "a point at which subsidiary parts originate or center." So, in other words the NE or the node is the central collection point of its various parts. Creating a node means, then, identifying this central point (the NE name and address) and inputting the exact parts comprising the node. All of this information is compiled and stored in the Management Information Base.

Management Information Base   The Management Information Base (MIB) is the provisioning information stored in the database of the NE. This includes the configuration of the units within the NE, the name and type of the NE, as well as addressing and network information necessary for management.

Confirm MIB   Confirming the MIB will send all of the basic NE information that has been entered to the System Controller. This is an essential step in the creation of the NE.

Update MIB   The MIB can be updated rather than confirmed, if the MIB already exists and there have been few changes made. This operation can be advantageous as it takes considerably less time than that of confirming the MIB.

Isolated State   Arriving from the factory, the WaveStar® AM 1 Plus is in an isolated state. This means that communication via DCN is not possible. In other words, no association with the ITM-SC can be established while the network element is in the isolated state.

To enable an association with the ITM-SC the network element must be brought out of the isolated state. To do so, use the ITM-CIT to either change or reselect any of the ″Provisioned DCN Information″ parameters. Once this is done, the network element will be removed from isolation.

□

....

8 - 3 0

Provisioning Methods

Provisioning methods Providing provisioning information to the network element, the management system, or both the NE and the management system can be accomplished in three different ways.

- Using an NE template.
- Using a pre-provisioned NE.
- Performing an MIB upload.

Management Information Base The Management Information Base (MIB) is the provisioning information stored in the database of the NE. This includes the configuration of the units within the NE, the name and type of the NE, as well as addressing and network information necessary for management.

MIB image As suggested by the name, the MIB image is a copy of the data stored in the MIB. The MIB image is stored in the ITM-SC thereby enabling the ITM-SC to manage the NE.

Templates A template is a collection of configuration data. There are two types of templates, default and user-defined. In the system software of the ITM-SC are a set of default templates, which have the essential units already provisioned. User-defined templates are templates created by the user, and they may use a default template as a basis. All of these templates can be used to pre-provision and provision network elements.

The provisioning information contained in a template includes only data concerning the network element contents; it does not include any information regarding the position of the NE within the network. For this reason, the templates are a basic provisioning tool capable of serving as the basis for pre-provisioning or provisioning an NE.

Pre-provisioning Pre-provisioning allows a network elements configuration data to be stored on the management system before an actual association with this NE is established. Thus, creating a pre-provisioned NE prepares for the provisioning of an NE by storing a dummy NE on the management system. This data, stored as a pre-provisioned NE, is accessed later when the actual network element is installed and ready to be provisioned.

A template serves as the basis for creation of a pre-provisioned NE; however, the MIB image created by pre-provisioning an NE includes not only the information from the template, it also has the essential information concerning the network element's place in the network.

Creating an MIB image   An MIB image is created during pre-provisioning; however, it may also be created from an existing network element already provisioned with its configuration data. For example, an MIB could have been created for an NE using the ITM-CIT. In this case, the NE is provisioned, but it is not yet under control of the ITM-SC. Once a physical connection exists between the NE and the ITM-SC, the ITM-SC can assume management of the NE by creating an MIB image from the network element's MIB.

Overview of provisioning methods   In the figure below, the methods of provisioning using the ITM-SC are illustrated. As discussed above, templates can be used as the basis for creation of the MIB images of pre-provisioned or provisioned NEs. Pre-provisioned NEs have the same provisioning information as a provisioned NE, and thus they can be used to quickly create the provisioned NE because no additional information must be entered. Finally, an MIB image can be created from the MIB of an existing NE.
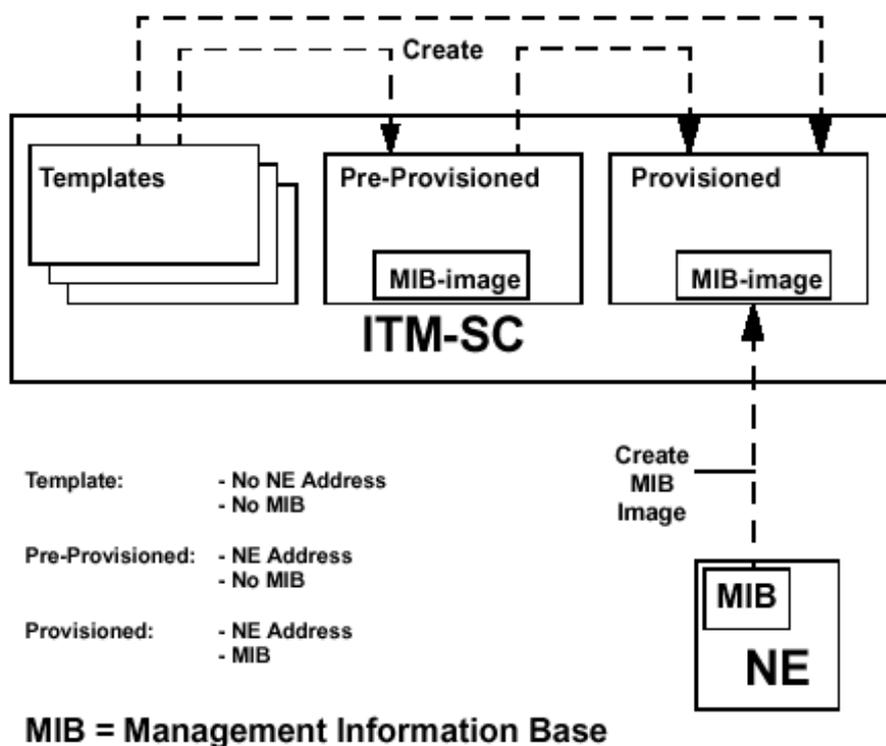
Provisioning outcomes   A properly completed template will appear in the list of NE templates.

After successfully pre-provisioning an NE, the proper equipment configuration data for the network element is stored in the management system. The NE is displayed on the network map with a blue color, indicating that it is a pre-provisioned network element.

Finally, a fully provisioned NE is integrated into the network and is displayed on the network map in green.

☐

Addressing and Management Concepts

Introduction To enable management, the ITM-SC must have addressing and management connection information for each NE under its control. The basic information concerning such topics as addressing and management connection information are given in this section; however, much more detailed information about all of these Data Communications Network (DCN) concepts can be found in the chapter "DCN Management".

Data Communications Network The Data Communications Network (DCN) is a general name for the collection of various communication means between network management devices, such as the ITM-SC, and the NEs. By providing the communication between management systems and the NEs, the DCN makes management possible. For further information, the chapter "DCN Management" discusses this network in depth.

DCN addresses The NE has two addresses in the DCN:

- Ethernet address
- NSAP address

Ethernet address The Ethernet address is the unique 6-byte address of a network element. Sometimes it is also referred to as the hardware or physical address of the node. The Ethernet address has only local meaning on the Q-LAN and can not be used for routing purposes. It does not contain the information on where the node is in the Data Communications Network.

NSAP address The Network Service Access Point (NSAP) address is used by the network protocol for location information. The NSAP address of a node is its DCN wide identifier which uniquely identifies the node in the network. Although different NSAP formats exist, it is preferable that all nodes in a network should use the same address structure. Complete details concerning the structural formatting of the NSAP address can be found in the section "NSAP Address" of the chapter "DCN Management."

□

WaveStar® AM 1 Configuration Possibilities

Standard configuration
The *WaveStar*™ AM 1 has standard 16 x 2Mbit/s connections. This unit is designated tributary slot 1 (TS1), and it is a part of the network element's main board.

Since the unit in TS1 is a part of the main board, it may not be changed; however, six different types of option cards may be placed for use in TS2.

Option cards in TS2
It is possible to place an optional cards in the *WaveStar*™ AM 1. This tributary port unit will occupy TS2, and it has various possibilities. It may be another card with 16 x 2Mbit/s interfaces. There are also cards available with 16 x 1.5 Mbit/s (DS1) or 2 x 34Mbit/s (E3) or 2 x 45Mbit/s (DS3) or 4 x X.21 interfaces or 2 x STM-1 interfaces. Finally, the TransLAN+ optional card has four 10/100 Mbit/s interfaces.

All of these units must be installed by a Lucent technician, as installation requires removal of the locked front panel. Moreover, each optional port unit to be placed in TS2 has its own distinctive front panel.

Potential configurations
The following table gives the possible configurations of the *WaveStar*™ AM 1.

Optional cards present in TS2	TS1	TS2
None	16 x 2Mbit/s	-
16 x 1.5 Mbit/s	16 x 2Mbit/s	16 x 1.5Mbit/s
16 x 2Mbit/s	16 x 2Mbit/s	16 x 2Mbit/s
2 x 34Mbit/s	16 x 2Mbit/s	2 x 34Mbit/s
2 x 45Mbit/s	16 x 2Mbit/s	2 x 45Mbit/s
4 x X.21	16 x 2Mbit/s	4 x X.21
4 x 10/100 BaseT Ethernet	16 x 2Mbit/s	4 x 10/100 Mbit/s
2 x STM-1 1330 nm SH	16 x 2Mbit/s	2 x 155 Mbit/s

Miscellaneous Discrete Inputs and Outputs

MDIs and MDOs Network elements may contain Miscellaneous Discrete Inputs (MDI) and Miscellaneous Discrete Outputs (MDO).

MDIs are inputs to a network element for external equipment. MDIs can be monitored by the management system. MDOs are outputs from a network element used to drive external equipment. MDOs can be activated or deactivated by the management system.

Objectives MDIs can be used to collect status information from other transmission equipment or to monitor external events (for example a door contact).

MDOs are used to drive external equipment or to influence the behavior of equipment external to the system .

About The *WaveStar*™ AM 1 contains four MDIs and four MDOs.

To help with general purpose surveillance, each network element MDI and MDO can be given a unique name, which is stored in the management system. The name can be no longer than 26 characters.

Outcome Using the MDIs, external events are reported to the management system via the alarm representation. If this event occurs an alarm is raised. Also, the severity of these alarms can be set. Once provisioned, MDOs can place external equipment under the system's control.

☐

Section: Timing Concepts.

Overview

Purpose   This section explains the concepts of timing in SDH networks. In the procedures in this chapter, the user is considered to be acquainted with the concepts.

Features and jargon concerning timing distribution in a network element and a network are treated together with the basic timing architecture of the network element.

☐

Network Element Timing

Introduction For telephone exchanges or switches, accurate timing is critical. Therefore switches are synchronized with each other. One way of synchronizing is through the network. In this case all the SDH-network elements in the network are synchronized with one master clock. All the switches in the network can synchronize with the network, and consequently to the master clock.

Timing reference The timing signal received by a network element is called the timing reference.

The *WaveStar*® AM 1 Plus can work in two different mode, the STM-1 and the STM-4 mode.

If it is working in the STM-1 mode, the different ports that provide the input signals that are available as timing references are the:

- Line ports
- Tributary port.

If the *WaveStar*® AM 1 Plus is working in the STM-4 mode *and* if the STM-1 option board is available, an extra tributary port is present as a timing reference.

Timing output A network element can provide a synchronization signal to other equipment by sending an output timing signal.

Different output timing sources that can be used are:

- Station clock output
- Line port
- Tributary port.

External clock output For synchronization of equipment that is not connected to the network element by tributary or line signals, the network element can provide an external clock signal (usually 2 Mhz). However, this equipment must be in close proximity to the network element as the clock signal can only be carried a few hundred meters.

**Timing sources and
outputs**

A schematic drawing of a network element with the timing sources
and output is shown. The dotted arrows indicate outgoing timing
signals. The straight arrows indicate the timing inputs on which the
internal clock of the network element can be synchronized.

Figure 8-13 Timing references

Station clock output

Line signal

Clock

Line signal

Tributary signal
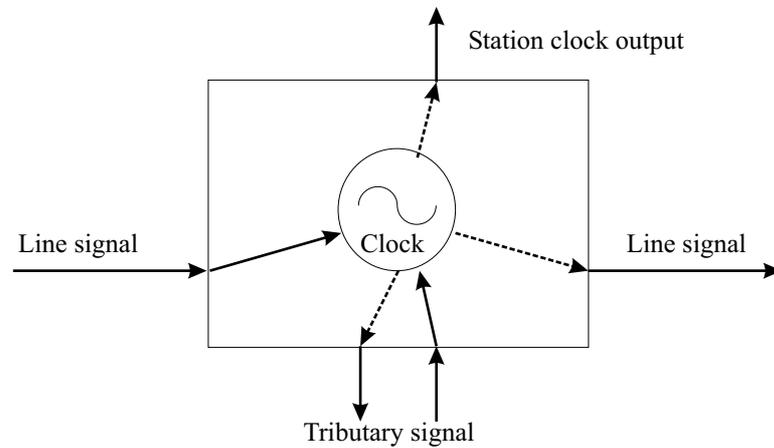
Timing modes

Timing units can be set in different modes:

- Free running
- Hold over
- Locked.

Free running

In the Free running mode, the timing unit generates a clock signal
from its own oscillator. No timing signal from other equipment is
used for the network element synchronization.

Hold over

The Hold over mode will prevent a frequency step in case of a
reference failure. Therefore it uses a frequency memory of the last
available frequency.

Locked

In the Locked mode, the timing unit locks the oscillator-frequency to
one of the external timing sources.

Schematic view of the timing modes
The next figure gives a schematic view of the three different timing modes.

Figure 8-14 Timing modes
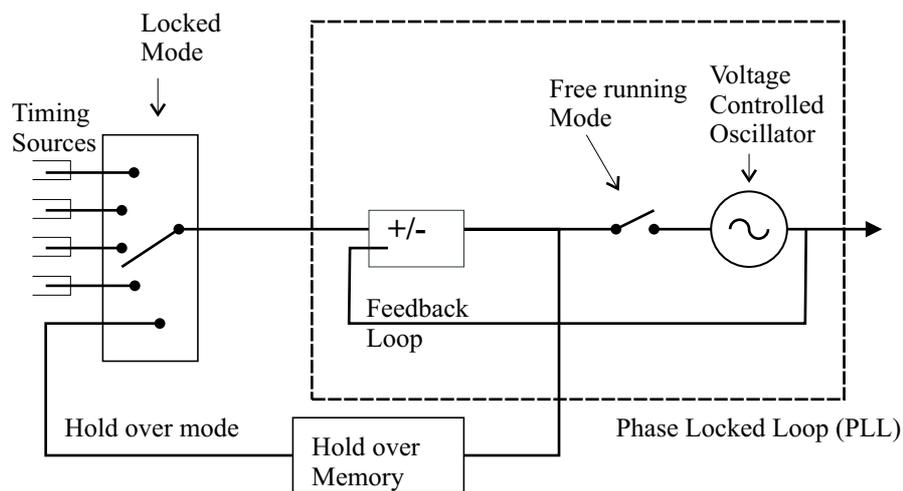
Network Synchronization

....

Introduction   For telephone exchanges or switches, accurate timing is critical. Therefore switches are synchronized with each other. One way of synchronizing is through the network. In this case all the SDH-network elements in the network are synchronized with one master clock. All the switches in the network can synchronize with the network, and consequently to the master clock.

Timing equipment

A network can use different types of equipment as a timing reference, each having its own, well defined, accuracy.

- Primary reference clock (PRC)
- Synchronization supply unit-transit (SSU-T)
- Synchronization supply unit-local (SSU-L)
- SDH equipment timing source (SEC).

PRC   The master clock should be a primary reference clock (PRC), that provides a very accurate network clock (a clock satisfying the ITU-T recommendations G.811). The other network elements in the ring are slaved to this clock. A second clock in the network can be used to act as the backup of the master clock.

The PRC can either be an autonomous clock or it is able to accept synchronization from a radio or satellite signal.

SSU   Noise, called jitter, may accumulate on the signal after passing through many nodes. It therefore becomes necessary at some point to recover and reshape the signal. In this case a synchronization supply unit (SSU) will be used. In addition to recovering and reshaping, the SSU will also be able to run on its own when the reference signal (for instance coming from the PRC) is lost. In this case, the SSU will be able to maintain the quality of the reference signal it produces by means of a holdover mode: the frequency and phase of the reference signal are stored in a memory and used to generate a reference signal locally.

Two kinds of SSUs exist:

- SSU-T: SSU-Transit
- SSU-L: SSU-Local

The functionality of both SSUs is equal, the accuracy of the SSU-T is higher than the accuracy of the SSU-L.

....

SEC   An SDH network element has its own internal oscillator, called the SDH equipment clock (SEC). The accuracy of a SEC is lower than the accuracy of both the SSU and the PRC.

Network example   The next figure gives an example of a network. Four network elements (NEs) of a large network are drawn, plus a master clock (PRC) and a SSU.

Figure 8-15 An example of timing in a network
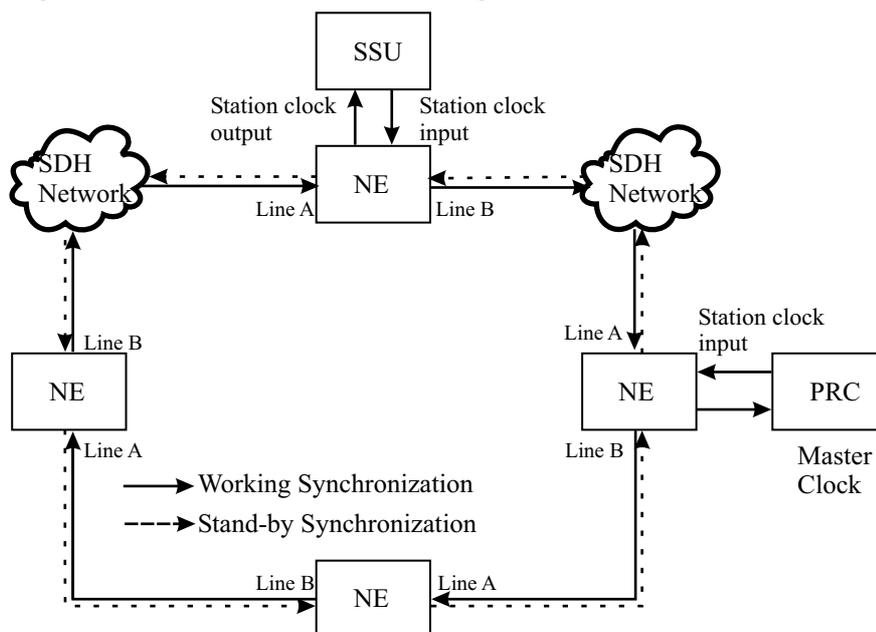
Timing Quality Levels

....

Introduction To choose the most appropriate timing signal from all the incoming timing signals, the quality of the timing signals must be known.

Different quality levels are defined for timing signals. The quality levels specify the quality of the incoming or outgoing timing signal. The quality levels are related to the equipment used to produce the corresponding timing signal.

Accuracy The accuracy of a timing signal can be given in an accuracy value. Every timing signal will have an average frequency, and a deviation in time from the average frequency value. The deviation from the average frequency, can be represented as a fraction of the average frequency. This fraction is known as the accuracy value.

Example When a timing reference has an average frequency of 2048 MHz, and varies in time between 2048.01 MHz and 2047.99 MHz, the deviation from the average value is plus or minus 0.01 MHz. This is can be expressed in an accuracy value:

Accuracy = 0.01 / 2048 = 0.0000049 = 4.9 x 10-6

Quality Levels The quality level (QL) values are transported as a synchronization status message in the S1 Byte in the STM-N signal or in the 4th position of the Sa-bit in a framed 2 Mbit/s signal.

QL	S1-byte	Accuracy	Description
Quality Unknown	S1=0	N/A	No QL information of the signal is available.
PRC	S1=02	10 -11	Primary Reference Clock indicates that the timing signal is provided by a Primary Reference Clock.
SSU-T	S1=04	1.5 x 10 -9	Synchronization Supply Unit-Transit indicates that the timing signal is derived from a Transit SSU
SSU-L	S1=08	3 x 10 -8	Synchronization Supply Unit-Local indicates that the timing signal was derived from a Local SSU

....

QL	S1-byte	Accuracy	Description
SEC	S1=11	4.6 x 10 -6	SDH Equipment Clock indicates that the timing signal is provided by an SDH Equipment Clock.
DNU	S1=15	N/A	Do not use for synchronization indicates that the timing signal should not be used, since it may cause timing loops.

Priorities

Introduction   The timing reference signal is transported through a synchronized network by the network elements. The path this timing signal will follow can be controlled by the network operator.

Description   When only the quality level of the timing reference signal is used, more signals with equal quality level can arrive at a network element. To determine the timing source that the network element will choose in such a case, a priority is assigned to each timing source.

In choosing a timing source, the network element first selects the timing source with the highest quality level. When there are several timing sources available with this highest quality level, the priority is taken into account.

Example   In this figure, notice how the priorities define the timing path when each node receives two signals of PRC quality. The priority in the upper node is disabled since this input signal depends on an output signal of this network element; this could cause a timing loop, as explained in ″Timing Loop.″

Figure 8-16 An example of priority settings in a network
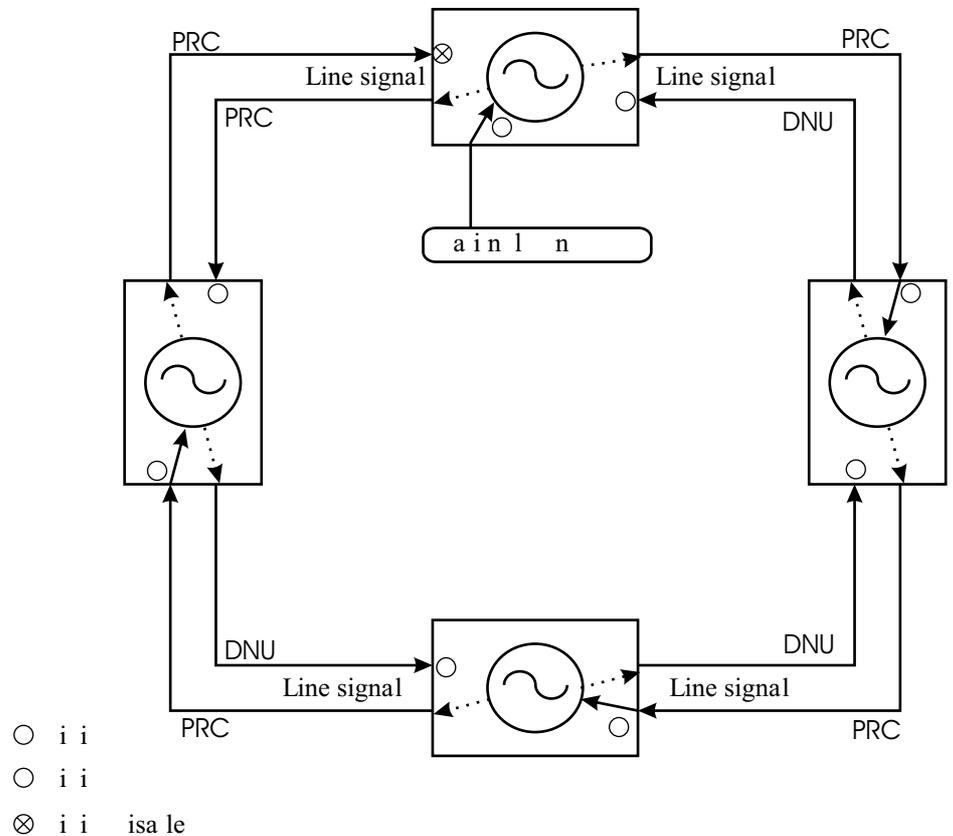
Example of Network Timing

....

Introduction Timing in a network can be realized in numerous ways and configurations. The following example shows a timing chain with a regenerator loop and one PRC. The quality levels indicated in the figure represent the information that is carried by the S1 byte of that signal.

Example

Figure 8-17 An example of a timing chain with a regenerator loop.
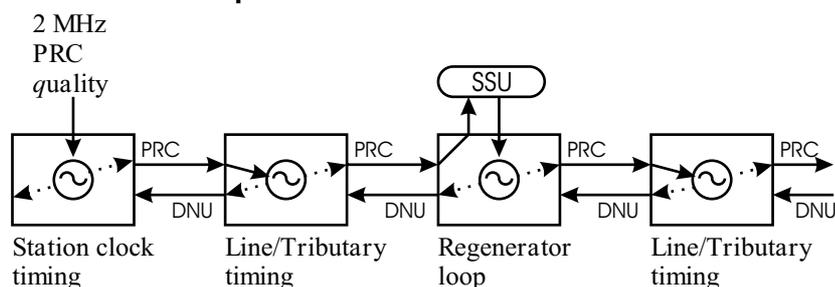
This network contains a station clock (PRC quality), a number of network elements and an SSU. A dotted line indicates the outgoing timing signals, a straight arrow inside a network element indicates the timing signal that is used to synchronize with. The connection between the network elements can either be line signals or tributary ports.

Different types of timing From left to right, the following types of network element timing can be identified:

- Station clock timing
- Line/Tributary timing
- Regenerator loop
- Line/Tributary timing.

☐

....

Timing Loop

....

Introduction   If a timing plan is not engineered correctly, a timing loop may occur. In a timing loop the timing signal that is received by a network element can not be traced back to an independent reference. The reference signal that a network element receives in a timing loop, depends on the timing signal that this network element sends out itself. In the figure below an example of a timing loop is given. Both network elements get a timing reference which depends on itself.

Timing Loop Sketched

Figure 8-18 A timing loop
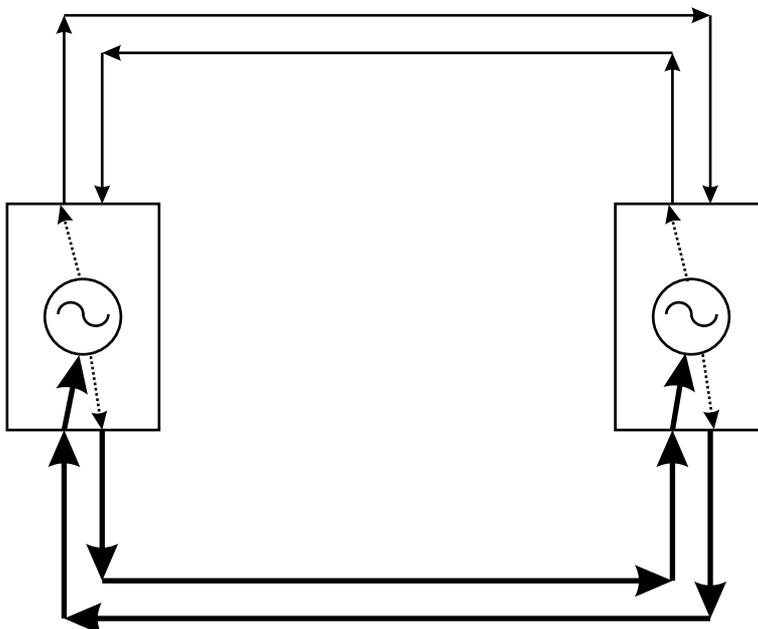
Timing Loop   In a timing loop the timing reference of a network element is derived from the timing output of the same network element. Due to this, the reference signal becomes very instable. This affects the performance of the network in a negative way.

To prevent timing loops, the quality level and priority for every port must be provisioned correctly. By disabling certain ports timing loops can be avoided.

☐

....

Retiming

....

Introduction   When, for instance, a 2 Mbit/s PDH signal enters an SDH network, it is mapped into a VC-12. This VC-12 itself is aligned to a TU-12 in larger containers (for instance VC-4) and then transported through the network. A pointer is carried along to indicate the position of the VC-12 in the container. During transport through the SDH network, the VC-12 may shift in the TU-12. As a consequence, the pointer will also change, since it dynamically indicates the position of the VC-12.

In other words, the payload can float in the container. Due to this floating, the phase information of the original 2 Mbit/s signal inside the VC-12 can no longer be used.

This problem can be overcome using (2 Mbit/s) retiming. The main idea of retiming is the enforcement of timing integrity at the cost of data integrity.

Retiming   A phase difference might occur between the tributary signal entering the SDH Network and the network element clock of the node where this signal leaves the SDH network. Even if the whole SDH network is synchronized with one reference clock, this clock can be out of phase with the original clock of the tributary signal. To clock the signal out with the SDH-PRC frequency, the signal is unpacked (from its virtual container) and stored in an elastic buffer. From there it is send out, and then the retimed signal will carry the SDH-PRC frequency. Now it can be used as a timing reference outside the SDH network.

Retiming is possible on the following tributary interfaces:

- 1.5 Mbit/s interfaces
- 2 Mbit/s interfaces
- X.21 interfaces.

Important! Due to the nature of the X.21 protocol, enforcement of timing integrity does not go at the cost of data integrity on this interface.

Self-timed   In the self-timed mode, the timing signal is derived from the bitrate of the, in case of 2 Mbit/s retiming, VC-12. The bitrate may fluctuate due to pointer adjustments within the SDH network. Therefore the self-timed mode is not suitable for carrying a timing reference through the SDH network.

....

Retiming diagram   In the following figure, the dotted lines indicate the timing sources
and outputs that are used in the network. The solid lines indicate the
data transport.

**Figure 8-19 A 2 Mbit/s signal entering an SDH network and
leaving it with 2 Mbit/s retiming**
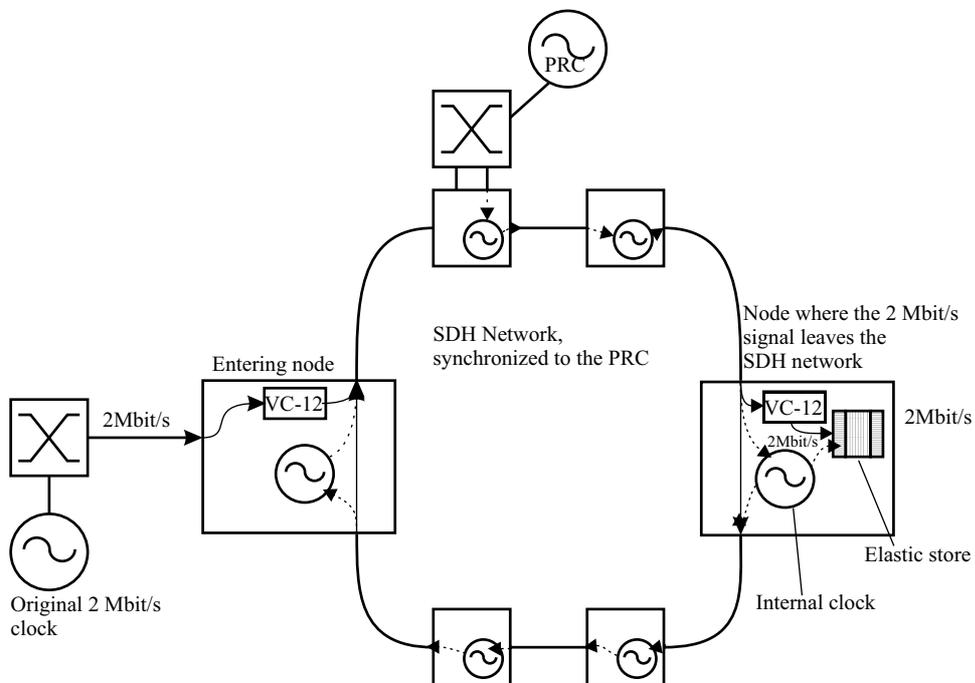
Timing Configuration of the WaveStar® AM 1 Plus

Timing functions   Timing functions of the network element can be divided into three main functionalities. These three functionalities correspond to the three main windows for timing management.

To provision the network element timing, all these functionalities must be addressed.

Block functionality   The table below indicates the actions that can be performed in the procedures addressing the three functionalities.

Timing Sources	Input port timing process
	Timing source assignment
	Timing source functions
System Timing	System timing link switch
	System clock processes
	Output port timing process
Station Clock Output Timing	Output clock timing link switch
	Station clock output selection
	Station clock output process
	Station clock output distribution functions

Section: Timing Concepts.
Timing Configuration of the WaveStar® AM
1 Plus

Concepts

Functional diagram   The following diagram indicates the three main functionalities.

Figure 8-20 The three basic timing functionalities.
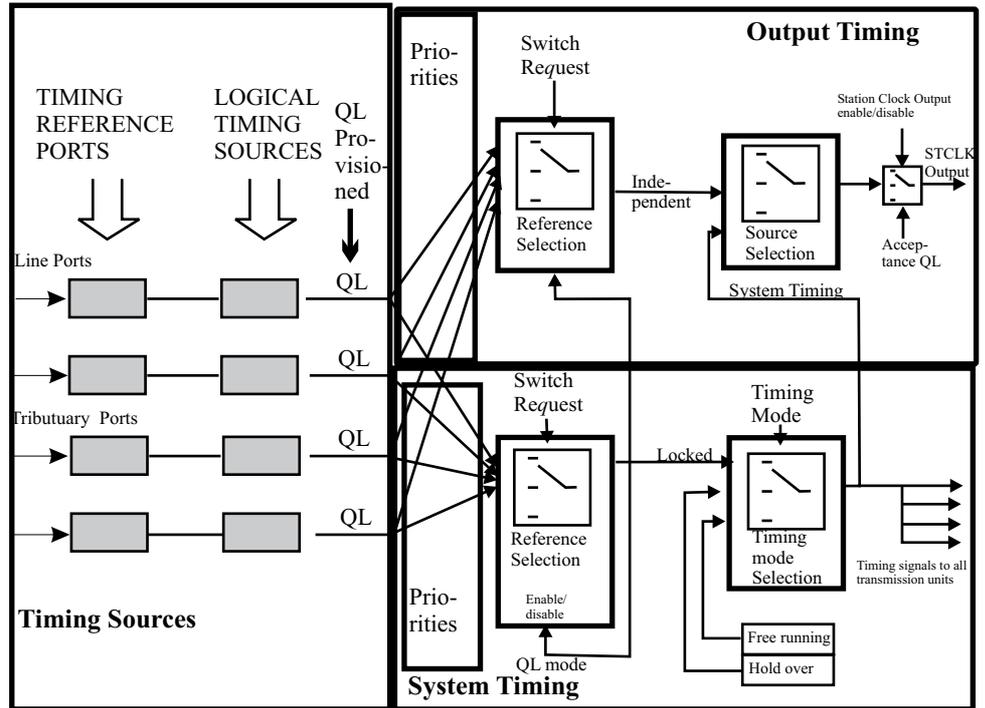
Section: Concepts of Path Provisioning and Protection

Overview

....

Purpose   This section explains the concepts of transmission provisioning. The information in this section can be used as background information for transmission provisioning. The following concepts are described in this section:

- Transmission Plan
- Cross Connections
- Ethernet over SDH
- VC-3 Concatenation
- VC-12 Concatenation
- Multiplexer Section Protection (MSP)
- Sub Network Connection (SNC) protection

☐

....

8 - 5 2

Transmission Plan

Introduction
A network element can be an Add Drop Multiplexer (ADM) or a Terminal Multiplexer (TM). An ADM can be part of a ring, an TM is part of a point to point connection. The transmission plan shows an overview of the network and the traffic. To provide traffic in the network, cross connections are made in each separate network element.

Design Transmission Plan
Transmission provisioning is based on a transmission plan, which must be available when the separate network elements are configured. The transmission plan shows:

- the parameters needed for making the cross connections
- which ports are terminating ports

Figure 8-21 Example of a Transmission Plan
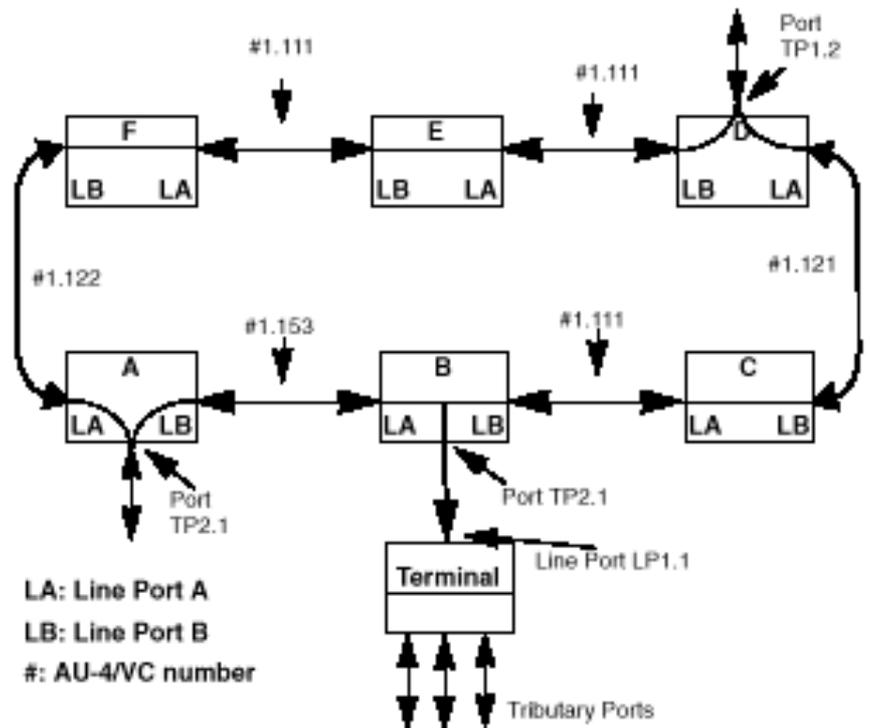
The following hints can be used to set up a transmission plan:

- Make a drawing of the current network configuration (for
  example a ring) in which to provision a transmission path. It is
  important to make clear in this drawing how the network
  elements are connected to each other.
  Example: LB-side of network element A connected to LA-side of
  network element B.

Figure 8-22 Drawing of the current network configuration
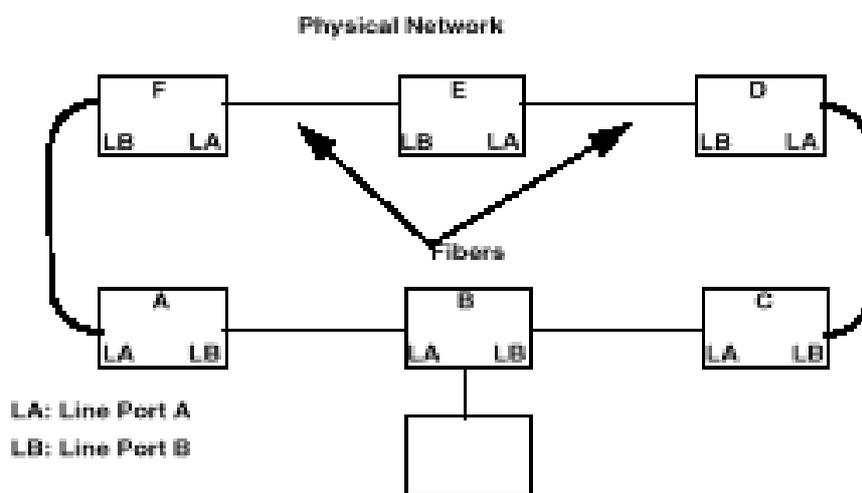
- Identify path channels within the line connections between
  network elements: first check which channels are available.
  Example: Between network elements A and B: #1.153, between
  network elements B and C: #1.111 etc. (#1 is AU-4 number 1). A
  ring with *WaveStar®* AM 1 network elements is only possible on
  STM-1 level, therefore only #1 is available

- Identify network elements in which add-drop cross connections
  should be established. These are the terminating network
  elements of the transmission path.

- Identify terminating ports. First check which ports are available.
  Example: TP2.1 in network element A and TP1.2 in network
  element D.

- Identify the network elements in which through connections
  should be established (in between terminating network elements).
  Example: network element C.

□

Cross Connections

....

Introduction	A cross connection is made to create a path from one point to another point in the network. A transmission plan is made to provision paths in a network and according to this plan cross connections can be made in each network element involved in the path.
	The Cross Connect Unit connects the signals at VC-4, VC-3 or VC-12 level between the termination points of the line ports or tributary ports.
Cross Connect Units	The WaveStar® AM 1 network element is an Add Drop Multiplexer. Cross connections can be made between the 2 line ports and between a line port and a tributary port. It is also possible to make a cross connection with SNC/N protection.
Diagram	The following diagrams show the transmission architecture for the WaveStar® AM 1 network element for STM-1 interfaces. The WaveStar® AM 1 network element supports STM-4 interfaces as well.

Figure 8-23 Cross Connections on the WaveStar® AM1
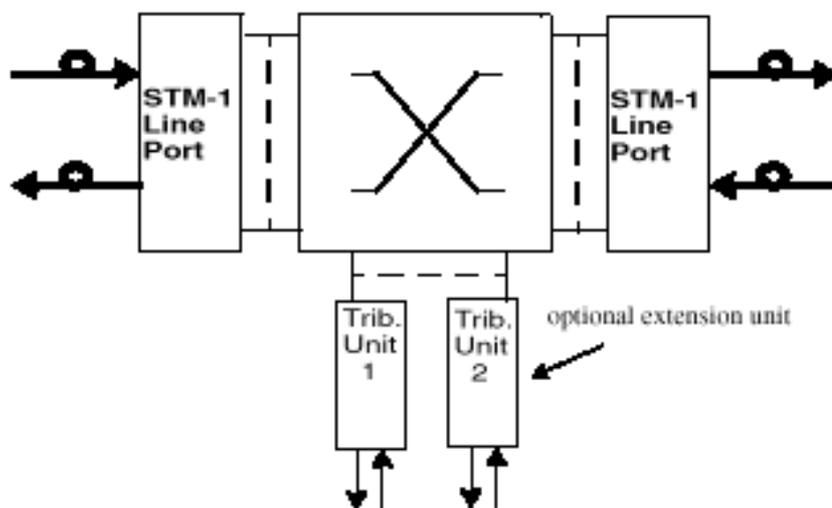
Connection points	A cross connection is made between termination points (TP). On the tributary units a VC-12 termination point is selected. On the line units, the TU number inside the VC-4 must be selected. The TU number consists of 3 numbers:

- k: the number of the TUG-3 inside the VC-4
- l: the number of the TUG-2 inside the TUG-3
- m: the TU-12 number inside the TUG-2.

....

Example:
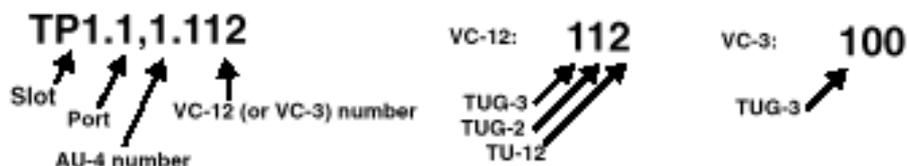
The following table shows the names of the termination points.

Unit	TP Type	TP name
Line 1 and Line 2 (STM-1 or STM-4)	TU-12/TU-3	LP1.1,1.[klm] and LP2.1,1.[klm]
Tributary 1 (2 Mbit/s)	VC-12	TP1.1 - TP1.16
Tributary 2 (1.5 Mbit/s)	VC-11	TP2.1 — TP2.16
Tributary 2 (2 Mbit/s)	VC-12	TP2.1 - TP2.16
Tributary 2 (34/45 Mbit/s)	VC-3	TP2.1 - TP2.2
Tributary 2 (X.21)	VC-12	TP2.1 ... TP2.4
Tributary 2 (Ethernet)	VC-12/ VC3	LAN2.1 ... LAN2.4
Tributary 2 (STM-1)	VC-4	TP2.1 — TP2.2

TUG Structure   A VC-12 cross connection can only be made if the TUG structure of the VC-4 (of the line unit) is structured to contain TU-12s. A VC–3 cross connection can only be made if the TUG structure of the VC-4 (of the line unit) is structured to contain TU-3s. If the TUG structure is not set correctly, the termination points will not appear in the lists to make the cross connections.

The following picture shows an example of a sub-structured VC-4

Figure 8-24 TUG Structure
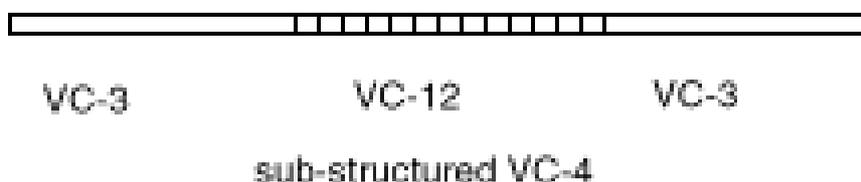
Alarms The cross connections can only be created at one network element at the same time. If the termination points are monitored this will cause the following alarms: VC-4/VC3/VC12 unequipped and TU3/TU12 Loss Of Pointer. Therefore first provision the complete transmission path and then set the ports and termination points to monitored.

☐

Ethernet over SDH

Introduction   To connect remote PC LAN network sites via an SDH network
without the need for intermediate bridges or routers, the WaveStar®
AM 1 plus network element is equipped with the Ethernet Interface
extension card. The Ethernet Interface extension card contains four
10/100BaseT Ethernet ports (LAN ports). The LAN ports
automatically determine the speed of the network, whether it is
10BaseT or 100BaseT. All valid Ethernet packets are accepted (both
Ethernet 2 and IEEE 802.3). The WaveStar® AM 1plus network
element can be configured in a Point-to-Point, a LAN-interconnect or
a LAN-VPN configuration.

Point—to—point   The WaveStar® AM 1plus network elements are connected in a
point-to-point manner across a Wide Area Network (WAN) which is
an SDH network. The ethernet traffic is thus carried across the WAN
as a client of the configured SDH paths. The NE's acts as simple
ethernet bridges across the WAN. The NE's runs on the ethernet in a
promiscuous mode receiving every packet on the LAN and every
packet is then forwarded across the configured WAN. In this
point-to-point configuration each NE can contain up to 4 LAN groups
each of them assigned to one end-user.

The following figure shows the Point-to-Point network topology.

Figure 8-25 WaveStar® AM 1 network elements in Point-to-Point configuration
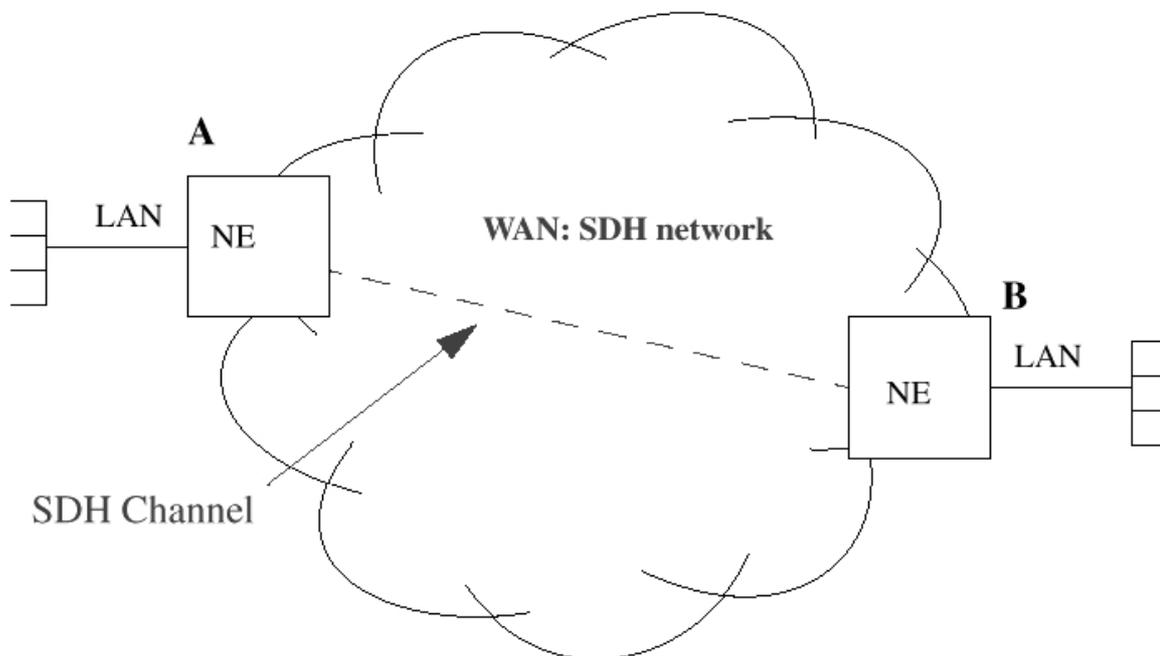
The ethernet packets are carried across the SDH network in a channel. Each channel comprises up to 4 VC12 or up to 2 VC3 concatenated. These VC12s and VC3s behave in the same way as normal SDH VC12s from an E1 port or SDH VC3s from an E3 port. They are connected as point-to-point links across the SDH network to the VCs on the remote NE. There is some buffering in the NE, but it is still possible to lose packets because the channel bandwith can be less than the ethernet traffic rate.

LAN-interconnect   In this configuration there are more then two NEs connected to each other. Each NE contains one ore more LAN groups (V-LANs). Each LAN group is assigned to one end-user.

The following figure shows the LAN-interconnect network topology.

**Figure 8-26 WaveStar® AM 1 network elements in
LAN-interconnect configuration**
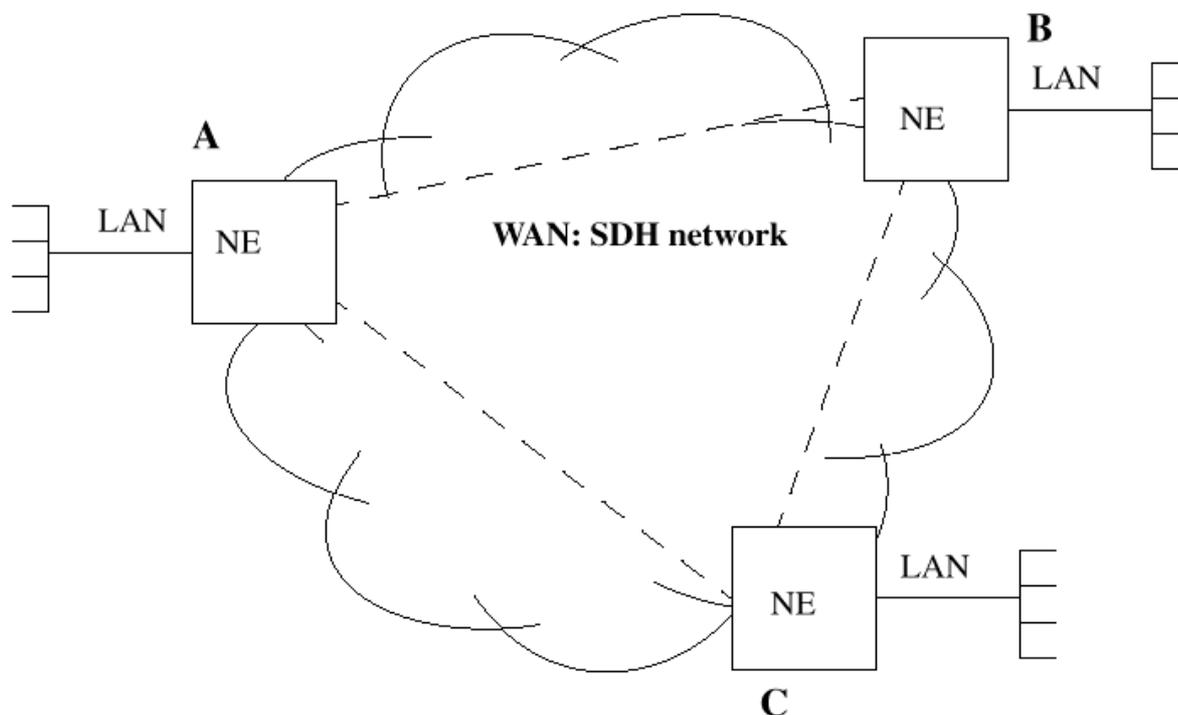
The ethernet packets are carried across the SDH network in a channel.
Each channel comprises up to 4 VC12 or up to 2 VC3 concatenated.
These VC12s and VC3s behave in the same way as normal SDH
VC12s from an E1 port respectively normal SDH VC3s from an E3
port.

This configuration mode support the following features:

- Learning bridges

- Spanning tree

- Additional SDH bandwith and

- V-LAN.

- CID (Customer Identifier)

LAN-VPN (M-LAN)   In the LAN-VPN (Virtual Private Network) configuration, also
metioned as M-LAN there are more then two NEs connected to each
other. Each NE contains one ore more LAN groups (V-LANs) and
each LAN group can be shared by more then one end-users. The
end-users are assigned bandwidth by the operator. The operator also
specifies a traffic policy for each end-user. The operator offer the
end-users multiples of 64 kBit/s bandwidth without the cost burden of
a full 2 Mbit/s link. Extra bandwith may be added by the operator at
any time.

The following figure shows the LAN—VPN network topology.

**Figure 8-27 WaveStar® AM 1 network elements in LAN-VPN
configuration**
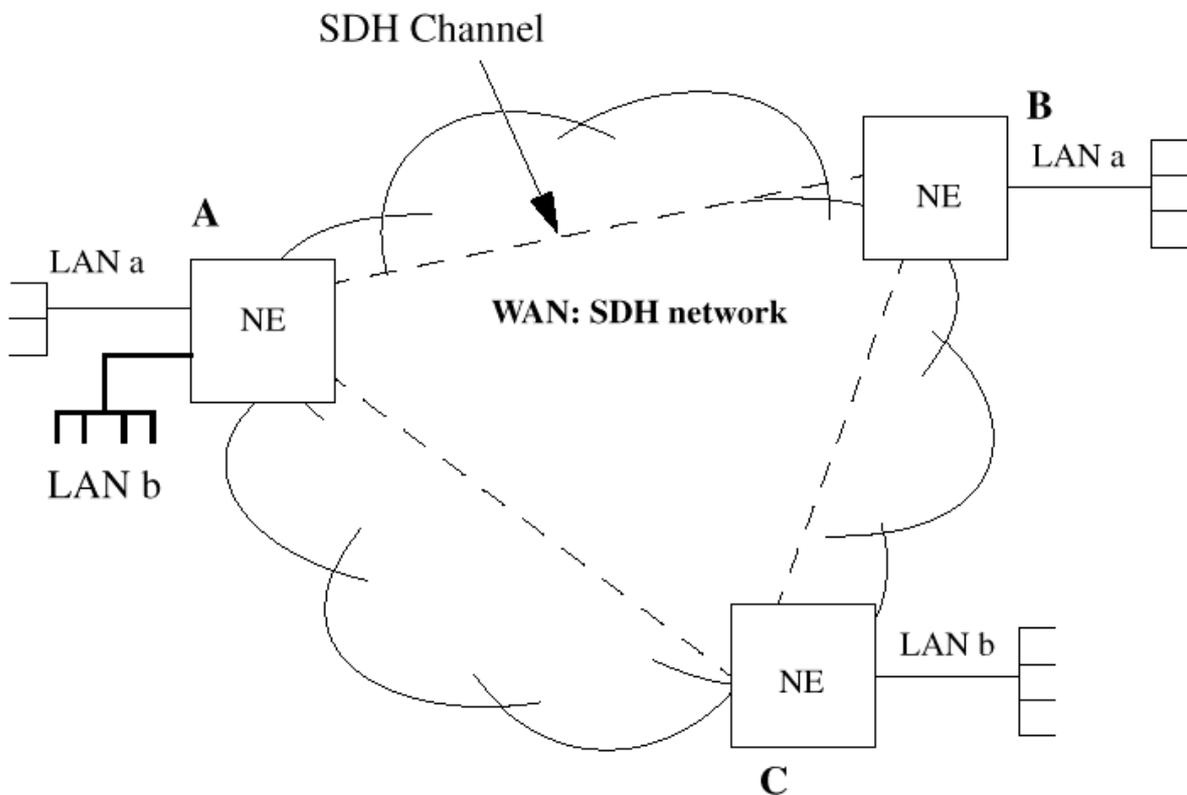
The ethernet packets are carried across the SDH network in a channel.
Each channel comprises up to 5 VC12 or up to 2 VC3 concatenated.
These VC12s and VC3s behave in the same way as normal SDH
VC12s from an E1 port respectively SDH VC3s from an E3 port.

This configuration mode support the following features:

• Learning bridges

• Spanning tree

- Additional SDH bandwith and

- V-LAN (Virtual-LAN)

- CID (Customer Identifier)

- Assigned bandwidth policy (CIR = Committed Information Rate and PIR = Peak Information Rate)

LAN ports   The LAN ports automatically determine the speed of the network (whether it is 10Base T or 100Base T). All valid ethernet packets are accepted (both ethernet 2 and IEEE 802.3). A 2 Mbit/s channel is usable for the ethernet transport if the VC-12 cross connection is made. A 34 Mbit/s channel is usable for the ethernet transport if the VC-3 cross connection is made. It is the operator responsability to configure the bandwith dedicated to each WAN port (2, 4, 8, 10, 50 or 100 Mbit/s).

Cross connection termination points   The following figure shows the names of the physical ports and of the termination points used to make a (VC-12) cross connections:

Physical Port
LAN 2. X

Slot Port
X=1...4

VC-12
LAN 2. X. 3

Slot Port Vc12 number
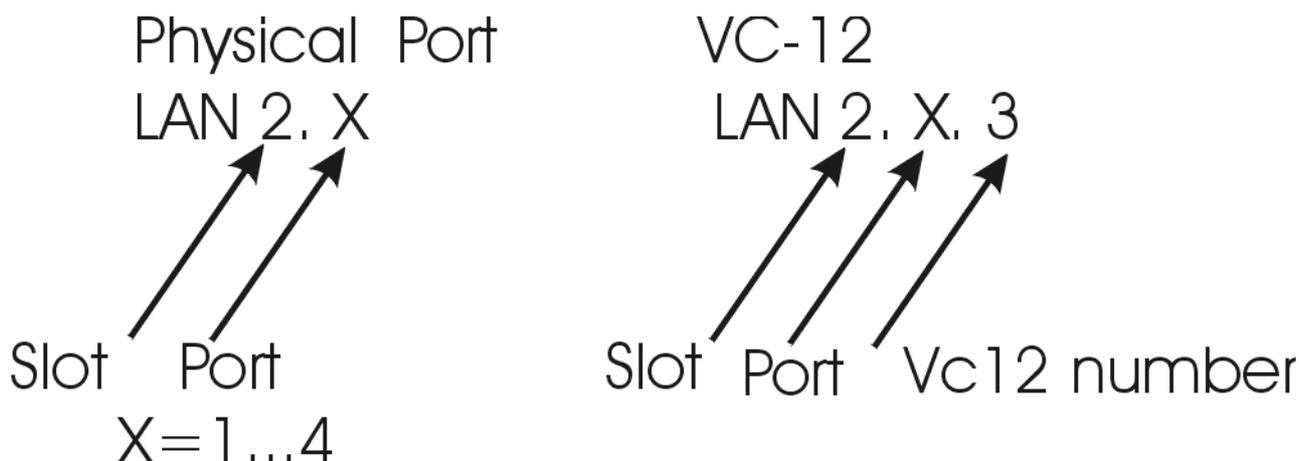
Loss of signal   A ″Link Integrity Failure″ detected at the ethernet physical layer results in a Loss of Signal defect on a 10/100Base T ethernet port (LANdLOS). When a LANdLOS occurs, the transfer of bits to and from the twisted pair physical medium shall be disabled. Test pulses are still generated/sensed. Each 10/100BaseT LAN port has a green LED, which is normally lit. In case of a LANdLOS the green LED is off.

**LAN groups, V-LAN, LAN
ports and WAN ports**

A LAN group can contain multiple LAN ports and multiple WAN
ports.

Figure 8-28 Relation LAN ports, WAN ports and SDH channels
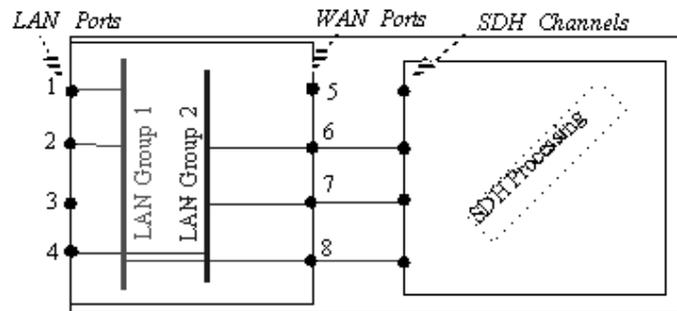
Multiple LAN ports can be assigned to different LAN groups, also
metioned as Virtual LAN's (V-LAN). This keeps the traffic on each
V-LAN totally separate. LAN groups are used to connect LAN ports
and WAN ports. The LAN ports are the physical 10BaseT or
100BaseT Ethernet ports on the NE. The WAN ports are the logical
connection points to the SDH channels. The LAN port is the interface
between the customers ethernet LAN and the ethernet switch on the
LAN unit. The WAN port is the internal port between the ethernet
switch and the part of the LAN unit where the ethernet frame is
mapped into or demapped from SDH payloads.

The following configurations are possible:

- point to point (one LAN, one WAN)

- point to multipoint (one LAN, multiple WANs)

- multipoint to point (multiple LANs, one WAN)

- multipoint to multipoint (multiple LANs, multiple WANs)

- local bridge (multiple LANs, no WAN).

**WAN ports and SDH
channels**

The Ethernet packets are carried across the SDH network in a
channel.

Each SDH channel associated with a LAN group can be connected to
a number of SDH containers which provide a path across the SDH
network. The following types of containers are supported:

- VC-12

- Virtually concatenated VC-12

- VC-3

- Virtually concatenated VC-3

The VC-path which is used as a channel for the ethernet packets transport can be monitored as a normal SDH connection. The standard SDH protection scheme SNC and MSP may be used. The only limitation is that only bidirectional point-to-point paths may be used, because the data network expects to use the SDH path as a bidirectional data link.

Virtually concatenated VCs (additional SDH bandwidth)

The channel that carries the encapsulated Ethernet packets across the SDH network channel can be a virtually concatenated VC-3 or a virtually concatenated VC-12. Virtual concatenation is a mechanism by which a number of independent VCs can be used to carry a single payload with a size greater than one VC-3 or VC-12. Virtual concatenation breaks the contiguous bandwidth (a concatenated C3 or C12 container) into individual VCs, transports them individually and recombines the VCs again to a contiguous bandwidth at the end point of the transmission path. Virtual concatenation requires only concatenation functionality at the path termination network elements. When a virtually concatenated VC-3 or VC-12 path is used, the remote WAN port must receive all elements of the concatenated signal within a fixed time interval. This means that the concatenated signals must be routed (and protected) all in the same way. At the end of the path, each VC-3 or VC-12 must be realigned and connected symmetrically back to the same WAN port (in the same sequence). Therefore each VC-3 or VC-12 is assigned a sequence number to verify that the connection is made correctly. The payload is mapped into the VC-3s or VC-12s in this sequence. On each trail termination point (TTP) the actual (accepted) and expected or transmitted sequence number can be checked.

The term VC-3–Xv is used to indicate a virtually concatenated VC-3. X is the number of concatenated VC-3s. X = 2. The term VC-12–Xv is used to indicate a virtually concatenated VC-12. X is the number of concatenated VC-12s. X = 2, 3, 4 or 5..

Learning bridges

To increases the efficiency of the network a network can be separated in segments. A bridge passes packets between multiple network segments. A bridge can have several ports. By noting at which port an Ethernet packet with a certain source address arrives, the bridge learns to which ports a packet with a certain destination address must be sent. If the port does not know the destination address it will send it to all the ports except the port where it comes from. The tables which the learning bridge uses to pass the Ethernet packets to its ports are not shown to the user by the management systems.

Figure 8-29 Example of a learning bridge with multiple ports
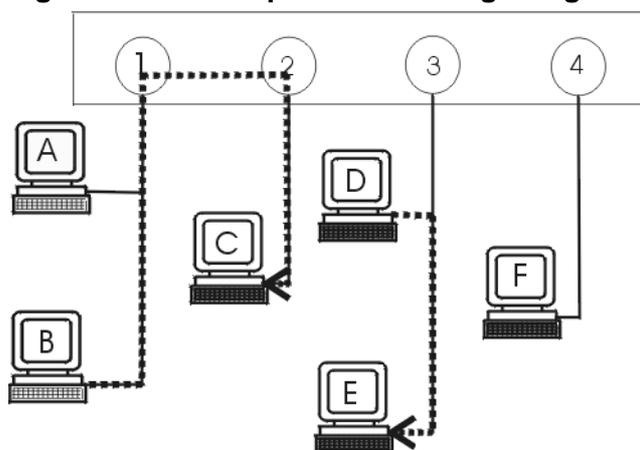
Example: After the bridge has received a packet from station C it knows that station C is attached to port 2. When the bridge knows to which ports a station is attached, it will send packets with destination addresses of these stations only to the port the station is attached to (e.g. a packet from station B to station C is only forwarded to port 2). When a destination address of a packet is of a station in its own segment, the packet is not forwarded by the bridge (e.g. a packet from station D to station E).

Spanning tree

If more than one bridge is used between segments of the network a bridging loop occur, which cause packets to circulate forever. The spanning tree algorithm avoids the occurrence of these bridging loops. The spanning tree algorithm elects a root node and makes sure that each bridge blocks its ports in such a manner that there is only one path from any given point on the network to the root. In this way a mesh network is reduced to a tree which spans every node. The WAN part of the network formed by the NEs maintains its own spanning tree, independent of the spanning tree maintained on the customer's LANs. Thus the spanning tree protocol behavior is different on the LAN side and the WAN side of an NE. Note that users have no way to know which is the root.

Due to the spanning tree algorithm meshed configuration can be made
to enhance availability (alternative channels if one fails). If multiple
VC-n paths are provisioned between two nodes, the spanning tree
algorithm closes down SDH channels to avoid loops. Thus the
increase of bandwidth for payload due to multiple VC-n paths may
not be as expected. So, to increase the capacity of the path use virual
concatenated VC-3s or VC-12s in stead of multiple VC-3 or VC-12
paths.

**Figure 8-30 Example of SDH ports that are switched off due to
the spanning tree algorithm**

WAN port to WAN port connections

Spanning Tree closes some
of the ports

root

SDH Network

SDH Network

■ NE with LAN bridging support
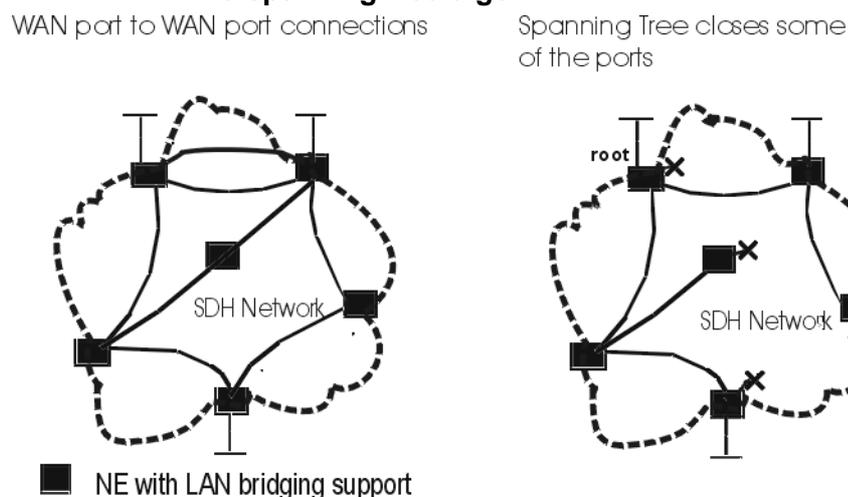
Customer identifier

To allow a system to identify which LANs belongs to each end-user,
each user's LAN port are assigned a Customer Identifier (CIR).

**Assignment of bandwidth
and assigned bandwidth
policy**

Each LAN port is assigned a data rate which the customer can rely on
being available called the Committed Information Rate (CIR). This
information is provisioned per LAN port and applies to the rate of
data which is inserted at that port. Each LAN port of a V-LAN may
have different CIRs assigned.

If a end-user exceeds the assigned CIR, the NE's behaviour depends
on the chosen bandwidth policy mechanism for that port. a choisce
can be made between:

- Strict policy; any packet above the CIR will be dropped

- Oversubscription mode; any packets above the CIR will be
  carried over the network if there is bandwidth available.

Port names The following table shows the names of the physical and logical ports
used for the TransLAN plus card.

Port Type	Name	Description
Physical Port	LAN2.a	a is the port number. The port number can be 1 to 4.
VC-12 Termina-tion point	TP2.1klm	klm specifies the TU position in a fixed so-called VC-4. The number before the klm number is always 1. These TPs are the connection point for the cross connections
VC-3 Termina-tion point	TP2.1klm	klm specifies the TU position in a fixed s0–called VC-4. The number before the klm number is always 1. These TPs are the connection point for the cross connections
SDH Channel	SDHChan2.b	b can be 1 to 4. This is the same number as in the associated logical WAN port
WAN Port	WAN2.b	b is the same number as in the associated SDH Channel (1 to 4)
LAN Group	LANGRP2.c	c is the number of the LAN group (1 to 8)

The following diagram shows the relation between the ports

Figure 8-31 Ports for LAN Unit

Lucent Technologies - Proprietary
See notice on first page
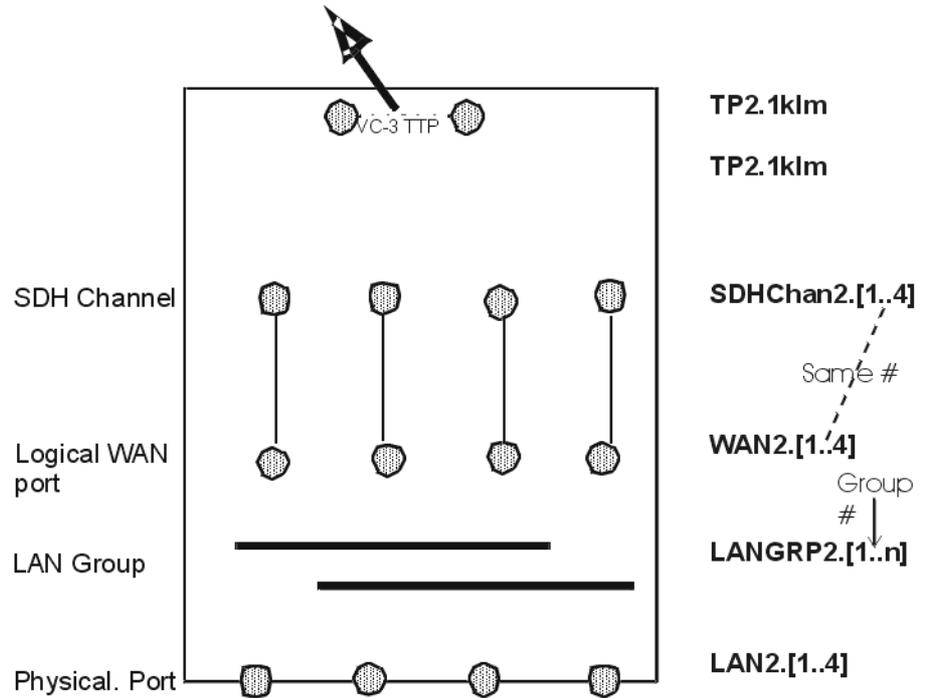
VC-3 Concatenation

Introduction   The concatenation of two VC-3s provides a mechanism to transport payloads greater than the capacity of a single VC-3, for example to transport ethernet data in SDH networks.This feature is for the LAN tributary only.

A concatenated VC-3 group is indicated as VC-3-2v. V means virtual concatenation.

Virtual Concatenation   Virtual concatenation allows the transport of a single VC-3-2v structure in 2 individual TU-3 without the use of any concatenation indication in the pointer bytes(which is the case for contiguous concatenation). It only requires the path termination function to provide concatenation functionality, hence guaranteeing interworking with other standard low order connection functions.

Termination   VC-3 concatenation is only supported without termination. This means that only VC-3 level cross connections can be made.

A VC-3-2v signal is handled like two individual VC-3 signals. The same alarms and performance values are supported as for VC-3. The result of the VC-3-2v supervision is copied into the two VC-3s.

- An alarm in an VC-3-2v group is displayed as one alarm for the entire group.

- Two VC-3s can have different path and path trace.

☐

VC-12 Concatenation

Introduction

The concatenation of two VC-12s provides a mechanism to transport payloads greater than the capacity of a single VC-12, for example to transport ethernet data in SDH networks.This feature is for the LAN tributary only.

A concatenated VC-12 group is indicated as VC-12-xv. V means virtual concatenation. X can be 2,3,4,5.

Virtual Concatenation

Virtual concatenation allows the transport of a single VC-12-xv structure in x individual TU-12 without the use of any concatenation indication in the pointer bytes (which is the case for contiguous concatenation). It only requires the path termination function to provide concatenation functionality, hence guaranteeing interworking with other standard low order connection functions.

Termination

VC-12 concatenation is only supported without termination. This means that only VC-12 level cross connections can be made.

A VC-12-xv signal is handled like X individual VC-12 signals. The same alarms and performance values are supported as for VC-12. The result of the VC-12-xv supervision is copied into the X VC-12s.

- An alarm in an VC-12-xv group is displayed as one alarm for the entire group.

- X VC-12s can have different path and path trace.

☐

Multiplexer Section Protection

Introduction Multiplex Section Protection (MSP) is used to protect the traffic in a point-to-point connection. A requirement for this kind of protection is that the transmission lines are doubled. Multiplex Section Protection is only applicable for WaveStar® AM 1 network element configurations with STM-1 interfaces.

Definition MSP provides the capability for switching the transmission path from the working section to the protection section in a point-to-point connection. The protection line can not be used for carrying low priority traffic.

Objective To protect a multiplexer section in a point-to-point connection.

Outcome A protection setting to protect the transmission path against transmission failures in a point-to-point connection (MS-AIS, LOF, MS-DEG) and port equipment failures.

Principle In a point-to-point connection between network elements, protected by MSP, the lines must be doubled. One pair is selected as a designated worker and the other pair is designated protection. The capacity in the protection or stand-by section must be reserved but is not available for traffic.

Simply put, the protection or stand-by section carries the same traffic as the worker section and it can not be used for carrying any other kind of traffic.

A trail continues to use the working route until a fault condition occurs or a external switch request is issued to switch to the protection route.

Figure 8-32 Example of MSP protection.
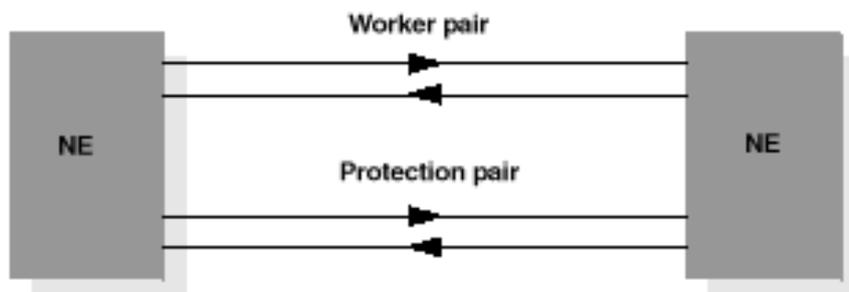
Revertive In the case of failure when in the Revertive mode the traffic switches to the protection line and switches back when the failure is solved.

Non-Revertive   In the Non-Revertive mode the traffic switches to the protection line and remains on the protected line even when the failure is solved.

Bi-directional   In the case of failure in the Bidirectional mode both sides, the transmit and receive, are switched.

□

Sub Network Connection Protection

Introduction   Sub Network Connection (SNC) protection is used to protect the traffic for a pre-selected path (path protection). This type of path protection can only be used for VC-3 and VC-12 level.

Definition   SNC protection is characterized by sending the signal in both directions. When a fault condition occurs the receive NE switches to the protecting line. The capacity for protection can not be used for any other traffic.

Objective   To be able to protect every provisioned path on an individual basis within a subnetwork.

Outcome   A provisioned subnetwork containing individually paths that are 1+1 protected against service failures.

Principle   Sub Network Connection (SNC) protection switching deals with
protection against transmission failures in and between Ring Add/Drop
NEs. One leg is selected as a designated worker and the other leg as a
designated protecting. This means that the capacity is used for
protection even if the normal route is available. A trail continues to
use the working route until a fault condition occurs or an external
switch request is issued to switch to the protecting route. This type of
protection is non revertive. This means that when a traffic failure in
the working route has been cleared, traffic will remain on the
protection route until a manual or forced switch is applied, or when a
failure occurs on the protection line. This behavior is irrespective of
any service restoration in the working route.

Figure 8-33 Example of SNC protection
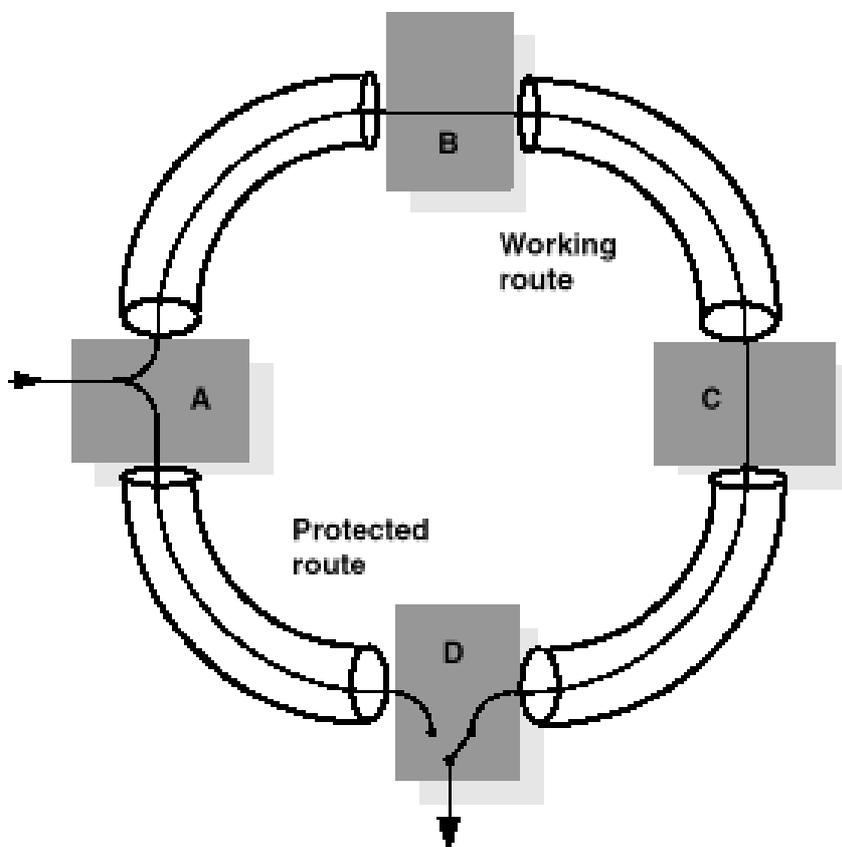
SNC/I   Sub Network Connection Inherent protection or SNC/I monitoring.The
switching criteria for SNC/I are based on signal failures. Signal
failures that cause SNC/I protection switch are: AIS (Alarm Indication
Signal), UNEQ (unequipped VC), TIM (Trace Identifier Mismatch),
TU-AIS and TU-LOP (Loss of Pointer).

SNC/N Sub Network Connection Non-intrusive protection or SNC/N monitoring. The switching criteria for SNC/N are based on both signal failures and signal degrade. Signal failures that cause SNC/N protection switch are the same as for SNC/I: AIS (Alarm Indication Signal), UNEQ (unequipped VC), TIM (Trace Identifier Mismatch), TU-AIS and TU-LOP (Loss of Pointer). Signal degrades that cause SNC/N protection switching are based on the number of Errored Blocks detected during a certain period. The Threshold that defines when a signal is declared degraded can be set by the user.

The WaveStar® AM 1 only uses SNC/N Protection.

□

Section: Traffic Maintenance Concepts

Overview

Purpose   This section explains the concepts of the maintenance settings that can be done for transmission. The information in this section can be used as background information for provisioning these settings. The following concepts are described in this section:

- Port Types

- Termination Points

The concepts of MSP and SNC protection are described in the chapter "Path Provisioning and Protection"

☐

Lucent Technologies - Proprietary
See notice on first page

Port Types

Introduction   A Port is an interface point for signals. A distinction can be made between physical and logical ports. At the logical port the overhead bytes are terminated: in the transmit direction overhead bytes are added, in the receive direction overhead bytes are extracted. Therefore logical ports are also called Termination Points.

Figure 8-34 Physical and Logical Ports
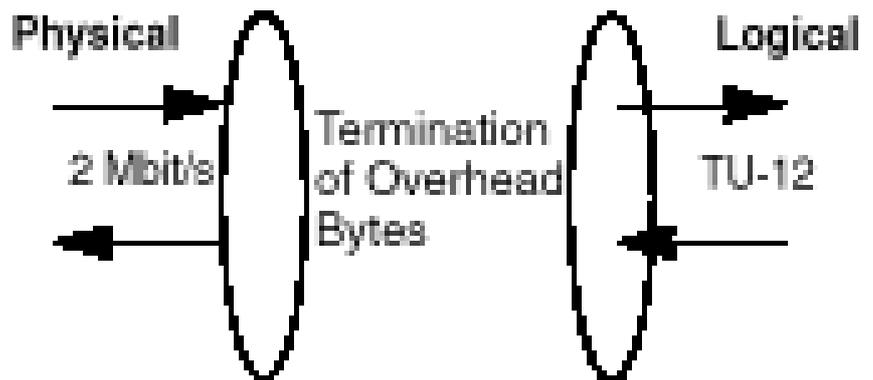
Physical ports   The WaveStar® AM 1 network element contains two STM-1/4 line ports and 1 or 2 tributary port units. The first tributary unit has sixteen 2 Mbit/s ports, The second tributary unit is an optional extension unit.

The following table shows the different types of extension units with its port types and number of ports

Extension Unit	number of ports
1.5 Mbit/s	16 x 1.5 Mbit/s (DS1)
2 Mbit/s	16 x 2 Mbit/s (E1)
34 Mbit/s	2 x 34 Mbit/s (E3)
45 Mbit/s	2 x 45 Mbit/s (DS3)
X.21	4 x 2 Mbit/s
TransLAN™ Plus	4 x 10/100 BaseT Ethernet
STM-1 1330 nm SH	2 x 155 Mbit/s

Port Names   The name of the physical ports consists of two parts separated by a dot. The first part is related to the slot name, the second part is the port number within that slot.

Example: LP2.1, TP1.3

The name of the logical ports consists of the physical port name followed by the AU-4 number and for low order signals, the VC number (VC-12 or VC-3). The VC number consists of:

- the number of the TUG-3 inside the VC-4
- the number of the TUG-2 inside the TUG-3
- the TU-12 number inside the TUG-2.
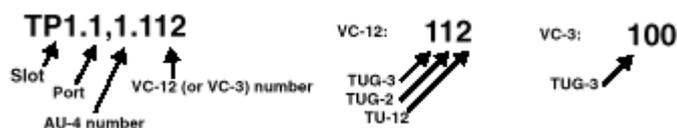
Test Loops   An incoming test loop can be set on the 1.5 Mbit/s, 2 Mbit/s, 34 Mbit/s, 45 Mbit/s and X.21 ports. The input signal is directly routed back to its corresponding output without altering the signal format. This loop can be used to test the connectors. Only one inloop can be set at the same time.

An outcoming test loop can be set on the 1.5 Mbit/s, 2 Mbit/s, 34 Mbit/s, 45 Mbit/s and X.21 ports. The output signal is directly routed back to its corresponding input without altering the signal format. This loop can be used to test how the signal passes through the system.

If an testloop is enabled, the **Abnormal** state is activated. After disabling the testloop the cross connections that existed before setting the testloop are restored.

Setting a testloop is achieved by making a unidirectional cross connection. The termination points of the source and the sink are the same. Setting testloops in only possible on VC-3 and VC-12 level.

Figure 8-35 Test Loop for Physical Ports of 2 Mbit/s Port Units
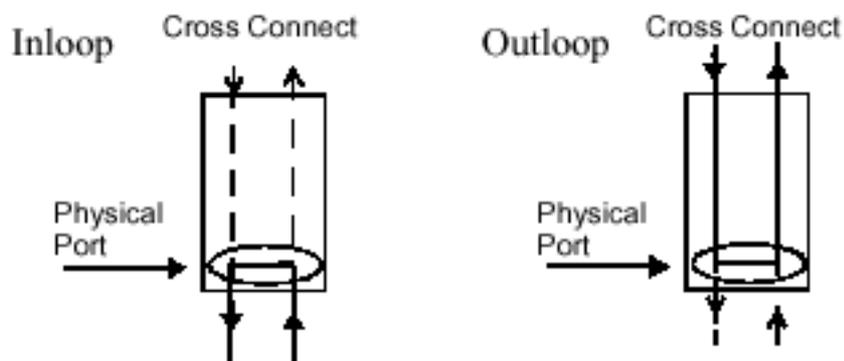
Termination Points

....

Introduction

In the termination points the path overhead bytes of the VC-4, VC-3 or VC-12 signal is terminated (added or removed). In the AU-4, TU-3 and TU-12 termination points the path overhead is not terminated, but can be monitored.

The following information can be retrieved from the path overhead:

- a Trail Trace Identifier (TTI), used for path trace
- a Signal Label, indicating what type of signal is carried
- error checking information, a threshold can be set to determine in case of how many errors a signal is declared degraded

Alarms

When a termination point is set to *Monitored,* alarms related to this termination point are reported. A termination point is set to *Not Monitored* (alarms are not reported) when it is not used.

Path Trace

Figure 8-36 path trace on termination points

Accepted TTI = Expected TTI: Path is correct
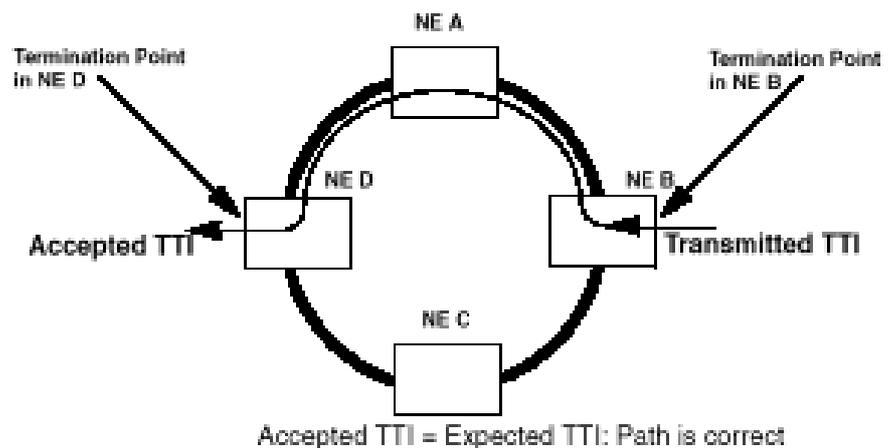
To check whether a path is correctly provisioned a path trace can be set. A label (for example a word) is sent along the path from one termination point to the other. This label is called *Trace Identifier* (TI). If the TI is a specific string, this string is called *Access Point Identifier* (API). If the expected API equals the accepted API, the transmission path is well provisioned.

In the path overhead of a VC-4/VC-3 signal, byte J1 in the regenerator section is used for the TI. For a VC-12 signal, byte J2 is used. A 16 byte frame is formed of which one byte is used for error detection. Therefore the string that can be inserted in these bytes has a maximum length of 15 characters (or 30 hexadecimal digits).

....

TIM Detection   If the *Trace Identifier Mismatch* (TIM) detection is enabled, traffic will be lost when a mistake in the trace string is detected. Upon mismatch, an *Alarm Indication Signal* (AIS) is inserted in the downstream signal and a *Remote Defect Indicator* (RDI) is inserted in the upstream signal.

Signal label   The signal label contains information about the signal that is part of the VC. The signal label indicates whether the VC is unequipped, whether it is a structured signal, which type of mapping is used or whether it is an AIS (Alarm Indication Signal).

Signal Degrade Thresholds   The signal degrade threshold can be set for the Multiplex Section (MS), VC-12, VC-3 and VC-4 levels. The signal degrade threshold determines when a signal is considered degraded. Two parameters can be set:

- number of errored blocks per second
- number of adjacent bad seconds.

The signal is considered degraded, when during the defined number of bad seconds the signal contains more than the defined errored blocks per second. This causes an alarm STM-n Moderate Block Error Rate (n is 0,1 or 16) or VC-n Moderate Block Error Rate (n is 12, 3 or 4).

On VC-12, VC-3 and VC-4 level the signal degrade threshold is also used as a switching criterion if SNC/N protection switching is used. When the signal is determined degraded an SNC/N protection switch is performed.

□

Section: Concepts of Software Upgrade

Overview

Purpose   This section describes the background information necessary to perform the procedures for upgrading the software.

      ☐

Software Upgrade of a WaveStar® AM 1 plus

....

Introduction The controller software of the network element is stored on the controller unit of the network element. To upgrade this software the new software must be downloaded on the network element. This can be done from the ITM-SC or from the ITM-CIT.

System Controller Software The System Controller contains the software to control and support the network element. The Manufacturers Executable Code (MEC) file contains the complete software package for one network element. The software in the system controller is also used to provide a basic configuration to the units connected to the system controller. These other units obtain the appropriate part of the software package from the System Controller during the system start-up or when a unit is inserted.

Two Memory Stores On the System Controller of the WaveStar® AM 1 plus are two memory stores that can contain each a different MEC. The store with the software that is executed is called the active store and the other store is called the backup store. In case of a software upgrade, the management system downloads a complete software package to the backup store of the System Controller.

Switch Stores With a switch command from the management system, the software in the backup store can be made active. The switch command switches between the two stores, thus the active store becomes the backup store and vice versa.

Diagram This diagram shows the software stores in the network element.

Figure 8-37 Software Stores in a network element
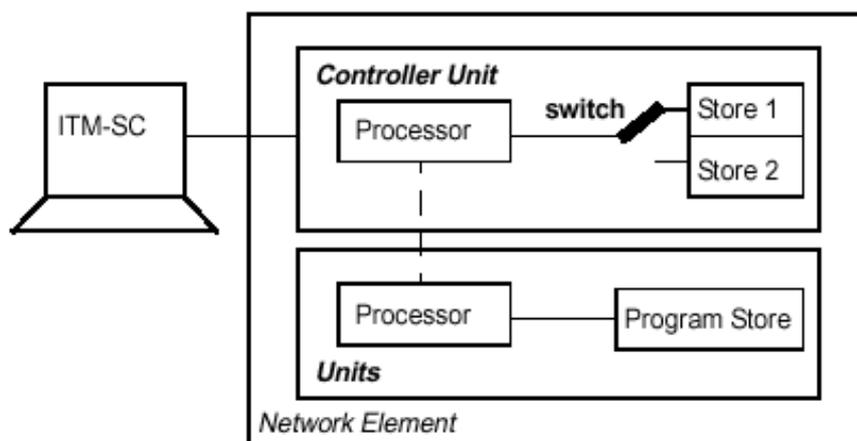
Commit the Software   After confirmation of a switch command between the active and backup store, the management system loses its association with the network element for approximately one minute. If the management system can renew the association with the network element the active store is committed. If the active store is not committed within two hours after the switch, the network element will switch back to the old software load.

                □

9   Using the ITM-SC Interface

Overview

Purpose   Using the ITM-SC interface provides information on how to use the Integrated Transport Management-Subnetwork Controller (ITM-SC).

Objectives   To customize or change settings of the ITM-SC Interface according to the users needs.

Outcome   Be able to work with the ITM-SC Interface.

Intended Use   This chapter contains four sections. The first section described the HP-Vue specific subjects. The other sections describe the subjects which are more ITM-SC specific, such as Module description, general ITM-SC tasks and the Network Map.

Each section starts with a conceptual explanation and, if available, this is followed by a procedure.

☐

Section: HP-Vue Specific Subjects

Overview

Purpose   This section describes the more HP-Vue specific subjects such as:

- Buttons and Mouse usage.

- The general software modules.

☐

Front Panel

....

About the ITM-SC Front Panel

To navigate and control the ITM-SC application, the HP graphical user interface (GUI) displays a front panel. Depending on the user class, a number of different icons on the front panel give access to the different modules of the application. The procedure to open or close a module is explained and a short description of the modules is given.

The front panel window is different for administrator, supervisor and operator.

System Administrator Front Panel

The front panel of the system administrator is shown below.

....
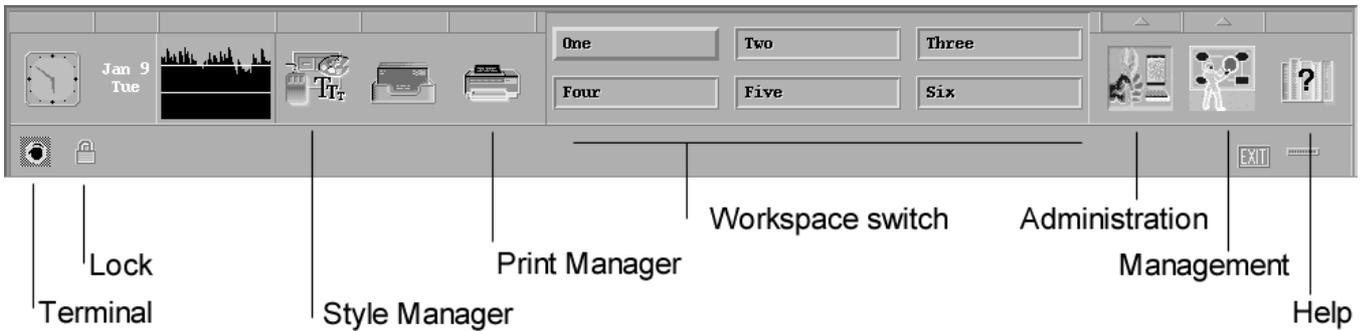
General Modules

....

Purpose   General modules available to each user are described below. For more
                 information about the general modules can be found in the on-line
                 documentation via the Help button. Refer to System Administrator
                 Front Panel to locate the buttons and modules.

Help Manager The Help Manager provides access to online help for HP-VUE. This
                 information includes coverage of workstation controls and tool use.

                 The Help Manager menu is shown below.

....
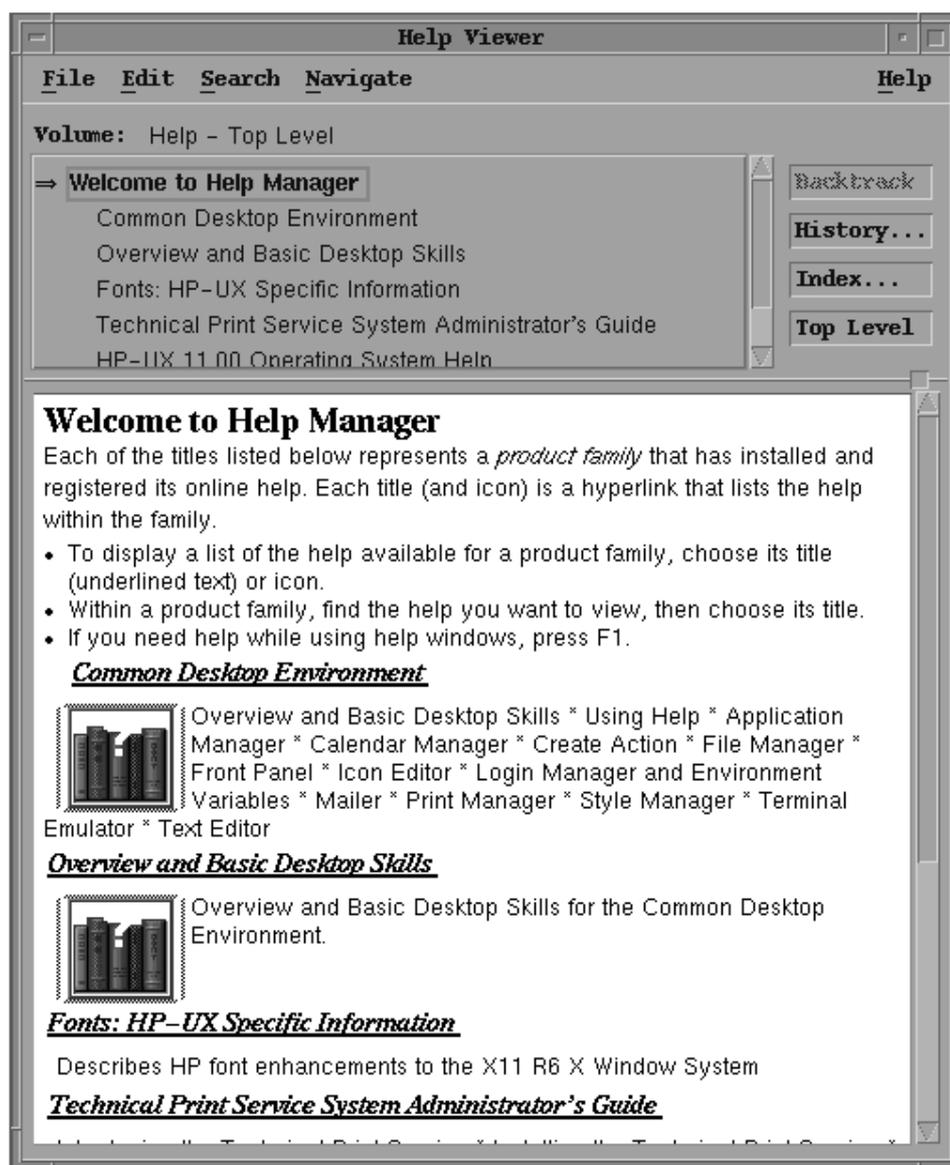
Print Manager The Print Manager makes it possible to:

- Check the status of a print job.
- Cancel a print job.

The Print Manager Menu differs depending on the printers that are defined with the System Administration Manager (SAM). (Refer to the Subnetwork Installation Guide).

The Print Manager icon gives access to a menu of available printers.
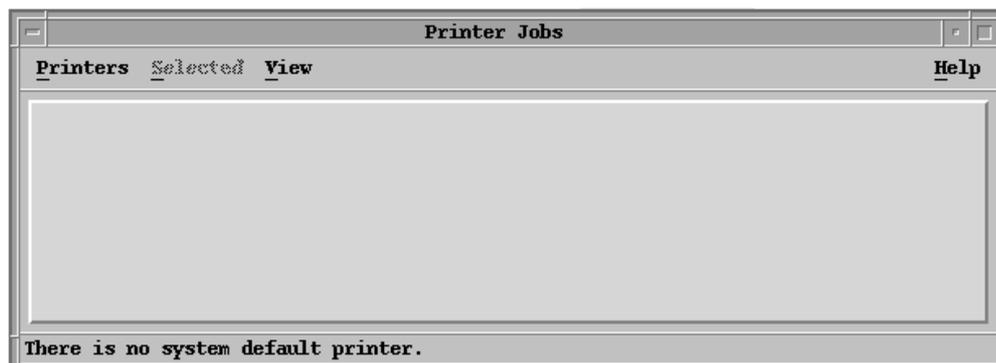
Workspace Switch The Workspace Switch provides greater workspace flexibility by using a virtual window on which multiple windows can be created.

Several workspaces can be selected on the workstation, however only one of these is shown on the physical window at a time.

Style Manager The Style Manager makes it possible to customize visual elements and the workstation behavior. Select the Style Manager icon to access the menu for customizing.

Icons on the Style Manager menu are described below:

Menu Option	Function
Color	Sets workspace colors and palettes.
Font	Sets HP-VUE font sizes.
Backdrop	Sets workspace backdrop pattern.
Keyboard	Sets keyboard click volume and character repeat settings.

Menu Option	Function
Mouse	Sets mouse left or right handed control, button click settings, double click speed, pointer acceleration and pointer movement threshold.
Audio	Sets beeper volume, tone and duration.
Screen	Sets number of minutes before the window times out to prevent burn out of the monitor, and set password protection at time out.
Window	Sets the way windows are opened and activated.
Startup	Sets the start up and ending of a session.

Screen Saver Options

A screen saver will protect the terminal window from burned-in images and enhances security by blanking the screen. Note that a screen saver does not password protect the screen. When requiring a password lock activate the screenlock as well.

The Screen Saver is invoked when no keyboard or mouse activity occurs after a predetermined time. Applications active when the Screen Saver is invoked remain open. However, those applications are subject to their time-out restrictions.

Screen Saver properties can be set only when the user is logged in as root. The ITM-SC Administrator as well as the other ITM-SC users do *not* have the rights to change these settings.

The Screen Saver time-out can be set from 1 minute to 120 minutes. Options for the screen saver are described below:

Option	What It Does
Time-out	Specifies the time interval (from 1 to 120 minutes) from the last mouse move or keystroke to when the window times out. The slider control decreases or increases the number of minutes.
Full Screen Cover	Determines whether or not to completely cover the window when Lock is used from the front panel.

Terminal Window

The Terminal icon provides access to a terminal window.

A terminal window is a screen that allows HP-UX commands to be executed.

☐

Buttons and Mouse Movement

....

Button Names and Functions   The ITM-SC guides the user through the system by means of windows. These windows can contain the following buttons:

Button	Function
Apply	Executes the changes made. The window remains open to permit similar action.
OK	Accepts or executes changes and closes the window.
Edit	Provides the option to change data in shown data entry fields. A different window can be displayed.
Close	Closes the window and resumes normal operation of the application, without changes.
Print	Prints the information to the selected output.
Help	Provides additional information through the context-sensitive on-line help.
Cancel	Cancels the selected action or changes.

Using the Mouse   Mouse movements are described in the table below:

Movement	Function
Select	Select an object or menu item, click the left button (default) on the mouse with the pointer on the object.
Drag	To move an object to an other location, select the object by using the left button (default). Then click it with the middle mouse button and hold that button down, while moving the mouse.
	To move a group of objects to another location, use the left button to define a box over the group of objects and move the box.
	Moving of a group can also be done by pressing **Ctrl** + **left mouse button** to select each object of the group. Then click it with the middle mouse button and hold that button down, while moving the mouse.
Menu	To display a menu that is associated with the pointer location or the selected object, click the right button (default) of the mouse.

□

....

9 - 8   **Lucent Technologies - Proprietary**   365-312–521
                               See notice on first page   Issue a, June 2001

Section: ITM-SC Specific Modules and Windows

Overview

Purpose   This section describes subjects which are more ITM-SC specific. Subjects described in the section are:

- ITM-SC specific modules

- General ITM-SC windows

- Main EMS menu window

□

Accessing the ITM-SC Specific Modules

....

Module Icons   Some of the modules on the frontpanel have submenus for accessing one or more applications. The Management and Administration module both contain several applications.

Opening a Module   Select the triangle just above the modules to open the modules.

Closing a Module   Modules can be closed by selected closing the window (or **ALT-F4**) or by selecting the triangle at the bottom of the menu.

☐

....

9 - 1 0

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

Management Module

....

Purpose Through the Management Module the operator has the choice to:

- Start the network element management.
- Monitor a number of ITM-SCs for raised alarms.

Management Menu The Management menu provides options for managing network elements.

Menu Options Selections on the Management menu are described below:

Menu Option	Function
Default ITM-SC NE Management	Default ITM-SC NE Management allows the user to access the default ITM-SC server.
Any ITM-SC NE Management	Any ITM-SC NE Management allows the user to access any ITM-SC server.
Alarm Monitor	Alarm Monitor to configure, start and stop the monitoring of listed ITM-SCs for raised alarms. This is only relevant for a multi-server configuration.
Set Admin/Default ITM-SC	Set Admin/Default ITM-SC allows the user to change the default ITM-SC server.
Change Password	Change password allows to change the ITM-SC password of the user currently logged in.

....

Administration Module

....

Purpose   The Administration Module is only accessible when the administrator
is logged in. This module gives access to the ITM-SC administration
tasks.

Administration Menu   The Administration menu is shown below:
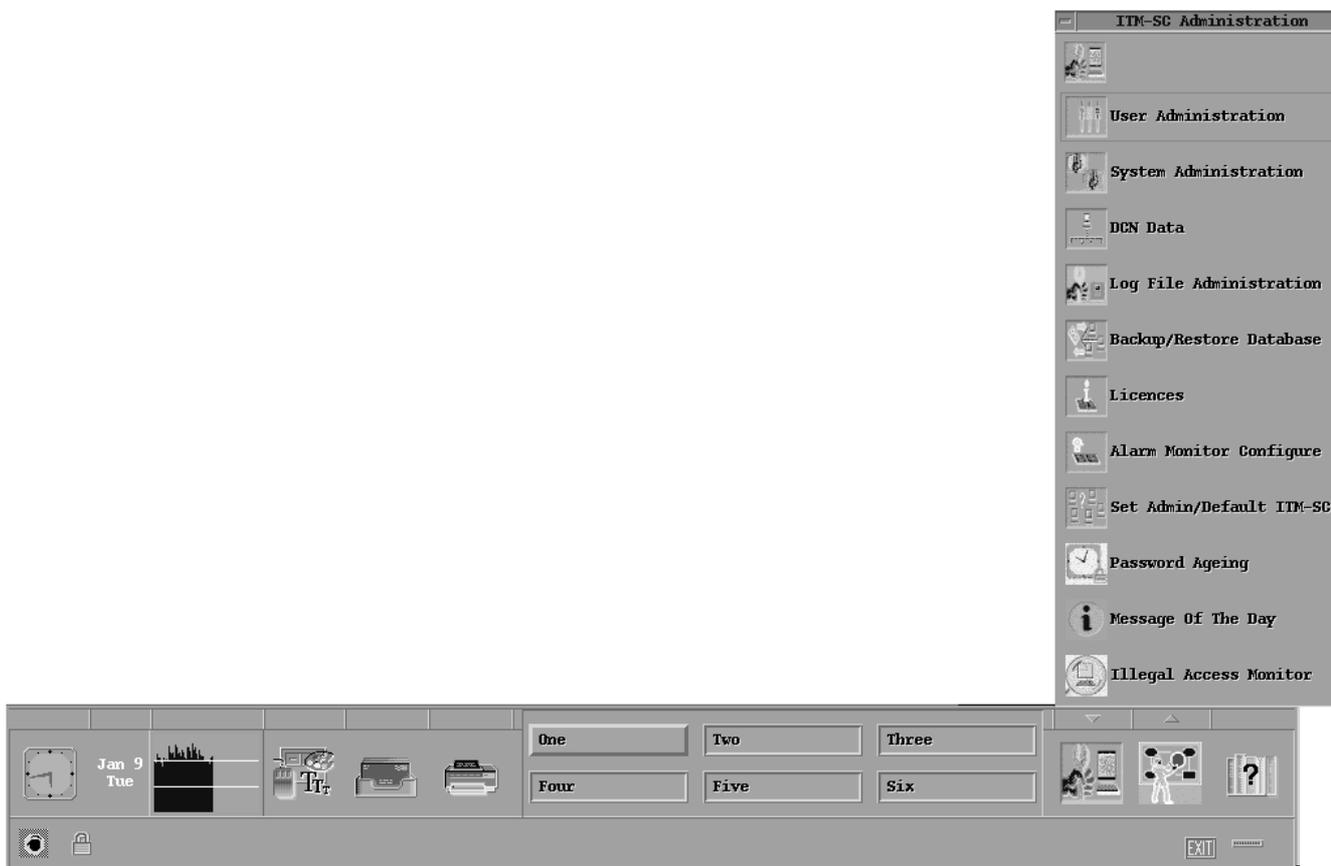
Menu Options   The Administration menu options are described below:

Menu Option	Function
User Administration	Add, delete or modify user logins.
System Administration	Start or stop the ITM-SC application.
DCN Data	Manage the Data Communications Network data.
Log File Administration	View or delete ITM-SC logins.
Backup/Restore Database	Backup or restore the application database.

....

Menu Option	Function
Licences	Enter or change licence information.
Alarm Monitor Configure	Configure a selected server to provide system alarm monitoring information.
Set Admin/Default ITM-SC	Select the server to which the subsequent administration commands are applied to.
Password Ageing	Enable/disable the password ageing parameters.
Message Of The Day	Enable/disable the message of the day parameters.
Illegal Access Monitor	Enable/disable the illegal access monitor parameters.

□

General ITM-SC Windows

....

Introduction   The Element Management System (ITM-SC) contains four types of windows:

- EMS-Menu.

- Selection Dialog window.

- Information window.

- Edit window.

**Button Names and
Functions**   The ITM-SC guides the user through the system by means of windows. These windows can contain the following buttons:

Button	Function
Apply	Executes the changes made. The window remains open to permit similar action.
OK	Accepts or executes changes and closes the window.
Edit	Provides the option to change data in shown data entry fields. A different window can be displayed.
Close	Closes the window and resumes normal operation of the application, without changes.
Print	Prints the information to the selected output.
Help	Provides additional information through the context-sensitive on-line help.
Cancel	Cancels the selected action or changes.

....

9 - 1 4

Information Window   An Information window makes it possible to change or view
information of a component (for instance a node).
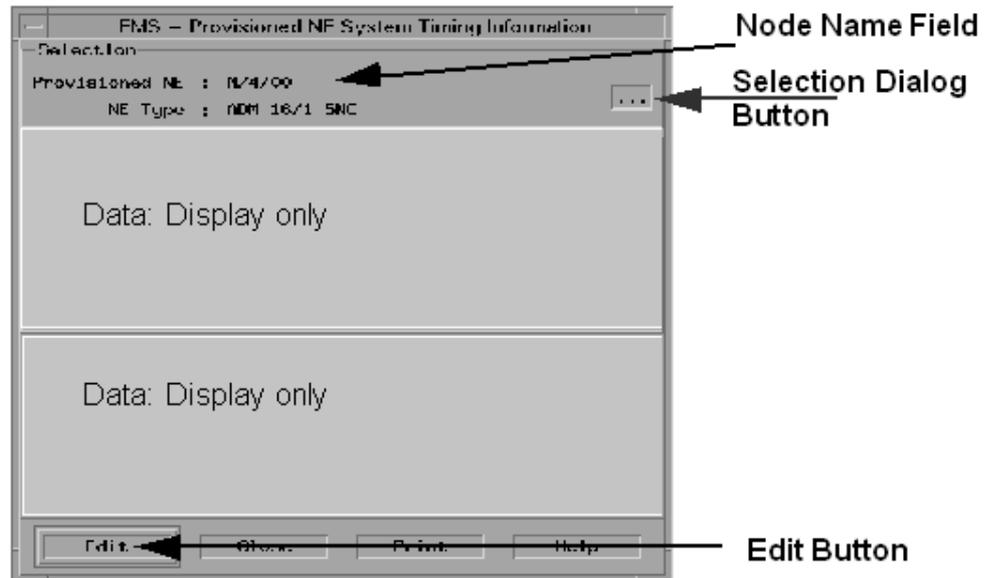
It is possible to click on the selection dialogue button to select a
specific NE. When clicking the selection dialogue button a list with
node names appears. From this list a node can be selected to edit or
view the nodes information.

Edit Window   An Edit window makes it possible to edit the data of a network element. The message field will display information about the action performed by the ITM-SC.
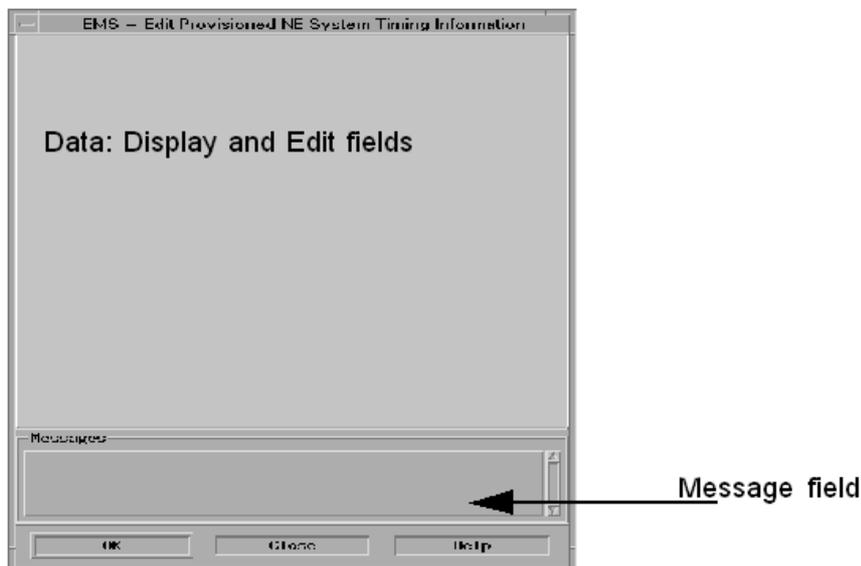
Selection Dialog Window   The Selection Dialog window makes it possible to select a NE, slot, port, termination point, time, date etc. out of a list. The chosen items will be used to edit the characteristics of the item or filter lists by means of the item.

This example window below provides a list of network elements.

```
┌──────────────────────────────────────────────────────────┐
│ ─     EMS — NE Selection Dialog                          │
│ ┌── Node Name              NE Type ──                    │
│ │  A6/00                   ISM RDI                    ▲  │
│ │  A7/00                   ISM RDI                       │
│ │  I24T1L/CI               ISM T                         │
│ │  I26                     ISM RDI                       │
│ │  IW—SLM16—ADM/01         SLM ADM                       │
│ │  IW—SLM16—ADM/02         SLM ADM                       │
│ │ ████M74/00███████████████ADM 16/1 SNC████████          │
│ │  M75/00                  ADM 16/1 SNC                  │
│ │                                                    ▽  │
│ ┌─ Search Pattern: ──────────────────────────────       │
│ │ M74/00                   ADM 16/1 SNC                  │
│ │                                                        │
│  ┌──────────┐    ┌──────────┐    ┌──────────┐           │
│  │   OK     │    │  Close   │    │  Help    │           │
│  └──────────┘    └──────────┘    └──────────┘           │
└──────────────────────────────────────────────────────────┘
```
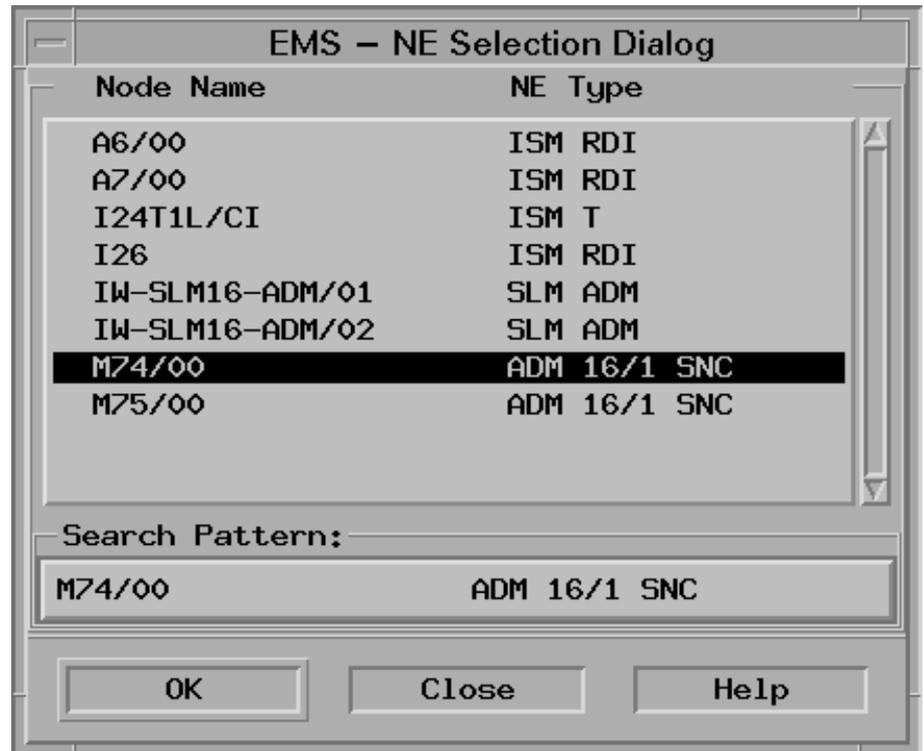
To speed up the search for an item the Search Pattern can be used.
When using the Search pattern and when a match for the typed
selection is found, the found item is highlighted in the list. When
more than one match is found, the first match is marked with a
diamond symbol.

□

Main EMS—Menu Window

....

Introduction	The EMS - Menu window is the main window of the ITM-SC application. The EMS - Menu contains several fields that either provide information about the current status of the network element, or that can be used to manage the network element.
Parts of the EMS - Menu	The EMS - Menu can be divided into three parts:

- Menu Bar.
- Alarm Summary.
- Network Map.

The picture below distinguishes the 3 parts.

....
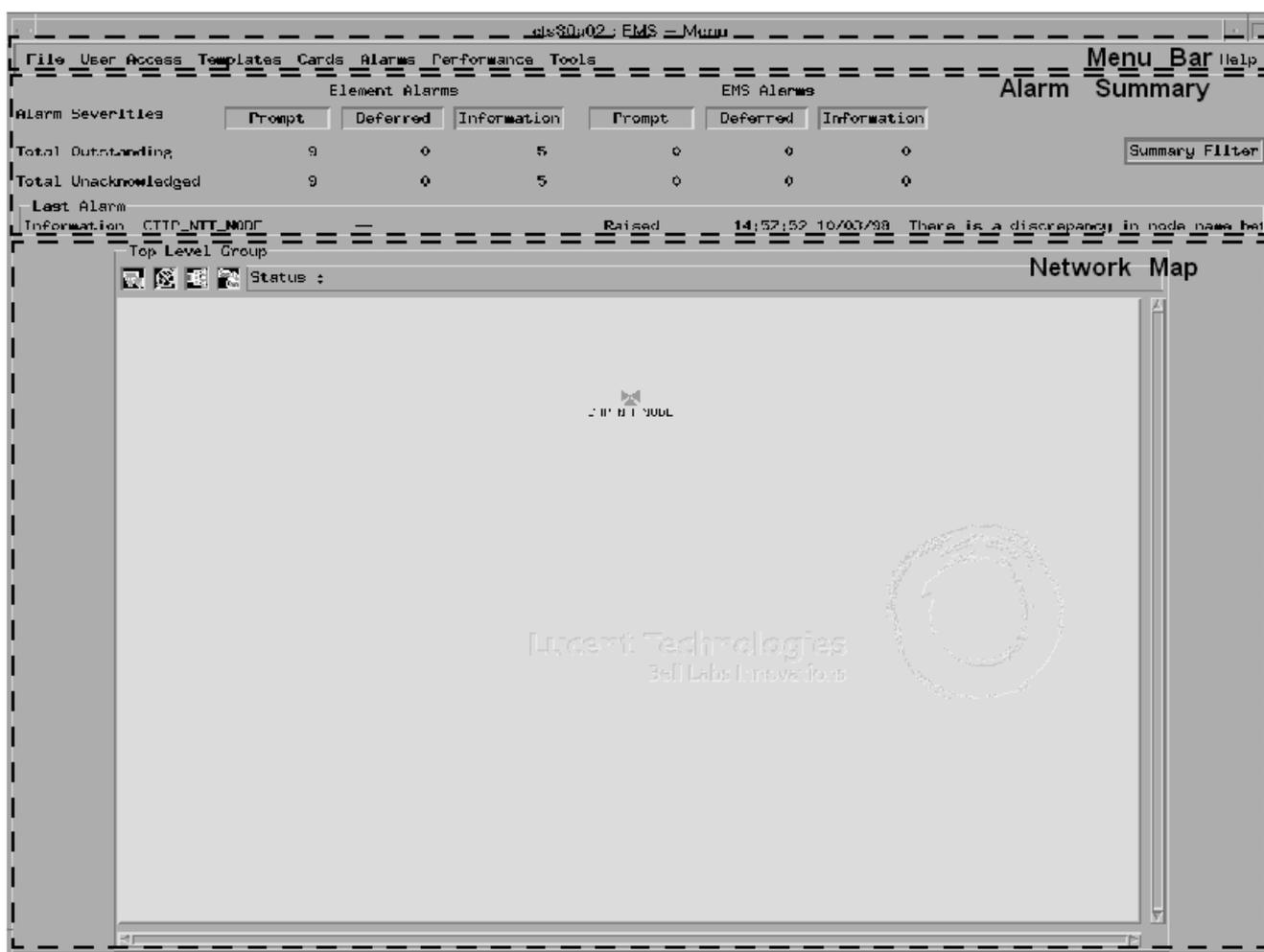
Menu Bar   Via the Menu Bar it is possible to manage the network element. It consist of several buttons that have one or more submenus attached to it. By clicking a menu bar button, the submenus will scroll down and the submenu that is required can be selected. These submenus can, on their part, contain several sub-submenus as well.

Menu bar structure   The structure underlying the menu bar is as follows:

```
File ───────┬─── Reports ─────────────────┬─── Browser
            │                              └─── Properties
            ├─── Synchronization Logging ──┬─── Synchronization Control
            │                              └─── Synchronization Logs
            ├─── Operator Logs ────────────┬─── Operator Logging Status
            │                              ├─── Operator Log Control
            │                              ├─── Operator Logs
            │                              └─── Archive List
            └─── Exit

User Access ─┬─── Create User Role
             ├─── Delete User Role
             ├─── User Role Information
             ├─── Access Groups
             ├─── User Access Profiles
             ├─── CIT Access Control
             └─── CIT Access List

Templates ──┬─── Equipment ──────────────┬─── Create
            │                            ├─── Delete
            │                            ├─── NE Inventory
            │                            ├─── Slot
            │                            └─── TPU Protection
            └─── Synchronization ────────┬─── Create
                                         ├─── Delete
                                         ├─── ISM Information
                                         ├─── SLM Information
                                         ├─── ADM 16/1 Information
                                         ├─── TM 1 Information
                                         └─── AM 1 / AM 1 Plus Information

Cards ──────────── Inventory
Pre-provisioning ─┬─── Create
                  ├─── Delete
                  ├─── NE Information
                  ├─── NE Card Inventory
                  ├─── Subrack
                  ├─── Slot
                  └─── TPU Protection
```

Provisioning	Equipment	Create	NE From Pre-Provisioned
			NE From Template
			MIB Image From NE
		Delete MIB Image	
		Card Inventory	
		Software Inventory	
		NE Information	
		NE Card Inventory	
		OT Associations List	
		Subrack	
		Slot	
		Port	
		MDI	
		MDO	
		NE Software Inventory	
	Transmission	ISM Cross Connect	List
			Display
		SLM Cross Connect	List
			Display
		ADM 155 Cross Connect	List
			Display
		ADM 4/1 Cross Connect	List
			Display
		Phase Cross Connect	List All
			Filter List
			Display
		ADM 16/1 Cross Connect	List
			Display
			DNI List
			Cascaded Cross Connections List
		TM1 Cross Connects	
		AM1 / AM1 Plus Cross Connects	
		Termination Points	RS and MS
			PDH Signal
			VC4
			VC3
			VC12
			VC11
			TU2
			TU3
			TU12
			AU4
			AU4-4c
			Signal Degrade Thresholds
		Bus Structure	
		Phase Bus Allocation	

Provisioning	Synchronization	ISM Synchronization	Timing Sources
			System Timing
			Output Timing
			Configure from Template
		SLM Synchronization	Timing Sources
			System Timing
			Output Timing
			Configure from Template
		Phase Synchronization	Timing Sources
			System Timing
			Output Timing
		ADM 155 Synchronization	Timing Reference
			QL Management
		ADM 4/1 Synchronization	Timing Reference
			QL Management
		ADM 16/1 Synchronization	Timing Ports
			Timing Sources
			Output Timing
			Configure from Template
		AM 1 / AM 1 Plus Synchronization	Timing Sources
			System Timing
			Output Timing
			Configure from Template
		TM 1 Synchronization	System Timing
			Output Timing
			Configure from Template
		Summary	
	Packet over SDH	LAN Group	
		SDH Channels	
Management	NE Status		
	NE Time Synchronization	NE Time Synchronization	
		NE Time Synchronization - Details	
	MIB Upload		
	MIB Download		
	Update MIB System		
	Manage Associations		
	Overlay Comms Networks	Data Comms Test	
		DCC and EOW List	
		DCC Metric Values	
		DCC over MSP	
		Overhead Bytes Accessibility	
		NE Tunnel Information	
	User Confirmation Required		
	Geographic Redundancy	Manager Information	
		NE Information	
	Provision SID		

Protection	Equipment	ISM	PPC
			TGU
			TPU 1+ 1
			TPU 1:N
		Phase	BBU 1 + 1
			CCU 1+1
			CMU 1+1
			CMU 1:N
			PPU 1+1
			PPU 1:N
			TIU3 1+1
			TIU4 1+1
			TIU1 1:N
		RR Channel 1: N	
		ADM155	2Mb 1: N
			TRF 1+ 1
		ADM4/ 1	16x2Mb 1: N
			32x2Mb 1: N
			34Mb 1: N
			45Mb 1: N
			TRF 1+ 1
		ADM16/ 1	CC 1+ 1
			PT 1+ 1
			E3/ DS3 1+ 1
			E1/ DS1 TPU 1:N
			E4/ STM1E/SPIA TPU 1: N
		ADM16/ 1 Compact	CORE UNIT 1+1
			STM1O TPU 1+1
			E1 TPU 1: N
		WDACS	MS Control
			DTU
			STM 1: N
			Matrix Slice
			MC Subrack
	Transmission	ADM16/ 1	SNC
			DNI
			Cascaded
		MS- SPRING	
		MSP	
		OMSP	
		VC4 SNC	
		VC3 SNC	
		VC2 SNC	
		VC12 SNC	
		AM 1 / AM 1 Plus VC3 SNC	
		AM 1 / AM 1 Plus VC12 SNC	
		ISM PCTFI	

```
Events ─────┬── Alarm List
            ├── Alarm Statistics
            ├── Autonomous Event List
            ├── NE Event Control
            ├── Multi NE Event Control
            ├── EMS Event Store Capacity
            ├── EMS Event Control
            ├── Event Archive
            ├── Event Parameters ──┬── NE
            │                      ├── Specific Resources
            │                      ├── EMS
            │                      └── Management
            ├── SLM Regen Alarm Info
            └── WDACS Station Alarm Control

Performance ─┬── Report List
             ├── Archive List
             ├── Measurement ──┬── TP Configuration
             │                 ├── TP Configuration via Subrack
             │                 ├── Current Measurements
             │                 ├── TP Threshold Configuration
             │                 ├── OLS80G PM Current Measurements
             │                 └── OLS80G TP Threshold Configuration
             └── Reset Digital Counters

Tools ───────┬── MEC Files
             ├── Licenses
             ├── Default Devices
             └── Year Display

Help ────────┬── Alarm Map
             ├── Contents and Index
             ├── User Guides
             ├── Operator Logs
             └── On Version
```

Alarm Summary   The Alarm Summary provides an overview of the alarms risen on both the NEs and the NE management system. A more detailed description of the alarm summary can be found in the chapter "Event Management".

Network map   The Network Map is the main window for managing all NEs within the subnetwork and gives direct information about NEs their status. A more detailed description of the Network Map can be found in the section "Network Map" of this chapter.

Section: ITM-SC General Tasks

Overview

....

Purpose   This section describes subjects which are ITM-SC related such as:

- Accessing the ITM-SC.

- Changing of ITM-SC passwords.

- ITM-SC Reports

- Log out of the ITM-SC.

☐

Lucent Technologies - Proprietary

Parameters for Accessing the ITM-SC

Login   Before the ITM-SC application can be started the user needs to login.

Window to use   The following window is used to login into the ITM-SC.

ITM-SC/SDH Transport Management (hzhli01a)

Please enter your user name

| OK | Start Over | Options ▽ | Help |

ITM-SC

Login and Password   The login or user name has up to 8 alphanumeric characters (a..z, A..Z, 0..9). The Password requires a minimum of 6 characters (a..z, A..Z, 0..9 and other printable characters e.g. - * +) with at least 2 alphabetic characters and at least 1 non alphabetic character.

Button Description   Buttons on the window are described below:

Button	Function
OK	Confirms the start of the login after filling in the "Login" and "Password" fields.
Start Over	Removes data from the "Login" and "Password" fields. Lets the user begin the login procedure again, without registering a login attempt. Clear is quicker than backspacing, which can also be used.
Options	Displays a menu containing Restart Server, Copyright, Fail-safe Session, HP-VUE Lite Session, HP-VUE Session and Languages. These items are HP specific and control features of the workstation and what happens after login. For more information about the selectable items, refer to the HP system documentation.
Help	Provides information on how to login.

□

Accessing the ITM-SC

Purpose	To login in to the ITM-SC.

Related information   For more information on the parameters used refer to:

- Parameters for Accessing the ITM-SC

Procedure   Perform the following procedure to Log in to the ITM-SC.

1   Enter Login (user name) and click OK or press **ENTER**.

2   Enter password. Click OK or press **ENTER**.

    Result:

    If the login is successful, an HP copyright message appears. After this the Front Panel appears.

    An "Incorrect Login" message appears when the login or password entered is incorrect. Press **ENTER** or click OK when this message appears. After this the login process can be restarted.

E ND OF S TEPS

□

Changing Password

Purpose	To increase the security of the ITM-SC and its network managed the user is able to change his/her own ITM-SC password.
Before you begin	In this procedure a shell window is provided to change the password. A script will guide the user through the change of password.
Related information	Related procedures are:

- Modifying ITM-SC User Information
- Configuring Password Ageing.

Procedure Follow the script below to change the ITM-SC password.

1 Open the *ITM-SC Management* menu and select the *Changing Password* icon.

> **Result:**
>
> A shell window appears asking the user for the current password.

2 Enter the current password. Press **ENTER**.

> **Result:**
>
> The user is asked to enter a new password.

3 Enter a new password. Press **ENTER**.

> **Result:**
>
> The user is asked to re-enter the new password.

4 Re-enter the new password. Press **ENTER**.

> **Result:**
>
> If the new password is accepted the following message will appear: Password has been updated successfully. The shell window will disappear automatically.

E N D   O F   S T E P S

□

Report Concepts

Background
When selecting anywhere in the ITM-SC the Print button, system information that is shown in that window, can be sent to two different outputs. It can be printed directly to a printer or to a file (a report). A report will be stored on the ITM-SC for later use.

File directory and format
If a report is created a file, representing the report, is stored on the ITM-SC.

The location of these files is: */var/spool/itm/sc/reports/<ServerName>/* where *<ServerName>* is the name of the server. The format of these files are ASCII.

Limited printing capacity
When printing long reports, only the first 2000 lines will be printed. The user will be notified if the report is not printed entirely.

Report Printing window
The Report Printing window allows the user to decide which type of output is generated.
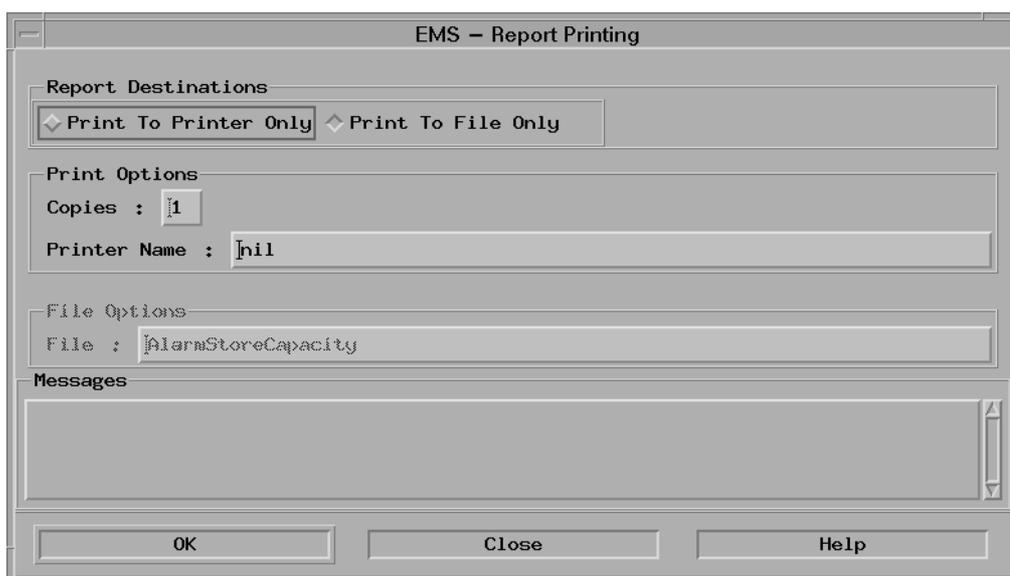
Fields to Use
Use these fields to determine the print output:

Field	Description
Report Destinations	Shows the possible outputs: Printer or File. *Print to Printer Only* is the default setting.

Field	Description
Print Options	Is only highlighted if *Print to Printer Only* is selected. The Printer Name is the name of the default printer, but if an other printer is required, its name can be entered. The number of copies can also be entered.
File Options	Is only highlighted if *Print to File Only* is selected. The name of the file to print to can be entered. Note that if the entered file name already exists, the old file will be overwritten!

Report Browser window   The Report Browser window is used to view the reports stored on the ITM-SC system.
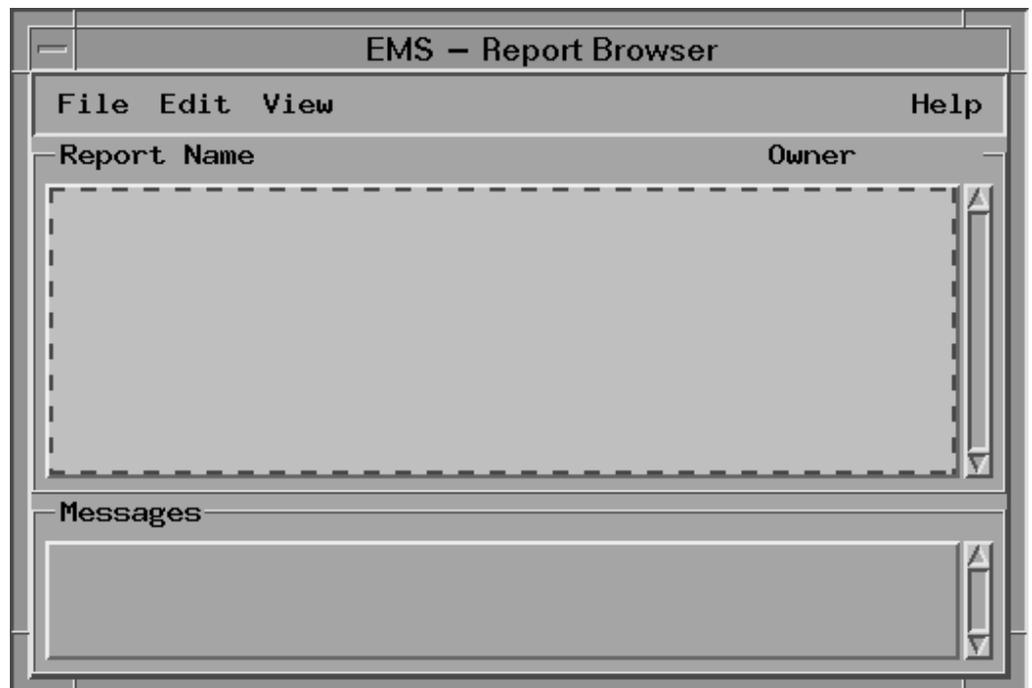
Report Options   Use the *File* menu of the Report Browser to:

- Browse online or hardcopy a report.
- Rename a report.
- Copy a report to another device, such as computer disk.
- Delete a report.
- View the report names of all the users.

☐

Printing a Report

Purpose   To store or print all kinds of system data for evaluation.

Related information   The related concept is:

- Report Concepts

Procedure   Perform the following procedure for printing data by a selected printer.

1   Click on the `Print` button in the information window from which the data is to be printed.

2   Select the desired output device.

If the output device is a printer, enter the number of copies and, if needed the name of the printer.

If the output device is a file, enter the file name.

3   Click `OK`.

> **Result:**
>
> The report will be printed. Note that the only the first 2000 lines will be printed of reports which exceed this limit.

E ND   OF   S TEPS

☐

View a Report

Purpose
Use this procedure to view the information that has been printed to files.

Related information
The related concept is:

- Report Concepts

Procedure
Follow these steps to browse a report:

1 Select *File -> Reports -> Browser*.

Result:

The Report Browser window appears.

2 Select the Report Name from the list of report names. When no reports are shown select View and All or User successively.

3 Execute the desired operation.

4 After operating on the file select *File -> Close* to complete the procedure.

END OF STEPS

□

Logout of the ITM-SC

....

Background	When the user has completed his work on the ITM-SC, he or she can log out of the Graphical User Interface. Then unauthorized users will not be able to access the ITM-SC.
Security	In the style manager the administrator can enable logout confirmation, so an accidental logout can be prevented. Furthermore, an administrator is the only user that can make lasting changes in the style manager. Any changes to settings made by other users are lost at logout.
Windows to Use	To log out of the system, the Logout icon and the Logout Confirmation window (optional) are used.

Logout Icon

□

....
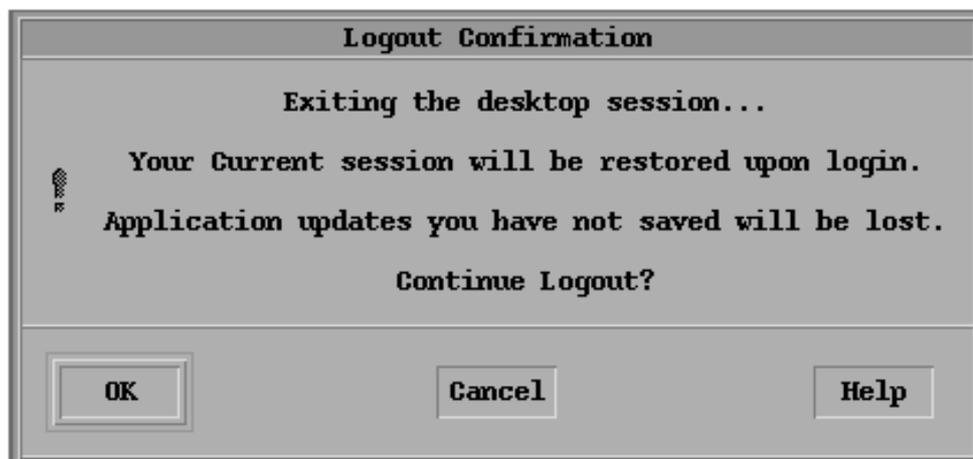
Logout

....

Related information   The related concept is:

- Logout of the ITM-SC

Procedure   To logout perform the following procedure:

....

1   Click on the Logout icon.

Result:

If provisioned, the Logout confirmation window appears. A confirmation is then requested to make sure that the session has to be ended.

....

2   Click OK.

Result:

After confirming, the login window is displayed until the workstation time-out threshold is reached, then the screen saver appears and the log out procedure is completed.

END OF STEPS

....

□

....

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

9 - 3 3

Section: ITM-SC Network Map

Overview

Purpose   This section will give an description of the features and use of the
Network Map as well as provide some tasks to manage the Network
Map.

☐

ITM-SC Network Map Concepts

Introduction   After activating Network Element Management from the Management Module, the Subnetwork Map window is displayed. This window is the main window for managing all network elements within the subnetwork and gives direct information about network elements, their status and Map groups.

Example of Network Map   An example of the Network Map is shown below.

Network Map Icons   The Network Map icons are described in the table below:

Icon	Name	Description
	Up	To go up a group from the current group (unless at top-level already). Changes the display to show the group.

Icon	Name	Description
	Con-nec-tions	This button will toggle the display of the RR connectivity lines. Note: only applicable for Radio Relay NEs.
	Display groups	Toggles the display between the contents of groups and the group icon. This also can be done by pressing control (CTRL) and selecting the Group or NE.
	Modify groups	Used to modify the grouping of network elements. This also can be done by selecting and NE or Group together with the right mouse button. Select from the pop up menu Modify Map Grouping of Nodes

Network Element Icons The following icons represent the different types of network elements in different statuses.

	Add/Drop Multiplexer STM 1	Ring Drop & Insert 2 Mb	Regenerator	Terminator	Dual Facing Terminator	Cross Connect
Normal						
Geographic Redundancy						
Lining Up						
Lining Up + Geographic Redundancy						

Map Group A Map Group is a group of NEs which are put together because they are geographically or functionally related.

Group Icon The following icon represents a group of nodes:

Group Name

NE Status   The color of each icon on the window represents the current status of the network element or connection. If two conditions exist for the same network element or connection, the network element icon or line is colored to indicate the condition with the highest severity. All alarms of the entire subnetwork are shown in one window; this is sometimes called the Alarm Map.

Colors of Alarms   The list below describes alarm colors and severity or status.

Color	Meaning
White	The NE or Connection is currently selected.
Grey	No current 'associations' exist with the NE or Connection. An association exist when there is communication between an ITM-SC and an NE.
Red	A 'Prompt Alarm' is currently on the NE or Connection.
Yellow	A 'Deferred Alarm' is currently on the NE or Connection.
Orange	An 'Information Alarm' is currently on the NE or Connection.
Green	No alarms currently on the NE or Connection.
Blue	The node has been pre-provisioned.

Additional Alarm Information   Additional information about an alarm can be given by the flashing square or "outlined" icon:

Action	Description
Flashing square	The alarm is not acknowledged yet. This is valid to each NE type but not for connections.
Outline	The network element is protected under Geographic Redundancy by this ITM-SC, but is not managed currently by this ITM-SC. This ITM-SC is not associated with this network element, so the outline is shown in grey. Valid for each NE type.
Short Beep	Indicates the arrival of a new alarm.

Specific Actions on the Network Map   Information about network elements or connections can easily be obtained using the Network Map. The alarms display can be filtered in such a way that only alarms of the selected network element or connection are shown.

To ..	Do this ..

Select an NE or group of NEs	Click once on the specific item.
Select multiple NEs	Press shift and draw using the cursor to make a rectangle over all NEs to select. This can also be done by pressing Ctrl and clicking with left mouse button on the desire NEs
Clear all selections	Click once on the Network Map outside any node or group.
Retrieve the alarm list of a NE or connection	Double click left-button on the specific NE or connection.
Drag selected nodes/groups	select nodes/groups and hold middle mouse button and drag to new position.

Pop-up Menus   The following pop-up menus can be accessed via selecting an item using the right mouse button.

Selecting item	provides shortcut to
NE	Alarm List Shelf Display
background	Change the Groupings

□

Customizing ITM-SC Network Map Concepts

Introduction

To prevent the Network Map from appearing cluttered when several network elements occupy a small space, those network elements can be grouped together into a map group which is represented by a single icon. For example network elements can be grouped in a geographical of functional way. It is possible that a map group contains another map group.

Customizing Features

In order to customize the Network Map three procedures are provided:

- Creating of Map Groups.

- Modifying of Map Groups.

- Placing NEs in Map Groups.

These procedures can be found in this section under Managing Map Groups Procedures.

Icons for Customizing the Network Map

Four icons are provided to customize the Network Map. When network elements are mentioned, this is irrespective of network element type or whether the network element is associated or not. Non-associated network elements are called nodes. Within Map Groups nodes are treated in the same way as network elements.

Icon	Name	Description
	Up	To go up a group from the current group (unless at top-level already). Changes the display to show the group.
	Con-nec-tions	This button will toggle the display of the RR connectivity lines. Note: only applicable for Radio Relay NEs.
	Display groups	Toggles the display between the contents of groups and the group icon. This also can be done by pressing control (CTRL) and selecting the Group or NE.
	Modify groups	Used to modify the grouping of network elements. This also can be done by selecting a NE or Group together with the right mouse button. Select from the pop up menu Modify Map Grouping of Nodes

Moving icons

To move a node or Map Group icon, select the node/group icon and drag the icon to the new position while holding the middle mouse button.

□

Parameters for Managing Map Groups

Old Group Name   Displays the old name of a group. This field is grayed out when creating a map group.

New Group Name   When creating a group: this is the name of the group to be created.

When modifying a group: this is the new group name.

Parent Group Name   This is the name of the group's parent in the hierarchy.

When creating a group: specifies where in the hierarchy the group appears.

When modifying a group: provides a mechanism for moving the group to a different parent.

Background Image File   This is the name of the background GIF filename used for the background image when the group is displayed. By default for a new group, it will be the Lucent logo file. The files available are the files in the directory: *../lib/map_data*. To display a new file, this file must be present in this directory.

□

Windows for Managing Map Groups

Windows to use   The windows to be used to managing the Map Groups and their contents are:

- *EMS - Map Group Control.*

- *EMS - Map Group Create/Change.*

EMS - Map Group Control

**EMS - Map Group
Create/Change**

```
┌─────────────────────────────────────────────────────┐
│ ─    EMS ─ Map Group Create/Change                   │
├─────────────────────────────────────────────────────┤
│                                   ◇ Create ◇ Modify  │
│                                                       │
│   Old Group Name          [                    ] [≛] │
│                                                       │
│   New Group Name          [drahcein           ] [↓] │
│                                                       │
│   Parent Group Name       [Top-Level Group    ] [±] │
│                                                       │
│   Background Image File   [toplevel.gif       ] [±] │
│   ┌─Messages──────────────────────────────────┐      │
│   │                                          │▲│      │
│   │                                          │ │      │
│   │                                          │▼│      │
│   └──────────────────────────────────────────┘      │
│                                                       │
│   [Apply]              [Close]             [Help]    │
└─────────────────────────────────────────────────────┘
```

☐
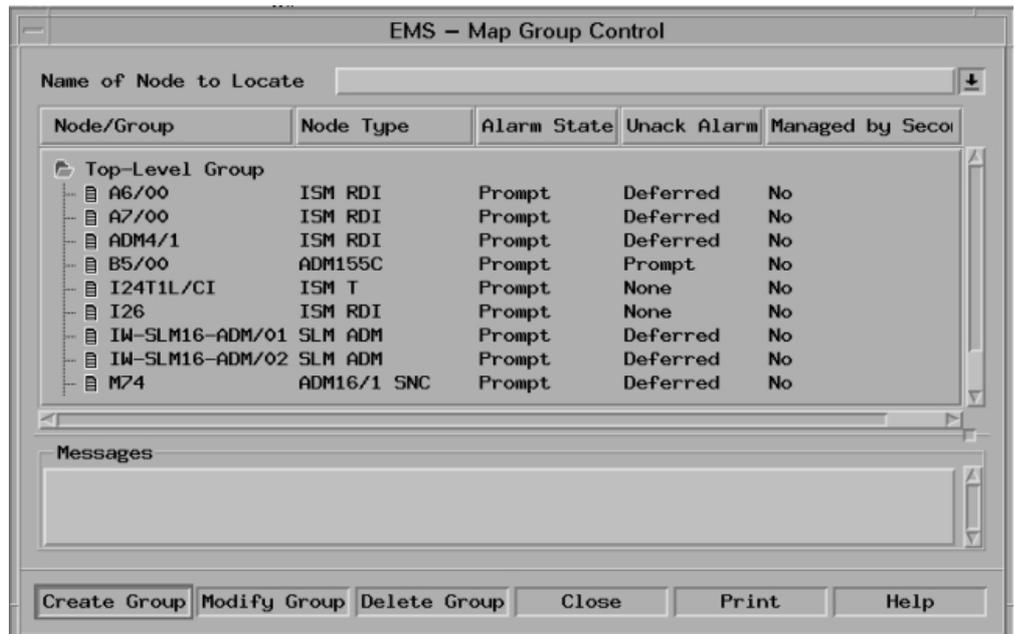
Lucent Technologies - Proprietary
See notice on first page
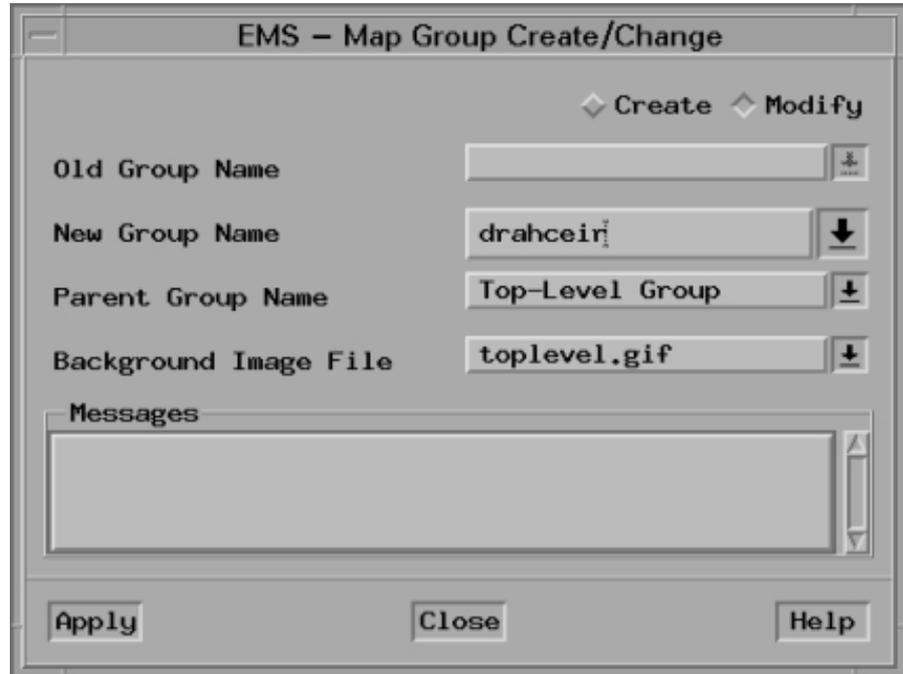
Managing Map Groups Procedures

....

Purpose Three procedures are provided to:

- create new map groups

- modify existing map groups

- Place/insert NEs into a map group

Before you begin Before performing this procedure make sure:

- The background image file is present in the ..../*lib/map_data* directory.

Before performing this procedure note the following:

- There is no correlation between Map Groups and Access Groups. Map groups only re-arrange the graphical presentation of NEs and Nodes on the Network Map. Access Groups are groups of NEs created for user security.

Related information Related concepts are:

- ITM-SC Network Map Concepts

- Customizing ITM-SC Network Map Concepts

Create Map Groups Follow these steps to create a network element group and apply a background image file:

....

1 Click with the `right mouse button` on Network Map (NOT on a node!) or click on the Modify groups icon.

> **Result:**
>
> When using the first option the Network Map Background pop-up menu appears.
>
> When using the Modify groups icon the *EMS - Map Group Create/Change* window appears. Proceed with step 3!

....

2 Select `Change the Groupings`.

> **Result:**
>
> The *EMS - Map Group Control* window appears, showing a hierarchical view of the Network map's Map Groups.

....

3 Select `Create Group`.

....

Result:

The *EMS - Map Group Create/Change* window appears.

....

4   Fill in New Group Name.

....

5   Select the Parent Group Name when the created group has to be
placed in a other Map Group.

....

6   Select the appropriate filename in Background Image File and click
`Apply`.

Result:

A new Map Group is created and is displayed in the *EMS - Map
Group Control* window. Double click on the Map Group to
display the content of the Map Group with the selected
background image file as background.

....

7   Click on the `Close` button.

Result:

The *EMS - Map Group Control* window appears. It is possible
to continue to modify Map Groups.

....

8   Click the `Close` button in the *EMS - Map Group Control* window
when the Map Groups modifications is completed.

Result:

The *EMS - Map Group Control* window disappears.

E N D   O F   S T E P S ....

Modify Map Groups   Follow these steps to modify network element groups:

....

1   Click with the `right mouse button` on Network Map (NOT on a
node!) or click on the Modify groups icon.

Result:

When using the first option the Network Map Background
pop-up menu appears.

When using the Modify groups icon the *EMS - Map Group
Create/Change* window appears. Proceed with step 3!

....

Lucent Technologies - Proprietary

....

2   Select `Change the Groupings`.

> **Result:**
>
> The *EMS - Map Group Control* window appears. This window provides a hierarchical presentation of the Network map's Map Groups.

....

3   Select a Map Group.

....

4   Click the `Modify Group` button.

> **Result:**
>
> The *EMS - Map Group Create/Change* window appears.

....

5   Select the Map Group to modify, enter the modifications and click `Apply` to activate the changes.

....

6   Click `Close`.

> **Result:**
>
> The *EMS - Map Group Control* window appears.

....

7   Click `Close` in the *EMS - Map Group Control* window.

> **Result:**
>
> The changes made are activated and accessible and the Map Groups are updated with the changes to complete the procedure.

E N D   O F   S T E P S
....

Place NEs in Map Groups   Follow these steps to rearrange network elements in network element groups:

....

1   Click with the `right mouse button` on Network Map (NOT on a node!) or click on the Modify groups icon.

> **Result:**
>
> When using the first option the Network Map Background pop-up menu appears.
>
> When using the Modify groups icon the *EMS - Map Group Create/Change* window appears. Proceed with step 3!

....

....

2 Select `Change the Groupings`.

> **Result:**
>
> The *EMS - Map Group Control* window appears. This window provides a hierarchical view of the network map's Map Groups. All NEs, whether or not a member of a Map group, are shown.

....

3 To add an NE to a group, use the mouse to drag the node to the hierarchy display. Select an NE with the left mouse button, and drag it with the middle mouse button to the group. Release the button.

....

4 When an NE is difficult to find, select the NE number or name in the *Name of Node to Locate* field.

> **Result:**
>
> The requested node is highlighted.

....

5 Continue to move the nodes until they are arranged within the Map Groups as wanted.

....

6 Click `Close`.

> **Result:**
>
> Modifications are activated for the Map groups and the procedure is completed.

E ND   OF   S TEPS
....

☐

Glossary

**5ESS**

Number 5 Electronic Switching System

5TAD

Five Tributary Add Drop subrack (WaveStar® ADM 16/1)

9TAD

Nine Tributary Add Drop subrack (WaveStar® ADM 16/1)

12 digit Numerical Code (12NC)

Used to uniquely identify an item or product. The first ten digits uniquely identify an item. The eleventh digit is used to specify the particular variant of an item. The twelfth digit is used for the revision issue. Items with the first eleven digits the same, are functionally equal and may be exchanged.

A **AAU**

Alarm Adapter Unit (RR)

AC

Alternating Current

ACU

Alarm Collection Unit (RR)

ADM

Add-Drop Multiplexer

Add-Drop Multiplexer 155 Mbit/s Compact Subrack (ADM-155C)

A network multiplexer that is designed to flexibly multiplex plesiochronous and STM-1 tributary port signals into STM-1 line port signals.

Administrative Unit (AU)

Carrier for TUs.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 1

Administrative Unit Pointer (AU PTR)
Indicates the phase alignment of the VC-n with respect to the STM-N frame. The pointer position is fixed with respect to the STM-N frame.

Administrator
See ITM-SC System Administrator.

Agent
Performs operations on managed objects and issues events on behalf of these managed objects. All SDH managed objects will support at least an agent. Control of distant agents is possible via local ″Managers″.

Alarm
The notification (audible or visual) of a significant event. See also Event.

Alarm Adapter Unit (AAU)
Radio Relay circuit pack that is used for collection of external alarms and remote control of external equipment.

Alarm Collection Unit (ACU)
Radio Relay circuit pack that performs collection of equipment alarms, analogue measurement from internal monitoring points and calculating data.

Alarm Indication Signal (AIS)
Code transmitted downstream in a digital Network that shows that an upstream failure has been detected and alarmed if the upstream alarm has not been suppressed. Also referred to as All OneS.

ALS
Automatic Laser Shutdown

Alarm Severity
An attribute defining the priority of the alarm message. The way alarms are processed depends on the severity.

Aligning
Indicating the head of a virtual container by means of a pointer, i.e. creating an Administrative Unit (AU) or a Tributary Unit (TU).

Alternate Mark Inversion (AMI)
A line code that employs a ternary signal to convert binary digits, in which successive binary ones are represented by signal elements that are normally of alternative positive and negative polarity but equal in amplitude and in which binary zeros are represented by signal elements that have zero amplitude.

American Standard Code for Information Interchange (ASCII)
A standard 8-bit code used for exchanging information among data processing systems and associated equipment.

GLOSSARY
GL - 2

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

Anomaly
A difference between the actual and desired operation of a function.

ANSI
American National Standards Institute

Assembly
Gathering together of payload data with overhead and pointer information (an indication of the direction of the signal).

APS
Automatic Protection Switching

AS
Alarm Suppression assembly

Association
A logical connection between manager and agent through which management information can be exchanged.

Asynchronous
See Non-synchronous.

ATC
Auxiliary Transmission Channel

ATM
Asynchronous Transfer Mode

ATPC
Automatic Transmit Power Control

AU
Administrative Unit

AU4AD
Administrative Unit 4 Assembler/Disassembler

AUG
Administrative Unit Group

AUTO
Automatic

Automatic Transmit Power Control (ATPC)
Reduces the transmitter power output level during normal propagation conditions, and increase the power output to maximum level during fading periods trying to maintain nominal receiver input level.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 3

Autonomous Message

A message transmitted from the controlled Network Element to the ITM-SC which was not a response to an ITM-SC originated command.

B   **B3ZS**

Bipolar 3-Zero Substitution

B8ZS

Bipolar 8-Zero Substitution

BBTR

Backplane Bus TRansceiver

BC

Board Controller

BCC

Board Controller Complex

BIN

BINary

BIP

Bit Interleaved Parity

BISDN

Broadband Integrated Services Digital Network

Bit Error Ratio (BER)

The ratio of bits received in error to bits sent.

Bit Interleaved Parity (BIP)

A method of error monitoring using a specified number of bits (BIP-8)

BLD OUT LG

Build-Out Lightguide

Board Controller Local Area Network (BC-LAN)

The internal local area network that provides communications between the Line Controller circuit pack and board controllers on the circuit packs associated with a high speed line.

Branching

Interconnection of independent line systems.

Broadband Communication

Voice, data, and/or video communication at greater than 2 Mbit/s rates.

Broadband Service Transport

STM-1 concatenation transport over the SLM for ATM applications.

BUSTR

BUS Transmitter and Receiver

C **CAS**

Channel Associated Signalling

CAT

CATastrophic

CC

Cross-Connection Cross-Connect (WaveStar® ADM 16/1)

CCIR

See ITU-R.

CCITT

See ITU-T.

CCS

Common Channel Signaling

CEPT

Conférence Européenne des Administrations des Postes et des Télécommunications

Channel

A sub-unit of transmission capacity within a defined higher level of transmission capacity, e.g. a CEPT-4 (140 Mbit/s) within a 565 Mbit fiber system.

Circuit

A combination of two transmission channels permitting bi-directional transmission of signals between two points, to support a single communication.

CIT

Craft Interface Terminal

Clear Channel (Cl. Ch.)

A provisionable mode for the 34 and 140 Mbit/s tributary outputs that causes parity violations to not be monitored or corrected before the 34 and 140 Mbit/s are encoded.

Client

Computer in a computer network that generally offers a user interface to a server. See also Server.

CMI

Coded Mark Inversion

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 5

CO
Central Office

Concatenation
A procedure whereby a multiplicity of Virtual Containers is associated one with another with the result that their combined capacity can be used as a single container across which bit sequence integrity is maintained.

Configuration Management (CM)
Subsystem of the ITM-SC that, among other things, configures the network and processes messages from the network.

CONN PCB
Connector Printed Circuit Board

Container (C)
Carries plesiochronous signal, the "payload".

Co-resident
A hardware configuration where the ITM-SC and ITM-NM applications can be active at the same time independently on the same hardware and software platform without interfering each others functioning.

Common Object Request Broker Architecture (CORBA)
CORBA allows applications to communicate with one another no matter where they are located or who has designed them.

CP
Circuit Pack

Craft Interface Terminal (CIT)
Local manager for SDH Network Elements.

CRC
Cyclic Redundancy Check

Cross-Connect Map
Connection map for an SDH Network Element; contains information about how signals are connected between high speed timeslots and low speed tributaries. See also Squelch Map.

Cross Polarization Interference Cancellation
This feature permits both orthogonal polarizations of one Radio Frequency carrier to be used simultaneously, thus achieving greater spectral efficiency.

CV
Code Violation

D   DACS
Digital Access & Cross-connect System

DACScan-T
See Integrated Transport Management Network Manager.

Database Administrator
A user who administers the database of the ITM-SC application. See also User Privilege.

Data Communication Channel (DCC)
The embedded overhead communication channel in the SDH line. This is used for end-to-end communication and maintenance. It carries alarm, control, and status information between Network Elements in an SDH network.

Data Communication Equipment (DCE)
Provides the signal conversion and coding between the data terminating equipment and the line. The DCE may be separate equipment or a part of the data terminating equipment.

Data Terminating Equipment (DTE)
Originates data for transmission and accepts transmitted data.

DC
Direct Current

DCF
Data Communications Function

DCN
Data Communications Network

DCS
Digital Cross-connect System

DDF
Digital Distribution Frame

Dedicated Protection Ring (DP-Ring)
A protection method used in ISM Network Elements.

Defect
A limited interruption of the ability of an item to perform a required function. It may or may not lead to maintenance action depending on the results of additional analysis.

Demultiplexing
A process applied to a multiplexed signal for recovering signals combined within it and for restoring the distinct individual channels of these signals.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 7

Digital Link

A transmission span such as a point-to-point 2 Mbit/s, 34 Mbit/s, 140 Mbit/s, VC12, VC3 or VC4 link between controlled Network Elements. The channels within a digital link are insignificant.

Digital Section

A transmission span such as an STM-N or 565 Mbit/s signal. A digital section may contain multiple digital channels.

DIL

Dual In Line

Directory Service Network Element (DSNE)

A designated Network Element that is responsible for administering a database that maps Network Elements names (node names) to addresses (node Id). There can be one DSNE per (sub)network.

Disassembly

Splitting up a signal into its constituents as payload data and overhead (an indication of the direction of a signal).

Domain

The domain of an ITM-SC is the set of all SDH Network Elements that are controlled by that particular ITM-SC.

Downstream

At or towards the destination of the considered transmission stream, i.e. looking in the same direction of transmission.

DPLL

Digital Phase Locked Loop

DPS

Data communication Packet Switch (ISM)

DR

Digital Radio

DRI

Dual Ring Interworking

DS-n

Digital Signal, Level n

DTMF

Dual Tone Multi-Frequency

DUS

Do not Use for Synchronization

GLOSSARY
GL - 8

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

DWDM

Dense Wavelength Division Multiplexing

E   EC-n

Electrical Carrier, Level n

ECC

Embedded Control Channel

Electronic Industries Association (EIA)

A trade association of the electronic industry that establishes electrical and functional standards.

Element Management System (EMS)

See Integrated Transport Management Subnetwork Controller.

EMC

ElectroMagnetic Compatibility

EMI

ElectroMagnetic Interference

EOW

See Orderwire.

Equivalent Bit Error Ratio (EBER)

The calculated average bit error rate over a data stream.

Errored Second (ES)

A performance monitoring parameter.

ES

End System

ESD

ElectroStatic Discharge

ESPG

Elastic Store & Pointer Generator

ETSI

European Telecommunication Standardisation Institute

Event

A significant change. Events in controlled Network Elements include signal failures, equipment failures, signals exceeding thresholds, and protection switch activity. When an event occurs in a controlled Network Element, the controlled Network Element will generate an alarm or status message and send it to the ITM-SC.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 9

Event Management (EM)

Subsystem of ITM-SC that processes and logs event reports of the network.

Externally Timed

An operating condition of a clock in which it is locked to an external reference and is using time constants that are altered to quickly bring the local oscillator's frequency into the approximate agreement with the synchronization reference frequency.

Extra Traffic

Unprotected traffic that is carried over the protection channels when that capacity is not used for the protection of service traffic.

F   Far End Block Error (FEBE)

An indication returned to the transmitting node that an errored block has been detected at the receiving node. A block is a specified grouping of bits.

Far End Receive Failure (FERF)

An indication returned to a transmitting Network Element that the receiving Network Element has detected an incoming section failure.

FAS

Frame Alignment Signal

FAW

Frame Alignment Word

FC

Full contact Connector

FCC

Federal Communications Commission

FDDI

Fiber Distributed Data Interface

FEP

Front End Processor

Free Running

An operating condition of a Network Element in which its local oscillator is not locked to any synchronization reference and is using no storage techniques to sustain its accuracy.

G   Geographic Location

Location of the ITM-SC server. This is entered as part of the installation procedure of an ITM-SC.

Gateway Network Element (GNE)

Passes information between other Network Elements and management systems via a Data Communications Network.

Geographic Redundancy (GR)

Allows protection of management for a Network Element by assigning it to two ITM-SCs. The first primary ITM-SC, usually manages the Network Element and is now in the protected domain. If the primary ITM-SC or the link between the Network Element and the primary fails, the secondary ITM-SC will automatically take over management of the Network Element and is now in the protecting domain. The two ITM-SCs are connected by a peer to peer link, which they use to pass Geographic Redundancy management information over. This link must be established before any Network Element can be protected by Geographic Redundancy.

Global Wait to Restore Time

Corresponds to the time to wait before switching back to the timing reference occurs after a timing link failure has cleared. This time applies for all timing sources in a system hence the name global. This can be between 0 and 60 minutes, in increments of one minute.

GUI

Graphical User Interface

H   HE

Host Exchange

High Density Bipolar 3 code (HDB3)

Line code for e.g. 2 Mbit/s transmission systems.

High level Data Link Control (HDLC)

OSI reference model datalink layer protocol.

Higher order Path Adaptation (HPA)

Function that adapts a lower order Virtual Container to a higher order Virtual Container by processing the Tributary Unit pointer which indicates the phase of the lower order Virtual Container Path Overhead relative to the higher order Virtual Container Path Overhead and assembling/disassembling the complete higher order Virtual Container.

Higher order Path Connection (HPC)

Function that provides for flexible assignment of higher order Virtual Containers within an STM-N signal.

Higher order Path Termination (HPT)

Function that terminates a higher order path by generating and adding the appropriate Virtual Container Path Overhead to the relevant container at the path source and removing the Virtual Container Path Overhead and reading it at the path sink.

HMI

Human Machine Interface

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 1 1

HO

High Order

Holdover

An operating condition of a clock in which its local oscillator is not locked to an external reference but is using storage techniques to maintain its accuracy with respect to the last known frequency comparison with a synchronized reference.

Host Name

Name of the server on which the ITM-SC is running.

HP-UX

Unix Operating System for Hewlett Packard platform.

HS

High Speed

I   **ICB**

Interconnection Box

ICP

InterConnection Panel

IEC

International Electrotechnical Committee

IEEE

Institute of Electrical and Electronic Engineers

IF

Intermediate Frequency

IFT

InterFace Terminal

Intelligent Synchronous Multiplexer (ISM)

A network multiplexer that is designed to flexibly multiplex plesiochronous and STM-1 tributary port signals into STM-1 or STM-4 line port signals.

Intergrated Transport Management Craft Interface Terminal (ITM-CIT)

Local manager for SDH Network Elements in a subnetwork. Also referred to as Craft Interface Terminal.

Intermediate System (IS)

A system which routes/relays management information. An SDH Network Element may be a combined Intermediate and end system.

GLOSSARY

GL-12

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

IPS

Inter Processor Status

IS

In-Service

ISDN

Integrated Services Digital Network

IS-IS Routing

The Network Elements in a management network, route packets (data) between each other using a IS-IS level protocol. The size of a network running IS-IS Level 1 is limited, and therefore certain mechanisms are employed to facilitate the management of larger networks. For STATIC ROUTING, the capability exists for disabling the protocol over the LAN connections, effectively causing the management network to be partitioned into separate IS-IS Level 1 areas. In order for the ITM-SC to communicate with a specific Network Element in one of these areas, the ITM-SC must identify through which socalled Gateway Network Element this specific Network Element is connected to the LAN. All packets to this specific Network Element are routed directly to the Gateway Network Element by ITM-SC, before being re-routed (if necessary) within the Level 1 area. For DYNAMIC ROUTING an IS-IS Level 2 routing protocol is used allowing a number of Level 1 areas to interwork. The Network Elements which connect an IS-IS area to another area are set to run the IS-IS Level 2 protocol within the Network Element and on the connection between other Network Elements. Packets can now be routed between IS-IS areas and the ITM-SC does not have to identify the Gateway Network Elements.

ISO

International Standards Organisation

ITM-SC Administrator

See ITM-SC System Administrator.

ITM-SC System Administrator

A user of the ITM-SC application with System Administrator privileges. See also User Privilege.

ITU

International Telecommunications Union

ITU-R

International Telecommunications Union - Radio standardization sector. Formerly known as CCIR: Comité Consultatif International Radio; International Radio Consultative Committee.

ITU-T

International Telecommunications Union - Telecommunication standardization sector. Formerly known as CCITT: Comité Consultatif International Télégrafique & Téléphonique; International Telegraph and Telephone Consultative Committee.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 1 3

J   Jitter

Short term variations of amplitude and frequency components of a digital signal from their ideal position in time.

L   LAN

Local Area Network

LBA

Lightwave Booster Amplifier.

LCN

Local Communications Network

LDI

Linear Drop/Insert (Add-Drop)

LED

Light Emitting Diode

LEN

Local Exchange Node

LF

Low Frequency

LH

Long Haul

License key

An encrypted code that is required to enable the use of specific modules in the ITM-SC. Valid license keys can be obtained from your provider.

Line

Transmission line; refers to a transmission medium, together with the associated high speed equipment, required to provide the means of transporting information between two consecutive Network Elements, one of which originates the line signal and the other terminates the line signal.

Line Build Out (LBO)

An optical attenuator that guarantees the proper signal level and shape at the receiver input.

Line Overhead Controller (LOC)

SLM circuit pack that accesses the overhead bytes from the high speed line.

LNC

LiNe Controller (SLM)

GLOSSARY
GL-14

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

LO
Low Order

LOF
Loss Of Frame

LOM
Loss Of Multiframe

LOP
Loss Of Pointer

LOS
Loss Of Signal

Lower order Path Adaptation (LPA)
Function that adapts a PDH signal to a synchronous network by mapping the signal into or de-mapping the signal out of a synchronous container.

Lower order Path Connection (LPC)
Function that provides for flexible assignment of lower order VCs in a higher order VC.

Lower order Path Termination (LPT)
Function that terminates a lower order path by generating and adding the appropriate VC POH to the relevant container at the path source and removing the VC POH and reading it at the path sink.

LPU
Line Port Unit (ISM)

LPU155
Line Port Unit 155 Mbit/s (WaveStar® ADM 4/1)

LRX
Line Receiver (SLM)

LS
Low Speed

LTA
Line Terminal Application (SLM)

LTX
Line Transmitter (SLM)

LTX/EML
Line Transmitter with Electro-absorption Modulated Laser (SLM)

M   MAF

Management Application Function

Management Connection

Identifies the type of routing used (STATIC or DYNAMIC), and if STATIC is selected allows the Gateway Network Element to be identified. See also IS-IS Routing.

Management Information Base (MIB)

The database in the Network Element and contains the configuration data of the Network Element. A copy of each MIB is available in the ITM-SC and is called the MIB image. Under normal circumstances the MIB and MIB image of one Network Eelement are synchronized.

Manager

Capable of issuing network management operations and receiving events. The manager communicates with the Agent in the controlled Network Element.

Manufacturer Executable Code (MEC)

Network Element system software in binary format that after being downloaded to one of the stores can be executed by the system controller of the Network Element.

Mapping

Gathering together of payload data with overhead, i.e. packing the PDH signal into a Virtual Container.

MDI

Miscellaneous Discrete Input

MDO

Miscellaneous Discrete Output

Mediation Device (MD)

Allows for exchange of management information between Operations System and Network Elements.

MEF

Maintenance Entity Function (in NE)

MEM

System MEMory unit (for SLM ADM NEs)

Message Communications Function (MCF)

Function that provides facilities for the transport and routing of Telecommunications Management Network messages to and from the Network Manager.

MF

Mediation Function

....

G L O S S A R Y   **Lucent Technologies - Proprietary**   365-312–521
G L - 1 6   See notice on first page   Issue a, June 2001

MFS
Multi Frame Synchronization signal

MIB image
See Management Information Base.

Midspan Meet
The capability to interface between two lightwave Network Elements of different vendors. This applies to high speed optical interfaces.

MMI
Man-Machine Interface Also referred to as Human Machine Interface (HMI)

MO
Managed Object

Motif
X-Windows System supplied by Open Software Foundation.

MS
Multiplexer Section

MTBF
Mean Time Between Failures

MTBMA
Mean Time Between Maintenance Activities

MTIE
Maximum Time Interval Error

MTPI
Multiplexer Timing Physical Interface

MTTR
Mean Time To Repair

Multiplexer Section OverHead (MSOH)
Part of the Section Overhead. Is accessible only at line terminals and multiplexers.

Multiplexer Section Protection (MSP)
Provides capability for switching a signal from a working to a protection section.

Multiplexer Section Shared Protection Ring (MS-SPRING)
A protection method used in SLM Add-Drop Multiplexer Network Elements.

Multiplexer Section Termination (MST)
Function that generates the Multiplexer Section OverHead in the transmit direction and terminates the Multiplexer Section OverHead in the receive direction.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 1 7

Multiplexer Timing Source (MTS)
Function that provides timing reference to the relevant component parts of the multiplex equipment and represents the SDH Network Element clock.

Multiplexing
A procedure by which multiple lower order path layer signals are adapted into a higher order path, or the multiple higher order path layer signals are adapted into a multiplex section.

N   NEF
Network Element Function

NEM
Network Element Manager

Network Element (NE)
A Network Element is comprised of telecommunication equipment (or groups/parts of telecommunication equipment) and support equipment that performs network element functions and has one or more standard Q-type interfaces. A Network Element is direct manageable by a management system. See also Node.

Network Element Equivalent (NEE)
The functionality, database size and processing power required from the ITM-SC is different for each Network Element type supported. Therefore each type represents an amount of Network Element Equivalent.

Network Mediation Unit (NMU)
Used to collect fault and alarm events from transmission equipment. The ITM-SC can forward alarms to the NMU. The NMU can forward alarms to an Operations System.

Network Service Access Point (NSAP)
An end system address of the System Controller according to ISO 8348 AD2. The format used is ISO_DCC_LUCENT, which has the following structure:

IDP | DSP

| 39 | 00 | 00 | 80 | 00 | 00 | 00 | 00 | 00 | 00 | 00 | | | | | | | | | 01 |

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

AFI   IDI   DFI   Organization   Spare   RD   Area_id   SID   SEL

Area_Address
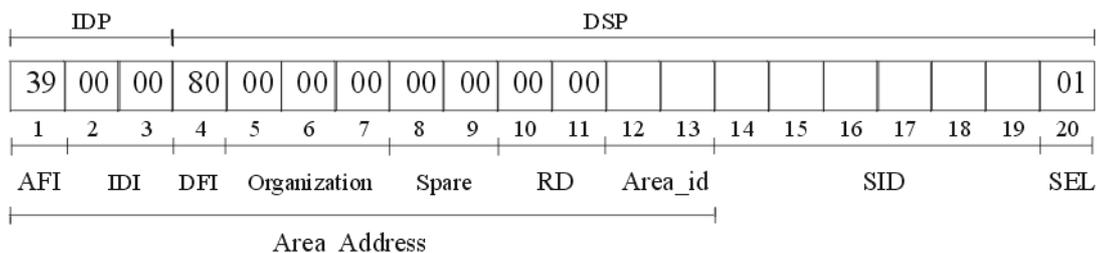
Where

Field	Description	Length	Fixed Values
IDP	Initial Domain Part	3 octets	-
DSP	Domain Specific Part	17 octets	-
AFI	Authority and Format Identifier	1 octet	39
IDI	Initial Domain Identifier	2 octets	00 00
DFI	DSP Format Identifier	1 octet	80
Organization		3 octets	00 00 00
Spare		2 octets	00 00
RD	Routing Domain	2 octets	00 00
Area_id		2 octets	Provisionable
SID	System Identification	6 octets	-
SEL	NSAP Selector	1 octet	01
Area_Address	All Octets from AFI to Area_id	13 or 3 octets	-

NMC
Network Maintenance Center

NMS
Network Management System

NNE
Non-SDH Network Element

NNI
Network Node Interface

Node
Defined as all equipment that is controlled by one system controller. A node is not always direct manageable by a management system. See also Network Element.

NOMC
Network Operation Maintenance Channel

Non-revertive switching
In non-revertive switching there is an active and standby high speed line, circuit pack, etc. When a protection switch occurs, the standby line, circuit pack, etc., is selected causing the old standby line, circuit pack, etc., to be used for the new active line, circuit pack, etc. The original active line, circuit pack, etc., becomes the standby line, circuit pack, etc. This status remains in effect when the faults clears. Therefore, this protection scheme is non-revertive in that there is no switch back to the original status in effect before the fault occurred.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 1 9

Non-synchronous
The essential characteristic of time-scales or signals such that their corresponding significant instants do not necessarily occur at the same average rate.

Not Protected Domain
The not protected domain for the ITM-SC contains all the Network Elements which are managed by one ITM-SC and are not currently protected by another ITM-SC. If the ITM-SC fails, the Network Elements in this domain are not managed by any ITM-SC. See also Geographic Redundancy.

NPI
Null Pointer Indication

NRZ
Non-Return to Zero

NSA
Non-Service Affecting

NVM
Non-Volatile Memory

O **OA**
Optical Amplifier (OLS)

OAA case tools
A software package/tool to aid the process of requirements, analysis, design and implementation of object orientated systems.

OAM&P
Operations, Administration, Maintenance and Provisioning

OC-n
Optical Carrier, Level n

ODF
Optical Distribution Frame

ODU
Optical Demultiplexer Unit (OLS)

OFS
Out of Frame Second

OI
Optical Interface (WaveStar® ADM 16/1)

OMU

Optical Multiplexer Unit (OLS)

Operations System (OS)

Operations System is the system which provides operations, administration and maintenance functions.

Operator

A user of the ITM-SC application with Operator privileges. See also User Privilege.

Optical Line System (OLS)

A high-capacity lightwave system that is designed to multiplex eight optical signals with different wavelengths into one combined signal through an optical fiber. There is a difference of 1.5 micrometer in wavelength between two multiplexed signals.

OOF

Out Of Frame

OOS

Out Of Service

OSB

Optical Splice Box

OSF

Open Software Foundation Operations System Function

OSF/Motif

The WaveStar® ITM-SC application has an X-windows graphical representation and the components used in the "Graphical User Interface" are OSF/Motif compliant, these components comprise of items such as: scrollbars, menus, radio buttons, etc.

OSI

Open Systems Interconnection

OW

(Engineering) Order Wire

....

P   PABX

Private Automatic Branch eXchange

Paddle Board - Peripheral Control and Timing link (PB-PCT)

Is a small circuit board used in a 5ESS exchange for protection switching and optical to electrical conversion of the PCT-link.

Path

A logical connection between a termination point at which a standard format for a signal at the given rate is assembled, and transmitted and another termination point at which the received

standard frame format for the signal is disassembled.

Path Overhead (POH)
Virtual Container Path Overhead provides for integrity of communication between the point of assembly of a Virtual Container and its point of disassembly.

PC
Personal Computer

PCB
Printed Circuit Board

PCM
Pulse Code Modulation

PCT-link
Peripheral Control and Timing-link

PDH
Plesiochronous Digital Hierarchy

Peer ITM-SC
ITM-SC at the other end of the Peer to Peer link.

Peer to Peer link
Connection between two ITM-SCs with Geographic Redundancy. The link is used to co-ordinate the management of a Network Element. See also Geographic Redundancy.

Performance Monitoring (PM)
Measures the quality of service and identifies degrading or marginally operating systems (before an alarm is generated).

Peripheral Control and Timing Facility Interface (PCTFI)
A proprietary physical link interface supporting the transport of 21 * 2 Mbit/s signals.

PI
Physical Interface Plesiochronous Interface (WaveStar® ADM 16/1)

Platform
Family of equipment and software configurations designed to support a particular Application.

Plesiochronous Network
A network that contains multiple subnetworks, each internally synchronous and all operating at the same nominal frequency, but whose timing may be slightly different at any particular instant.

PMA
Performance Monitoring Application

GLOSSARY
GL-22

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

Pointer

An indicator whose value defines the frame offset of a virtual container with respect to the frame reference of the transport entity on which it is supported.

POTS

Plain Old Telephone Service

PP

Pointer Processing

PPC

Pointer Processor and Cross-connect (ISM)

Primary ITM-SC

ITM-SC that is usually managing a Network Element. If the primary ITM-SC fails, management of the Network Element is passed over to the secondary ITM-SC. A Network Element should be provisioned normally on the primary ITM-SC and then be configured for use on the secondary. See also Geographic Redundancy.

Primary Reference Clock (PRC)

The main timing clock reference in SDH equipment.

Protected Domain

The protected domain for an ITM-SC contains all the Network Elements this manager is the primary ITM-SC for and are protected by another secondary ITM-SC. See also Geographic Redundancy.

Protecting Domain

The protecting domain for an ITM-SC contains all the Network Elements this manager is the secondary ITM-SC for. See also Geographic Redundancy.

Protection

Extra capacity (channels, circuit packs) in transmission equipment that is not intended to be used for service, but rather to serve as backup against equipment failures.

PSA

Partially Service Affecting

PSDN

Public Switched Data Network

PSF

Power Supply Filter

PSF-SIP

Power Supply Filter; originally designed for Italian customer.

PSN

Packet-Switched Network

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 2 3

PSTN

Public Switched Telephone Network

PT

Protected Terminal Power supply filter and Timing circuit pack (WaveStar® ADM 16/1)

Q   QAF

Q Adapter Function (in NE)

Q-LAN

Thin Ethernet LAN which connects the manager to Gateway Network Elements so that management information between Network Elements and management systems can be exchanged.

QOS

Quality Of Service

Quality Level (QL)

The quality of the timing signal(s) provided to clock a Network Element. The level is provided by the Synchronization Status Marker which can accompany the timing signal. If the System and Output Timing Quality Level mode is "Enabled", and if the signal selected for the Station Clock Output has a quality level below the Acceptance Quality Level, the Network Element "squelches" the Station Clock Output Signal, which means that no signal is forwarded at all. Possible levels are: - PRC (Primary Reference Clock) - SSU_T (Synchronization Supply Unit - Transit) - SSU_L (Synchronization Supply Unit - Local) - SEC (SDH Equipment Clock) - DUS (Do not Use for Synchronization)

R   RA

Regenerator Application (SLM)

Radio Protection Switching system (RPS)

Its main function is to handle the automatic and manual switching from a main channel to a common protection channel in an N+1 system.

Radio Relay (RR)

A point-to-point Digital Radio system to transport STM-1 signals via microwaves.

RCU

Rigid Connect Unit (SLM)

RCVR Data Distribution Unit (RCVR)

Radio Relay circuit pack that performs distribution of the protection channel and the low priority traffic in the receiver side.

RDDU

RCVR Data Distribution Unit (RR)

G L O S S A R Y
G L - 2 4

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

RDI

Remote Defect Indicator. Previously known as Far End Receive Failure (FERF).

RDI

Ring Drop/Insert (Add-Drop)

RDSV

Running Digital Sum Violations

Receive-direction

The direction towards the cross-connect.

REGEN

Regenerator (SLM)

Regenerator Loop

Loop in a Network Element between the Station Clock Output(s) and one or both Station Clock Inputs, which can be used to dejitterize the selected timing reference in network applications.

Regenerator Overhead Controller (ROC)

SLM circuit pack that provides user access to the SDH overhead channels at repeater sites.

Regenerator Section Termination (RST)

Function that generates the Regenerator Section Overhead (RSOH) in the transmit direction and terminates the RSOH in the receive direction.

REI

Remote Error Indication. Previously known as Far End Block Error (FEBE).

Relay Unit (RU)

Radio Relay circuit pack whose main function is to perform protection switching when the Alignment Switch in the demodulator unit is unable to perform protection switching.

Restore Timer

Counts down the time (in minutes) during which the switch waits to let the worker line recover before switching back to it. This option can be set to prevent the protection switch continually switching if a line has a continual transient fault. This field is greyed out if the mode is non-revertive.

Revertive Switching

In revertive switching, there is a working and protection high speed line, circuit pack, etc. When a protection switch occurs, the protection line, circuit pack, etc., is selected. When the fault clears, service reverts back to the original working line.

RF

Radio Frequency

RFI

Remote Failure Indicator

365-312–521
Issue a, June 2001
Lucent Technologies - Proprietary
See notice on first page
G L O S S A R Y
G L - 2 5

RGU

ReGenerator Unit (SLM)

Route

A series of contiguous digital sections.

RPS

Ring Protection Switching

RSM

Remote Switching Module

RSOH

Regenerator Section OverHead; part of SOH.

RZ

Return to Zero

S   SA

Service Affecting Synchronous Adapter (WaveStar® ADM 16/1)

SAI

Station Alarm Interface

SC

Square coupled Connector

SD

Signal Degrade

SDH-TE

SDH - Terminal Equipment

Specification and Design Language (SDL)

This is a standard formal language for specifying (essentially) finite state machines.

SEC

SDH Equipment Clock

Secondary ITM-SC

Backup ITM-SC for a Network Element should the primary ITM-SC fail. A Network Element should be provisioned normally on the primary ITM-SC and then be configured for use on the secondary. See also Geographic Redundancy.

Section

A transport entity in the transmission media layer network which provides integrity of information transfer across a section layer network connection by means of a termination function at the section layer.

Section Adaptation (SA)

Function that processes the AU-pointer to indicate the phase of the VC-3/4 POH relative to the STM-N SOH and assembles/disassembles the complete STM-N frame.

Section Overhead (SOH)

Capacity added to either an AU-4 or assembly of AU-3s to create an STM-1. Contains always STM-1 framing and optionally maintenance and operational functions. SOH can be subdivided in MSOH (multiplex section overhead) and RSOH (regenerator section overhead).

SEF

Support Entity Function (in NE)

Self-healing

A network's ability to automatically recover from the failure of one or more of its components.

Server

Computer in a computer network that performs dedicated main tasks which require generally sufficient performance. See also Client.

Severely Errored Frame Seconds (SEFS)

A performance monitoring parameter.

Severely Errored Second (SES)

A second with a binary error ratio and used as a performance monitoring parameter.

Severity

See Alarm Severity

Service

The operational mode of a physical entity that indicates that the entity is providing service. This designation will change with each switch action.

SH

Short Haul

SI

Synchronous Interface (WaveStar® ADM 16/1)

SIB

Subrack Interface Box

SLC

Subscriber Loop Carrier

SLM

Signal Label Mismatch

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 2 7

Smart Communication Channel (SCC)
A HDLC messaging channel between the SDH-TE and the 5ESS host node. Similar to the DCC messaging channels located in the STM-N section overhead.

SML
Service Management Level

SMN
SDH Management Network

SMS
SDH Management Subnetwork

SNC/I
SubNetwork Connection (protection) / Inherent monitoring

SNC/NI
SubNetwork Connection / Non Intrusive monitoring

SNR
Signal to Noise Ratio

Soft Windows
PC emulator package for HP platforms.

SONET
Synchronous Optical Network

Space Diversity (SD)
Reception of the Radio signal via mirror effects on earth.

SPB2M
Subrack Protection for 2 Mbit/s Board (WaveStar® ADM 4/1)

SPI
SDH Physical Interface Synchronous-Plesiochronous Interface (WaveStar® ADM 16/1)

Squelch Map
Traffic map for SLM Add-Drop Multiplexer Network Elements that contains information for each cross-connection in the ring and indicates the source and destination Network Elements for the low speed circuit that the cross-connection is part of. This information is used to prevent traffic misconnection in rings with isolated Network Elements or segments. See also Cross Connection Map.

SSM
Synchronization Status Marker

Standby
The operational mode of a physical entity that indicates that the entity is not providing service, but standby. This designation will change with each switch action.

Station Clock Input (SCI)
An external clock may be connected to a Station Clock Input.

Station Clock Output (SCO)
A clock signal that can be used for other systems.

Streched Ring (STRING)
An open ring in which each node is an Add-Drop Multiplexer. The end nodes operate with one high speed line equipped.

STS
Synchronous Transport Signal; used in SONET.

Subnetwork
A group of interconnected/interrelated Network Elements. The most common connotation is an SDH network in which the Network Elements have data communications channels (DCC) connectivity.

Supervisor
A user of the ITM-SC application with Supervisor privileges. See also User Privilege.

Supervisory Unit (SU)
Radio Relay circuit pack that gives comprehensive supervision and control facilities to the user by collecting information from the Alarm Collection Units and Alarm Adapter Units.

SUPV
Supervision unit (WaveStar® ADM 4/1)

SUPV_SVC
Supervision with Service Channel unit (WaveStar® ADM 4/1)

SVCE
Service

Switch Receive Unit (SWR)
SLM circuit pack that provides the cross-connect in the receive direction between high speed line timeslots and low speed tributaries.

Switch Transmit Unit (SWT)
SLM circuit pack that provides the cross-connect in the transmit direction between high speed line timeslots and low speed tributaries.

Switching Module (SM)
An access module from the 5ESS switch.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 2 9

Synchronization Supply Unit (SSU)

A circuit pack that recovers and reshapes the clock signal in order to filter out jitter. The Local (SSU_L) and Transit (SSU_T) types are available.

Synchronous

The essential characteristic of time-scales or signals such that their corresponding significant instants occur at precisely the same average rate.

Synchronous Digital Hierarchy (SDH)

A hierarchical set of digital transport structures, standardized for the transport of suitable adapted payloads over transmission networks.

Synchronous Equipment Management Function (SEMF)

Function that converts performance data and implementation specific hardware alarms into object-oriented messages for transmission over the DCC and/or Q-interface. It also converts object-oriented messages related to other management functions for passing across the S reference points.

Synchronous Line Multiplexer (SLM)

A line multiplexer that is designed to multiplex VC-4 and STM-1 tributary port signals into STM-16 line port signals.

Synchronous Network

The synchronization of synchronous transmission systems with synchronous payloads to a master Network clock that can be traced to a single reference clock.

Synchronous Transport Module (STM)

The information structure used to support (section layer) connections in SDH.

System Administrator

A user of the computer system on which the ITM-SC application can be installed. See also User Privilege.

System Controller (CTL)

ISM circuit pack that controls the configuration of an Intelligent Synchronous Multiplexer system.

System Controller (SC)

WaveStar® ADM 16/1 circuit pack that controls and provisions all units. It also contains the data communication packet switch functionallity which is necessary for routing of management information between Network Elements and their management system.

System Controller (SCT)

SLM Line Terminal and Regenerator Network Element circuit pack that provides the highest level of system control for the Synchronous Line Multiplexer system. The SCT circuit pack provides overall administrative control of the system. Its memory is included in the same one circuit pack.

GLOSSARY
GL-30

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

System Controller (STC)

SLM Add-Drop Multiplexer Network Element circuit pack that provides the highest level of system control for the Synchronous Line Multiplexer system. The STC circuit pack provides overall administrative control of the system. Its memory is provided by the MEM circuit pack.

System Controller (SYSCTL)

OLS circuit pack that provides the highest level of system control for the Optical Line System. The SYSCTL circuit pack provides overall administrative control of the system. Its memory is provided by the SYSMEM circuit pack.

System Memory Unit (MEM)

SLM Add-Drop Multiplexer Network Element circuit pack that provides the highest level of system control for the Synchronous Line Multiplexer system. The MEM circuit pack provides memory support for the System Controller (STC) circuit pack.

System Memory Unit (SYSMEM)

OLS circuit pack that provides the highest level of system control for the Optical Line System. The SYSMEM circuit pack provides memory support for the SYSCTL circuit pack.

T   TCA

Threshold Crossing Alarm

TCP/IP

Transmission Control Protocol/Internet Protocol

TDEV

Timing DEViation

TDM

Timing Division Multiplexing

Template

A collection of parameters that define a specific Network Element configuration. A Template gives the user the opportunity to configure parameters in a Network Element with a single operation. They are re-usable, and allow the user to configure the parameters in many Networks Elements in the same way. A set of Default templates is provided, and the user can create new templates and edit or delete user-created ones. Note that a template is always associated with one specific Network Element type and can not be used for other Network Element types.

TERM

Terminal Multiplexer

TGU

Timing Generator Unit

TI

Timing Interface (WaveStar® ADM 16/1)

TLM
TeLeMetry Unit (OLS)

TLP
Terminal with Line Protection

TMN
Telecommunications Management Network

TPU
Tributary Port Unit

TPU-PCT
Tributary Port Unit - Peripheral Control and Timing link

TPU2
Tributary port Unit 2 Mbit/s (WaveStar® ADM 4/1)

TPU34/45
Tributary port Unit 34 / 45 Mbit/s (WaveStar® ADM 4/1)

TPU155
Tributary port Unit 155 Mbit/s (WaveStar® ADM 4/1)

Transmit-direction
The direction outwards from the cross-connect.

Trellis Code Modulation
A combined coding and modulation scheme for improving the reliability of a digital transmission system without increasing the transmitted power or the required bandwidth.

TRF
TRansFer unit (WaveStar® ADM 4/1)

Tributary
A signal of a specific rate (2 Mbit/s, 34 Mbit/s, 140 Mbit/s, VC12, VC3, VC4, STM-1 or STM-4) that may be added to or dropped from a line signal.

Tributary Overhead Controller (TOC)
SLM circuit pack that allows access to the overhead bytes of the incoming tributary signal.

Tributary Overhead Controller (TOHCTL)
OLS circuit pack that allows access to the overhead bytes of the Supervisory channel.

Tributary Unit (TU)
An information structure which provides adaptation between the lower order path layer and the higher path layer. Consists of a VC-n plus a tributary unit pointer TU PTR.

GLOSSARY
GL-32

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

Tributary Unit Pointer (TU PTR)
Indicates the phase alignment of the VC with respect to the TU in which it resides. The pointer position is fixed with respect to the TU frame.

TSA
Time Slot Assignment

TSI
Time Slot Interchange

TTP
Trail Termination Point

TUG
Tributary Unit Group

U   UAS
UnAvailable Seconds

ULDT
Ultra Long Distance Transmission

UIM/X
A package used for developing the WaveStar® ITM-SC GUI for X-windows.

Unavailable Seconds
A performance monitoring parameter.

Uninterruptable Power Supply (UPS)
Allows connected computer equipment to gracefully shutdown, therefore preventing damage in case of a power fail and absorb dips in the supplied power.

Universal Co-ordinated Time (UTC)
A time-zone independent indication of an event. The local time can be calculated from the Universal Co-ordinated Time.

UPL
User PaneL

Upstream
At or towards the source of the considered transmission stream, i.e. looking in the opposite direction of transmission.

User Privilege
Permissions a user has to perform actions on the computer system on which the ITM-SC application runs. The following users can be distinguished:

365-312–521
Issue a, June 2001
Lucent Technologies - Proprietary
See notice on first page
G L O S S A R Y
G L - 3 3

User Type	User name	Permissions
System Administrator this is NOT an ITM-SC user	root (fixed)	maintain platform.
Database Administrator this is NOT an ITM-SC user	informix (fixed)	maintain database.
ITM-SC System Administrator	i2kadmin (fixed)	maintain ITM-SC application, maintain Network Element templates, maintain MEC files on the ITM-SC, set default ITM-SC parameters.
Supervisor	free choice	perform all data retrieval functions, perform all alarm suppression functions, perform configuration changes.
Operator	free choice	perform all data retrieval functions, perform all alarm suppression functions.

V   VF

Voice Frequency

Virtual Container (VC)

Container with path overhead.

W   Wait to Restore Time (WRT)

Corresponds to the time to wait before switching back after a failure has cleared, in a revertive protection scheme. This can be between 0 and 15 minutes, in increments of one minute.

WAN

Wide Area Network

Wander

Long term variations of amplitude frequency components (below 10 Hz) of a digital signal from their ideal position in time possibly resulting in buffer problems at a receiver.

WaveStar® ADM 16/1

A network multiplexer that is designed to flexibly multiplex plesiochronous and STM-1 tributary port signals into STM-4 or STM-16 line port signals.

WaveStar® Integrated Transport Management Subnetwork Controller (ITM-SC)

Manager for SDH Network Elements in a subnetwork. Also referred to as Element Management System.

WaveStar® Network Management System (NMS)

Manager for SDH Network Elements in a network. Formerly known as DACScan-T.

WDM

Wavelength Division Multiplexing

What You See Is What You Get (WYSIWYG)

Information as displayed on the screen will appear in the same way on printed output.

GLOSSARY
GL-34

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

Wideband Communications
Voice, data, and/or video communication at digital rates from 64 kbit/s to 2 Mbit/s.

Windows
Graphical User Interface on PC systems.

Working
Label attached to a physical entity. In case of revertive switching the working line or unit is the entity that is carrying service under normal operation. In case of non-revertive switching the label has no particular meaning.

WS
Work Station

WSF
Work Station Facility

X   **XMTR**
Transmitter (RR)

XMTR Switch Unit
Radio Relay circuit pack that performs connections for protection switching and transmission of low priority traffic on the protection channel.

XPIC
Cross Polarization Interference Cancellation

XSU
XMTR Switch Unit (RR)

X-Terminal
Workstation that can support an X-Windows interface

X-Windows
Graphical User Interface on Unix Systems.

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

G L O S S A R Y
G L - 3 5

Index

I N D E X
I N - 2

Lucent Technologies - Proprietary
See notice on first page

365-312–521
Issue a, June 2001

365-312–521
Issue a, June 2001

Lucent Technologies - Proprietary
See notice on first page

I N D E X
I N - 3