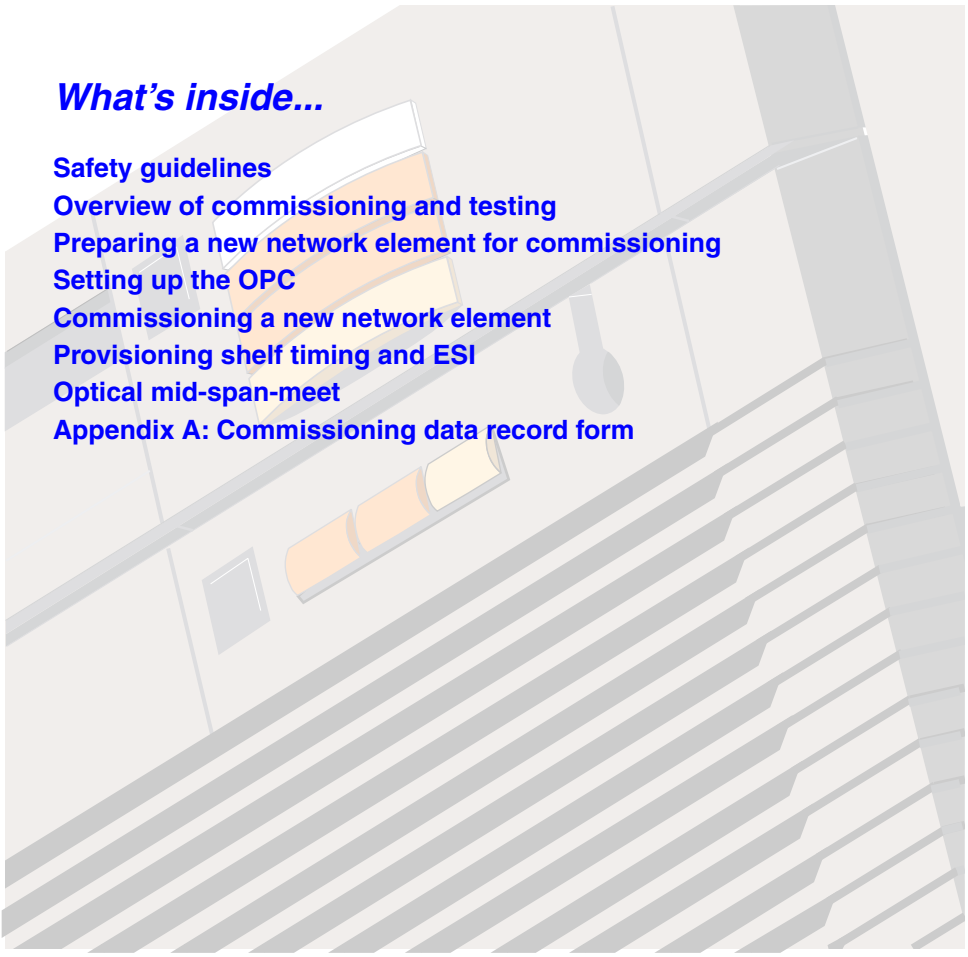
NT7E65DJ 323-1111-220

SONET Transmission Products

S/DMS TransportNode OC-3/OC-12 NE—TBM

Commissioning Procedures

Standard Rel 14 February 2001



What's inside...

NORTEL NETWORKS™

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About this document

This document provides recommended commissioning procedures for new OC-3/OC-12 network elements. These procedures ensure that the OC-3/OC-12 equipment is functioning properly before performing the site tests in *Site Testing Procedures*, 323-1111-221, and the end-to-end tests in *System Testing Procedures,* 323-1111-222. Before performing these procedures, ensure that the procedures in *Installation Procedures*, 323-1111-201, are completed.

A commissioning data record form (to be filled in) is found in Appendix A of this document.

See *System Administration Procedures*, 323-1111-302, for X-terminal configuration.

See *System Expansion Procedures*, 323-1111-224, for procedures on adding new DS1/DS3/STS-1 channels to an existing system.

Audience

This document is for the following members of the operating company:

- installers
- system lineup and test (SLAT) engineers/technicians
- provisioners
- maintenance engineers

References in this document

This document refers to the following documents:

- *Timing and Synchronization Description,* 323-1111-192
- *Installation Procedures,* 323-1111-201
- *Site Testing Procedures*, 323-1111-221
- *System Testing Procedures,* 323-1111-222
- *System Expansion Procedures I*, 323-1111-224
- *System Expansion Procedures II - Add/Delete Nodes*, 323-1111-225
- *User Interfaces Description*, 323-1111-301
- *System Administration Procedures*, 323-1111-302
- *Data Administration Procedures*, 323-1111-304
- *Provisioning and Operations Procedures*, 323-1111-310
- *Protection Switching Procedures*, 323-1111-311
- *Network Surveillance Procedures*, 323-1111-510
- *Performance Monitoring Procedures*, 323-1111-520
- *Alarm and Trouble Clearing Procedures*, 323-1111-543
- *Log Report Manual*, 323-1111-840
- *Common Procedures*, 323-1111-846

Safety guidelines

This chapter contains safety guidelines that must be followed for personal safety and for the proper handling and operation of equipment.

Warnings and safety precautions

To avoid injury, follow all danger warnings provided with this product, as well as the safety procedures established by your company.

To avoid damage to equipment or service interruptions, follow all caution warnings provided with this product, as well as the safety procedures established by your company.

In this documentation, danger and caution notices look like the following.

DANGER
Risk of personal injury
A danger warning with this symbol indicates a risk of personal injury.

DANGER
Risk of electrical shock
A danger warning with this symbol indicates a risk of personal injury due to an electrical hazard.

CAUTION
Risk of interruption to service/equipment damage
A caution warning with this symbol indicates a risk of service interruption or equipment damage.

CAUTION
Risk of damaging circuit packs
A caution warning with this symbol alerts you to use antistatic protection to avoid damaging circuit packs.

Circuit packs

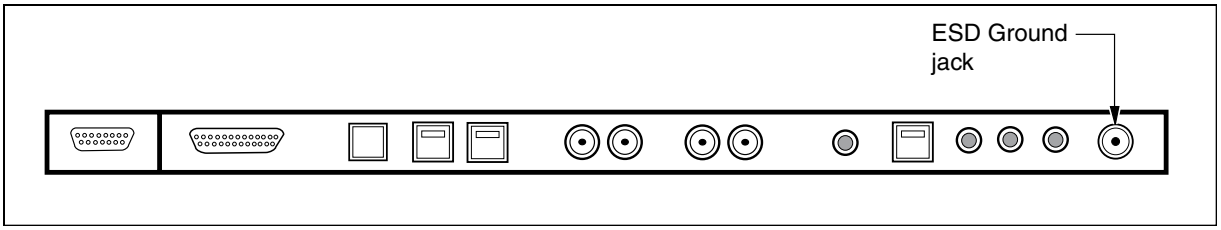
All circuit packs are subject to damage by rough handling or from electrostatic discharge. Adhere to the following procedures to avoid damaging the circuit packs.

Static electricity

Static electricity charges build up on your body if you walk a short distance. This buildup is sufficient to damage a circuit pack. Therefore, always wear a skin-contact ground strap or other suitable personal grounding device when working on a shelf, on cables connected to a circuit pack, or on a circuit pack itself.

Ground straps can be the expandable-wrist type where the grounding cord is connected to the ground plug on the local craft access panel (LCAP).

FW-1674



Alternatively, your company may provide antistatic protection by mounting bays on conductive floor coverings, and providing conductive shoes or heel grounders to all personnel.

All circuit packs are shipped in antistatic bags marked with the following symbol.

ATTENTION
OBSERVER DES PRECAUTIONS
POUR LA MANIPULATION.
DISPOSITIFS SENSIBLES AUX
CHARGES STATIQUES

ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
SENSITIVE DEVICES

Handling, installing, or replacing circuit packs

When handling, installing, or replacing circuit packs, observe the following precautions:

- Wear a wrist strap or other static-grounding device before removing a circuit pack from its package or from a shelf.
- Place each circuit pack in an antistatic bag when it is not mounted in a shelf.
- Handle each circuit pack by the faceplate or stiffener.

- Do not touch the solder side of the circuit pack, the pin connector, or the components.
- Do not stack circuit packs on or against each other.
- Inspect all circuit packs for damage before sliding them into the shelf. Closely inspect all pin connectors to ensure pins are undamaged.
- Do not force circuit packs into their packaging material.
- Protect all optical connectors of the transmit and receive optical circuit packs by covering them with clean dust caps at all times.
- Before inserting any circuit pack or OPC into a shelf, or using a portable operations controller (OPC), allow the circuit pack or OPC to come to room temperature.

Storing circuit packs

Spare circuit packs must be left in the original shipping container until required. To prevent damage to circuit packs while in storage, observe procedures that prevent the following:

- accumulation of dirt or dust on the pin connectors
- damage to the board or its components
- board warpage (to boards stored in areas where the humidity can exceed 95 percent and the temperature can exceed 70°C)

Transporting circuit packs

When transporting circuit packs, pack each circuit pack in its original antistatic shielding bag, padding, and box. If the original material is lost, use other suitable material to prevent damage in transit.

Software tapes

All software tapes are subject to damage by rough handling or from electrostatic discharge. When handling or installing software tapes, observe the following precautions:

- Wear a wrist strap or other static-grounding device before removing a software tape from its package or from an OPC.
- Place each software tape in its case when it is not mounted in an OPC tape drive.
- Do not touch the bare tape in the cassette.
- Inspect all tape cassettes for damage before sliding them into the OPC tape drive.
- Do not force tape cassettes into the OPC tape drive.
- Before inserting any cassette tape into an OPC tape drive, allow the cassette tape to come to room temperature.

Software cartridges

When handling or installing software cartridges, observe these precautions:

- Wear a wrist strap or other static-grounding device before you insert or remove a cartridge from the cartridge drive of an OPC.
- Place each cartridge in its case when you remove it from the cartridge drive of an OPC.
- Ensure that the cartridge is inserted with connector facing inward and the Nortel Networks logo facing towards the left. Do not force the cartridge into the OPC cartridge drive.

Optical fibers

Optical fibers are either single or multiple strand. The following information and precautions apply to all fibers.

Laser radiation

All Nortel Networks S/DMS optical products and associated optical test sets use laser sources that emit light energy into fiber cables. This energy is within the red (visible) and infrared (invisible) regions of the electromagnetic spectrum.

Laser products are subject to federal regulations, state or provincial regulations, and local practices. Regulation 21 CFR 1040 of the U.S. Bureau of Radiological Health requires manufacturers to certify each laser product as Class I, II, III, or IV, depending on the characteristics of the laser radiation emitted. In terms of health and safety, Class I products present the least hazard (none at all), while class IV products present the greatest hazard.

All Nortel Networks S/DMS transmission products comply with 21 CFR 1040, Chapter 1, subchapter J as a Class I laser product, as set forth by the U.S. Bureau of Radiological Health. These regulations ensure that there are no hazards to personnel from the laser transmitter when the system is in its operating configuration. A label similar to the one above is located on all optical interface packs, near the optical connector.

Caution
Avoid direct exposure to beam. Invisible light can blind. Keep all optical connectors capped.

During testing and maintenance, some procedures require the handling of optical fibers and transmitters with the dust caps removed. In these circumstances, laser radiation within the limits of Class IIIb might be present.

This level of radiation is sufficient to cause injury to personnel and caution must therefore be exercised to avoid exposure. This precaution applies to any point in the system where the laser signal can be accessed (for example, at the optical connectors on the optical interface circuit packs).

Handling optical fibers

When working with optical fibers, observe the following precautions:

- Wear safety glasses when installing optical fibers.
- Avoid direct exposure to fiber ends or optical connector ends where the laser signal can be accessed.
- Wipe clean or wash your hands after handling optical fibers. Small bits of glass are almost invisible and can damage your eyes.

DANGER
Risk of eye injury
If there is any suspicion of a glass chip in your eye, seek medical attention at once.

- Do not handle pieces of optical fiber with bare fingers. Use tweezers or the sticky side of a piece of vinyl tape to pick up and discard any loose fiber ends.
- Place all optical fiber cuttings in a plastic bottle provided for that purpose.
- Handle optical fibers with care. Position them in a safe and secure location during installation.
- Protect all optical fiber connectors with dust caps at all times.
- Follow the manufacturer's instructions when using an optical test set. Incorrect calibration or control settings could result in hazardous levels of radiation.

Splicing optical fibers

During the splicing of any fiber, you might be required to look at the fiber using an eye loupe (a small magnifier). Observe the following precautions:

- Before starting the splicing, power off all laser sources to the fiber or disconnect the remote fiber end from the laser sources.
- Ensure that the laser sources stay disconnected or powered off, whether the sources are located in a central office, subscriber premises, or a remote location.
- Before starting the splicing, disconnect any optical test sets from the fiber (whether locally or remotely connected).
- Use only the optical instruments approved by your company.

Repairing optical fibers

When there is an accidental break in the fiber:

- Notify both central-office and field-repair personnel.
- Identify to the central-office personnel where the fibers have been damaged.

- Power off all laser sources to the fiber or disconnect the remote fiber end from the laser sources, whether the sources are located in a central office, subscriber premises, or a remote location.

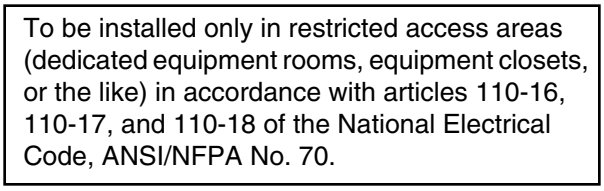
Radio-frequency emissions

The following regulatory notice applies to all Nortel Networks SONET transmission products.

- This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the Federal Communications Commission (FCC) Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.
- This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operating this equipment in a residential area may cause harmful interference, in which case users must correct the interference at their own expense.

Equipment location

To prevent access by other than trained personnel, all equipment must be placed in restricted access areas (dedicated equipment rooms, equipment closets, or the like) in accordance with articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA No. 70. The equipment warning label above is located in the top left-hand corner of the back cover of each shelf to remind installers of this requirement.



Overview of commissioning and testing

This chapter provides an overview of commissioning and testing an S/DMS TransportNode TBM system.

> ***Note:*** The term system refers to your entire SONET Transmission Products system that is being deployed in your network (such as a linear system or a ring system).

MAC address for the OPC

To assign an Internet Protocol (IP) address, the medium access code (MAC) address (the hardware address) of the operations controller (OPC) is required. If the OPC is commissioned, you can obtain the MAC address by typing **macaddr** in the UNIX shell. If the OPC is not commissioned, the MAC address can be obtained from the OPC hardware. To obtain the MAC address from the OPC hardware, refer to Chapter 3.

Commissioning and testing process

The commissioning and testing process includes all the tasks necessary to bring a new system into steady-state operation. The process also applies when expanding an existing, in-service system (for example, by adding network elements, tributaries, or other equipment). The system expansion procedures are designed so that the new equipment or functionality can be added and tested without taking the existing traffic-carrying equipment out of service.

The commissioning and testing process can be described in terms of the following four basic steps:

- preparing a new network element for commissioning
- commissioning a new network element
- site testing
- system testing

The commissioning and testing of a linear system always begins at the site farthest from the primary OPC site, in which the backup OPC usually resides (if equipped), and continues towards the primary OPC site, with stops at each of the intermediate sites (if there are any).

For a ring, commissioning and testing begins at either node adjacent to the node containing the primary OPC and continues in the direction opposite from the primary OPC node, with stops at each of the intermediate nodes.

The process is designed to minimize the amount of movement of technicians between sites. For example, the commissioning and site testing for a particular network element is intended to be done at the same time to avoid returning to a site unnecessarily.

When commissioning and testing a network element that is to form part of a new system, follow the flowcharts in this chapter. When commissioning and testing network elements being added to an existing system or equipment being added to an existing network element, follow the task lists and flowcharts in *System Expansion Procedures I*, 323-1111-224, and *System Expansion Procedures II - Add/Delete Nodes*, 323-1111-225.

The following flowcharts in this chapter outline the commissioning and testing process:

— Flowchart for new linear systems (Figure 2-2 to Figure 2-6), starting on page 2-17

— Flowchart for new ring systems (Figure 2-7 to Figure 2-11), starting on page 2-22

Preparing a network element for commissioning

When a network element is installed it is left in the powered-down state, without the fiber or other traffic-carrying cables connected. The system lineup and test (SLAT) team, therefore, must first measure the shelf and bay power, and then power up the system. These procedures are described in Chapter 3, “Preparing a new network element for commissioning” in this document.

Commissioning

Commissioning involves entering the minimum amount of data required for a network element to operate. This data includes system identification information (entered once at the system level for each new OPC span of control) and network element data, which is entered for each network element in the system. The commissioning procedures are provided in this document.

Commissioning involves the following three basic steps:

- system-level commissioning
- network element level commissioning (including network element configuration data)
- synchronizing primary and backup OPC modules

It is recommended to keep a written record of all commissioning data on a copy of the Commissioning Data Record form, which is included at the end of this document.

Commissioning can be performed using a portable, more rugged version of the OPC module, known as the portable OPC, which is equipped with a 110 V ac power supply.

If a portable OPC is not available, commissioning can be done using the primary OPC, both for systems with a backup OPC and for systems without a backup OPC. If the portable OPC is not used, the primary OPC must be moved from site to site during the commissioning process.

When new network elements are added to existing in-service systems, if a CNet connection can be made from an existing network element in the system being expanded, the commissioning and software download can be done from the primary OPC for the existing system.

If a CNet connection is not possible (as is typically the case in expansions of existing rings), a portable, a spare, or the backup OPC can be taken to the site of the new network element to do the initial commissioning and software download (as described in "In-service system expansions" on page 2-4).

For information on configuring OPC ports and managing X terminals for the OPC, refer to *System Administration Procedures*, 323-1111-302.

Site testing

Once commissioned, the network element must then be tested, first on a stand-alone basis, and then as part of a system (that is, either a linear system or a ring). The testing process is designed to systematically prove each element of the system and their interconnections. The site testing procedures are provided in *Site Testing Procedures*, 323-1111-221.

The first level of testing is site testing, which is applied to the network element on a stand-alone basis, prior to cabling the network elements together into a functional system. The site tests prove the operation of the network element equipment, interfaces, and key features, such as protection switching. In some cases, however, such as in testing regenerators and in some tributary tests, cabled-in connections with other network elements are required in order to establish the necessary signal flow and test access points.

System testing

After the network elements are site tested, they are cabled together as required for system operation. The system-level tests are then performed. Typically, the system-level tests include the end-to-end tests (system-level

protection-switching tests and timed bit-error-rate tests), and tests of features that require cabled-in connectivity between network elements. The system testing procedures are provided in *System Testing Procedures*, 323-1111-222.

In a linear system, the system tests are applied after all the network elements (terminals, ADMs, and regenerators) have been cabled together. In a ring, progressive end-to-end tests are done as each add-drop multiplexer (ADM) node is progressively added to the ring. Additional end-to-end tests are then applied to the ring as a whole.

When the end-to-end system tests are completed, final system tests are performed as specified in *System Testing Procedures*, 323-1111-222. These include deleting unused facilities, backing up the commissioning data to tape or cartridge, verifying that the primary and the backup OPCs communicate, and preparing the system for provisioning. Provisioning for traffic-carrying equipment and facilities is done according to the instructions in *Provisioning and Operations Procedures*, 323-1111-310.

Network element level commissioning (including network element configuration data)

Network element (or shelf) commissioning is performed at each site. Commissioning at this level consists of entering various commissioning data onto the portable OPC (or the primary OPC if a portable OPC is not available) such as the following:

- network element number (1 to 65534)
- shelf type (Transport Bandwidth Manager [TBM])
- shelf function (terminal, add-drop multiplexer [ADM], ring ADM, regenerator)
- transmission rate (OC-3 or OC-12)
- hardware configuration
- shelf serial number (obtained from a label on the shelf)

As each network element is commissioned, the network element commissioning data is progressively added to the database of the OPC used for commissioning. When the commissioning of all the network elements is completed, the data from the portable OPC is synchronized with the primary OPC (that is, uploaded to the primary OPC).

In-service system expansions

When commissioning the network element data for new shelves being added to existing in-service systems, the primary OPC must be left in place to manage the existing in-service network elements. Unlike the case of a new system, the primary OPC therefore cannot be carried from site to site. When a network element is commissioned, fibers have not yet been connected, and therefore the SONET data communications are not available.

However, if a CNet connection can be established between an existing network element in the span of control and the new network element (such as a matched node ring), the primary OPC can thereby establish data communications with the new network element. The primary OPC can therefore be used to commission the new network element from its current location and download the network element software.

If a CNet connection cannot be established with the new network element, a portable, a spare, or the backup OPC is transported to the site of the new network element. It is then used to commission the network element and download the network element software. In this case, you must manually reenter the network element commissioning data for the new network elements into the primary OPC. This method ensures that the new commissioning data is entered into the primary OPC's database without overwriting the existing OPC data and any data changes that might have been made while the commissioning task was ongoing.

Downloading the network element software

After the commissioning data is entered, the network element software is downloaded from the OPC used for commissioning to the network elements over the CNet local area network (LAN). You must make certain that the OPC used for commissioning is running the current software release.

Once the software download is completed, it is necessary to enter or verify the following network element configuration data (using the network element user interface) to complete all the tests outlined in *Site Testing Procedures*, 323-1111-221, and in *System Testing Procedures*, 323-1111-222. The following configuration data is entered or verified for each network element:

- network element name and bay frame location ID
- shelf function and time offset
- shelf timing and ESI parameters
- line build-out (LBO) for DS3 and STS-1 tributary cables
- facility identifier
- OC-3/OC-12 switching configuration

Network element database backup

Once all the network element configuration data is entered, a manual network element database backup must be performed.

A tape or cartridge backup is also performed after each network element is commissioned. The tape or cartridge can be used to restore commissioned data on a replacement OPC in the event of a failure of the OPC used for commissioning. It is also recommended that you perform a final tape or cartridge backup once the system is fully tested and ready to carry traffic. A

telco might also decide to keep a written record of all commissioning data on a copy of the commissioning data record form that is included in "Appendix A: Commissioning data record form" in this document.

Defining a configuration

OC-12 systems are defined as either linear or ring configurations. A configuration is defined using the OPC Configuration Manager tool by assigning line terminating equipment (LTEs) to the configuration. LTEs include terminals in linear systems and ring ADMs in rings.

In a linear configuration, default STS connections are created without having to define any configuration, as described in *Site Testing Procedures* 323-1111-221. These connections are taken down once the system is completely tested.

For a ring, the ring configuration is created as part of the progressive end-to-end tests, as described in *System Testing Procedures*, 323-1111-222. A new configuration is created for the first ADM node in the ring. The remaining nodes are progressively added to the ring configuration during the tests.

NWK and VTM rings

The terms NWK and VTM are used to distinguish between bidirectional line-switched rings (BLSRs) which use different OC-12 optical interface units.

An NWK ring uses the following cards in each network element: one NT7E02 OC-12 ring networking interface circuit pack and one NT7E35 OC-12 ring loopback circuit pack in the primary transport slots, a second pair of the same types in the secondary transport slots, and one NT7E36AA overhead bridge card in slot 22.

A VTM ring uses two NT7E05 OC-12 VTM circuit packs in the primary transport slots of each network element.

Synchronizing the primary and the backup OPC

After commissioning all network elements in the system using the portable OPC, the commissioning data gathered by the portable OPC must be transferred to the primary OPC module using a control network cable. This data transfer is referred to as data synchronization.

For new systems, when a portable OPC is not available, the commissioning data is gathered by the primary OPC as it is transported from site to site, until the site where it is intended to reside is reached.

For upgrades and expansions of existing in-service systems, a portable, a spare, or the backup OPC is transported from site to site to commission the individual network elements being added to an existing span of control. As described in "In-service system expansions" on page 2-4, you must take care to preserve the existing data on the primary OPC.

The final commissioning operation to be performed is data synchronization between the primary and backup OPC modules (if a backup OPC is not equipped in the system, this step is omitted). Data is transferred across the system using the SONET section data communication channel.

Synchronizing the backup OPC ensures that the backup OPC can fully manage the system in the event of a primary OPC failure (date and time are synchronized between the primary and backup OPCs only if the time of day between OPCs are within 30 min).

> ***Note:*** Alarm histories are not copied across OPCs as part of the data synchronization process so, if an OPC is lost, all the alarm history for the system is lost.

TBM control shelf

A TBM control shelf is a TBM shelf equipped only with an OPC module. It has no transport interfaces. The control shelf is connected to the system using a control network cable and is intended for the positioning of an OPC in situations where no space is available for the OPC in any other shelf in the system. The OPC continues its normal function in the system when it is installed in the control shelf.

The control shelf is part of the OPC span of control and must be commissioned in the system. However, since the control shelf does not have any transport interfaces, it is not part of the system configuration that is set up using the Configuration Manager tool.

When commissioning a control shelf, follow the normal procedures for commissioning a new system, keeping in mind that there are no transport interfaces on a control shelf. The control shelf must be commissioned as a terminal shelf containing either the primary OPC or the backup OPC.

> ***Note:*** After commissioning the control shelf, the CNet link fail alarm for the control shelf must be enabled. See the chapter on provisioning equipment alarms in *Provisioning and Operations Procedures*, 323-1111-310, for more information.

OPC span of control definition

An OPC span of control is defined as a region in which all network elements are managed by the same primary and backup OPC modules. A maximum of 24 network elements (including terminals, ADMs, and control shelves) can be managed by a single primary and backup OPC pair. If a system is larger than 24 network elements, additional spans of control must be defined requiring additional OPC pairs to manage the entire system (for example, a system of 50 network elements requires three spans of control).

On systems consisting of multiple spans of control, each span of control must be commissioned separately. All OPC modules should reside physically within the same span of control they manage. As well, all network element IDs within the multiple spans of control must be unique.

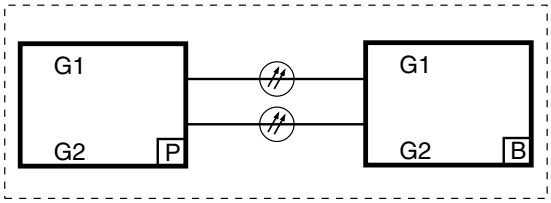
When configuring a system with one or more OC-12 TBM shelves and an OC-48 shelf, the OC-48 shelf must be terminated at one end as an OC-48 network element.

Note: You cannot have mixed OC-12 and OC-48 spans of control.

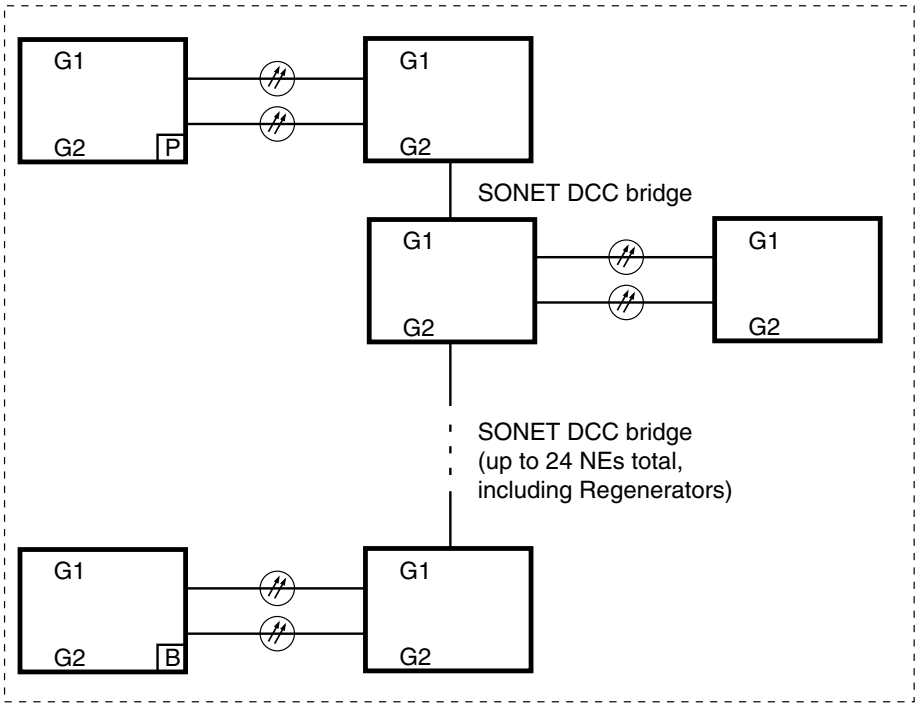
For examples of various span of control configurations for a system, see Figure 2-1.

Figure 2-1
Span of control configurations

FW-2294 (TBM)



Configuration No. 1



Configuration No. 2

Legend:

G1 = TBM channel
G2 = TBM channel
P = Location of Primary OPC
B = Location of Backup OPC
= Boundary of span-of-control

Commissioning using the SONET DCC bridge

A SONET data communications channel (SDCC) bridge can be used to bridge the operations, administration, and maintenance (OAM) functionality of two or more spans of control. Several spans of control can be bridged together as long as the rule of one primary OPC for each 24 network elements is respected.

The commissioning process for spans connected together using a DCC bridge is the same as previously described. However, the user must ensure that the DCC bridge is installed before beginning commissioning. As well, the user must ensure that all network element IDs are unique throughout the spans being bridged.

> ***Note:*** If an OC-12 TBM shelf is connected to an OC-48 network element (as an OC-12 or STS-12 tributary), the SONET data communications channel (SDCC) link fail alarm is raised if the alarm is not disabled at the TBM shelf. This alarm must be disabled whenever the OC-12 TBM is connected as a tributary of an OC-48, except when the TBM is a tributary of the fourth quadrant in a linear, nondiversely routed OC-48, or when the OC-48 is using NT7E20GB processor card. Otherwise the alarm is active during system operation. See *Provisioning and Operations Procedures*, 323-1111-310, for instructions on how to disable this alarm at the TBM shelf.

Provisionable SONET DCC

The SONET DCC (SDCC) links for OC-3 tributaries are provisionable from the network element user interface. The SDCC links for all primary and secondary OC-3 and OC-12 optics are also provisionable. These are represented as an SDCC COMM facility at the network element user interface.

Once an SDCC link has been provisioned, it can operate in the following two modes: protected and diversely routed (route diversity enabled).

> ***Note:*** Route diversity can only be turned on for the transport optical interfaces, and only on terminal and ADM network elements. Route diversity is currently unavailable for the tributary optical interfaces. If route diversity is turned on using the RouteDiv command in the optical protection provisioning screen, a second SDCC port is added. One port is connected to the working optics and one to the protection optics. If route diversity is turned off, the SDCC port on the protection optics is automatically deleted, and a single SDCC port is connected to the optics working/protection pair.

When a transport optics circuit pack (OC-3 or OC-12) is provisioned, the SONET DCC for that line is automatically enabled.

The SDCC ports are automatically deprovisioned when their associated optics are deprovisioned.

The SDCC COMM facility can be disabled, if required, using the delete command in the COMM facility screen.The facility can be reenabled using the add command for mid-span-meet scenarios in which security might be a concern or if there are incompatibilities when optics are connected to another manufacturer's equipment. Enabling and disabling of the SONET DCCs also allows some control over the extent of the data communications network.

When a tributary optics circuit pack (OC-3 tributary) is provisioned, no SONET DCC is added for that line. SONET DCC must be provisioned using the add command from the COMM facility screen, if desired.

Care must be taken when enabling or disabling SDCC COMM facilities. For example, if SONET DCC, which is the sole communications link to a network element, is disabled remotely, it can only be enabled by travelling to the network element site, connecting a terminal directly to the user interface port on the shelf, and logging in locally.

> ***Note:*** Removing a SONET DCC could result in loss of association. Software download, alarm gathering, remote login, and other functions relying on the SDCC would be lost.

SONET DCC provisioning is described in the chapter on facility procedures in *Provisioning and Operations Procedures*, 323-1111-310.

Access control to the SONET data communications network

There are important interactions between the OPC Commissioning Manager tool and access control to customer-owned nodes in the SONET data communications network. You must consider these interactions if you are changing or deleting identification information. Security control for customer-owned nodes in the SONET data communications network is provided by the **config_dcc_ac** command. This feature is described in *System Administration Procedures*, 323-1111-302.

Decommissioning an OPC or network element

If you are going to decommission a node (OPC or network element) using the OPC Commissioning Manager tool, first check to see if the node appears in any access or deny lists in the SONET data communications network. The access and deny lists provide security for customer-owned nodes. Before you decommission the node, you must first remove the node from all access and deny lists in the SONET data communications network. You cannot remove the node from the access and deny lists after the node has been decommissioned.

Updating network and node identification parameters

The **config_dcc_ac** command has an audit option that can automatically update changed identification information within an OPC span of control. However, this option cannot update parameters that change for nodes outside the local OPC span of control. These parameters include the following

- network identifier
- system identifier
- network element identification number
- the OPC or network element name
- NSAP address (if changed as the result of replacing the shelf processor or OPC)

If these parameters change for entries in the access control lists of an OPC but the nodes are not in the OPC's span of control, you must remove the entries containing the old parameters and add back new entries using the new parameters. The local OPC cannot obtain the new parameters for nodes not in its span of control.

Reassigning STS-1 channels

You can change the STS-1 or VT channel assignment of existing traffic by using the editing procedures for an STS or VT connection described in *Provisioning and Operations Procedures*, 323-1111-310.

Before you start

There are a number of things to do before starting the commissioning process:

- Ensure that you have all the equipment you need, as listed in “Equipment requirements.”
- Plan out the network element ID that you must assign to each network element in the system. All network element IDs must be unique within the system.
- Identify the particular span of control configuration that applies to the system to be commissioned.
- Find out the OPC userID and password for the slat security level (the default userID is “slat” with password “slat”).
- Find out the network element login userID and password, for each network element to be commissioned (the default userID is “admin” with password “admin”).
- Find and copy the Commissioning Data Record form included at the end of this document.

  Note: Read the warnings and precautions in Chapter 1, “Safety guidelines” in this book to avoid injury to personnel and damage to equipment.

Equipment requirements

It is assumed that all required software is loaded onto the portable, primary, and backup OPCs before leaving the factory, and that the primary and backup OPCs are already on site.

For in-service upgrades and system expansions using a portable or spare OPC, it is assumed that all required software is loaded on to the portable or spare OPC (for software download instructions, see *Software Administration Procedures*, 323-1111-303). If you are using the backup OPC, it is assumed that it is already running the current software release and that its database has been synchronized with that of the primary OPC.

The equipment required for commissioning consists of the following:

- the portable OPC (or the primary OPC, or the backup OPC or a spare, if a portable is not available)
- a blank tape or cartridge for data backups
- a CNet cable (9-pin D-sub [male] to 9-pin D-sub [male]) if the portable OPC is used
- two CNet terminator plugs
- a VT100-compatible terminal or terminal emulator
- a null modem RS-232 cable (NT7E44RA or RB) to fit the VT100-compatible terminal at one end and the 9-pin (male) connection at the other end

The following optional equipment is recommended. It replaces the VT100-compatible terminal and RS-232 cable that appear in the preceding list:

- a VT100-compatible laptop computer (battery pack might be required), configured for use as an OPC terminal
- a null modem 9-pin (female) to 9-pin (male) RS-232 cable (NT7E44SA or SB)

The pin assignments for the NT7E44RA and NT7E44RB cables are provided in the following table.

9-pin connector pin number and function	Wire color	25-pin connector pin number and function
1—DCD	BK	4—RTS
2—RXD1	BR	2—TXD
3—TXD1	R	3—RXD
4—DTR	O	5—CTS
4—DTR	Y	6—DSR
5—GND	G	7—GND
6—DSR	BL	20—DTR
7—RTS	V	8—DCD
8—CTS	W	20—DTR
9—not connected	—	—
Note: If a DEC VT320 or 420 terminal (equipped with an RJ-11 connector) is used, pins 1 and 4 on the 9-pin connector must be shorted together.		

The pin assignments for the NT7E44SA and NT7E44SB cables are provided in the following table.

9-pin connector pin number and function (female)	**Wire color**	**9-pin connector pin number and function (male)**
1—DCD	BK	4—DTR
2—RXD1	BR	3—TXD
3—TXD1	R	2—RXD
4—DTR	O	1—DCD
4—DTR	Y	6—DSR
5—GND	G	5—GND
6—DSR	BL	4—DTR
7—RTS	V	8—CTS
8—CTS	W	7—RTS
9—not connected	—	—
Note: All VT100-compatible terminals used with the OPC must support the following signals: CTS Clear To Send DCD Data Carrier Detect DSR Data Set Ready DTR Data Terminal Ready RTS Ready To Send RXD Receive Data TXD Transmit Data		

The OC-12 uses a security feature to ensure proper logging off from an OPC port 1 session when the modem line is dropped (or the terminal disconnected). This feature uses the data carrier detect (DCD) line (pin 1) of OPC port 1.

Because some North American terminals do not support the full RS-232 protocol through their RG-11 connectors, this security feature might prevent use of some types of terminals with the current NT7E44RA/RB cable. The North American version of the DEC VT320 and VT420 are two examples. The international version of these models do not have this problem since they support the full RS-232 protocol (25-pin connector).

To get such North American terminals to operate, modify the cable by shorting pin 1 (DCD) to pin 4 (data terminal ready) on the 9-pin connector side (going into the OPC port 1 connector). The extra security feature is automatically disabled when using this modified cable with the North American VT320 and VT420 models.

A written record of all commissioning data must be kept on a copy of the commissioning data record form included in "Appendix A: Commissioning data record form" in this document.

Commissioning and testing flowcharts and task list

Commission a new system using the flowcharts in this chapter (Figures 2-2 to 2-6 for a linear system and Figures 2-7 to 2-11 for a ring system) and the chapter task lists in Chapter 4 and Chapter 5. The commissioning and testing flowcharts refer to specific task lists included in the relevant chapters of this document as well as in *Site Testing Procedures*, 323-1111-221, and *System Testing Procedures*, 323-1111-222.

Figure 2-2 (Sheet 1 of 5)
Commissioning and testing flowchart for a linear system

FW-2351 (OC12)

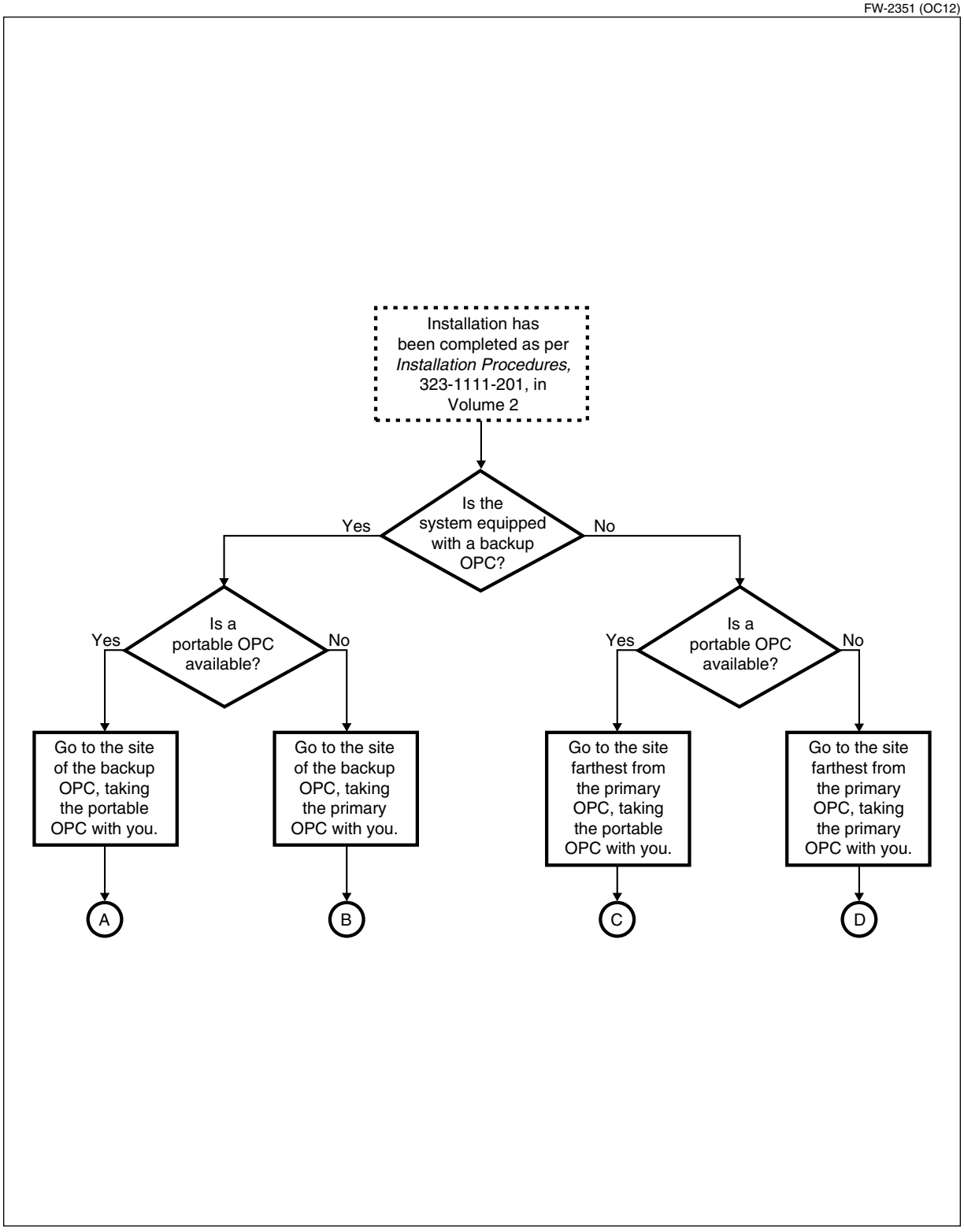


Figure 2-3 (Sheet 2 of 5)
Commissioning and testing flowchart for a linear system

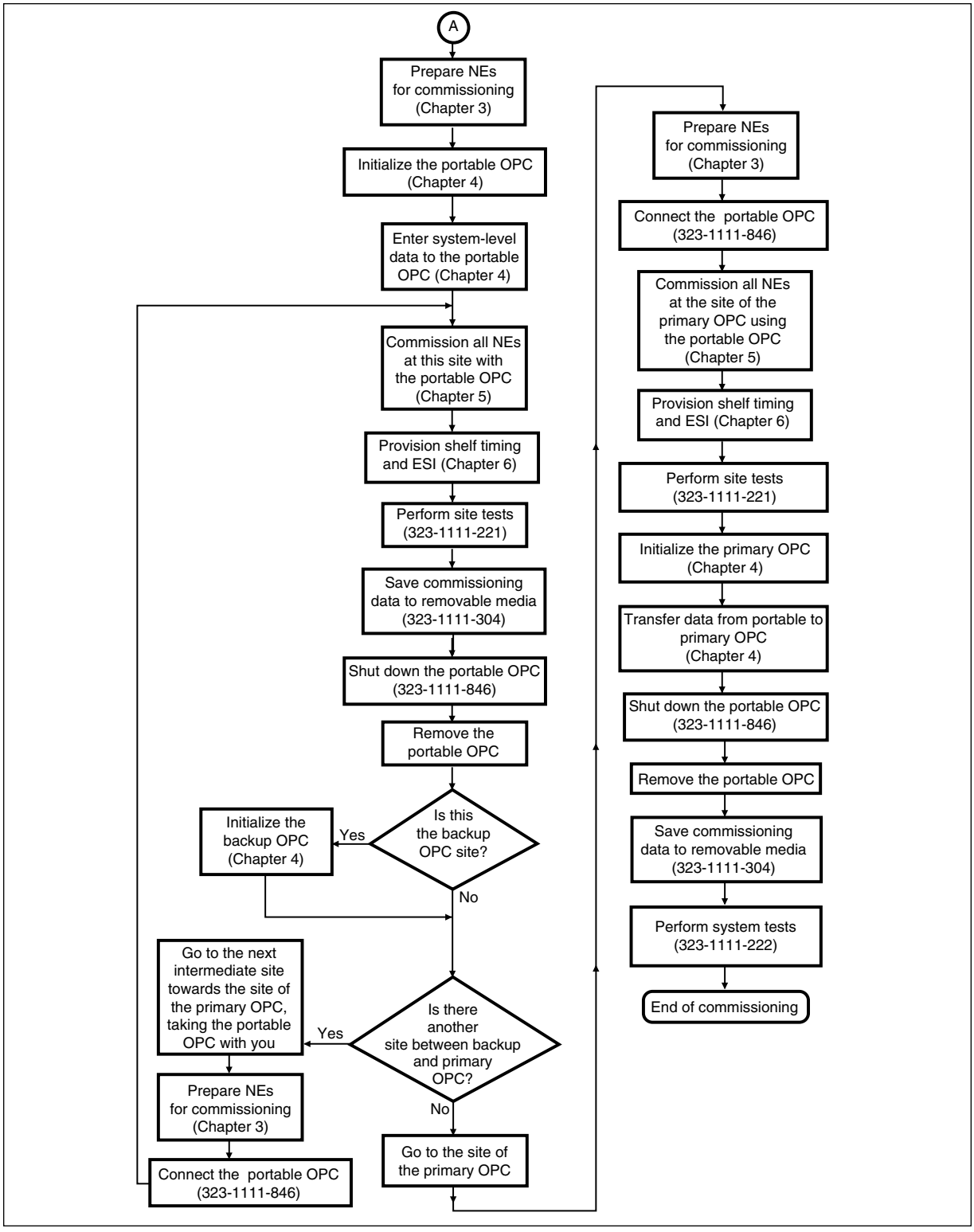


Figure 2-4 (Sheet 3 of 5)
Commissioning and testing flowchart for a linear system

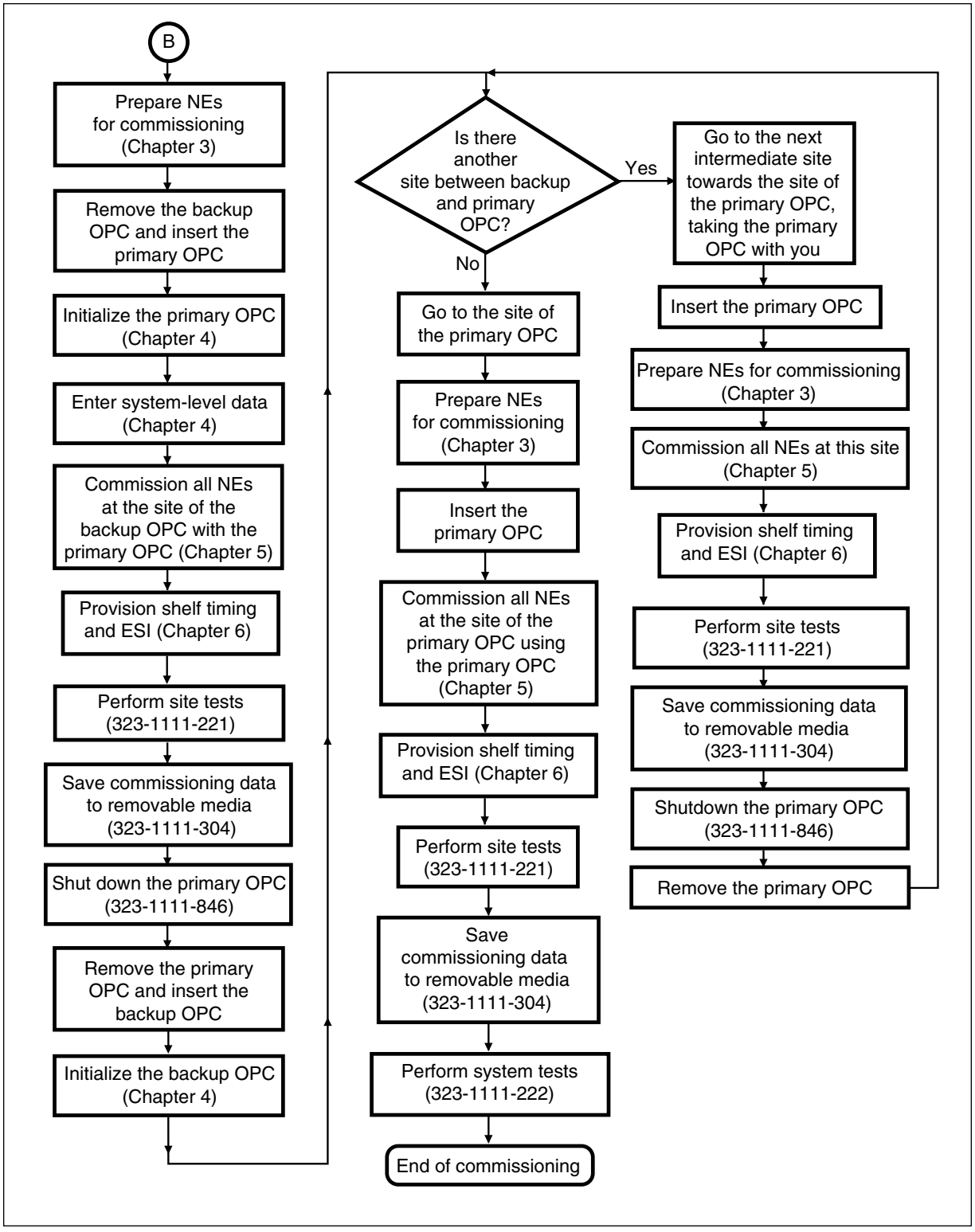


Figure 2-5 (Sheet 4 of 5)
Commissioning and testing flowchart for a linear system

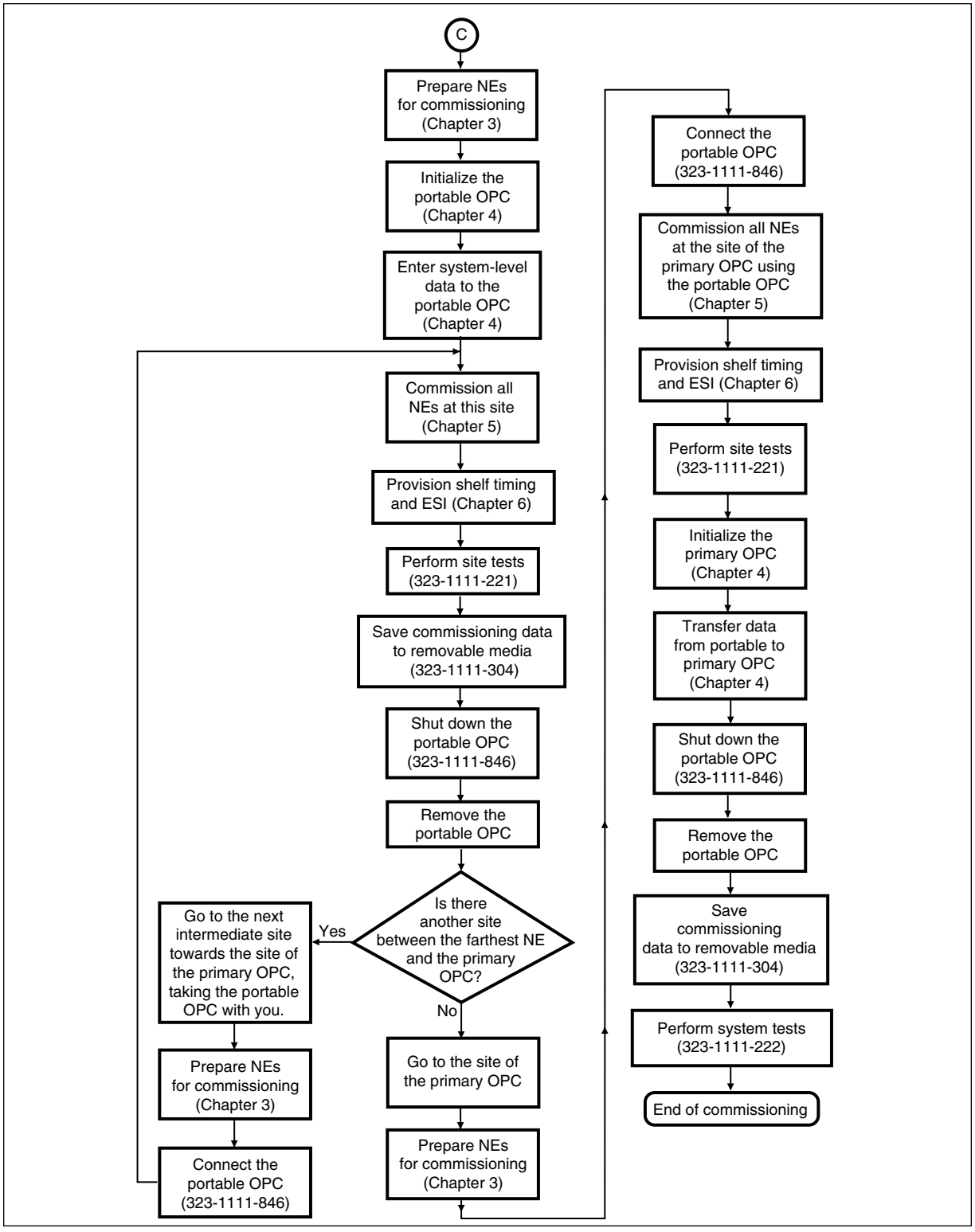


Figure 2-6 (Sheet 5 of 5)
Commissioning and testing flowchart for a linear system

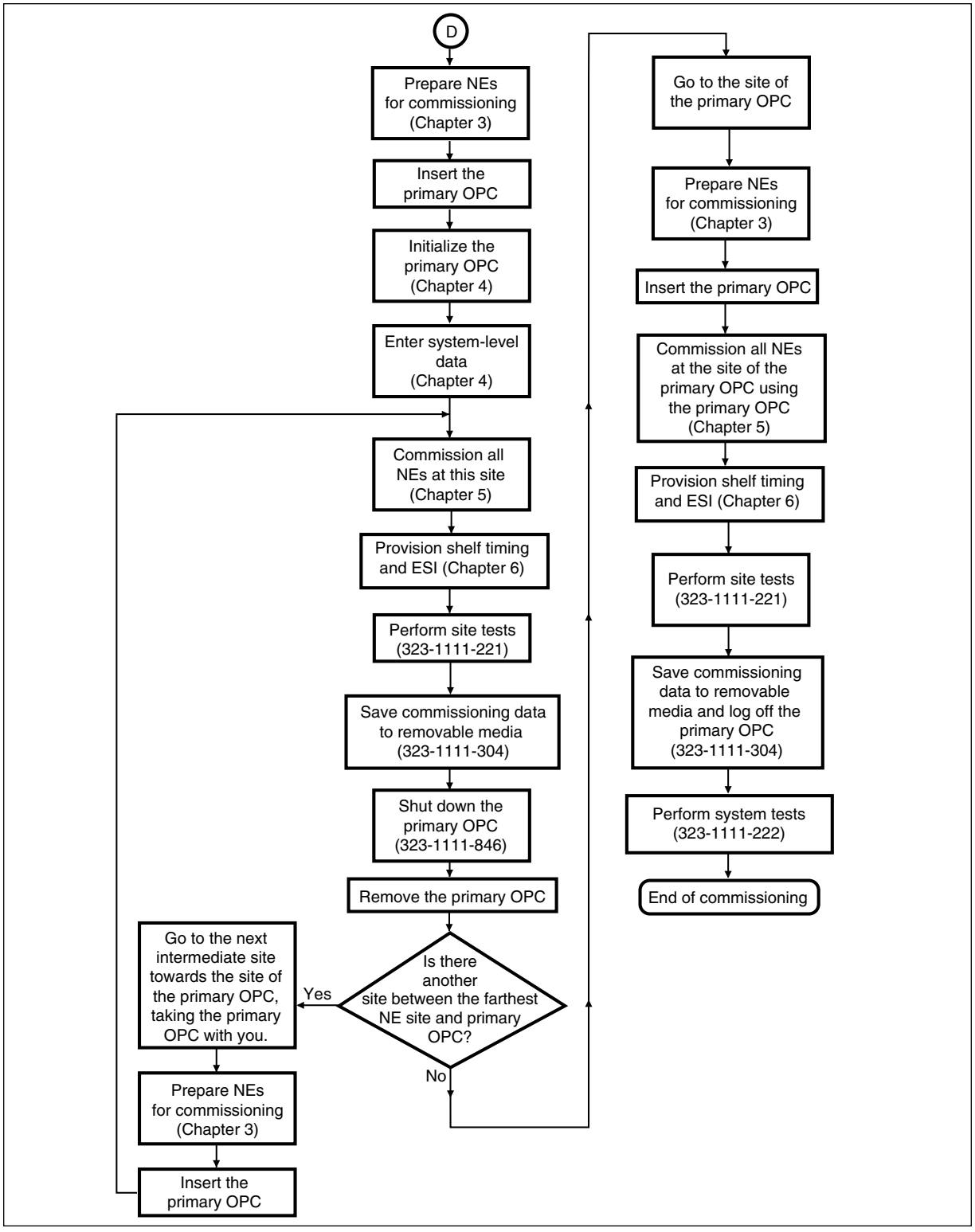


Figure 2-7 (Sheet 1 of 5)
Commissioning and testing flowchart for a BLSR system

FW-2351 (OC12 blsr)

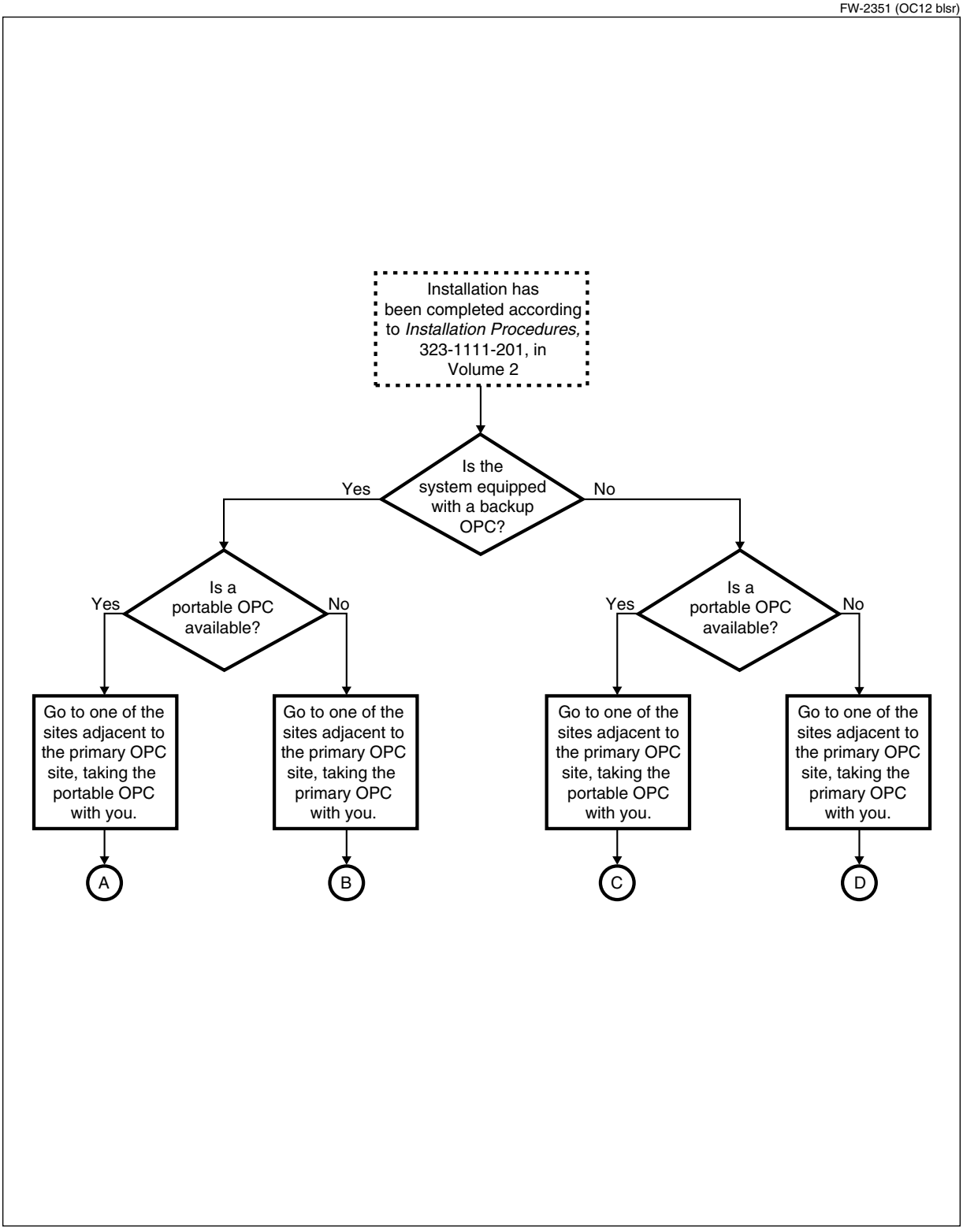
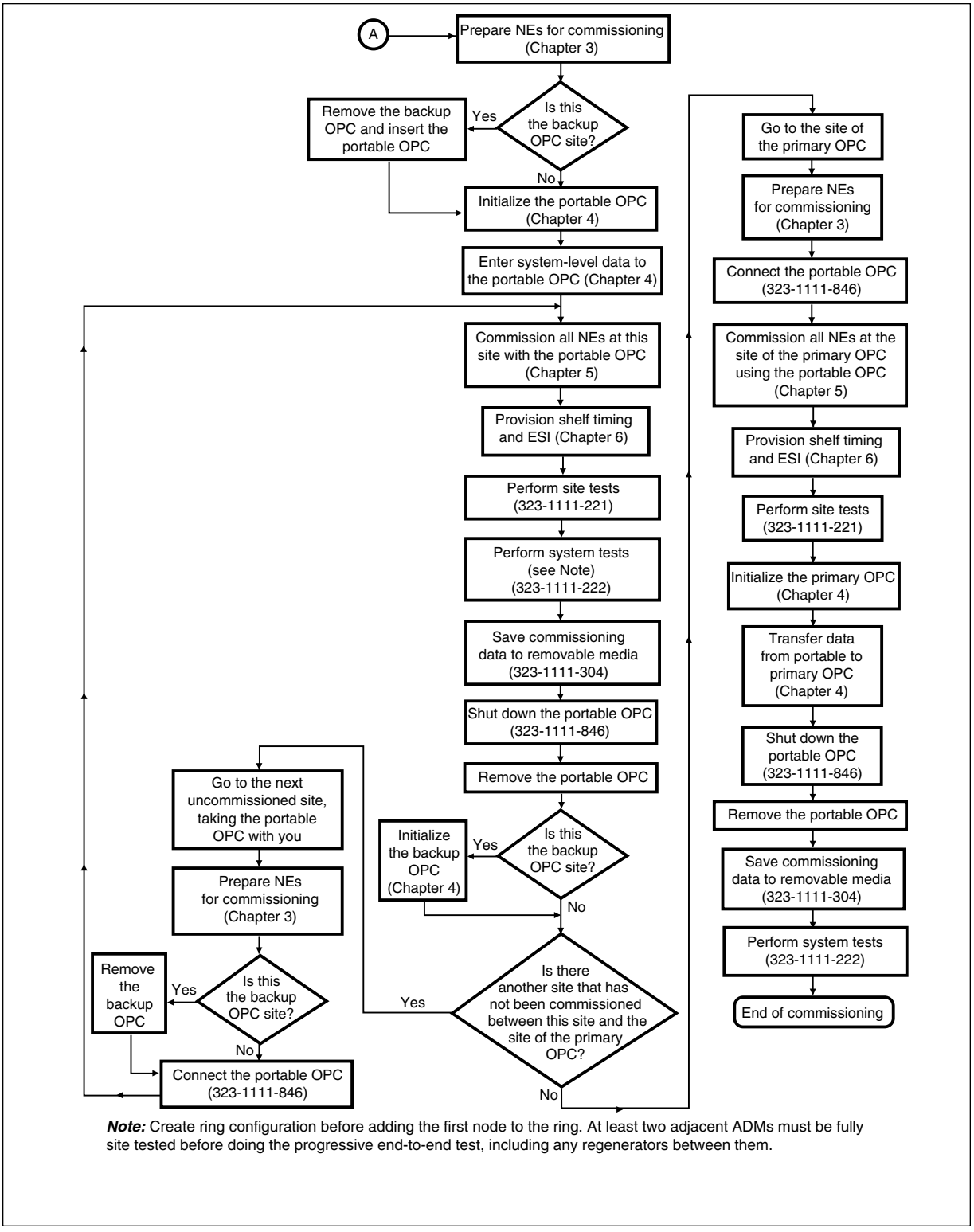


Figure 2-8 (Sheet 2 of 5)
Commissioning and testing flowchart for a BLSR system

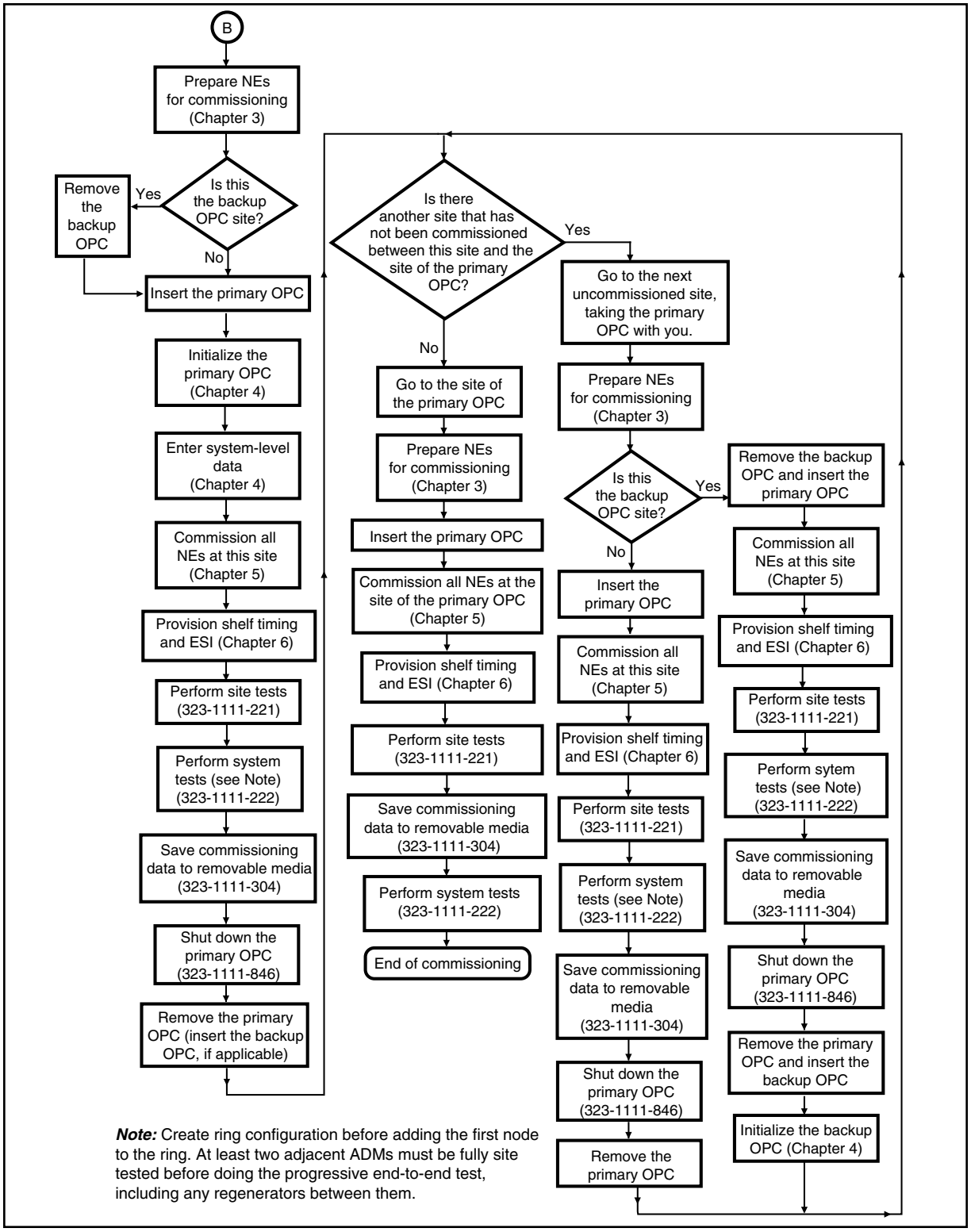
OS.0321



Note: Create ring configuration before adding the first node to the ring. At least two adjacent ADMs must be fully site tested before doing the progressive end-to-end test, including any regenerators between them.

Figure 2-9 (Sheet 3 of 5)
Commissioning and testing flowchart for a BLSR system

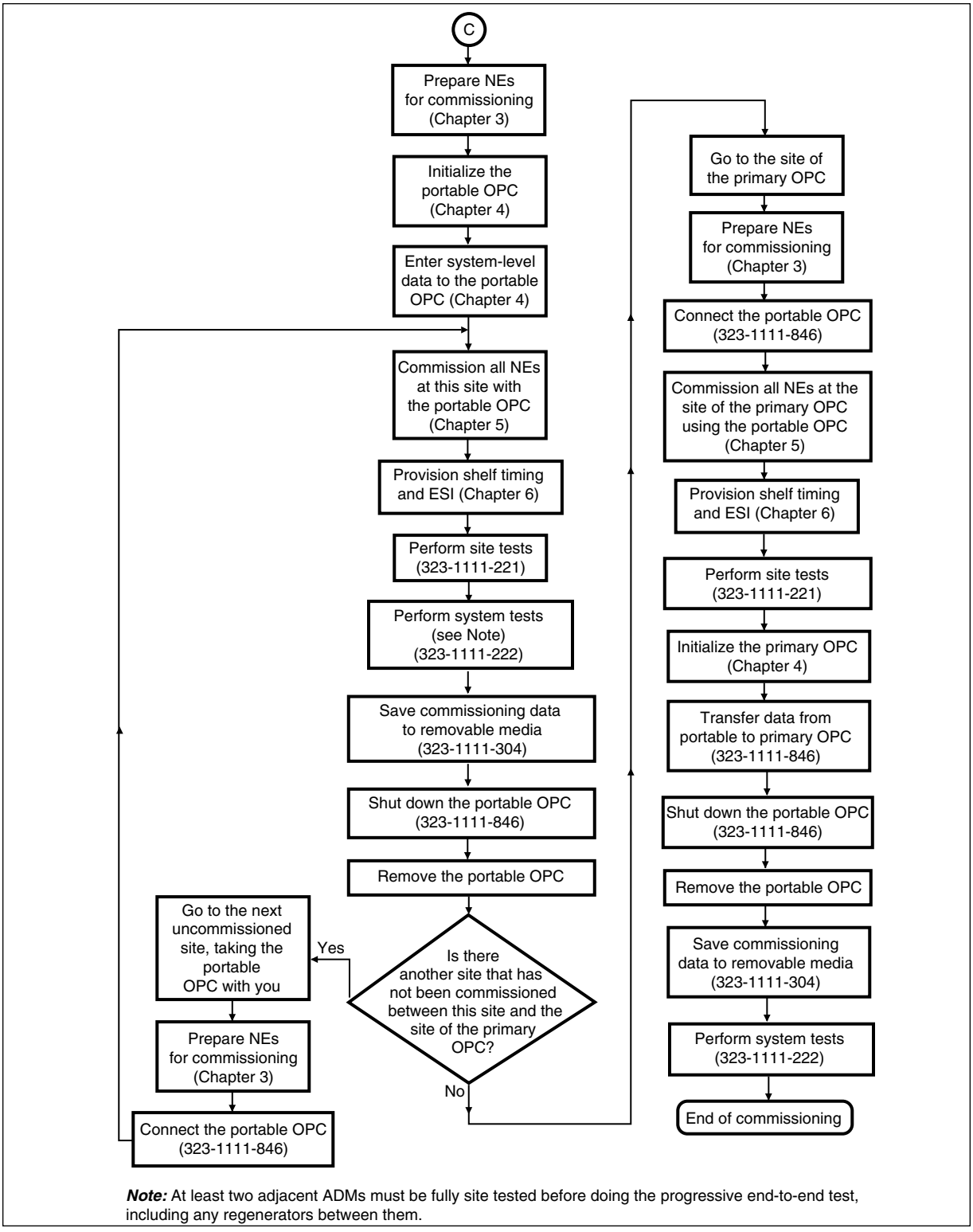
OS.0322



Note: Create ring configuration before adding the first node to the ring. At least two adjacent ADMs must be fully site tested before doing the progressive end-to-end test, including any regenerators between them.

Figure 2-10 (Sheet 4 of 5)
Commissioning and testing flowchart for a BLSR system

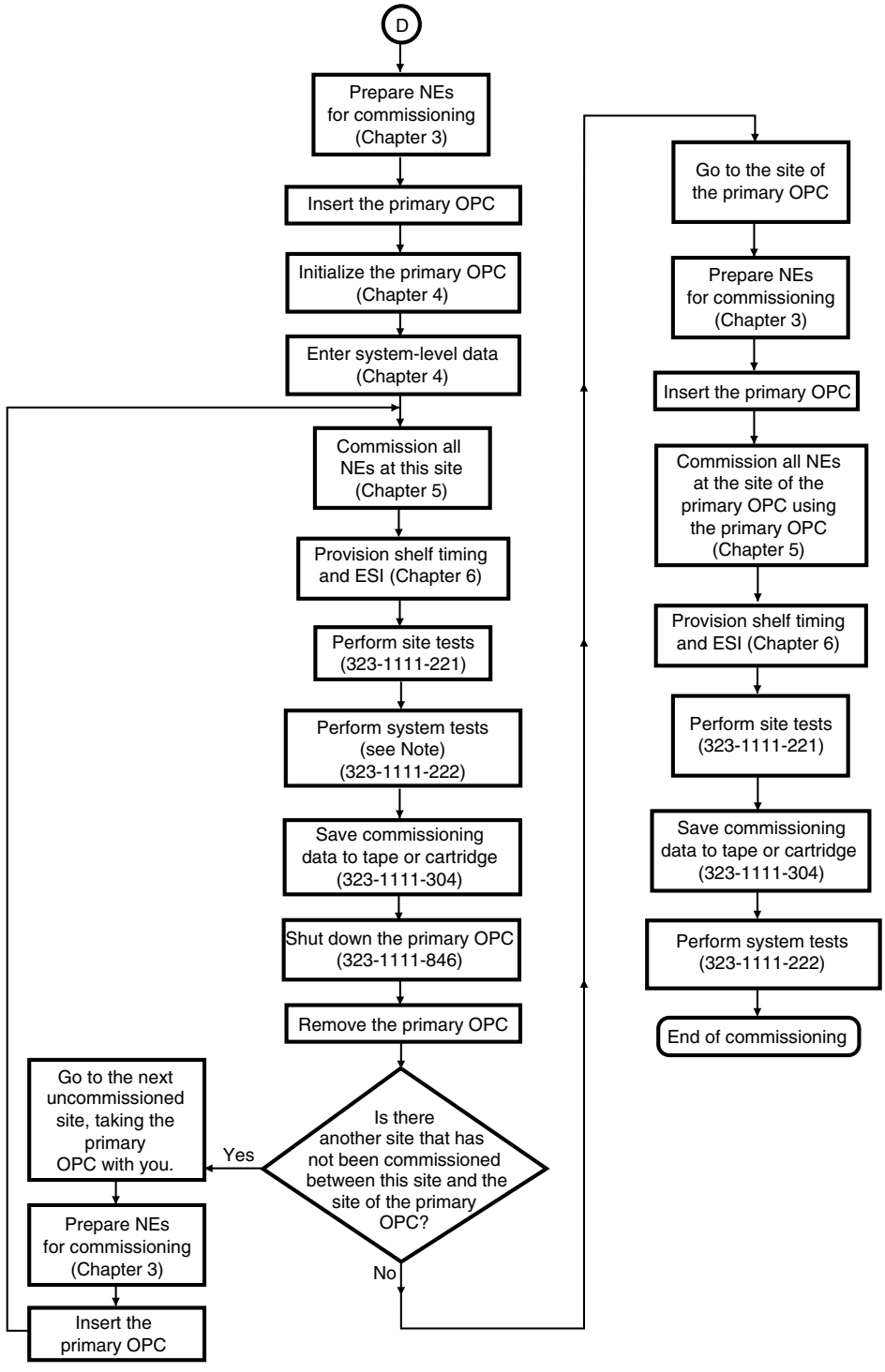
OS.0323



Note: At least two adjacent ADMs must be fully site tested before doing the progressive end-to-end test, including any regenerators between them.

Figure 2-11 (Sheet 5 of 5)
Commissioning and testing flowchart for a BLSR system

OS.0324



Note: At least two adjacent ADMs must be fully site tested before doing the progressive end-to-end test, including any regenerators between them.

Preparing a new network element for commissioning

This chapter contains general information required before starting the site tests. This chapter also includes setup procedures for commissioning and site testing. The procedures shown must be performed on a new network element before any commissioning and initial provisioning.

Requirements

Table 3-1 to Table 3-4 provide the list of required tools and materials to perform the various tests outlined in this document. Table 3-1 shows the test equipment required for tests involving either DS1s, DS3s, or STS-1s on the Transport Bandwidth Manager (TBM) shelf. Table 3-2 lists the additional test equipment that applies specifically to DS1s on a TBM shelf. Table 3-3 and Table 3-4 list the additional test equipment that applies specifically to DS3s and STS-1s on a TBM shelf.

Chapter task list

Follow the task list below to prepare network elements (NEs) for commissioning. Perform the tasks in the order listed. Each task is a procedure that starts on the page number shown in the right column.

Note: Read the warnings and precautions in Chapter 1, “Safety guidelines,” to avoid any risk of injury to personnel and damage to the equipment.

Table 3-1
Test equipment for DS1, DS3 or STS-1

Qty	Equipment	Details	Used for
1	portable operations controller, NT7E24CA	includes a portable case, power supply cord, control network cable (9-pin D-subminiature male connector, both ends, and two control network terminator plugs)	commissioning and software downloading
1	portable OPC user terminal Toshiba T3100SX laptop computer or equivalent	includes a 9-pin female to 9-pin male RS-232C cable, and Crosstalk MARK IV software	commissioning and software downloading
1	network element user terminal, Digital Equipment Corporation VT100 or equivalent	includes a keyboard and display, power supply cord, and RS-232C cable with a 25-pin D-subminiature male connector	many procedures
1	optical power meter Photodyne 12XE, 12XR, or 17XT use 2017 adapter (also 2000 blank cover on 12XE or 12XT) use 2021 adapter (also blank cover on 12XE or 12XT) use 2041 adapter (also blank cover on 12XE or 12XT)	single-mode 1310 or 1310/1550 nm unit, with JFD tuning tool for biconic connectors for FC connectors for ST connectors	optical power tests
2	optical test cords use NT7E46AA or NT7E46BA or NT7E46CA	single-mode, 5 m (16 ft) long with biconic SPA connectors with FC connectors with ST connectors	optical power tests
2	attenuated optical test cords, use NT7E47AA or NT7E47BA or NT7E47CA	single-mode, 25 dB attenuation, 5m (16 ft) with biconic SPA connectors with FC connectors with ST connectors	optical loopback tests
1	variable optical attenuator Hewlett-Packard 8158B	single-mode, 1310/1550 nm, equipped with 2 HP8110 optical test cords with biconic connectors	optical receiver sensitivity test

—continued—

Table 3-1 (continued)
Test equipment for DS1, DS3 or STS-1

Qty	Equipment	Details	Used for
1	digital multimeter Fluke 77 or equivalent		voltage and resistance tests, alarm and telemetry tests
1	TBOS (E2A) test set KS-22828 L1		serial telemetry test
1	Hewlett-Packard transmission test set (VF)	orderwire test set	orderwire tests
2	orderwire test cord NT7E44GA	15-pin D-connector to 24-AWG cable	VF orderwire tests
1	work light	must be approved for use in the equipment area	equipment inspection
1	small insulated slotted screwdriver		inserting circuit packs (ESI, DS1 interfaces, OPC)
1	site test results form	use a copy of the original in Appendix A of 323-1111-221	most tests
—end—			

Table 3-2
Additional test equipment for DS1

Qty	Equipment	Details	Used for
1	DS1 transmission test set, Tau-Tron S5104 (Tx-Rx)	DS1 signal transmitter/receiver	DS1 and optical in-bay tests
2	electrical test cords, P3Q3B	bantam-to-NE-310 connectors, 2m (7 ft)	connection to the DS1 test set
14	electrical test cords	bantam-to-bantam connectors, 1m (3 ft)	DS1 continuity test, at DSX-1

Table 3-3
Additional test equipment for DS3

Qty	Equipment	Details	Used for
1	DS3 transmission test set, Tau-Tron S5200D (Tx)	DS3 signal transmitter	DS3 and optical in-bay tests
1	DS3 receiver test set, Tau-Tron S5200D (Rx)	DS3 signal receiver	DS3 and optical in-bay tests
12	coaxial test cord NE-P2BJ	WECO (NE-358) connector at each end	DS3 continuity test, at DSX-3
12	coaxial test cord	BNC-to-BNC (1 m/3 ft long)	DS3 continuity tests at shelf level
4	coaxial test cord NT3E60AA	BNC-to-WECO (NE-358)	connection to the DS3 test set

Table 3-4
Additional test equipment for STS-1

Qty	Equipment	Details	Used for
1	STS-1 transmission test set, HP37704A SONET test set with a 37776A electrical interface (Tx)	STS-1 signal transmitter	STS-1 and optical in-bay tests
1	STS-1 receiver test set, HP37704A SONET test set with a 37776A electrical interface (Rx)	STS-1 signal receiver	STS-1 and optical in-bay tests
12	coaxial test cord NE-P2BJ	WECO (NE-358) connector at each end	STS-1 continuity test
12	coaxial test cord	BNC-to-BNC (1 m/3 ft long)	STS-1 continuity tests at shelf level
4	coaxial test cord NT3E60AA	BNC-to-WECO (NE-358)	connection to the STS-1 test set

Procedure 3-1
Determining the MAC address from the OPC hardware

Use this procedure to determine the medium access code (MAC) address of an OPC without accessing its UNIX shell. The MAC address is the hardware address of an OPC and is required to assign an Internet Protocol (IP) address to the OPC. The IP address is required to establish an Ethernet local-area network (LAN) connection.

If the OPC is commissioned, you can obtain the MAC address by typing **macaddr** in the UNIX shell.

Requirements

Before starting this procedure, you must:

- ensure that the OPC module is not installed in a shelf, or if it resides in a shelf, that it is not inserted into the backplane connector
- review the safety guidelines at the beginning of this document

CAUTION
Risk of damaging equipment
Avoid touching any components on the printed circuit board. Electrostatic sensitive devices can be damaged by electrostatic discharge. Always ground yourself before handling the circuit pack.

Action

Step	Action
1	Note the risk inherent in performing this procedure.

CAUTION
Risk of data corruption
Never pull out a powered OPC without performing the proper OPC shutdown procedure. See *Common Procedures*, 323-1111-846.

Record the OPC serial number (primary and backup) on the Commissioning Data Record form included at the end of this document. The serial number appears on the main board of each OPC (see Figure 3-1).

Note: This information is also required for Chapter 4, "Setting up the OPC" when verifying the OPC serial number.

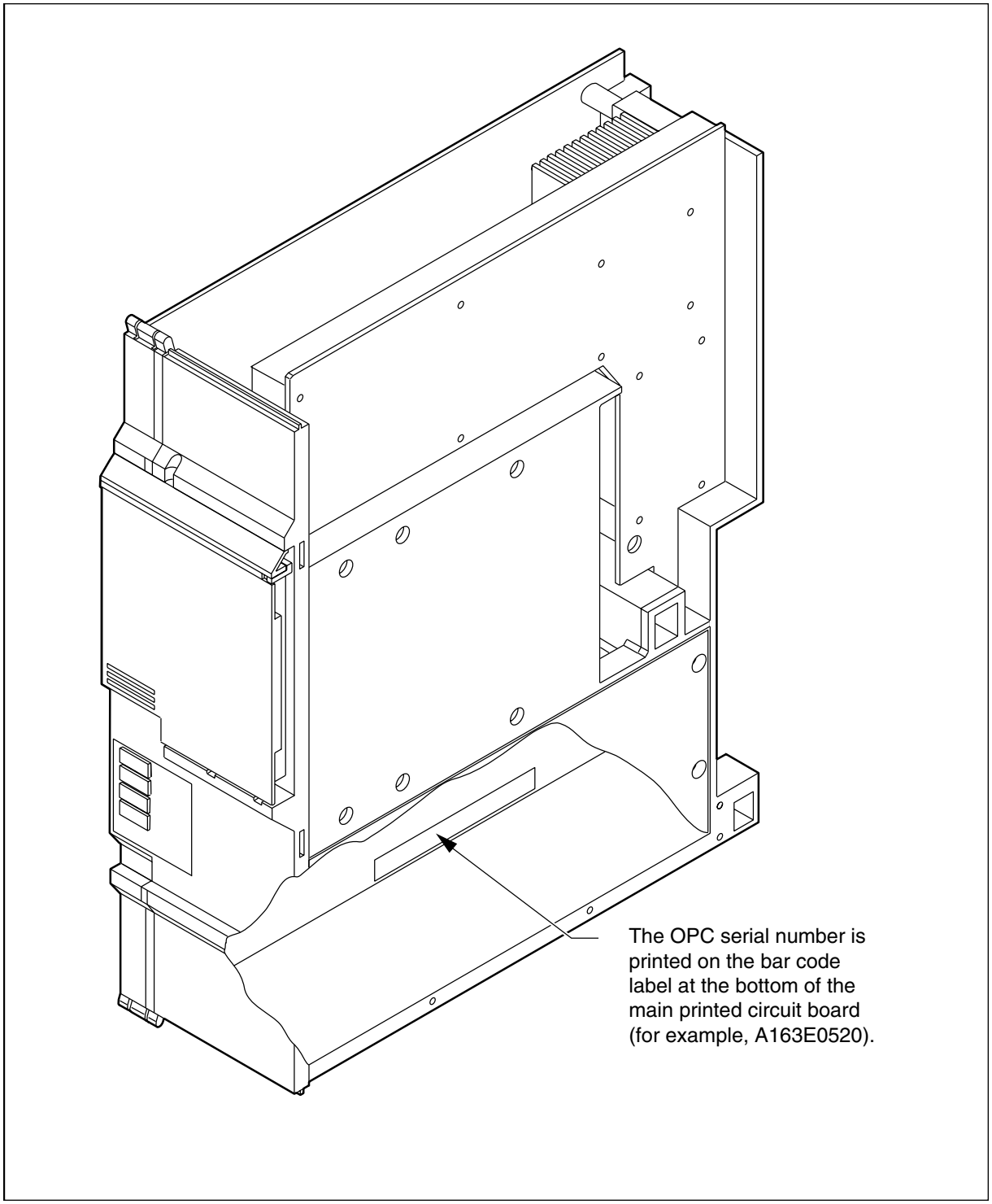
—continued—

Procedure 3-1 (continued)
Determining the MAC address from the OPC hardware

Step	Action
	The OPC serial number has the following format: **An h hhxxxx** where **n** is a positive integer **h** is a hexadecimal number **x** is a hexadecimal number used in the MAC address example: A1 D 000001
2	Determine the MAC address as follows. The MAC address has the following format: **00-00-75-30-xx-xx** where **xx-xx** is the last four digits (least significant) of the OPC serial number (example: 00-01) **—end—**

Figure 3-1
Locating the serial number on the main board of the OPC

FW-2073



Procedure 3-2
Verifying bay and shelf power

Use this procedure to verify the power connections and power cable polarity for a bay and OC-3/OC-12 Transport Bandwidth Manager (TBM) equipment.

> ***Note:*** Ensure that you record the serial numbers for both the primary and backup operations controllers (OPCs) onto the commissioning data record form (found in Appendix A of this document) before the OPCs are inserted into their respective shelves.

Requirements

Before starting this procedure, you must:

- review the safety guidelines in Chapter 1, “Safety guidelines”
- ensure that there are no circuit packs inserted into the backplane connectors of the shelf

Tools and materials

1	digital multimeter (for example, Fluke 77)
1	small insulated slotted screwdriver
as required	cable ties

Action

Step	Action
1	At the breaker interface panel (BIP), ensure that the A and B circuit breakers are OFF.
2	Remove the snap-on breaker interface panel (BIP) cover. Locate the locking screw in the center of the front section of the BIP and using the small slotted screwdriver, release it by turning counterclockwise (see Figure 3-2). Then, swing open the hinged panel.

—continued—

Procedure 3-2 (continued)
Verifying bay and shelf power

Step	Action
3	Measure the voltage and polarity of both the A and B feeds at the BIP power terminal block. Ensure that the digital multimeter meets the required voltage reading as follows and record these values in the site test results form in Appendix A of *Site Testing Procedures*, 323-1111-221.

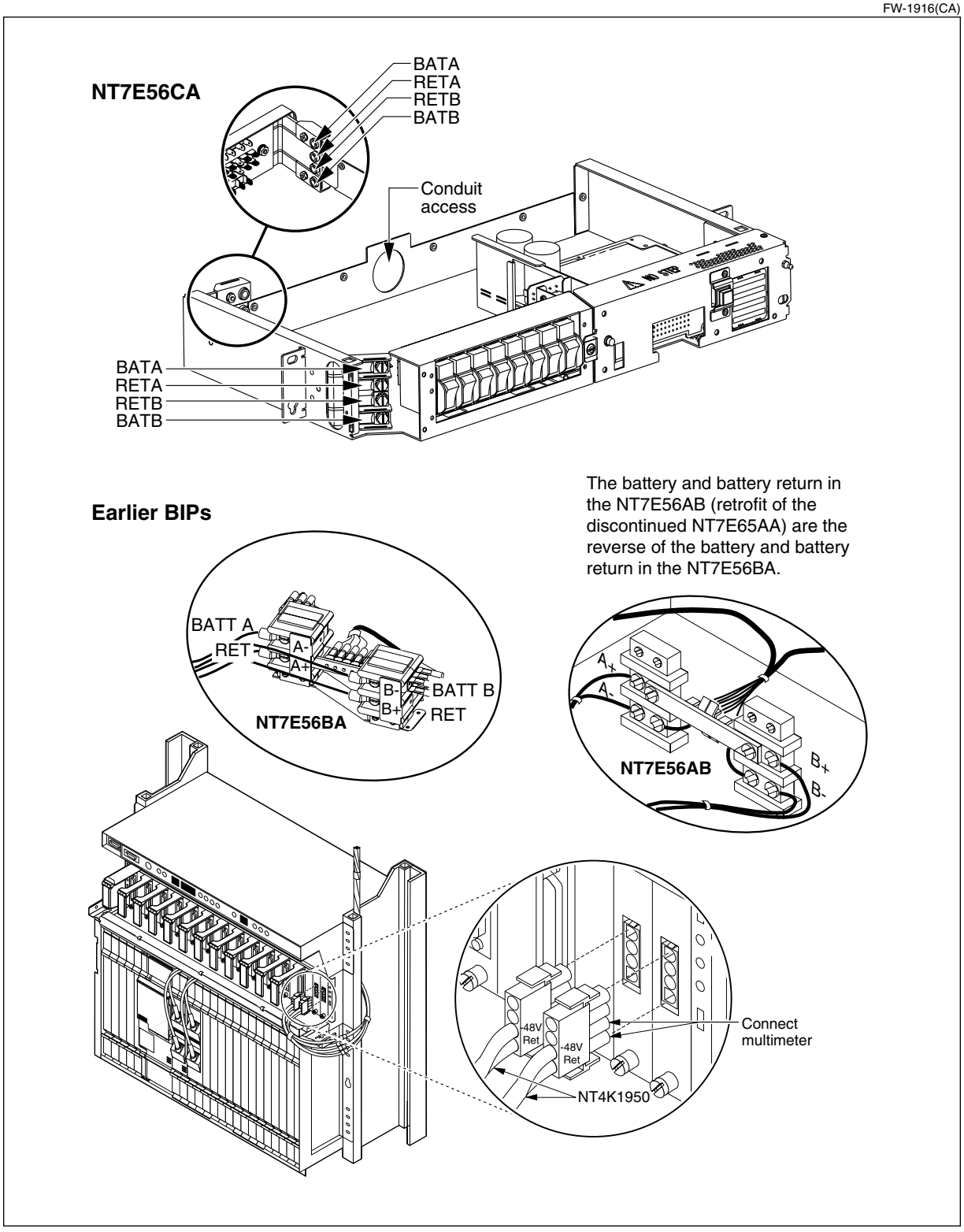
BIP Power terminal blocks	**Required voltage reading**
Across A- and A+	–42 to –56 V
Across B- and B+	–42 to –56 V

4	Set the A and B breakers to ON position. Measure the A and B feeds at the BIP power terminal block and record the measurement in the site test results form in Appendix A of *Site Testing Procedures*, 323-1111-221. The measured voltage must not vary from the measurement taken in step 3.
5	Unplug cable NT4K1950 from both power termination circuit packs (see Figure 3-2). Connect the multimeter between –48V and Ret at each connector in turn, and verify that the voltage measurement at the connectors is consistent with the voltage measured in step 3 and step 4. Record the measurement in the Site testing form in Appendix A of *Site Testing Procedures*, 323-1111-221.
6	Verify that the shelf terminal block polarities match those illustrated in Figure 3-2.
7	Record the serial number of the primary and backup OPC (if equipped) in the commissioning data record form in Appendix A of this document (see Figure 3-1). This information is required later.

—continued—

Figure 3-2
OC-3/OC-12 TBM bay power leads

FW-1916(CA)



Procedure 3-2 (continued)
Verifying bay and shelf power

Step	Action
8	Note the risks inherent in continuing with this procedure.

CAUTION
Risk of damaging circuit packs
Avoid touching any components on the printed circuit board. Electrostatic-sensitive devices can be damaged by electrostatic discharge. Always ground yourself before handling the circuit pack.

CAUTION
Risk of traffic loss
Inserting mappers in slots other than those specified, or configuring a DS1/DS3/STS/1-mix system different from the predetermined configurations listed in *Installation Procedures*, 323-1111-201 results in loss of traffic or in an auto-provisioning alarm.

CAUTION
Risk of problems with software download
The DS1, DS3, and STS/1 circuit packs must be firmly seated and screwed into the appropriate slots. Software downloading problems can occur if the DS1, DS3, or STS-1 circuit packs are not seated properly.

CAUTION
Risk of problems with synchronization
The external synchronization interface (ESI) circuit packs must be firmly seated and screwed into the appropriate slots.

Insert and fully engage each circuit pack into the shelf backplane.

9 Turn the BIP A and B feed circuit breakers OFF.

10 Verify that the circuit breaker trip LED on the BIP is lit.

11 At the battery distribution fuse panel, remove all fuses for the A and B feeds.

12 Install only the main fuse for the A feed. Do not install the indicator fuse.

13 At the BIP, set the A breaker to the ON position.

14 Measure the voltage and polarity of the A feed at the shelf power terminal blocks.

—continued—

Procedure 3-2 (continued)
Verifying bay and shelf power

Step	Action
15	At the battery distribution fuse panel, install the main fuse for the B feed. Do not install the indicator fuse.
16	At the BIP, set the B breaker to the ON position and the A breaker to the OFF position.
17	Measure the voltage and polarity of the B feed at the shelf power terminal blocks.
18	At the BIP, install the indicator fuses for both A and B feeds.
19	Turn ON the BIP circuit breakers for the equipped shelves. Ensure that the fans are operating and that airflow through the equipment is not obstructed. See Figure 3-3 and Figure 3-4 for BIP circuit breaker contacts. Measure the BIP and shelf terminal block loaded voltages. Record the measurement in the Site testing form in Appendix A of *Site Testing Procedures*, 323-1111-221. *loaded voltage = unloaded voltage from step 3 ± 1.25 V.* *Power lamp on the BIP is ON.* *Trip LED on the BIP is OFF.*
20	Turn an unused circuit breaker ON and verify that the trip LED is ON.
21	Turn OFF the unused circuit breaker and verify that the trip LED is OFF.
22	Unused circuit breakers can be left in the ON or OFF position.

If unused circuit breakers are to be left in the	**Then** go to
ON position	step 23
OFF position	step 24

23	Turn all the unused circuit breakers to the ON position. All circuit breakers must now be ON regardless of whether they are used or unused. Go to step 25.
24	Turn all the unused circuit breakers to the OFF position.
25	Verify that the unused circuit breakers have been properly wired for normally closed (ON) or normally open (OFF). See the procedure on connecting the office battery to the BIP and setting the switch in *Installation Procedures*, 323-1111-201.
26	Go to the procedure "Verifying breaker interface panel option settings" on page 3-15.

—end—

Figure 3-3
Circuit breaker contacts—NT7E6AB and NT7E6BA BIP

FW-0408 (TBM)

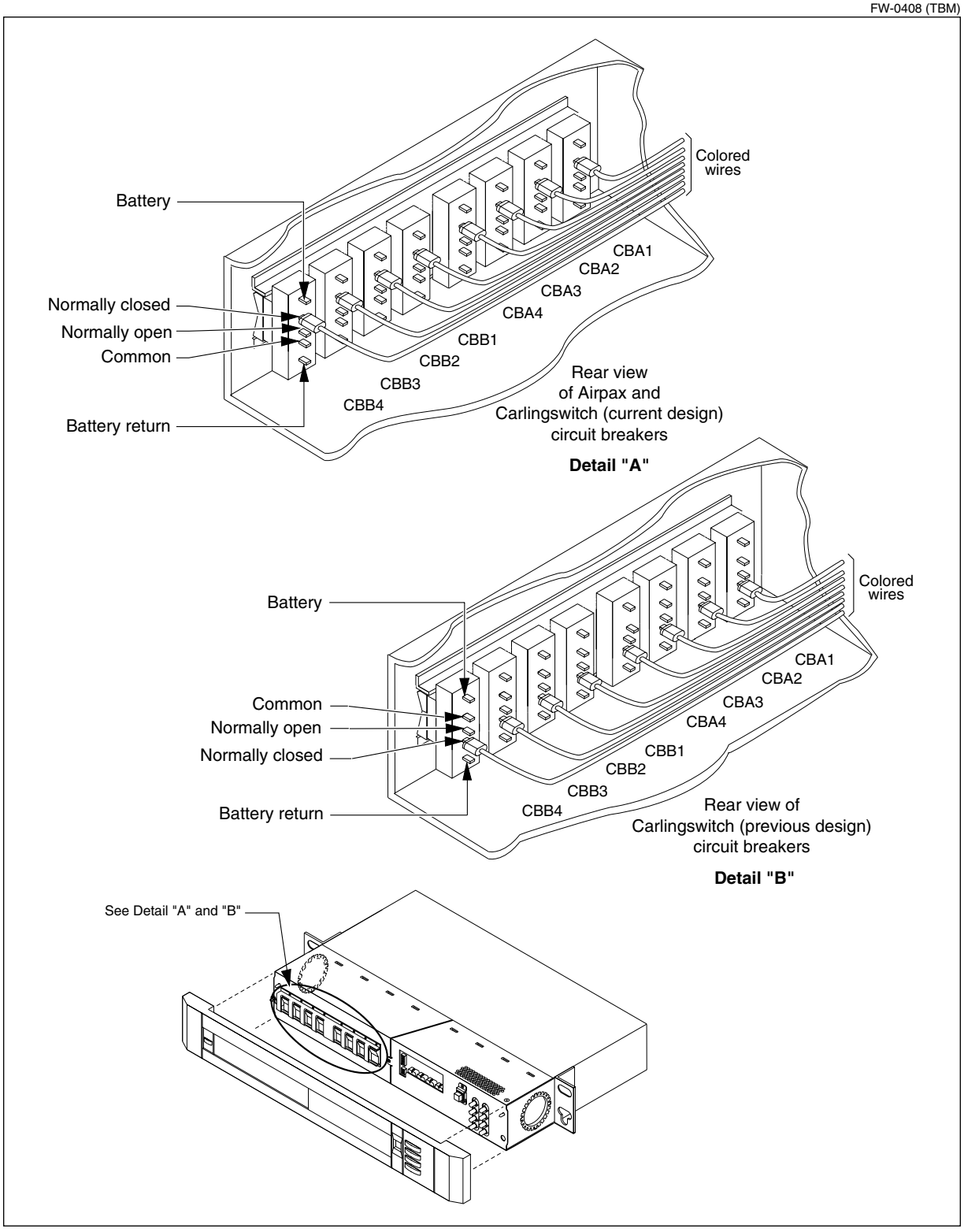
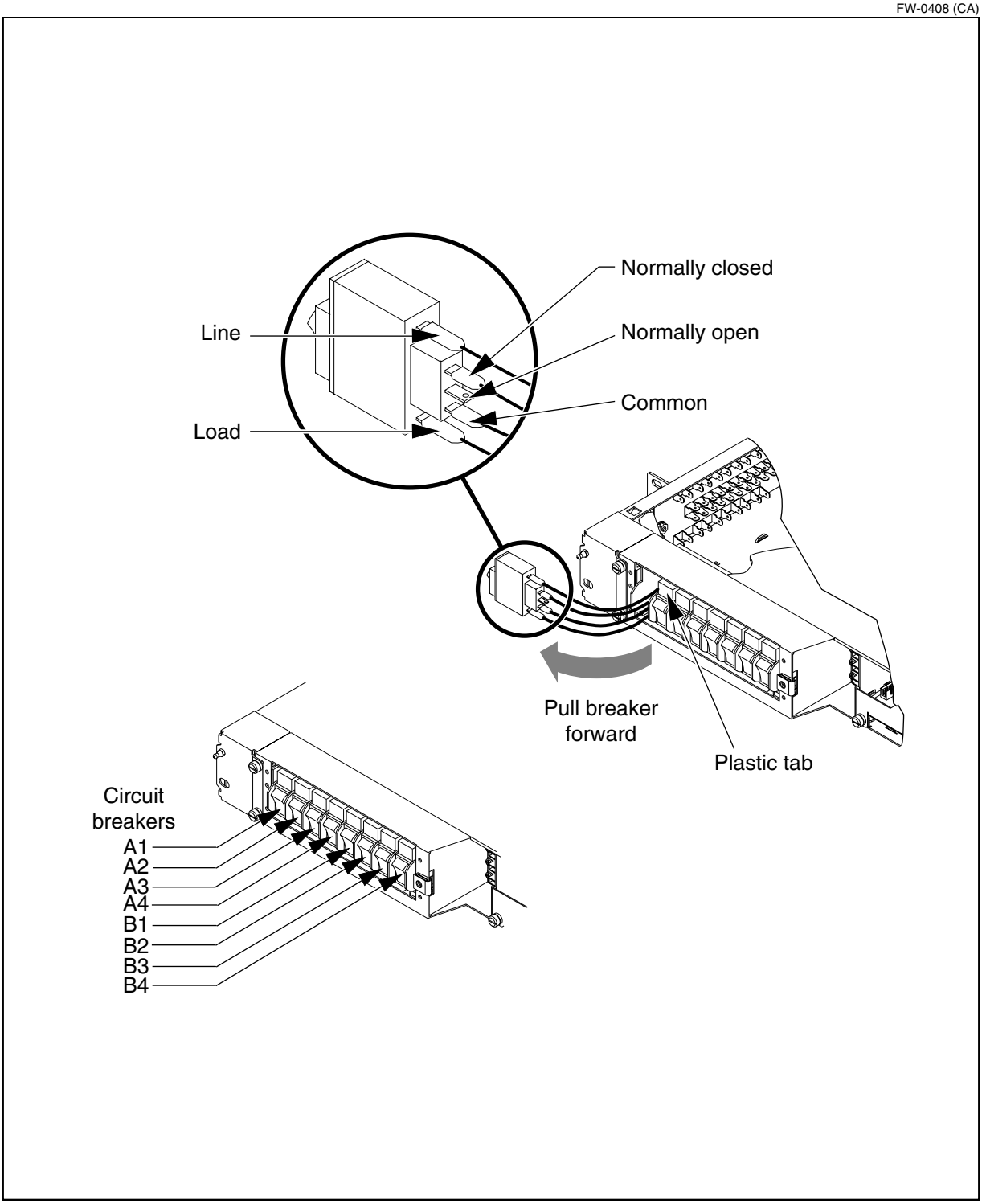


Figure 3-4
Circuit breaker contacts—NT7E56CA BIP

FW-0408 (CA)



Procedure 3-3
Verifying breaker interface panel option settings

Use this procedure to configure the breaker interface panel (BIP) DIP switches, the mini breakers, or the GMT fuses for various OC-3/OC-12 bay configurations.

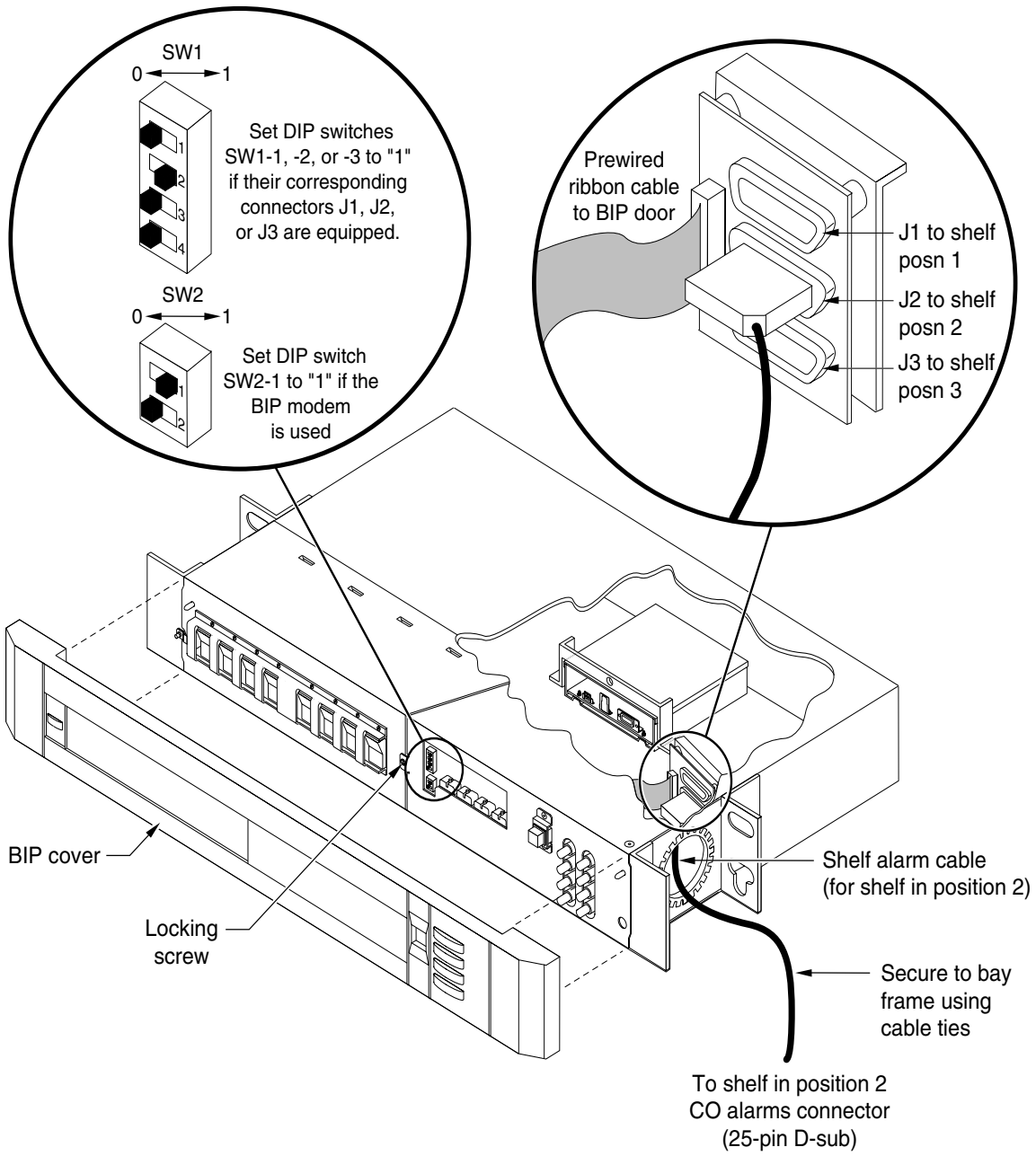
Action

Step	Action
1	Locate DIP switches SW1 and SW2 and the BIP shelf alarm connectors (J1, J2 and J3) (see Figure 3-5). The NT7E56CA BIP does not have SW2 because the modem kit NT7E90BA is self equipped upon installation. The NT7E56CA BIP does not have J2 and J3 because all three shelf alarm cables are combined into one cable.
2	Set switches SW1-1, 1-2, and 1-3 to 1 if their corresponding connectors J1, J2 or J3 are equipped (see Figure 3-6). On the NT7E56CA BIP, set the switches if their corresponding shelves are equipped.
3	Set SW1-4 to 0, unless the audible critical alarm must not be transmitted to the CO office alarms.
4	If the Nortel Networks BIP modem is used, set SW2-1 to 1, otherwise set to 0. SW2-2 is for future use; set it to 0. The maintenance display unit (MDU) is for future use. This is not applicable to the NT7E56CA BIP (see step 1).
5	Set the lamp, modem, maintenance terminal, OEM and BIP circuit breakers and fuses as shown on the bottom right of Figure 3-7 on page 3-18. If the Nortel Networks BIP modem is used, put the modem 2-A breaker in the normally closed (down) position. This is not applicable for the NT7E56CA BIP.
6	Close the BIP hinged cover and fasten it by turning the locking screw clockwise. Replace the snap-on BIP cover.
7	Replace all covers and faceplates.

—end—

Figure 3-5
BIP DIP switches (SW1, SW2) and shelf alarm cables physical location

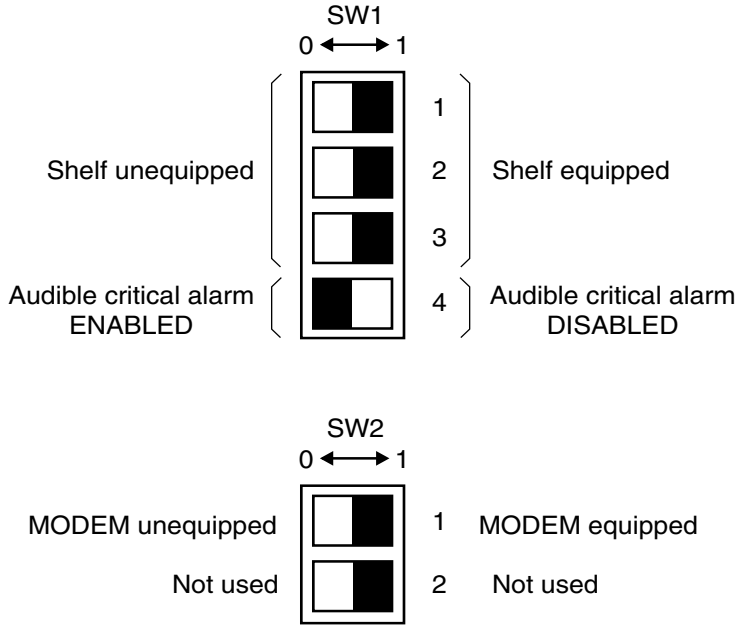
FW-0152 R11



Note: On the NT7E56CA BIP, the SW1 switch is found in the right-hand panel. The SW2 switch does not exist as it is not required.

Figure 3-6
BIP provisionable DIP switches (SW1 and SW2)

FW-2290 (CA)



Note 1: DIP switches are shown in the equipped mode.

Note 2: On the NT7E56CA BIP, the modem is equipped automatically upon connection, and therefore SW2 is not required.

Switch 1

Section	Setting
1	If shelf position #1 is equipped, set to 1, otherwise set to 0.
2	If shelf position #2 is equipped, set to 1, otherwise set to 0.
3	If shelf position #3 is equipped, set to 1, otherwise set to 0.
4	If audible critical alarm is to be transmitted to central office, set to 0, otherwise set to 1.

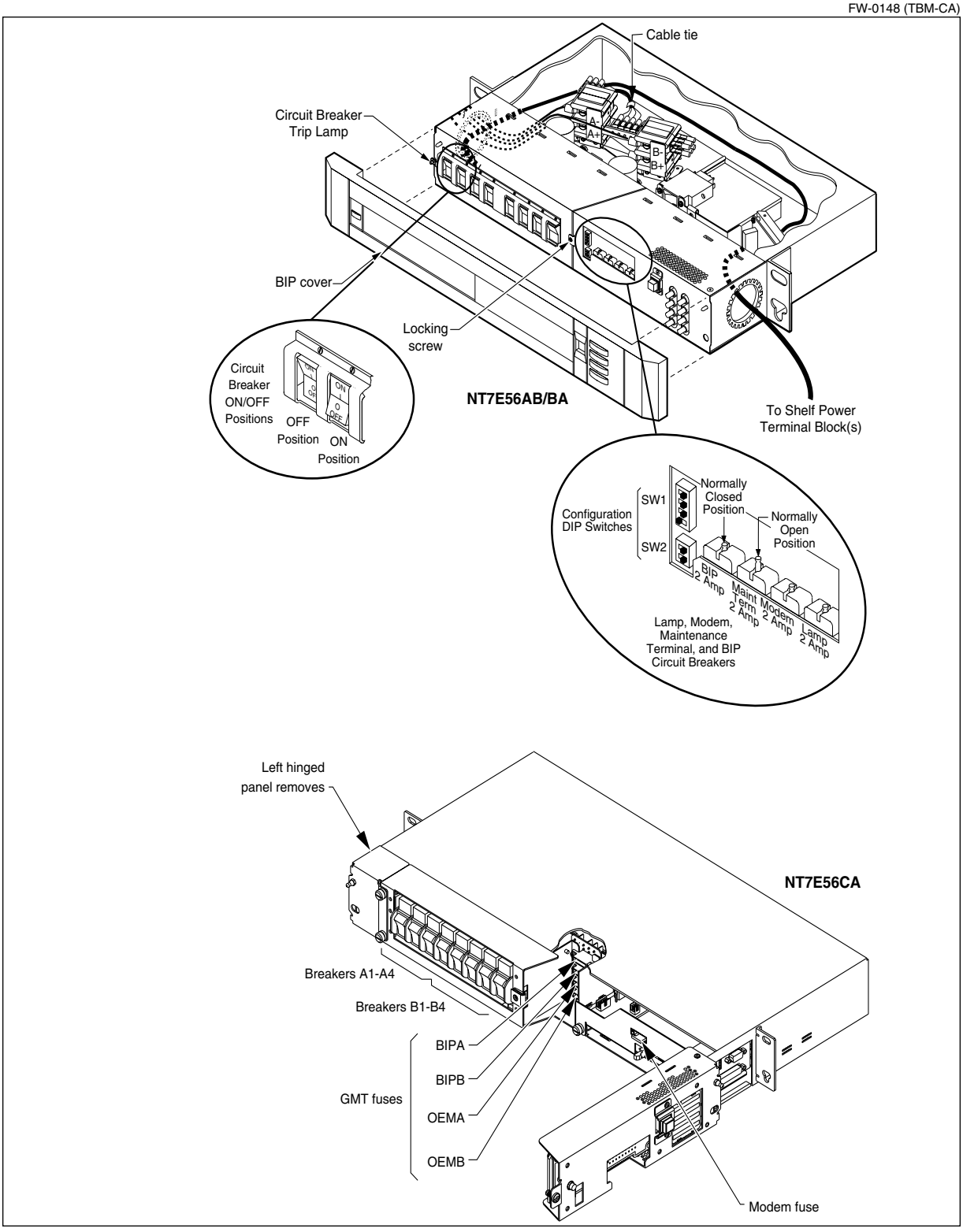
Switch 2

Section	Setting
1	If modem is equipped, set to 1, otherwise set to 0.
2	Not used; set to 0.

Note: The printed circuit board provides a legend to determine the setting of these switches.

Figure 3-7
BIP mini breakers physical location

FW-0148 (TBM-CA)



Setting up the OPC

This chapter provides the procedures required to set up the operations controller (OPC) before commissioning a network element.

> ***Note:*** The OSI Commissioning tool must be closed before opening the OPC Commissioning Manager tool.

Chapter task lists

Users are directed to the following task lists from the system commissioning and testing flowchart in Chapter 2 of this document.

Initializing the primary or backup OPC

Perform the following tasks to initialize the primary or backup OPC.

Task	Reference
Preliminary tasks	
Recording the OPC serial number that appears on the main board of the OPC	Procedure 3-1
Connecting a terminal to an OPC	323-1111-846
Testing an OPC tape or cartridge drive	
Logging in to the OPC	323-1111-846
Saving OPC data to tape or cartridge	323-1111-304
Changing the OPC password	323-1111-846
Retrieving the OPC data from tape or cartridge	323-1111-304
Logging out of the OPC	323-1111-846
Logging in to the OPC using the original password	323-1111-846

—continued—

Task	Reference
Initializing the OPC	
Clearing commissioning data from an OPC	page 4-3
Logging in to the OPC	323-1111-846
Verifying the OPC serial number	page 4-7
Changing the OPC date and time	323-1111-302
Selecting the OPC 1-HZ pulse clock source	page 4-9
—end—	

Initializing the portable OPC

Perform the following tasks to initialize the portable OPC.

Task	Reference
Connecting a terminal to the portable OPC	323-1111-846
Clearing commissioning data from an OPC	page 4-3
Connecting the portable OPC to a network element	323-1111-846
Logging in to the OPC	323-1111-846
Changing the OPC date and time	323-1111-302

Entering system-level data

Perform the following task to enter system-level data.

Task	Reference
Entering system-level data	page 4-12

Transferring data from the portable to the primary OPC

Perform the following task to transfer data from the portable to the primary OPC.

Task	Reference
Transferring data from the portable to the primary OPC	page 4-17

Changing the network ID and system ID

Perform the following task to change the network ID and system ID.

Task	Reference
Changing the Network ID and System ID	page 4-19

Procedure 4-1
Clearing commissioning data from an OPC

Use this procedure to clear the commissioning data from an operations controller (OPC) if it contains data that is not required for your commissioning process (that is, if it contains data from a previous, completed commissioning process).

This procedure is not required for a brand new OPC (or if you know that the OPC does not contain any data). This procedure is required in any other case (for example, if you do not know whether an OPC already has data in it).

Note: If you are going to decommission an OPC or change the OPC name, first check to see if the OPC appears in any access or deny lists in the SONET data communications network. The access and deny lists provide security for customer-owned nodes (see *System Administration Procedures*, 323-1111-302). Before you change the name, you must first remove the original OPC name from all access and deny lists in the network. You cannot remove the OPC from the access and deny lists after it has been decommissioned.

Requirements

Before starting this procedure, you must:

- set up the OPC as specified in the procedure to connect a terminal to an OPC in *Common Procedures*, 323-1111-846
- log in to the OPC with access privileges for the Enable Clear Commissioning Manager tool. For log in instructions and an overview of the OPC user interface, see *Common Procedures*, 323-1111-846.
- read the command conventions described in *Common Procedures*, 323-1111-846

Note: The Enable Clear Commissioning tool is a restricted tool. With the exception of the root user, restricted tools are accessed only by non-default userIDs, such as those assigned to the default techsupport user group. The default techsupport user group includes the Restricted Tools toolset. A non-default userID can be set by the system administrator as described in *System Administration Procedures*, 323-1111-302. If a non-default userID with access privileges for this tool does not exist or is not desired, you must access the tool as the root user.

—continued—

Procedure 4-1 (continued)
Clearing commissioning data from an OPC

Action

Step	Action
1	**If** you logged in to the OPC as — **Then** go to root — step 2 non-default user — step 3
2	At the prompt “opc>”, enter **opcui** ↵ *The User Session Manager appears.*

3	From the User Session Manager, open the Enable Clear Commissioning tool by moving the cursor to the tool name and pressing Ctrl_A (or Keypad 0).
	The following appears:
	`----------`
	`WARNING: This tool can remove the OPC’s addresses from the commissioning files and allow the OPC commissioning data to be cleared. Refer to the NTP procedure for Clearing Commissioning data from an OPC.`
	`1. Display commissioning data`
	`2. Delete Primary OPC`
	`3. Delete Backup OPC`
	`4. Enable Clear Commissioning Data`
	`5. Quit`
	`Enter the number for your selection:`

4	Select “Enable Clear Commissioning Data” by entering: **4** ↵ *A request for confirmation appears.*
5	Confirm by entering: **yes** ↵

6	Verify that you successfully cleared the commissioning data by entering:
	1 ↵
	The following messages appear:
	`No Primary OPC has been commissioned.`
	`No Backup OPCs has been commissioned.`

—continued—

Procedure 4-1 (continued)
Clearing commissioning data from an OPC

Step	Action

7

If	Then
steps 4 and 5 were successful (that is, if the messages shown in step 6 appear)	go to step 8
unsuccessful	go to step 4. If this is your second time at this step, contact your next level of support or your Nortel Networks Support Group

8 Quit the Enable Clear Commissioning tool by entering:

5 ↵

*The **Clear Commissioning Data** button in the Commissioning Manager is now enabled. The User Session Manager appears.*

9 Open the Commissioning Manager tool by moving the cursor to the tool name and pressing Ctrl_A (or Keypad 0).

The Commissioning Manager main window appears.

OS.0455

```
>.  Commissioning Manager (Version #)                          Utilities

System: XXXX                                   OPC Serial Number: A193e3a25

=> 1. [ Clear commissioning data    ♦1]

   2. [ Commission new system       ♦2]

   3. [ Commission new network element     ♦3]

        Commissioned network elements:

        NE      Type        Function        Serial Number    OPC
        57      TBM         Ring ADM        A2 8 0828081
        60      TBM         Ring ADM        A2 3 0841834
        61      TBM         Ring ADM        A2 d 0842433     Primary
        75      TBM         ADM             A2 a 0838743
        76      TBM         Terminal        A2 6 0838882
        78      TBM         Ring ADM        A2 8 0838859     Backup

   4. [ Transfer data to Primary OPC (from SLAT OPC)     ♦4]

   5. [ Transfer data to Backup OPC (from Primary OPC)   ♦5]

  C 0   M 0   m 1   w 2   FailProt 0   Lckt 0   ActProt 0   PrfAlrt 0   16:08
```

10 Tab to the **Clear commissioning data** button and select it by pressing Ctrl_A (or Keypad 0).

A confirmation dialog appears.

—continued—

Procedure 4-1 (continued)
Clearing commissioning data from an OPC

Step	Action
11	Tab to the **Yes** button and select it by pressing Ctrl_A (or Keypad 0). *The confirmation dialog closes and a progress message appears as the OPC commissioning data clearing process starts.* *This operation can take up to 2 minutes to complete.* *The "Commissioning data has been successfully cleared" message appears.*
12	Select the **Done** button by pressing Ctrl_A (or Keypad 0). *The dialog closes, and the arrow (=>) indicator moves to Commission New System.*
13	Close the Commissioning Manager tool by pressing Esc) or do the following: **a.** Display the window menu by pressing Ctrl_L W (or Keypad 6). *The window menu appears.* **b.** Select the **Exit** command by pressing Space (or Keypad 0). *The tool closes and the User Session Manager appears.*
14	Tab to the **Logout** button, and select it by pressing Ctrl_A (or Keypad 0). *A confirmation dialog appears.*
15	Tab to the **Logout** button, and select it by pressing Ctrl_A (or Keypad 0). *The "opc>" prompt appears.*
16	Log out of the OPC by entering: **exit** ↵

—end—

Procedure 4-2
Verifying the OPC serial number

Use this procedure to verify OPC serial numbers.

Requirements

Before starting this procedure, you must:

- write down the OPC serial number obtained in Procedure 3-1. (This serial number should have been recorded on the commissioning data record form at the end of this document.)
- obtain a userID and password that allow you access to the OPC
- read the command conventions described in *Common Procedures*, 323-1111-846
- determine if the OPC has the correct software version (see the procedure in *Network Surveillance Procedures*, 323-1111-510)

Action

Step	Action
1	If you have not already done so, log in to the OPC and open the Commissioning Manager tool. If you do not know how to do this, see the procedures in *Common Procedures*, 323-1111-846.

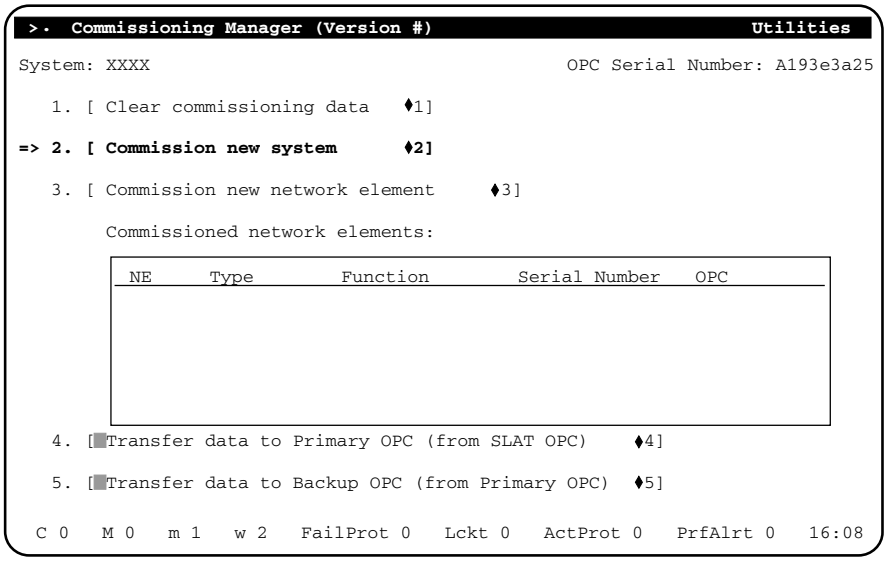
—continued—

Procedure 4-2 (continued)
Verifying the OPC serial number

Step	Action

The Commissioning Manager tool opens and the main window appears.

OS.0444



2 Read the serial number of the OPC you are logged into, as it appears in the upper right corner of the Commissioning Manager main window.

3 Compare the serial number of the OPC obtained from step 2 with that obtained from the bar code label of the main printed circuit board of the OPC. These serial numbers must be identical.

Note: See the commissioning data record form in "Appendix A: Commissioning data record form" in this document for the serial number (from the bar code label).

4 Close the tool by pressing Esc) or do the following:

a. Display the window menu by pressing Ctrl_L W (or Keypad 6).

The window menu appears.

b. Select the **Exit** command by pressing Space (or Keypad 0).

The tool closes and the User Session Manager appears.

—end—

Procedure 4-3
Selecting the OPC 1-HZ pulse clock source

Use this procedure to select the 1-HZ pulse source for the operations controller (OPC) system clock. Use the 1-HZ pulse as the clock source when a more accurate external time source is not available. When the 1-HZ pulse is enabled, the clock source is the 1-HZ pulse. When it is disabled, the clock is driven by its own internal crystal. The local crystal is subject to drift, and is therefore less accurate.

Since the backup OPC is automatically time synchronized by the primary OPC using Network Time Protocol, this procedure can only be performed on a primary OPC that is not being time synchronized by an external time source.

For more information about the OPC Date tool, see *System Administration Procedures*, 323-1111-302.

Requirements

Before starting this procedure, you must:

- obtain the password of a user account with permission to change the OPC time. These accounts include root, slat, and admin for the active OPC, and root or standby for the inactive OPC.
- ensure Network Time Protocol is unconfigured
- read the command conventions described in *Common Procedures*, 323-1111-846

CAUTION
Risk of loss of system surveillance
Do not log out of the OPC while a shutdown is in progress if you are in the Shutdown or Date tool. This action freezes the OPC in manually busy state (MANSBY). To return the OPC to service, reboot using the **/etc/reboot** command.

Action

Step	Action
1	Log in to the OPC and open the OPC Date tool. If you do not know how to do this, see the procedures on logging in to the OPC and opening the OPC date tool in *Common Procedures*, 323-1111-846.

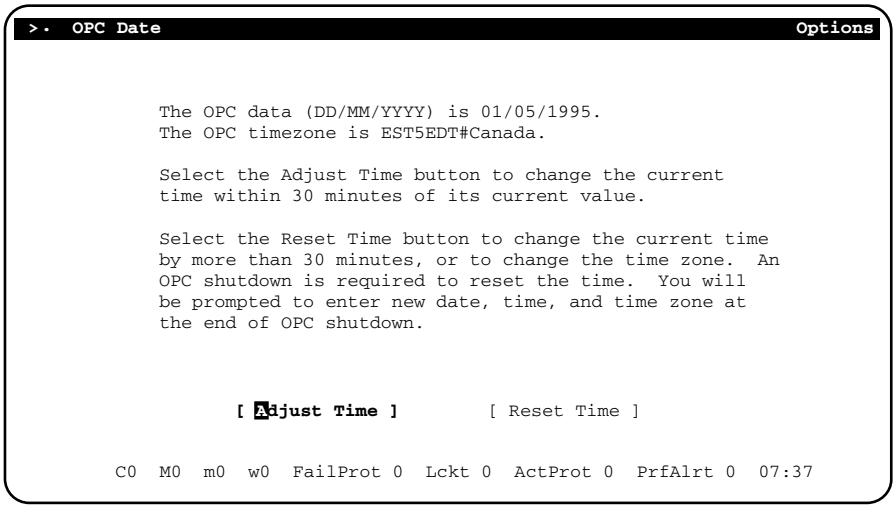
—continued—

Procedure 4-3 (continued)
Selecting the OPC 1-HZ pulse clock source

Step	Action

The OPC Date tool opens and the main window appears.

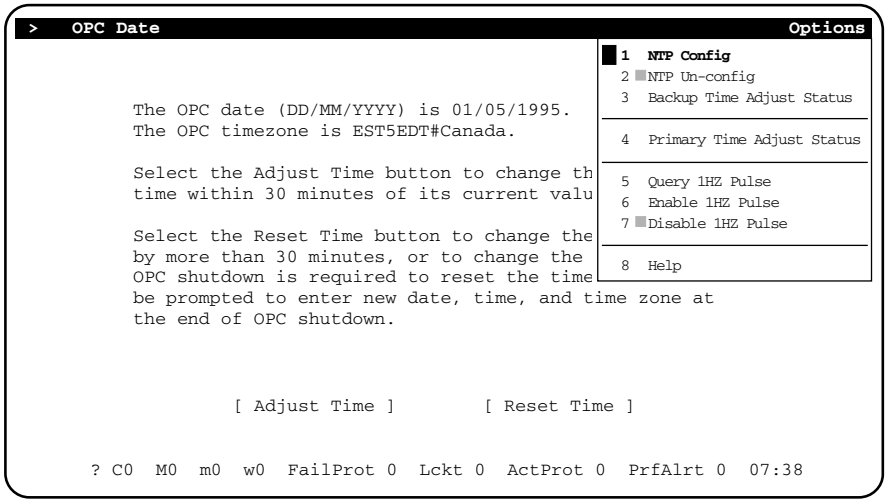
FW-21186



2 Display the Options menu by pressing Ctrl_L T (or Keypad ,).

The Options menu appears.

FW-21820



—continued—

Procedure 4-3 (continued)
Selecting the OPC 1-HZ pulse clock source

Step	Action
3	Use the arrow keys to move to the **Query 1HZ Pulse** command and select it by pressing Space (or Keypad 0). *The 1HZ Query dialog appears indicating whether the 1HZ pulse is enabled or disabled. If the 1HZ pulse is disabled, it must be enabled.*

If the 1 Hz pulse is	**Then** go to
disabled	step 4
enabled	step 7

4	Select the **Done** button by pressing Ctrl_A (or Keypad 0), to remove the dialog. *The dialog closes, and the main window appears.*
5	Press Ctrl_L T (or Keypad,), to redisplay the Options menu. *The Options menu appears.*
6	Use the arrow keys to move to the **Enable 1HZ Pulse** command and select it by pressing Space (or Keypad 0). *The 1HZ pulse becomes the source of the OPC clock. The new enable state of the 1HZ pulse appears.*
7	Select the **Done** button by pressing Ctrl_A (or Keypad 0), to remove the dialog. *The dialog closes, and the main window appears.*
8	Press Esc) to close the tool, or do the following: **a.** Display the window menu by pressing Ctrl_L W (or Keypad 6). *The window menu appears.* **b.** Select the **Exit** command by pressing Space (or Keypad 0). *The tool closes and the User Session Manager appears.*

—end—

Procedure 4-4
Entering system-level data

Use this procedure to enter data about the system before you commission the network elements in it. This procedure can be performed without connecting to any network element.

> ***Note:*** The term "system" refers to your entire S/DMS TransportNode system that is being deployed in your network. The term "span of control" refers to an independently maintained subset of network elements within that system, under the control of a single OPC or OPC pair.

Requirements

Before starting this procedure, you must:

- set up a portable OPC as described in the procedure to connect a terminal to the portable OPC in *Common Procedures*, 323-1111-846
- have a userID and password that allow you access to the OPC
- obtain all system-level data, including the OPC serial numbers. The serial number of an OPC is located at the bottom of the motherboard, on the right side (if you are looking at the faceplate). The serial number of the OPC you are logged into also appears in the upper right corner of the Commissioning Manager tool main window.
- read the command conventions described in *Common Procedures*, 323-1111-846

CAUTION
Risk of affecting data communications
The Commissioning Manager has interactions with the access control feature for the SONET data communications network. If you are changing or removing commissioning data for system identifier, network identifier, OPC or network element name, or network element number, read "Access control to the SONET data communications network" on page 2-11 before you continue with this procedure.

Action

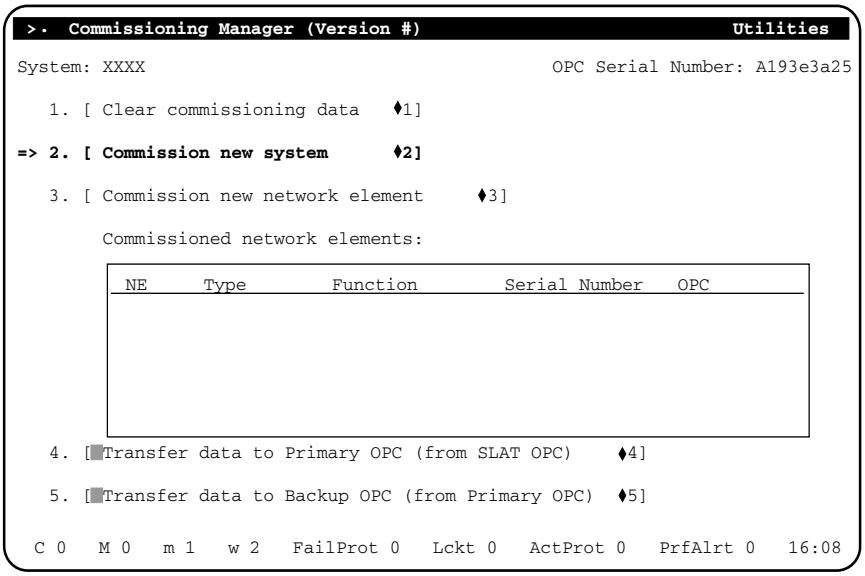
Step	Action
1	Log in to the portable OPC, if available, or the primary OPC if a portable OPC is not available and open the User Session Manager.

—continued—

Procedure 4-4 (continued)
Entering system-level data

Step	Action
	If you do not know how to do this, see the procedure to log in to the OPC in *Common Procedures*, 323-1111-846. *The User Session Manager appears.*
2	If the time on the portable OPC or the primary OPC (indicated on the lower right of the User Session Manager) is not correct, use the OPC Date tool to set it correctly, as described in the procedure on changing the OPC date and time in *System Administration Procedures*, 323-1111-302.
3	Open the Commissioning Manager tool. If you do not know how to do this, see the procedure to open an OPC tool in *Common Procedures*, 323-1111-846. *The Commissioning Manager main window appears.*

OS.0444



4	If the Clear Commissioning Data button is enabled: **a.** Tab to the **Clear Commissioning Data** button, and select it by pressing Ctrl_A (or Keypad 0). *A confirmation dialog appears.* **b.** Tab to the **Yes** button, and select it by pressing Ctrl_A (or Keypad 0). *The confirmation dialog closes and a progress message appears as the OPC commissioning data clearing process starts.* *This operation can take up to 2 minutes to complete.* *The "Commissioning data has been successfully cleared" message appears.*

—continued—

Procedure 4-4 (continued)
Entering system-level data

Step	Action

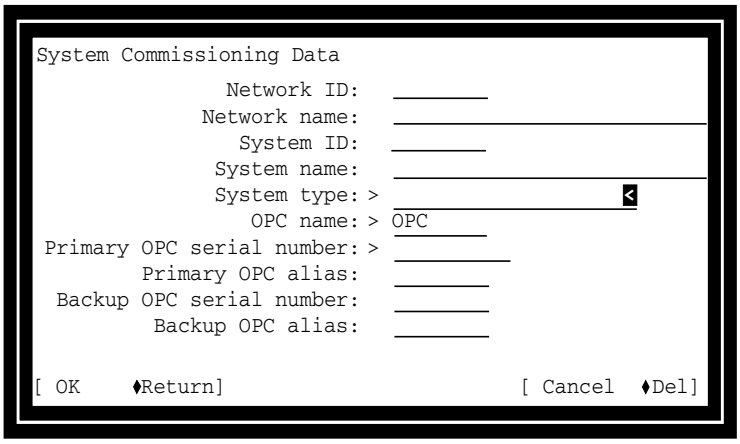
c. Select the **Done** button by pressing Ctrl_A (or Keypad 0).

The dialog closes, and the arrow (=>) indicator moves to Commission New System.

5 Select the **Commission new system** button, by pressing Ctrl_A (or Keypad 0).

The System Commissioning Data dialog appears.

OS.0443



6 Tab to the Network ID field and type in the number that has been assigned to the network, a number from 1 to 65534.

7 If you want to specify a network name, tab to the Network name field, and type in a name up to 32 alphanumeric characters long. (This step is optional.)

8 Tab to the System ID field and type in the number that has been assigned to the system, a number from 1 to 65534.

9 If you want to specify a system name, tab to the System name field, and type in a name up to 32 alphanumeric characters long. (This step is optional.)

10 Tab to the System type field, and press Ctrl_L / (or Keypad 3).

A chooser menu appears, listing the available system types.

11 Move to the appropriate system type, and select it by pressing Space (or Keypad 0).

The chosen system type appears in the System type field.

—continued—

Procedure 4-4 (continued)
Entering system-level data

Step	Action
12	Tab to the OPC Name field, and then type a node name for the primary/backup OPC pair. OPC node names must be unique within the network and have the following format: **OPC<xxxxx>** where <**xxxxx**> is any alphanumeric sequence (up to 5 characters) ***Note 1:*** The OPC appends a letter (**P** or **B**) to the OPC name to identify whether the OPC is the primary (**P**) or the backup (**B**). ***Note 2:*** The node name is displayed by tools such as LISTNODES. ***Note 3:*** The OPC field name should be identical in the Commissioning Manager tool of the primary OPC and in the Commissioning Manager tool of the backup OPC. It is not necessary to enter the OPC name manually into the backup OPC's Commissioning Manager tool; the OPC name is automatically transferred from the primary OPC to the backup OPC at the end of the commissioning process.
13	Tab to the Primary OPC Serial Number field, and type the serial number of the primary OPC. The serial number of a modular OPC is located at the bottom of the mother board, on the right side (from the perspective of looking at the faceplate). The serial number of the OPC you are logged into also appears in the upper right corner of the Commissioning Manager tool main window. **Anhhhhhhh** where **n** is a positive integer **h** is a hexadecimal number. (Example: A143e0bb5) ***Note:*** If the serial number is not accepted, contact your next level of support or your Nortel Networks support group.
14	If you want to specify another name (an alias) for the primary OPC, tab to the Primary OPC Alias field, and type a name up to 9 alphanumeric characters long. (This step is optional: the default alias is the OPC name with P or B [for primary or backup] suffixed.)
15	If the system has a backup OPC, fill in the Backup OPC serial number field, and Backup OPC alias field in the same way as described in step 13 and step 14.
16	Record the system-level commissioning data on the commissioning data record form in "Appendix A: Commissioning data record form" of this document.

—continued—

Procedure 4-4 (continued)
Entering system-level data

Step	Action
17	To complete the entry of system-level commissioning data, tab to the **OK** button, and select it by pressing Ctrl_A (or Keypad 0). *If you select OK, and the information has been correctly entered, the System Commissioning Data dialog closes, and the name of the system being commissioned appears on the first line of the main window. The arrow (=>) indicator in the main window moves to the Commission New Network Element button.* ***Note:*** If any essential data is missing or entered incorrectly, an error dialog explaining the nature of the problem appears. In addition, the System Commissioning Data dialog remains displayed, and each of the fields that needs data, or contains erroneous data, is marked with an "X". Correct the fields marked with an "X" and select OK.
18	If you need to communicate with remote OPCs (OPCs in other spans of control) or to a portable OPC, see the procedure to commission OPCs in other spans of control in *System Testing Procedures*, 323-1111-222. ***Note:*** To use the Software Delivery tool to install network element software loads from the portable OPC, you must commission the portable OPC, using the procedure to commission OPCs in other spans of control, in *System Testing Procedures*, 323-1111-222. **—end—**

Procedure 4-5
Transferring data from the portable to the primary OPC

Use this procedure to transfer commissioning data for a span of control from the portable operations controller (OPC) to the primary OPC, after all the network elements in the span have been commissioned. Data transfer proceeds more quickly when the portable OPC is attached to the primary OPC over CNet (control network). However, you can also transfer data over fiber.

When you use this procedure to transfer data to the primary OPC, all previously existing data on the primary OPC is destroyed. Therefore, you must complete all commissioning procedures that define system or network element data before executing this procedure.

The primary OPC goes out of service during the transfer. Therefore, this procedure must not be used if the primary OPC is in service. A change application procedure (CAP), written specifically to perform a data transfer from the portable OPC to an in-service primary OPC, is available from your Nortel Networks support group.

Requirements

Before starting this procedure, you must:

- obtain a userID and password that allow you access to the primary OPC and use the Commissioning Manager and OPC Shutdown tools
- complete the commissioning of all network elements
- set up the equipment as specified in *Common Procedures*, 323-1111-846 install the primary OPC in its slot, and initialize it
- read the command conventions described in *Common Procedures*, 323-1111-846

Action

Step	Action
1	Log in to the primary OPC, and open the Commissioning Manager tool. If you do not know how to do this, see the procedures in *Common Procedures*, 323-1111-846.

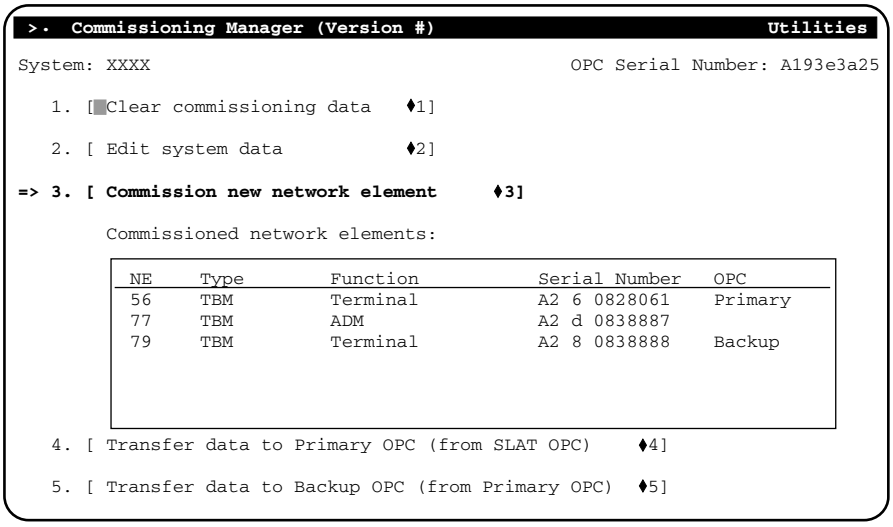
—continued—

Procedure 4-5 (continued)
Transferring data from the portable to the primary OPC

Step	Action

The Commissioning Manager main window appears.

OS.0374



2 Tab to the **Transfer data to Primary OPC** button, and select it by pressing Ctrl_A (or Keypad 0). A confirmation dialog appears.

3 Tab to the **Yes** button, and select it by pressing Ctrl_A (or Keypad 0).

The confirmation dialog closes and the commissioning data is copied from the portable OPC to the primary OPC (this could take several minutes). When the process is completed, a notification dialog appears.

Note: If anything goes wrong with the transfer, use the Event Browser to check for logs describing the problem. For a description of the log, see *Log Report Manual*, 323-1111-840.

4 Select the **Done** button, by pressing Ctrl_A (or Keypad 0).

The notification dialog closes and the main window appears.

5 Close the Commissioning Manager tool by pressing Esc), or do the following:

a. Display the window menu by pressing Ctrl_L W (or Keypad 6).

The window menu appears.

b. Select the **Exit** command by pressing Space (or Keypad 0).

The tool closes and the User Session Manager appears.

—end—

Procedure 4-6
Changing the Network ID and System ID

Use this procedure to change the network ID, system ID, or both the network and system IDs of a network element. The network ID value is identical for all network elements within the span of control (SOC). Also, the system ID value is identical for all network elements within the span of control (SOC).

Before you change any network element's network ID or system ID, you must consider the implications for the span of control for the operations controller (OPC) managing the affected network elements. These considerations are described in the Consolidating OPC spans of control chapter of *System Expansion Procedures* |, 323-1111-224.

The -audit option of the Secure DCC feature command can only update the parameters that change for nodes in the local OPC's span of control. See *System Administration Procedures*, 323-1111-302. These parameters can include the network identifier, system identifier, network element identification number, or the OPC or network element name. If these parameters change for entries in the access control lists of an OPC but the nodes are not in the OPC's span of control, you must remove the entries containing the old parameters and add the new entries using the new parameters. The local OPC cannot obtain the new parameters for nodes not in its span of control.

If you find any situation in which the system does not respond as described in this chapter, contact your next level of support or Nortel Networks (See *About the OC-3/OC-12 NE—TBM Library*, 323-1111-090). Do not try to troubleshoot the system.

Requirements

Before starting this procedure, you must:

- obtain a userID and password that allow you access to the primary OPC and use the Commissioning Manager and OPC Shutdown tools
- read the command conventions described in *Common Procedures*, 323-1111-846
- make sure that the NE ID is unique for all network elements within all configurations that the OPC is provisioned. That is, the network elements must have NE IDs that are unique from the perspective of connection service, irrespective of the configuration or span of control (SOC)
- make sure that the Secure DCC access is allowed from the OPC to the NE if the Secure DCC feature is enabled. Otherwise, the process fails after you have entered the new network and system IDs.

—continued—

Procedure 4-6 (continued)
Changing the Network ID and System ID

Action

Step	Action

1

CAUTION
Risk of service interruption
If you encounter an "Eqp NE DB missing/outdated" alarm, you must perform a manual NE database backup according to *Data Administration Procedures*, 323-1111-304. Otherwise, loss of service can result if there is a reboot with the accompanying autoprovisioning.

2 Log in to the primary OPC and open the Commissioning Manager tool. If you do not know how to do this, see the procedures in *Common Procedures*, 323-1111-846.

The Commissioning Manager main window appears.

OS.0374

```
>.  Commissioning Manager (Version #)                          Utilities

System: XXXX                                    OPC Serial Number: A193e3a25

   1. [ Clear commissioning data    ♦1]

   2. [ Edit system data            ♦2]

=> 3. [ Commission new network element     ♦3]

        Commissioned network elements:

        NE    Type      Function          Serial Number   OPC
        56    TBM       Terminal          A2 6 0828061    Primary
        77    TBM       ADM               A2 d 0838887
        79    TBM       Terminal          A2 8 0838888    Backup

   4. [ Transfer data to Primary OPC (from SLAT OPC)    ♦4]

   5. [ Transfer data to Backup OPC (from Primary OPC)  ♦5]
```

—continued—

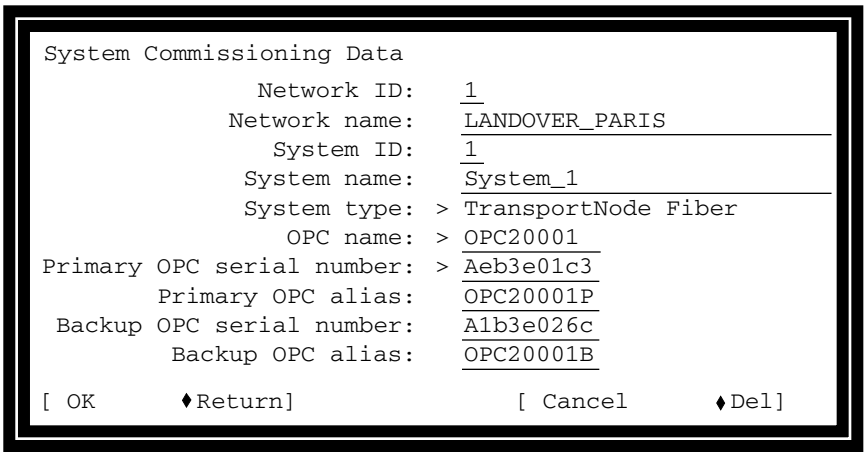
Procedure 4-6 (continued)
Changing the Network ID and System ID

Step	Action

3 Tab to the **Edit system data** button and select it by pressing Ctrl_A (or Keypad 0).

The System Commissioning Data dialog appears.

OS.0713



Note: The Network ID and System ID fields have a default value of 1.

4 Determine if you want to change the network ID, system ID, or both the network ID and system ID.

If you want to change	**Then** go to
only the network ID	step 5
only the system ID	step 8
both the network ID and system ID	step 5

5 Tab to the Network ID field. Use the arrow keys to select the first number on the left and press the **Backspace** key. Continue pressing the **Backspace** key until all the numbers have been removed.

The existing network ID is removed.

6 With the Network ID field selected, enter:

<Network ID>

where

Network ID is a positive integer in the range of **1** to **65534**

The new network ID is added.

—continued—

Procedure 4-6 (continued)
Changing the Network ID and System ID

Step	Action
7	Determine if you want to change only the network ID or both the network ID and system ID. **If** you want to change — **Then** go to only the network ID — step 10 both the network ID and system ID — step 8
8	Tab to the System ID field. Use the arrow keys to select the first number on the left and press the **Backspace** key. Continue pressing the **Backspace** key until all the numbers have been removed. *The existing system ID is removed.*
9	With the System ID field selected, enter: **<System ID>** where **System ID** is a positive integer in the range of **1** to **65534** *The new system ID is added.*
10	To complete the entry to change the network ID, the system ID, or both the network ID and system ID, tab to the **OK** button and select it by pressing Ctrl_A (or Keypad 0). *A warning message appears.*
11	To confirm the message, tab to the **OK** button and select it by pressing Ctrl_A (or Keypad 0). *Another warning message appears.*
12	To confirm the remaining messages, tab to the **OK** button and select it by pressing Ctrl_A (or Keypad 0).
13	Save the system data to tape or cartridge according to *Data Administration Procedures*, 323-1111-304.
14	Perform a Secure DCC audit according to *System Administration Procedures*, 323-1111-302.

—end—

Commissioning a new network element

This chapter provides the procedures required to commission a new S/DMS TransportNode OC-3/OC-12 network element. Commissioning is the set of tasks performed to bring a new network element to steady-state operation. Commissioning is performed only once for each network element.

Chapter task list

Commissioning a network element in a new VTM ring

The following tasks must be performed when commissioning a network element in a new VTM ring. The complete process for commissioning and testing a new ring is illustrated in the set of flowcharts in Chapter 2, "Overview of commissioning and testing".

Task	References
Entering network element commissioning data	page 5-7
Downloading software to a network element	page 5-12
Updating shelf inventory CLEI	page 5-16
Performing a manual network element database backup (Approve command)	page 5-22
Verifying and downloading the firmware load of an OC-12 VTM optical interface circuit pack	page 5-25
Verifying and downloading the firmware load of an STS-1 electrical interface circuit pack	page 5-28
Verifying and downloading the firmware load of the maintenance interface circuit pack	page 5-31
Setting the network element name	page 5-36
Setting the bay frame location ID	page 5-40
Setting the shelf function	page 5-42
Setting the shelf time offset	page 5-44

—continued—

Task	References
Provisioning shelf timing and ESI	Chapter 6
Changing a line build-out (LBO)	323-1111-310
Setting the facility identifier	323-1111-310
Saving commissioning data to tape	323-1111-304
Transferring data from the portable to the primary OPC	page 5-50
—end—	

Commissioning a network element in a new system (configurations other than VTM)

The following tasks are performed (if applicable) when commissioning a new network element in a configuration other than a VTM ring (such as an NWK ring or a linear system).

Task	Reference
Decommissioning a network element	page 5-4
Entering network element commissioning data	page 5-7
Downloading software to a network element	page 5-12
Updating shelf inventory CLEI	page 5-16
Performing a manual network element database backup (Approve command)	page 5-22
Verifying and downloading the firmware load of the maintenance interface circuit pack	page 5-31
Verifying and downloading the firmware load of an STS-1 electrical interface circuit pack	page 5-28
Setting the network element name	page 5-36
Setting the bay frame location ID	page 5-40
Setting the shelf function	page 5-42
Setting the shelf time offset	page 5-44
Provisioning shelf timing and ESI (see Note 1)	Chapter 6
Changing a line build-out (LBO) (see Note 1)	323-1111-310
Setting the facility identifier (see Note 1)	323-1111-310
Changing the route diversity on an OC-12 network element	page 5-46
Changing an OC-3/OC-12 protection switching mode (linear only) (see Note 1)	page 5-48
—continued—	

Task	Reference
Enabling/Disabling the Recover Unidirectional Failure (RUF) software (see Note 2)	323-1111-310
Saving commissioning data to tape	323-1111-304
Transferring data from the portable to the primary OPC	page 5-50
Verifying and downloading the firmware load of an OC-12 ring loopback circuit pack	page 5-52
Note 1: This procedure does not apply to control shelves. ***Note 2:*** This procedure only applies to NWK network elements.	
—end—	

Procedure 5-1
Decommissioning a network element

Use this procedure to decommission a network element (NE) from a span of control.

Requirements

Before starting this procedure, you must:

- obtain a userID and password that allow you access to the OPC and use the commissioning manager tool
- read the command conventions described in *Common Procedures*, 323-1111-846

CAUTION
Risk of affecting data communications
The Commissioning Manager has interactions with the access control feature for the SONET data communications network. If you are changing or removing commissioning data for system identifier, network identifier, OPC or network element name, or network element number, read "Access control to the SONET data communications network" on page 2-11 before you continue with this procedure.

Action

Step	Action
1	Log in to the active OPC, and open the Commissioning Manager tool. If you do not know how to do this, see the procedures to log in to the OPC and to open an OPC tool in *Common Procedures*, 323-1111-846.

—continued—

Procedure 5-1 (continued)
Decommissioning a network element

Step	Action

The Commissioning Manager main window similar to the following appears.

OS.0451

```
>·  Commissioning Manager (Version OC-3/OC-12 REL 14.00)          Utilities

System: XXXX                                      OPC Serial Number:  A193e3a25

   1. [ Clear commissioning data    ♦1]

   2. [ Edit system data            ♦2]

=> 3. [ Commission new network element     ♦3]

        Commissioned network elements:

        NE     Type      Function        Serial Number   OPC
        56     TBM       Terminal        A2 6 0828061    Primary
        77     TBM       ADM             A2 d 0838887
        79     TBM       Terminal        A2 8 0838888    Backup

   4. [ Transfer Full data to Primary OPC (from SLAT OPC)    ♦4]

   5. [ Transfer Full data to Backup OPC (from Primary OPC)  ♦5]
```

2 Tab to the Commissioned network elements list, move to the NE you plan to decommission, and select it, by pressing Ctrl_A (or Keypad 0).

The NE is highlighted.

3 Display the List Item menu by pressing Ctrl_L (or Keypad Enter).

OS.0358

```
>·  Commissioning Manager (Version #)                            Utilities

System: XXXX                                      OPC Serial Number:  A193e3a25

   1. [ Clear commissioning data    ♦1]

   2. [ Edit system data            ♦2]

=> 3. [ Commission new network element     ♦3]

        Commissioned network elements:

        NE   Type      Function     Serial Number   OPC
        35   TBM       Terminal     A2 c 0180004    Primary
        36   TBM       Terminal
                                    1 Edit          ♦(
                                    2 Delete        Del
                                    3 Select        >>
                                    4 Deselect      >>
                                    5 Help          ♦H

   4. [ Transfer data to Primary O                  ♦4]

   5. [ Transfer data to Backup OPC (from Primary OPC)  ♦5]

 C 0   M 0   m 0   w 0   FailProt 0   Lckt 0   ActProt 0   PrfAlrt 0   09:27
```

—continued—

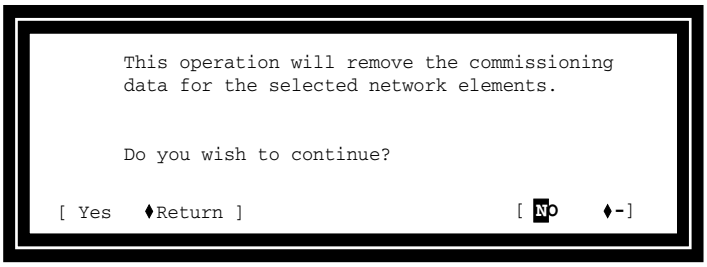
Procedure 5-1 (continued)
Decommissioning a network element

Step	Action

4 Move to the **Delete** command, and select it by pressing Space (or Keypad 0).

A delete network element confirmation dialog appears.

FW-20680



5 Tab to the **Yes** button, and select it by pressing Ctrl_A (or Keypad 0).

The confirmation dialog closes.The NE is decommissioned and removed from the list in the main window.

6 Close the Commissioning Manager tool by pressing Esc) or do the following:

a. Display the window menu by pressing Ctrl_L W (or Keypad 6).

The window menu appears.

b. Select the **Exit** command by pressing Space (or Keypad 0).

The tool closes and the User Session Manager appears.

—end—

Procedure 5-2
Entering network element commissioning data

Use this procedure to commission a network element (NE). The order in which you commission NEs is not critical.

If you are commissioning a new span of control, this procedure can be performed on the portable operations controller (OPC). Data entered for each NE is collected on the portable and then transferred to the primary and backup OPCs. The portable OPC does not need to be attached to the NE. The procedure can be performed at any location. If a portable OPC is not available, this procedure can be performed on the primary OPC. In this case, data entered for each NE is collected on the primary OPC, which is transported from site to site, and then transferred to the backup OPC.

If you are adding an NE to an existing span of control, this procedure is performed on the primary OPC. Commissioning data including the data for the new NE is then transferred to the portable OPC, which is taken to the site of the NE to complete the commissioning process. If a portable OPC is not available, the primary OPC is taken to the site of the NE to complete the commissioning process.

For the assignment of NE numbers, it is recommended that the following guidelines be followed:

- The available NE assignment numbers are from 1 to 65534.
- NE numbers are divided into five groups that are intertoll, metropolitan, territorial, non intertoll, and non metropolitan.
- NE numbers are unique within a planning territory.
- NE numbers are controlled and assigned by the area planner.
- For systems that cross provincial/state borders, the planners/designers in each province/state develop unique NE numbering for current and future growth.
- Where practical, NE numbers are assigned sequentially to a system from west to east.

—continued—

Procedure 5-2 (continued)
Entering network element commissioning data

Requirements

Before starting this procedure, you must:

- ensure that the new NE is assigned a unique NE number (from 1 to 65534). It is important to plan expected future system expansion to accommodate this numbering requirement, since connection by CNet or STS links can bridge subnetworks. All NEs in the combined network must be uniquely numbered.
- set up the portable OPC (if using a portable OPC in the commissioning process) at the NE site. Follow the procedures to connect a terminal to the portable OPC and to connect the portable OPC to a network element in *Common Procedures*, 323-1111-846.
- complete the entry of system-level data, as specified in the procedure Entering system-level data on page 4-12
- have a userID and password that allow you access to the OPC
- obtain the NE serial number
- read the command conventions for the type of interface you are using (CMT or graphical) described in *Common Procedures*, 323-1111-846

CAUTION
Risk of affecting data communications
The Commissioning Manager has interactions with the access control feature for the SONET data communications network. If you are changing or removing commissioning data for system identifier, network identifier, OPC or network element name, or network element number, read "Access control to the SONET data communications network" on page 2-11 before you continue with this procedure.

Action

Step	Action
1	Log in to the portable OPC (or the primary OPC, if a portable OPC is not available), and open the Commissioning Manager tool. If you do not know how to do this, see the procedures in *Common Procedures*, 323-1111-846.

—continued—

Procedure 5-2 (continued)
Entering network element commissioning data

Step	Action

The Commissioning Manager main window similar to the following appears.

OS.0451

```
 >.  Commissioning Manager (Version OC-3/OC-12 REL 14.00)          Utilities

System: XXXX                                      OPC Serial Number:  A193e3a25

   1. [ Clear commissioning data   ♦1]

   2. [ Edit system data           ♦2]

=> 3. [ Commission new network element     ♦3]

        Commissioned network elements:

        NE     Type        Function         Serial Number   OPC
        56     TBM         Terminal         A2 6 0828061    Primary
        77     TBM         ADM              A2 d 0838887
        79     TBM         Terminal         A2 8 0838888    Backup

   4. [ Transfer Full data to Primary OPC (from SLAT OPC)    ♦4]

   5. [ Transfer Full data to Backup OPC (from Primary OPC)  ♦5]
```

2 Select the **Commission new network element** button by pressing Ctrl_A (or Keypad 0).

The Network Element Commissioning Data dialog appears.

OS.0492

```
Network Element Commissioning Data

 Network Element Number: >
            Shelf type: >
        Shelf function: >
     Transmission rate:
 Hardware configuration:
    Shelf serial number: >
       Software release: >  OC-3/OC-12 REL XXXX

This network element contains: (♦) no OPC
                               ( ) Primary OPC
                               ( ) Backup OPC

[OK  ♦Return]                    [Cancel  ♦Del]
```

3 In the Network element number field, type a number (1 to 65534) that is unique within this network. This number must be assigned according to the NE numbering plan for this network.

4 Tab to the Shelf type field, and display the chooser menu attached to this field by pressing Ctrl_L / (or Keypad 3).

The chooser menu appears.

—continued—

Procedure 5-2 (continued)
Entering network element commissioning data

Step	Action
5	Move to the appropriate shelf type, and select it by pressing Space (or Keypad 0). *The chosen shelf type appears in the field.*
6	Tab to the Shelf function field, and display the chooser menu attached to this field by pressing Ctrl_L / (or Keypad 3). *The chooser menu appears.*
7	Move to the appropriate shelf function (regenerator, terminal, ADM or rIng ADM), and select it by pressing Space (or Keypad 0). *The chosen shelf function appears in the field.*
8	Tab to the Transmission rate field, and display the chooser menu attached to this field by pressing Ctrl_L / (or Keypad 3). *The chooser menu appears.*
9	Move to the appropriate rate (OC-3 or OC-12), and select it by pressing Space (or Keypad 0). ***Note:*** A ring ADM requires the OC12 transmission rate. *The chosen rate appears in the field.*
10	If the NE is a TBM ring ADM with a transmission rate of OC-12, **a.** Tab to the Hardware configuration field and display the chooser menu by pressing Ctrl_L / (or Keypad 3). *The chooser menu appears.* **b.** Move to the appropriate hardware configuration and select it by pressing Space (or Keypad 0). *The chosen hardware configuration appears in the field.*
11	Tab to the Shelf serial number field, and type the shelf serial number. This number appears in a bar code on the shelf frame. The format of the serial number is An c hhhhhhh, where n is 2 or 3, c is a checksum, and h is a hexadecimal number (Example: A2 C 0200001) ***Note:*** If this serial number is not accepted, contact your next level of support or your Nortel Networks support group.
12	If the NE contains the backup OPC: **a.** Tab to the field containing the three OPC radio buttons. **b.** Move to the **Backup OPC** button, and select it by pressing Ctrl_A (or Keypad 0). *A mark appears between the brackets beside backup OPC, and the button is disabled for the commissioning of subsequent NEs.*

—continued—

Procedure 5-2 (continued)
Entering network element commissioning data

Step	Action
13	If the NE contains the primary OPC: **a.** Tab to the field containing the three OPC buttons. **b.** Move to the **Primary OPC** button, and select it by pressing Ctrl_A (or Keypad 0). *A mark appears between the brackets beside Primary OPC, and the button is disabled for the commissioning of subsequent NEs.*
14	Record all commissioning data for this NE on the commissioning data record form in Appendix A of this document.
15	To complete the entry of commissioning data for this NE, tab to the **OK** button, and select it by pressing Ctrl_A (or Keypad 0). *If you select OK, and the information has been correctly entered, the dialog closes. The NE is added to the list in the main window.* ***Note 1:*** If any essential data is missing or entered incorrectly, an error dialog explaining the nature of the problem appears. In addition, the Network Element Commissioning Data dialog remains displayed, and each of the fields that needs data, or contains erroneous data, is marked with an "X". ***Note 2:*** If you are not commissioning a new system but are commissioning a system in which the fibers are already connected, you should perform a datasync on the commissioning information entered. See the procedure on transferring data from the primary to the backup OPC *System Testing Procedures*, 323-1111-222.
16	Press Ctrl_T 0 to return to the User Session Manager. *The Commissioning Manager window closes, but the tool remains open, ready for future use.* **—end—**

Procedure 5-3
Downloading software to a network element

Use this procedure to supply a network element with its software load. If a portable OPC is being used to download software, it must be attached to the network element to perform this procedure. If the primary OPC is being used to download software, it must be placed into the slots reserved for the OPC in the shelf. The order in which you commission network elements is not critical. You might decide to work from the site of the primary OPC to the site of the backup OPC; or your choice might be determined by installation progress at the various sites.

> ***Note:*** It is important to disconnect the portable OPC from the network as soon as this procedure is completed. If left attached, the portable can be accessed by a network element that is performing a database backup. Database backups must be serviced by the active primary (or backup) OPC.

After software is downloaded, the network element automatically downloads firmware to STS-1, VTM and ring Loopback circuit packs (if they are present). While these downloads are in progress, the "Automatic firmware download in progress" alarms are active.

Requirements

Before starting this procedure, you must:

- obtain a userID and password that allows you access to the OPC and use the Reboot/Load Manager tool
- complete the entry of system level data as specified in the procedure Entering system-level data on page 4-12
- commission the portable OPC, using the procedure to commission OPCs in other spans of control in *System Testing Procedures*, 323-1111-222
- complete the entry of network element commissioning and configuration data as specified in the procedure Entering network element commissioning data on page 5-7
- go to the network element site
- if you are using a portable OPC in the commissioning process, set it up at the network element site. Follow the procedures to connect a terminal to the portable OPC and to connect the portable OPC to a network element in *Common Procedures*, 323-1111-846.
- read the command conventions for the type of interface you are using (CMT) or graphical) in *Common Procedures*, 323-1111-846

—continued—

Procedure 5-3 (continued)
Downloading software to a network element

Action

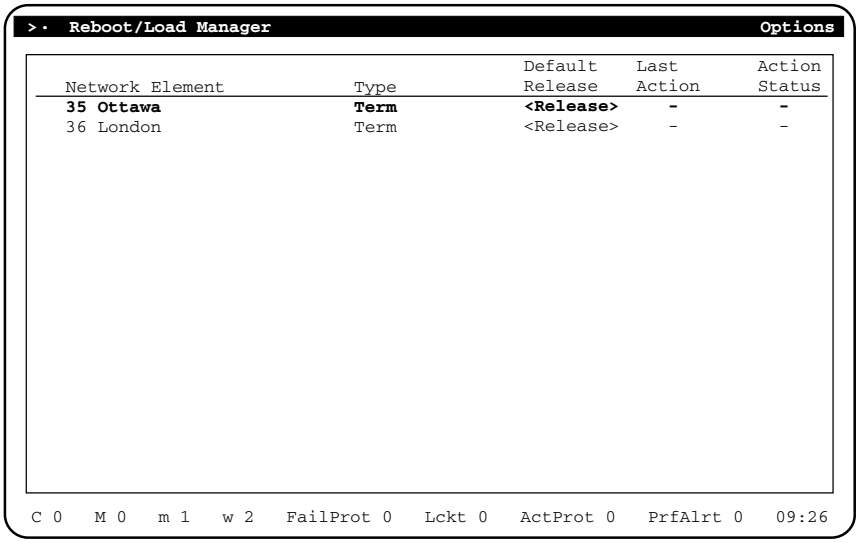
Step	Action

1 Press Ctrl_T 0 to return to the User Session Manager, and open the Reboot/Load Manager tool.

If you do not know how to do this, see the procedure to open an OPC tool in *Common Procedures*, 323-1111-846. For more information on the Reboot/Load Manager tool, see *Software Administration Procedures*, 323-1111-303 and *User Interfaces Description*, 323-1111-301.

The Reboot/Load Manager main window similar to the following appears.

OS.0330



2 Note the risk of damaging circuit packs as you continue the procedure.

CAUTION
Risk of damaging circuit packs
Steps 2 to 6 involve the handling of circuit packs. Use an antistatic strap (or other static protection device) to protect against static damage.

To start the download, remove the Proc circuit pack (slot 21 on the OC-3/OC-12 terminal or ADM shelf, or on the OC-12 regenerator shelf), and then reinsert it securely into its backplane connectors.

—continued—

Procedure 5-3 (continued)
Downloading software to a network element

Step	Action
	The download starts. After several seconds, "Loading" appears in the Reboot/Load Manager Last Action field. After 5 to 10 minutes, "Completed" appears in the Action Status field. Then, "Loading" appears again in the Last Action field. When "Completed" appears in the Action Status field, the download is complete.
	The Proc, however, needs a few more minutes to initialize. When the green "Active" LED on the Proc goes on, initialization is complete.
3	Make sure that all circuit packs, including the maintenance interface controller (MIC) circuit pack, are properly seated in the network element backplane connectors.
	Note 1: When a network element is rebooted, it blocks writing to the network element circuit packs to prevent the corruption of the configuration with incorrect parameters. The network element has several processes that suspend themselves until the database is restored and available. The network element requests a database restore from the OPC. If a database is available, the network element downloads the database, hardware write is unblocked, and all of the suspended processes are started. When the network element is downloading software for the first time (for example, when commissioning a new network element), there is no database backup at the OPC. Therefore, the network element is not able to find a database at the OPC and begins autoprovisioning. The network element autoprovisions using data that it can generate internally. Once autoprovisioning is complete, the network element can read but not write to the circuit packs, and an alarm is raised indicating the need for the approve command. The approve command enables hardware write and causes a restart. Until the approve command is entered after all the network element commissioning is done, circuit packs are not initialized. As a result, the fail LED might be lit on optics modules until the approve command is entered (the initialization process can take up to 3 minutes). ***Note 2:*** If the network element autoprovisions, clear the facility performance counters after you execute the **approve** command (such as in Procedure 5-5). Use one of the following methods to clear the facility performance counters for DS-1, DS-3, STS-1, and OC-3 facilities. • Complete the procedure on clearing the facility performance counters in *Performance Monitoring Procedures*, 323-1111-520. • Enter the **init reg** command on the TL1 interface.

—continued—

Procedure 5-3 (continued)
Downloading software to a network element

Step	Action
	Note 3: .The equipment alarm "database not restored" is raised after downloading software without a database. This alarm persists and can be ignored until you perform the procedure, "Performing a manual network element database backup (Approve command)" on page 5-22.
	Note 4: The OC-12 optical interface circuit packs might stay in the fail state (the red LED is on) until the approve command is issued. See "Performing a manual network element database backup (Approve command)" on page 5-22.
4	Close the Reboot/Load Manager tool by pressing Esc) or do the following: **a.** Display the window menu by pressing Ctrl_L W (or Keypad 6). *The window menu appears.* **b.** Select the **Exit** command by pressing Space (or Keypad 0). *The tool closes and the User Session Manager appears.*
5	Disconnect the portable OPC from the network element: **a.** Shut down the OPC. (For more information, see the procedure to shut down an OPC in *Common Procedures*, 323-1111-846. **b.** Switch the power switch at the back of the portable OPC to the OFF position, when the shutdown dialog informs you to do so. **c.** Remove the control network cable from both the network element and the portable OPC. For more information, see the procedure to connect the portable OPC to a network element in *Common Procedures*, 323-1111-846.
6	If this network element contains the primary or backup OPC, to ensure that the OPC date and time are correct: **a.** Connect a terminal to the OPC, as described in *Common Procedures*, 323-1111-846, and ensure that it is properly installed in its slot and initialized. **b.** Log in to the OPC and open the User Session Manager. If you do not know how to do this, see the procedure to open an OPC tool in *Common Procedures*, 323-1111-846. *The User Session Manager appears.* **c.** If the time on the OPC (indicated on the lower right of the User Session Manager) is not correct, use the OPC Date tool to set it correctly, as described in the procedure on changing the OPC date and time in *System Administration Procedures*, 323-1111-302. **—end—**

Procedure 5-4
Updating shelf inventory CLEI

Use this procedure to add new common language equipment identifiers (CLEI) in the shelf inventory for new system-recognized replacement circuit packs or versions of circuit packs. Performing this procedure allows the shelf inventory to properly display the new CLEIs when new or new versions of circuit packs are equipped.

If the network element software does not recognize a circuit pack, the shelf inventory screen displays question marks in place of the CLEI. As well, unrecognized circuit packs result in the OPC hardware baseline audit raising a "Below baseline CP exists in the system" alarm.

> ***Note:*** The OPC hardware baseline and PECCLEI tools are independent of each other and both have their own separate sources for determining circuit pack information. If the "Below baseline CP exists in the system" alarm is raised, you must use the baseline tool to correctly clear the alarm. (Refer to *Alarm Clearing Procedures*, 323-1111-543, to clear the alarm.)

The equipment shelf inventory reads the CLEI from the software table of the product engineering codes (PEC), hardware versions, and CLEI. When the CLEI is available on the hardware, the shelf inventory reads the CLEI from the hardware instead of the software. The last four characters of the CLEI are available on all circuit packs. For some circuit packs, the full ten characters are available. The owner of the CLEI, either system or user, defines if the CLEI was provided by the system itself or by a user. By default the PEC/CLEI entity set contains only system values. Each time a CLEI record is added it is defined as a user value. User values can be updated or deleted. System values cannot be updated or deleted.

Requirements

This procedure is performed using the command interpreter (CI) level of the network element user interface. Contact your next level of support or Nortel Networks according to About the OC-12 NE Library, 323-1111-090, to obtain the restricted tools access password (this password changes every day and is valid for 12 hours).

Before starting this procedure log in to the network element user interface with admin access privileges. For login instructions and overview of the user interface, see *Common Procedures*, 323-1111-846.

—continued—

Procedure 5-4 (continued)
Updating shelf inventory CLEI

Action

Step	Action

1	Access the command interpreter (CI) level of the network element user interface by entering:
	quit all ↵
	The following message is displayed followed by a prompt:
	`CI:`
	`>`

2	Access the tool supervisor by entering:
	toolsup ↵
	The following message is displayed followed by a prompt:
	`TOOLSUP - Tool Supervisor`
	`Type HELP to display available commands`
	`TOOLSUP:`
	`>`

3	Access the controlled CI tool by entering:
	access on pecclei ↵
	The following message is displayed followed by a prompt:
	`Enter password:`
	`>`

4	Enter the restricted tool access password (obtained from your next level of support or Nortel Networks) by entering:
	<password> ↵
	The following message is displayed followed by a prompt:
	`PECCLEI permitted`
	`PECCLEI access will expire 12 hours from now.`
	
	`** WARNING **`
	`You have permitted access to command(s) that require skilled and knowledgable users. Proper use is required to avoid possible service degradations. Please ensure that only fully trained and qualified personnel proceed.`
	
	`>`

—continued—

Procedure 5-4 (continued)
Updating shelf inventory CLEI

Step	Action

5	Access the pecclei tool by entering:
	pecclei ↵
	The following message is displayed followed by a prompt:
	`PECCLEI:`
	`>`

6	Determine which of the following actions you want to perform.

If you want	**Then** go to
a list of available help commands	step 7
to query the PEC CLEI entity set	step 8
to add, delete, or update a CLEI record	step 9
to exit the pecclei tool and the CI level of the NE UI	step 11

7 For a list of available help commands enter:

help ↵

The following list appears:

```
QUERY    - Query the PEC CLEI entity set
ADD      - Add a new PEC/CLEI/Version combination to the
           pec clei entity set
DELETE   - Delete a PEC/CLEI Version combination from the
           pec clei entity set
UPDATE   - Update the CLEI code of a PEC/Version in the
           pec clei entity set
HELP     - Display this screen
QUIT     - exit from PECCLEI
>
```

Go to step 6.

—continued—

Procedure 5-4 (continued)
Updating shelf inventory CLEI

Step	Action
8	To view the existing software table of CLEI records enter: **query <option> <code>** ↵ where **<option>** is **pec** and, **clei**, **cctpk**, or **all** **<code>** is the product engineering code for option **pec** **<code>** is the common language equipment identifier for option **clei** **<code>** is the circuit pack type for option **cctpk type** (see step 9) **<code>** is not required for all the circuit packs in the shelf inventory for option **all** **<code>** is **system** for all the circuit pack CLEIs provided by the system for option **all** **<code>** is **user** for all the circuit pack CLEIs provided by the user for option **all** *A list of the pec, CLEI, version, circuit pack type, and owner (system or user) for each specific circuit pack appears.* Go to step 6.

—continued—

Procedure 5-4 (continued)
Updating shelf inventory CLEI

Step	Action
9	To add, delete or update a CLEI record enter: **<command> <pec> <clei> <version> <circuit pack type>** ↵ where **<command>** is **add**, **delete**, or **update** **<pec>** is the PEC of the circuit pack **<clei>** is the CLEI of the circuit pack **<version>** is the vintage of the circuit pack **<circuit pack type>** **bnc_io** for BNC input/output (NT4K30) **ds1_in** for DS1 input (NT4K32) **ds1_out** for DS1 output (NT4K33) **proc** for processor (NT4K52) **mic** for maintenance interface controller (NT4K53) **power** for TXP power/breaker I/O (NT4K58) **ds3_prsw** for DS3 Protection switcher (NT4K60) **oc3_if** for OC3 networking interface (NT7E01) **oc12_if** for OC12 networking interface (NT7E02) **ds1_mpr** for DS1 enhanced VT mapper (NT7E04) **oc12 _vtm** for VTM optical interface (NT7E05) **ds3_sts1_mpr** for DS3 STS mapper (NT7E08) **sts1_if** for STS-1 interface (NT7E09) **esi_carr** for external synchronization carrier (NT7E19) **opc** for operations controller (NT7E24) **esi_unit** for external synchronization interface (NT7E27) **sts12_if** for STS-12 interface (NT7E33) **oc12_lpbk** for ring loopback (NT7E35) **ohb** for overhead bridge (NT7E36) *A confirmation message appears asking if you want to continue.*
10	To add, delete, or update the CLEI record enter: **yes** ↵ *The circuit pack is added, removed, or updated.* Go to step 6

—continued—

Procedure 5-4 (continued)
Updating shelf inventory CLEI

Step	Action
11	To exit the pecclei tool enter: **quit** ↵ *The following message appears:* `TOOLSUP:`
12	To exit the CI area enter: **quit** ↵ *The CI prompt appears.*
13	To return to the NE UI main menu, enter: **fwp** ↵ *The NE UI main menu appears.*

—end—

Procedure 5-5
Performing a manual network element database backup (Approve command)

Use this procedure to make a manual backup copy of the network element database that includes all provisioning data. If there is a failure, the backup copy can be used to restore the network element database. A backup is recommended every time a provisioning change is made.

Shelf database backups are stored on the hard disk of the operations controller (OPC) module.

Two copies of the database are stored: current, and backup 1. When you perform a backup, the oldest copy is deleted.

Backups must be done periodically to make sure that they contain only recent and relevant data. Backups minimize the amount of lost data if there is a failure. A backup can be done automatically by scheduling it as a network event. For details, see *System Administration Procedures*, 323-1111-302.

Requirements

Before starting this procedure, you must:

- be directly logged into the desired network element since the selectne command cannot be used
- be logged in to the network element user interface and be at the main menu level
- be familiar with the VT100-type network element user interface. A complete guided tour of the network element user interface is also available in *User Interfaces Description*, 323-1111-301.

—continued—

Procedure 5-5 (continued)
Performing a manual network element database backup (Approve command)

Action

Step	Action
	Note 1: When a network element is rebooted, it blocks writing to the network element circuit packs to prevent the corruption of the configuration with incorrect parameters. The network element has several processes that suspend themselves until the database is restored and available. The network element requests a database restore from the OPC. If a database is available, the network element downloads the database, hardware write is unblocked, and all of the suspended processes are started. If the network element is unable to find the database, it requests the database backup. If that fails, it begins autoprovisioning. The network element autoprovisions using data that it can generate internally. Once autoprovisioning is complete, the network element can read but not write to the circuit packs, and an alarm is raised indicating the need for the approve command. The approve command enables hardware write and causes a restart. At the end of the restart, the database confirms that it has good data. If the provisioning is done correctly, no hardware data changes and no traffic is lost. *The alarm "Database not restored, type Q approve" is present on the network element*. ***Note 2:*** If the network element autoprovisions, clear the facility performance counters after you execute the **approve** command (as in this procedure). Use one of the following methods to clear the facility performance counters for DS-1, DS-3, STS-1, and OC-3 facilities. • Complete the procedure on clearing the facility performance counters in *Performance Monitoring Procedures*, 323-1111-520. • Enter the **init reg** command on the TL1 interface. ***Note 3:*** If a reboot with no backup is done (for example, when you commission a new network element), the approve command must be issued.
1	Issue the Approve command by entering: **approve** ↵ *The system prompts you for confirmation.* ***Note:*** Do not use the approve command for more than one NE at one time; otherwise, there is a risk of interrupting the data download.

—continued—

Procedure 5-5 (continued)
Performing a manual network element database backup (Approve command)

Step	Action
2	Confirm the Approve command by entering: **y** ↵ ***Note:*** A warning asking you to perform an STS-1 connection audit is displayed. If the approve command is performed on an NE carrying live traffic, you should perform an STS-1 connection audit before proceeding. Traffic will be lost if an STS-1 connection audit is not performed before the approve command is issued. *This forces a system restart. The system restarts with the new configuration data. Immediately afterwards, the network element data is backed up to the OPC.* ***Note:*** Allow sufficient time (up to 5 minutes) for network element initialization after the restart is completed.
3	Verify that the processor circuit pack has booted successfully by logging in to the local network element user interface. If you do not know how to do this, see the procedure to log in to and start a session with the network element user interface in *Common Procedures*, 323-1111-846. *The "Database not restored. Type Q approve" at NE alarm should be cleared.*
4	Attempt to execute the Approve command by entering: **approve** ↵ *The system prompts you for confirmation.*
5	Confirm the Approve command by entering: **y** ↵
6	Verify that the request is denied and the network element user interface displays the message "Not applicable at this time".
7	Verify that no traffic hit occurred.

—end—

Procedure 5-6
Verifying and downloading the firmware load of an OC-12 VTM optical interface circuit pack

Use this procedure at a VTM ring ADM to verify that the latest firmware load is present and to download the correct firmware load, if necessary.

The OC-12 VTM ring must be equipped with OC-12 VTM optical interface (NT7E05) circuit packs containing the appropriate firmware load. This procedure is performed using the local command input (CI) area at the network element.

Requirements

Before starting this procedure by logging in from the operations controller (OPC), you must:

- set up the portable OPC at the network element site, if you are using a portable OPC in the commissioning process, as specified in the procedures to connect a terminal to the portable OPC and to connect the portable OPC to a network element in *Common Procedures*, 323-1111-846
- set up the primary OPC at the network element site if a portable OPC is not available
- have a userID and password that allow you access to the OPC at the admin security level
- read the command conventions for the type of interface you are using (CMT or graphical) in *Common Procedures*, 323-1111-846

Before starting this procedure by logging directly in to the network element, you must:

- connect a terminal to the network element, as described in the procedure to connect a VT100-compatible terminal to user interface port 2 in *Common Procedures*, 323-1111-846
- be directly logged into the desired network element since the selectne command cannot be used
- have a userID and password that allow you access to the network element at the admin security level
- read the command conventions described in *Common Procedures*, 323-1111-846

—continued—

Procedure 5-6 (continued)
Verifying and downloading the firmware load of an OC-12 VTM optical interface circuit pack

Action

Step	Action
1	At the network element user interface, enter: **alarms** ↵ *The active alarms list is displayed.*
2	Scan the list of active alarms (use **f** ↵ and **b** ↵ to move through the list) for the "OC-12 G1 firmware/software incompatible" minor alarm and the "OC-12 G2 firmware/software incompatible" minor alarm.

If	Then
either alarm is active or both alarms are active	go to step 3
either alarm is not active	you have completed this procedure

3	At the network element user interface, enter the following commands: **quit all** ↵ **mbrfwdl** ↵
4	**CAUTION** **Risk of traffic loss** Do not issue any other OAM operations during a firmware download of the VTM circuit pack. Download the firmware load from the OPC to the OC-12 VTM circuit packs by entering: **forcedld oc12vtm <circuit pack group>** ↵ **yes** ↵ where **<circuit pack group>** is **g1** if the "OC-12 G1 firmware/software incompatible" alarm is active (slot 9 VTM circuit pack) **g2** if the "OC-12 G2 firmware/software incompatible" alarm is active (slot 10 VTM circuit pack) *The OC-12 VTM firmware is transferred from the OPC to the OC-12 VTM circuit pack(s). This operation takes about 15 minutes for each VTM circuit pack.*

—continued—

Procedure 5-6 (continued)
Verifying and downloading the firmware load of an OC-12 VTM optical interface circuit pack

Step	Action
	Wait for the Done message to appear before proceeding with the next step. ***Note:*** If the LOS LED on the faceplate of the VTM circuit pack is off, the LOS LED will turn on for about 20 seconds at the end of the firmware download. This is expected and does not signify a LOS condition (no corresponding LOS conditions are detected or alarmed).
5	Quit out of the MBRFWDL CI tool and return to the network element's main user interface screen by entering: **quit** ↵ **fwp** ↵ *The Network Element Status screen is displayed. Wait 3 minutes before proceeding to allow the initialization of the VTM firmware.*
6	At the network element user interface, enter: **alarms** ↵ *The active alarms list is displayed.*
7	Scan the list of active alarms (use **f** ↵ and **b** ↵ to move through the list) for the "OC-12 G1 firmware/software incompatible" minor alarm and the "OC-12 G2 firmware/software incompatible" minor alarm.

If either alarm is	**Then**
active	call your next level of support or your Nortel Networks support group
not active	you have completed this procedure

—end—

Procedure 5-7
Verifying and downloading the firmware load of an STS-1 electrical interface circuit pack

Use this procedure to download the correct firmware load to the STS-1 electrical interface circuit pack if the firmware/software incompatible alarm is raised against the STS-1 electrical interface circuit pack.

Perform this procedure using the local command input (CI) area at the network element.

> ***Note:*** This procedure is not applicable when commissioning a control shelf.

Requirements

Before starting this procedure by logging in from the OPC, you must:

- set up the portable operations controller (OPC) at the network element site, if you are using a portable OPC in the commissioning process, as specified in the procedures to connect a terminal to the portable OPC and to connect the portable OPC to a network element in *Common Procedures*, 323-1111-846
- set up the primary OPC at the network element site if a portable OPC is not available
- have a userID and password that allow you access to the OPC at the admin security level
- read the command conventions for the type of interface you are using (CMT or graphical) described in *Common Procedures*, 323-1111-846

Before starting this procedure by logging directly in to the network element, you must:

- be directly logged into the desired network element since the selectne command cannot be used
- connect a terminal to the network element, as described in the procedure to connect a VT100-compatible terminal to user interface port 2 in *Common Procedures*, 323-1111-846
- have a userID and password that allow you access to the network element at the admin security level
- read the command conventions described in *Common Procedures*, 323-1111-846

—continued—

Procedure 5-7 (continued)
Verifying and downloading the firmware load of an STS-1 electrical interface circuit pack

Action

Step	Action
1	At the network element user interface, enter: **alarms** ↵ *The active alarms list is displayed.*
2	Scan the list of active alarms (use **f** ↵ and **b** ↵ to move through the list) for "STS-1 firmware/software incompatible" minor alarms.

If	Then
any "STS-1 firmware/software incompatible" alarm is active, record the STS-1 circuit pack against which the alarm is raised here (Y/N): STS-1 G1 (slot 11): _____ STS-1 G2 (slot 13): _____ STS-1 G3 (slot 15): _____ STS-1 G4 (slot 17): _____ STS-1 P (slot 3): _____ ***Note:*** The STS-1 firmware/software incompatible alarm is raised against each STS-1 circuit pack that has incorrect firmware, therefore ensure you scan the complete list of active alarms and record which of the STS-1 circuit packs raise the firmware version mismatch alarm.	go to step 3
no "STS-1 firmware/software incompatible" alarm is active	you have completed this procedure

3	Verify the firmware residing on the circuit pack by entering the commands: **mbrfwdl** ↵ **queryfw sts1 <circuit pack group>** ↵

where

<**circuit pack group**>	is **g1**, **g2**, **g3**, **g4**, or **p** if the "STS-1 G4 firmware/software incompatible" alarm is active ***Note:*** See the circuit packs recorded in step 2.

The STS-1 firmware load gets transferred to the STS1 circuit packs. This operation takes about 1 minute. Wait for the Done message to appear before proceeding with the next step.

—continued—

Procedure 5-7 (continued)
Verifying and downloading the firmware load of an STS-1 electrical interface circuit pack

Step	Action
4	Transfer the correct STS-1 firmware from the OPC to the STS-1 circuit pack by entering: **mbrfwdl** ↵ **forcedld sts1 <circuit pack group>** ↵ **yes** ↵ where <**circuit pack group**> is the circuit pack entered in step 3. *The STS-1 firmware gets transferred from the Processor to the STS-1 circuit pack. This operation takes about 3 minutes per STS-1 circuit pack. Wait for the Done message to appear before proceeding with the next step.*
5	Repeat step 4 for the remaining STS-1 circuit packs in the shelf which need the new firmware (all those STS-1 circuit packs which have the STS-1 firmware/software incompatible alarm raised against them). This was recorded in step 2.
6	Quit out of the MBRFWDL CI tool and return to the network element's main user interface screen by entering: **quit** ↵ **fwp** ↵ *The Network Element Status screen is displayed.*
7	Check for alarms by entering: **alarms** ↵ *The active alarms list is displayed.*
8	Scan the list of active alarms (use **f** ↵ and **b** ↵ to move through the list) for "STS-1 firmware/software incompatible" minor alarms.

If	Then
any "STS-1 firmware/software incompatible" alarm is active	call your next level of support or your Nortel Networks support group
no "STS-1 firmware/software incompatible" major alarm is active	you have completed this procedure

—end—

Procedure 5-8
Verifying and downloading the firmware load of the maintenance interface circuit pack

Use this procedure to download the MIC firmware to the maintenance interface circuit Pack (MIC) if the MIC firmware version mismatch alarm is raised.

To execute this procedure, it is assumed that association to the NEs in the system exists. The system must be running normally (not recovering from a restart).

CAUTION:
Risk of damaging circuit pack
During the course of the download the following must be observed:
- Do not remove the MIC, PROC, or OPC cards.
- Do not perform a shelf restart of any kind.
- Do not log out of the NE UI from which this command is being run.

Failure to observe the above may result in damage to the MIC card which will require that it be returned to Nortel Networks for repair.

CAUTION
Download of firmware is irreversible
The download process is irreversible. Once the new firmware is installed, it cannot be reverted to the old firmware version.

Requirements

Before starting this procedure by logging in from the OPC, you must:

- set up the portable operations controller (OPC) at the network element site, if you are using a portable OPC in the commissioning process, as specified in the procedures to connect a terminal to the portable OPC and to connect the portable OPC to a network element in *Common Procedures*, 323-1111-846
- set up the primary OPC at the network element site if a portable OPC is not available
- have a userID and password that allow you access to the OPC at the admin security level

—continued—

Procedure 5-8 (continued)
Verifying and downloading the firmware load of the maintenance interface circuit pack

- read the command conventions for the type of interface you are using (CMT or graphical) described in *Common Procedures*, 323-1111-846

Before starting this procedure by logging directly in to the network element, you must:

- be directly logged into the desired network element since the selectne command cannot be used
- connect a terminal to the network element, as described in the procedure to connect a VT100-compatible terminal to user interface port 2 in *Common Procedures*, 323-1111-846
- have a userID and password that allow you access to the network element at the admin security level
- read the command conventions described in *Common Procedures*, 323-1111-846

Action

Step	Action
1	At the NE user interface, enter: **alarms** ↵ *A list of the alarms of the network element you are logged into appears.*
2	Review the list of alarms and find out if the "MIC firmware version mismatch" minor alarm is present.

If the above alarm is	**Then**
displayed in the list	go to step 3
not displayed in the list	you have completed this procedure

3	Check whether the MIC firmware currently installed is the new MIC firmware by entering: **quit all** ↵ **owaomci** ↵ **vintage** ↵

—continued—

Procedure 5-8 (continued)
Verifying and downloading the firmware load of the maintenance interface circuit pack

Step	Action

A message similar to the following appears:

```
The MIC Firmware Vintage is: 4.2
```

If the MIC Firmware Vintage is	**Then**
other than 5.0 (for example 4.2)	go to step 4
5.0	contact your next level of support or your Nortel Networks support group

4 At the NE user interface, enter:

micdlci ↵

The following prompt appears.

```
micdlci:
>
```

5 Note the risk of damaging circuit pack as you continue this procedure.

CAUTION:
Risk of damaging circuit pack
During the course of the download the following must be observed:
- Do not remove the MIC, PROC, or OPC cards.
- Do not perform a shelf restart of any kind.
- Do not log out of the NE UI from which this command is being run.

Failure to observe the above may result in damage to the maintenance interface card which will require that it be returned to Nortel Networks for repair.

Download the MIC firmware to the maintenance interface circuit pack by entering:

download ↵

—continued—

Procedure 5-8 (continued)
Verifying and downloading the firmware load of the maintenance interface circuit pack

Step	Action

The following message appears:

```
This command will copy the MAINT IF firmware loadfile from
the OPC to the NE and will download the MAINT IF card with
the new firmware.

This process normally takes less than 30 seconds, though
in extreme cases it may take several minutes. While card
is being downloaded, the following must be observed:
 -Do not remove the MAINT IF, PROC or OPC cards.
 -Do not perform a shelf restart of any kind.
 -Do not log out of the NE UI from which this
  command is being run.

Failure to observe the above may result in damage
to the MAINT IF which will require that it be returned
to Nortel Networks for repair.

Proceed?
Please confirm ("Yes" or "No"):
```

6 At the confirmation message, enter:

yes ↵

The MIC firmware is retrieved from the OPC and transferred to the MIC which is then initialized. This process takes about 1 minute to complete. The following message is displayed during the process:

```
Copying the MIC FW loadfile from OPC to SFDEV...
Loadfile copy complete.
Initializing the MAINT IF card for firmware download...
Initialization complete.
Download firmware to MAINT IF card...
Download complete.
Resetting the MAINT IF card...
   ...please allow up to 5 minutes for the reset to
   complete before using the Orderwire.
   The "MIC Firmware Version Mismatch" alarm will be
   cleared when the reset has completed.
>
```

—continued—

Procedure 5-8 (continued)
Verifying and downloading the firmware load of the maintenance interface circuit pack

Step	Action
7	Wait until this time elapses or until the firmware version mismatch minor alarm clears before proceeding. *If the download fails, or if the tool detects a post-download failure, a message indicating that there was a download failure is displayed.* **If** the download failure message is / **Then** not displayed / go to step 8 displayed / contact your Nortel Networks support group
8	To check whether the new MIC firmware was installed successfully, enter: **owaomci** ↵ **vintage** ↵ *The following message appears:* `The MIC Firmware Vintage is: 5.0` *If any other vintage is displayed contact your Nortel Networks support group.*
9	Quit the MICDLCI and OWAOMCI tools and return to the network element's main user interface screen by entering: **quit all** ↵ **fwp** ↵ *The Network Element Status Screen appears.*
10	At the NE user interface, enter: **alarms** ↵ *A list of the alarms of the network element you are logged into appears.*
11	Review the list of alarms and find out if the "MIC firmware version mismatch" minor alarm is still present. **If** the above alarm is / **Then** not displayed in the list / you have completed this procedure displayed in the list / contact your Nortel Networks support group

—end—

Procedure 5-9
Setting the network element name

Use this procedure to set the name of the network element as defined by the user.

Requirements

Before starting this procedure, you must:

- be logged in the network element user interface and be at the main menu level
- be familiar with the VT100-type network element user interface. To review how to use the interface, see *Common Procedures*, 323-1111-846. A complete guided tour of the network element user interface is also available in *User Interfaces Description*, 323-1111-301

Action

Step	Action
1	Access the system administration screen by entering: **admin nep** ↵ *The network element profile screen appears.*
2	Set the network element name by entering: **nename <nename>** ↵ where **<nename>** is an ASCII string of up to 20 characters ***Note 1:*** The network element name cannot start with the character #. If # is the first character of the network element name, you cannot access the network element using the NE Login Manager. ***Note 2:*** When typing the network element name, place it within single quotes ('network element name'), otherwise all the text is converted to uppercase. Use single quotes if spaces or special characters (?, =) are included, or if the first character is a number. ***Note 3:*** When naming a network element, if the network element name is to be used as the TL1 message target identifier (TID), the name must be formed from the allowable TL1 character set. Allowable characters consist of the following: A to Z (uppercase and lowercase), 0 to 9, and the special characters, hyphens (-), underscores (_), periods. No spaces are allowed. ***Note 4:*** If you are changing the NE name (also used as the TID) it should be done after any necessary In-Service NE Renumbering. Otherwise the TID is changed to the new NE name. **—continued—**

Procedure 5-9 (continued)
Setting the network element name

Step	Action

Note 5: Each NE name within a SOC must be unique. You can check NE names in the SOC using the LISTNODES or LISTNES commands.

A screen similar to the following appears.

OS.0405

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      • • •   •   •   •   •   •
St.Tropez              • • •   •   •   •   •   •
NE Profile   1.1.63
 0 Quit      Network Element Profile             Shelf: 1
 2
 3                          State:  IS
 4                      NE Number:  28
 5                        NE Name: <St.Tropez             >
 6                  Auto Provision:  On
 7           AINS Start-UP Period:  4 Hours
 8           NeName St.Tropez
 9 NeName    NeName command successful.
10
11
12
13 Schedule
14
15
16 Logs
17
18 Help
  NE 63
Time  17:35  >
```

—end—

Procedure 5-10
Verifying the network element commissioning data for an OC-12 ring ADM

Use this procedure to verify the network element commissioning data. This procedure is only applicable to network elements of an OC-12 ring.

Requirements

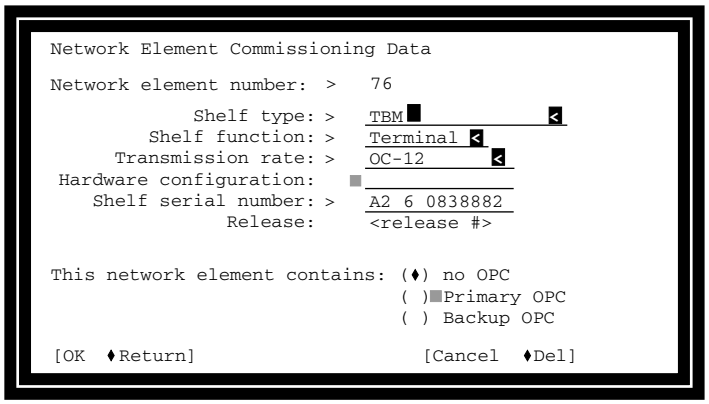
Before starting this procedure, you must:

- have a userID and password that allow you access to the OPC and the Commissioning Manager tool
- read the command conventions for the type of interface you are using (CMT or graphical) in *Common Procedures*, 323-1111-846

Action

Step	Action
1	Log in to the OPC and open the Commissioning Manager tool. To do this, from the OPC User Session Manager, tab to Commissioning Manager and select it by pressing Ctrl_A (or Keypad 0). *The Commissioning Manager main window appears.*
2	Tab to the list of commissioned network elements, use the arrow keys to move to the NE for which you need commissioning data, and select it by pressing Ctrl_A (or Keypad 0).
3	Display the list item menu by pressing Ctrl_L (or Keypad Enter). *The list item menu appears.*
4	Select the Edit command by pressing Space (or Keypad 0). *The Network Element Commissioning Data dialog appears.*

OS.0495



—continued—

Procedure 5-10 (continued)
Verifying the network element commissioning data for an OC-12 ring ADM

Step	Action
5	Verify the content of the Hardware configuration field. **If** the Hardware configuration field shows — **Then** go to VTM — step 9 NWK — step 6 ***Note:*** For the Hardware configuration field to be active, the Shelf function must be Ring ADM and the Transmission rate must be OC-12.
6	To change the value in the field, tab to the Hardware configuration field.
7	Display the chooser menu attached to the field by pressing Ctrl_L / (or Keypad 3).
8	Move to VTM, and select it by pressing Ctrl_A (or Keypad 0). *VTM appears in the Hardware configuration field.*
9	Tab to the **OK** button and select it by pressing Ctrl_A (or Keypad 0). *The Network Element Commissioning Data dialog closes.*
10	Close the Commissioning Manager tool: **a.** Display the window menu by pressing Ctrl_L W (or Keypad 6). *The window menu appears.* **b.** Select the **Exit** command by pressing Space (or Keypad 0). *The Commissioning Manager tool closes and the User Session Manager appears.* **—end—**

Procedure 5-11
Setting the bay frame location ID

Use this procedure to give a bay/aisle identifier to a bay frame. The location ID can be up to seven ASCII characters and it appears on all equipment screens.

Requirements

Before starting this procedure, you must:

- be logged in the network element user interface and be at the main menu level
- be familiar with the VT100-type network element user interface. To review how to use the interface, see *Common Procedures*, 323-1111-846. A complete guided tour of the network element user interface is also available in *User Interfaces Description*, 323-1111-301

Action

Step	Action
1	Access the shelf screen and select a shelf by entering: **equipmnt sh** ↵ *The shelf screen appears.*
2	Access the edit shelf screen by entering: **edit** ↵ *The edit shelf screen appears.*
3	Change the bay frame location ID by entering: **location <location id>** ↵ where **<location id>** is 1 to 7 ASCII characters ***Note:*** When typing the bay frame location ID, place it within single quotes ('ID'), otherwise all the text is converted to uppercase. Use single quotes if spaces or special characters (?, =) are included, or if the first character is a number.

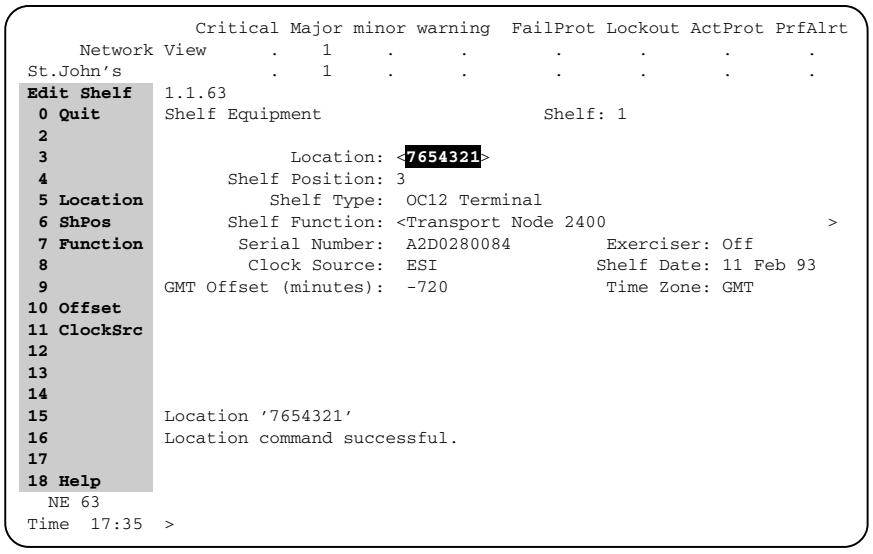
—continued—

Procedure 5-11 (continued)
Setting the bay frame location ID

Step	Action

A screen similar to the following appears.

OS.0411



—end—

Procedure 5-12
Setting the shelf function

Use this procedure to change the shelf function for the network element. The shelf function is a 40-character user-definable description for the shelf. It can be used to identify the shelf's role in the network.

Note: Another shelf function, which is defined at the OPC level through fixed menu choices, allows the system to recognize the configuration of the shelf. Both shelf functions can be different: they have no relationship. For information on how to select the shelf function at the OPC, see Procedure 5-2, "Entering network element commissioning data".

Requirements

Before starting this procedure, you must:

- be logged in the network element user interface and be at the main menu level
- be familiar with the VT100-type network element user interface. To review how to use the interface, see *Common Procedures*, 323-1111-846. A complete guided tour of the network element user interface is also available in *User Interfaces Description*, 323-1111-301.

Action

Step	Action
1	Access the shelf screen and select a shelf by entering: **equipmnt sh** ↵ *The shelf screen appears.*
2	Access the edit shelf screen by entering: **edit** ↵ *The edit shelf screen appears.*
3	Change the shelf function by entering: **function <description>** ↵ where **<description>** is 1 to 40 ASCII characters ***Note:*** When typing the bay frame location ID, place it within single quotes ('ID'), otherwise all the text is converted to uppercase. Use single quotes if spaces or special characters (?, =) are included, or if the first character is a number.

—continued—

Procedure 5-12 (continued)
Setting the shelf function

Step	Action

A screen similar to the following appears.

OS.0412

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .    .     .      .        .       .       .       .
 St.John's             .    .     .      .        .       .       .       .
Edit Shelf   1.1.63
 0 Quit      Shelf Equipment                    Shelf: 1
 2
 3                        Location: <1234.56>
 4                  Shelf Position: 3
 5 Location             Shelf Type:  OC12 Terminal
 6 ShPos            Shelf Function: <Transport __12_ DS3s                    >
 7 Function          Serial Number:  A2D0280084          Exerciser: Off
 8                    Clock Source:  ESI                Shelf Date: 11 Feb 93
 9           GMT Offset (minutes):  -720                Time Zone: GMT
10 Offset
11 ClockSrc
12
13
14
15           Function 'Transport __12_ DS3s'
16           Function command successful.
17
18 Help
  NE 63
Time  17:35  >
```

—end—

Procedure 5-13
Setting the shelf time offset

Use this procedure to set the time zone of the shelf. For a list of time zones and time zone (TZ) codes, see *System Administration Procedures*, 323-1111-302.

The time offset must be provisioned if the network includes network elements in different time zones. This provisioning is to allow the OPC to correlate alarms with respect to different local times. The time zone codes are used to set the shelf time offset.

If you select a time zone that has an associated daylight savings time offset, then at 2:00 a.m. on a specified day (the Sunday in the date period), the shelf time offset automatically changes. The change is as indicated in the time zone table in *System Administration Procedures*, 323-1111-302.

> ***Note:*** The change to and from daylight savings time may not be at exactly 2:00 a.m. There may be up to a 1-minute delay, to 2:01 a.m. On average, the delay is about 30 seconds.

The time offset, in minutes before or after Greenwich Mean Time (GMT), is indicated in the NE UI. The offset itself cannot be changed.

Requirements

Before starting this procedure, you must:

- be logged in the network element user interface and be at the main menu level
- be familiar with the VT100-type network element user interface. To review how to use the interface, see *Common Procedures*, 323-1111-846. A complete guided tour of the network element user interface is also available in *User Interfaces Description*, 323-1111-301.

Action

Step	Action
1	Access the shelf screen and select a shelf by entering: **equipmnt sh** ↵ *The shelf screen appears.*
2	Access the edit shelf screen by entering: **edit** ↵ *The edit shelf screen appears.*

—continued—

Procedure 5-13 (continued)
Setting the shelf time offset

Step	Action
3	Change the shelf time offset by entering: **timezone <NE tz>** ↵ **yes** ↵ where **<NE tz>** is the timezone of the shelf *A screen similar to the following appears.*

OS.0413

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .    .     .      .        .        .       .       .
St.John's              .    .     .      .        .        .       .       .
Edit Shelf   1.1.63
 0 Quit      Shelf Equipment                    Shelf: 1
 2
 3                    Location: 1234.56
 4                Shelf Position: 3
 5 Location           Shelf Type:  OC48 RingAdm
 6 ShPos          Shelf Function: <                                        >
 7 Function        Serial Number:  A270280556          Exerciser: Off
 8 Clock            Clock Source:  ESI                Shelf Date: 11 Feb 93
 9               GMT Offset (minutes):  -360           Time Zone: EST5CDT
10
11 Offset
12 ClockSrc  Offset -360
13           Offset command successful.
14
15
16
17
18 Help
  NE 63
Time  17:35  >
```

—end—

Procedure 5-14
Changing the route diversity on an OC-12 network element

Use this procedure to toggle the route diversity parameter (On to Off or vice versa) or set it as specified. Route diversity is used if regenerators are in a system.

Note: For rings, route diversity is set to ON and cannot be changed.

Requirements

Before starting this procedure, you must:

- ensure that the NEs (terminals) at both ends of a line have the same route diversity setting
- be aware that using route diversity (ON) in a nondiverse situation can cause DataComm loss of signal when using a unidirectional switch
- be aware that turning off route diversity (OFF) in a diverse situation can cause DataComm loss of signal alarms at the first and last regenerator on the protection path (when traffic is on the working channel) or at the first and last regenerator on the working path (when traffic is on the protection channel)
- be aware that in either of the two preceding cases, the DataComm loss of signal alarms might be accompanied by the loss of remote OAM&P capabilities on one or more NEs

Action

Step	Action
1	Display the protection screen by entering: **protectn** ↵ *The protection screen appears for the selected NE.*
2	Select the service type by entering: **dtlprot oc12** ↵
3	Select the protection provisioning screen by entering: **protprov** ↵ *The protection provisioning screen appears for the selected NE.*

—continued—

Procedure 5-14 (continued)
Changing the route diversity on an OC-12 network element

Step	Action
4	Note the risk of loss of communication as you continue with this procedure.

CAUTION
Risk of loss of communication
Before changing the route diversity setting on an OC-3/OC-12 interface protection pair (OC-3/OC-12 G1/G2 or OC-3/OC-12 G1S/G2S) ensure that both units of the protection pair are not active. Changing the route diversity while both OC-3/OC-12 interfaces on a protection pair are active will result in a communications loss.

Change the route diversity by entering:

routediv <state> ↵

where

<state> is **on** or **off**

—end—

Procedure 5-15
Changing an OC-3/OC-12 protection switching mode

Use this procedure to assign a protection switching mode, either unidirectional (uni) switching or bidirectional (bi) switching to the OC-3/OC-12 optical interface circuit pack for the 1+1 configuration.

For a ring system, the default mode is bidirectional and it cannot be changed.

Note 1: This procedure is not applicable when commissioning a control shelf.

Note 2: You cannot change the switching mode in a linear system if a protection switch is active.

Requirements

Before starting this procedure, you must:

- be logged into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE user interface. A complete guided tour of the NE user interface is also available in *User Interfaces Description*, 323-1111-301.
- ensure that the terminal NEs at both ends of a line have the same protection switching mode

Action

Step	Action
1	Display the detailed protection screen for the OC-12 or OC-3 optics by entering: **protectn** ↵ **dtlprot <ocn> <circuit pack group>** ↵ where **<ocn>** is **oc12** or **oc3** **<circuit pack group>** is **g1** or **g2** or **g1s** or **g2s** for OC12 ADM (linear) or **g1** or **g2** or **g1s** or **g2s** or **g3** to **g8** for OC-3 terminal, ADM, and tributaries

—continued—

Procedure 5-15 (continued)
Changing an OC-3/OC-12 protection switching mode

Step	Action
2	Change the protection switching mode by entering: **protprov** ↵ **swmode <switch mode>** ↵ **yes** ↵ where **<switch mode>** is **uni** or **bi** *A screen similar to the following appears showing the switch-mode change.*

OS.0407

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .     .     1      .        .       .       .       .
 St. John's            .     .     1      .        .       .       .       .
Prot Prov    1.1.63
 0 Quit      OC12 Protection Provisioning            Shelf: 1
 2                              Protection Exerciser: Scheduled
 3                                 Protection Scheme: 1+1 Non-revertive
 4           Wait To Restore: -  minutes
 5           Route Diversity: Off
 6 SwMode        Switch Mode: Uni-directional
 7                ProtOscCtl  Oscillate   OscPeriod  LcktPeriod
 8           G1       On         < 6>     < 1 min >  < 1 min >
 9           G2       On         < 6>     < 1 min >  < 1 min >
10
11
12 RouteDiv  PROTPROV:
13 ProtExer
14
15
16
17
18 Help
  NE 63
Time  17:35  >
```

—end—

Procedure 5-16
Transferring data from the portable to the primary OPC

Use this procedure to transfer commissioning data for a span of control from the portable operations controller (OPC) to the primary OPC, after all the NEs in the span have been commissioned. Data transfer proceeds more quickly when the portable OPC is attached to the primary OPC over the control network (CNet). However, you can also transfer data over SONET.

When you use this procedure to transfer data to the primary OPC, all previously existing data on the primary OPC is overwritten. Therefore, you must complete all commissioning procedures that define system or NE data, before executing this procedure.

The primary OPC goes out of service during the transfer. Therefore, the procedure must not be used if the primary OPC is in service. A Change Application Procedure (CAP), written to perform a data transfer from the portable OPC to an in-service primary OPC, is available from your Nortel Networks support group.

Requirements

Before starting this procedure, you must:

- obtain a userID and password that allow you access to the OPC and to use the Commissioning Manager and OPC Shutdown tools
- complete the commissioning of all NEs
- set up equipment as specified in the procedures to connect a terminal for the portable OPC and connect the portable OPC to an NE in *Common Procedures*, 323-1111-846, at any NE with SONET continuity to the primary OPC
- install the primary OPC in its slot, and initialize it
- read the command conventions for the type of interface you are using (CMT or graphical) in *Common Procedures*, 323-1111-846

Action

Step	Action
1	Log in to the portable OPC, and open the Commissioning Manager tool. If you do not know how to do this, see the procedures (to log in to the OPC and to open an OPC tool) in *Common Procedures*, 323-1111-846.

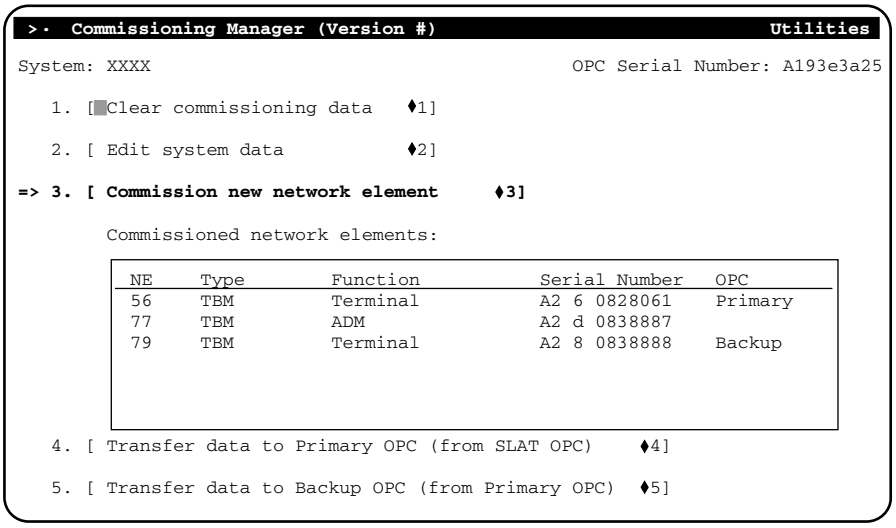
—continued—

Procedure 5-16 (continued)
Transferring data from the portable to the primary OPC

Step	Action

The Commissioning Manager main window similar to the following appears.

OS.0374



2 Tab to the **Transfer data to Primary OPC** button, and select it by pressing Ctrl_A (or Keypad 0).

A confirmation dialog appears.

3 Tab to the **Yes** button, and select it by pressing Ctrl_A (or Keypad 0).

The confirmation dialog closes and the commissioning data is copied from the portable OPC to the primary OPC (this can take several minutes). When the process is complete, a notification dialog appears.

Note: If anything goes wrong with the transfer, use the Event Browser to check for logs describing the problem. See the procedure to view error logs in *Alarm and Trouble Clearing Procedures*, 323-1111-543.

4 Select the **Done** button, by pressing Ctrl_A (or Keypad 0).

The notification dialog closes.

5 Close the Commissioning Manager tool by pressing Esc), or do the following:

a. Display the window menu by pressing Ctrl_L W (or Keypad 6).

The window menu appears.

b. Select the **Exit** command by pressing Space (or Keypad 0).

The tool closes and the User Session Manager appears.

—end—

Procedure 5-17
Verifying and downloading the firmware load of an OC-12 ring loopback circuit pack

Use this procedure at an NWK ring ADM to verify that the latest firmware load is present and to download the correct firmware load, if necessary.

The OC-12 NWK ring must be equipped with OC-12 ring loopback (NT7E35) circuit packs containing the appropriate firmware load. This procedure is performed using the local command input (CI) area at the network element.

> ***Note:*** This procedure is not applicable when commissioning a control shelf.

Requirements

Before starting this procedure by logging in from the operations controller (OPC), you must:

- set up the portable OPC at the network element site, if you are using a portable OPC in the commissioning process, as specified in the procedures to connect a terminal to the portable OPC and to connect the portable OPC to a network element in *Common Procedures*, 323-1111-846
- set up the primary OPC at the network element site, if a portable OPC is not available
- have a userID and password that allow you access to the OPC at the admin security level
- read the command conventions for the type of interface you are using (CMT or graphical) in Common Procedures, 323-1111-846

Before you start this procedure by logging in to the network element, you must:

- connect a terminal to the network element, as described in the procedure to connect a VT100-compatible terminal to user interface port 2 in *Common Procedures*, 323-1111-846
- be directly logged into the desired network element since the selectne command cannot be used
- have a userID and password that allow you access to the network element at the admin security level
- read the command conventions described in *Common Procedures*, 323-1111-846

—continued—

Procedure 5-17 (continued)
Verifying and downloading the firmware load of an OC-12 ring loopback circuit pack

Action

Step	Action
1	Query the firmware load by entering: **mbrfwdl** ↵ **queryfw <unit>** ↵ where **<unit>** (circuit pack group) is **lpbk g1** or **lpbk g1s** (the loopback circuit pack whose firmware is to be updated)
2	**If** the firmware version of the circuit pack … **Then** is not Release 14 — go to step 3 is Release 14 — you have completed this procedure
3	At the network element user interface, issue the following commands: **quit all** ↵ **mbrfwdl** ↵ **forcedld <unit>** ↵ **yes** ↵ where **<unit>** is **lpbk g1** or **lpbk g1s** *The loopback firmware load gets transferred from the OPC to the loopback circuit pack. The whole operation takes up to 2 minutes. Wait for the Done message to appear before proceeding with the next step.*
4	Quit out of the MBRFWDL CI tool and return to the network element's main user interface screen by entering: **quit** ↵ **fwp**↵ *The Network Element Status screen is displayed.*
5	At the network element user interface, enter: **alarms** ↵ *The active alarms list is displayed.*

—continued—

Procedure 5-17 (continued)
Verifying and downloading the firmware load of an OC-12 ring loopback circuit pack

Step	Action
6	Scan the list of active alarms (use **f** ↵ and **b** ↵ to move through the list) for the "Lpbk G1 firmware/software incompatible" minor alarm and the "Lpbk G1S firmware/software incompatible" minor alarm.

If either alarm is	**Then**
active	call your next level of support or your Nortel Networks support group
not active	you have completed this procedure

—end—

Provisioning shelf timing and ESI

This chapter provides the procedures required to provision the shelf timing. This chapter also provides the procedures to provision external synchronization interfaces (ESI), for the network elements that require ESI equipment.

The shelf timing modes available depend on whether a system is linear, an NWK ring or a VTM ring. The sequence of tasks for commissioning shelf timing on each type of system is summarized in flowcharts as follows:

- for linear systems, see Figure 6-1 on page 6-5
- for NWK ring systems, see Figure 6-2 on page 6-6
- for VTM ring systems, see Figure 6-3 on page 6-7

To perform the tasks in the flowcharts:

- to install ESI equipment, refer to *System Expansion Procedures, I,* 323-1111-224
- to test ESI clock mode changes, VTM clock mode changes, reference protection switching, timing distribution facilities and ESI equipment protection, refer to *System Testing Procedures*, 323-1111-222
- to set the shelf timing modes, refer to the task lists in this chapter

For a description of shelf timing and ESI, see *Timing and Synchronization Description*, 323-1111-192.

Introduction shelf timing

The OC-3/OC-12 network elements support five primary shelf timing modes. The shelf timing modes available at a network element depend on the network element type. The shelf timing modes are:

- external timing (for ADMs and terminals that use an external timing source)
- line timing (for ADMs and terminals)
- loop timing (for terminals)
- through timing (for OC-12 regenerators)

- shelf freerun timing (for ADMs and terminals)

There are three types of line timing:

- ESI line timing (for ADMs and terminals equipped with ESI equipment)
- VTM line timing (for VTM ring ADMs without ESI equipment)
- primary optics line timing (for linear ADMs without ESI equipment)

For shelf timing modes that do not use ESI equipment, the setting of the shelf clock source determines the shelf timing mode. For shelf timing modes that use ESI equipment, the settings of the clock source and timing reference together determine the shelf timing mode.

The shelf equipment screen of the network element (NE) user interface displays the shelf clock source beside the label "NE Clock Source". The timing reference protection screen displays the timing references under the heading "Source".

Table 6-1 on page 6-3 lists the required shelf clock source and possible timing reference settings for each shelf timing mode and network element type.

Network elements, with shelf clock sources provisioned as VTM line timed or ESI, have two additional shelf timing modes:

- ESI holdover and ESI freerun
- VTM holdover and VTM freerun

ESI freerun provides a greater accuracy than shelf freerun, and ESI holdover provides a greater accuracy than ESI freerun. The VTM holdover provides greater accuracy than shelf freerun without the requirement to equip a network element with ESI units. Table 6-2 on page 6-4 shows the clock stability for holdover and freerun.

VTM and ESI holdover improve network stability under fault conditions. If a network element has a setting of ESI for its shelf clock source and all timing references fail, the shelf timing mode changes to ESI holdover. ESI holdover stability is guaranteed during the first hours.

If a network element has vtmlinetimed for its shelf clock source, and all timing reference fail, the shelf timing mode changes to VTM holdover. VTM holdover stability is guaranteed during the first 24 hours.

The NE user interface allows you to provision ESI and VTM freerun and holdover. Usually, you only provision holdover for testing purposes.

The current clock mode for the ESI units or OC-12 VTM circuit packs determines if the shelf timing mode is ESI holdover or freerun, or VTM holdover or freerun. (Refer to *Timing and Synchronization Description*, 323-1111-192 for information on ESI and VTM clock modes). To change the clock mode, you edit the target clock mode.

You can use the ESI equipment screen of the NE user interface to change the ESI target clock mode to normal, holdover or freerun. For VTM network elements, you can use the OC-12 equipment screen of the NE user interface to change the VTM target clock mode to normal, holdover or freerun.

Table 6-2 shows the settings for ESI holdover and freerun, VTM holdover and freerun, and shelf freerun.

Table 6-1
Shelf clock source and timing reference settings for each shelf timing mode

Shelf timing mode		**ESI required**	**Network element type** (see Note 1)	**Shelf clock source**	**Possible timing references** (see Note 2)
External timing		yes	NWK ring ADM, VTM ring ADM, linear ADM, linear terminal	ESI	BITSA, BITSB
Line timing	ESI line timing	yes	NWK ring ADM, VTM ring ADM, linear ADM, linear terminal (see Note 3)	ESI	G1, G2 for linear terminal and VTM ring; G1, G1S for NWK ring; G1, G2, G1S, G2S for linear ADM
	VTM line timing	no	VTM ring ADM	VTM line timed	G1, G2
	Primary optics timing	no	linear ADM	primary optics	not applicable
Loop timing		no	linear terminal	loop timed	not applicable

—continued—

Table 6-1 (continued)
Shelf clock source and timing reference settings for each shelf timing mode

Shelf timing mode	ESI required	Network element type (see Note 1)	Shelf clock source	Possible timing references (see Note 2)
Through timing	no	OC-12 regenerator	through timed (see Note 4)	not applicable
Shelf freerun	no	NWK ring ADM, VTM ring ADM, linear ADM, linear terminal	freerun	not applicable

Note 1: Linear systems contain OC-12 networking interface circuit packs (NT7E02) or OC-3 networking interface circuit packs (NT7E01). NWK rings contain OC-12 networking interface circuit packs (NT7E02). VTM rings contain OC-12 VTM circuit packs (NT7E05).

Note 2: When the shelf clock source is ESI, the timing reference determines if the shelf timing mode is external timing or line timing. In other cases, you only need the shelf clock source to determine the shelf timing mode.

Note 3: On terminal network elements with ESI equipment, when the shelf clock source is ESI and the timing references are G1 or G2, the shelf timing mode is line timing. On OC-48 network elements, Nortel Networks calls the same case loop timing.

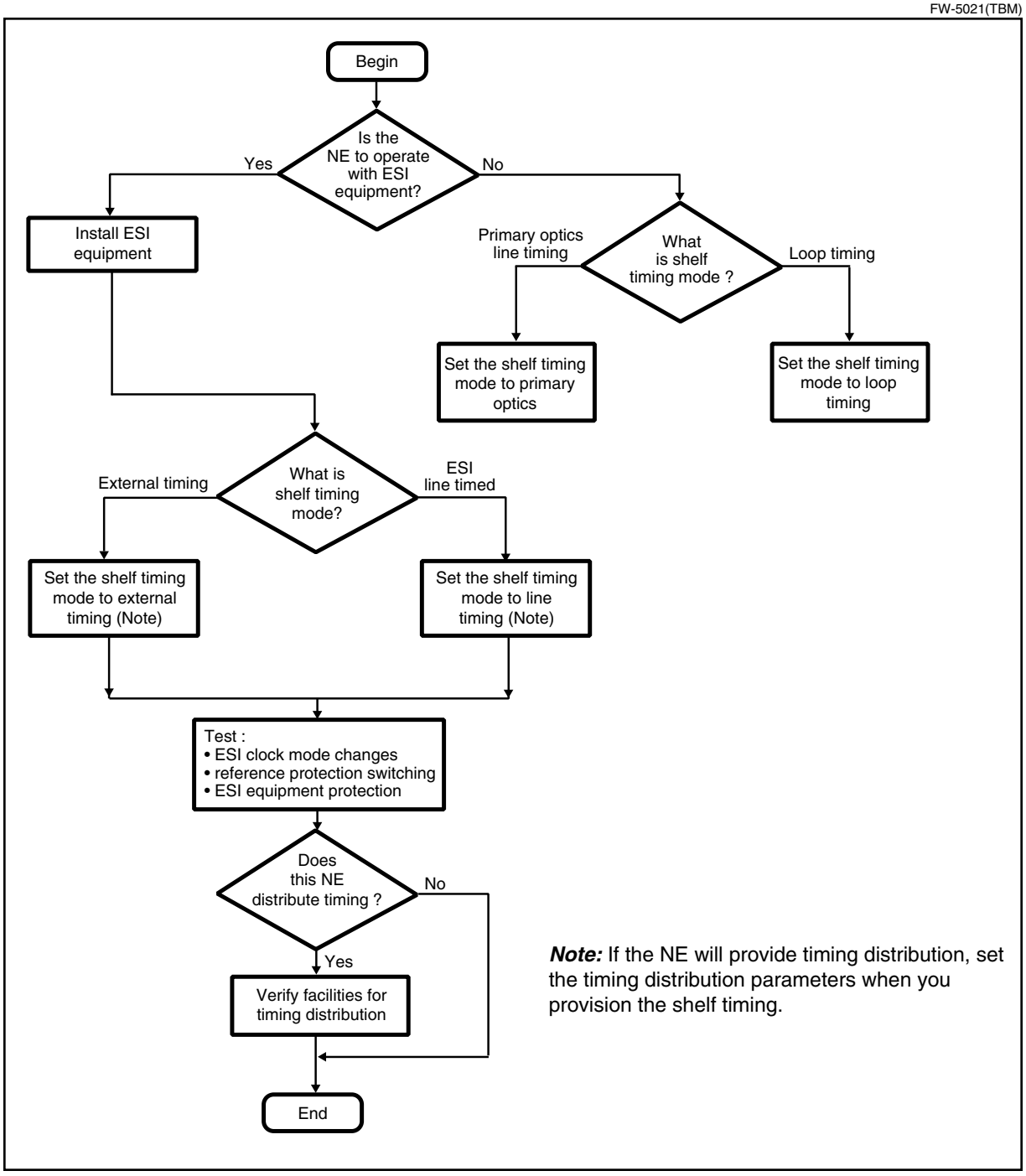
Note 4: On regenerator shelves, the clock source is always through timed. You cannot change this setting.

Table 6-2
Holdover and freerun shelf timing modes

Shelf timing mode	Equipped with ESI	Shelf clock source	Current clock mode	Clock stability
ESI holdover	yes	ESI	holdover	±0.37 ppm over 24 hours (0 to +50°C); ±2.0 ppm over 24 hours (-40 to +65°C)
VTM holdover	no	VTM line timed	holdover	±4.6 ppm over 24 hours (maximum temperature variation of 17°C)
ESI freerun	yes	ESI	freerun	±4.6 ppm (-40 to +65°C)
VTM freerun	no	VTM line timed	freerun	±20 ppm (-40 to +65°C)
Shelf freerun	no	freerun	freerun	±20 ppm (-40 to +65°C)

Figure 6-1
Flow chart of shelf timing commissioning tasks for linear systems

FW-5021(TBM)



Note: If the NE will provide timing distribution, set the timing distribution parameters when you provision the shelf timing.

Figure 6-2
Flowchart of commissioning tasks for NWK ring systems

FW-5023(TBM)

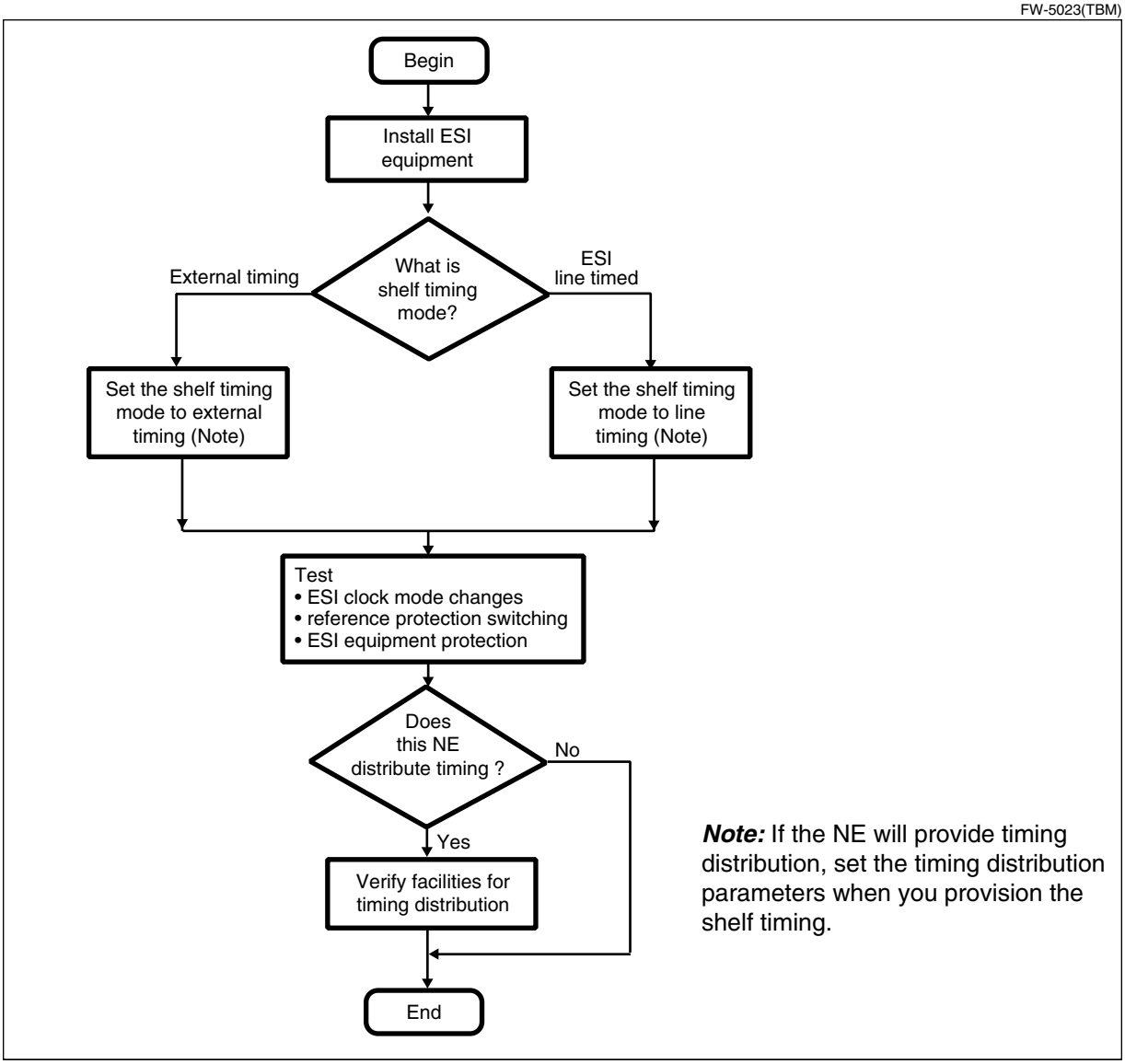
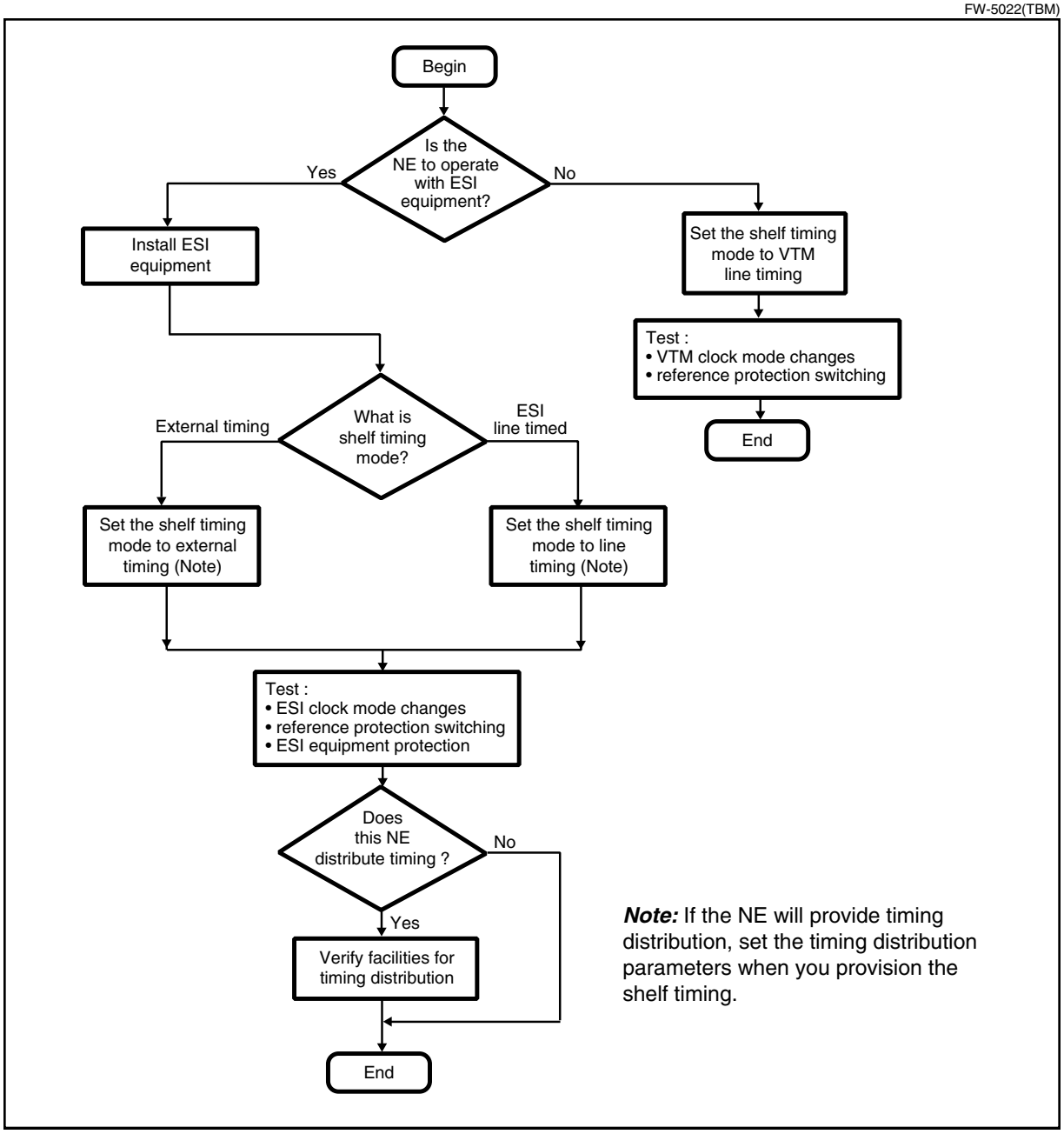


Figure 6-3
Flow chart of shelf timing commissioning tasks for VTM ring systems

FW-5022(TBM)



Note: If the NE will provide timing distribution, set the timing distribution parameters when you provision the shelf timing.

External synchronization interfaces (ESI)

External synchronization interface (ESI) units enable the network element to

- input timing from an external source,
- improve the timing accuracy when all timing references fail, through ESI holdover or ESI freerun, and
- provide timing distribution.

Table 6-1 on page 6-3 shows the shelf timing modes that require ESI equipment. When the shelf timing mode is external timing, the ESI units input timing from an external source. When all timing references of the ESI fail, the ESI improves the timing accuracy through ESI holdover. The ESI has a 24 hour holdover period. (See Table 6-2 for ESI holdover clock stability.) All network elements equipped with ESI units, regardless of their shelf timing mode, can distribute timing references to a BITS.

The ESI equipment operates in a 1+1 protection mode. However, if you have only one ESI unit, you must install the unit in the upper position in the ESI carrier. For procedures on ESI protections switching, see *Protection Switching Procedures*, 323-1111-311.

See *Timing and Synchronization Description*, 323-1111-192, for guidelines on equipping ESI in OC-3/OC-12 TBM systems.

Synchronization status messaging

Synchronization status messaging allows systems to communicate information about the quality of their timing references. These messages enable a network to use the best timing source available, even when degradation or failures in the timing signals occur. Synchronization status messaging reduces the potential for timing loops and hierarchy violations.

With synchronization status messaging, the network element

- monitors the quality level of the available timing reference signals,
- selects the timing reference with the highest clock quality level, and
- performs an automatic timing reference switch, if necessary, when the available timing references or their clock quality levels change.

Table 6-3 shows the clock quality levels as defined by the SONET standard.

Table 6-3
Synchronization status messages

Acronym	Description	Quality level
ST1	Stratum 1 traceable to the primary reference source	1
STU	Synchronized – traceability unknown	2
ST2	Stratum 2	3
ST3	Stratum 3	4
SMC	SONET minimum clock (±20 ppm)	5
ST4	Traceable Stratum 4 (not supported in this release)	6
DUS	Do not use for synchronization	7
RES	Reserved for network synchronization use (not supported in this release)	As assigned by the user

You can provision your system to communicate synchronization status messages between network elements. The S1 byte of the SONET overhead carries the synchronization status messages between network elements. You can also provision network elements with ESI equipment to carry synchronization status messages between the BITS and the ESI equipment. The DS1 datalink of the extended superframe (ESF) format carries synchronization status messages between ESIs and BITS.

DS1 ESF synchronization status messaging enables the following:

- the ESI to receive synchronization status messages from the BITS at externally timed network elements
- the BITS to receive synchronization status messages from the ESI at network elements that provide timing distribution

OC-12 linear systems and NWK rings support synchronization status messaging as long as all ADM network elements have ESI equipment. VTM rings support synchronization status messaging if ADMs have ESI equipment or are VTM line timed. It is recommended that you use synchronization status messaging in VTM rings that have VTM line timed ADMs, to minimize the time in VTM holdover.

Note: If you use synchronization status messaging to time a protected pair of OC-3 optics interfaces at an OPTera Metro 3000 or OC-3 Express network element by way of a protected pair of OC-3 tributaries on an OC-12 TBM network element, both of the OC-3 tributaries must be provisioned as timing references.

Synchronization status messaging is not supported on OC-3 NEs, primary optics timed NEs, and loop timed NEs. On ESI line timed OC-3 NEs, the clock quality level must therefore be provisioned as STU. TBM OC-3 NEs, line timed NEs and primary optics timed NEs transmit SMC to downstream NEs.

Network elements with ESI versions NT7E2CA/EA support synchronization status messaging between ESI and BITS in the extended superframe (ESF) format of the DS1 signal. For the ESI to receive DS1 ESF synchronization status messages from a BITS source, the BITS must send DS1 signals in ESF framing format and carry synchronization status messages.

You can provision the quality level transmitted on OC-12 line optics, OC-3 tributaries, and the ESI output facilities G1OUT and G2OUT by using the edittx command within the command interpreter tool, SYNCMSGCI. For example, you can provision the quality level transmitted on an OC-3 tributary to DUS to prevent a downstream node from timing from the OC-12 NE.

Table 6-4 summarizes the availability of synchronization status messaging in OC-3/OC-12 TBM systems.

Table 6-4
Availability of synchronization status messaging in OC-3/OC-12 TBM systems

System type	S1 byte synchronization status messaging between network elements	DS1 ESF synchronization status messaging between ESI and BITS
OC-3 linear	not supported	not supported
OC-12 linear	supported only if equipped with ESI at all ADM network elements	supported at network elements with ESI version NT7E27CA/EA
NWK ring	supported only if equipped with ESI at all network elements	supported at network elements with ESI version NT7E27CA/EA
VTM ring	supported if ESI equipped at one or more network elements	supported at network elements with ESI version NT7E27CA/EA
Note: Synchronization status messaging is not supported on OC-3 NEs, primary optics timed NEs, and loop timed NEs. On ESI line timed OC-3 NEs, the clock quality level must therefore be provisioned as STU. TBM OC-3 NEs, line timed NEs and primary optics timed NEs transmit SMC to downstream NEs.		

Synchronization status messaging command interpreter (SYNCMSGCI)
You can query the synchronization status messages using a query message command (qrymsg) within the synchronization messaging command interpreter tool, SYNCMSGCI. The query displays each facility that receives or transmits synchronization status messages, and shows the associated clock quality level.

The edittx command enables admin users to use the SYNCMSGCI to manually provision the synchronization status message transmitted on the OC-12 line optics, the OC-3 tributaries, and ESI DS1 outputs (G1OUT and G2OUT).

Timing inputs

Timing references

At line timed network elements, timing is derived and generated from the optics sources. To provision line timing, you must provision the source of the timing references.

At externally timed networks elements, the BITS (building-integrated timing supply) sends timing to the ESI through the ESI input facilities, BITSA and BITSB. To provision ESI timing input, you must provision the source of the timing references and the BITSA and BITSB input facilities.

You can provision up to four sources (numbered 1 to 4) as timing references for timing generation. In normal circumstances, timing reference number 1 has the highest priority and number 4 has the lowest priority. Systems that support synchronizations status messaging also use the clock quality levels of the timing references. Whenever two or more available sources carry the same clock quality message, the system selects the source with the highest priority for a reference protection switch.

You must set each timing reference source to one of the following values:

- the external timing sources; BITSA or BITSB
- the optics sources; OC-3/OC-12 G1, G2, G1S or G2S (the available optics sources depend on the network element type)
- or null, to disable the timing reference source

If your system has synchronization status messaging, you can use mix mode provisioning at externally timed network elements. Mix mode provisioning uses both external and optics sources for timing references.

For synchronization status messaging, you must assign a clock quality level for each timing reference. Both the timing reference source and the quality level appear on the timing reference protection screen of the network element user interface.

Table 6-5 summarizes the timing reference parameters and their possible values.

Table 6-5
Timing reference parameters

Parameter	Possible values	
Timing reference source	BITSA or BITSB	(external sources)
	OC-3/OC-12 G1, G2, G1S, G2S	(optics sources; source available depends on network element type)
	null	(disables the timing reference)
Clock quality level	st1, stu, st2, st3, smc	(assigns quality level; overrides synchronization status messages)
	dus	(do not use for synchronization)
	auto	(sets the quality level to that received in the synchronization status message)

Mix mode provisioning

You can use mix mode provisioning at externally timed OC-12 network elements that have synchronization status messaging.

Externally timed network elements are usually provisioned with two timing references, BITSA and BITSB. Line timed network elements are usually provisioned with one or two optical interfaces (for example, OC-12 G1 and OC-12 G2) as timing references sources.

Mix mode provisioning uses both external and optics sources for timing references. The network element allows you to provision up to four timing reference sources.

Mix mode provisioning provides better network timing survivability. Mix mode provisioning requires careful network planning to make sure timing loops do not form under fault conditions.

A summary of engineering guidelines for mix mode provisioning in ring and linear systems follows. For more details and illustrations of mix mode provisioning, see *Timing and Synchronization Description*, 323-1111-192.

Guidelines for mix mode provisioning in ring systems:

- Only use mix mode provisioning if you have more than one externally timed network element.
- You can use mix mode provisioning in a ring with two externally timed network elements. You must provision the following:
  - — one externally timed network element to have the clockwise optics provisioned as the source

— the other externally timed network element to have the counter-clockwise optics provisioned as the source

- You can use mix mode provisioning in a ring with more than two externally timed network elements. You must provision

  — one externally timed network element to have the clockwise optics provisioned as the source, and

  — another externally time network element to have the counter-clockwise optics provisioned as the source.

  You can provision both optics of the remaining externally timed network elements.

Guidelines for mix mode provisioning in linear systems:

- When you use mix mode provisioning in linear systems, there is no danger of forming timing loops.
- If a linear system only has one externally timed network element, there is no benefit in using mix mode provisioning.
- If a linear system has two or more externally timed network elements, provision the BITS sources as timing references 1 and 2, and the optics sources 3 and 4. At externally timed terminals, provision the OC-12 G1 optics as the third source.

DUS for ST3

You can use an additional option, called DUS for ST3, to customize the timing input at an externally timed network element. You access the DUS for ST3 command from the synchronization messaging command interpreter tool, SYNCMSGCI.

By default, whenever an ESI enters a non-normal clock mode (such as holdover), the NE sends an ST3 quality level in its synchronization message. The DUS for ST3 option enables you to change this default. You can provision the ESI to send DUS (do not use for synchronization) instead of ST3 when the ESI enters a non-normal clock mode.

You can benefit from this option when you have a downstream network element with the clock quality level ST3E. ST3E is a non-standard clock quality level, that has a greater accuracy than ST3. In synchronization status messaging, you can have an ST3E timing reference that uses the ST3 quality level message.

Therefore, if the following conditions occur:

- you have a downstream timing reference with the clock quality level ST3E, and
- you enable DUS for ST3 at the externally timed network element, and
- the externally timed network element loses all of its BITS input,

then the system will behave as follows:

- the externally timed network element enters holdover and sends DUS, and
- the downstream network element uses the more accurate ST3E timing reference for synchronization

ESI timing input facilities

To provision the ESI input facilities, BITSA and BITSB, you must set the line coding format, the signal format and the DS1 framing format. Table 6-6 on page 6-14 summarizes the parameters and possible values for the ESI input facilities.

Table 6-6
ESI input facility parameters

Parameter	Possible values	
Line coding format	AMI B8ZS	
Signal format	DS1 (bitsds) Composite clock (bitscc)	 (does not support synchronization status messaging)
DS1 framing format	Superframe (SF) Extended superframe (ESF)	(does not support synchronization status messaging) (required to receive synchronization status messages from BITS)

Timing distribution

You can distribute timing references from any network element with ESI equipment. Each ESI unit (G1 or G2) can provide one DS1 timing signal to synchronize external equipment, such as a BITS. The ESI uses its G1OUT and G2OUT facilities to distribute timing.

When you do not require timing distribution, you must set G1OUT and G2OUT out of service.

Timing distribution sources

The OC-3/OC-12 TBM refers to the two provisioned optics sources as OCA and OCB. The system assigns an optical interface (OC-3/OC-12 G1, G2, G1S or G2S depending on the network element type) for OCA and OCB. You can view the OCA and OCB assignments on the timing reference source screen of the NE user interface. You can also change the timing references assigned to OCA or OCB. Note that both internal shelf timing and timing distribution use the same OCA and OCB signals.

You can use the source tracking parameter to provision how the ESI derives the timing signal that it distributes on G1OUT and G2OUT. The source tracking parameter appears on the ESI facility screen. The source tracking can be set to ACT or OFF.

The effect of the ACT settings depends on whether a network element is line timed or externally timed.

When the source tracking is ACT:

- on line-timed network elements, the derived DS1 signal used for timing distribution follows the active OC-3 or OC-12 timing source
- on externally timed network elements, the derived DS1 used for timing distribution follows the OC-12 timing source with the highest quality synchronization status message

See *Timing and Synchronization Description*, 323-1111-192, for further information on the effect of the source tracking setting.

The effect of the OFF setting is the same for both line timed and externally timed network elements. When the source tracking is OFF, you use the source parameter in the ESI facility screen to directly assign OCA or OCB as sources for G1OUT and G2OUT.

You can provision the sources as follows:

- the G1OUT and G2OUT outputs for timing distribution, both come from a single OC-3 or OC-12 interface (that is, both come from OCA or both come from OCB), or
- the G1OUT outputs for timing distribution comes from one OC-3 or OC-12 interface and the G2OUT output for timing distribution comes from another OC-3 or OC-12 interface (that is, one comes from OCA and the other comes from OCB)

When the source tracking is OFF and the signal used to derive timing distribution fails, the ESI outputs an alarm indication signal (AIS) even if another timing signal is available.

You can use one of two methods to alert a BITS to a degradation in the clock quality level of the distributed timing signal:

- message pass-through mode, and
- alarm indication signal (AIS) generation mode.

The message pass-through mode requires the system to support synchronization status messaging between the ESI and BITS. In this mode, the BITS directly receives the quality level of the timing distribution signal.

In the AIS generation mode, if the synchronization status message contained within the OC-12 S1 byte is of equal or poorer quality than the user provisioned threshold value, the ESI DS1 output sends DS1 AIS.

You can use the ESI facility screen to provision the threshold AIS. If you set the AIS parameter to NULL, the ESI uses the message pass-through mode. If you set the threshold to a specific quality level, and the quality level of the timing reference source is equal to or poorer than the threshold, the ESI sends an AIS to the BITS.

Table 6-7 summarizes the timing distribution source parameters and possible values.

Table 6-7
Timing distribution source parameters

Parameter	Possible values	
Source tracking	ACT	(on line timed NEs, the system derives the timing from the active timing source; on externally timed NEs, the system derives the timing from the source with the highest quality synchronization status message)
	OFF	(source parameter used to provision whether timing distribution derived from OCA or OCB)
Source	OCA	
	OCB	
Threshold AIS	stu, st2, st3 or smc	sets the quality level for the threshold
	Null	disables the threshold AIS generation

ESI timing output facilities

To provision the ESI output facilities, G1OUT and G2OUT, you must set the line coding format, the DS1 framing format and the line build-out. Table 6-8 summarizes the parameters and possible values for the ESI output facilities.

Table 6-8
ESI output facility parameters

Parameter	Possible values	
DS1 framing format	Superframe (SF)	(does not support synchronization status messaging)
	Extended superframe (ESF)	(required to receive synchronization status messages from BITS)
Line build out	Short	0 to 46 m (0 to 150 ft)
	Medium	46 to 137 m (150 to 450 ft)
	Long	137 to 200 m (450 to 655 ft)

Default settings

When you power on a shelf for the first time or autoprovision the shelf, the settings for shelf timing and ESI are as shown in Table 6-9.

Table 6-9
Default settings

Shelf timing	
NE clock source	Freerun
ESI target clock mode	Normal
OC-12 target clock mode (for VTM network elements)	Normal
Sources assigned to OCA and OCB	
OCA	
for linear ADMs	OC-12 or OC-3 G1
for terminal ADMs	OC-12 or OC-3 G1
for NWK ring ADMs	OC-12 G1
for VTM ring ADMS	OC-12 G1
OCB	
for linear ADMs	OC-12 or OC-3 G2
for terminals	OC-12 or OC-3 G2
for NWK ring ADMs	OC-12 G1S
for VTM ring ADMs	OC-12 G2
Timing references	
Timing reference #1 source	BITSA if ESI equipped (otherwise Null)
Timing reference #2 source	BITSB if ESI equipped (otherwise Null)
Timing reference #3 source	Null
Timing reference #4 source	Null
Clock quality level on BITSA	STU-P
Clock quality level on BITSB	STU-P
Clock quality level on optics assigned to OCA	STU-P
Clock quality level on optics assigned to OCB	STU-P
Status message when ESI enters non-normal state	ST3

—continued—

Table 6-9 (continued)
Default settings

ESI input facility parameters	
BITSA facility state	In-service (IS)
BITSB facility state	In-service (IS)
BITSA signal format	DS1
BITSB signal format	DS1
BITSA line coding format	B8ZS
BITSB line coding format	B8ZS
BITSA framing format	Superframe (SF)
BITSB framing format	Superframe (SF)
Timing distribution source parameters	
G1OUT source tracking	OFF
G2OUT source tracking	OFF
G1OUT source	OCA
G2OUT source	OCB
G1OUT threshold AIS	Null
G2OUT threshold AIS	Null
ESI output facility parameters	
G1OUT facility state	In-service (IS)
G2OUT facility state	In-service (IS)
G1OUT framing format	Superframe (SF)
G2OUT framing format	Superframe (SF)
G1OUT line build-out (LBO)	Short
G2OUT line build-out (LBO)	Short

Before you start

Before you start you must:

- know whether or not you require ESI equipment at the network element. If you require ESI equipment, install the ESI carrier and units as described in *System Expansion Procedures I,* 323-1111-224.

- know the shelf timing mode for the network element. Most planning departments specify the shelf timing mode. Planning departments must study the full network synchronization scheme to define the shelf timing mode for each network element.
- know whether your network element is a terminal, linear ADM, NWK ring ADM or VTM ring ADM.
- know whether or not the shelf needs an external source (for example, a BITS) to supply a timing reference. If you need an external reference to supply timing to the shelf, connect the supply to the shelf with the ESI cable as described in *Installation Procedures*, 323-1111-201.
- know whether or not you will use the network element for timing distribution. If you need the ESI equipment to distribute timing, install the ESI cable as described in *Installation Procedures*, 323-1111-201.

  Note: If you require synchronization status messaging between the ESI and BITS, you must use ESI version NT7E27CA or NT7E27EA.

CAUTION
Risk of traffic outage
Formation of a timing loop can cause a traffic outage. When you provision a timing reference on a system, make sure a timing loop is not formed. Refer to *Timing and Synchronization Description*, 323-1111-192, for advice on how to avoid timing loops.

Your shelf has default settings when you first power-on, as shown in Table 6-9. To provision shelf timing and ESI, you change the parameters as required for the network element.

You can provision shelf timing one parameter at a time. Alternatively, you can use the **setupesi** command within the SHELF_CLOCK_CI tool to provision all the required parameters.

Note: Run the setupesi command on only one NE at a time to ensure consistent results.

When the network element is equipped with ESI, the **setupesi** command also provisions timing distribution parameters. The setupesi command does not affect the state of the G1OUT and G2OUT timing distribution facilities. By default, G1OUT and G2OUT are in service. If you do not want to distribute timing, use Procedure 6-20 to set G1OUT and G2OUT out of service.

Table 6-10 gives references to the task lists that you can use to provision each shelf timing mode. The task lists provide the process to follow if you use the SHELF_CLOCK_CI tool or if you set each of the parameters individually. Table 6-11 summarizes other ESI provisioning tasks.

Table 6-10
Overview of task lists on how to provision shelf timing for each network element type

Shelf timing mode		Network element type	Equipped with ESI	Task list and page
External timing		NWK ring ADM, VTM ring ADM,	yes	"Setting the shelf timing mode to external timing on ring NEs" on page 6-23
		linear ADM, linear terminal	yes	"Setting the shelf timing mode to external timing on linear NEs" on page 6-24
Line timing	ESI line timing	NWK ring ADM, VTM ring ADM	yes	"Setting the shelf timing mode to ESI line timing on ring NEs" on page 6-26
		linear ADM, linear terminal	yes	"Setting the shelf timing mode to ESI line timing on linear NEs" on page 6-27
	VTM line timing	VTM ring ADM	no	"Setting the shelf timing mode to VTM line timing on VTM NEs" on page 6-29
	primary optics timing	linear ADM	no	"Setting the shelf timing mode to primary optics timing on linear ADMs" on page 6-30
Loop timing		linear terminal	no	"Setting the shelf timing mode to loop timing on terminal NEs" on page 6-31
Shelf freerun		NWK ring ADM, VTM ring ADM, linear ADM, linear terminal	no	"Setting the shelf timing mode to shelf freerun (on new systems)" on page 6-32
ESI freerun or holdover		NWK ring ADM, VTM ring ADM, linear ADM, linear terminal	yes	"Setting the shelf timing mode to ESI freerun or ESI holdover" on page 6-33
VTM freerun or holdover		VTM ring ADM	no	"Setting the shelf timing mode to VTM freerun or VTM holdover" on page 6-33

Table 6-11
Summary of other ESI provisioning task lists

Description of task	Task lists
Provisioning any network element with ESI equipment to provide timing distribution	"Provisioning timing distribution" on page 6-32
Setting whether the ESI sends a DUS or ST3 synchronization status message when it enters a non-normal clock mode	"Enabling or disabling the DUS for ST3 option" on page 6-33
Querying synchronization status messages	"Querying synchronization status messages" on page 6-33

Chapter task lists

Setting the shelf timing mode to external timing on ring NEs

You can use the **setupesi external** command to provision external timing. Alternatively, you can provision each parameter individually. The **setupesi external** command provides the option to provision timing distribution.

Automated setup (external timing on ring ADM network elements)

Task	Reference
Set the shelf timing mode to external timing	page 6-34
If you do not require timing distribution, set G1OUT and G2OUT out of service	page 6-91
Change any individual parameters, as required, following the task lists for Manual setup (external timing on ring ADM network elements) and Provisioning timing distribution	page 6-23 and page 6-32

Manual setup (external timing on ring ADM network elements)

Task	Reference
Set the shelf clock source to ESI	page 6-54
Set the ESI target clock mode to normal	page 6-56
Set the source for timing references number 1 to BITSA or BITSB and number 2 to BITSA, BITSB or null, as required	page 6-60
Set the source for timing references number 3 and 4 to null. For mix mode provisioning, set 3 to an optics source and 4 to null, or both 3 and 4 to optics sources. (Refer to mix mode provisioning in *Timing and Synchronization Description*, 323-1111-192)	page 6-60
Set the clock quality level for timing references number 1 and 2; - to allow DS1 ESF synchronization status messaging, set the clock quality level for both sources to auto - to disable DS1 ESF synchronization status messaging, set the clock quality level for both sources to STU For mix mode provisioning, set the clock quality levels for timing references number 3 and 4 to auto	page 6-64
Set the line coding format for BITSA and BITSB	page 6-70
Set the framing format for BITSA and BITSB (to receive synchronization status messages from BITSA and BITSB, the framing format must be extended superframe (ESF))	page 6-72

—continued—

Task (continued)	Reference
Set the signal format for BITSA and BITSB	page 6-74
If required, enable the DUS for ST3 option	page 6-86
If you do not require timing distribution, set G1OUT and G2OUT out of service	page 6-91

Setting the shelf timing mode to external timing on linear NEs

You can use the **setupesi** command to provision external timing. Alternatively, you can provision each parameter individually. The **setupesi external** command provides the option to provision timing distribution.

> ***Note:*** On OC-3 NEs, you must use the manual setup procedure, "Manual setup (external timing on linear network elements)" on page 6-25.

Automated setup (external timing on linear network elements)

Task	Reference
If you require synchronization status messaging, enable SONET overhead on the working and protection OC-12 line-side interfaces (see Note)	Procedure to enable SONET overhead on working and protection OC-12 interfaces in 323-1111-310
Set the shelf timing mode to external timing	page 6-34
If you do not require timing distribution, set G1OUT and G2OUT out of service	page 6-91
Change any individual parameters, as required, following the task lists for Manual setup (external timing on linear network elements) and Provisioning timing distribution	page 6-25 and page 6-32
Note:Do not enable SONET overhead on the working and protection channels - when the OC-12 line-side interfaces connect with OC-12 drop-side interfaces of an OC-48 network element - when the OC-12 line-side interfaces connect with non-Nortel Networks equipment and the non-Nortel Networks equipment does not support enabling the SONET overhead on both working and protection OC-12 interfaces	

Manual setup (external timing on linear network elements)

Task	Reference
If you require synchronization status messaging, enable SONET overhead on the working and protection OC-12 line-side interfaces (see Note)	Procedure to enable SONET overhead on working and protection OC-12 interfaces in 323-1111-310
Set the shelf clock source to ESI	page 6-54
Set the ESI target clock mode to normal	page 6-56
Set the source for timing references number 1 to BITSA or BITSB and number 2 to BITSA, BITSB or null, as required	page 6-60
Set the source for timing references number 3 and 4 to null. For mix mode provisioning, set 3 to an optics source and 4 to null, or both 3 and 4 to optics sources. (See to mix mode provisioning in *Timing and Synchronization Description*, 323-1111-192)	page 6-60
Set the clock quality level for timing references number 1 and 2; - to allow DS1 ESF synchronization status messaging, set the clock quality level for both sources to auto - to disable DS1 ESF synchronization status messaging, set the clock quality level for both sources to STU For mix mode provisioning, set the clock quality levels for timing references number 3 and 4 to auto	page 6-64
Set the line coding format for BITSA and BITSB	page 6-70
Set the framing format for BITSA and BITSB (to receive synchronization status messages from BITSA and BITSB, the framing format must be extended superframe (ESF))	page 6-72
Set the signal format for BITSA and BITSB	page 6-74
Set the BITSA and BITSB facilities in service	page 6-91
If required, enable the DUS for ST3 option	page 6-86
If you do not require timing distribution, set G1OUT and G2OUT out of service	page 6-91
Note:Do not enable SONET overhead on the working and protection channels - when the OC-12 line-side interfaces connect with OC-12 drop-side interfaces of an OC-48 network element - when the OC-12 line-side interfaces connect with non-Nortel Networks equipment and the non-Nortel Networks equipment does not support enabling the SONET overhead on both working and protection OC-12 interfaces	

Setting the shelf timing mode to ESI line timing on ring NEs

You can use the **setupesi linetimed** command to provision ESI line timing. Alternatively, you can provision each parameter individually. The **setupesi linetimed** command provides the option to provision timing distribution.

Automated setup (ESI line timing on ring ADM network elements)

Task	Reference
Set the shelf timing mode to ESI line timing	page 6-40
If you do not require timing distribution, set G1OUT and G2OUT out of service	page 6-91
Change any individual parameters, as required, following the task lists for Manual setup (ESI line timing on ring ADM network elements) and Provisioning timing distribution	page 6-26 and page 6-32

Manual setup (ESI line timing on ring ADM network elements)

Task	Reference
Set the shelf clock source to ESI	page 6-54
Set the ESI target clock mode to normal	page 6-56
Set the source for timing reference number 1 to OC-12 G1 or OC-12 G2 for VTM ring ADMs and OC-12 G1 or OC-12 G1S for NWK ring ADMs, as required	page 6-60
Set the source for timing reference number 2 to OC-12 G2 or OC-12 G1 for VTM ring ADMs and OC-12 G1S or OC-12 G1 for NWK ring ADMs, as required	page 6-60
Set the source for timing references number 3 and 4 to null	page 6-60
Set the clock quality level for timing references number 1 and 2; - to allow synchronization status messaging, set the clock quality level for both sources to auto - to disable synchronization status messaging, set the clock quality level for both sources to STU	page 6-64
Set BITSA and BITSB facilities out of service	page 6-91
If you do not require timing distribution, set G1OUT and G2OUT out of service	page 6-91

Setting the shelf timing mode to ESI line timing on linear NEs

You can use the **setupesi linetimed** command to provision ESI line timing. Alternatively, you can provision each parameter individually. The **setupesi linetimed** command provides the option to provision timing distribution.

Note: On OC-3 NEs, you must use the manual setup procedure, "Manual setup (ESI line timing on linear network elements)" on page 6-28.

Automated setup (ESI line timing on linear network elements)

Task	Reference
If you require synchronization status messaging, enable SONET overhead on the working and protection OC-12 line-side interfaces (see Note)	Procedure to enable SONET overhead on working and protection OC-12 interfaces in 323-1111-310
Set the shelf timing mode to ESI line timing	page 6-40
If you do not require timing distribution, set G1OUT and G2OUT out of service	page 6-91
Change any individual parameters, as required, following the task lists for Manual setup (ESI line timing on linear network elements) and Provisioning timing distribution	page 6-28 and page 6-32
Note:Do not enable SONET overhead on the working and protection channels -when the OC-12 line-side interfaces connect with OC-12 drop-side interfaces of an OC-48 network element -when the OC-12 line-side interfaces connect with non-Nortel Networks equipment and the non-Nortel Networks equipment does not support enabling the SONET overhead on both working and protection OC-12 interfaces	

Manual setup (ESI line timing on linear network elements)

Task	Reference
If you require synchronization status messaging, enable SONET overhead on the working and protection OC-12 line-side interfaces (see Note)	Procedure to enable SONET overhead on working and protection OC-12 interfaces in 323-1111-310
Set the shelf clock source to ESI	page 6-54
Set the ESI target clock mode to normal	page 6-56
If you want to use optics sources other than OC-12 G1 and OC-12 G2, change the assignments of the internal sources OCA and OCB according to your requirements	page 6-66
Set the source for timing reference number 1 to OC-12 G1, OC-12 G1S, OC-12 G2 or OC-12 G2S, as required	page 6-60
Set the source for timing reference number 2 to OC-12 G2, OC-12 G2S, OC-12 G1, OC-12 G1S or null, as required	page 6-60
Set the source for timing references number 3 and 4 to null	page 6-60
Set the clock quality level for timing references number 1 and 2; - to allow synchronization status messaging, set the clock quality level for both sources to auto - to disable synchronization status messaging, set the clock quality level for both sources to STU; on OC-3 NEs, you must disable synchronization status messaging	page 6-64
Set BITSA and BITSB facilities out of service	page 6-91
If you do not require timing distribution, set G1OUT and G2OUT out of service	page 6-91
Note:Do not enable SONET overhead on the working and protection channels -when the OC-12 line-side interfaces connect with OC-12 drop-side interfaces of an OC-48 network element -when the OC-12 line-side interfaces connect with non-Nortel Networks equipment and the non-Nortel Networks equipment does not support enabling the SONET overhead on both working and protection OC-12 interfaces	

Setting the shelf timing mode to VTM line timing on VTM NEs

You can use the **setupesi vtmlinetimed** command to provision VTM line timing. Alternatively, you can provision each parameter individually.

Automated setup (VTM line timing)

Task	Reference
Set the shelf timing mode to VTM line timing	page 6-45
Change any individual parameters, as required following the task list for Manual setup (VTM line timing)	page 6-29

Manual setup (VTM line timing)

Task	Reference
Set the shelf clock source to VTM line timed	page 6-54
Set the VTM target clock mode to normal	page 6-58
Set the source for timing reference number 1 to OC-12 G1 or OC-12 G2, as required	page 6-60
Set the source for timing reference number 2 to OC-12 G2, OC-12 G1 or null, as required	page 6-60
Set the source for timing references number 3 and 4 to null	page 6-60
Set the clock quality level for timing reference numbers 1 and 2; - to allow synchronization status messaging, set the clock quality level for both sources to auto - to disable synchronization status messaging, set the clock quality level for both sources to STU	page 6-64

Setting the shelf timing mode to primary optics timing on linear ADMs

You can use the **setupesi primaryoptics** command to provision primary optics timing. Alternatively, you can provision each parameter individually.

Automated setup (primary optics timing)

Task	Reference
Set the shelf timing mode to primary optics timing	page 6-48
Change any individual parameters, as required, following the task lists for Manual setup (primary optics timing)	page 6-30

Manual setup (primary optics timing)

Task	Reference
Set the shelf clock source to primary optics	page 6-54
Set the source for timing references number 1 to 4 to null (See Note)	page 6-60
Note: This task is optional. When the shelf timing mode is primary optics, the timing references in the timing reference protection screen are not used. Setting these timing reference to null enables the screen to show that these references are not used.	

Setting the shelf timing mode to loop timing on terminal NEs

You can use the **setupesi** command to provision loop timing. Alternatively, you can provision each parameter individually.

> ***Note:*** On OC-3 NEs, you must use the manual setup procedure, "Manual setup (ESI line timing on linear network elements)" on page 6-28.

Automated setup (loop timing)

Task	Reference
If you require synchronization status messaging, enable SONET overhead on the working and protection OC-12 line-side interfaces (see Note)	Procedure to enable SONET overhead on working and protection OC-12 interfaces in 323-1111-310
Set the shelf timing mode to loop timing	page 6-51
Change any individual parameters, as required, following the task lists for Manual setup (loop timing)	page 6-31

Manual setup (loop timing)

Task	Reference
If you require synchronization status messaging, enable SONET overhead on the working and protection OC-12 line-side interfaces (see Note 1)	Procedure to enable SONET overhead on working and protection OC-12 interfaces in 323-1111-310
Set the shelf clock source to loop timing	page 6-54
Set the source for timing references number 1 to 4 to null (see Note 2)	page 6-60

Note 1: Do not enable SONET overhead on the working and protection channels
-when the OC-12 line-side interfaces connect with OC-12 drop-side interfaces of an OC-48 network element
-when the OC-12 line-side interfaces connect with non-Nortel Networks equipment and the non-Nortel Networks equipment does not support enabling the SONET overhead on both working and protection OC-12 interfaces

Note 2: This task is optional. When the shelf timing mode is loop timing, the timing references in the timing reference protection screen are not used. Setting these timing reference to null enables the screen to show that these references are not used. Although leaving the references provisioned will not affect operation, unnecessary ESI BITS A and BITS B timing reference interface fail alarms may result.

Provisioning timing distribution

Task	Reference
Set the framing format for G1OUT and G2OUT	page 6-72
Set the line build-out for G1OUT and G2OUT	page 6-77
Set the timing distribution source tracking and source for G1OUT and G2OUT	page 6-79
Set the G1OUT and G2OUT facilities in service	page 6-91
Set the AIS threshold for G1OUT and G2OUT	page 6-83

Note 1: If you do not require timing distribution, set G1OUT and G2OUT facilities out of service. Failure to do so may lead to unexpected synchronization message behavior or alarms. (Refer to Procedure 6-20.)

Note 2: To allow synchronization status message insertion in a DS1 output signal (that is, G1OUT or G2OUT),
- the network element must have ESI version NT7E27CA or NT7E27EA circuit packs, and
- the G1OUT and G2OUT facilities must use the framing format, extended superframe (ESF).

Note 3: To upgrade the ESI subunit for synchronization status messaging with in-service systems, refer to *System Expansion Procedures I*, 323-1111-224.

Setting the shelf timing mode to shelf freerun (on new systems)

Task	Reference
Set the shelf clock source to shelf freerun	page 6-54

Setting the shelf timing mode to ESI freerun or ESI holdover

Task	Reference
Set the shelf clock source to ESI	page 6-54
Set the ESI target mode to freerun or holdover	page 6-56

Setting the shelf timing mode to VTM freerun or VTM holdover

Task	Reference
Set the shelf clock source to vtm line timed	page 6-54
Set the VTM target mode to freerun or holdover	page 6-58

Enabling or disabling the DUS for ST3 option

Task	Reference
Enable or disable the DUS for ST3 option	page 6-86

Querying synchronization status messages

Task	Reference
To display the synchronization status message	page 6-88

Provision the clock quality level inserted into a timing signal

Task	Reference
To manually provision the clock quality level	page 6-92

Procedure 6-1
Setting the shelf timing mode to external timing

Use this procedure to provision a shelf for external timing, using the command interpreter (CI) tool SHELF_CLOCK_CI and the **setupesi external** command.

> ***Note:*** Run the setupesi command on only one NE at a time to ensure consistent results.

The **setupesi external** command provisions all external synchronization interface (ESI) parameters required for setting the shelf timing mode to external timing. It also provisions the ESI for timing distribution. Table 6-12 on page 6-38 provides a list of the ESI parameters and their associated values. Once the parameters are set using the tool, you can manually change the value of any parameter to accommodate particular needs.

> ***Note 1:*** Do not use CI commands while using the **selectNE** command. You can only use CI commands at the local network element.
>
> ***Note 2:*** You cannot use this procedure at OC-3 network elements.

Requirements

Before you start this procedure, you must:

- make sure you provisioned the OC-12 optical interface circuit packs
- make sure you already installed and provisioned the ESI circuit packs
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)
- understand the implications of changing the shelf timing mode (see *Timing and Synchronization Description*, 323-1111-192)

  Note 1: To allow synchronization status message extraction from a DS1 input signal (that is, BITSA or BITSB)

  — the network element must have ESI version NT7E27CA or NT7E27EA circuit packs, and

  — the BITSA and BITSB facilities must use the framing format, extended superframe (ESF)

  — the external BITS source must provide DS1 signals in ESF framing format and carry synchronization status messages

—continued—

Procedure 6-1 (continued)
Setting the shelf timing mode to external timing

Note 2: To allow synchronization status message insertion in a DS1 output signal (that is, G1OUT or G2OUT)

— the network element must have ESI version NT7E27CA or NT7E27EA circuit packs, and

— the G1OUT and G2OUT facilities must use the framing format, extended superframe (ESF)

Note 3: To upgrade the ESI unit for synchronization status messaging with in-service systems, refer to *System Expansion Procedures I*, 323-1111-224.

Note 4: If you do not require timing distribution, set both the G1OUT and G2OUT facilities out of service. Failure to do so can lead to unexpected synchronization message behavior or alarms.

Step	Action

CAUTION
Risk of ESI failure
Do not run the excerciser while using the **setupesi** command.

CAUTION
Risk of traffic loss
The following command affects network synchronization, and can affect traffic. To avoid timing loops, verify the clock source setting of each network element in the system. An incorrect clock source setting can cause a service outage.

1 Access the SHELF_CLOCK_CI command interpreter (CI) tool by entering:

shelf_clock_ci ↵

—continued—

Procedure 6-1 (continued)
Setting the shelf timing mode to external timing

Step	Action
2	Set the shelf timing mode to external timing by entering: **setupesi external <frame format> <messaging> [threshold] [mix mode]** ↵ **yes** ↵ where **<frame format>** is **sf** for superframe (SF) format or **esf** for extended superframe (ESF) format **<messaging>** is **msgon** to enable synchronization status messaging, or **msgoff** to disable synchronization status messaging **[threshold]** is **stu, st2, st3, smc** or **null** for setting the AIS threshold for G1OUT and G2OUT; when this parameter is omitted, the AIS threshold is set according to the framing parameter (see Table 6-12 on page 6-38) **[mix mode]** is **off** or omitted for setting the source for timing references number 3 and 4 to null is **oca** for setting the source for timing reference number 3 to the optics assigned to OCA and reference number 4 to null is **ocb** for setting the source for timing reference number 3 to the optics assigned for OCB and reference number 4 to null is **on** for setting the source for timing reference number 3 to the optics assigned for OCA and number 4 to the optics assigned for OCB ***Note 1:*** The threshold and mix mode parameters are optional. ***Note 2:*** See Table 6-12 on page 6-38 for a list of parameters affected by the command. ***Note 3:*** On linear ADMs, to use the mix mode parameters **oca**, **ocb** or **on**, the optics assigned to OCA must be OC-12 G1 and the optics assigned to OCB must be OC-12 G2. If you want to set timing reference numbers 3 and 4 to OC-12 G1S or OC-12 G2S, perform Procedures 6-9 and 6-11 after you complete this procedure. *The screen displays a list of the parameters changed and their old and new values.*

—continued—

Procedure 6-1 (continued)
Setting the shelf timing mode to external timing

Step	Action
3	Determine whether or not the command was successful. **If** the command / **Then** go to is successful — step 4 fails — step 1 If the command fails the second time, contact your next level of support or your Nortel Networks support group.
4	Quit the SHELF_CLOCK_CI tool by entering: **quit** ↵
5	To change any of the parameters defined automatically in step 2, refer to the following task lists: • "Setting the shelf timing mode to external timing on ring NEs" on page 6-23 • "Provisioning timing distribution" on page 6-32 Perform the required procedures.

—end—

Table 6-12
ESI parameter settings using the setupesi external command

Description	Value
NE clock source	ESI
ESI target clock mode	Normal (see Note)
Timing reference #1 source	BITSA
Timing reference #2 source	BITSB
Timing reference #3 source	NULL or as set by **[mix mode]**
Timing reference #4 source	NULL or as set by **[mix mode]**
Clock quality level for BITSA	STU-P **<messaging>** is **msgoff**) Auto (**<messaging>** is **msgon**)
Clock quality level for BITSB	STU-P (**<messaging>** is **msgoff**) Auto (**<messaging>** is **msgon**)
Clock quality level for the optics source assigned to OCA	STU-P (**<messaging>** is **msgoff**) Auto (**<messaging>** is **msgon**)
Clock quality level for the optics source assigned to OCB	STU-P (**<messaging>** is **msgoff**) Auto (**<messaging>** is **msgon**)
Source tracking for G1OUT	OFF
Source tracking for G2OUT	OFF
Timing distribution source for G1OUT	OCA
Timing distribution source for G2OUT	OCB
AIS threshold for G1OUT	SMC (**< frame format>** is **sf**) NULL (**< frame format>** is **esf**) or as set by **[threshold]**
AIS threshold for G2OUT	SMC (**< frame format>** is **sf**) NULL (**< frame format>** is **esf**) or as set by **[threshold]**
BITSA facility state	IS
BITSB facility state	IS
Framing format for BITSA	SF (**<frame format>** is **sf**) ESF ((**<frame format>** is **esf**)

—continued—

Table 6-12 (continued)
ESI parameter settings using the setupesi external command

Description	Value
Framing format for BITSB	SF (**<frame format>** is **sf**) ESF (**<frame format>** is **esf**)
Framing format for G1OUT	SF (**<frame format>** is **sf**) ESF (**<frame format>** is **esf**)
Framing format for G2OUT	SF (**<frame format>** is **sf**) ESF (**<frame format>** is **esf**)
Note:The target clock mode changes to Holdover momentarily as the command progresses. The value then changes to Normal.	

Procedure 6-2
Setting the shelf timing mode to ESI line timing

Use this procedure to provision a shelf for ESI line timing, using the command interpreter (CI) tool SHELF_CLOCK_CI and the **setupesi linetimed** command.

> ***Note:*** Run the setupesi command on only one NE at a time to ensure consistent results.

The **setupesi linetimed** command provisions all the external synchronization interface (ESI) parameters required for setting the shelf timing mode to ESI line timing. It also provisions the ESI for timing distribution. Table 6-13 on page 6-43 provides a list of the ESI parameters and their associated values. Once the parameters are set using the tool, you can manually change the value of any parameter to accommodate particular needs.

> ***Note 1:*** This procedure applies to ADMs and terminals with ESI equipment.
>
> ***Note 2:*** You cannot use this procedure on OC-3 network elements.
>
> ***Note 3:*** The procedure does not apply to VTM network elements without ESI circuit packs. To automatically provision line timing on a VTM network elements without ESI circuit packs, follow Procedure 6-3.
>
> ***Note 4:*** Do not use the **setupesi linetimed** command on a network element that is already line-timed, to set the timing reference sources to the default values. If you wish to change the timing reference sources, follow Procedure 6-9.
>
> ***Note 5:*** Do not use CI commands while using the **selectNE** command. CI commands can only be executed at the local network element.
>
> ***Note 6:*** For linear ADMs, the **setupesi linetimed** command sets the timing references to OC-12 G1 and OC-12 G2. If you want to set the timing reference sources to OC-12 G1S and OC-12 G2S, perform Procedure 6-9 and Procedure 6-11 after you complete this procedure.
>
> ***Note 7:*** If you do not require timing distribution, set both the G1OUT and G2OUT facilities out of service. Failure to do so can lead to unexpected synchronization message behavior or alarms.

Requirements

Before starting this procedure, you must:

- make sure you provisioned the OC-12 optical interface circuit packs
- make sure you installed and provisioned the ESI circuit packs

—continued—

Procedure 6-2 (continued)
Setting the shelf timing mode to ESI line timing

- for synchronization status messaging on linear systems, make sure the SONET overhead is enabled on both the working and the protection OC-12 interfaces. For instructions on enabling SONET overhead on working and protection OC-12 interfaces, see the procedure to enable SONET overhead on working and protection OC-12 interfaces in *Provisioning and Operations Procedures*, 323-1111-310.
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)
- understand the implications of changing the shelf timing mode (see *Timing and Synchronization Description*, 323-1111-192)

Action

Step	Action

CAUTION
Risk of ESI failure
Do not run the excerciser while using the **setupesi** command.

CAUTION
Risk of traffic loss
The following command affects network synchronization, and can affect traffic. To avoid timing loops, verify the clock source setting of each network element in the system. An incorrect clock source setting can cause a service outage.

1 Access the SHELF_CLOCK_CI command interpreter (CI) tool by entering:

shelf_clock_ci ↵

—continued—

Procedure 6-2 (continued)
Setting the shelf timing mode to ESI line timing

Step	Action
2	Set the shelf timing mode to line timing by entering: **setupesi linetimed <frame format> <messaging> [threshold]** ↵ **yes** ↵ where **<frame format>** is **sf** for superframe (SF) or **esf** for extended superframe (ESF) **<messaging>** is **msgon** to enable synchronization status messaging or **msgoff** to disable synchronization status messaging **[threshold]** is **stu**, **st2**, **st3, smc** or **null** for setting the AIS threshold for G1OUT and G2OUT; when this parameter is omitted, the AIS threshold is set according to the framing parameter (see Table 6-12 on page 6-38) ***Note 1:*** See Table 6-13 for a list of ESI parameters affected by the command. ***Note 2:*** The threshold parameter is optional. *The screen displays a list of the parameters changed and their old and new values.*
3	Determine whether or not the command was successful. **If** the command / **Then** go to is successful — step 4 fails — step 1 If the command fails the second time, contact your next level of support or your Nortel Networks support group.
4	Quit the SHELF_CLOCK_CI tool by entering: **quit** ↵
5	To change any of the parameters defined automatically in step 2, • for ring ADMs, refer to the task list, "Setting the shelf timing mode to ESI line timing on ring NEs" on page 6-26, or • for linear ADMs, refer to the task list, "Setting the shelf timing mode to ESI line timing on linear NEs" on page 6-27. • for timing distribution, refer to the task list, "Provisioning timing distribution" on page 6-32. Perform the required procedures.

—end—

Table 6-13
ESI parameter settings using the setupesi linetimed command

Description	Value
NE clock source	ESI
ESI target clock mode	Normal (see Note)
Source assigned to OCA	OC-12 G1
Source assigned to OCB	OC-12 G2 (for linear terminals or ADMs, and VTM ring ADMs), or OC-12 G1S (for NWK ring ADMs)
Timing reference #1 source	OC-12 G1
Timing reference #2 source	OC-12 G2 (for linear terminals or ADMs, and VTM ring ADMs), or OC-12 G1S (for NWK ring ADMs)
Timing reference #3 source	NULL
Timing reference #4 source	NULL
Clock quality level for reference #1	STU-P (**<messaging>** is **msgoff**) Auto (**<messaging>** is **msgon**)
Clock quality level for reference #2	STU-P (**<messaging>** is **msgoff**) Auto (**<messaging>** is **msgon**)
Clock quality level for reference #3 and #4	Not applicable
Source tracking for G1OUT	ACT
Source tracking for G2OUT	ACT
AIS threshold for G1OUT	SMC (**< frame format>** is **sf**) NULL (**< frame format>** is **esf**) or as set by **[threshold]**
AIS threshold for G2OUT	SMC (**< frame format>** is **sf**) NULL (**< frame format>** is **esf**) or as set by **[threshold]**
Framing format for G1OUT	SF (**<frame format>** is **sf**) ESF (**<frame format>** is **esf**)
Framing format for G2OUT	SF (**<frame format>** is **sf**) ESF (**<frame format>** is **esf**)
	—continued—

Table 6-13 (continued)
ESI parameter settings using the setupesi linetimed command

Description	Value
Framing format for BITSA	SF (**<frame format>** is **sf**) ESF (**<frame format>** is **esf**)
Framing format for BITSB	SF (**<frame format>** is **sf**) ESF (**<frame format>** is **esf**)
BITSA facility state	OOS
BITSB facility state	OOS
Note: The target clock mode changes to Holdover momentarily as the command progresses. The value then changes to Normal.	

Procedure 6-3
Setting the shelf timing mode to VTM line timing

Use this procedure to provision a VTM network element for VTM line timing, using the command interpreter (CI) tool, SHELF_CLOCK_CI.

> ***Note:*** Run the setupesi command on only one NE at a time to ensure consistent results.

The **setupesi vtmlinetimed** command provisions a VTM network element for VTM line timing. Once the parameters are set using the tool, you can manually change the value of any parameter to accommodate particular needs. Table 6-14 on page 6-47 provides a list of the parameters and their associated values.

> ***Note 1:*** This procedure applies to VTM network elements without ESIs. To automatically provision line timing for network elements with ESIs, use Procedure 6-2.
>
> ***Note 2:*** The **setupesi vtmlinetimed** command does not take the BITSA, BITSB, G1OUT or G2OUT facilities or the ESI equipment out of service. To avoid the possibility of alarms, delete the ESI equipment before you enter the **setupesi vtmlinetimed** command.
>
> ***Note 3:*** Do not use the **setupesi vtmlinetimed** command on a network element that is already vtmlinetimed to set the timing reference sources to the default values.
>
> ***Note 4:*** Do not use CI commands while using the **selectNE** command. CI commands can only be executed at the local network element.

Requirements

Before starting this procedure, you must:

- make sure you already installed OC-12 VTM circuit packs
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)
- understand the implications of changing the shelf timing mode (see *Timing and Synchronization Description*, 323-1111-192)

—continued—

Procedure 6-3 (continued)
Setting the shelf timing mode to VTM line timing

Action

Step	Action

CAUTION
Risk of loss of network synchronization
Do not run the excerciser while using the **setupesi** command.

CAUTION
Risk of traffic loss
The following command affects network synchronization, and can affect traffic. To avoid timing loops, verify the clock source setting of each network element in the system. An incorrect clock source setting can cause a service outage.

1 Access the SHELF_CLOCK_CI command interpreter (CI) tool by entering:

shelf_clock_ci ↵

2 Set the shelf timing mode to VTM line timing by entering:

setupesi vtmlinetimed msgon ↵

yes ↵

where

msgon enables synchronization status messaging

Note 1: Only **msgon** is supported for VTM line timing.

Note 2: See Table 6-14 on page 6-47 for a list of the parameters affected by the tool.

The screen displays a list of the parameters changed and their old and new values.

—continued—

Procedure 6-3 (continued)
Setting the shelf timing mode to VTM line timing

Step	Action
3	Determine whether or not the command was successful. **If** the command / **Then** go to is successful — step 4 fails — step 1 If the command fails the second time, contact your next level of support or your Nortel Networks support group.
4	Quit the SHELF_CLOCK_CI tool by entering: **quit** ↵
5	To change any of the parameters defined automatically in step 2, refer to the manual task list on page 6-29 and perform the required procedures.

—end—

Table 6-14
Parameter settings using the setupesi vtmlinetimed command

Description	Value
NE clock source	vtmlinetimed
VTM target clock mode	Normal (see Note)
Timing reference #1 source	OC-12 G1
Timing reference #2 source	OC-12 G2
Timing reference #3 source	NULL
Timing reference #4 source	NULL
Clock quality level for reference #1	Auto
Clock quality level for reference #2	Auto
Clock quality level for reference #3 and #4	Not applicable
Note: The target clock mode changes to Holdover momentarily as the command progresses. The value then changes to Normal.	

Procedure 6-4
Setting the shelf timing mode to primary optics timing

Use this procedure to provision a shelf for primary optics timing, using the command interpreter (CI) tool SHELF_CLOCK_CI and the **setupesi primaryoptics** command.

> ***Note:*** Run the setupesi command on only one NE at a time to ensure consistent results.

The **setupesi primaryoptics** command provisions the parameters required for setting the shelf timing mode to primary optics timing. Table 6-15 on page 6-50 provides a list of the parameters and their associated values. Once the parameters are set using the tool, you can manually change the value of any parameter to accommodate particular needs.

> ***Note 1:*** This procedure applies to OC-12 linear ADM network elements.
>
> ***Note 2:*** You cannot use this procedure on OC-3 network elements.
>
> ***Note 3:*** You cannot use synchronization status messaging at primary optics timed network elements.
>
> ***Note 4:*** Do not use CI commands while using the **selectNE** command. CI commands can only be executed at the local network element.
>
> ***Note 5:*** The **setupesi primaryoptics** command does not affect the internal optics sources assigned to OCA or OCB. If you want to change the internal sources assigned to OCA or OCB, use Procedure 6-11.

Requirements

Before starting this procedure, you must:

- make sure you provisioned the OC-12 optical interface circuit packs
- make sure you installed and provisioned the ESI circuit packs
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)
- understand the implications of changing the shelf timing mode (see *Timing and Synchronization Description*, 323-1111-192)

—continued—

Procedure 6-4 (continued)
Setting the shelf timing mode to primary optics timing

Action

Step	Action

CAUTION
Risk of loss of network synchronization
Do not run the excerciser while using the **setupesi** command.

CAUTION
Risk of traffic loss
The following command affects network synchronization, and can affect traffic. To avoid timing loops, verify the clock source setting of each network element in the system. An incorrect clock source setting can cause a service outage.

1 Access the SHELF_CLOCK_CI command interpreter (CI) tool by entering:

shelf_clock_ci ↵

2 Set the shelf timing mode to primary optics timing by entering:

setupesi primaryoptics ↵
yes ↵

Note: See Table 6-15 on page 6-50 for a list of parameters affected by the command.

The screen displays a list of the parameters changed and their old and new values.

3 Determine whether or not the command was successful.

If the command	**Then** go to
is successful	step 4
fails	step 1

If the command fails the second time, contact your next level of support or your Nortel Networks support group.

4 Quit the SHELF_CLOCK_CI tool by entering:

quit ↵

5 To change any of the parameters defined in step 2, refer to the task list on "Manual setup (primary optics timing)" on page 6-30. Perform the required procedures.

—end—

Table 6-15
Parameter settings using the setupesi primary optics command

Description	Value
NE clock source	primaryoptics
Timing reference #1 source	NULL
Timing reference #2 source	NULL
Timing reference #3 source	NULL
Timing reference #4 source	NULL
Clock quality level for reference #1	Not applicable
Clock quality level for reference #2	Not applicable
Clock quality level for reference #3	Not applicable
Clock quality level for reference #4	Not applicable

Procedure 6-5
Setting the shelf timing mode to loop timing

Use this procedure to provision a shelf for loop timing, using the command interpreter (CI) tool SHELF_CLOCK_CI and the **setupesi looptimed** command.

> ***Note:*** Run the setupesi command on only one NE at a time to ensure consistent results.

The **setupesi looptimed** command provisions the parameters required for setting the shelf timing mode to loop timing. Table 6-15 on page 6-50 provides a list of the parameters and their associated values. Once the parameters are set using the tool, you can manually change the value of any parameter to accommodate particular needs.

> ***Note 1:*** This procedure applies to OC-12 terminal network elements.
>
> ***Note 2:*** You cannot use this procedure on OC-3 network elements.
>
> ***Note 3:*** If you provision synchronization status messaging on linear network elements, you must first enable SONET overhead on the working and the protection OC-12 interfaces. See the procedure to enable SONET overhead on working and protection OC-12 interface in *Provisioning and Operations Procedures*, 323-1111-310.
>
> ***Note 4:*** Do not use CI commands while using the **selectNE** command. CI commands can only be executed at the local network element.

Requirements

Before starting this procedure, you must:

- make sure you provisioned the OC-12 optical interface circuit packs
- make sure you installed and provisioned the ESI circuit packs
- for synchronization status messaging on linear systems, make sure the SONET overhead is enabled on both the working and the protection OC-12 interfaces. For instructions on enabling SONET overhead on working and protection OC-12 interfaces, see the procedure to enable SONET overhead on working and protection OC-12 interface in *Provisioning and Operations Procedures*, 323-1111-310.
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)
- understand the implications of changing the shelf timing mode (see *Timing and Synchronization Description*, 323-1111-192)

—continued—

Procedure 6-5 (continued)
Setting the shelf timing mode to loop timing

Action

Step	Action

CAUTION
Risk of loss of network synchronization
Do not run the excerciser while using the **setupesi** command.

CAUTION
Risk of traffic loss
The following command affects network synchronization, and can affect traffic. To avoid timing loops, verify the clock source setting of each network element in the system. An incorrect clock source setting can cause a service outage.

1 Access the SHELF_CLOCK_CI command interpreter (CI) tool by entering:

shelf_clock_ci ↵

2 Set the shelf timing mode to loop timing by entering:

setupesi looptimed ↵
yes ↵

Note 1: See Table 6-15 on page 6-50 for a list of parameters affected by the command.

The screen displays a list of the parameters changed and their old and new values.

3 Determine whether or not the command was successful.

If the command	**Then** go to
is successful	step 4
fails	step 1

If the command fails the second time, contact your next level of support or your Nortel Networks support group.

4 Quit the SHELF_CLOCK_CI tool by entering:

quit ↵

5 To change any of the parameters defined in step 2, refer to the task list on "Manual setup (loop timing)" on page 6-31. Perform the required procedures.

—end—

Table 6-16
Parameter settings using the setupesi looptimed command

Description	Value
NE clock source	looptimed
Timing reference #1 source	NULL
Timing reference #2 source	NULL
Timing reference #3 source	NULL
Timing reference #4 source	NULL
Clock quality level for reference #1	Not applicable
Clock quality level for reference #2	Not applicable
Clock quality level for reference #3	Not applicable
Clock quality level for reference #4	Not applicable

Procedure 6-6
Setting the shelf clock source

Use this procedure to set the shelf clock source for terminals and add-drop multiplexer (ADM) nodes. You cannot use the **clocksrc** command on regenerator shelves.

For complete procedures to upgrade to or downgrade from timing using external synchronization interface (ESI) equipment, refer to *System Expansion Procedures I*, 323-1111-224.

Requirements

Before you start this procedure, you must:

- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)
- understand the implications of changing the shelf clock source (see *Timing and Synchronization Description*, 323-1111-192)

Action

Step	Action
1	Access the Shelf Equipment screen by entering: **equipmnt sh** ↵ *The screen displays the Shelf Equipment screen.*
2	Access the Shelf Equipment edit screen by entering: **edit** ↵ *The screen displays the Shelf Equipment edit screen.*

CAUTION
Risk of traffic loss
The following command affects network synchronization, and can affect traffic. To avoid timing loops, verify the clock source setting of each network element in the system. An incorrect clock source setting can cause a service outage.

—continued—

Procedure 6-6 (continued)
Setting the shelf clock source

Step	Action

3 Edit the clock source by entering:

clocksrc <clock source> ↵
yes ↵

where

<clock source> is **freerun**, **esi**, **looptimed**, **primaryoptics or vtmlinetimed**

A screen similar to the following appears.

OS.0200

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .    .     .      .        .        .       .       .
 St.John's             .    .     .      .        .        .       .       .
Edit Shelf   1.1.63
 0 Quit      Shelf Equipment                    Shelf: 1
 2
 3                    Location: <1234.56>
 4                Shelf Position: <1>
 5 Location           Shelf Type:  OC12 TBM Terminal
 6 ShPos          Shelf Function: <Transport Node                        >
 7 Function        Serial Number:  123456789012       Exciserer: Off
 8                NE Clock Source:  ESI              Shelf Date: 15 Apr 98
 9           GMT Offset (minutes): <   0>              Time Zone: GMT
10 Timezone
11 ClockSrc  clocksrc esi
12           Warning:This command will affect network synchronization and
13           may affect traffic. To avoid timing loops, verify the clock
14           source setting of each network element in the network.
15           Incorrect clock source settings may cause a service outage.
16           Refer to the NTPs for further information.
17           Please confirm ("Yes" or "No" ):
18 Help
  NE 63
Time  17:35  >
```

Note 1: The clock source settings available depend on the network element type as follows:
- freerun is available on all network elements
- esi is available on all network elements equipped with ESI
- looptimed is only available on linear terminals
- primaryoptics is only available on linear ADMs
- vtmlinetimed is only available on VTM network elements

Note 2: The clock source on regenerator shelves is through timed. You cannot change this setting.

—end—

Procedure 6-7
Changing the ESI target clock mode

Use this procedure to change the ESI target clock mode for TBM shelves equipped with ESI. Under normal operating conditions, the setting of the target clock mode must be normal. The ESI automatically enters freerun or holdover modes during operations as necessary (such as during loss of the timing reference). You can set the target clock mode to freerun or holdover when testing the ESI synchronization performance.

Changes to the target clock mode cause corresponding changes to the current clock mode. However, the current clock mode changes automatically during various facility or equipment failures.

For a description of ESI clock modes, see *Timing and Synchronization Description*, 323-1111-192.

Requirements

Before you start this procedure, you must:

- make sure you already installed the ESI equipment
- log in to the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

—continued—

Procedure 6-7 (continued)
Changing the ESI target clock mode

Action

Step	Action

1 Access the ESI Equipment screen for the ESI unit by entering:

equipmnt esi <unit>↵

where

<unit> is **g1** or **g2**

A screen similar to the following appears.

OS.0417

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .     .     .      .        .       .       .       .
St. John's             .     .     .      .        .       .       .       .
ESI Equip    1.1.63
 0 Quit      ESI Equipment                        Shelf: 1
 2 Select                                          Unit: ESI  G1
 3 Query                                       Location: Frame 1 Shpos 1
 4                        State:  IS
 5 ListAlms
 6 AlmRpt                Status:  Active
 7            Current Clock Mode:  Freerun
 8 Chgstate    Target Clock Mode:  Normal
 9 EditTarg      NE Clock Source:  ESI
10 DtlProt         Circuit Packs:  ESI Car  NT7E19AA Slot 23
11                                 ESI Unit NT7E27AA Slot 23-1
12 TRefProt  EQ:
13 Add
14 Delete
15
16 Facility
17 AlmProv
18 Help
  NE 63
Time  13:47  >
```

2 Change the ESI target clock mode by entering:

edittarg <mode> ↵

where

<mode> is **normal**, **holdover**, or **freerun**

Note: When you change the target clock mode of ESI G1, the target clock mode of ESI G2 automatically changes to the same value.

—end—

Procedure 6-8
Changing the OC-12 VTM target clock mode

Use this procedure to change the target clock mode of the OC-12 VTM circuit pack. Under normal operating conditions, the target clock mode must be normal. The system automatically enters freerun or holdover modes during operations as necessary (such as during loss of the timing reference) You can set the target clock mode to freerun or holdover when testing the synchronization performance.

Changes to the target clock mode cause corresponding changes to the current clock mode. However, the current clock mode may change automatically during various facility or equipment failures.

For a description of VTM clock modes, see *Timing and Synchronization Description*, 323-1111-192.

Requirements

Before you start this procedure, you must:

- log in to the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the OC12 Equipment screen by entering: **equipmnt oc12 g1** ↵ *The screen displays the OC12 Equipment screen.*

—continued—

Procedure 6-8 (continued)
Changing the OC-12 VTM target clock mode

Step	Action
2	Change the target clock mode by entering: **edittarg <clock mode>** ↵ where **<clock mode>** is **holdover**, **normal**, or **freerun** ***Note:*** When the target clock mode is changed on a VTM line timed network element, the command is made in either the OC-12 G1 equipment screen or the OC-12 G2 equipment screen. The target clock mode for both G1 and G2 change simultaneously as a result of the command. The log generated is always for the one from which the target clock mode is changed. For example, if the change is made on the OC-12 G1 screen, only an OC-12 G1 log is generated. *A screen similar to the following appears.*

OS.0398

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .     .     .      .        .       .       .       .
                       .     .     .      .        .       .       .       .

 OC12 Equip     1.1.63
  0 Quit        OC12 Equipment                        Shelf: 1
  2 Select                                             Unit: OC12  G1
  3 Query                                          Location:          ShPos 1
  4                                 State:  IS-Traffic-Tx Active
  5 ListAlms
  6 AlmRpt                        Status:  Active
  7                     Current Clock Mode:  Holdover
  8 ChgState             Target Clock Mode:  Holdover
  9 EditTarg               NE Clock Source:  VtmLineTimed
 10 DtlProt                  Circuit Packs:  OC12 VTM NT7E05BF  Slot 9
 11
 12 Diagnose
 13 Add         edittarg holdover
 14 Delete      EditTarg command successful.
 15
 16 Facility
 17 AlmProv
 18 Help
   NE 63
 Time  19:00  >
```

—end—

Procedure 6-9
Changing a timing reference source

Use this procedure to provision a source for each timing reference. You can only change the timing reference source if the timing reference facility is inactive.

Each terminal and add-drop multiplexer node can have up to four timing references (numbered 1 to 4). In normal operations, number 1 has the highest priority and number 4 has the lowest priority. When two timing references carry the same clock quality level, the shelf continues to use the active source as its timing reference. When a timing reference protection switch occurs and there are two alternate references with the same clock quality level, the shelf switches to the timing reference with the highest priority.

The possible timing references are the following:

- the external sources BITSA and BITSB
- the OC-3 or OC-12 optics sources G1, G1S, G2 and G2S

The available optics sources depend on the network element type and the optic sources assigned for OCA and OCB. See Table 6-9 on page 6-18 for the default assignments for OCA and OCB. To change the default settings for OCA and OCB, see Procedure 6-11.

The following table recommends timing reference sources for external timing, line timing and loop timing when you do not use mix mode provisioning.

Table 6-17
Recommended timing references for each shelf timing mode

Shelf timing mode	Timing reference number 1	Timing reference number 2	Timing reference number 3	Timing reference number 4
External timing	BITSA	BITSB	NULL	NULL
ESI line timing	OCA	OCB	NULL	NULL
VTM line timing	OCA	OCB	NULL	NULL
Primary optics timing	NULL	NULL	NULL	NULL
Loop timing	NULL	NULL	NULL	NULL
Note:This table uses OCA and OCB to represent their assigned optics sources (that is, OC-12 G1, G2, G1S or G2S or OC-3 G1, G2, G1S or G2S).				

—continued—

Procedure 6-9 (continued)
Changing a timing reference source

You can also provision both external and optical sources as timing references at externally timed network elements. This mix mode provisioning provides for better timing survivability. When you use mix mode provisioning, you must carefully plan the timing sub-system to prevent timing loops under fault conditions. See "Mix mode provisioning" on page 6-12 and *Timing and Synchronization Description*, 323-1111-192 for more information.

Requirements

Before you start this procedure, you must:

- make sure you already installed the ESI equipment
- log in to the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the Reference Protection screen by entering: **protectn** ↵ **trefprot** ↵

—continued—

Procedure 6-9 (continued)
Changing a timing reference source

Step	Action

2 Access the Reference Protection edit screen by entering:

edit ↵

The Reference Protection edit screen similar to the following appears.

OS.0313

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .    .     .      .        .       .       .       .
St. John's             .    .     .      .        .       .       .       .
Edit RefPr   1.1.63
 0 Quit      Reference Protection              Shelf: 1
                                        NE Clock Source: ESI
 2
 3
 4           #  Source    State   Status  QLevel   Forced   AutoSw   Manual
 5           1  BITSA       IS   Active  ST1-P      ¥        ¥        ¥
 6           2  BITSB       IS           ST1-P      ¥        ¥        ¥
 7           3  NULL
 8           4  NULL
 9
10           Edit:
11
12 Source
13 QLevel
14
15
16
17
18 Help
  NE 63
Time  13:47  >
```

3 Verify the status of the timing reference facility you want to change. (The Reference Protection screen identifies the active facility.) If the facility is active, perform a forced switch on the facility by entering:

forced op <reference #> ↵
yes ↵

where

<reference #>	is **1**, **2**, **3** or **4**

4 Set the timing reference source by entering:

source <reference #> <unit> ↵

where

<reference #>	is the priority level, **1**, **2**, **3** or **4**
<unit>	is **null** to disable the timing reference source
	bitsa or **bitsb** for external sources
	g1, g2, g1s or **g2s** for optics sources (the options available depend on the network element type)

A warning message and a request for confirmation appear.

—continued—

Procedure 6-9 (continued)
Changing a timing reference source

Step	Action
5	Confirm the change by entering: **yes** ↵ *The system assigns the requested timing source unit to the specified reference number.*
6	Repeat step 3 to step 5 for each of the other timing reference inputs.
7	If you do not select BITSA or BITSB as a timing source, change the facility state to out of service by entering: **facility esi <unit>** ↵ **chgstate oos** ↵ **yes** ↵ where **<unit>** is **bitsa** or **bitsb**

—end—

Procedure 6-10
Provisioning the clock quality level of an input timing reference

Use this procedure to manually provision the clock quality level of an input timing reference.

When the quality level of a reference is provisioned to auto, the network element determines the quality level of the reference from the synchronization status message.

You can provision the clock quality level for references that cannot carry synchronization status messages. You can also force a reference to any quality level. When you force a reference to a quality level, the system appends -P (for provisioned) to the quality level display. The forced clock quality level always overrides the clock quality level of the synchronization status message.

For external timing, if your ESI does not support synchronization status messaging between the ESI and BITS, you must force the reference (BITSA and BITSB) to a quality level.

For information related to clock quality levels, see "Synchronization status messaging" on page 6-8 and *Timing and Synchronization Description*, 323-1111-192. To display the synchronization status messages, see Procedure 6-19.

Requirements

Before you start, you must:

- make sure you already installed the ESI equipment
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the Reference Protection edit screen by entering: **protectn** ↵ **trefprot** ↵ **edit** ↵ *The Reference Protection edit screen appears.*

—continued—

Procedure 6-10 (continued)
Provisioning the clock quality level of an input timing reference

Step	Action
2	Provision the clock quality level for an input timing reference by entering: **qlevel <reference #> <quality level>** ↵ where **< reference #>** is **1**, **2**, **3** or **4** **<quality level>** is **st1** Stratum 1 (quality level 1) **stu** stratum traceability unknown (quality level 2) **st2** stratum 2 (quality level 3) **st3** stratum 3 (quality level 4) **smc** SONET minimum clock (quality level 5) **dus** do not use for synchronization (quality level 7) **auto** to use the quality level received in the synchronization status message *A warning message and a request for confirmation appear.*
3	Confirm the change by entering: **yes** ↵ *A screen similar to the following appears.*

OS.0420

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .    .     .      .        .       .       .       .
 St. John's            .    .     .      .        .       .       .       .
 Edit RefPr   1.1.63
  0 Quit      Reference Protection              Shelf: 1
  2                                  NE Clock Source: ESI
  3
  4           #  Source    State   Status  QLevel   Forced   AutoSw   Manual
  5           1  BITSA        IS   Active  ST1-P      ¥        ¥        ¥
  6           2  BITSB        IS           ST1-P      ¥        ¥        ¥
  7           3  OC12 G1      IS           ST1        ¥        ¥        ¥
  8           4  OC12 G2      IS           DUS        ¥        ¥        ¥
  9
 10
 11
 12 Source
 13 QLevel
 14
 15
 16
 17
 18 Help
   NE 63
 Time  13:47  >
```

Note: If a source fails, the QLevel field in the Reference Protection screen displays the quality level of the source before its failure.

4 Repeat the procedure for each of the other timing references.

—end—

Procedure 6-11
Provisioning the internal sources OCA and OCB

Use this procedure to change the internal assignments for OCA and OCB.

OCA and OCB are sources for the following:

- timing references used in network element synchronization
- timing distribution outputs, G1OUT and G2OUT

When you power on a shelf for the first time or autoprovision the shelf, the default assignments for OCA and OCB are as follows:

NE type	OCA	OCB
terminal	OC-12 or OC-3 G1 (slot 9)	OC-12 or OC-3 G2 (slot 10)
linear ADM	OC-12 or OC-3 G1 (slot 9)	OC-12 or OC-3 G2 (slot 10)
NWK ring ADM	OC-12 G1 (slot 9)	OC-12 G1S (slot 5)
VTM ring ADM	OC-12 G1 (slot 9)	OC-12 G2 (slot 10)

The only need to alter these default assignments arises when you use linear ADM network elements, because linear ADMs have four line-side interfaces. All other OC-12 network elements have only two line-side interfaces.

The linear ADM network elements contain two primary interfaces and two secondary interfaces. The primary interfaces, OC-12 (or OC-3) G1 and OC-12 (or OC-3) G2, occupy slots 9 and 10. The secondary interfaces, OC-12 (or OC-3) G1S and OC-12 (or OC-3) G2S, occupy slots 5 and 7.

—continued—

Procedure 6-11 (continued)
Provisioning the internal sources OCA and OCB

Table 6-18 shows OCA and OCB settings in linear ADM network elements for three different scenarios:

Table 6-18
OC-3/OC-12 linear ADM timing reference scenarios

Scenario number	Scenario description	OCA	OCB
1	references derived from OC-3 or OC-12 G1 and G2 (both from the same adjacent network element)	G1	G2
2	references derived from OC-3 or OC-12 G1S and G2S (both from the same adjacent network element)	G1S	G2S
3	references derived from OC-3 or OC-12 G1 and G1S (one from each of the two adjacent network elements)	G1	G1S

Requirements

Before you start, you must:

- log in to the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action

Note 1: This procedure applies to linear ADM nodes. You can use the same commands to provision OCA and OCB for other network element types. If you use this procedure to provision non-linear ADMs, the guidelines for selecting G1, G2, G1S and G2S differ. See *Timing and Synchronization*, 323-1111-192 for more information.

Note 2: To change the OCA or OCB sources, the Source Tracking field in the ESI Facility screens for G1OUT and G2OUT must display "Off". (See Procedure 6-16 to change the source tracking.)

Note 3: To change the OCA or OCB sources, the unit selected (G1, G2, G1S or G2S) must not be a timing source. If the unit appears in the Reference Protection screen, you must deprovision it before you change OCA or OCB. To deprovision the unit, set it to null in the Reference Protection screen, following Procedure 6-9 on page 6-60.

—continued—

Procedure 6-11 (continued)
Provisioning the internal sources OCA and OCB

Step	Action

1 Access the Timing Reference Source screen by entering:

protectn ↵
trefprot ↵
trefsrc ↵

The Timing Reference Source screen appears.

OS.0419

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .    .     .      .        .        .        .       .
St. John's             .    .     .      .        .        .        .       .
ESI TRef        1.1.63
 0 Quit                                        Shelf: 1
 2
 3              Timing Reference Source
 4
 5 OCASrc        Source    Timing Reference
 6 OCBSrc        BITSA      -
 7               BITSB      -
 8               OCA        OC12 G1
 9               OCB        OC12 G2
10
11
12
13
14
15
16
17
18 Help
  NE 63
Time  13:47  >
```

2 Select the source for OCA by entering:

ocasrc <unit> ↵

where **<unit>** is	to derive shelf timing from
g1	G1 and G2 (scenario 1 of Table 6-18), or G1 and G1S (scenario 3 of Table 6-18)
g1s	G1S and G2S (scenario 2 of Table 6-18)

3 Confirm the selection by entering:

yes ↵

—continued—

Procedure 6-11 (continued)
Provisioning the internal sources OCA and OCB

Step	Action
4	Set the source for OCB by entering: **ocbsrc <unit>** ↵ where **<unit>** is — to derive shelf timing from **g2** — G1 and G2 (scenario 1 of Table 6-18) **g1s** — G1 and G1S (scenario 3 of Table 6-18) **g2s** — G1S and G2S (scenario 2 of Table 6-18)
5	Confirm the selection by entering: **yes** ↵

—end—

Procedure 6-12
Changing the ESI line coding format

Use this procedure to set the line coding format for an ESI timing reference input facility. The line coding format can be B8ZS or AMI.

You must change the ESI timing facility state to out-of-service before you change the ESI timing line coding format.

Requirements

Before starting this procedure, you must:

- make sure you already installed and provisioned the ESI equipment
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the ESI Facility screen and select the facility by entering: **facility esi <unit>** ↵ where **<unit>** is **bitsa** or **bitsb** *The screen displays the ESI Facility screen.*
2	If the facility is not already out of service, change its state to out-of-service by entering: **chgstate oos** ↵ **yes** ↵
3	Access the ESI Facility edit screen by entering: **edit** ↵
4	Change the line coding by entering: **lcoding <line coding>** ↵ where **<line coding>** is **b8zs** or **ami,** or press Return (↵) without typing **b8zs** or **ami** to toggle between these values

—continued—

Procedure 6-12 (continued)
Changing the ESI line coding format

Step	Action

A screen similar to the following shows the change of the line coding format.

OS.0423

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View       .    .     .       .       .       .       .       .
                        .    .     .       .       .       .       .       .

Edit Fac      1.1.63
 0 Quit       ES1Facility                          Shelf: 1
 2 Select                                            Unit: BITSA
 3 Query                 State:  OOS
 4
 5 LCoding       Coding Format:  B8ZS          Framing Format:  Superframe
 6 FrameFmt      Signal Format:  DS1           Line Build Out:  -
 7 SigFmt               Source:  -            Source Tracking:  -
 8 LBO         Timing Reference:  -
 9 Source         Threshold AIS:  -
10 SrcTrack
11 ThresAIS    lcoding b8zs
12             LCoding command successful.
13
14
15
16
17
18 Help
   NE 63
 Time  06:34  >
```

5 Return to the ESI facility screen by entering:

quit ↵

6 Return the facility to the in-service state by entering:

chgstate is ↵

The state changes to in service (IS).

7 Repeat the procedure for the other timing reference facility.

—end—

Procedure 6-13
Changing the framing format of an ESI facility

Use this procedure to set the framing format of an ESI facility. The framing format can be set to either superframe (SF) or extended superframe (ESF).

Set the ESI timing facility out of service before you change the framing format.

To carry synchronization status messages over a DS1 link between BITS and an ESI, you must provision the framing format as ESF. If you provision the framing format as SF, the network element treats the signal as *synchronization traceability unknown* (STU, clock quality level 2).

Requirements

Before you start this procedure, you must:

- make sure you already installed and provisioned the ESI equipment
- log in to the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the ESI facility screen and select the facility by entering: **facility esi <timing reference>** ↵ where **<timing reference>** is **bitsa**, **bitsb**, **g1out** or **g2out** *The screen displays the ESI facility screen.*
2	If the facility is not already out of service, change its state to out-of-service by entering: **chgstate oos** ↵ **yes** ↵
3	Access the ESI Facility edit screen by entering: **edit** ↵

—continued—

Procedure 6-13 (continued)
Changing the framing format of an ESI facility

Step	Action

4 Change the framing format using one of two possible methods. Enter:

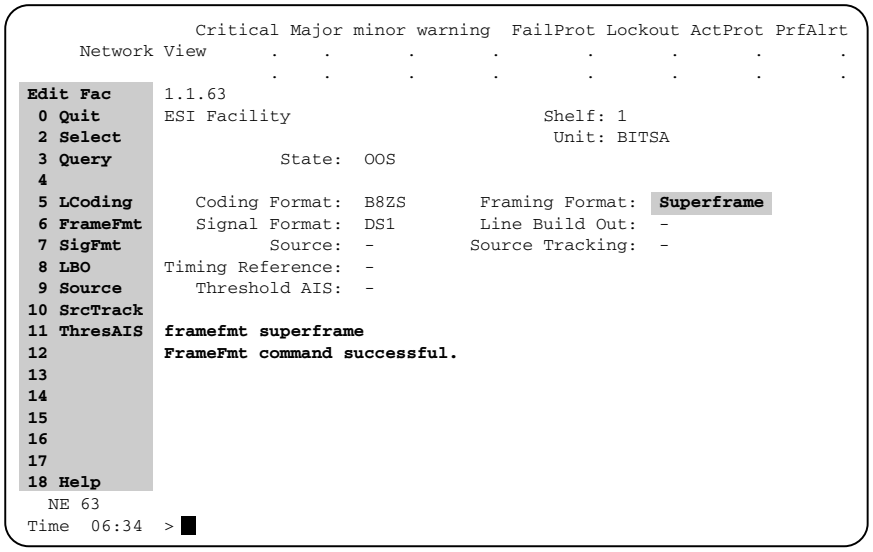
framefmt <frame format> ↵

where

<frame format> is **superframe** or **extended,** or press Return (↵) without typing **superframe** or **extended** to toggle between these values

A screen similar to the following shows the change in the framing format.

OS.0424



5 Return to the ESI facility screen. Enter

quit ↵

6 Return the facility to the in-service state by entering:

chgstate is ↵

The state changes to in service (IS).

7 Repeat the procedure for each of the other timing reference facilities.

—end—

Procedure 6-14
Changing the ESI input signal format

Use this procedure to set the external synchronization interface (ESI) timing signal format for an ESI facility. The signal format can be set to either a DS1 signal (bitsds1) or a composite clock signal (bitscc).

This procedure applies to the ESI input facilities BITSA and BITSB. This procedure does not apply to the timing distribution facilities G1OUT and G2OUT. (You can only use DS1 signal format to distribute timing from the ESI to BITS.)

To carry synchronization status messages over a DS1 link between BITS and an ESI, the signal format must be DS1.

Set the ESI facilities out of service before you change the signal format. When you change the signal format for one ESI input facility, the signal format for the other input facility also changes.

Requirements

Before you start this procedure, you must:

- make sure you already installed and provisioned the ESI equipment
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the ESI facility screen and select the input facility by entering: **facility esi <unit>** ↵ where **<unit>** is **bitsa** or **bitsb** *The ESI facility screen for BITSA or BITSB appears.*
2	If the facility is not already out of service, change its state to out-of-service by entering: **chgstate oos** ↵ **yes** ↵
3	Repeat steps 1 and 2 for the other ESI input facility.

—continued—

Procedure 6-14 (continued)
Changing the ESI input signal format

Step	Action
4	Access the ESI Facility edit screen by entering: **edit** ↵
5	Change the signal format by entering: **sigfmt <signal format>** ↵ where **<signal format>** is **bitsds1** to select DS1 is **bitscc** to select composite clock, or press Return (↵) without typing **bitsds1** or **bitscc** to toggle between these values *The system sets the signal format to the selected value. A screen similar to the following appears.*

OS.0425

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .     .       .       .       .       .       .       .
                       .     .       .       .       .       .       .       .
Edit Fac        1.1.63
 0 Quit         ESI Facility                        Shelf: 1
 2 Select                                            Unit: BITSA
 3 Query                  State:  OOS
 4
 5 LCoding         Coding Format:  B8ZS       Framing Format:  Superframe
 6 FrameFmt        Signal Format:  DS1        Line Build Out:  -
 7 SigFmt                 Source:  -         Source Tracking:  -
 8 LBO           Timing Reference:  -
 9 Source           Threshold AIS:  -
10 SrcTrack
11 ThresAIS     sigfmt bitsds1
12              SigFmt command successful.
13
14
15
16
17
18 Help
  NE 63
Time  06:34  >
```

6	Return to the ESI facility screen by entering: **quit** ↵
7	Return the facility to the in-service state by entering: **chgstate is** ↵ *The state changes to in-service (IS).*

—continued—

Procedure 6-14 (continued)
Changing the ESI input signal format

Step	Action
8	Access the other ESI input facility screen by entering: **facility esi <unit>** ↵ where **<unit>** is **bitsa** or **bitsb** *The ESI facility screen for BITSA or BITSB appears.*
9	Return the facility to the in-service state by entering: **chgstate is** ↵ *The state changes to in-service (IS).* **—end—**

Procedure 6-15
Changing the ESI DS1 distribution line build-out (LBO)

Use this procedure to set the DS1 output line build-out (LBO) for an external synchronization interface (ESI) timing reference facility. Table 6-19 provides the distance associated with each of the different line build-out ranges.

Table 6-19
ESI DS1 line build-out selections

Range	Length
Short	0 to 46 m (0 to 150 ft)
Medium	46 to 137 m (150 to 450 ft)
Long	137 to 200 m (450 to 655 ft)

You must take the ESI timing distribution facility out of service before you change the ESI timing reference line build-out.

Requirements

Before you start this procedure, you must:

- make sure you already installed and provisioned the ESI equipment
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Step	Action
1	Access the ESI Facility screen and select the facility by entering: **facility esi <unit>** ↵ where **<unit>** is **g1out** or **g2out** *The ESI facility screen appears.*
2	If the facility is not already out of service, change its state to out-of-service by entering: **chgstate oos** ↵ **yes** ↵

—continued—

Procedure 6-15 (continued)
Changing the ESI DS1 distribution line build-out (LBO)

Step	Action
3	Access the ESI Facility edit screen by entering: **edit** ↵
4	Select the line build-out length by entering: **lbo <lbo length>** ↵ where **<lbo length>** is **short**, **medium**, or **long** *A screen similar to the following appears.*

OS.0426

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .    .     .       .         .        .       .       .
                       .    .     .       .         .        .       .       .
Edit Fac       1.1.63
 0 Quit        ESI Facility                        Shelf: 1
 2 Select                                           Unit: G2OUT
 3 Query                State:  OOS
 4
 5 LCoding        Coding Format:  -          Framing Format:  Superframe
 6 FrameFmt       Signal Format:  DS1        Line Build Out:  Short
 7 SigFmt               Source:  OCA       Source Tracking:  Act
 8 LBO         Timing Reference:  OC12 G
 9 Source         Threshold AIS:  Sonet Clock
10 SrcTrack
11 ThresAIS    lbo short
12             LBO command successful.
13
14
15
16
17
18 Help
  NE 63
Time  06:34  >
```

5	Return to the ESI facility screen by entering: **quit** ↵
6	Return the facility to the in-service state by entering: **chgstate is** ↵ *The state changes to in-service (IS).*
7	Repeat the procedure for the other timing reference facility.

—end—

Procedure 6-16
Changing the ESI timing distribution source tracking and source

Use this procedure to select the timing distribution source for an external synchronization interface (ESI) timing reference facility. The ESI timing distribution provides timing to external equipment and to other network elements. You can change the source tracking with the ESI timing distribution facility in service. You must set the ESI timing distribution facility out of service before you change the ESI timing distribution source.

You can use the **srctrack** (source tracking) and **source** commands in the ESI facility screen to provision the ESI timing distribution sources.

The source tracking can be ACT or OFF. When the source tracking is ACT

- in line-timed linear or ring network elements, the derived DS1 used for timing distribution follows the active OC-3 or OC-12 timing source
- in externally timed linear or ring network elements, the derived DS1 used for timing distribution uses the OC-12 timing source with the highest quality synchronization status message

When the source tracking is OFF, you can provision G1OUT and G2OUT to OCA or OCB sources using the **source** command. You can provision the sources such that

- both ESI DS1 outputs (G1OUT and G2OUT) for timing distribution come from a single OC-3 or OC-12 interface, or
- each ESI DS1 output (G1OUT and G2OUT) for timing distribution comes from different OC3 or OC-12 interfaces

When the source tracking is OFF and an OC-3 or OC-12 link fails, the ESI outputs an alarm indications signal (AIS) even if other OC-3 or OC-12 links are available.

For information on the optical interfaces assigned to OCA and OCB, see *Timing and Synchronization Description*, 323-1111-192. For procedures on how to change the internal sources assigned to OCA and OCB, see Procedure 6-11, page 6-66.

For more information on ESI timing distribution, see "Timing distribution" on page 6-14 and *Timing and Synchronization Description*, 323-1111-192.

—continued—

Procedure 6-16 (continued)
Changing the ESI timing distribution source tracking and source

Step	Action

Requirements

Before starting this procedure, you must:

- make sure you already installed and provisioned the ESI equipment
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the ESI Facility screen and select the facility. **facility esi <unit>** ↵ where **<unit>** is **g1out** or **g2out** *The ESI Facility screen appears.*
2	Access the ESI Facility edit screen by entering: **edit** ↵
3	Change the source tracking by entering: **srctrack <source tracking>** **yes** ↵ where **<source tracking>** is **act** or **off** *The system sets the source tracking to the selected value.*

—continued—

Procedure 6-16 (continued)
Changing the ESI timing distribution source tracking and source

Step	Action

A screen similar to the following appears.

OS.0427

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .    .     .     .        .       .       .       .
                       .    .     .     .        .       .       .       .
Edit Fac        1.1.63
 0 Quit         ESI Facility                        Shelf: 1
 2 Select                                            Unit: G2OUT
 3 Query                  State:  OOS
 4
 5 LCoding         Coding Format:  -          Framing Format:  Superframe
 6 FrameFmt        Signal Format:  DS1        Line Build Out:  Short
 7 SigFmt                 Source:  OCA      Source Tracking:  Off
 8 LBO           Timing Reference:  OC12 G1
 9 Source           Threshold AIS:  Sonet Clock
10 SrcTrack
11 ThresAIS      y
12               SrcTrack command successful.
13
14
15
16
17
18 Help
   NE 63
Time  06:34  >
```

4	**If** the **<source tracking>**	**Then**
	is **act**	go to step 8
	is **off**	go to step 5

5 If the facility is not already out of service, change its state to out-of-service by entering:

chgstate oos ↵
yes ↵

6 Select the timing distribution source by entering:

edit ↵
source <td source>

where

<td source>	is **oca** or **ocb,** or press Return (↵) without typing **oca** or **ocb** to toggle between these values

—continued—

Procedure 6-16 (continued)
Changing the ESI timing distribution source tracking and source

Step	Action

A screen similar to the following appears.

OS.0518

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View      .     .       .       .         .       .       .       .
                       .     .       .       .         .       .       .       .
  Edit Fac    1.1.63
  0 Quit      ESI Facility                          Shelf: 1
  2 Select                                           Unit: G2OUT
  3 Query                State:  OOS
  4
  5 LCoding      Coding Format:  -           Framing Format:  Superframe
  6 FrameFmt     Signal Format:  DS1         Line Build Out:  Short
  7 SigFmt              Source:  OCB       Source Tracking:  Off
  8 LBO       Timing Reference:  OC12 G1S
  9 Source       Threshold AIS:  Sonet Clock
 10 SrcTrack
 11 ThresAIS  source ocb
 12           Source command successful.
 13
 14
 15
 16
 17
 18 Help
   NE 63
 Time  06:34  >
```

7 If the facility was placed out of service in step 5, return the facility to the in-service state by entering:

chgstate is ↵

The state changes to in-service (IS).

8 Return to the ESI Facility screen by entering:

quit ↵

9 Repeat the procedure for the other timing reference facility.

—end—

Procedure 6-17
Changing the AIS threshold for a timing distribution facility

Use this procedure to change the alarm indication signal (AIS) threshold value for each timing distribution DS1 output signal. You can also use this procedure to disable AIS generation.

You can use the following techniques to alert the BITS of degradation in the clock quality level received from the network element:

- message pass-through mode
- alarm indication signal (AIS) generation mode

The message pass-through mode requires the system to support synchronization status messaging between the ESI and BITS. In this mode, the system passes the synchronization status message from the selected OC-12 optical interface, through the ESI DS1 outputs, to the BITS. The BITS selects its reference based on the received synchronization status message. When you use message pass-through, the threshold AIS value is NULL.

The alarm indication signal (AIS) generation mode does not require synchronization status messaging between the ESI and the BITS. In this mode, if the synchronization status message from the OC-12 optical interface is at or falls below a threshold value, the ESI sends an AIS to the BITS. This procedure enables you to specify the AIS threshold value.

Requirements

Before starting this procedure, you must:

- make sure you already installed and provisioned the ESI equipment
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

—continued—

Procedure 6-17 (continued)
Changing the AIS threshold for a timing distribution facility

Action

Step	Action
1	Access the ESI Facility screen and select the facility by entering: **facility esi <unit>** ↵ where **<unit>** is **g1out** or **g2out** *The ESI Facility screen appears.*
2	Access the ESI Facility edit screen. **edit** ↵
3	Set the quality level for the alarm indication signal (AIS) threshold by entering: **thresais <quality level>** ↵ where **<quality level>** is **stu, st2, st3** or **smc,** to set a threshold AIS value is **null,** to disable the threshold AIS feature ***Note:*** This command can cause the ESI Tx minor alarm. The system raises the alarm when the synchronization status message in the selected OC-12 interface is at, or below, the threshold AIS. *A screen similar to the following appears:*

OS.0428

```
                Critical Major minor warning  FailProt Lockout ActProt PrfAlrt
     Network View       .     .     .       .        .       .       .       .
                        .     .     .       .        .       .       .       .

 Edit Fac    1.1.63
  0 Quit     ESI Facility                          Shelf: 1
  2 Select                                          Unit: G1OUT
  3 Query                 State:  IS
  4
  5 LCoding      Coding Format:  -          Framing Format:  Superframe
  6 FrameFmt     Signal Format:  DS1        Line Build Out:  Short
  7 SigFmt              Source:  OCA       Source Tracking:  Act
  8 LBO       Timing Reference:  OC12 G1
  9 Source       Threshold AIS:  Stratum 3
 10 SrcTrack
 11 ThresAIS  thresais st3
 12           ThresAIS command successful.
 13
 14
 15
 16
 17
 18 Help
   NE 63
 Time  06:34  >
```

—continued—

Procedure 6-17 (continued)
Changing the AIS threshold for a timing distribution facility

Step	Action
4	Return to the ESI Facility screen by entering: **quit** ↵
5	Repeat the procedure for the other timing reference facility.

—end—

Procedure 6-18
Querying, enabling or disabling the DUS for ST3 option

Use this procedure to query, enable or disable the DUS for ST3 option, using the command interpreter (CI) tool, SYNCMSGCI

When you enable the DUS for ST3 option, the system inserts a DUS message into the SONET overhead whenever the ESI enters a non-normal (freerun, holdover, acquire or fast) clock mode. The DUS (do not use for synchronization) message, prevents downstream network elements from using the signal for synchronization. When you disable the DUS for ST3 option, the system inserts an ST3 message into the SONET message whenever the ESI enters a non-normal mode.

When the local network element loses both BITS inputs, inserting DUS messages prevents downstream ST3 clocks from following the local ESI holdover.

For more information on the DUS for ST3 option and its application, see *Timing and Synchronization Description*, 323-1111-192.

> ***Note:*** Do not use the **dusforst3** command when you log into a network element using the **selectne** command.

Requirements

Before you start this procedure, you must:

- make sure you installed and provisioned the ESI circuit packs
- log into the NE user interface and be at the main menu level. You must have ADMIN privileges.
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the SYNCMSGCI command interpreter (CI) tool. **syncmsgci** ↵

—continued—

Procedure 6-18 (continued)
Querying, enabling or disabling the DUS for ST3 option

Step	Action
2	Query the DUS for ST3 option to determine its state by entering: **dusforst3 query** ↵ **If** DUS for ST3 is — **Then** the screen displays the message disabled — *The shelf will transmit ST3 on the OC12 facilities when going to holdover or freerun.* enabled — *The shelf will transmit DUS on the OC12 facilities when going to holdover or freerun.*
3	**If** — **Then** go to you want to change the state — step 4 do not want to change the state — step 7
4	Change the state of DUS for ST3 by entering: **dusforst3 <state>** ↵ *where* **<state>** is **disable** or **enable**
5	The system requests confirmation. Enter: **yes** ↵
6	Query DUS for ST3 to make sure the DUS for ST3 state changed by entering: **dusforst3 query** ↵
7	Exit the SYNCMSGCI tool by entering: **quit** ↵

—end—

Procedure 6-19
Querying synchronization status messages

Use this procedure to display the received and transmitted synchronization status messages for a network element.

Requirements

Before you start you must:

- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Note 1: Do not use the **qrymsg** command when you log into a network element using the **selectne** command.

Note 2: The output of the **qrymsg** command is static. You must repeat this procedure whenever you want to display the current synchronization status messages.

Action

Step	Action
1	Access the SYNCMSGCI command interpreter tool by entering: **syncmsgci** ↵
2	Query the synchronization status messages by entering: **qrymsg** ↵

—continued—

Procedure 6-19 (continued)
Querying synchronization status messages

Step	Action

A table similar to the following appears when the clock quality level is set to auto.

Facility	State	Rx	(P)	Tx	(P)	Comments
OC-12 G1S	IS	ST1		ST1		
OC-12 G1	IS	ST1		ST1		
OC-3 G3	IS	DUS		ST1		
OC-3 G4	IS	DUS		ST1		
OC-3 G7	IS	DUS		ST1		
OC-3 G8	OOS	DUS		ST1		
BITS A	IS	DUS	(STU)	n/a		
BITS B	IS	DUS	(STU)	n/a		
DS1 OUT G1	IS	n/a		ST1		SF framing
DS1 OUT G2	IS	n/a		ST1		SF framing

A table similar to the following appears when the clock quality level is set to non-auto for some facilities showing values in Tx (P).

Facility	State	Rx	(P)	Tx	(P)	Comments
OC-12 G1S	IS	ST1		ST1		
OC-12 G1	IS	ST1		ST1		
OC-3 G3	IS	DUS		ST1		
OC-3 G4	IS	DUS		ST1		
OC-3 G7	IS	DUS		ST1	(ST2)	
OC-3 G8	OOS	DUS		ST1	(ST2)	
BITS A	IS	DUS	(STU)	n/a		
BITS B	IS	DUS	(STU)	n/a		
DS1 OUT G1	IS	n/a		ST1		SF framing
DS1 OUT G2	IS	n/a		ST1		SF framing

—continued—

Procedure 6-19 (continued)
Querying synchronization status messages

Step	Action

- The Facility column identifies each interface that receives or transmits status messages.
- The State column shows if the facility is in service (IS) or out of service (OOS).
- The Rx (received) column shows the synchronization status message received on each interface. It also shows under the heading (P), the quality level that was provisioned. If the clock quality level is set to auto, the provisioned (P) column remains blank. The provisioned level for received messages is set through the Timing Reference Protection screen.

  Note: The G1OUT (DS1 OUT G1) and G2OUT (DS1 OUT G2) display n/a (not applicable) because they are only output facilities.
- The Tx (transmitted) column shows the clock synchronization status message that the system inserts into each interface. It also shows under the heading (P), the quality level that was provisioned.
  - — If the clock quality level is set to auto, the provisioned (P) column remains blank. The provisioned level for transmitted messages is set through the edittx command within the SYNCMSGCI tool.
  - — If Tx for a facility is set to non-auto (which can be set through the edittx command on the SYNCMSGCI command interpreter tool), you can set quality levels in Tx (P) that are different from the ones the system inserts in the Tx column. When Tx (P) has been set, it overrides the value in Tx.

  Note: BITSA and BITSB display n/a (not applicable) because they are only input facilities.
- The comments column provides additional information about the facility. For example, the comment SF framing indicates that DS1 OUT G1 OUT and DS1 OUT G2 OUT use superframe framing format.

  Note: Although the qrymsg display shows that the same quality level is transmitted on both optics of an OC3 tributary protected pair, only the active optics transmit the quality level shown. The inactive tributary always transmits DUS.

—end—

Procedure 6-20
Changing the state of an ESI facility

Use this procedure to change the ESI facilities from in service (IS) to out of service (OOS) or vice versa. This procedure applies to the BITSA and BITSB timing input facilities and the G1OUT and G2OUT timing distribution facilities.

Requirements

Before you start you must:

- make sure you already installed and provisioned the ESI equipment
- log into the NE user interface and be at the main menu level
- be familiar with the VT100-type NE UI (see *Common Procedures*, 323-1111-846)

Action

Step	Action
1	Access the ESI facility screen and select the facility by entering: **facility esi <unit>** ↵ where **<unit>** is **bitsa**, **bitsb**, **g1out** or **g2out** *The ESI facility screen appears.*
2	Change the state of the facility by entering: **chgstate <state>** ↵ where **<state>** is **oos** to change the state to out-of-service is **is** to change the state to in-service
3	**If <state>** is — **Then** go to **is** — step 5 **oos** — step 4
4	Confirm the command by entering: **yes** ↵
5	You have completed the procedure. **—end—**

Procedure 6-21
Provisioning the clock quality level inserted into a timing signal

Use this procedure to manually provision the clock quality level inserted into the OC-12 lines, OC-3 tributaries, or the DS1 outputs (G1OUT and G2OUT).

When you use this procedure, you override the transmitted synchronization status message. To remove the provisioned clock quality levels, repeat this procedure and set the clock quality level to auto. To display the received and transmitted synchronization status messages, use Procedure 6-19, "Querying synchronization status messages" on page 6-88.

For a protected pair of OC-3 tributary circuit packs or in a linear system for a protected pair of OC-12 circuit packs, you must provision the transmit quality levels for the active circuit pack. If a protection switch is made, the provisioned quality level will be transmitted on the newly active circuit pack.

In mid-span meet applications, to suppress the status message transmitted to the other half of the network, the clock quality level must be provisioned as "do not use for synchronization" (DUS, quality level 7).

For more information on synchronization status messaging, see:

- "Synchronization status messaging" on page 6-8
- "Synchronization status messaging command interpreter (SYNCMSGCI)" on page 6-10

Note: Do not use the **edittx** command when you log into a network element using the **selectne** command.

Requirements

Before you start you must:

- Log in to the network element user interface. You must log in to the network element locally, through the NE Login Manager tool of the OPC, or using the rlogin command. The edittx command must not be issued when you are logged in to a network element using the selectne command since the edittx command always report on the local network element. For log-in instructions and overview of the user interface, see *Common Procedures*, 323-1111-846.

  Note: This procedure is supported only on NEs that support synchronization status messaging (SSM). For more information on NEs that support SSM, see Table 6-4, "Availability of synchronization status messaging in OC-3/OC-12 TBM systems" on page 6-10.

—continued—

Procedure 6-21 (continued)
Provisioning the clock quality level inserted into a timing signal

Action

Step	Action

CAUTION
Risk of traffic loss
The following command affects the synchronization status message sent to the downstream nodes. An incorrect application of the edittx command can cause a service outage.

1 Access the SYNCMSGCI command interpreter (CI) tool and provision the clock quality level by entering:

syncmsgci ↵

edittx <service type> <circuit pack group> <quality level> ↵

where

<service type>	is **oc3**, **oc12**, **g1out**, or **g2out**
<circuit pack group>	is **g1s**, **g2s, g3** to **g8**, for OC-3, **g1**, **g2**, **g1s** or **g2s** for OC-12
<quality level>	is **st1** for quality level 1
	stu for quality level 2
	st2 for quality level 3
	st3 for quality level 4
	smc for quality level 5
	st4 for quality level 6 only for g1out or g2out
	dus for quality level 7
	auto for removing any provisioned quality level, so the actual quality level of the reference is transmitted

Note: If the G1OUT/G2OUT facilities have been provisioned to non auto values, then source tracking has no effect. EDITTX for G1OUT/G2OUT is not supported (and hence not recommended) when source tracking is active.

2 Confirm the command by entering:

yes ↵

Note: See Procedure 6-16,"Changing the ESI timing distribution source tracking and source" on page 6-79, to change the source tracking and provision the timing distribution source.

—end—

Optical mid-span-meet

A mid-span-meet (MSM) is the optical connection of two fiber network elements (NE). The MSM is between any of the following:

- an OC-3/OC-12 NE and previous releases of OC-3/OC-12 (see Procedure 7-1 “Connecting to OC-3/OC-12” on page 7-3)
- an OC-3/OC-12 NE and another vendor’s NE (see Procedure 7-2 “Connecting to other vendor equipment” on page 7-9)
- an OC-3/OC-12 SONET NE and a Synchronous Digital Hierarchy (SDH) NE (see *Provisioning and Operations Procedures*, 323-1111-310.)

Types of mid-span-meets

A MSM typically occurs where traffic passes across boundaries between operating companies:

- where two companies connect NEs from different manufacturers
- when both companies use Nortel Networks NEs but each company wants to control its end of the MSM with a Operations Controller (OPC) thus forming separate Spans of Control (SOC). Each operating company monitors and maintains the NE on its end of the MSM. The NE on either end could be operating with different software releases because there are two SOCs.
- where a SONET system connects to an SDH system. The signal format and payload structure are the same for SONET and SDH. However, SDH interprets the overhead data differently.

Software compatibility

OC-3/OC-12 releases prior to release 13 provided payload and overhead compatibility with other vendors’ equipment. Now, release 13 and later includes SONET Data Communication Channel (SDCC) connectivity with other vendors. OC-3/OC-12 also supports the Target Address Resolution Protocol (TARP) to allow NEs from other vendors to route TL1 messages through the Nortel Networks NE.

SONET software

The compatible OC-3/OC-12 releases for MSM SONET-to-SONET applications are: 6.xx, 7.xx, 8.xx, 9.xx, 10.xx, 11.xx, 13.xx, and 14.xx.

> ***Note:*** Any new MSM must be installed with OC-3/OC-12 release 13 or higher.

SDH software

The compatible OC-3/OC-12 releases for MSM SONET-to-SDH applications are release 8.1 and higher.

Hardware compatibility for MSM applications

Table 7-1 shows the compatibility of hardware for OC-3/OC-12 SONET-to-SONET and for SONET-to-SDH MSM applications.

OC-3/OC-12 SONET hardware compatibility

Table 7-1 lists the compatibility rules for OC-3/OC-12 NEs in SONET to SONET MSM applications. Also refer to the NTP Engineering rules and FAX-on-demand service (1-800-451-1685) for the current hardware baselines for the software releases.

Table 7-1
SONET hardware compatibility

System	Hardware requirements	Description
OC-3	NT7E01Gx	Can only be used with release 9.xx or higher
OC-12	NT7E02Kx/Lx/Mx Linear Optics	Linear applications only
	NT7E02Ex/Fx/Jx Ring Optics	Linear and ring applications
	NT7E02Px Enhanced Optics	Linear and ring applications, release 9.xx and higher
	NT7E01Cx/Dx/Gx Optics	Used as optical tributaries in OC-12 configuration

Chapter task list

This chapter contains the following tasks. Perform the task applicable to your installation.

Task	Reference
Connecting to OC-3/OC-12	page 7-3
Connecting to other vendor equipment	page 7-9

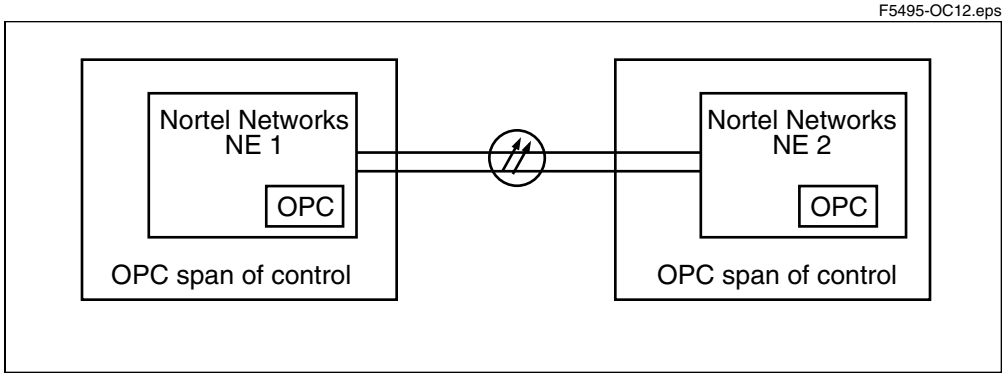
Procedure 7-1
Connecting to OC-3/OC-12

A mid-span-meet (MSM) optical connection of two Nortel Networks NEs is between an OC-3/OC-12 NE and a previous release of OC-3/OC-12.

MSM NEs can have different line rates and hardware vintages. NEs can be running different software releases with each end belonging to a different OPC span of control (SOC). Each SOC is associated with different maintenance administration groups or operating companies. See Figure 7-1.

Figure 7-1
Mid-span-meet between Nortel Networks NEs

F5495-OC12.eps



SONET Data communications channel

If the SONET data communications channel (SDCC) is active across the MSM boundary, the numbering schemes of the two NEs must be coordinated to ensure unique NE numbering. The numbering includes:

- the MSM NEs under the two OPC's SOCs
- any other NEs with operations, administration, maintenance, and provisioning (OAM&P) connections (either optical or through CNET) to the MSM NEs

To prevent the exchange of OAM&P data between NEs, disable the SONET data communications channel (SDCC). For the procedure to disable the SDCC, see "Disabling SONET data communications control (SDCC)" on page 7-7. For additional information about placing an SDCC channel out of service, see *System Testing Procedures* 323-1111-222.

Unless SDCC communication is required across the MSM, Nortel Networks recommends that the SDCC be turned off.

—continued—

When SDCC is on:

- OAM&P information is exchanged between the MSM NEs
- you can log on to and view the status of both MSM NEs

When SDCC is off, OAM&P data cannot be exchanged

Disabling SDCC on only one end of the MSM

Disabling SDCC on only one end raises "SDCC Link Fail" alarms on the other end. To remove the alarms from the networks, turn off these alarm points (see "Disabling alarm points" on page 7-7).

> ***Note:*** Disabling the "SDCC Link Fail" alarm points does not turn off the SDCC ports. Nortel Networks recommends that you turn off the SDCC ports at both ends of the MSM if possible. Only disable the alarm points if the SDCC ports must remain on.

Configurations

In the OPC Configuration Manager tool, enter the line or ring configurations depending on the MSM.

Linear configurations

The physical configuration for the MSM must be entered in the OPC Configuration Manager tools for both NEs in the MSM. In the Configuration Manager, a Nortel Networks NE outside the OPC's SOC (a node not controlled by this OPC) is represented by a dummy NE. The label "Not in SOC" identifies the dummy NE. For more information on configuring linear configurations, refer to *System Administration Procedures*, 232-1111-302.

Ring configurations

Where an MSM between Nortel Networks NEs is part of a BLSR ring:

- The ring configuration information must be entered in the Configuration Manager tools for both NEs. Even if a ring ADM is not in the OPCs SOC, enter the information (including the APS ID) for that ADM node and its neighboring nodes in the Configuration Manager tool. The node will appear as a dummy node labeled "Not in SOC." The ring configurations in both Configuration Manager tools must be identical. For more information, about OC-12 ring configurations, see *Provisioning and Operation Procedures*, 323-1111-310.

—continued—

- Any STS connections established around the ring must be entered in the OPC Connection Manager tools. Even connections that do not cross the MSM boundary must be entered. The STS connections in both Configuration Manager tools must be identical. For more information, about setting up STS connections, see *Provisioning and Operation Procedures*, 323-1111-310.

STS connection timeslots

Timeslots for STS connections that cross the MSM boundary must be coordinated. Coordination makes sure that the same STS-1 in the optical line is being used for the service on both ends of the MSM. Time slot assignment (TSA) on linear configurations defines the STS-1 timeslot in the optical line that the low speed service such as DS3 will use.

Note: After the STS connections that cross the MSM are built, the STS Connection Manager identifies the far end NE with a question mark icon (?) in the Tributary field.

Remote Unidirectional Failure feature

Disable the Remote Unidirectional Failure (RUF) feature if both of the following conditions exist:

- one NE in the MSM is running OC-3/OC-12 software release 11.20 and terminates DS1 and DS3 traffic and,
- the other NE uses another software release.

To disable the RUF feature, see the procedure "Disabling the Remote Unidirectional Failure (RUF) feature" on page 7-8.

The RUF feature detects misconnected traffic. The feature determines if the misconnection can be corrected by executing an OC-3/OC-12 protection switch. RUF uses a proprietary protocol in the Z3, Z4, and Z5 bytes of the STS path overhead to message failure and state information between NEs.

Only release 11.20 systems can communicate with other release 11.20 systems. In release 11.20 systems RUF is enabled by default.

OC-12 release 13 systems also use the RUF feature but overhead byte values are different. The release 13 RUF does not interoperate with the release 11.20 RUF feature. In release 13 systems the RUF is disabled by default.

—continued—

Procedure 7-1 (continued)
Connecting to OC-3/OC-12

Requirements

Before starting the procedure:

- coordinate the numbering plans between the two networks or disable the data communications channels (SDCC) between MSM NEs.
  - — For more information about the SDCC see "SONET Data communications channel" on page 7-3
  - — For the procedure to disable the SDCC, see "Disabling SONET data communications control (SDCC)" on page 7-7.
- audit both ends of the MSM to make sure that all hardware meets Nortel Networks baseline requirements for the appropriate software versions (for more information, see "Hardware compatibility for MSM applications" on page 7-2
- enter the MSM configuration in the OPC Configuration Manager tool to indicate how the NEs are physically connected (for more information, see "Configurations" on page 7-4)
- coordinate the timeslots for STS connections that cross the MSM boundary
- assign STS connections in the STS Connection Manager to the correct tributaries on both ends (for more information, see "STS connection timeslots" on page 7-5)
- disable the RUF feature if necessary (for more information, see "Remote Unidirectional Failure feature" on page 7-5)

Actions

Step	Action
	Logging in to the NE user interface
1	Log in to the NE user interface (UI) at the main level (for more information on logging in, see *Common Procedures*, 323-1111-846).
	Verifying and provisioning protection switch mode
2	To verify the switch mode, enter the commands **protectn** ↵ **dtlprot oc <line rate>** ↵ where **<line rate>** is either 3 or 12 **protprov** ↵ *The OC12 Protection Provisioning screen appears.*

—continued—

Procedure 7-1 (continued)
Connecting to OC-3/OC-12

Step	Action
3	If the switch mode needs to be changed, enter **swmode** ↵ *A message appears asking for confirmation of the change.*
4	To confirm the change, enter **y** ↵
	Verifying route diversity
5	To verify the state of the route diversity, enter **protectn** ↵ **dtlprot oc <line rate>** ↵ where **<line rate>** is either 3 or 12 **protprov** ↵
6	If the route diversity state needs to be changed, enter **routediv** ↵
7	To confirm the change, enter **y** ↵
	Disabling SONET data communications control (SDCC)
	For more information on disabling the SDCC, see "SONET Data communications channel" on page 7-3.
8	List the ports by entering the commands **fa comm** ↵ **ports sdcc** ↵ *The Comm Facility screen with a list of SDCC ports appears.*
9	Record the SDCC ports that cross the MSM boundary.
10	To disable a port, delete the port by entering **delete <port>** ↵ where **<port>** is the SDCC port that crosses the MSM. A message appears asking for confirmation of the deletion of the port.
11	To confirm the change, enter **y** ↵
12	Repeat step 10 and step 11 for any remaining ports that cross the MSM.
	Disabling alarm points
	For more information on disabling alarm points, see "Disabling SDCC on only one end of the MSM" on page 7-4.

—continued—

Procedure 7-1 (continued)
Connecting to OC-3/OC-12

Step	Action
13	List the ports by entering the commands **fa comm** ↵ **ports sdcc** ↵ The Comm Facility screen with a list of SDCC ports appears.
14	Record the SDCC ports that cross the MSM boundary.
15	To disable alarm points, enter the commands: **dtlport <channel>** ↵ where **<channel>** is the SDCC channel that raised the alarm **almprov** ↵ **editstat <alarm point>** ↵ where **<alarm point>** is the SDCC Link Fail alarm point A message appears asking for confirmation to disable the alarm point.
16	To confirm the change, enter **y** ↵
17	Repeat step 15 and step 16 for any other SDCC link fail points that are raised.

Disabling the Remote Unidirectional Failure (RUF) feature

For more information on disabling RUF for software, see "Remote Unidirectional Failure feature" on page 7-5.

18	To disable the RUF feature on OC-3/OC-12, enter: **rufci** ↵ **disable all** ↵

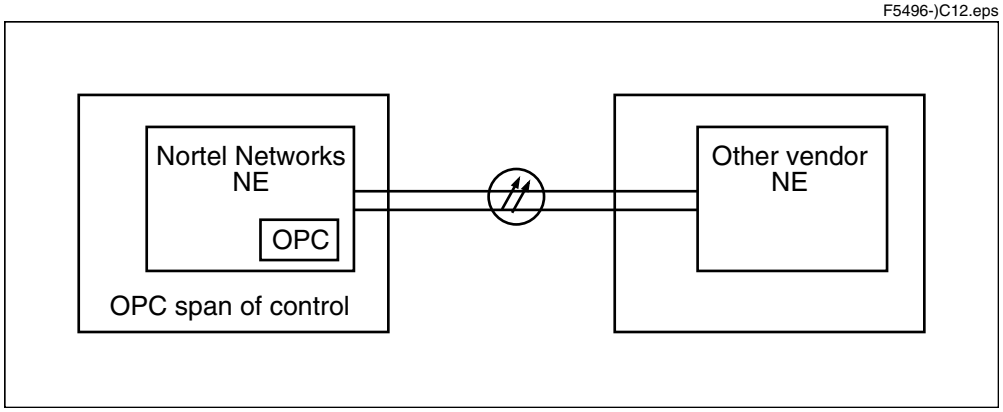
—end—

Procedure 7-2
Connecting to other vendor equipment

A mid-span-meet (MSM) is an optical connection between another vendor's NE and an OC-3/OC-12 Nortel Networks NE (see Figure 7-2). Compatibility between the NEs depends on the other vendor's degree of compliance to the latest Bellcore GR-253 specification. The optical line rate between the NEs can be at a tributary rate or at the NEs' high speed rate.

Figure 7-2
Mid-span-meet between a Nortel Networks NE and another vendor's NE

F5496-)C12.eps



Switch mode

The NEs on both ends of the MSM must be provisioned so that the switch mode is the same. Nortel Networks recommends that each NE be provisioned with the switch mode set to unidirectional and protection scheme set to 1+1. For the procedure to check and change switch mode, see "Verifying and provisioning protection switch mode" on page 7-15.

In unidirectional 1+1 mode, K-byte signalling does not have to be compliant between the two vendors for protection switching to occur. Switching happens at the local end and K-bytes provide only status messaging. If K-byte alarms occur after setting protection to 1+1, you can disable the alarms. Nortel Networks equipment still sends K-byte data to show protection status. Other vendors' equipment may not send K-byte data to the remote end. In this case, the active LEDs on the circuit packs and the software switch status may not reflect the active traffic path.

—continued—

Procedure 7-2 (continued)
Connecting to other vendor equipment

MSM configuration in the OPC Configuration Manager

The physical configuration for the MSM must be entered in the OPC Configuration Manager tools for both NEs in the MSM. In the Configuration Manager, the other vendor's NE outside the OPC's SOC (a node not controlled by this OPC) is represented by a dummy NE. The label "Not in SOC" identifies the dummy NE. Refer to the chapter on configuring linear ADM configurations in *System Administration Procedures,* 323-1111-302.

STS connections

Timeslots

Timeslots for STS connections that cross the MSM boundary must be coordinated. Coordination makes sure that the same STS-1 in the optical line is being used for the service on both ends of the MSM. Time slot assignment (TSA) on linear configurations defines the STS-1 timeslot in the optical line that the low speed service (such as DS1, DS3) uses.

For timeslot assignments refer to the chapter "Setting up connections at the OPC" in *Provisioning and Operations Procedures*, 323-1111-310.

> ***Note:*** After the STS connections that cross the MSM are built, the STS Connection Manager identifies the far end NE with a question mark in the Tributary field.

Tributary mappers for linear OC-12 MSM applications

In the OPC Connection Manager tool, STS connections on the Nortel Networks OC-12 NE that terminate to DS1 tributary mappers must be assigned to STS-1 tributary mappers at the other vendor's NE.

If six STS channels dropping to DS1 tributary mappers at the other vendor's NE are defined, the other vendor's NE appears to the OPC Connection Manager tool to be filled. The OPC Connection Manger tool will not assign additional mappers or STS connections to the node. However, if the DS1s from the Nortel Networks end of the STS connections are assigned to STS-1 tributary mappers on the other vendor's NE, the OPC Connection Manager tool allows the entire OC-12's bandwidth to be assigned to the other vendor's node.

> ***Note:*** A maximum of 168 DS1s (6 STS channels) can be dropped at a single Nortel Networks OC-12 NE. Space limitations on the shelf rather than bandwidth limit the number of DS1s. Refer to *Provisioning and Operations Procedures*, 323-1111-310 for more information on setting up connections at the OPC.

—continued—

Procedure 7-2 (continued)
Connecting to other vendor equipment

SONET data communications channel

Disable SONET data communications channel (SDCC) communications on the Nortel Networks NE in the MSM if the OC-3/OC-12 NE is running software release 8.xx or above. If SDDC communication is required across the MSM boundary, then the SDDC Link Fail alarm point must be disabled. For more information, see "Disabling SONET data communications control" on page 7-15. For additional information about placing an SDCC channel out of service, see *System Testing Procedures* 323-1111-222.

Target Address Resolution Protocol

The Target Resolution Protocol (TARP) transparency feature allows SDCC messages from other vendors' NEs to pass through Nortel Networks NEs. If you intend to use the TARP feature, you must enable the SDCC ports and disable the SDCC Link Fail alarm point. For more information on TARP, see "Using the Target Address Resolution Protocol (TARP)" on page 7-16.

DS1 to VT1.5 mapping patterns

The Nortel Networks OC-3/OC-12 NE uses a different mapping pattern from Bellcore when mapping VT1.5 in the STS-1 format. Most vendors use this alternative VT1.5 mapping pattern. If another vendor uses the Bellcore mapping method, the DS-1 signal will appear at a different port than expected. Table 7-2 compares the Nortel Networks and Bellcore mapping patterns

—continued—

Procedure 7-2 (continued)
Connecting to other vendor equipment

Table 7-2
Bellcore and Nortel Networks mapping patterns (DS1 to VT1.5)

DS1 No.	Nortel Networks		Bellcore	
	VT1.5 No.	VT Group No., VT No.	VT1.5 No.	VT Group No., VT No.
1	1	1,1	1	1,1
2	8	1,2	2	2,1
3	15	1,3	3	3,1
4	22	1,4	4	4,1
5	2	2,1	5	5,1
6	9	2,2	6	6,1
7	16	2,3	7	7,1
8	23	2,4	8	1,2
9	3	3,1	9	2,2
10	10	3,2	10	3,2
11	17	3,3	11	4,2
12	24	3,4	12	5,2
13	4	4,1	13	6,2
14	11	4,2	14	7,2
15	18	4,3	15	1,3
16	25	4,4	16	2,3
17	5	5,1	17	3,3
18	12	5,2	18	4,3
19	19	5,3	19	5,3
20	26	5,4	20	6,3
21	6	6,1	21	7,3
22	13	6,2	22	1,4
23	20	6,3	23	2,4
24	27	6,4	24	3,4
25	7	7,1	25	4,4
26	14	7,2	26	5,4
27	21	7,3	27	6,4
28	28	7,4	28	7,4

—continued—

Procedure 7-2 (continued)
Connecting to other vendor equipment

H4 byte processing

Nortel Networks OC-3/OC-12 NEs are compliant with GR-253 which uses a simplified coding scheme to process the H4 pointer byte in the SONET overhead.

Earlier Bellcore standards also allowed full-byte coding as well as the simplified scheme. In full-byte coding, the H4 byte functioned as an indicator for VT structure STS-1 signals.

If a Nortel Networks OC-3/OC-12 shelf is connected to a vendor's shelf that uses the full byte coding scheme, DS1 traffic will not transmit successfully.

Remote Unidirectional Failure feature

The Remote Unidirectional Failure (RUF) feature must be disabled if the Nortel Networks NE in the MSM terminates DS1 and DS3 traffic.

The RUF feature detects misconnected traffic. The feature determines if the misconnection can be corrected by executing an protection switch. RUF uses a proprietary protocol in the Z3, Z4, and Z5 bytes of the STS path overhead to message failure and state information between NEs.

For a procedure to disable RUF, see "Disabling the Remote Unidirectional Failure (RUF) feature" on page 7-17.

Note: The RUF feature is disabled by default.

—continued—

Procedure 7-2 (continued)
Connecting to other vendor equipment

Requirements

Before starting the procedure:

- make sure that switch mode is the same at both NEs (for more information, see "Switch mode" on page 7-9)
- coordinate the numbering plans between the two networks or disable the data communications channels (SDCC) between MSM NEs.
  - — For more information about the SDCC see "SONET data communications channel" on page 7-11
  - — For the procedure to disable the SDCC, see "Disabling SONET data communications control" on page 7-15.
- audit both NEs in the MSM to make sure that the hardware meets published baseline requirements for the appropriate software versions (for more information, see "OC-3/OC-12 SONET hardware compatibility" on page 7-2)
- enter the MSM configuration in the OPC Configuration Manager tool to indicate how the NEs are physically connected (for more information, see "MSM configuration in the OPC Configuration Manager" on page 7-10)
- coordinate the timeslots for STS connections that cross the MSM boundary (for more information, see "Timeslots" on page 7-10)
- assign STS connections in the STS Connection Manager to the correct tributaries on both ends; assign STS connections that terminate to DS1 tributary mappers on the Nortel Networks NE to STS-1 tributary mappers at the other vendor's NE (for more information, see "Tributary mappers for linear OC-12 MSM applications" on page 7-10)
- compare the DS1 to VT1.5 mapping patterns of other vendors' NEs to see if it matches the alternate Bellcore mapping pattern (for more information, see "DS1 to VT1.5 mapping patterns" on page 7-11).

—continued—

Procedure 7-2 (continued)
Connecting to other vendor equipment

Actions

Step	Action
	Logging in to the NE user interface
1	Log in to the Nortel Networks NE user interface (UI) at the main level (for more information on logging in, see *Common Procedures*, 323-1111-846).
	Verifying and provisioning protection switch mode
	Switch mode on both ends of the MSM must be provisioned the same (unidirectional or bidirectional). For more information on switch mode, see "Switch mode" on page 7-9.
2	To verify the switch mode, enter the commands **protectn** ↵ **dtlprot oc<line rate>** ↵ where **<line rate>** is either 3 or 12 **protprov** ↵ *The OC12 Protection Provisioning screen appears.*
3	If the switch mode needs to be changed, enter **swmode** ↵ *A message appears asking for confirmation of the change.*
4	To confirm the change, enter **y** ↵
	Disabling SONET data communications control
	For more information on disabling the SDCC, see "SONET data communications channel" on page 7-11.
5	List the ports by entering the commands **fa comm** ↵ **ports sdcc** ↵ The COMM Facility screen with a list of SDCC ports appears.
6	Record the SDCC ports that cross the MSM boundary.
7	To disable a port, delete the port by entering **delete <port>** ↵ where **<port>** is the SDCC port that crosses the MSM A message appears asking for confirmation of the deletion of the port.

—continued—

Procedure 7-2 (continued)
Connecting to other vendor equipment

Step	Action
8	To confirm the change, enter **y** ↵
9	Repeat step 7 and step 8 for any remaining ports that cross the MSM.

Using the Target Address Resolution Protocol (TARP)

For more information on TARP and an MSM, see "Target Address Resolution Protocol" on page 7-11.

See *System Testing Procedures* 323-1111-222 for procedures on:

- Placing SONET data communications ports in or out of service
- Provisioning the OPC for TARP
- Requesting a TARP echo response from a network element

Disabling the Fiber Connection Error alarm

In an MSM, the Fiber Connection Error alarm occurs on OC-3 or OC-12 fibers that cross the MSM boundary.

Note: Disabling an alarm point only masks the alarm from being raised. The state of the facility still shows in the UI screen as IS Trbl-Partial Fail. The state does not affect service or protection switching capabilities.

10 To disable the Fiber Connection Error alarm point, enter

eq oc<line rate> g<optical group> ↵

where **<line rate>** is either 3 or 12 and <optical group > is the optical group that crosses the MSM

almprov ↵

editstat <alarm point> ↵

where **<alarm point>** is the Fiber Connection Error alarm point

A message appears asking for confirmation to disable the alarm point.

11 To confirm the change, enter

y ↵

Disabling the exerciser function

Disable the exerciser function when another vendor's NE in the MSM does not support the exerciser function. Otherwise, a Protection Path Fail will be raised.

You can disable exerciser functionality on the OC-3 and OC-12 transport or tributary optics on OC-3/OC-12 shelves in linear (terminal and ADM) configurations.

Note: You cannot disable exerciser functionality for the OC-12 transport optics in OC-12 ring ADMs.

—continued—

Procedure 7-2 (continued)
Connecting to other vendor equipment

Step	Action
12	To disable the exerciser function, enter **protectn** ↵ **dtlprot oc<line rate> g<optical group>** ↵ where **<line rate>** is either 3 or 12 and **<optical group>** is the optical group that crosses the MSM **protprov** ↵ **protexer disabled** ↵

Disabling the Remote Unidirectional Failure (RUF) feature

For more information on disabling RUF, see "Remote Unidirectional Failure feature" on page 7-13.

13	To disable the RUF feature, enter: **rufci** ↵ **disable all** ↵

—end—

Appendix A: Commissioning data record form

This chapter is a guide for formal commissioning. The commissioning data record is presented in the same order as the procedures in Chapters 2 through 5 of this document. See the commissioning data record on the next page.

Note: Photocopy these blank forms and keep them for future use.

Commissioning data record

Commissioning Data Record			Use a copy of this form to keep a permanent record of all commissioning data		
Network name:					
System name:					
Primary OPC serial #:				Time zone:	
Backup OPC serial #:				Time zone:	
NE #	Shelf type; Shelf function	Transm. rate; Hardware config.	Shelf serial #; Software rel.	NE name; NE location	GMToffset; Time zone

Commissioning data record

Commissioning Data Record			Use a copy of this form to keep a permanent record of all commissioning data		
Network name:					
System name:					
Primary OPC serial #:				Time zone:	
Backup OPC serial #:				Time zone:	
NE #	Shelf type; Shelf function	Transm. rate; Hardware config.	Shelf serial #; Software rel.	NE name; NE location	GMToffset; Time zone

SONET Transmission Products

S/DMS TransportNode OC-3/OC-12 NE—TBM

Commissioning Procedures

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