

Optimux-1551

STM-1/OC-3 Terminal Multiplexer

Version 2.2



data communications

The Access Company

Optimux-1551

STM-1/OC-3 Terminal Multiplexer

Version 2.2

Installation and Operation Manual

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To facilitate the reuse, recycling and other forms of recovery of waste equipment in protecting the environment, the owner of this RAD product is required to refrain from disposing of this product as unsorted municipal waste at the end of its life cycle. Upon termination of the unit's use, customers should provide for its collection for reuse, recycling or other form of environmentally conscientious disposal.



General Safety Instructions

The following instructions serve as a general guide for the safe installation and operation of telecommunications products. Additional instructions, if applicable, are included inside the manual.

Safety Symbols



This symbol may appear on the equipment or in the text. It indicates potential safety hazards regarding product operation or maintenance to operator or service personnel.



Danger of electric shock! Avoid any contact with the marked surface while the product is energized or connected to outdoor telecommunication lines.



Protective ground: the marked lug or terminal should be connected to the building protective ground bus.



Some products may be equipped with a laser diode. In such cases, a label with the laser class and other warnings as applicable will be attached near the optical transmitter. The laser warning symbol may be also attached.

Please observe the following precautions:

- Before turning on the equipment, make sure that the fiber optic cable is intact and is connected to the transmitter.
- Do not attempt to adjust the laser drive current.
- Do not use broken or unterminated fiber-optic cables/connectors or look straight at the laser beam.
- The use of optical devices with the equipment will increase eye hazard.
- Use of controls, adjustments or performing procedures other than those specified herein, may result in hazardous radiation exposure.

ATTENTION: The laser beam may be invisible!

In some cases, the users may insert their own SFP laser transceivers into the product. Users are alerted that RAD cannot be held responsible for any damage that may result if non-compliant transceivers are used. In particular, users are warned to use only agency approved products that comply with the local laser safety regulations for Class 1 laser products.

Always observe standard safety precautions during installation, operation and maintenance of this product. Only qualified and authorized service personnel should carry out adjustment, maintenance or repairs to this product. No installation, adjustment, maintenance or repairs should be performed by either the operator or the user.

Handling Energized Products

General Safety Practices

Do not touch or tamper with the power supply when the power cord is connected. Line voltages may be present inside certain products even when the power switch (if installed) is in the OFF position or a fuse is blown. For DC-powered products, although the voltages levels are usually not hazardous, energy hazards may still exist.

Before working on equipment connected to power lines or telecommunication lines, remove jewelry or any other metallic object that may come into contact with energized parts.

Unless otherwise specified, all products are intended to be grounded during normal use. Grounding is provided by connecting the mains plug to a wall socket with a protective ground terminal. If a ground lug is provided on the product, it should be connected to the protective ground at all times, by a wire with a diameter of 18 AWG or wider. Rack-mounted equipment should be mounted only in grounded racks and cabinets.

Always make the ground connection first and disconnect it last. Do not connect telecommunication cables to ungrounded equipment. Make sure that all other cables are disconnected before disconnecting the ground.

Some products may have panels secured by thumbscrews with a slotted head. These panels may cover hazardous circuits or parts, such as power supplies. These thumbscrews should therefore always be tightened securely with a screwdriver after both initial installation and subsequent access to the panels.

Connecting AC Mains

Make sure that the electrical installation complies with local codes.

Always connect the AC plug to a wall socket with a protective ground.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Always connect the power cord first to the equipment and then to the wall socket. If a power switch is provided in the equipment, set it to the OFF position. If the power cord cannot be readily disconnected in case of emergency, make sure that a readily accessible circuit breaker or emergency switch is installed in the building installation.

In cases when the power distribution system is IT type, the switch must disconnect both poles simultaneously.

Connecting DC Power

Unless otherwise specified in the manual, the DC input to the equipment is floating in reference to the ground. Any single pole can be externally grounded.

Due to the high current capability of DC power systems, care should be taken when connecting the DC supply to avoid short-circuits and fire hazards.

DC units should be installed in a restricted access area, i.e. an area where access is authorized only to qualified service and maintenance personnel.

Make sure that the DC power supply is electrically isolated from any AC source and that the installation complies with the local codes.

The maximum permissible current capability of the branch distribution circuit that supplies power to the product is 16A. The circuit breaker in the building installation should have high breaking capacity and must operate at short-circuit current exceeding 35A.

Before connecting the DC supply wires, ensure that power is removed from the DC circuit. Locate the circuit breaker of the panel board that services the equipment and switch it to the OFF position. When connecting the DC supply wires, first connect the ground wire to the corresponding terminal, then the positive pole and last the negative pole. Switch the circuit breaker back to the ON position.

A readily accessible disconnect device that is suitably rated and approved should be incorporated in the building installation.

If the DC power supply is floating, the switch must disconnect both poles simultaneously.

Connecting Data and Telecommunications Cables

Data and telecommunication interfaces are classified according to their safety status.

The following table lists the status of several standard interfaces. If the status of a given port differs from the standard one, a notice will be given in the manual.

Ports	Safety Status
V.11, V.28, V.35, V.36, RS-530, X.21, 10 BaseT, 100 BaseT, Unbalanced E1, E2, E3, STM, DS-2, DS-3, S-Interface ISDN, Analog voice E&M	SELV Safety Extra Low Voltage: Ports which do not present a safety hazard. Usually up to 30 VAC or 60 VDC.
xDSL (without feeding voltage), Balanced E1, T1, Sub E1/T1	TNV-1 Telecommunication Network Voltage-1: Ports whose normal operating voltage is within the limits of SELV, on which overvoltages from telecommunications networks are possible.
FXS (Foreign Exchange Subscriber)	TNV-2 Telecommunication Network Voltage-2: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are not possible. These ports are not permitted to be directly connected to external telephone and data lines.
FXO (Foreign Exchange Office), xDSL (with feeding voltage), U-Interface ISDN	TNV-3 Telecommunication Network Voltage-3: Ports whose normal operating voltage exceeds the limits of SELV (usually up to 120 VDC or telephone ringing voltages), on which overvoltages from telecommunication networks are possible.

Always connect a given port to a port of the same safety status. If in doubt, seek the assistance of a qualified safety engineer.

Always make sure that the equipment is grounded before connecting telecommunication cables. Do not disconnect the ground connection before disconnecting all telecommunications cables.

Some SELV and non-SELV circuits use the same connectors. Use caution when connecting cables. Extra caution should be exercised during thunderstorms.

When using shielded or coaxial cables, verify that there is a good ground connection at both ends. The grounding and bonding of the ground connections should comply with the local codes.

The telecommunication wiring in the building may be damaged or present a fire hazard in case of contact between exposed external wires and the AC power lines. In order to reduce the risk, there are restrictions on the diameter of wires in the telecom cables, between the equipment and the mating connectors.

Caution

To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cords.

Attention

Pour réduire les risques d'incendie, utiliser seulement des conducteurs de télécommunications 26 AWG ou de section supérieure.

Some ports are suitable for connection to intra-building or non-exposed wiring or cabling only. In such cases, a notice will be given in the installation instructions.

Do not attempt to tamper with any carrier-provided equipment or connection hardware.

Electromagnetic Compatibility (EMC)

The equipment is designed and approved to comply with the electromagnetic regulations of major regulatory bodies. The following instructions may enhance the performance of the equipment and will provide better protection against excessive emission and better immunity against disturbances.

A good ground connection is essential. When installing the equipment in a rack, make sure to remove all traces of paint from the mounting points. Use suitable lock-washers and torque. If an external grounding lug is provided, connect it to the ground bus using braided wire as short as possible.

The equipment is designed to comply with EMC requirements when connecting it with unshielded twisted pair (UTP) cables. However, the use of shielded wires is always recommended, especially for high-rate data. In some cases, when unshielded wires are used, ferrite cores should be installed on certain cables. In such cases, special instructions are provided in the manual.

Disconnect all wires which are not in permanent use, such as cables used for one-time configuration.

The compliance of the equipment with the regulations for conducted emission on the data lines is dependent on the cable quality. The emission is tested for UTP with 80 dB longitudinal conversion loss (LCL).

Unless otherwise specified or described in the manual, TNV-1 and TNV-3 ports provide secondary protection against surges on the data lines. Primary protectors should be provided in the building installation.

The equipment is designed to provide adequate protection against electro-static discharge (ESD). However, it is good working practice to use caution when connecting cables terminated with plastic connectors (without a grounded metal hood, such as flat cables) to sensitive data lines. Before connecting such cables, discharge yourself by touching ground or wear an ESD preventive wrist strap.

FCC-15 User Information

This equipment has been tested and found to comply with the limits of the Class A digital device, pursuant to Part 15 of the 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 Installation and Operation manual, may cause harmful interference to the radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canadian Emission Requirements

This Class A digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Warning per EN 55022 (CISPR-22)

Warning

This is a class A product. In a domestic environment, this product may cause radio interference, in which case the user will be required to take adequate measures.

Avertissement

Cet appareil est un appareil de Classe A. Dans un environnement résidentiel, cet appareil peut provoquer des brouillages radioélectriques. Dans ces cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.

Achtung

Das vorliegende Gerät fällt unter die Funkstörgrenzwertklasse A. In Wohngebieten können beim Betrieb dieses Gerätes Rundfunkstörungen auftreten, für deren Behebung der Benutzer verantwortlich ist.

Mise au rebut du produit



Afin de faciliter la réutilisation, le recyclage ainsi que d'autres formes de récupération d'équipement mis au rebut dans le cadre de la protection de l'environnement, il est demandé au propriétaire de ce produit RAD de ne pas mettre ce dernier au rebut en tant que déchet municipal non trié, une fois que le produit est arrivé en fin de cycle de vie. Le client devrait proposer des solutions de réutilisation, de recyclage ou toute autre forme de mise au rebut de cette unité dans un esprit de protection de l'environnement, lorsqu'il aura fini de l'utiliser.

Instructions générales de sécurité

Les instructions suivantes servent de guide général d'installation et d'opération sécurisées des produits de télécommunications. Des instructions supplémentaires sont éventuellement indiquées dans le manuel.

Symboles de sécurité



Avertissement

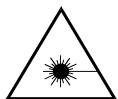
Ce symbole peut apparaître sur l'équipement ou dans le texte. Il indique des risques potentiels de sécurité pour l'opérateur ou le personnel de service, quant à l'opération du produit ou à sa maintenance.



Danger de choc électrique ! Evitez tout contact avec la surface marquée tant que le produit est sous tension ou connecté à des lignes externes de télécommunications.



Mise à la terre de protection : la cosse ou la borne marquée devrait être connectée à la prise de terre de protection du bâtiment.



Avertissement

Certains produits peuvent être équipés d'une diode laser. Dans de tels cas, une étiquette indiquant la classe laser ainsi que d'autres avertissements, le cas échéant, sera jointe près du transmetteur optique. Le symbole d'avertissement laser peut aussi être joint.

Veuillez observer les précautions suivantes :

- Avant la mise en marche de l'équipement, assurez-vous que le câble de fibre optique est intact et qu'il est connecté au transmetteur.
- Ne tentez pas d'ajuster le courant de la commande laser.
- N'utilisez pas des câbles ou connecteurs de fibre optique cassés ou sans terminaison et n'observez pas directement un rayon laser.
- L'usage de périphériques optiques avec l'équipement augmentera le risque pour les yeux.
- L'usage de contrôles, ajustages ou procédures autres que celles spécifiées ici pourrait résulter en une dangereuse exposition aux radiations.

ATTENTION : Le rayon laser peut être invisible !

Les utilisateurs pourront, dans certains cas, insérer leurs propres émetteurs-récepteurs Laser SFP dans le produit. Les utilisateurs sont avertis que RAD ne pourra pas être tenue responsable de tout dommage pouvant résulter de l'utilisation d'émetteurs-récepteurs non conformes. Plus particulièrement, les utilisateurs sont avertis de n'utiliser que des produits approuvés par l'agence et conformes à la réglementation locale de sécurité laser pour les produits laser de classe 1.

Respectez toujours les précautions standards de sécurité durant l'installation, l'opération et la maintenance de ce produit. Seul le personnel de service qualifié et autorisé devrait effectuer l'ajustage, la maintenance ou les réparations de ce produit. Aucune opération d'installation, d'ajustage, de maintenance ou de réparation ne devrait être effectuée par l'opérateur ou l'utilisateur.

Manipuler des produits sous tension

Règles générales de sécurité

Ne pas toucher ou altérer l'alimentation en courant lorsque le câble d'alimentation est branché. Des tensions de lignes peuvent être présentes dans certains produits, même lorsque le commutateur (s'il est installé) est en position OFF ou si le fusible est rompu. Pour les produits alimentés par CC, les niveaux de tension ne sont généralement pas dangereux mais des risques de courant peuvent toujours exister.

Avant de travailler sur un équipement connecté aux lignes de tension ou de télécommunications, retirez vos bijoux ou tout autre objet métallique pouvant venir en contact avec les pièces sous tension.

Sauf s'il en est autrement indiqué, tous les produits sont destinés à être mis à la terre durant l'usage normal. La mise à la terre est fournie par la connexion de la fiche principale à une prise murale équipée d'une borne protectrice de mise à la terre. Si une cosse de mise à la terre est fournie avec le produit, elle devrait être connectée à tout moment à une mise à la terre de protection par un conducteur de diamètre 18 AWG ou plus. L'équipement monté en châssis ne devrait être monté que sur des châssis et dans des armoires mises à la terre.

Branchez toujours la mise à la terre en premier et débranchez-la en dernier. Ne branchez pas des câbles de télécommunications à un équipement qui n'est pas mis à la terre. Assurez-vous que tous les autres câbles sont débranchés avant de déconnecter la mise à la terre.

Connexion au courant du secteur

Assurez-vous que l'installation électrique est conforme à la réglementation locale.

Branchez toujours la fiche de secteur à une prise murale équipée d'une borne protectrice de mise à la terre.

La capacité maximale permissible en courant du circuit de distribution de la connexion alimentant le produit est de 16A. Le coupe-circuit dans l'installation du bâtiment devrait avoir une capacité élevée de rupture et devrait fonctionner sur courant de court-circuit dépassant 35A.

Branchez toujours le câble d'alimentation en premier à l'équipement puis à la prise murale. Si un commutateur est fourni avec l'équipement, fixez-le en position OFF. Si le câble d'alimentation ne peut pas être facilement débranché en cas d'urgence, assurez-vous qu'un coupe-circuit ou un disjoncteur d'urgence facilement accessible est installé dans l'installation du bâtiment.

Le disjoncteur devrait déconnecter simultanément les deux pôles si le système de distribution de courant est de type IT.

Connexion d'alimentation CC

Sauf s'il en est autrement spécifié dans le manuel, l'entrée CC de l'équipement est flottante par rapport à la mise à la terre. Tout pôle doit être mis à la terre en externe.

A cause de la capacité de courant des systèmes à alimentation CC, des précautions devraient être prises lors de la connexion de l'alimentation CC pour éviter des courts-circuits et des risques d'incendie.

Les unités CC devraient être installées dans une zone à accès restreint, une zone où l'accès n'est autorisé qu'au personnel qualifié de service et de maintenance.

Assurez-vous que l'alimentation CC est isolée de toute source de courant CA (secteur) et que l'installation est conforme à la réglementation locale.

La capacité maximale permissible en courant du circuit de distribution de la connexion alimentant le produit est de 16A. Le coupe-circuit dans l'installation du bâtiment devrait avoir une capacité élevée de rupture et devrait fonctionner sur courant de court-circuit dépassant 35A.

Avant la connexion des câbles d'alimentation en courant CC, assurez-vous que le circuit CC n'est pas sous tension. Localisez le coupe-circuit dans le tableau desservant l'équipement et fixez-le en position OFF. Lors de la connexion de câbles d'alimentation CC, connectez d'abord le conducteur de mise à la terre à la borne correspondante, puis le pôle positif et en dernier, le pôle négatif. Remettez le coupe-circuit en position ON.

Un disjoncteur facilement accessible, adapté et approuvé devrait être intégré à l'installation du bâtiment.

Le disjoncteur devrait déconnecter simultanément les deux pôles si l'alimentation en courant CC est flottante.

Declaration of Conformity

Manufacturer's Name: RAD Data Communications Ltd.
Manufacturer's Address: 24 Raoul Wallenberg St., Tel Aviv 69719,
Israel

Declares that the product:

Product Name: Optimux-1551

Conforms to the following standard(s) or other normative document(s):

EMC:	EN 55022:1998	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement.
	EN 50024: 1998	Information technology equipment – Immunity characteristics – Limits and methods of measurement.
Safety:	EN 60950: 2000	Safety of information technology equipment.

Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC, the Low Voltage Directive 73/23/EEC and the R&TTE Directive 1999/5/EC for wired equipment. The product was tested in a typical configuration.

Tel Aviv, 22 August 2004



Haim Karshen
VP Quality

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Quick Start Guide

Installation of Optimux-1551 should be carried out only by an experienced technician. If you are familiar with Optimux-1551, use this guide to prepare the unit for operation.

1. Installing Optimux-1551

Connecting the Interfaces

1. Connect the OC-3/STS-3 (/STM-1) equipment to the back panel fiber optic or BNC connectors.
2. Connect the E1/DS1 channels to the back panel Telco connectors. Refer to [Appendix A](#).
3. Connect a control terminal via a cross-cable (supplied with the product) to the back panel Control port; or, connect a Telnet host, a PC running a Web browsing application, or a RADview/SNMP management station to the back panel Ethernet port. (In a direct Ethernet connection, use a cross-cable.)

Note *Optimux-1551 supports multiple simultaneous management sessions as follows:*

- *One session via terminal application connected directly to the unit's Control port*
- *Up to two sessions via Telnet and/or web browser connected to the unit's Ethernet port*
- *Multiple sessions (maximum quantity depends on network resources) via SNMP application (for example, RADview) connected to the unit's Ethernet port.*

Connecting the Power

Connect the power cable to the power connector on the Optimux-1551 power supply.

The unit has no power switch. Operation starts when the power is applied to the power supply connector(s).

Caution *Do not connect or disconnect the power cable from the device while the cable is connected to the power main!*

2. Configuring Optimux-1551

Configure Optimux-1551 to the desired operation mode via an ASCII terminal connected to the back panel Control port. Alternatively, you can manage Optimux-1551 over Telnet, a PC running a Web browsing application or RADview application via the MNG port.

Starting a Terminal Session

- **To connect the terminal:**
 1. Connect a terminal cross adaptor with a flat cable (supplied with the product) to the Control connector of Optimux-1551.
 2. Turn the control terminal on.
 3. Reset Optimux-1551 by turning it off and back on.
 4. Once the ON LED starts flashing, press **<Enter>** several times.
 5. Optimux-1551 automatically adjusts itself to the current terminal baud rate and responds with a string of dots.
 6. Press **<.>** (period) several times, until Optimux-1551 displays the user name and password entry form.
 7. Enter your user name and password and proceed with the management session.

Configuring the IP Management Parameters

- **To configure the IP management parameters:**

From the Management menu (**Main > Configuration > System Configuration > Management**), select the following host IP parameters:

 - Host IP address
 - Subnet mask
 - Default gateway IP address
 - Community names
 - Network managers.

Configuring the Timing

➤ To configure the master clock:

- From the Master Clock menu (**Main > Configuration > System Configuration > Master Clock**), configure the Optimux-1551 master clock:

Notes *In a point-to-point application, if the near end unit is set to internal clock, the far end unit should be set to loopback clock. Refer to [Chapter 6, Configuring Typical Applications](#).*

- Internal
- Loopback
- External Reference E1 (if optional station clock card is installed)
- External Reference T1 (if optional station clock card is installed)
- External Tributary (if optional station clock card is installed).

Caution *There is no alarm indication for incorrect clock configuration.*

Configuring the Primary and Management Ethernet Ports

➤ To configure the Ethernet ports:

From the Primary/Management Port menu (**Main > Configuration > System Configuration > Control Port > Ethernet Configuration**), configure the following parameters:

- Autonegotiation
- Ethernet mode, if autonegotiation is disabled
- LAN speed, if autonegotiation is disabled.

Configuring the OC-3/STS-3 (/STM-1) Port

➤ To configure the OC-3/STS-3 (/STM-1) port:

From the Uplink Configuration menu (**Main > Configuration > Physical Ports Configuration > Uplink Configuration**), configure the following parameters:

- EED threshold
- SD threshold
- J1 Tx path trace enable
- J1 Rx path trace enable
- J1 path trace.

Configuring the E1/DS1 Channels

➤ To configure the E1/DS1 Channels:

From the LIU Configuration menu (**Main > Configuration > Physical Ports Configuration > Channel Configuration > LIU Configuration**):

1. Select E1 or DS1 as the **Channel Line Type**.

Note *If the OP-63E1 card is installed, DS1 is not an option.*

2. If E1 is the channel type, select the **Interface Type**.
3. Select **Line Coding**.
4. If DS1 is the channel type, select **Line Length**.

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Appendix A. Interface Specification

Appendix B. Glossary

Chapter 1

Introduction

This chapter provides a general introduction to Optimux-1551, including:

- An overview of Optimux-1551, its versions and options
- A brief physical description of Optimux-1551
- A functional description of Optimux-1551
- Technical specifications.

1.1 Overview

Optimux-1551 is an STS-3/OC-3/STM-1 synchronous digital multiplexer intended mainly for use in point-to-point applications, providing access to SONET (Synchronous Optical Network)/SDH (Synchronous Digital Hierarchy) transmission cores at the STS-3/OC-3/STM-1 level (155.52 Mbps).

Optimux-1551 provides a flexible, efficient and cost-effective method for transporting PDH (Plesiochronous Digital Hierarchy) signals at E1 rates (2.048 Mbps) or DS1 rates (1.544 Mbps) via a SONET or SDH uplink.

Optimux-1551's uplink aggregate can be equipped with electrical intra-office interfaces or with short-haul or long-haul optical interfaces. The long-haul optical interface supports a range of up to 80 km (50 miles), thereby enabling remote access to regional and national SONET/SDH transmission networks.

Optional backup cards can be installed to provide no-single-point-of-failure redundancy for the STS-3/OC 3/STM-1 uplink, power supply, and control and access primary cards. When a backup card is replaced, there is no interruption in system operation (hot swap). When a primary card is replaced, the switching time from the primary card to the backup card is less than 50 ms.

Product Options

Uplink Interface Options

Optimux-1551 is available with an electrical coaxial uplink interface or a variety of fiber optic uplink options (see [Table 1-7](#)). The unit can be ordered with a second (redundant) uplink.



Power Supply Options

To avoid injury, always disconnect an AC or DC power supply's cable before removing the power supply.

Optimux-1551 is available with one of the following types of power supply:

- 100 to 240 VAC
- 48 VDC nominal.

The unit can be ordered with a second (redundant) power supply.

Channel Module Options

The channels interfaces can be:

- 120Ω balanced or 75Ω unbalanced E1, or
- 100Ω balanced DS1.

The physical E1/DS1 connections are made through 64-pin Telco connectors.

Notes

- *In this manual, the access and control card is referred to by its designation on the front panel: OP-6384, OP-2128, or OP-4256.*
- *For 75Ω unbalanced E1, use a Telco-Telco cable (P/N: CBL-TELCO-TELCO/2M) and a BNC patch panel (P/N: OP-A/ADAPTOR/21BNC), which supports 21 unbalanced E1 ports.*

The unit can be ordered with a second (redundant) OP-6384, OP-2128, or OP-4256 card, which connects to the channels via an internal Y-connection on the backplane.

Note

Both cards must be the same type: two OP-6384s, two OP-2128s, or two OP-4256s. OP-63E1 only supports E1 (63 channels). OP-6384 supports E1 (63 channels) or DS1 (84 channels). OP-2128 supports E1 (21 channels) or DS1 (28 channels), and OP-4256 supports E1 (42 channels) or DS1 (56 channels).

Cabling accessories for the channel connector include:

- Telco-Telco cable, P/N: CBL-TELCO-TELCO/2M
- Telco-open cable, P/N: CBL-TELCO-OPEN/2M
- Telco-RJ45 cable, P/N: CBL-TELCO-RJ45/2M
- BNC patch panel, P/N: OP-A/ADAPTOR/21BNC (supports 21 unbalanced E1 ports)
- RJ-45 patch panel, P/N: OP-A/ADAPTOR/28RJ (supports 21 E1 or 28 DS1 balanced ports).

Note

Cabling accessories are not supplied with the Optimux-1551 – they must be ordered separately.

Station Clock Option

An optional station clock card can be installed on the OP-6384/OP-2128/OP-4256 card. When both the station clock and an external clock are used, the unit's transmit clock for transmission over the STS-3/OC-3/STM-1 uplink is locked to the station clock input source. The input source can be either one of the E1/DS1 tributaries or a dedicated external E1/DS1 input.

The station clock card supports STRATUM 3 for the SONET/SDH equipment.

Applications

Point-to-Point Application

In [Figure 1-1](#), a company campus line or a line leased from the local operator is used to link two Optimux-1551 units situated at a distance ranging from several hundreds of meters to several tens of kilometers. A backup uplink is optionally used to ensure uninterrupted data flow between the two sites. The Optimux-1551 at each site is connected to E1/DS1 access equipment.

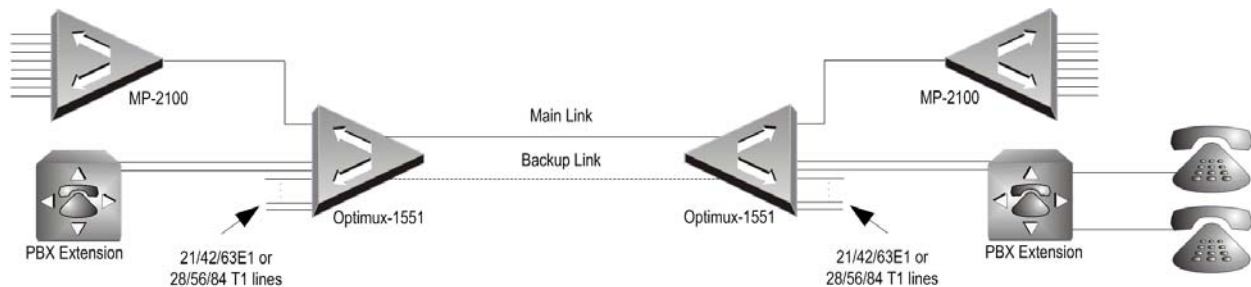


Figure 1-1. Point-to-Point Link Application

Operation over SONET/SDH Network

Optimux-1551's uplink enables direct connections to SONET/SDH networks as illustrated in [Figure 1-2](#).

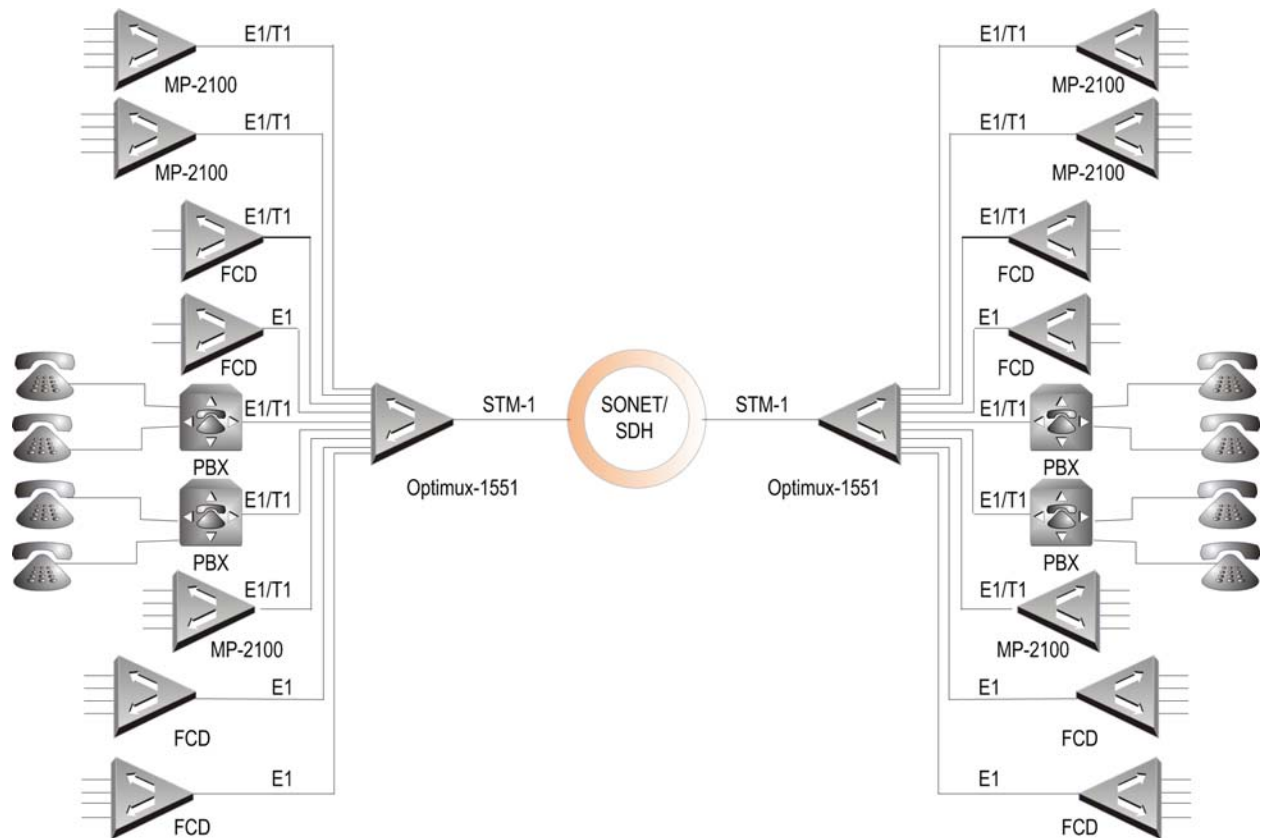


Figure 1-2. Point-to-Point application over SONET/SDH networks

E1/DS1 Fan-Out for SONET/SDH Network

The uplink enables E1/DS1 fan-out connections to SONET/SDH networks as illustrated in [Figure 1-3](#), where the unit can be connected to an add-drop multiplexer (ADM).

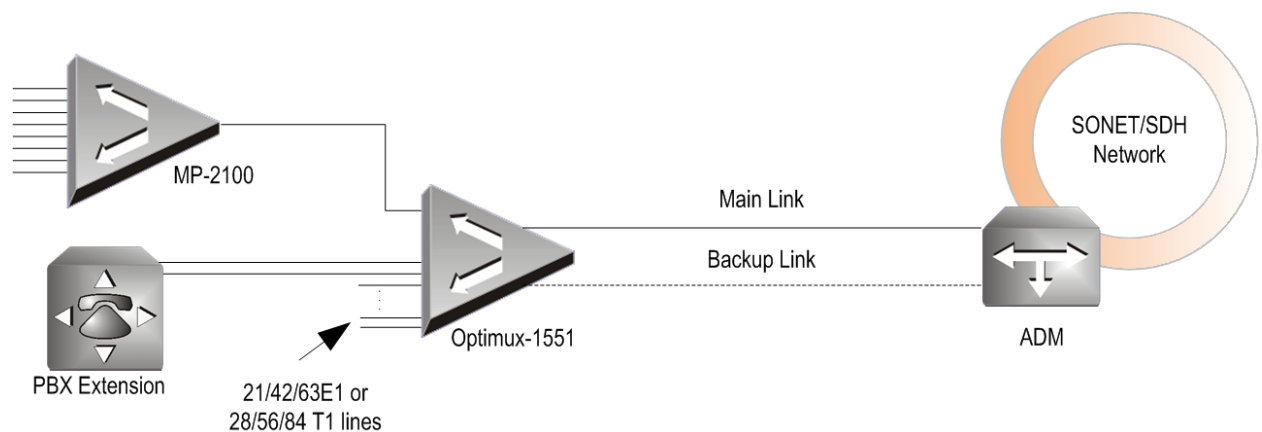


Figure 1-3. E1/DS1 Fan-Out for SONET/SDH Networks

Features

With the optical uplink, Optimux-1551 provides a simple, flexible and cost-effective solution for transporting multiple E1/DS1 signals at distances up to 80 km (50 miles).

Optimux-1551 multiplexes 21/42/63 E1 or 28/56/84 DS1 channels over a single STS-3/OC-3/STM-1 data stream. This provides a highly cost-effective, simple solution for transporting multiple E1/DS1 channels for a broad range of applications.

Optimux-1551 supports fiber optic (multimode, single-mode, WDM, and SF3) and coax uplinks.

Optimux-1551 supports 1+1 unidirectional SONET/SDH automatic protection, as well as 1+1 protection on E1/DS1 tributaries and power supply modules, eliminating any single point of failure.

Critical modules can be automatically switched to optional backup modules when required. An optional second power supply provides automatic power redundancy and fail-safe operation. An optional second uplink provides user-configurable redundancy on uplink failure. An optional second OP-6384/OP-2128/OP-4256 card provides user-configurable redundancy for other primary hardware functions. All of these redundant cards can also be replaced without shutting down the unit and without interrupting data flow.

The power supply (and optional backup power supply) can be ordered with either 100 to 240 VAC or 48 VDC nominal intake.

The timing source for transmission to the STS-3/OC-3/STM-1 can be the Optimux-1551 internal clock, loopback of the received clock, or an external clock (requires an optional station clock card installed on the OP-6384/OP-2128/OP-4256 card).

Note

If a station clock card is installed on the main OP-6384/OP-2128/OP-4256 card and there is a backup OP-6384/OP-2128/OP-4256 card, then to maintain redundancy a station clock card must also be installed on the backup OP-6384/OP-2128/OP-4256 card.

To facilitate system diagnostics, Optimux-1551 features LED status indicators, AIS alarm generation, alarm dry contact interface with cut-off button, in-service monitoring of E1/DS1 lines and statistics collection and diagnostic loops on channels and uplinks.

Optimux-1551 setup, control, and diagnostics can be managed via a serial port (from an ASCII terminal), via an Ethernet/Fast-Ethernet port (from a RADview or other SNMP, Telnet, or Web browser station), or from a remote unit via inband DCC bytes (RADview/SNMP, Telnet, or Web). The serial port can also be configured for dial-out alarms.

Optimux-1551 is packaged in a compact 2U high unit for mounting in either an ANSI or ETSI 19" rack.

Optimux-1551 conforms to the following standards: ITU G.703, ITU G.707, ITU G.783, ITU G.823, ITU G.824, ITU G.841, ITU G.957, RFC3895, RFC3592, Bellcore GR-253-CORE, Bellcore GR-499-CORE.

Optimux-1551 is designed to meet the requirements of NEBS level 3.

1.2 Physical Description

Optimux-1551 is a compact 88 mm/3.4 inch (2U) high unit, which can operate as a standalone unit or can be installed in a 483mm/19 inch ANSI or ETSI rack using the brackets provided with the unit. [Figure 1-4](#) is a 3D view of the unit.



Figure 1-4. Optimux-1551 Front Panel – 3D View



Figure 1-5. Optimux-1551 Back Panel – 3D View

The front panel includes the power connectors, the fan tray, and the LED indicators for power, system, alarm, uplink, and channel status. For details on the front panel LEDs, see [Chapter 3](#).

The back panel contains the connectors for uplinks, channels, serial and Ethernet management, monitoring, optional external clock, and alarm dry contact. It also contains another set of LED indicators for the uplink, system, and power status, as well as an alarm cut-off button. For details on the back panel, see [Chapter 3](#).

1.3 Functional Description

General Description

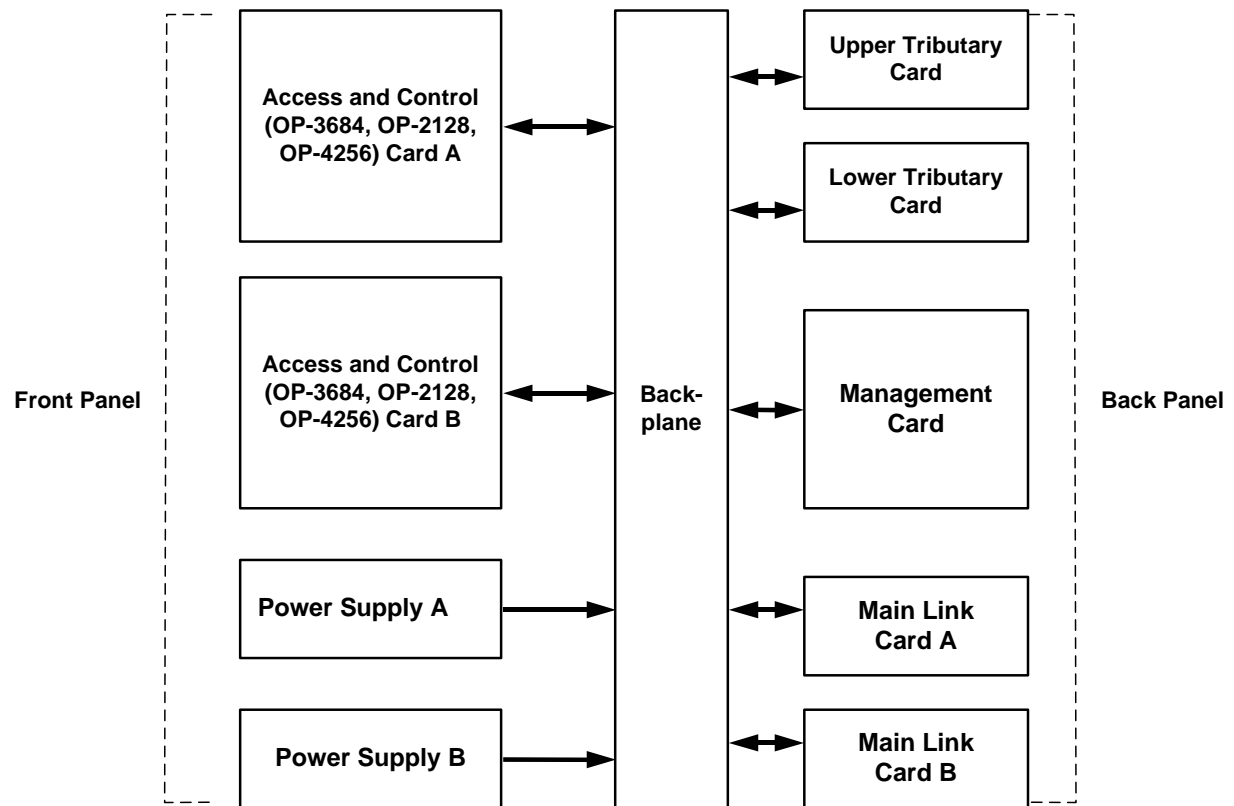


Figure 1-6. General

The cards in the Optimux-1551 are listed in [Table 1-1](#).

Table 1-1. Primary Cards

Card	Description
(OP-6384/ OP-2128/ OP-4256	The main board of the unit, it contains the major circuits. A second card can be installed for redundancy. The cards are hot-swap replaceable.
Power Supply	100 to 240 VAC, or 48 VDC. A second power supply can be installed for redundancy. The power supplies are hot-swap replaceable.
Backplane	Communications and physical connections for the primary cards.
Tributary	The tributary card provides physical interfaces to the E1/DS1 lines, including line transformers, for up to 63 E1 (2.048 Mbps) or for 84 DS1 (1.544 Mbps) lines. The tributary card provides six 64-pin telco connectors.
Management	Permanent, non-replaceable card that provides the physical connection hardware for an (optional) external clock input, an Ethernet connection, a serial (terminal) connection, an E1/DS1 channel monitoring (sniffing) output, a alarm dry contact output, and an alarm cut-off pushbutton.
Uplink	Coax or fiber optic STS-3/OC-3/STM-1 (155.52 Mbps) uplink. A number of optical interface cards are available for multimode, single-mode, and various wavelengths. A second card can be installed for redundancy. The cards are hot-swap replaceable.
Fan Tray	The fan tray has four fans. The fan tray also has a Status LED that indicates the internal fans' status. The fan tray is hot-swap replaceable

OP-6384/OP-2128/OP-4256 Card

The OP-6384/OP-2128/OP-4256 card includes mappers, E1/DS1 channel interfaces, SONET/SDH STS-3/OC-3/STM-1 overhead terminator, dry contacts for major and minor alarms, serial communications interface, Ethernet interface, redundancy logic for itself and for the uplink card, CPU interface, and clock interface. The card is the mounting base for the optional station clock card.

OP-6384/OP-2128/OP-4256 Card Redundancy

Note

If two cards are installed, both must be of the same type (both cards should either be OP-6384, OP-2128, or OP-4256) and used with the same type and number of channels:

- *OP-63E1: 63 E1*
- *OP-84T1: 63 E1 or 84 DS1*
- *OP-2128: 21 E1 or 28 DS1*
- *OP-4256: 42 E1 or 56 DS1.*

Two OP-6384/OP-2128/OP-4256 cards can be ordered with Optimux-1551 to provide 1+1 hardware protection. Where two cards are installed and redundancy is configured as automatic, one of the cards is the active card and the second is the standby card. The active and standby status switches between the cards when a failure is detected on the active card.

Two modes of protection are supported:

Automatic	Backup card becomes active card on failure condition in first card.
Off	Automatic switching between cards is disabled but still may be performed manually. The active card is the card selected as the main card.

Causes for Redundancy Switching

The following reasons can cause a redundancy switch (jump) from the active to the backup OP-6384/OP-2128/OP-4256 card. The reasons are listed in descending order of priority. In other words, if reason 1 occurs in card 1, operation switches to card 2, and then reason 2 occurs in card 2, operation will not switch back to card 1 (if reason 1 is still occurring).

Table 1-2. Causes for Redundancy Switching

Cause
1. Problem with framer
2. Problem with station clock when the unit is operating with an external clock
3. Problem with a mapper
4. Problem with a CPLD (hardware logic component)
5. The state of loss conditions on E1/DS1 channels depends on the configuration of tributary channel priorities and tributary fail limits (see Configuring the OP-6384/OP-2128/OP-4256 (Access and Control) Card Redundancy , and Configuring the Channels sections, Chapter 4). The status of the channels can be viewed in the System Status menu (Monitor > System Monitoring > System Status).
6. Problem with the flash memory.

Multiplexing and Mapping

There are three mappers on the OP-6384 Card, two on the OP-4256 card and one on the OP-2128 card. The mappers map the channel signals to the TUG3 level. The SONET/(SDH) STS-3/OC-3/STM-1 overhead terminators map the TUG-3 over VC-4 and STM-1. See [Figure 1-7](#) to [Figure 1-10](#) and [Table 1-3](#) to [Table 1-6](#).

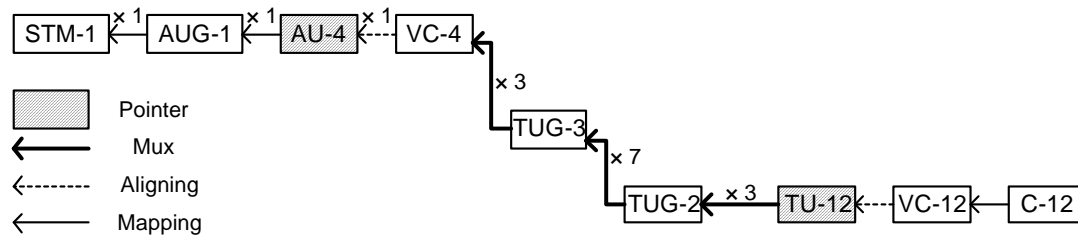


Figure 1-7. E1 over STM-1 Multiplexing

Table 1-3. E1 over STM-1 Mapping

TU#	TUG3	TUG2	TU12	TU#	TUG3	TUG2	TU12	TU#	TUG3	TUG2	TU12
1	1	1	1	22	1	1	2	43	1	1	3
2	2	1	1	23	2	1	2	44	2	1	3
3	3	1	1	24	3	1	2	45	3	1	3
4	1	2	1	25	1	2	2	46	1	2	3
5	2	2	1	26	2	2	2	47	2	2	3
6	3	2	1	27	3	2	2	48	3	2	3
7	1	3	1	28	1	3	2	49	1	3	3
8	2	3	1	29	2	3	2	50	2	3	3
9	3	3	1	30	3	3	2	51	3	3	3
10	1	4	1	31	1	4	2	52	1	4	3
11	2	4	1	32	2	4	2	53	2	4	3
12	3	4	1	33	3	4	2	54	3	4	3
13	1	5	1	34	1	5	2	55	1	5	3
14	2	5	1	35	2	5	2	56	2	5	3
15	3	5	1	36	3	5	2	57	3	5	3
16	1	6	1	37	1	6	2	58	1	6	3
17	2	6	1	38	2	6	2	59	2	6	3
18	3	6	1	39	3	6	2	60	3	6	3
19	1	7	1	40	1	7	2	61	1	7	3
20	2	7	1	41	2	7	2	62	2	7	3
21	3	7	1	42	3	7	2	63	3	7	3

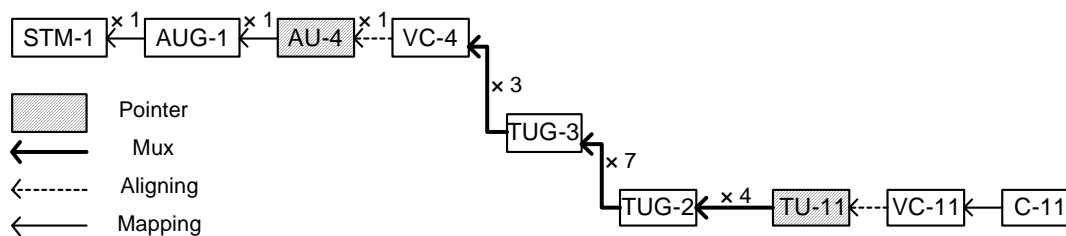


Figure 1-8. DS1 over STM-1 Multiplexing

Table 1-4. DS1 over STM-1 Mapping

TU#	TUG3	TUG2	TU11	TU#	TUG3	TUG2	TU11	TU#	TUG3	TUG2	TU11
1	1	1	1	29	2	3	2	57	3	5	3
2	2	1	1	30	3	3	2	58	1	6	3
3	3	1	1	31	1	4	2	59	2	6	3
4	1	2	1	32	2	4	2	60	3	6	3
5	2	2	1	33	3	4	2	61	1	7	3
6	3	2	1	34	1	5	2	62	2	7	3
7	1	3	1	35	2	5	2	63	3	7	3
8	2	3	1	36	3	5	2	64	1	1	4
9	3	3	1	37	1	6	2	65	2	1	4
10	1	4	1	38	2	6	2	66	3	1	4
11	2	4	1	39	3	6	2	67	1	2	4
12	3	4	1	40	1	7	2	68	2	2	4
13	1	5	1	41	2	7	2	69	3	2	4
14	2	5	1	42	3	7	2	70	1	3	4
15	3	5	1	43	1	1	3	71	2	3	4
16	1	6	1	44	2	1	3	72	3	3	4
17	2	6	1	45	3	1	3	73	1	4	4
18	3	6	1	46	1	2	3	74	2	4	4
19	1	7	1	47	2	2	3	75	3	4	4
20	2	7	1	48	3	2	3	76	1	5	4
21	3	7	1	49	1	3	3	77	2	5	4
22	1	1	2	50	2	3	3	78	3	5	4
23	2	1	2	51	3	3	3	79	1	6	4
24	3	1	2	52	1	4	3	80	2	6	4
25	1	2	2	53	2	4	3	81	3	6	4
26	2	2	2	54	3	4	3	82	1	7	4
27	3	2	2	55	1	5	3	83	2	7	4
28	1	3	2	56	2	5	3	84	3	7	4

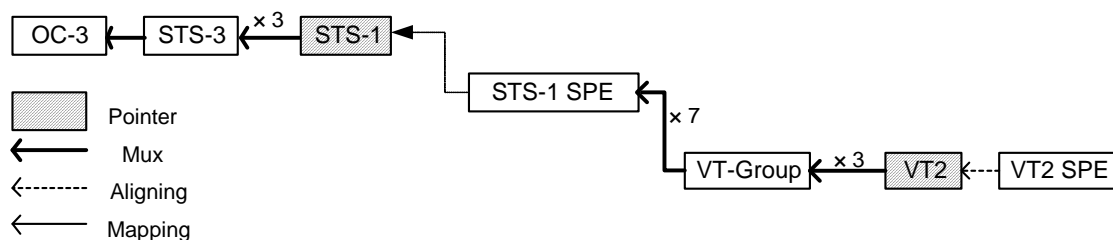


Figure 1-9. E1 over OC-3 Multiplexing

Table 1-5. E1 over OC-3 Mapping

TU#	STS-1	VT-Group	VT 2	TU#	STS-1	VT-Group	VT 2	TU#	STS-1	VT-Group	VT 2
1	1	1	1	22	2	1	1	43	3	1	1
2	1	2	1	23	2	2	1	44	3	2	1
3	1	3	1	24	2	3	1	45	3	3	1
4	1	4	1	25	2	4	1	46	3	4	1
5	1	5	1	26	2	5	1	47	3	5	1
6	1	6	1	27	2	6	1	48	3	6	1
7	1	7	1	28	2	7	1	49	3	7	1
8	1	1	2	29	2	1	2	50	3	1	2
9	1	2	2	30	2	2	2	51	3	2	2
10	1	3	2	31	2	3	2	52	3	3	2
11	1	4	2	32	2	4	2	53	3	4	2
12	1	5	2	33	2	5	2	54	3	5	2
13	1	6	2	34	2	6	2	55	3	6	2
14	1	7	2	35	2	7	2	56	3	7	2
15	1	1	3	36	2	1	3	57	3	1	3
16	1	2	3	37	2	2	3	58	3	2	3
17	1	3	3	38	2	3	3	59	3	3	3
18	1	4	3	39	2	4	3	60	3	4	3
19	1	5	3	40	2	5	3	61	3	5	3
20	1	6	3	41	2	6	3	62	3	6	3
21	1	7	3	42	2	7	3	63	3	7	3

Note

HVC 1: Channels 1 – 21, HVC 2: Channels 22 – 42, HVC 3: Channels 43 – 63

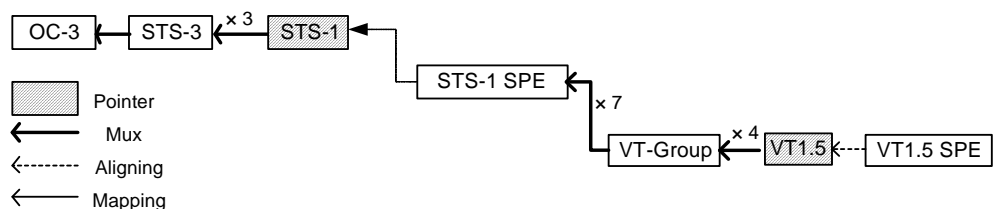


Figure 1-10. DS1 over OC-3 Multiplexing

Table 1-6. DS1 over OC-3 Mapping

TU#	STS-1	VT-Group	VT1.5	TU#	STS-1	VT-Group	VT1.5	TU#	STS-1	VT-Group	VT1.5
1	1	1	1	29	2	1	1	57	3	1	1
2	1	2	1	30	2	2	1	58	3	2	1
3	1	3	1	31	2	3	1	59	3	3	1
4	1	4	1	32	2	4	1	60	3	4	1
5	1	5	1	33	2	5	1	61	3	5	1
6	1	6	1	34	2	6	1	62	3	6	1
7	1	7	1	35	2	7	1	63	3	7	1
8	1	1	2	36	2	1	2	64	3	1	2
9	1	2	2	37	2	2	2	65	3	2	2
10	1	3	2	38	2	3	2	66	3	3	2
11	1	4	2	39	2	4	2	67	3	4	2
12	1	5	2	40	2	5	2	68	3	5	2
13	1	6	2	41	2	6	2	69	3	6	2
14	1	7	2	42	2	7	2	70	3	7	2
15	1	1	3	43	2	1	3	71	3	1	3
16	1	2	3	44	2	2	3	72	3	2	3
17	1	3	3	45	2	3	3	73	3	3	3
18	1	4	3	46	2	4	3	74	3	4	3
19	1	5	3	47	2	5	3	75	3	5	3
20	1	6	3	48	2	6	3	76	3	6	3
21	1	7	3	49	2	7	3	77	3	7	3
22	1	1	4	50	2	1	4	78	3	1	4
23	1	2	4	51	2	2	4	79	3	2	4
24	1	3	4	52	2	3	4	80	3	3	4
25	1	4	4	53	2	4	4	81	3	4	4
26	1	5	4	54	2	5	4	82	3	5	4
27	1	6	4	55	2	6	4	83	3	6	4
28	1	7	4	56	2	7	4	84	3	7	4

Note

HVC 1: Channels 1 – 28, HVC 2: Channels 29 – 56, HVC 3: Channels 57 – 84

Uplink Cards

Two types of STS-3/OC-3/STM-1 uplink interfaces are supported:

- Electrical – with BNC connectors
- Optical –
 - 850 nm for multimode fiber
 - 1310 and 1550 nm laser for extended range over single-mode fiber
 - 1310 and 1550 nm laser (WDM) for extended range over single fiber using different wavelengths for transmit and receive
 - 1310 nm laser (SF3) for extended range over single fiber using the same wavelength for transmit and receive.

Note

The uplink cards are hot-swappable.

Fiber Optic Interface Cards

Fiber optic interface cards are modular cards that convert incoming optical signals to electrical signals, and outgoing electrical signals to optical signals. Conversion is achieved by utilizing an infrared LED or laser transmitter. Fiber optic interface cards support ST, SC, SC/APC, and FC-PC connectors, single-mode and multimode fibers, and wavelengths of 850 nm, 1310 nm and 1550 nm. [Table 1-7](#) details available fiber optic types and their performance.

Table 1-7. Optical Uplink Performance

Wavelength [nm]	Fiber Type [μ m]	Transmitter Type	Typical Output Power [dBm]	Receiver Sensitivity [dBm]	Connector Type	Typical Max. Range [km] [miles]	
850nm	62.5/125 Multimode	VCSEL	-18	-26	SC, ST, FC	2	1.25
1310nm	9/125 Single-mode	Laser	-12	-31	ST, SC, FC	20	12.5
1550nm	9/125 Single-mode	Laser	-12	-31	ST, FC, SC	20	12.5
1310nm Long Haul	9/125 Single-mode	Laser	-2	-34	ST, SC, FC	40	25
1550nm Long Haul	9/125 Single-mode	Laser	-2	-34	ST, FC, SC	80	50
1310nm/ 1550nm	9/125 Single-mode	Laser (SF1/SF2)	-12	-29	SC	20 km	
1310nm	9/125 Single-mode	Laser (SF3)	-12	-27	SC/APC	20 km	

Electrical Interface Card

The electrical interface card includes a line interface transceiver. The receiver recovers clock and data from the incoming signal, and also provides signal detect output. The receive and transmit data cables are connected to the card through a 75Ω coaxial BNC connector (unbalanced).

Uplink Redundancy

Up to two uplink cards can be ordered with Optimux-1551. The uplink A card is the default active uplink and the uplink B card is the default protection (backup) uplink. The uplink card redundancy is unidirectional 1+1 automatic protection in accordance with GR-253-CORE (for SONET) and ITU G.841 (for SDH). Together with the unit's 1+1 protection on the E1/DS1 tributaries, this eliminates any single point of failure.

The status of the uplink cards changes if any of the following occurs to the current active uplink:

- Loss of signal
- Loss of frame
- EED B2
- MS-AIS
- SD (signal degradation) – the SD threshold can be user-configured.

The signal received from the active uplink (A or B) is passed to both the active OP-6384/OP-2128/OP-4256 card and the protection OP-6384/OP-2128/OP-4256 card.

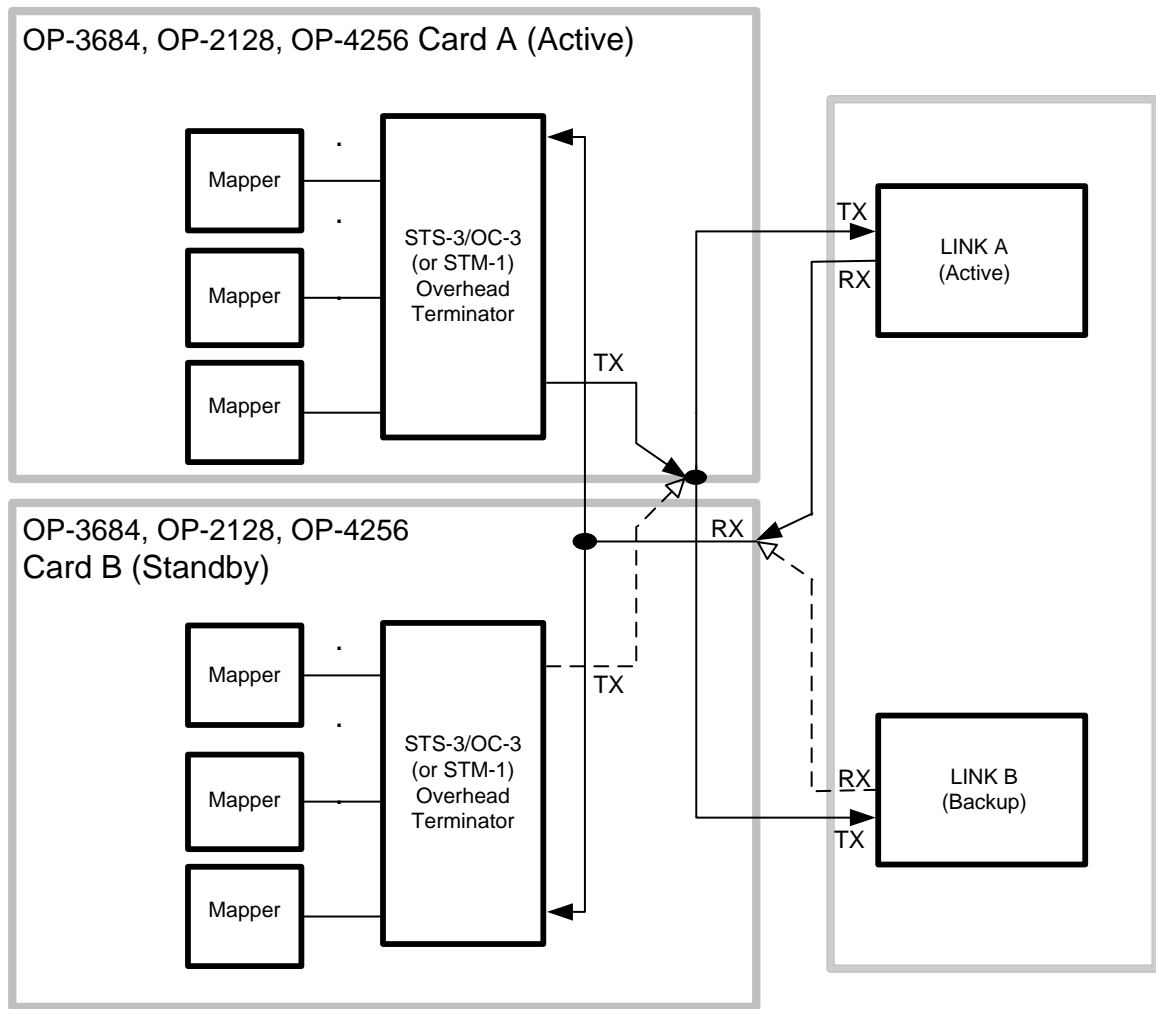


Figure 1-11. Uplink Redundancy

Both uplinks must be the same interface type, i.e., both electrical or both optical.

With a backup uplink card installed, Optimux-1551 redundancy mechanisms can be implemented. The following user-selectable modes are available:

Automatic Redundancy	Upon detection of signal loss or malfunction in the active uplink (A), switches to the protection uplink (B). Automatically reinstates card (A) as active when card (A) recovers from the signal loss condition.
Manual Redundancy	Switches transmission to the protection uplink (B) upon active uplink (A) malfunction or signal loss, but unlike, automatic redundancy, does not reinstate uplink (A) as active when uplink (A) recovers from the signal loss condition.
Off	Uplink A is the active uplink and cannot switch to uplink B.

Table 1-8. Automatic and Manual Uplink Redundancy

Mode	Fault Condition on Uplink (A) Rx	Consequent Action	Remark
Automatic	Signal loss	Backup activated	If signal loss is recovered on uplink (A), uplink (A) is automatically reselected.
Automatic	Loss of frame, MS-AIS, EED, SD	Backup activated	There is no way to check if uplink (A) has recovered. Therefore, uplink (A) will be reactivated only if a fault condition is detected on the protection uplink (B).
Manual	Signal loss, loss of frame, MS-AIS, EED, SD	Backup activated	The main uplink (A) will not be reactivated as long as the mode is manual.
Off	(Not applicable)	Backup not activated	Uplink A is always the active uplink.

Channels

Each E1/DS1 channel port performs the following functions:

- **Receive path:** recovers the data stream and the associated clock signal from the received line signal. The resulting channel data stream is transferred to the uplink.
- **Transmit path:** receives the channel data stream from the uplink and generates the line signal for transmission to the equipment connected to the interface.

Power Supply



To avoid injury, always disconnect an AC or DC power supply's cable before removing the power supply.

Optimux-1551 can be ordered with a 100 to 240 VAC or 48 nominal VDC power supply.

Note

The power supply cards are hot-swappable.

Power Supply Redundancy

Up to two power supplies can be ordered with Optimux-1551. The power supplies share the load. In the event of a failure in one of the power supplies, the other power supply automatically continues to support the entire load.

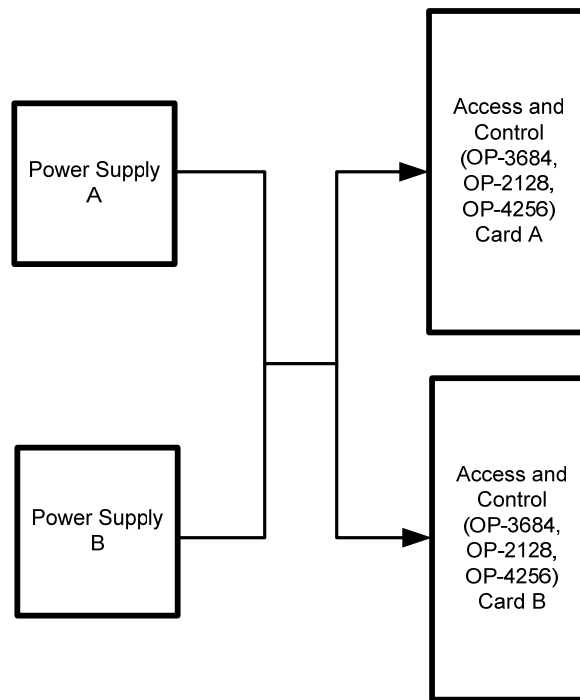


Figure 1-12. Power Supply Redundancy

If two power supplies are used, they do not have to be the same type. The power supply configuration can be:

- One or two AC
- One or two DC
- One AC and one DC.

Note

When installing both an AC power supply and a DC power supply, adhere to the following guidelines:

- *Jumper J1 on the DC power supply must be removed*
- *The DC power supply must be installed in power supply slot B and the AC power supply in power supply slot A.*

Each power supply has its own inlet connector.

If two power supply cards are installed, during normal operation power for the Optimux-1551 is taken from both supplies.

If one power supply fails, all the power consumption is automatically taken from the second power supply. If the failed power supply returns to normal operation, power is again taken from both supplies.

Management

Optimux-1551 is managed either by an ASCII terminal connection, using menu dialogs with numbered options selected by the operator, or via a more advanced interface, such as RADview, Telnet, or a web browser.

Terminal management menus and procedures are described in [Chapter 4, Supervisory Port Software Configuration](#).

Physical connections for control can be made through the Control (RS-232) port using a DB-9 connector (cross cable required) for terminal connection or through the MNG-ETH (Ethernet/Fast Ethernet) port using an RJ-45 interface for Ethernet connection. The Control port can also be configured to support call out using a standard dialup modem.

Monitoring

Optimux-1551's monitoring mode is used for diagnostic purposes. The monitoring mode enables the user to monitor the received data of the selected channel, also referred to as sniffing. The data can be monitored on the Monitor connector located on the back panel ([Figure 1-13](#)). For E1 channels, only HDB3 is supported. For DS1 channels, only B8ZS is supported. Monitoring does not influence regular data flow. The following picture illustrates Optimux-1551's monitoring feature.

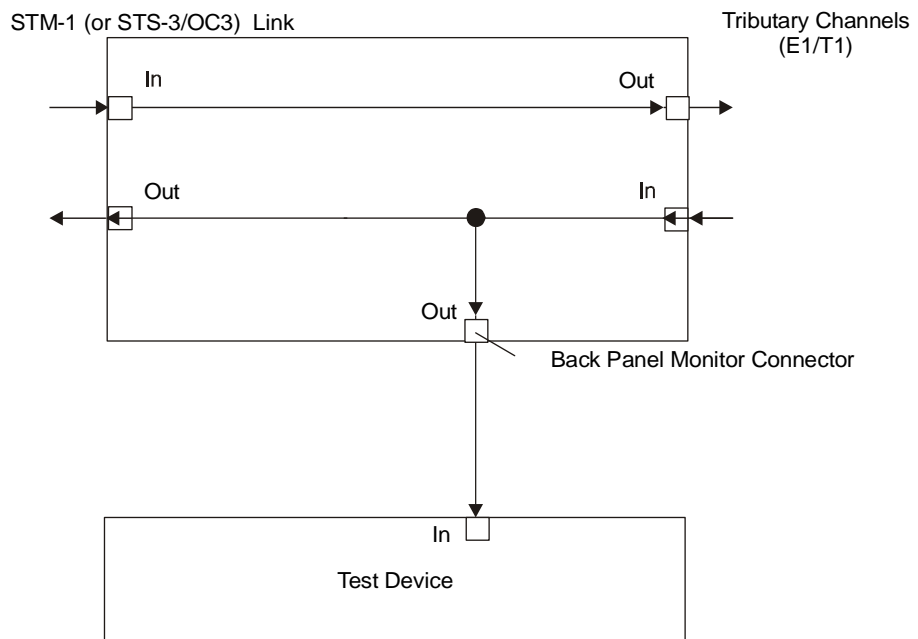


Figure 1-13. Monitoring Mode

Timing

The SONET/SDH overhead terminator requires a 19.44 MHz reference source clock, which provides transmit direction timing. Three timing modes are available (software selectable):

- INT (Internal)
- LBT (Loop Back Timing)
- EXT (External station clock – requires optional station clock card).

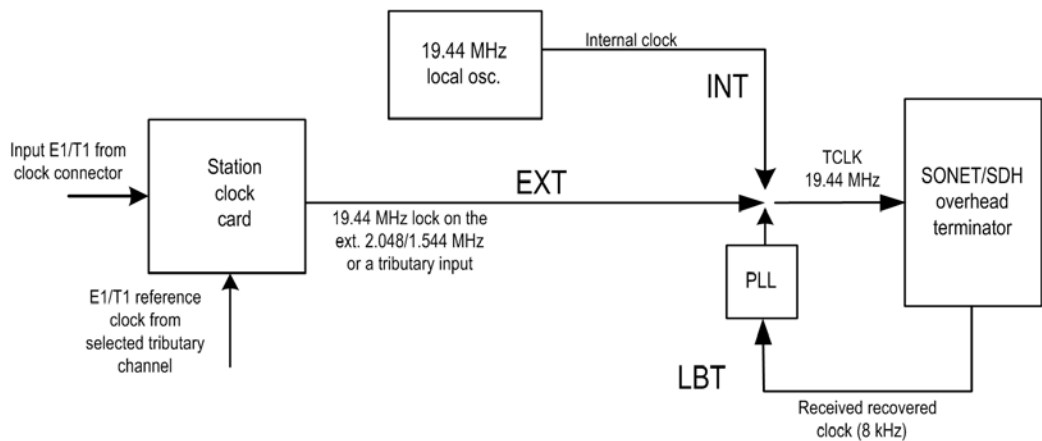


Figure 1-14. Timing

Internal: An onboard free-running oscillator (19.44 MHz \pm 20 ppm) is the timing source for the transmit data toward the STS-3/OC-3/STM-1 uplink.

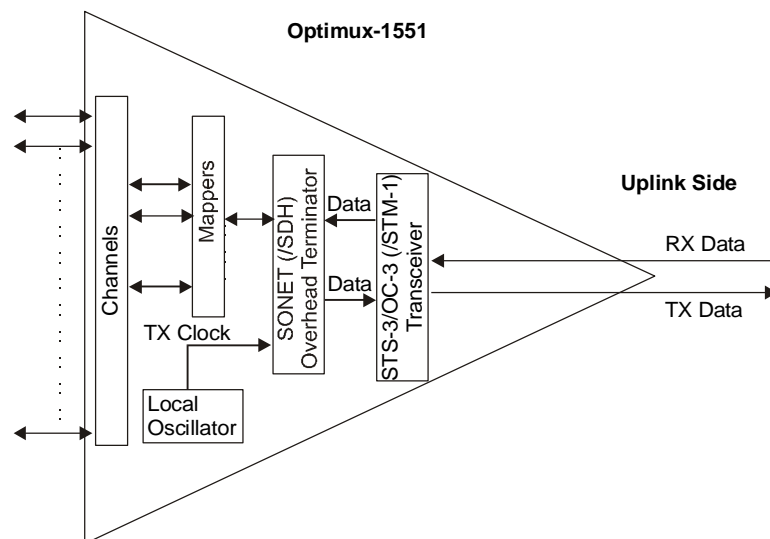


Figure 1-15. Internal Clock Mode

Loopback: The system transmit clock is locked to the recovered received clock signal coming from the STS-3/OC-3/STM-1. Systems that require a one-source clock function in this mode.

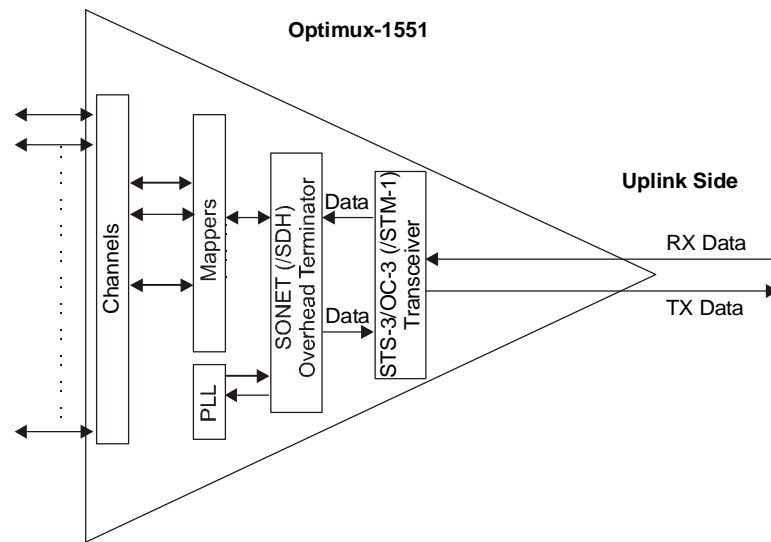


Figure 1-16. Loopback Timing Mode

External: The system is synchronized to an external E1/DS1 clock source. It requires an optional station clock daughterboard, which is installed on the OP-6384/OP-2128/OP-4256 card.

The station clock module performs clock regeneration for SEC (Synchronous Equipment Clock) and supports STRATUM 3 for the SONET/SDH equipment. The module can operate in free-run, locked and holdover modes

For source input, an external E1 (2.048 MHz) or DS1 (1.544 Mbps) clock or data can be run to the shielded, RJ-45-type Clock connector on the Optimux-1551 back panel.

Alternatively, the E1/DS1 source input can be taken from one of the channels.

The station clock module locks on the 2.048 MHz (or 1.544 MHz) source input and converts it to the 19.44 MHz required for the reference clock.

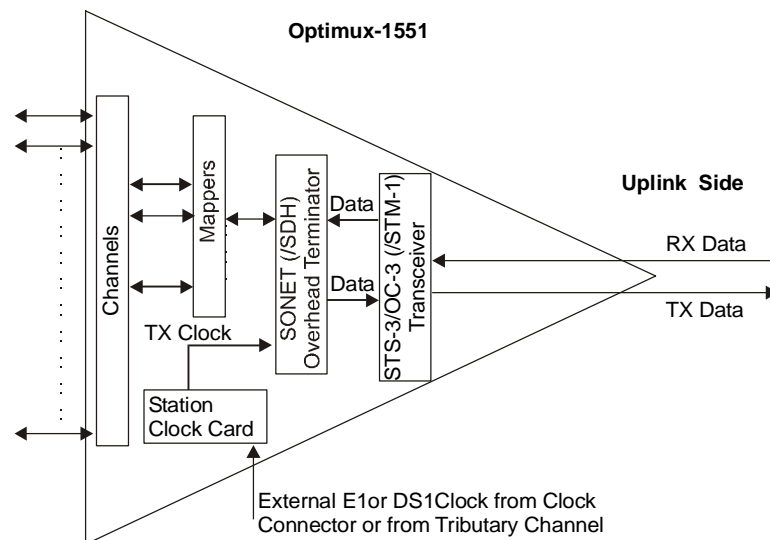


Figure 1-17. External Timing

Where two OP-6384/OP-2128/OP-4256 cards are installed, to maintain proper redundancy: if one has a station clock card installed the other must have a station clock card installed as well.

Diagnostics

Two kinds of diagnostic tests can be carried out: Local Loop Back (LLB) and Remote Loop Back (RLB). These loops can be carried out on the channel layer as well as on the uplink layer. For more information on diagnostics see [Chapter 5, Tests and Diagnostics](#).

Alarms and Events

Optimux-1551 reports about events and about two types of alarms: major and minor. Events are changes in state, while alarms are caused by conditions that can be changed or terminated.

Each type of alarm (major and minor) activates a LED and a dry contact alarm relay. Events do not activate LEDs or alarm relays. Alarms and events are logged in the system log file.

An alarm cut-off (ACO) button is located on the back panel. Once pressed, the dry contact is disengaged and remains so until a new alarm of the same type occurs.

The user can configure each alarm to be considered Major, Minor or Off. Optimux-1551 also supports external alarm input via the Alarms connector.

For more information about alarms refer to [Chapter 5, Tests and Diagnostics](#).

Statistics

Optimux-1551 includes several counters for statistics concerning the uplink and channels. For more information about statistics see [Chapter 4, Supervisory Port Software Configuration](#).

Cooling

Optimux-1551 includes a fan tray that provides cooling air to the internal circuits. Using cooling fans permits the unit to operate over a wide range of ambient temperatures, an advantage for equipment installed in curbside cabinets.

The fans operate when the unit's internal temperature becomes excessive. The operation of the fans is monitored by the management subsystem.

The fan tray is hot-swap replaceable. It contains a Status LED that indicates the status of the four internal fans in the fan tray.

1.4 Technical Specifications

Electrical Uplink	<i>Standards</i>	ITU-T G.703
	<i>Rate</i>	STS-3/OC-3/STM-1 (155.520 Mbps)
	<i>Line Code</i>	CMI
	<i>Impedance</i>	75Ω, unbalanced
	<i>Range</i>	12.7 dB
		135m is attainable when using RG-59B/U (at 78 MHz – in accordance with the square root of frequency law)
	<i>Connectors</i>	Two shielded BNC connectors
Fiber Optic Uplink	<i>Redundancy</i>	Optional additional electrical uplink
	<i>Performance</i>	Refer to Table 1-7
	<i>Standards</i>	ITU-T G.957
	<i>Connectors</i>	ST, SC, FC, SC/APC
Power Supply	<i>Redundancy</i>	Optional additional fiber optic uplink
	<i>Number of Supplies</i>	One or two (power sharing)
	<i>AC Power Module</i>	100 to 240 VAC, 50 or 60 Hz
	<i>DC Power Module</i>	48 VDC nominal
	<i>Power Consumption</i>	AC: 160 VA max, 1.6A max DC: 80W max, 2A max

General Indicators	<i>POWER A, B</i>	Green:	Power is OK
		Red:	Power fault
		Off:	No power
	<i>TST (yellow)</i>	On:	Unit is in test mode
		Flashing:	Downloading software
	<i>FLT (red)</i>	On:	OP-6384/OP-2128/OP-4256 card is in fault condition
	<i>ON A/B (green)</i>	On: Active	OP-6384/OP-2128/OP-4256 card
		Flashing:	During auto-baud detect process.
	<i>MAJ (red)</i>	On:	Major Alarm
		Flashing:	Major Alarm + ACO button pressed
	<i>MIN (yellow)</i>	On:	Minor Alarm
		Flashing:	Minor Alarm + ACO button pressed
	<i>Uplink SYNC A/B LOSS (red)</i>	On:	Uplink electrical/optical signal not present or out-of-frame detected on uplink (A/B)
	<i>Uplink AIS A/B (yellow)</i>	On:	AIS signal detected on uplink A/B
	<i>Channel SYNC LOSS/AIS (red/yellow)</i>	Red:	Loss of signal detected on the respective non masked channel.
		Yellow:	AIS signal detected on the respective non masked channel
		Flashing:	The channel is masked and the LED status for the masked channels' parameter is set to Blink by the user.
Control Port		Off:	The channel is masked and the LED status for the masked channels' parameter is set to Off by the user or when the channel is not masked and no Loss of Signal or AIS is detected on the respective channel.
	<i>SIG</i>	Green:	Signal detected on the respective uplink card
	<i>Interface</i>	RS-232 (V.24)	
	<i>Rate</i>	9,6 kbps, 19,200 kbps, 38,400 kbps, 57,600 kbps, 115,2 kbps	
	<i>Connector</i>	9-pin DB-9, female	

Ethernet Port	<i>Physical Interface</i>	10/100BaseT
	<i>Data rate</i>	10/100 Mbps
	<i>Transmission mode</i>	Full-duplex, half-duplex, autonegotiation
	<i>Connector</i>	Shielded RJ-45
E1 Channel Line Interface	<i>Standards</i>	ITU-T G.703 and G.823
	<i>Data Rate</i>	2.048 Mbps
	<i>Line Code</i>	HDB3 or AMI
	<i>Impedance</i>	120Ω balanced or 75Ω unbalanced
	<i>Range</i>	According to ITU-T Rec.G.703
	<i>Jitter</i>	According to ITU-T Rec. G.823
	<i>Connector</i>	64-pin unshielded telco
DS1 Channel Line Interface	<i>Standards</i>	ITU-T G.703 and G.824
	<i>Data Rate</i>	1.544 Mbps
	<i>Line Code</i>	B8ZS or AMI
	<i>Impedance</i>	100Ω balanced
	<i>Range</i>	According to ITU-T Rec.G.703
	<i>Jitter</i>	According to ITU-T Rec. G.824
	<i>Connector</i>	64-pin unshielded Telco
Monitoring Channel	<i>Data Rate</i>	2.048 Mbps for E1; 1.544 Mbps for DS1
	<i>Line Code</i>	HDB3 for E1; B8ZS for DS1
	<i>Impedance</i>	120Ω balanced for E1; 100Ω balanced for DS1
	<i>Range</i>	According to ITU-T Rec. G.703
	<i>Connector</i>	Shielded RJ-45
Alarm Relays	<i>Maximum Rating</i>	60 VDC max or 30 VAC max, 1/2 A max
	<i>Connector</i>	9-pin DB-9, female

Physical Characteristics	<i>Height</i>	88 mm (3.46 in) (2U)
	<i>Width</i>	437.8 mm (17.24 in)
	<i>Depth</i>	324.6 mm (12.78 in)
	<i>Weight</i>	8 kg

Chapter 2

Installation and Setup

This chapter provides information on:

- Site requirements and prerequisites
- Package contents
- Preparation for installation
- Installation
- Interfaces and connections.

2.1 Introduction

Optimux-1551 is delivered completely assembled. After installing Optimux-1551, refer to [Chapter 3](#) and [Chapter 4](#) for system operating instructions. If a problem arises, refer to [Chapter 5](#) for test and diagnostic instructions.



Card or cable replacement or other repairs should only be performed by a skilled technician who is aware of the hazards involved.

Always observe standard safety precautions during installation, operation, and maintenance of this product.



Optimux-1551 includes Class 1 lasers. For your safety:

- Do not look directly into the optical connectors while the unit is operating. The laser beams are invisible.
- Do not attempt to adjust the laser drive current.

The use of optical instruments with this product will increase eye hazard. Laser power up to 1 mW at 1300 nm and 1550 nm could be collected by an optical instrument.

Use of controls or adjustment or performing procedures other than those specified herein may result in hazardous radiation exposure.

2.2 Site Requirements and Prerequisites

AC-powered Optimux-1551 units should be installed within 1.5m (5 ft) of an easily accessible, grounded AC outlet capable of supplying voltage in the range of 90 to 260 VAC.

DC-powered Optimux-1551 units require a 48 VDC power source. Before operating the device, ensure that the input voltage at the end of the power cable is as required.

Allow at least 90 cm (36 in) of frontal clearance for operator access. Allow at least 10 cm (4 in) rear clearance for interface cable connections.

The ambient operating temperature of Optimux-1551 is 0°–50°C (32°–122°F) at a relative humidity up to 90%, non-condensing.

2.3 Package Contents

The Optimux-1551 package includes:

- Optimux-1551 unit
- Two mounting brackets for ANSI or ETSI rack installation
- Optimux-1551 Installation and Operation Manual
- DB9F-DB9M – crossover adaptor for the Control port
- CBL-SP-9 – DB9 to DB9 flat cable to be directly connected to the crossover adaptor.

2.4 Connecting the Interface Cables

Preparation for Installation

The Optimux-1551 is shipped ready for installation and equipped with all the internal cards ordered by the customer. Therefore, there are no internal settings to be made.

Replaceable Cards and Redundancy Options

Several cards are replaceable in the field. In some cases, an optional second card can be ordered and installed in the factory or the field for redundancy. Replaceable cards can be “hot swapped” – there is no need to shut off the Optimux-1551 when installing or removing them. The replacement and redundancy options for Optimux-1551 cards are listed in [Table 2-1](#).

Table 2-1. Replacement and Redundancy Options for Optimux-1551 Cards

Name	Replaceable	Redundancy Option	Comments
Back Plane	No	No	
OP-63E1/ OP-6384/ OP-2128/ OP-4256	Yes	Yes	Optional station clock daughter cards are installed on this card. Note: If a backup OP-63E1/OP-6384/OP-2128/OP-4256 is installed then, for redundancy, it must have the same daughter card(s) installed as the main OP-63E1/OP-6384/OP-2128/OP-4256 card.
Power Supply	Yes	Yes	
Management	No	No	
Uplink	Yes	Yes	Both uplink cards must be same media (electrical or optical).
Channel I/O Card	No	No	There are two , permanent channel I/O cards.
Fan Tray	Yes	No	

In addition to the replaceable standard cards, an optional station clock card can be factory installed on the OP-63E1/OP-6384/OP-2128/OP-4256 card (or ordered later and field-installed).

Caution

ESD-Sensitive Devices. The Optimux-1551 contains components sensitive to electrostatic discharge (ESD). To prevent ESD damage, touch the frame of a grounded equipment before starting the device. Handle cards only by their metal frames and do not touch internal components and connectors.

Removing and Installing the OP-63E1/OP-6384/OP-2128/OP-4256 Card

The OP-63E1/OP-6384/OP-2128/OP-4256 card sits on the rails of the Optimux-1551 chassis and is fastened to the front panel of the unit by means of two handles on the card's front panel, as shown in [Figure 2-1](#).

To install the OP-63E1/OP-6384/OP-2128/OP-4256 card, it is first necessary to unfasten and remove the card from the chassis.

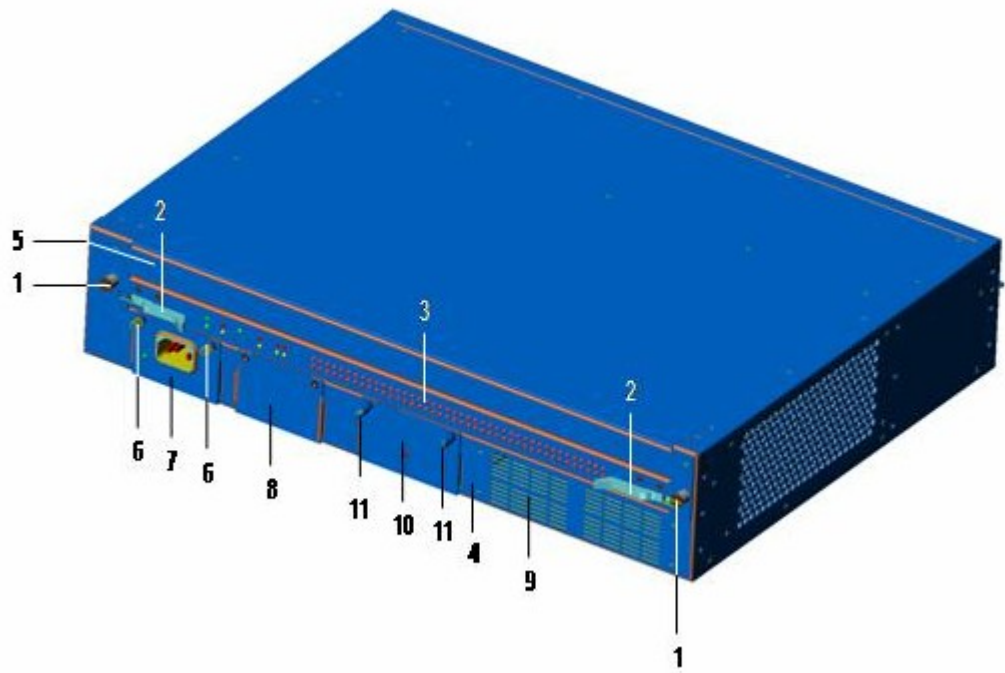


Figure 2-1. Optimux-1551 Front Panel

Table 2-2. Optimux-1551 Back Panel with OP-63E1/OP-6384/OP-2128/OP-4256 Card

Item Number	Description
1	Screw(s)
2	Handle(s)
3	OP-63E1 or OP-6384/OP-2128/OP-4256 Access and Control card
4	Optimux-1551 front panel
5	Blank panel (located above the installed OP card)
6	Thumbscrew(s)
7	Power supply card
8	Power supply blank panel
9	Air inlets
10	Fan tray
11	Fan tray thumbscrew(s)

➤ **To remove the OP-63E1/OP-6384/OP-2128/OP-4256 card:**

1. Loosen the two screws at either end of the card's front panel, next to the handles (see [Figure 2-1](#)).
2. Open the two handles all the way to the end of their axis of revolution, thereby releasing the card from the Optimux-1551 frame (see [Figure 2-1](#)).

3. Use the handles to pull the card till its rear connectors separate from the frame connectors.
4. Remove the card.

► **To install the OP-63E1/OP-6384/OP-2128/OP-4256 card:**

1. Verify that the handles are fully open so that the internal end of the handle does not impede insertion of the card by catching on the opening in the Optimux-1551 front panel.
2. Carefully align the back of the card in the Optimux-1551 frame, and push it in as far as it goes, till its rear connectors butt against the frame connectors (see [Figure 2-1](#)).
3. Close the handles by pushing them towards one another, thereby completing the insertion of the card's connectors into the frame connectors and securing the card in place. At this stage, the card panel should be flush with the back panel of the Optimux-1551 unit.
4. Tighten the screws.

Note

When removing an OP-63E1/OP-6384/OP-2128/OP-4256 card, it has to be replaced with a blank panel.

Removing/Installing the Blank Panel

The blank panel is fastened to the front panel of the unit by means of two screws located on the ends of the blank panel (see [Figure 2-1](#)).

► **To remove the blank panel:**

1. Loosen the two screws at either end of the blank panel.
2. Remove the blank panel.

► **To install the blank panel:**

1. Carefully fit the blank panel on the Optimux-1551 front panel chassis.
2. Tighten the screws.

Replacement of Power Supply Card



Warning

To avoid injury, always disconnect an AC or DC power supply's cable before removing the power supply.

The power supply card sits on rails in the Optimux-1551 chassis. It is held in place by spring-mounted bearings, and fastened to the front panel with two thumbscrews, as shown in [Figure 2-1](#).

Note

When installing both an AC power supply and a DC power supply, adhere to the following guidelines:

- *Jumper J1 on the DC power supply must be removed*
 - *The DC power supply must be installed in power supply slot B and the AC power supply in power supply slot A.*
-

- **To remove the power supply card**
 1. Unscrew the two power supply card thumbscrews (see [Figure 2-1](#)).
 2. Pull on the screw heads till the spring-mounted bearings are pushed in, releasing the card.
 3. Remove the card.
- **To install the power supply card**
 1. Insert the power supply card till it is locked in place in the Optimux-1551 chassis by the spring-mounted bearings.
 2. Fasten the card in place with the two thumbscrews (see [Figure 2-1](#)).

Note

When removing a power supply card, it must be replaced with a blank panel.

Removing/Installing the Power Supply Blank Panel

The blank panel is fastened to the front panel of the unit with two screws located on the upper ends of the blank panel.

- **To remove the blank panel:**
 1. Loosen the two screws at either upper end of the blank panel (see [Figure 2-1](#)).
 2. Remove the blank panel.
- **To install the blank panel:**
 1. Carefully fit the blank panel on the OP-1551 front panel chassis (see [Figure 2-1](#)).
 2. Tighten the screws.

Replacement of Fan Tray

The fan tray rests on the rails in the Optimux-1551 chassis, is held in place by spring-mounted bearings, and fastened to the front panel by two thumbscrews screws, as shown in [Figure 2-1](#).

- **To remove the fan tray:**
 1. Unscrew the two fan tray thumbscrews (see [Figure 2-1](#)).
 2. Pull on the screw heads until the spring-mounted bearings are pushed in, releasing the fan tray (see [Figure 2-1](#)).
 3. Remove the fan tray.
- **To install the fan tray:**
 1. Insert the fan tray card until it is locked in place in the Optimux-1551 chassis by the spring-mounted bearings.
 2. Fasten the fan tray in place with the two thumbscrews.

Note

The Optimux-1551 chassis must be installed with a fan tray when operating.

Replacement of Uplink Card

The Uplink card rests on rails inside the Optimux-1551 chassis and is held in place in the back panel by two flat head screws, as shown in [Figure 2-2](#). The figure shows a fiber optic uplink card. The procedure is the same for a coax uplink card.

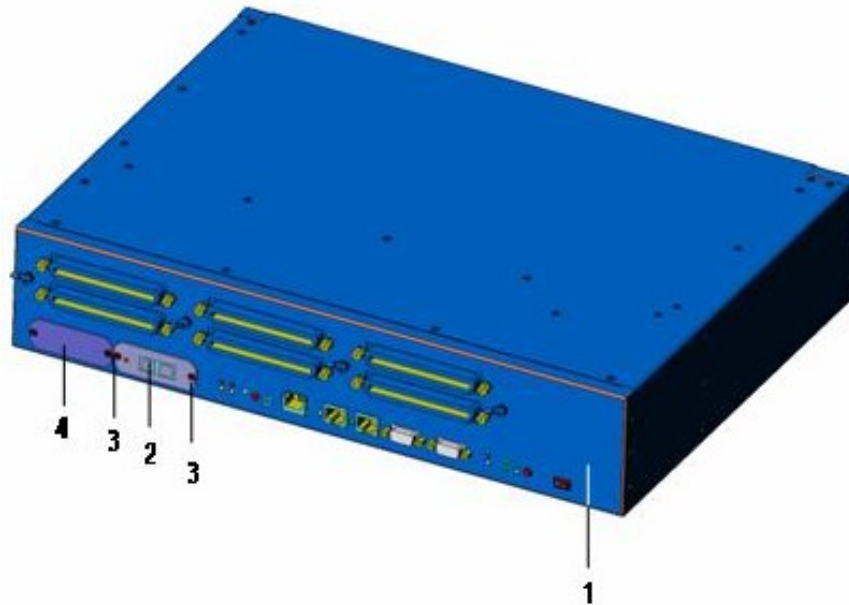


Figure 2-2. Optimux-1551 Back Panel

Table 2-3. Optimux-1551 Back Panel

Item Number	Description
1	Optimux-1551 back panel
2	Uplink card
3	Flat-head screw(s)
4	Uplink blank panel

➤ **To remove the uplink card:**

1. Unscrew the two flat head screws.
2. Remove the card.

➤ **To install the uplink card:**

1. Fit the uplink card into the internal rails of the Optimux-1551.
2. Push the card in all the way.
3. Fasten the card in place with the two screws.

Removing/Installing the Uplink Blank Panel

The blank panel sits on the Optimux-1551 chassis and is fastened to the back panel of the unit with two screws located on the side ends of the blank panel.

- **To remove the blank panel:**
 1. Loosen the two screws at either side end of the blank panel.
 2. Remove the blank panel (see [Figure 2-2](#)).
- **To install the blank panel:**
 1. Carefully fit the blank panel on the Optimux-1551 back panel chassis.
 2. Tighten the screws (see [Figure 2-2](#)).

Rack Installation

Optimux-1551 can be used as a standalone unit or mounted in a standard 19-inch rack.

Note

There are no jumpers or DIP switches on Optimux-1551. All the configurations are done through the software.

Two mounting brackets are provided with the Optimux-1551 for ANSI or ETSI rack installation. There are three rack installation configurations:

- Brackets at back of side panel for ANSI rack to fasten the unit from the back (see [Figure 2-3](#)).
- Brackets at front of side panel for ANSI rack to fasten the unit from the front (see [Figure 2-4](#)).
- Brackets towards the middle of side panel for ETSI rack to fasten the unit from the middle (see [Figure 2-5](#)).

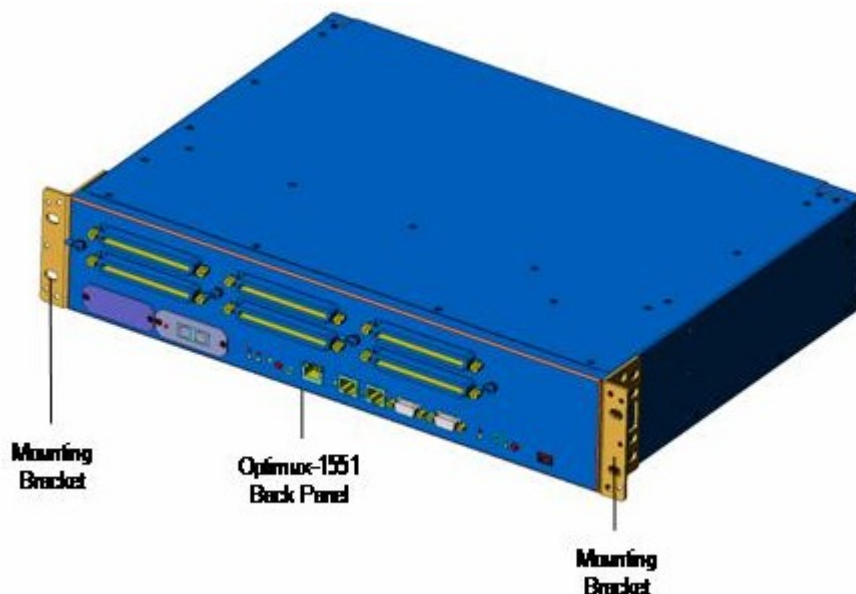


Figure 2-3. Brackets at the Back End of the Side Panels - for ANSI Rack

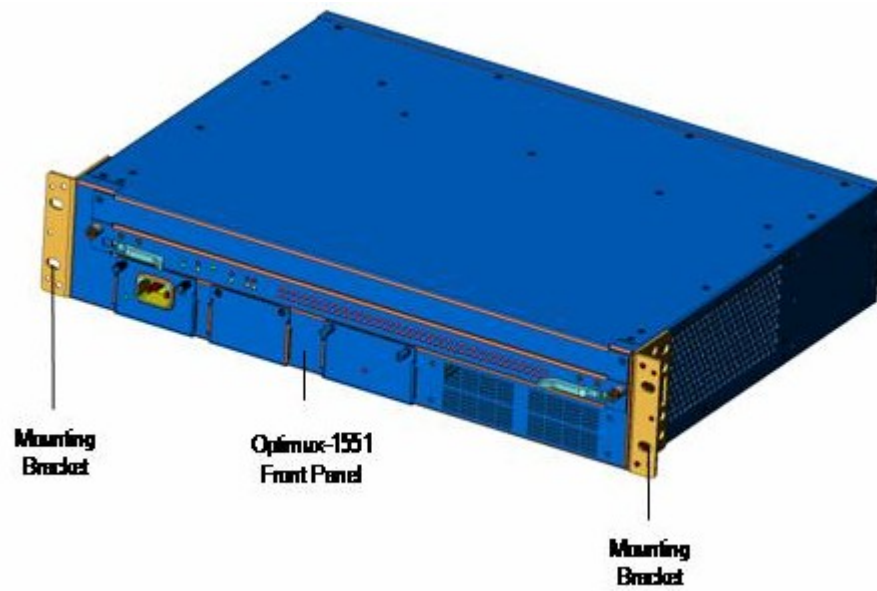


Figure 2-4. Brackets at the Front End of the Side Panels - for ANSI Rack

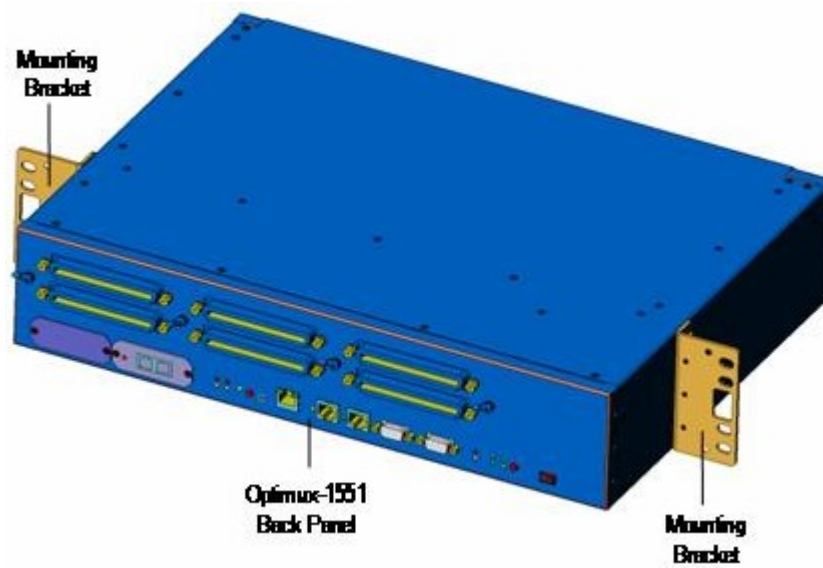


Figure 2-5. Brackets towards the Middle of the Side Panels - for ETSI Rack

Interfaces and Connections

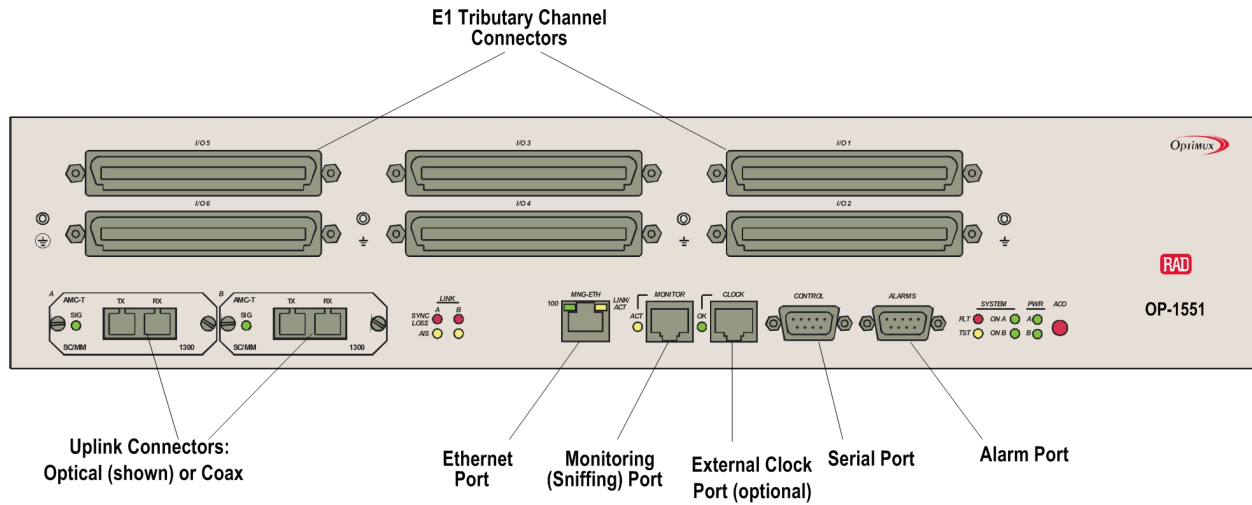


Figure 2-6. Optimux-1551 Back Panel

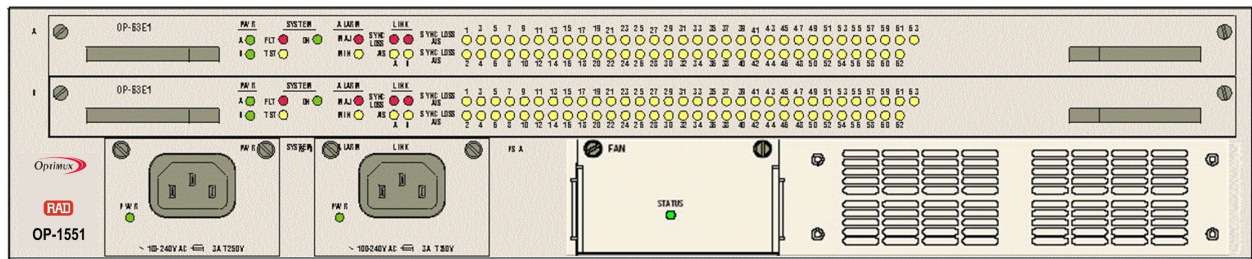


Figure 2-7. Optimux-1551 Front Panel - OP-63E1 Configuration

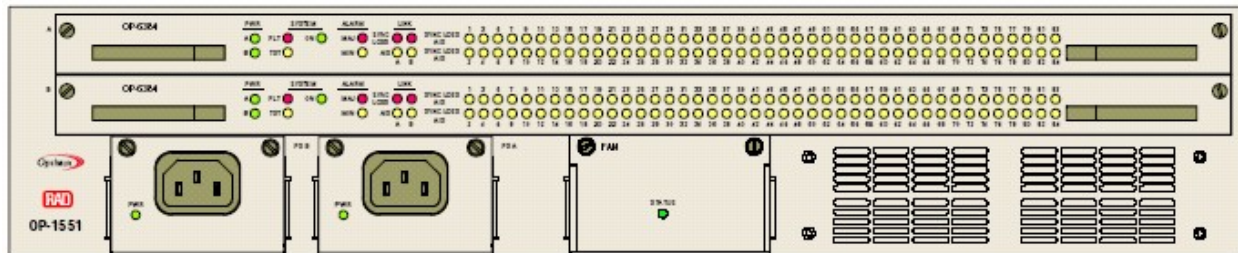


Figure 2-8. Optimux-1551 Front Panel - OP-6384 Configuration

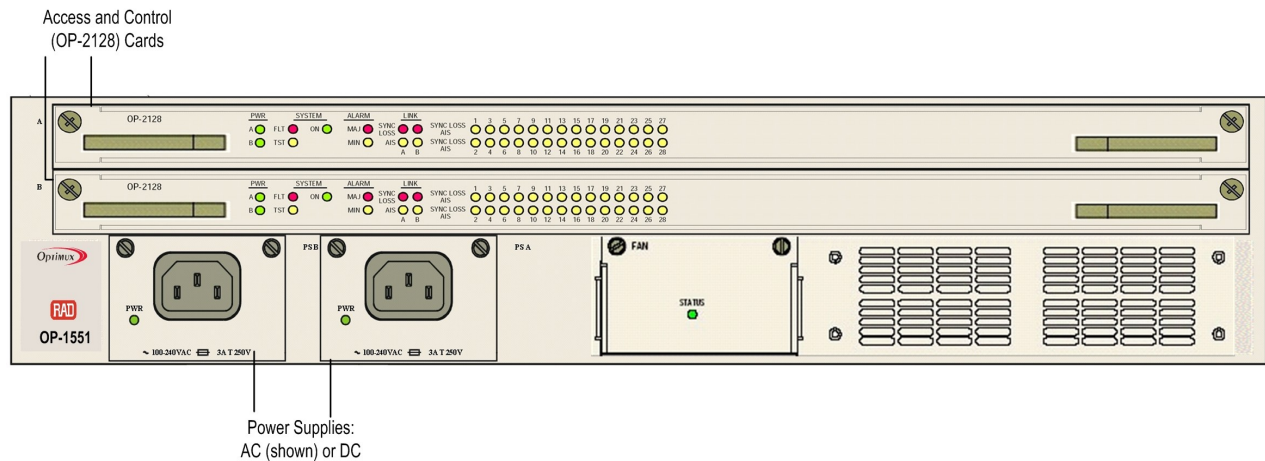


Figure 2-9. Optimux-1551 Front Panel - OP-2128 Configuration

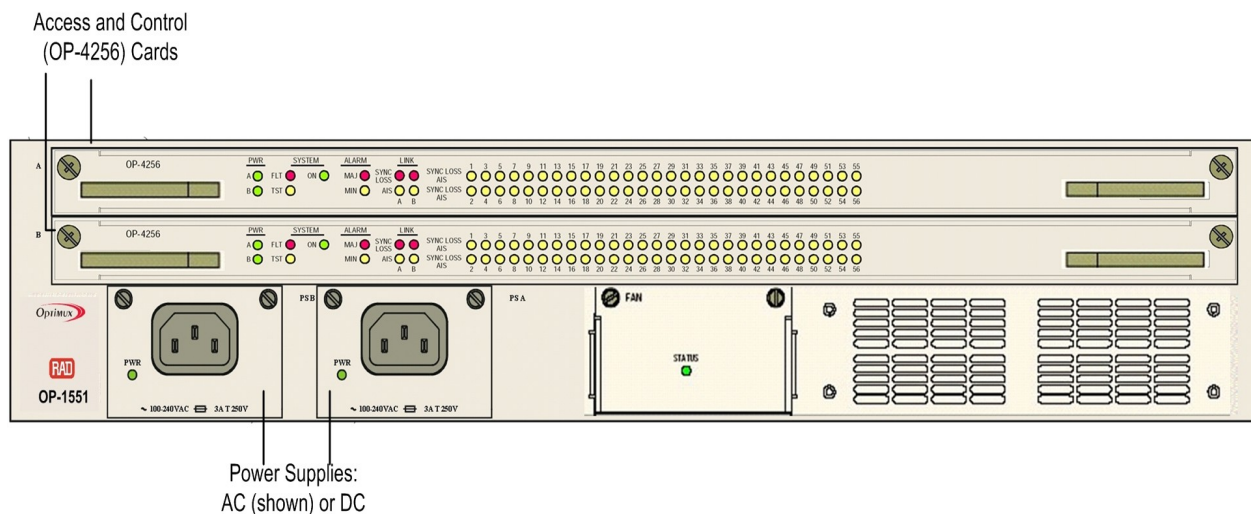


Figure 2-10. Optimux-1551 Front Panel - OP-4256 Configuration

Connecting the Serial Port

The Control port ([Figure 2-6](#)) provides a means for connecting an ASCII terminal or computer serial port to the Optimux-1551 and logging into the unit's software.

The serial interface is an RS-232 (V.24). The nominal cable length, for a data rate of 19.2 kbps, is up to 16m. Use a crossover adaptor DB9F-DB9M with a CBL-SP-9 flat cable, which are provided with the Optimux-1551.

Caution Terminal cables must have a frame ground connection. Use ungrounded cables when connecting a supervisory terminal to a DC-powered unit with floating ground. Using improper terminal cable may result in damage to supervisory terminal port.

➤ To connect the control cable:

- Attach the DB9F-DB9M crossover adaptor with the CBL-SP-9 flat cable to the Control connector on the back panel of Optimux-1551. Refer to [Appendix A](#) for cable information.

Connecting the Ethernet Port

The MNG-ETH connector on the back panel ([Figure 2-6](#)) is used to connect Optimux-1551 to an Ethernet LAN using a standard 10/100BaseT interface.

► To connect an Ethernet cable:

- Attach a standard straight Ethernet cable terminated with an RJ-45 connector to the MNG-ETH connector on the back panel of Optimux-1551.

Connecting the Alarm Connector

An alarm cable can be run to a remote monitoring site from the back panel Alarms connector ([Figure 2-6](#)). The maximum rating of alarm relay contacts is 0.5A.

In calculating the maximum range to the monitoring site, the rating of the relay contacts, the cabling gauge, and the power source of the monitoring device should be considered.

This connector also supports the input of customer alarms up to 48 VDC (min. 10 VDC). For the Alarms connector pinout connections, refer to [Appendix A](#).

► To connect an alarm cable to Optimux-1551:

- Attach a cable terminated with a 9-pin D-type male connector to the Alarms connector located on the Optimux-1551 back panel.

Alarms Interface

The Optimux-1551 activates and reports two types of alarms to the management station: Major and Minor. Each type of alarm can be defined as Major or Minor (see [Chapter 4](#)).

Dry Contacts

There are two user-accessible relays (through the 9-pin connector) in the Optimux-1551. One relay presents Major Alarms, the other Minor Alarms.

Whenever the management reports a Minor alarm or Major alarm, the appropriate relay is activated. A cut-off button, ACO, enables user-cancellation of an alarm.

An external alarm input is also supported, to enable an external force alarm for customer use.

Connecting the Uplinks

Two types of cards can be installed in the uplink slots ([Figure 2-6](#)): fiber optic and electrical. The uplink redundancy mode is user defined. Both links (A and B) must be of the same type (either both electrical or both fiber optic).

Connecting the Fiber Optic Links

► To connect the fiber optic cable:

1. Attach the fiber optic cable to the interface connector on the back panel of the Optimux-1551.

2. Attach the other end of the fiber optic cable to the far-end equipment.
3. Verify that the transmit end of the cable connects to the receive end of the uplink.

Connecting the Electrical Links

► **To connect the coaxial cable:**

1. First attach the coax cable to the interface connector on the back panel of the Optimux-1551.
2. Attach the other end of the electric cable to the far-end equipment.
3. Verify that the transmit end of the cable connects to the receive end of the uplink.

Connecting the Channels

Caution

The E1/DS1 channels are not intended for direct connection to unprotected lines. Adequate protection against lightning surges should be provided in the building installation.

The channels connect to six Telco-64 unshielded connectors ([Figure 2-6](#)).

Channel Connector Accessories

Cabling accessories are listed in [Table 2-4](#).

Note

Cabling accessories are not supplied with the Optimux-1551 – they must be ordered separately.

Table 2-4. I/O Cabling Accessories

Part Number	Description
CBL-TELCO-TELCO/2M	Telco-Telco cable. This cable has two Telco connectors (one at each end), one for the Optimux-1551 I/O jacks and the other for a patch panel (see later in this table).
CBL-TELCO-OPEN/2M	Telco open cable. This cable has a Telco connector at one end for the Optimux-1551 I/O jacks and loose wires at the other end for user-installed connectors, like RJ-45.
CBL-TELCO-RJ45/2M	Telco-RJ45 cable. This cable has a Telco connector at one end for the Optimux-1551 I/O jacks and RJ-45 male connectors at the other end for user EIs or T1s direct connection.
OP-A/ADAPTOR/21BNC	Patch panel with 21 BNC Tx and 21 BNC Rx. Supports 21 unbalanced E1 channels.
OP-A/ADAPTOR/28RJ	Patch panel with 28 RJ-45. Supports 21 balanced E1 channels or 28 balanced DS1 channels.

See cable diagrams in [Appendix A](#).

For patch panel connection of all 63 supported unbalanced E1 channels, three OP-A/ADAPTOR/21BNC are required (3 x 21 channels).

For patch panel connection of 42 supported unbalanced E1 channels, two OP-A/ADAPTOR/21BNC are required (2 x 21 channels).

For patch panel connection of 21 supported unbalanced E1 channels, one OP-A/ADAPTOR/21BNC is required (1 x 21 channels), (see [Figure 2-11](#)).

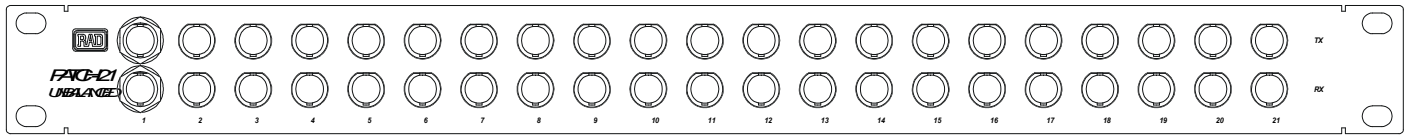


Figure 2-11. BNC patch panel for 21 unbalanced E1 channels

For patch panel connection of all 63 supported balanced E1 channels or of all 84 supported balanced DS1 channels, three OP-A/ADAPTOR/28RJ cables are required – 3 x 21 (E1) or 28 (DS1) channels.

For patch panel connection of 42 supported balanced E1 channels or of all 56 supported balanced DS1 channels, two OP-A/ADAPTOR/28RJ cables are required – 2 x 21 (E1) or 28 (DS1) channels.

For patch panel connection of 21 supported balanced E1 channels or of all 28 supported balanced DS1 channels, one OP-A/ADAPTOR/28RJ cable is required – (1 x 21 (E1) or 28 (DS1) channels), (see [Figure 2-12](#)).

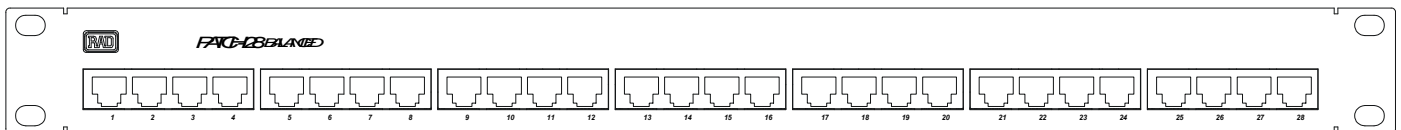


Figure 2-12. RJ-45 patch panel for 21 balanced E1 channels or 28 balanced DS1 channels

There are two Telco-type connectors, I/O 1 and I/O 2, on the back of each patch panel ([Figure 2-13](#)) for connecting to channel connectors on the back panel of the Optimux-1551. The operation of the patch panel I/O connectors depends on the patch panel model and the channel type:

- OP-A/ADAPTOR/21BNC: I/O 1 provides connection for 14 E1 unbalanced channels and I/O 2 for 7 E1 unbalanced channels
- OP-A/ADAPTOR/28RJ: I/O 1 provides connection for 14 E1/DS1 balanced channels and I/O 2 provides connection for 7 E1 or 14 DS1 balanced channels.



Figure 2-13. Telco ports on patch panel

For patch panel wiring details (see [Appendix A](#)).

Connecting the Power

Connecting the AC Power

AC power should be supplied to Optimux-1551 through the 5 ft (1.5m) standard power cable terminated by a standard 3-prong plug.

The AC outlet should be grounded properly. Ensure that supply voltage is in the range 100 VAC to 240 VAC.

➤ **To connect AC power:**

- Connect the power cable to the back panel connector first, and then to the AC mains outlet.

Caution

Do not connect or disconnect the power cable from the device while the cable is connected to the power main!

Connecting the DC Power



The DC power supply must conform to the prevailing safety regulations. In order to prevent fire hazards, the ungrounded DC supply line must be equipped with a suitable fuse or circuit breaker.

➤ **To connect DC power:**

Refer to the *DC Power Supply Connection Supplement*.

Connecting the External Station Clock Line (Option)

➤ **To connect station clock line:**

Connect a male RJ-45 connector to the plug. See [Appendix A](#) for the pinout.

Chapter 3

Operation

This chapter provides information on:

- Back panel indicators
- Front panel indicators
- Turn-on procedure
- Operating instructions
- Turn-off procedure.

3.1 Turning On Optimux-1551

When both power supplies are functional and are ON, power consumption by Optimux-1551 is shared between the two power supplies.

➤ **To turn ON Optimux-1551 with a single power supply module:**

1. Plug the power cable into the Power A connector on the front panel of Optimux-1551.
2. Plug the other side of the cable into the mains.

The PWR A indicator on the back panel lights in green.

➤ **To turn ON Optimux-1551 with two power supply modules:**

1. Plug at least one of the two power cables into one of the Power interfaces on the front panel of Optimux-1551.
2. To achieve power supply redundancy, plug the second power cable into the second Power interface on the front panel of Optimux-1551.
3. The PWR A and PWR B indicator(s) on the back and front panels light in green indicating that both power supplies are operational and not faulty.

Note

Before operation, make sure that the timing configuration at both ends of the uplink is valid:

- *In a point-to-point application, one end must be configured to loopback timing. The other end can use internal timing or (if the optional station clock card is installed) external timing.*
- *In a fan-out application, the local Optimux-1551 must be configured to loopback timing.*

Before operation, make sure that the fan tray is installed.

3.2 Controls and Indicators

This chapter describes Optimux-1551 back and front panel indicators and powering procedures.

Back Panel

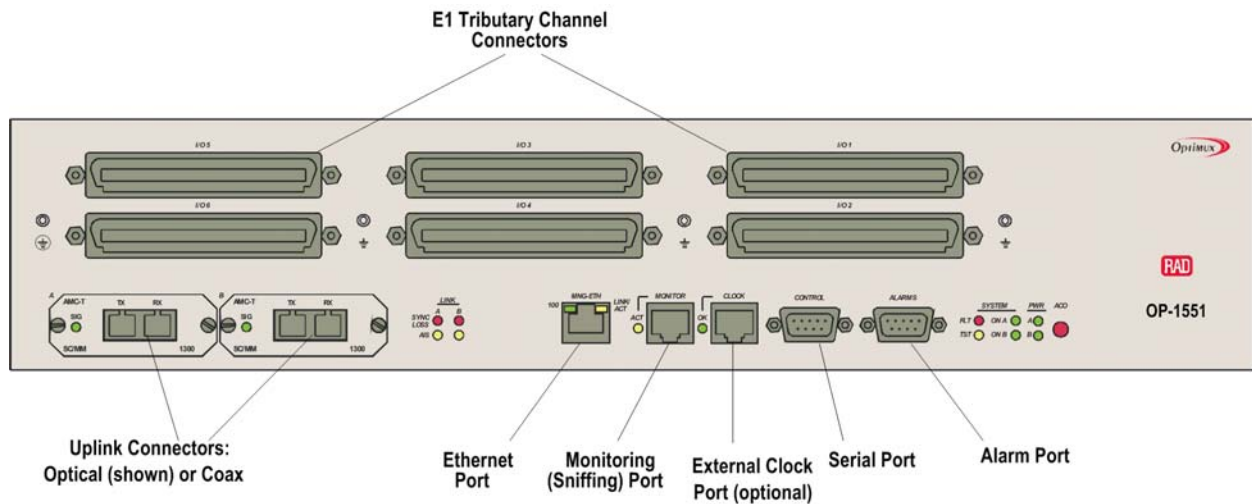


Figure 3-1. Optimux-1551 Back Panel

The Optimux-1551 back panel provides the uplink, alarm, management, optional station clock, and channel connections, as well as the status indications associated with these connections as shown in [Figure 3-1](#).

The Optimux-1551 back panel LED status indicators are detailed in [Table 3-1](#).

Table 3-1. Optimux-1551 Back Panel LEDs

Name	Color	Functionality
Uplink SYNC LOSS A,B	Red	On: Out-of-frame detected on the active uplink or signal loss detected on the respective uplink Note: If uplink card B is not installed or if redundancy is set to Off, then if a loss condition occurs, SYNC LOSS B LED remains Off. (Duplicate LED on front panel)
Uplink AIS A, B	Yellow	On: AIS signal detected on the respective uplink (Duplicate LED on front panel)

Table 3-1. Optimux-1551 Back Panel LEDs (Cont.)

Name	Color	Functionality
FLT	Red	On: OP-63E1/OP-6384/OP-2128/OP-4256 card is in fault condition (Duplicate LED on front panel)
TST	Yellow	On: active OP-63E1/OP-6384/OP-2128/OP-4256 card is in test condition Blinking: Software being downloaded to the unit (Duplicate LED on front panel)
ON A/B	Green	On: OP-63E1/OP-6384/OP-2128/OP-4256 card active Blinking: Automatic baud detection in progress Off: OP-63E1/OP-6384/OP-2128/OP-4256 card on standby (Duplicate LED on front panel)
PWR A	Green and Red	Green: Power Supply A OK Red: Power Supply A faulty Off: Power Supply A not installed (Duplicate LED on front panel)
PWR B	Green and Red	Green: When Power Supply OK Red: Power Supply B faulty Off: Power Supply B not installed (Duplicate LED on front panel)
ACO	Button	Cuts off the existing alarm relays but doesn't stop reporting them to the management software
100	Green	On: Ethernet working at 100 Mbps Off: Ethernet working at 10 Mbps
LINK/ACT	Green and Yellow	Green: Only Ethernet link integrity exists Yellow: Traffic activity exists on Ethernet
ACT	Yellow	On: Channel selected for sniffing
OK	Green	On: External E1/DS1 clock source exists on clock connector
SIG	Green	On: Signal detected on the respective main uplink card

Front Panel

Table 3-2 lists the functions of the LEDs located on the Optimux-1551 front panel.

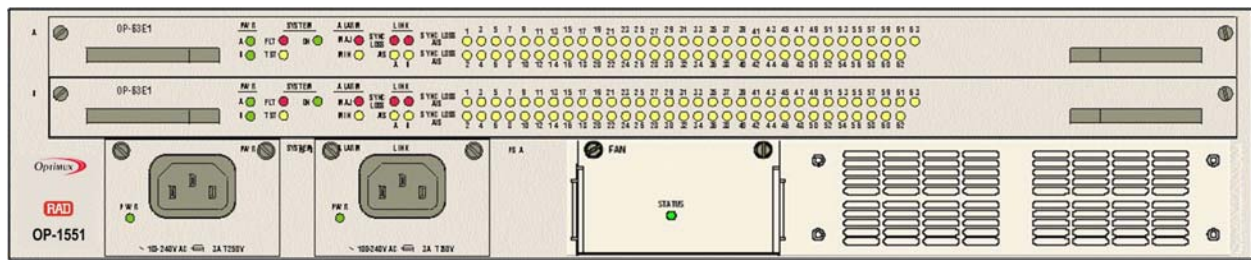


Figure 3-2. Optimux-1551 Front Panel OP-63E1 Configuration

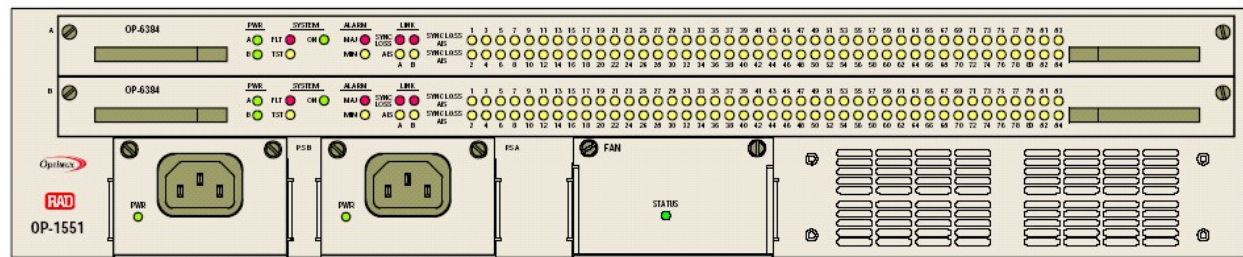


Figure 3-3. Optimux-1551 Front Panel OP-6384 Configuration

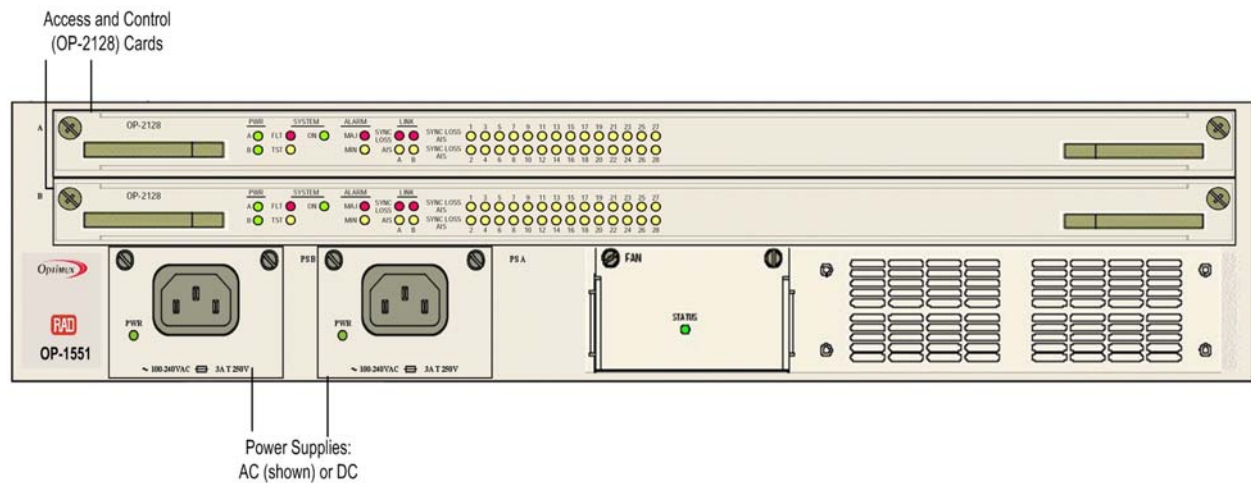


Figure 3-4. Optimux-1551 Front Panel OP-2128 Configuration

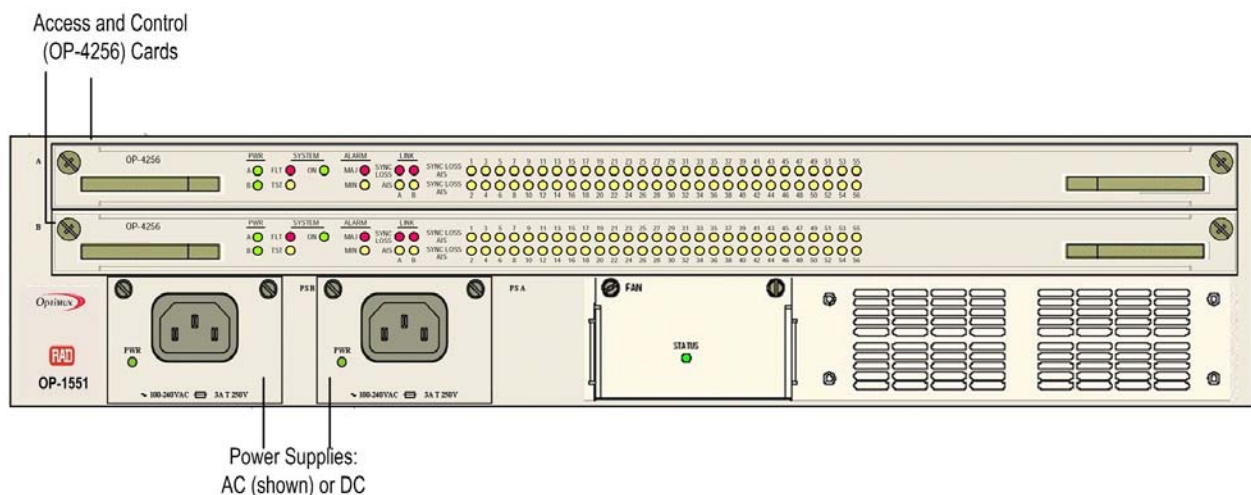


Figure 3-5. Optimux-1551 Front Panel - OP-4256 Configuration

Table 3-2. Optimux-1551 Front Panel LEDs

Name	Color	Functionality
PWR A	Green and Red	Green: Power Supply A OK Red: Power Supply A faulty Off: Power Supply A not installed (Duplicate LED on back panel)
PWR B	Green and Red	Green: Power Supply B OK Red: Power Supply B faulty Off: Power Supply B not installed (Duplicate LED on back panel)
FLT	Red	On: OP-63E1/OP-6384/OP-2128/OP-4256 card is in fault condition (Duplicate LED on back panel)
TST	Yellow	On: active OP-63E1/OP-6384/OP-2128/OP-4256 card is in test condition Blinking: Software being downloaded to the unit One TST indicator per OP-63E1/OP-6384/OP-2128/OP-4256 card (Duplicate LED on back panel)
ON A/B	Green	On: OP-63E1/OP-6384/OP-2128/OP-4256 card active Blinking: During autobaud detect process. Off: OP-63E1/OP-6384/OP-2128/OP-4256 card on standby (Duplicate LED on back panel)

Table 3-2. Optimux-1551 Front Panel LEDs (Cont.)

Name	Color	Functionality
Uplink SYNC LOSS A,B	Red	On: Out of frame is detected on the active uplink or signal loss is detected on the respective uplink <i>Note: If uplink card B is not installed or if redundancy is set to Off, then if a loss condition occurs, SYNC LOSS B LED remains Off.</i> (Duplicate LED on back panel)
Uplink AIS A,B	Yellow	On: AIS signal detected on the respective uplink (Duplicate LED on back panel)
MAJ	Red	On: Major alarm exists. Blinking: Major alarm exists and ACO has been pressed.
MIN	Yellow	On: Minor alarm exists. Blinking: Minor alarm exists and ACO has been pressed.
Channel SYNC LOSS/AIS	Red and Yellow	Red: Loss of signal detected on non-masked channel Yellow: AIS signal detected on non-masked channel Blinking: Channel is masked and the LED status for the masked channels is set to BLINK Off: For non-active channels, for a masked channel with a LED status, for the masked channel parameter set to OFF, and for a non-masked channel when not detecting Loss of Signal or AIS Examples for not active channel: Channels 22 – 28 on OP-2128 card when it is configured to E1 operation. Channels 43 – 56 on OP-4256 card when it is configured to E1 operation. Channels 64 – 84 on OP-6384 card when it is configured to E1 operation.
Status	Red and Green	Red: One or more of the fan tray's fan(s) is/are faulty. Green: All internal fan tray fans are operating properly.

3.3 Default Settings

During normal operation, the following indications ([Table 3-3](#)) should appear:

Table 3-3. Normal Indications

LED	State	Indicates
PWR A, B	ON, green	Power supplies of the Optimux-1551 unit active and OK
FLT	OFF	No fault occurred during the power up self-test
TST	OFF	No loop performed
LINK/ACT (MNG-ETH connector)	ON, green	Link integrity of the Ethernet port Only active if Ethernet link is connected and operating Note: Ethernet link is only required for managing Optimux-1551 via Ethernet
100	ON	100 Mbps rate
	OFF	10 Mbps rate
ACT (MNG-ETH connector)	Blinking, yellow	Ethernet port traffic
Channel SYNC LOSS	OFF	Receive signal detected on channel ports or non-active port.
Channel AIS	OFF	AIS signal not received on channel ports
OK (Clock Connector)	ON, green	Reference clock applied to clock connector. Required only when working with an external clock source.
ACT (Monitor Connector)	OFF	Monitoring mode not selected.
Major	OFF	Major alarm not detected (depending on alarm configuration)
Minor	OFF	Minor alarm not detected (depending on alarm configuration)
SIG	ON, green	Signal detected on respective main uplink card.
Status	ON, green	The fans are working properly.

3.4 Configuration Alternatives

This section describes how to prepare Optimux-1551 and a supervisory application for a control session.

Note *Optimux-1551 can support the following multiple management sessions simultaneously:*

- *One session via terminal application connected directly to the unit's Control port*
 - *Up to two sessions via Telnet and/or web browser connected to the unit's Ethernet port*
 - *Multiple (maximum quantity depends on network resources) sessions via SNMP-based application (for example, RADview) connected to the unit's Ethernet port.*
-

When a terminal interface is used, the number of users is displayed in the bottom right of every menu. In the web interface, the number of users can be displayed by clicking the Status button.

Managing Optimux-1551 via Terminal Port

Optimux-1551 includes a V.24/RS-232 asynchronous DTE port, designated Control and terminated in a 9-pin D-type female connector. The Control port continuously monitors the incoming data stream and immediately responds to any input string received through this port. The port requires a cross-cable (provided with Optimux-1551) for the ASCII terminal connection.

The Optimux-1551 control port can be configured to communicate at the following rates: 9.6, 19.2, 38.4, 57.6 or 115.2 kbps.

The word format consists of one or two stop bits and 7 or 8 data bits parity can be odd, even or disabled.

Note *At 115.2 kbps data rate, only 8 data bits and disabled parity are supported.*

Preparing the Terminal

Any standard ASCII terminal (a "dumb" terminal or a personal computer running a terminal emulation application) equipped with a V.24/RS-232 communication interface can be used to configure Optimux-1551. [Appendix A](#) details the pin assignment and control signal directions of the Optimux-1551 Control connector.

Starting Terminal Session

➤ **To start a terminal session:**

1. Connect a terminal cross-cable to the Control connector of Optimux-1551.
2. Turn on the control terminal.
3. Press <Enter> several times.

Optimux-1551 automatically adjusts itself to the current terminal baud rate and responds with a string of dots.

Note

When the ON LED flashes on the Optimux-1551, the autobaud detect process is active. Press <Enter> until dots appear, then press the <.> key until the Optimux-1551 login screen is displayed.

4. Continue pressing the <.> key until Optimux-1551 displays the user name and password entry form.
5. Enter your user name and password and proceed with the management session. (If no user name and password have been defined, press <Enter> twice.)

Managing a Local Optimux-1551 via the Ethernet Port

Optimux-1551 is equipped with a management Ethernet port (MNG-ETH), which enables communication with the Optimux-1551 management subsystem using the IP protocol. The Ethernet management port is configured for a LAN cross-over connection.

➤ **To prepare Optimux-1551 for network management:**

1. Connect a LAN network management station to the Optimux-1551 Ethernet port designated MNG.
2. Configure IP host parameters of the Optimux-1551 units via an ASCII terminal.
3. Do one of the following:
 - Run an SNMP management application (such as RADview)
 - Open a Telnet session (for example, Windows **Start** menu | **Run** | Telnet <IP_address>)
 - Open a Web Browser to: http://<IP_address>
where <IP_address> is Optimux-1551's IP address.

Managing a Far-End Optimux-1551 via the Ethernet Port

A far-end Optimux-1551 can be managed via a local unit's Ethernet port (MNG).

➤ **To prepare a far-end Optimux-1551 for network management:**

1. Open a DCC channel between the units.
2. Define Management IP addresses on the near- and far-end units on the same subnetwork as the Host IP of the near-end unit.
3. When there is a direct connection between a PC and the Optimux-1551 Ethernet connector, set the default gateway in the Optimux-1551 to the PC Ethernet card IP address.
4. Define the far-end unit Host IP as 0.0.0.0.

Note

The far-end unit must not be connected to a LAN.

3.5 Menu Map

Figure 3-6 illustrates the Optimux-1551 menu map.

Notes

- * - Menu items in the menu map (see [Figure 3-6](#)) marked with a single asterisk (*) are for SDH only.
 - ** - Menu items in the menu map marked with two asterisks (**) are for SONET only
 - The menus for E1 and DS1 channels are described together unless otherwise noted (where a field in a menu applies only for one or the other channel type, it is so noted).
-

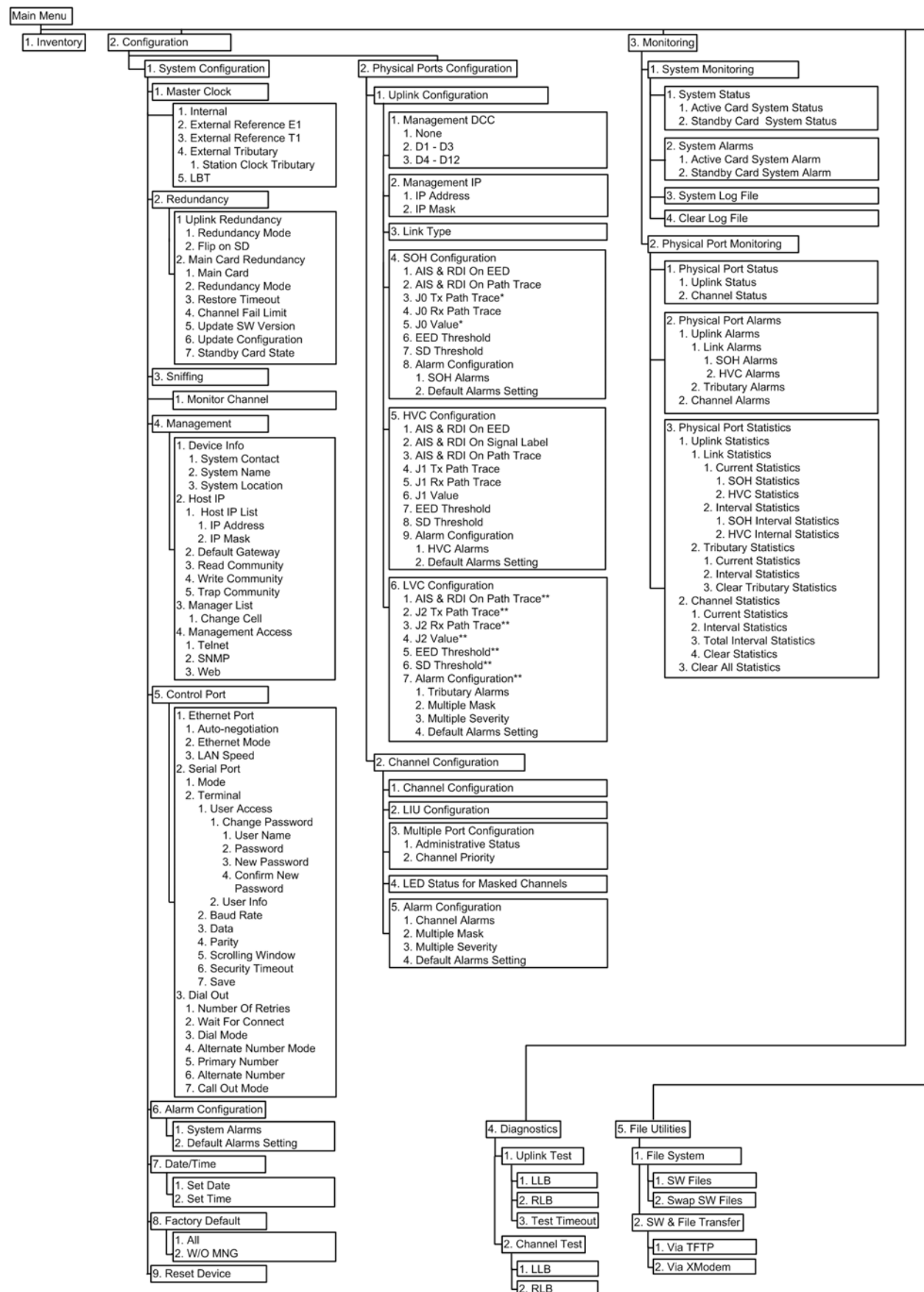


Figure 3-6. Optimux-1551 Menu Tree

Navigating the Management Menus

This section provides a general description of the software menu operation and conventions for navigating the menus. *Figure 3-6* lists all menus of the Optimux-1551 management software.

Choosing Options

➤ **To choose an option:**

1. Type the number corresponding to the option and press **<Enter>**.
Optimux-1551 immediately updates its database with a new value or displays a new menu for the selected option.
2. When a menu option has two values, type the option number and press **<Enter>**.
This toggles the available values.
3. Confirm the action requiring confirmation.
A prompt line is added to the menu display.
4. Save all values simultaneously if required (i.e., Serial Port menu).
A "Save All" prompt is added to the menu display.

Note

*When using a Web browser, values that you enter are not saved unless you press **<Enter>**. If you click a link before doing so, your changes are lost.*

Correcting Entries





➤ **To correct an erroneous entry:**

- Press **<Backspace>** to clear the error, then enter the correct characters
- Press **<Esc>** to exit the current menu, and then return to the menu to re-enter the required value.

Navigating Screens

Some of the Optimux-1551 management software screens require scrolling to navigate between parameters.

Use the following keys (case-sensitive) for navigation:

-  – move left; **CTRL + L** – scroll left
-  – move right; **CTRL+ R** – scroll right
-  – move up; **CTRL + U** – scroll up
-  – move down; **CTRL + D** – scroll down
- **<Tab>** – select next changeable cell
- **N** – display next part of menu, **P** – display previous part of menu

Note

Type <?> to display the navigation keys from a menu.

3.6 Turning Off Optimux-1551

Unplug Optimux-1551 front panel power supply/supplies from the mains.

Chapter 4

Configuration

The configuration of Optimux-1551 is performed via menu-driven embedded software. A configuration session can be performed using the following methods:

- Standard ASCII terminal or PC running a terminal emulation application connected to the back panel Control port
- Telnet, Web browser, or RADview application connected to the back panel MNG port.

4.1 Configuring Optimux-1551

Upon completion of the Optimux-1551 installation and operation procedures described in [Chapter 2](#) and [Chapter 3](#), a control session can be started.

Entering the User Name and Password

Enter a user name and password in order to start the Optimux-1551 management software:

<p style="text-align: center;">Optimux-1551</p> <p>USER NAME:</p> <p>PASSWORD:</p>

Figure 4-1. Login Window

► **To enter the user name and password:**

1. Type in your user name and press **<Enter>**.
2. Type in your password (up to ten characters).

Optimux-1551 responds to your entry with asterisks.

Note

Enter **SU** for user name with Read/Write permission or enter **USER** for Read permission only.

Enter 1234 for the (default) password.

3. Press **<Enter>**.

The Main menu is displayed:

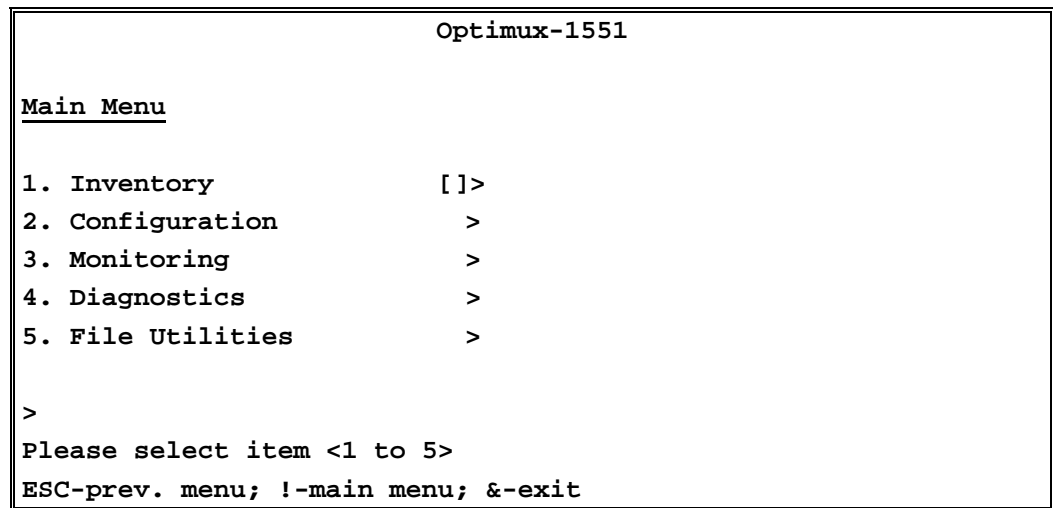


Figure 4-2. Main Menu

Note Monitoring system and ports is described in [Chapter 5](#).

Configuring the System

The Optimux-1551 management software allows you to perform the following:

- Selecting clock source
 - Configuring redundancy of uplink and OP-63E1/OP-6384/OP-2128/OP-4256 cards
 - Selecting a channel to monitor
 - Defining management parameters
 - Defining control port parameters
 - Defining alarm severity and masking alarms
 - Setting date and time
 - Resetting Optimux-1551 to the default values
 - Performing an overall reset of the device.
- **To display the Configuration menu:**
- From the Main Menu, choose **Configuration**.

The Configuration menu appears:

```

Optimux-1551

Configuration

1. System configuration          >
2. Physical ports configuration >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-3. Configuration Menu

- To display the System Configuration menu:
 - From the Configuration Menu, choose **System Configuration**.

The System Configuration menu appears:

```

Optimux-1551

Configuration>System Configuration

1. Master Clock                >   (LBT)
2. Redundancy                  >
3. Sniffing                    >
4. Management                  >
5. Control Port                >
6. Alarm Configuration         >
7. Date/Time                   >
8. Factory Default             >
9. Reset Device

>
Please select item <1 to 9>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-4. System Configuration Menu

Configuring the Master Clock

Optimux-1551 features a number of clocking options (see [Chapter 1](#)).

Note

There is no alarm indication to notify that the clock input has been incorrectly defined.

- To choose the clock source:
 1. From the System Configuration menu, choose **Master Clock**.

The Master Clock menu appears:

```

Optimux-1551

Configuration>System Configuration>Master Clock

1. Internal
2. External Reference E1
3. External Reference T1
4. External Tributary
5. LBT

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-5. Master Clock (LBT) Menu

2. To set the clock mode to internal, choose **Internal**.
3. To set the clock mode to loop back timing, choose **LBT** (default).
4. To set the clock mode to external, choose External Reference E1 or External Reference T1 or External Tributary.

Note

The **External** choice appears in the menu only if the optional station clock module is assembled on the Optimux-1551.

When selecting the External tributary source clock, the External Tributary menu appears.

```

Optimux-1551

Configuration>System Configuration>Master Clock>External
Tributary

Master Clock (Station Clock Tributary)
1. Station Clock Tributary [1 - 28] ... (2)

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-6. External Tributary Menu

In external mode, the External Tributary can be either one of the channels or the Clock connector located on the back panel. (See description of clock source in [Chapter 1](#).)

5. Select **Station Clock Tributary** from **1** to **21/43/63** (E1) or from **1** to **28/56/84** (DS1), depending on the installed card.

Note *If the tributary line type is set to DS1, then the station clock type is set automatically to DS1. Similarly, for E1 tributary line type, the station clock type is set to E1.*

Configuring the Redundancy

Optimux-1551 features a number of redundancy options (see [Chapter 1](#)).

- To display the Redundancy menu:
 - From the System Configuration menu, choose **Redundancy**.

The Redundancy menu appears:

```

Optimux-1551
Configuration>System Configuration>Redundancy

1. Uplink Redundancy          >
2. Main Card Redundancy       >
>

Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-7. Redundancy Menu

Configuring the Uplink Card Redundancy

The uplink card redundancy is unidirectional 1+1, in accordance with ITU G.841.

- To configure the Uplink card redundancy:
 1. From the Redundancy Menu, choose **Uplink Redundancy**, (see [Chapter 1](#).)

The Uplink Redundancy menu appears:

```

Optimux-1551
Configuration>System Configuration>Redundancy>Uplink Redundancy

1. Redundancy Mode              > (Auto)
2. Flip On SD                   (Yes)
>

Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-8. Uplink Redundancy Menu

2. To set the **Redundancy Mode**, choose **Auto** (default), **Manual**, or **Off**.
3. To set the **Flip on SD** (signal degradation), choose **Yes** (default) or **No**. This determines that an SD level fault will be enough to cause the active link to change.

OP-63E1/OP-6384/OP-2128/OP-4256 Card Replacement Instructions

When two OP-63E1/OP-6384/OP-2128/OP-4256 cards are installed, only the standby card may be removed without interrupting data service. Prior to removing the standby card, it should be set to shutdown state (see [Configuring the Redundancy](#)). When a card is in shutdown state, all the indicator LEDs on its front panel blink.

Once the standby card is set to shutdown, it can be extracted without interrupting service. The standby card will go back from shutdown state to normal state in the following cases:

1. The standby card is extracted and inserted again.
2. The active card is extracted and inserted again.

Configuring the OP-63E1/OP-6384/OP-2128/OP-4256 (Access and Control) Card Redundancy

For the unit to support redundancy, both OP-63E1/OP-6384/OP-2128/OP-4256 cards must have the same station clock daughter card configuration (a daughter card on each of them or no daughter cards at all). Also the backup OP-63E1/OP-6384/OP-2128/OP-4256 card's software version and configuration has to be updated (see below) to match those of the main card.

➤ **To configure the OP-63E1/OP-6384/OP-2128/OP-4256 card redundancy:**

1. From the Redundancy menu, choose **Main Card Redundancy**.

The Main Card menu appears:

Optimux-1551	
<u>Configuration>System Configuration>Redundancy>Main Card Redundancy</u>	
Actual Main Card	(Card A)
Redundancy Status	(Redundancy available)
Standby Shutdown Status	(Normal)
1. Main Card	(Card A)
2. Redundancy Mode	(Auto)
3. Restore Timeout [0 - 60]	(5)
4. Channel Fail Limit [1 - 63]	(5)
5. Update SW Version	>
6. Update Configuration	>
7. Standby Card State	(Normal)
>	
Please select item <1 to 6>	
ESC-prev. menu; !-main menu; &-exit	

Figure 4-9. Main Card Redundancy Menu

Note *Redundancy Status* is displayed if two OP-63E1/OP-6384/OP-2128/OP-4256 cards are installed and redundancy is set to automatic.

Standby Shutdown Status reports the shutdown status of the standby card. The possible values are:

- **No Card** – no standby card installed
 - **Normal** – standby card fully operational
 - **Shutdown** – standby card shut down
 - **Not Supported** – this feature not supported by standby card.
-

2. To set the **Main Card**, choose **Card A** (default) or **Card B**.
3. To set the **Redundancy Mode**, choose **Auto** (default) or **Off**.
4. To set the **Restore Timeout**, choose from **0** to **60** seconds.

Note *0* determines that the system will swap cards once only (no restore).

5. To set the **Channel Fail Limit**, choose from channel **1** to **63** (OP-63E1 card), **1** to **84** (OP-6384card), **1** to **28** (OP-2128 card), or **1** to **56** (OP-4256 card). This parameter determines how many channels must fail before the unit switches to the backup card.

Note *If two OP-63E1/OP-6384/OP-2128/OP-4256 cards are installed, then one of the following options can appear in the menu (depending on the states of the cards):*

- *If the cards have different software versions, the **Update SW Version** field is displayed.*
 - *If the cards have the same software version but different configurations, the **Update Configuration** field is displayed.*
-

6. To set the **Update SW Version**, choose **From Card A** or **From Card B**. The active software of the selected card is copied to the other card. (The field is not displayed if both cards have the same software version.)
7. To **Update Configuration**, choose **From Card A** or **From Card B**. The configuration of the selected card is copied to the other card. (The field is not displayed if both cards have the same configuration.)
8. To set **Standby Card State**, choose **Normal** (default) or **Shutdown**.

Note *The **Standby Card State** field is not displayed if there is no standby card or if there is a card but it does not support this feature.*

Monitoring (Sniffing) a Channel

Traffic on a selected channel can be monitored via the Monitor port on the Optimux-1551 back panel.

► To select a channel for monitoring:

1. From the System Configuration menu, choose **Sniffing**.

The Sniffing menu appears:

```
Optimux-1551
Configuration>System Configuration>Sniffing

1. Monitor Channel [0 - 63] ... (0)

>
Please select item <1 to 1>
ESC-prev. menu; !-main menu; &-exit
```

Figure 4-10. Sniffing Menu

2. Select a **Monitor Channel** by typing the number of the channel: choose from channel **1** to **63** (OP-63E1 card), **1** to **28** (OP-2128 card), or **1** to **56** (OP-4256 card).

Note

0 disables the monitoring function.

Configuring Management Parameters

Optimux-1551 can be managed from a workstation located on a LAN connected to the unit's MNG-ETH port. To establish a proper connection, it is necessary to configure the following parameters:

- host IP address
- subnet mask
- default gateway
- traps
- read community
- write community.

Note

Changes made to SNMP parameters take effect immediately.

➤ **To configure the Management parameters:**

- From the System Configuration menu, choose **Management**.

The Management menu appears:

```

Optimux-1551

Configuration>System Configuration>Management

1. Device Info                >
2. Host IP                    >
3. Manager List               []>
4. Management Access          >

>
Please select item <1 to 4>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-11. Management Menu

► To configure the Device Information parameters:

1. From the Management menu, choose **Device Info**.

The Device Info menu appears:

```

Optimux-1551

Configuration>System Configuration>Management>Device Info

System Description... (OP-1551 HW Version: 0.0 SW Version: 1.0)

1. System Contact      ... ()
2. System Name         ... ()
3. System Location     ... ()

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-12. Device Info Menu

2. To define the **System Contact**, enter a string up to 35 chars (default: null).
3. To define the **System Name**, enter a string up to 12 chars (default: null).
4. To define the **System Location**, enter a string up to 35 chars (default: null).

► To configure the Host IP parameters:

1. From the Management menu, choose **Host IP**.

The Host IP menu appears:

```

Optimux-1551

Configuration>System Configuration>Management>Host IP

1. Host IP List      >
2. Default Gateway ... (0.0.0.0)
3. Read Community   ... (public)
4. Write Community  ... ()
5. Trap Community   ... ()

>
Please select item <1 to 5>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-13. Host IP Menu

2. From the Host IP menu, choose **Host IP List**.

The Host IP List menu appears:

```

Optimux-1551

Configuration>System Configuration>Management>Host IP>Host IP
List

1. IP Address        ... (0.0.0.0)
2. IP Mask           ... (255.255.255.255)

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-14. Host IP List Menu

3. Enter an **IP Address** in an X.X.X.X format, where X is a decimal number from 0 to 255 (default: **0.0.0.0**).
4. Enter an **IP LAN Mask** (default: **255.255.255.255**).
5. On the Host IP Menu, to define a Default Gateway, choose **Default Gateway** and enter an IP address (default: **0.0.0.0**).
6. To define a Read Community, choose **Read Community** and enter a string up to 35 chars (default: **public**).
7. To define a Write Community, choose **Write Community** and enter a string up to 35 chars (default: **NULL**).
8. To define a Trap Community, choose **Trap Community** and enter a string up to 35 chars (default: **NULL**).

Trap Recipients

The manager list defines the network management stations that will receive traps from the SNMP agent of the Optimux-1551. Up to ten managers can be defined. A manager can be masked to temporarily prevent it from receiving traps.

➤ **To configure the Manager List parameters:**

1. From the Management menu, choose **Manager List**.

The Manager List menu appears:

Optimux-1551		
Configuration>System Configuration>Management>Manager List		
Num	IP	TrapMask
1	0.0.0.0	NO
2	0.0.0.0	NO
3	0.0.0.0	NO
4	0.0.0.0	NO
5	0.0.0.0	NO
1. Change cell		... <0.0.0.0>
>		
Manager List Table		
ESC-prev. menu; !-main menu; &-exit; ?-help		

Figure 4-15. Manager List Menu

2. To change the IP addresses, use the navigation keys.
3. To set (Yes) or release (No) the Trap Masks, use the navigation keys.

Management Access

You can enable or disable access to the Optimux-1551 management system via SNMP, Telnet or Web-based applications. By disabling SNMP, Telnet or Web, you prevent unauthorized access to the system when security of the Optimux-1551 IP address has been compromised. When SNMP, Telnet and Web access is disabled, Optimux-1551 can be managed via an ASCII terminal only.

➤ **To configure Management Access parameters:**

1. From the Management menu, choose **Management Access**.

The Management Access menu appears:

```

Optimux-1551

Configuration>System Configuration>Management>Management Access

1. TELNET          > (Enable)
2. SNMP            > (Enable)
3. WEB             > (Enable)

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-16. Management Access Menu

Note

The communication medium on which you are currently connected to the Optimux-1551 will not be displayed. This is to prevent you from accidentally disconnecting yourself. To disable access for your current medium, connect via one of the other media.

2. Select **Telnet** for Telnet access by selecting **Enable** (default), **Disable**, or **Managers Only**. Managers Only limits access to the communication originating at an IP addresses listed in the Managers List Menu. (This option is not displayed if you are on a Telnet connection.)
3. Select **SNMP** for SNMP access by selecting **Enable** (default), **Disable**, or **Managers Only**. (This option is not displayed if you are on an SNMP connection.)
4. Select **Web** for web access by selecting **Enable** (default), **Disable**, or **Managers Only**. (This option is not displayed if you are on a web connection.)

Configuring the Control Ports

Optimux-1551 enables you to configure the Ethernet and serial port parameters. For the serial port, in addition to communication parameters, you can define login and dial-out parameters.

- **To configure the control ports:**
 - From the System Configuration menu, choose **Control port**.

The Control Port menu appears:

```

Optimux-1551

Configuration>System Configuration>Control Port

1. Ethernet Port                >
2. Serial Port                  >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-17. Control Port Menu

Configuring the Ethernet Port

Ethernet port configuration is the same as MNG-ETH port configuration.

► To configure the Ethernet port:

1. From the Control Port menu, choose **Ethernet Port**.

The Ethernet Port menu appears:

```

Optimux-1551

Configuration>System Configuration>Control Port>Ethernet Port

1. Auto-negotiation              (Disable)
2. Ethernet Mode                 (Full Duplex)
3. LAN Speed                     (10 Mbps)

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-18. Ethernet Port Menu

2. Set **Autonegotiation** to **Enable** (default) or **Disable**.

Note

When autonegotiation is enabled, the **Ethernet Mode** and **LAN Speed** parameters are read-only and are displayed in the top of the menu.

3. If **Autonegotiation** is set to **Disable**, the **Ethernet Mode** parameter can be edited: select **Full Duplex** (default) or **Half Duplex**.
4. If **Autonegotiation** is set to **Disable**, the **LAN Speed** parameter can be edited: select **10 Mbps** or **100 Mbps**.

Configuring the Serial Port

Serial port configuration is the same as Control port configuration.

➤ **To configure the Serial port:**

1. From the Control Port menu, choose **Serial Port**.

The Serial Port menu appears:

Optimux-1551

Configuration>System Configuration>Control Port>Serial Port

1. Mode	(Terminal)
2. Terminal	>
3. Dial Out	>

>

Please select item <1 to 3>

ESC-prev. menu; !-main menu; &-exit

Figure 4-19. Serial Port Menu

Note If the **Mode** is configured to **Dial Out**, the Control (serial) port becomes inaccessible for further configuration. In that case configuration will have to be continued through the MNG-ETH (Ethernet) port until the serial port is reconfigured to Terminal mode. Therefore, if you intend to configure the serial port to Dial Out, first configure the unit with a valid IP address so that you will be able to manage the unit via the Ethernet.

If you mistakenly switch the port to Dial Out mode before you have assigned an IP address, then the only way to regain Terminal mode for the serial port is (while still in this menu) to use a connected terminal to enter **Q** (for quit).

2. Determine the **Mode** for the Control (serial) port: **Terminal** (default) or **Dial Out**. Terminal enables (further) configuring Optimux-1551 through the port, **Dial Out** changes the use of the port to serving as a channel for dial out modem access for reporting alarms.

Configuring Terminal Parameters

- From the Serial Port menu, choose **Terminal**.

The Terminal menu appears:

```

Optimux-1551

...>System Configuration>Control Port>Serial Port>Terminal
-----
1. User Access          >
2. Baud Rate            >  (115200bps)
3. Data                 (8 Bits)
4. Parity               >  (None)
5. Scrolling Window     (Appear)
6. Security Timeout     (10min)
7. Save All

>
Please select item <1 to 7>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-20. Terminal Menu

► To configure user access to the Terminal:

- From the Terminal Menu, choose **User Access**.

The User Access menu appears with a password query.

```

Optimux-1551

...>System Configuration>Control Port>Serial Port>Terminal>User
Access
-----
1. Change Password      >
2. User Info            []

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-21. User Access Menu

- Choose **Change Password**.

The full Change Password menu appears.

```

Optimux-1551

1. User Name                ... (user)
2. Password                 ... (*****)
3. New Password             ... (*****)
4. Confirm New Password     ... (*****)

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-22. Change Password Menu

The default settings are:

- User Name: can be either **SU** or **USER**
- Password: **1234**.

The SU account has permission to view and change all the configuration parameters. The USER account has permission only to view parameters.

➤ **To configure the password for management access:**

1. On the Change Password menu, confirm that the current user name is displayed: **USER** or **SU**.
2. Enter a current **Password**.
3. Select a new password and assign a new password to the current user.

Note

The password is up to 10 characters and is case sensitive.

4. Select **Confirm New Password** to confirm the new password.

If the new password and confirm password do not match, an error messages is displayed.

5. Reassign the new password.

➤ **To view users with permission to access the system:**

- Select **User Info** (**Main Menu** > **Configuration** > **Control Port** > **Serial Port** > **Terminal** > **User Access** > **User Info**) from the User Access menu.

The **User Info** table appears.

Optimux-1551			
<u>...>Control Port>Serial Port>Terminal>User Access>User Info</u>			
	User Name	Access level	Dynamic/Permanent
1	USER	RO	Permanent
2	SU	RW	Permanent
>			
Please select item <1 to 2>			
ESC-prev. menu; !-main menu; &-exit			

Figure 4-23. User Info Table Screen

The User Info Table displays the users with permission to access Optimux-1551 and the users' access level (Read Only or Read/Write).

Caution

To avoid being locked out of the system, write your User Name and Password and keep it for later reference.

Obtaining a New Password

If a user forgets a password, a new password has to be obtained.

► To obtain a new password:

1. Log in with user name **CHNGPASS**.

A random identification number (dynamic key) is displayed at the bottom of the screen.

2. Contact RAD Technical Support and refer to this key. You will be given a temporary password.
3. Log in using a temporary password. You will be prompted to enter and confirm a new password for the next session.

► To configure the terminal settings:

1. On the Terminal Menu, choose the desired **Baud Rate: 9600, 19200, 38400, 57600, 115200** (default) bps.
2. Select the number of **Data bits: 7 or 8** (default).
3. Choose the **Parity: None** (default), **Odd, Even**.

Enabling and Disabling Pop-up Messages

When the pop-up function is enabled, Optimux-1551 displays messages as they are generated by the system or received by the interfaces. The messages are displayed at the bottom of the terminal screen.

► To enable or disable pop-up alarms:

1. From the Terminal menu, select **Scrolling Window**.

This activates the pop-up messages mode.

2. Select **Appear** to enable the pop-up messages or select **Not Appear** to disable the pop-up messages.

Configuring Security Timeout

The timeout specifies a time interval after which Optimux-1551 automatically disconnects from the supervisory terminal (or Telnet or Web application) if no input from the user is detected. The timeout can be set to 10 minutes or disabled.

➤ **To configure the security timeout:**

- From the Terminal menu, select **Security Timeout** to disable it (**OFF**) or set to 10 minutes (**10 min**).

The display is refreshed and a new value appears.

Saving Changes to Terminal Parameters

➤ **To save changes to the terminal settings:**

- On the Terminal Menu, select **Save All**.

All changes that you have made in the Terminal Menu take effect and the display is refreshed.

Configuring Dial Out Parameters

➤ **To configure the Control port dial out properties:**

1. From the Serial Port menu, choose **Dial Out**.

The Dial Out menu appears:

Optimux-1551

...>System Configuration>Control Port>Serial Port>Dial Out

1. Number of Retries (2-8)	...	(2)
2. Wait For Connect	>	(30 sec)
3. Dial Mode		(Tone)
4. Alternate Number Mode		(Yes)
5. Primary Number (up to 20 chars)	...	()
6. Alternate Number (up to 20 chars)	...	()
7. Call Out Mode	>	(None)

>

Please select item <1 to 7>

ESC-prev. menu; !-main menu; &-exit

Figure 4-24. Dial Out Menu

2. Choose the **Number of Retries: (2 to 8)**. This is the number of times that the unit will attempt to call the **Primary Number**. After this number of tries, the unit will move on to try the **Alternate Number** (if one is defined).

3. Choose the **Wait for Connect** time: **30 sec**, **45 sec**, or **60 sec**. This is the amount of time that the unit will wait between dialing attempts.
4. Choose the **Dial Mode**: **Tone** or **Pulse**.
5. Choose the **Alternate Number Mode**: **Yes** or **No**.
6. Enter the **Primary Number**. Phone numbers can be composed of both digits and these two characters: "*" and "#".
7. If **Alternate Number Mode** is **Yes**, then Alternate Number will appear in the menu. Enter the **Alternate Number**.
8. Choose the **Call Out Mode**: **None**, **All**, or **Major**. This parameter configures how alarms trigger a call out. **None** will not trigger a call out, **All** will trigger a call out for any alarm, **Major** will trigger a call out only for a major alarm.

Configuring the Physical Ports

► To configure the physical ports:

- From the Configuration menu, choose **Physical Ports Configuration**.

The Physical Ports Configuration menu appears:

```

Optimux-1551

Configuration>Physical Ports Configuration

1. Uplink Configuration      >
2. Channel Configuration    >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-25. Physical Ports Configuration Menu

Configuring the Uplink

Masking and severity of the Optimux-1551 alarms is user controlled. For each alarm group there is also the option to reset the masking and severity to their default values (in the group's Alarm Configuration Menu).

Note

The uplink menus for SONET and SDH are described separately.

► To configure the uplink:

1. From the Physical Ports Configuration menu, choose **Uplink Configuration**.

The Uplink Configuration menu appears:

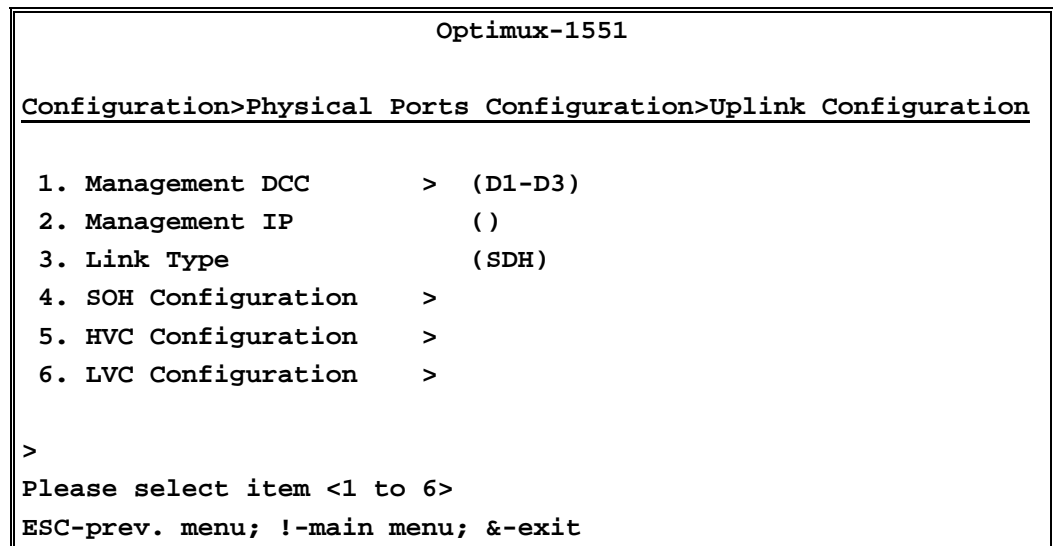


Figure 4-26. Uplink Configuration Menu

- If **D1-D3**, or **D4-D12** are chosen for the **Management DCC**, then **Management IP** is added to the menu. Enter a **Management IP** address.

Note

The Management DCC can be used to network manage a far end unit.

- Choose the **Link Type**: **SDH** (default when OP-63E1 installed) or **SONET** (default when OP-6384, OP-2128, or OP-4256 is installed).

Note

*Changing the **Link Type** sets some parameters to their default values and clears the log file.*

Optimux-1551 displays a confirmation request.

SOH Configuration for SONET Uplink

SOH or the start of heading character used as the first character for a message heading has to be configured for SONET uplink.

➤ **To configure the SOH bytes:**

- From the Uplink Configuration menu, choose **SOH Configuration**.

The SOH Configuration menu appears.

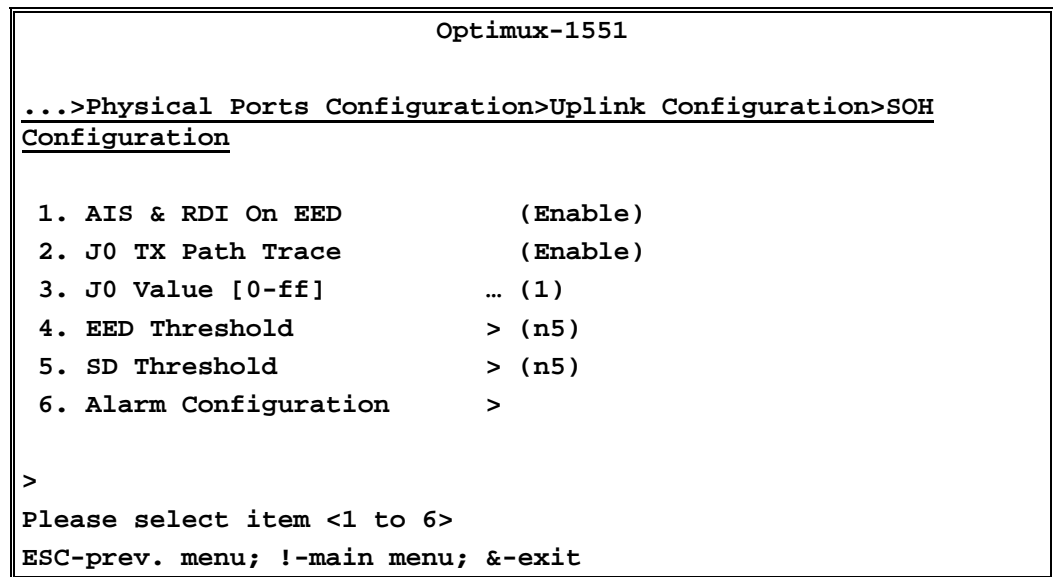


Figure 4-27. SOH Configuration Menu

2. **Enable** (default) or **Disable** the **AIS & RDI on EED** option to send or not send an **AIS** (Alarm Indication Signal) & **RDI** (Remote Defect Indication) **On EED** (Excessive Error Defect). The EED threshold is determined by the **EED Threshold** parameter.
3. Select whether to enable **J0 TX Path Trace**: **Enable** or **Disable** (default). This field controls insertion of a user-defined trace identifier into the transmit path (J0 byte).
4. If **J0 TX Path Trace** is enabled, **J0 Value** is displayed in the menu. Enter a hex value: **0** to **FF** (default: **1**).
5. Select an **EED** (excessive error defect) **Threshold** according to the exponential value 1^{-n} , where $n = 3, 4$, or 5 . An EED is reported if the BER (bit error rate) exceeds the EED threshold. The EED is cleared if the equivalent BER is greater than the exponential value $1^{-(EED + 1)}$.
6. Select an **SD** (Signal Degraded Defect) **Threshold**: **n5**, **n6**, **n7**, **n8**, or **n9**. Where "**n5**" = the exponential value 1^{-5} , etc. An SD is detected if the BER exceeds the selected SD threshold. The SD is cleared if the BER is greater than the exponential value $1^{-(SD+1)}$.

SOH Alarms Configuration (SONET)

Alarm masks and severity can be configured or reset to their default values.

- **To display the SOH Alarms Configuration menu:**
 - From the SOH Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

```

Optimux-1551

...>Uplink Configuration>SOH Configuration>Alarm Configuration

1. SOH Alarms                [ ] >
2. Default Alarms Setting

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-28. Alarm Configuration Menu

► To configure the SOH alarms:

1. From the Alarm Configuration menu, choose **SOH Alarms**.

The SOH Alarms menu appears:

```

Optimux-1551

...>SOH Configuration>Alarm Configuration>SOH Alarms

Alarm Name                Severity    Mask

1  Loss Of Signal Uplink A    Major      Off
2  Loss Of Signal Uplink B    Major      Off
3  Out Of Frame               Minor      Off
4  Loss Of Frame              Major      Off
5  Line AIS occurred          Major      Off
6  Far End Receive Fail (RDI) Minor      Off
7  Excessive Bit Error Rate   Major      Off

1. Minor
2. Major

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit; ?-help

```

Figure 4-29. SOH Alarms Menu

2. Use the navigation keys to change the **Severities** and **Mask**, as necessary.
3. For alarm descriptions, see [Chapter 5](#). **Severity** determines which relay to activate in the event that the alarm occurs: **Major** or **Minor**.
4. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list. Choose **On** or **Off**.

► To reset the SOH alarms:

1. From the Alarm Configuration menu, choose **Default Alarms Setting**.

2. Confirm the confirmation request to reset all the SOH alarms to their default mask and severity values.

SOH Configuration for an SDH Uplink

► To configure the SOH bytes:

1. From the Uplink Configuration menu, choose **SOH Configuration**.

The SOH Configuration menu (for an SDH Uplink) appears:

```

Optimux-1551

...>Physical Ports Configuration>Uplink Configuration>SOH
Configuration

1. AIS & RDI On EED                (Enable)
2. AIS & RDI On Path Trace         (Enable)
3. J0 TX Path Trace                (Enable)
4. J0 RX Path Trace                (Enable)
5. J0 Value                        ... (MS-PATH TRACE)
6. EED Threshold                   > (n5)
7. SD Threshold                    > (n5)
8. Alarm Configuration             >

>
Please select item <1 to 8>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-30. SOH Configuration Menu

2. Select whether to send an **AIS** (Alarm Indication Signal) & **RDI** (Remote Defect Indication) **On EED** (Excessive Error Defect): **Enable** (default) or **Disable**. (The EED threshold is determined by the **EED Threshold** parameter.)
3. Select whether to send an **AIS & RDI on Path Trace Mismatch**: **Enable** (default) or **Disable**.

Note

*The **AIS & RDI on Path Trace Mismatch** parameter is displayed only if **J0 RX Path Trace** is enabled.*

4. Select whether to enable **J0 TX Path Trace**: **Enable** or **Disable** (default). This field controls insertion of a user-defined trace string (J0 value) into the transmit path.
5. Select whether to enable **J0 RX Path Trace**: **Enable** or **Disable** (default). This field controls receiving and comparison of a user-defined trace string (J0 value). If the strings do not match a mismatch alarm is declared. If the receive string is unstable, an out of lock alarm is declared.
6. If **J0 TX Path Trace** or **J0 RX Path Trace** is enabled, **J0 Value** is displayed in the menu. Enter a string up to 15 chars (default: **MS-PATH TRACE**).

7. Select an **EED Threshold** according to the exponential value 1^{-n} , where $n = 3, 4, \text{ or } 5$. An EED is reported if the BER (bit error rate) exceeds the EED threshold. The EED is cleared if the equivalent BER is greater than the exponential value $1^{-(\text{EED} + 1)}$.
8. Select an **SD (Signal Degraded Defect) Threshold: n5, n6, n7, n8, or n9**. Where "n5" = the exponential value 1^{-5} , etc. An SD is detected if the BER exceeds the selected SD threshold. The SD is cleared if the BER is greater than the exponential value $1^{-(\text{SD}+1)}$.

SOH Alarms Configuration (SDH)

Alarm masks and severity can be configured or reset to their default values.

➤ **To display the SOH Alarms Configuration menu:**

- From the SOH Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

```

Optimux-1551
...>Uplink Configuration>SOH Configuration>Alarm Configuration

1. SOH Alarms                                [ ] >
2. Default Alarms Setting

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-31. Alarm Configuration Menu

➤ **To configure the SOH alarms:**

1. From the Alarm Configuration menu, choose **SOH Alarms**.

The SOH Alarms menu appears:

Optimux-1551			
...>SOH Configuration>Alarm Configuration>SOH Alarms			
	Alarm Name	Severity	Mask
	1 Loss of signal uplink A	Major	Off
	2 Loss of signal uplink B	Major	Off
	3 Out of frame	Minor	Off
v	4 Loss of frame	Major	Off
	5 Line AIS occurred	Major	Off
	6 Far end receive fail (RDI)	Minor	Off
	7 Excessive bit error rate	Major	Off
1. Minor			
2. Major			
>			
Please select item <1 to 2>			
ESC-prev. menu; !-main menu; &-exit; ?-help			

Figure 4-32. SOH Alarms Menu

2. Use the navigation keys to change the **Severities** and **Mask**, as necessary.
3. For alarm descriptions, see [Chapter 5](#). **Severity** determines which relay to activate in the event that the alarm occurs: **Major** or **Minor**.
4. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list. Choose **On** or **Off**.

► To reset the SOH alarms:

1. From the Alarm Configuration menu, choose **Default Alarms Setting**.
2. Confirm the confirmation request to reset all the SOH alarms to their default mask and severity values.

HVC Configuration for a SONET Uplink

The HVC bytes have to be configured for SONET uplink. The SDH bytes can also be configured for SONET uplink with the addition of the following parameters on the menu (see [Figure 4-33](#)):

- AIS and RDI on path trace
- J1 Rx path trace.

► To configure the HVC bytes:

1. From the Uplink Configuration menu, choose **HVC Configuration**.

The HVC Configuration menu appears:

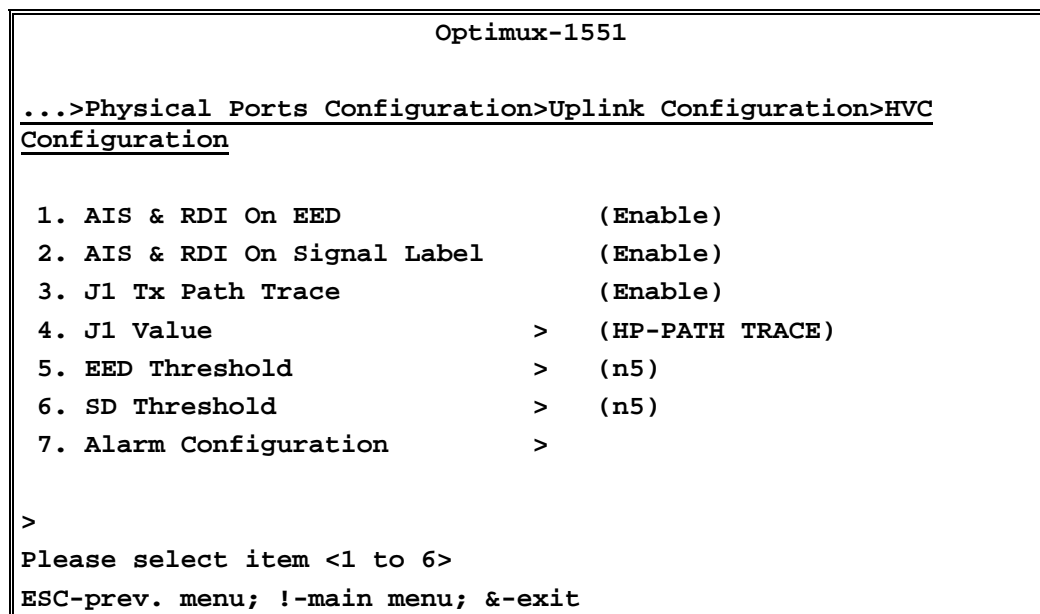


Figure 4-33. HVC Configuration Menu

2. Select whether to send an **AIS** (Alarm Indication Signal) and **RDI** (Remote Defect Indication) on an **EED** (Excessive Error Defect): **Enable** (default) or **Disable**.
3. Select whether to send an **AIS** and **RDI** on a **Signal Label**: **Enable** (default) or **Disable**.
4. Select whether to enable **J1 TX Path Trace**: **Enable** or **Disable** (default). This field controls insertion of a user-defined testing string (trace) into the transmit path (J1 byte).
5. If **J1 TX Path Trace** is enabled, **J1 Value** is displayed in the menu. Enter a string up to 62 chars (default: **HP-PATH TRACE**).
6. Select an **EED** (excessive error defect) **Threshold** according to the exponential value 1^{-n} , where $n = 3, 4$, or 5 . An EED is reported if the BER (bit error rate) exceeds the EED threshold. The EED is cleared if the equivalent BER is greater than the exponential value $1^{-(EED + 1)}$.
7. Select an **SD** (Signal Degraded Defect) **Threshold**: **n5**, **n6**, **n7**, **n8**, or **n9**. Where "**n5**" = the exponential value 1^{-5} , etc. An SD is detected if the BER exceeds the selected SD threshold. The SD is cleared if the BER is greater than the exponential value $1^{-(SD+1)}$.

HVC Alarms Configuration

Alarm masks and severity can be configured or reset to their default values.

► To display the HVC Alarms Configuration menu:

- From the HVC Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

```

Optimux-1551

...>Uplink Configuration>HVC Configuration>Alarm Configuration

1. HVC Alarms                                [ ] >
2. Default Alarms Setting                      >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-34. Alarm Configuration Menu

► To configure the HVC alarms:

- From the Alarm Configuration menu, choose **HVC Alarms**.

The HVC Alarms menu appears:

```

Optimux-1551

...>HVC Configuration>Alarm Configuration>HVC Alarms

      Path  Alarm Name                      Severity  Mask
1  HVC 1  Path AIS occurred                Minor    Off
2          Loss of pointer                 Minor    On
|  3          Far end receive fail (RDI)    Major    Off
v  4          Excessive bit error rate      Minor    Off
   5          Signal degraded               Major    Off
   6          Signal label mismatch         Major    Off
   7          Unequipped signal label       Major    On

1. HVC 1
2. HVC 2
3. HVC 3

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit: ?-help

```

Figure 4-35. HVC Alarms Menu

2. Select the relevant **Path** (see lists of E1/DS1 path mapping in [Chapter 1](#)).
3. Use the navigation keys to change the **Severities** and **Masks**, as necessary.
4. For alarm descriptions, see [Chapter 5](#). **Severity** determines which relay to activate in the event that the alarm occurs: **Major** or **Minor**.
5. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list. Choose **On** or **Off**.

► **To reset the HVC alarms:**

1. From the Alarm Configuration menu, choose **Default Alarms Setting**.

The Default Alarms Setting menu appears:

```

Optimux-1551

...>Uplink Configuration>HVC Configuration>Default Alarms
Setting
1. Enter First HVC [1 - 3]          ... (1)
2. Enter Last HVC [1 - 3]          ... (1)
3. Set To Default

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-36. Default Alarms Setting Menu

2. Choose a range of HVC path alarms to reset by selecting the **First HVC** and the **Last HVC** in the range (see [Multiplexing and Mapping](#)).
3. Select **Set to Default**, and approve the confirmation message that is displayed, to reset all the HVC alarms in the chosen range to their default mask and severity values

HVC Configuration for an SDH Uplink

► **To configure the HVC bytes:**

1. From the Uplink Configuration menu, choose **HVC Configuration**.

The HVC Configuration menu appears:

Optimux-1551	
<u>...>Physical Ports Configuration>Uplink Configuration>HVC Configuration</u>	
1. AIS & RDI On EED	(Enable)
2. AIS & RDI On Signal Label	(Enable)
3. AIS & RDI On Path Trace	(Enable)
4. J1 Tx Path Trace	(Enable)
5. J1 Rx Path Trace	(Enable)
6. J1 Value	... (HP-PATH TRACE)
7. EED Threshold	> (n5)
8. SD Threshold	> (n5)
9. Alarm Configuration	>
>	
Please select item <1 to 9>	
ESC-prev. menu; !-main menu; &-exit	

Figure 4-37. HVC Configuration Menu

2. Select whether to send an **AIS** (Alarm Indication Signal) and **RDI** (Remote Defect Indication) on an **EED** (Excessive Error Defect): **Enable** (default) or **Disable**. The EED threshold is set by the **EED Threshold** parameter.
3. Select whether to send an **AIS** and **RDI** on a **Signal Label Mismatch**: **Enable** (default: **HP-PATH TRACE**) or **Disable**.
4. Select whether to send an **AIS** and **RDI** on a **Path Trace Mismatch**: **Enable** (default) or **Disable**. This parameter is only displayed when **J1 RX Path Trace** is enabled.
5. Select whether to enable **J1 TX Path Trace**: **Enable** or **Disable** (default). This field controls insertion of a user-defined trace string (J1 value) into the transmit path.
6. Select whether to enable **J1 RX Path Trace**: **Enable** or **Disable** (default). This field controls receiving and comparison of a user-defined trace string (J1 value). If the strings do not match a mismatch alarm is declared. If the receive string is unstable, an out of lock alarm is declared.
7. If **J1 TX Path Trace** and/or **J1 RX Path Trace** are enabled, **J1 Value** is displayed in the menu. Enter a string up to 15 chars (default: **HP-PATH TRACE**).
8. Select an **EED** (excessive error defect) **Threshold** according to the exponential value 1^{-n} , where $n = 3, 4$, or 5 . An EED is reported if the BER (bit error rate) exceeds the EED threshold. The EED is cleared if the equivalent BER is greater than the exponential value $1^{-(EED + 1)}$.
9. Select an **SD** (Signal Degraded Defect) **Threshold**: **n5**, **n6**, **n7**, **n8**, or **n9**. Where "**n5**" = the exponential value 1^{-5} , etc. An SD is detected if the BER exceeds the selected SD threshold. The SD is cleared if the BER is greater than the exponential value $1^{-(SD+1)}$.

HVC Alarms Configuration

Alarm masks and severity can be configured or reset to their default values.

➤ **To display the HVC Alarms Configuration menu:**

- From the HVC Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

```

Optimux-1551

...>Uplink Configuration>HVC Configuration>Alarm Configuration

1. HVC Alarms                [ ] >
2. Default Alarms Setting    >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-38. Alarm Configuration Menu

➤ **To configure the HVC alarms:**

1. From the Alarm Configuration menu, choose **HVC Alarms**.

The HVC Alarms menu appears:

```

Optimux-1551

...>HVC Configuration>Alarm Configuration>HVC Alarms

Alarm Name                Severity    Mask

1 Path AIS occurred        Major      Off
2 Loss of pointer          Major      Off
| 3 Far end receive fail (RDI) Minor      Off
v 4 Path trace loss of lock Major      Off
5 Path trace ID mismatch   Minor      Off
6 Excessive bit error rate Major      Off
7 Signal degraded          Minor      Off

1. Minor
2. Major

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit; ?-help

```

Figure 4-39. HVC Alarms Menu

2. Use the navigation keys to change the **Severities** and **Masks**, as necessary.

3. For alarm descriptions, see [Chapter 5](#). **Severity** determines which relay to activate in the event that the alarm occurs: **Major** or **Minor**.
4. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list. Choose **On** or **Off**.

➤ **To reset the HVC alarms:**

1. From the Alarm Configuration menu, choose **Default Alarms Setting**.
2. Confirm the confirmation request to reset all the HVC alarms to their default mask and severity values.

LVC Configuration for a SONET Uplink

➤ **To configure the LVC bytes:**

1. From the Uplink Configuration menu, choose **LVC Configuration**.

The LVC Configuration menu appears:

Optimux-1551

...>Physical Ports Configuration>Uplink Configuration>LVC Configuration

1. AIS & RDI On Signal Label		(Enable)
2. J2 Tx Path Trace		(Enable)
3. J2 Value	...	(LP-PATH TRACE)
4. EED Threshold	>	(n5)
5. SD Threshold	>	(n5)
6. Alarm Configuration	>	

>

Please select item <1 to 7>

ESC-prev. menu; !-main menu; &-exit

Figure 4-40. LVC Configuration Menu

2. Select whether to send an **AIS** (Alarm Indication Signal) & **RDI** (Remote Defect Indication) **On a Signal Label**: **Enable** (default) or **Disable**.
3. Select whether to enable **J2 TX Path Trace**: **Enable** or **Disable** (default). This field controls insertion of a user-defined trace string (J2 value) into the transmit path.
4. If **J2 TX Path Trace** and/or **J2 RX Path Trace** are enabled, **J2 Value** is displayed in the menu. Enter a string up to 62 chars (default: **LP-PATH TRACE**).
5. Select an **EED** (excessive error defect) **Threshold** according to the exponential value 1^{-n} , where $n = 3, 4$, or 5 . An EED is reported if the BER (bit error rate) exceeds the EED threshold. The EED is cleared if the equivalent BER is greater than the exponential value $1^{-(EED + 1)}$.

6. Select an **SD** (Signal Degraded Defect) **Threshold: n5, n6, n7, n8, or n9.**
Where "**n5**" = the exponential value 10^{-5} , etc. An SD is detected if the BER exceeds the selected SD threshold. The SD is cleared if the BER is greater than the exponential value $10^{-(SD+1)}$.

LVC Alarms Configuration

Alarm masks and severity can be configured or reset to their default values.

➤ **To display the LVC Alarms Configuration menu:**

- From the LVC Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

Optimux-1551	
<u>...>Uplink Configuration>LVC Configuration>Alarm Configuration</u>	
1. Tributary Alarms	[] >
2. Multiple Mask	>
3. Multiple Severity	>
4. Default Alarms Setting	>
>	
Please select item <1 to 4>	
ESC-prev. menu; !-main menu; &-exit	

Figure 4-41. Alarm Configuration Menu

➤ **To configure the LVC channel alarms:**

1. From the Alarm Configuration menu, choose **Tributary Alarms**.

The Tributary Alarms menu appears:

Optimux-1551				
...>LVC Configuration>Alarm Configuration>Tributary Alarms				
Port	Alarm Name	Severity	Mask	
1	VT AIS occurred	Major	Off	
2	Loss of pointer	Major	Off	
3	Far end receive fail (RDI)	Minor	Off	
v 4	Excessive bit error rate	Major	Off	
5	Signal degraded	Minor	Off	
6	Signal label mismatch	Minor	Off	
7	Unequipped signal label	Minor	Off	
1. Change cell [1 - 63] ... (1)				
>				
Please select item <1 to 1>				
ESC-prev. menu; !-main menu; &-exit; ?-help				

Figure 4-42. Tributary Alarms Menu

Note

The range of ports depends on the card used, for the OP 63E1: 63 ports (shown); and for the OP 84T1: 84 ports.

2. In the **Change cell** field, select a port.
3. Use the navigation keys to change the **Severities** and **Masks**, as necessary.
4. For alarm descriptions, see [Chapter 5](#). **Severity** determines which relay to activate in the event that the alarm occurs: **Major** or **Minor**.
5. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list. Choose **On** or **Off**.

➤ **To configure alarm masks for multiple tributaries simultaneously:**

1. From the Alarm Configuration menu, choose **Multiple Mask**.

The Multiple Mask menu appears:

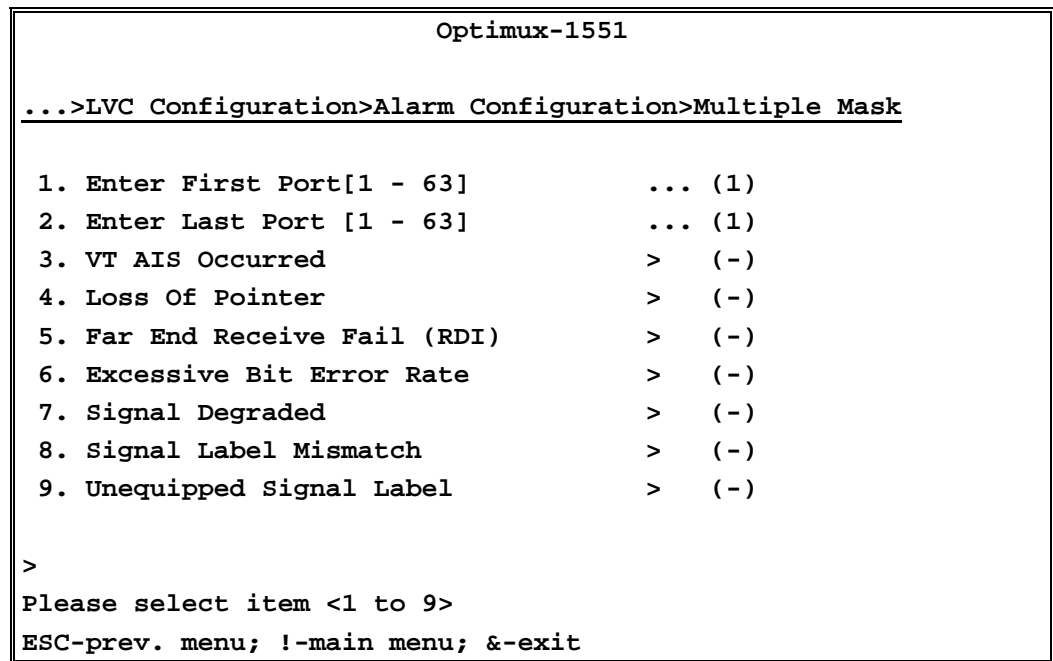


Figure 4-43. Multiple Mask Menu

Note

The range of ports in the domain of menu choices 1 and 2 depends on the card used, for the OP 63E1: 63 ports (shown); and for the OP 84T1: 84 ports.

2. Select group of ports by selecting a port in the **Enter First Port** field (the first port in the group) and a port in the **Enter Last Port** field (the last port in the group).
 3. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list. For each alarm, select **On** or **Off**.
- **To configure severities for multiple tributaries simultaneously:**
1. From the Alarm Configuration menu, choose **Multiple Severity**.

The Multiple Severity menu appears:

Optimux-1551	
<u>...>LVC Configuration>Alarm Configuration>Multiple Severity</u>	
1. Enter First Port[1 - 63]	... (1)
2. Enter Last Port [1 - 63]	... (1)
3. VT AIS Occurred	> (-)
4. Loss Of Pointer	> (-)
5. Far End Receive Fail (RDI)	> (-)
6. Excessive Bit Error Rate	> (-)
7. Signal Degraded	> (-)
8. Signal Label Mismatch	> (-)
9. Unequipped Signal Label	> (-)
>	
Please select item <1 to 9>	
ESC-prev. menu; !-main menu; &-exit	

Figure 4-44. Multiple Severity Menu

Note

The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP-63E1: 63 ports (shown)
 - OP-6384: 63 ports when set to E1 and 84 ports when set to T1
 - OP-4256: 42 ports when set to E1 and 56 ports when set to T1
 - OP-2128: 21 ports when set to E1 and 28 ports when set to T1
- OP 63E1: 63 ports (shown); for the OP 84T1: 84 ports.

2. Select group of ports by selecting a port in the Enter First Port field (the first port in the group) and a port in the Enter Last Port field (the last port in the group).
3. For each alarm, select the severity (**Minor** or **Major**).

➤ **To configure default alarm settings:**

1. From the Alarm Configuration menu, choose **Default Alarm Settings**.

The Default Alarm Settings menu appears:

```

Optimux-1551

...>LVC Configuration>Alarm Configuration>Default Alarms
Settings

1. Enter First Port[1 - 63]      ... (1)
2. Enter Last Port[1 - 63]      ... (1)
3. Set To Default

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-45. Default Alarm Settings Menu

Note

The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP-63E1: 63 ports (shown)
- OP-6384: 63 ports when set to E1 and 84 ports when set to T1
- OP-4256: 42 ports when set to E1 and 56 ports when set to T1
- OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

2. Select group of ports by selecting a port in the Enter First Port field (the first port in the group) and a port in the Enter Last Port field (the last port in the group). This is the group of ports to be configured with their default alarm settings.
3. To confirm the selection, select **Set to Default** and confirm by entering Y.

LVC Configuration for an SDH Uplink

➤ To configure the LVC bytes:

1. From the Uplink Configuration menu, choose **LVC Configuration**.

The LVC Configuration menu appears:

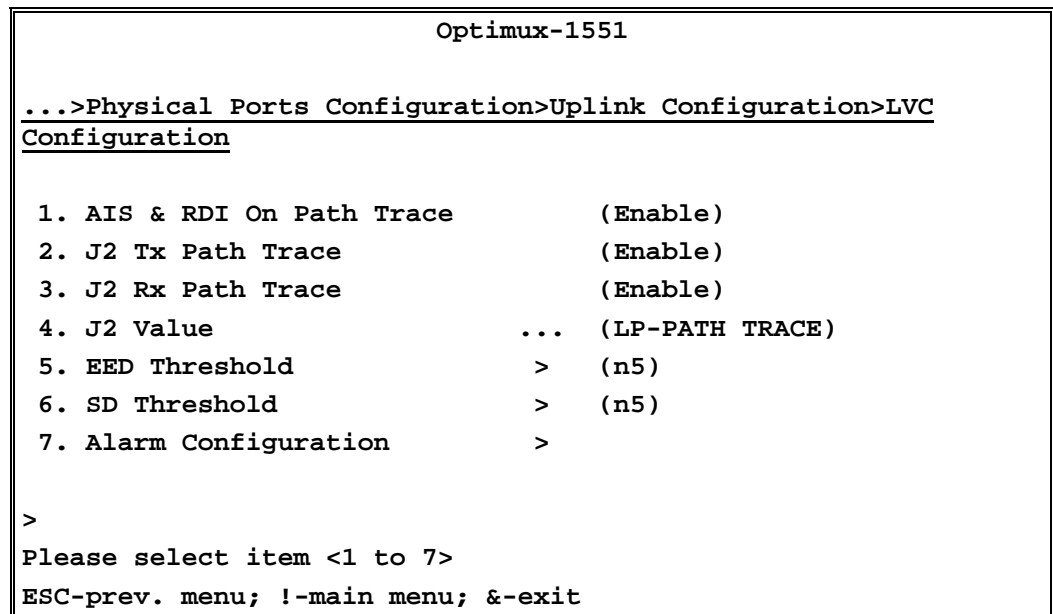


Figure 4-46. LVC Configuration Menu

2. Select whether to send an **AIS** (Alarm Indication Signal) & **RDI** (Remote Defect Indication) **On a Path Trace Mismatch: Enable** (default) or **Disable**. This parameter is only displayed when **J2 RX Path Trace** is enabled.
3. Select whether to enable **J2 TX Path Trace: Enable** or **Disable** (default). This field controls insertion of a user-defined trace string (J2 value) into the transmit path.
4. Select whether to enable **J2 RX Path Trace: Enable** or **Disable** (default). This field controls receiving and comparison of a user-defined trace string (J2 value). If the strings do not match a mismatch alarm is declared. If the receive string is unstable, an out of lock alarm is declared.
5. If **J2 TX Path Trace** and/or **J2 RX Path Trace** are enabled, **J2 Value** is displayed in the menu. Enter a string up to 15 chars (default: **LP-PATH TRACE**).
6. Select an **EED** (excessive error defect) **Threshold** according to the exponential value 1^{-n} , where $n = 3, 4$, or 5 . An EED is reported if the BER (bit error rate) exceeds the EED threshold. The EED is cleared if the equivalent BER is greater than the exponential value $1^{-(EED + 1)}$.
7. Select an **SD** (Signal Degraded Defect) **Threshold: n5, n6, n7, n8, or n9**. Where "**n5**" = the exponential value 1^{-5} , etc. An SD is detected if the BER exceeds the selected SD threshold. The SD is cleared if the BER is greater than the exponential value $1^{-(SD+1)}$.

LVC Alarms Configuration

Alarm masks and severity can be configured or reset to their default values.

► To display the LVC Alarms Configuration menu:

- From the LVC Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

```

Optimux-1551

...>Uplink Configuration>LVC Configuration>Alarm Configuration

1. Tributary Alarms                [ ] >
2. Multiple Mask                   >
3. Multiple Severity               >
4. Default Alarms Setting          >

>
Please select item <1 to 1>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-47. Alarm Configuration Menu

► To configure the LVC channel alarms:

1. From the Alarm Configuration menu, choose **Tributary Alarms**.

The Tributary Alarms menu appears:

```

Optimux-1551

...>LVC Configuration>Alarm Configuration>Tributary Alarms

      Port  Alarm Name                Severity  Mask
      ---  -
      1     1    VT AIS occurred        Major    On
      2           Loss of pointer        Major    On
      |  3           Far end receive fail (RDI)  Minor    Off
      v  4           Lower order path trace mismatch  Minor    Off
      5           Excessive bit error rate    Major    Off
      6           Signal degraded            Minor    Off
      7           Signal label mismatch       Minor    Off

1. Change cell [1 - 63]          ... (1)

>
Please select item <1 to 1>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-48. Tributary Alarms Menu

2. In the **Change cell** field, select a port.
3. Use the navigation keys to change the **Severities** and **Masks**, as necessary.
4. For alarm descriptions, see [Chapter 5](#). **Severity** determines which relay to activate in the event that the alarm occurs: **Major** or **Minor**.
5. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list. Choose **On** or **Off**.

➤ **To configure alarm masks for multiple tributaries simultaneously:**

1. From the Alarm Configuration menu, choose **Multiple Mask**.

The Multiple Mask menu appears:

Optimux-1551

...>LVC Configuration>Alarm Configuration>Multiple Mask

1. Enter First Port[1 - 63]	... (1)
2. Enter Last Port [1 - 63]	... (1)
3. VT AIS Occurred	> (-)
4. Loss Of Pointer	> (-)
5. Far End Receive Fail (RDI)	> (-)
6. Lower Order Path Trace Mismatch	> (-)
7. Excessive Bit Error Rate	> (-)
8. Signal Degraded	> (-)
9. Signal Label Mismatch	> (-)
10. V5 VC AIS	> (-)
11. Unequipped Signal Label	> (-)

>

Please select item <1 to 11>

ESC-prev. menu; !-main menu; &-exit

Figure 4-49. Multiple Mask Menu

Note

The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP-63E1: 63 ports (shown)
- OP-6384: 63 ports when set to E1 and 84 ports when set to T1
- OP-4256: 42 ports when set to E1 and 56 ports when set to T1
- OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

2. Select group of ports by selecting a port in the **Enter First Port** field (the first port in the group) and a port in the **Enter Last Port** field (the last port in the group).
3. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However,

the alarm still appears in the active alarm list. For each alarm, choose **On** or **Off**.

► **To configure severities for multiple tributaries simultaneously:**

1. From the Alarm Configuration menu, choose **Multiple Severity**.

The Multiple Severity menu appears:

Optimux-1551

...>LVC Configuration>Alarm Configuration>Multiple Severity

1. Enter First Port[1 - 63]	... (1)
2. Enter Last Port[1 - 63]	... (1)
3. VT AIS Occurred	> (-)
4. Loss Of Pointer	> (-)
5. Far End Receive Fail (RDI)	> (-)
6. Lower Order Path Trace Mismatch	> (-)
7. Excessive Bit Error Rate	> (-)
8. Signal Degraded	> (-)
9. Signal Label Mismatch	> (-)
10. V5 VC AIS	> (-)
11. Unequipped Signal Label	> (-)

>

Please select item <1 to 11>

ESC-prev. menu; !-main menu; &-exit

Figure 4-50. Multiple Severity Menu

Note

The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP 63E1: 63 ports (shown)
- OP-6384: 63 ports when set to E1 and 84 ports when set to T1
- OP-4256: 42 ports when set to E1 and 56 ports when set to T1
- OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

2. Select group of ports by selecting a port in the Enter First Port field (the first port in the group) and a port in the Enter Last Port field (the last port in the group).
3. For each alarm, select the severity (**Minor** or **Major**).

► **To configure default alarm settings:**

1. From the Alarm Configuration menu, choose **Default Alarm Settings**.

The Default Alarm Settings menu appears:

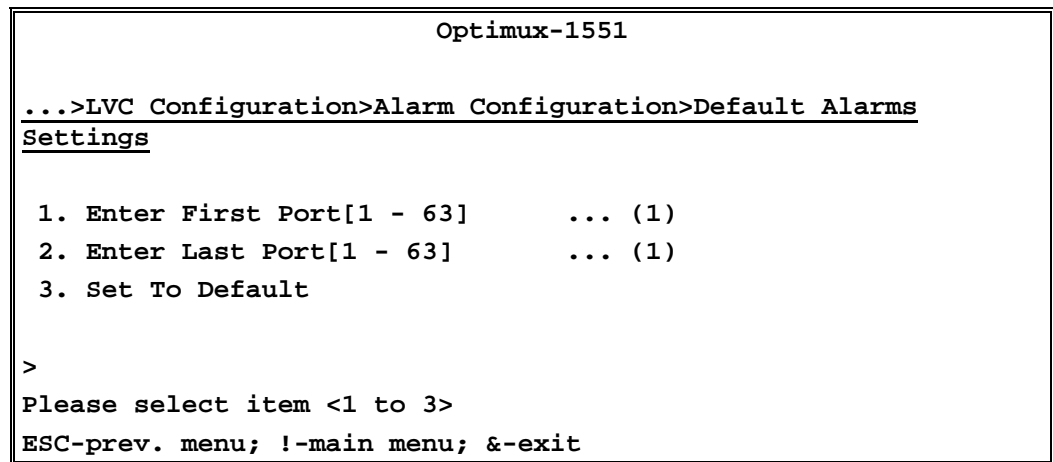


Figure 4-51. Default Alarm Settings Menu

Note

The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP 63E1: 63 ports (shown)
- OP-6384: 63 ports when set to E1 and 84 ports when set to T1
- OP-4256: 42 ports when set to E1 and 56 ports when set to T1
- OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

2. Select group of ports by selecting a port in the Enter **First Port** field (the first port in the group) and a port in the Enter **Last Port** field (the last port in the group). This is the group of ports to be configured with their default alarm settings.
3. To confirm the selection, select **Set to Default** and confirm by entering Y.

Monitoring Optimux-1551 Operation

The Optimux-1551 software enables display of system and port status and alarms. These menus are described in [Chapter 5](#).

Note

The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP 63E1: 63 ports (shown)
- OP-6384: 63 ports when set to E1 and 84 ports when set to T1
- OP-4256: 42 ports when set to E1 and 56 ports when set to T1
- OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

Configuring System Alarms

- To configure the system alarms:

1. From the System Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

```

Optimux-1551

Configuration>System Configuration>Alarm Configuration

1. System Alarms                [] >
2. Default Alarms Setting

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-52. Alarm Configuration Menu

- From the Alarm Configuration menu, choose **System Alarms**.

The System Alarms menu appears:

```

Optimux-1551

Configuration>System Configuration>Alarm Configuration>System
Alarms

Alarm Name                      Severity    Mask

1 Self test failure             Major      Off
2 Signal loss on station clock  Major      Off
3 Real time clock battery failure Major      Off
4 High temperature              Major      Off
5 Uplink redundancy not available Major      Off
6 Input alarm                   Minor      Off
7 Power supply A failure        Major      Off

1. Minor
2. Major

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit; ?-help

```

Figure 4-53. Alarm Systems Menu

- The alarms are described in [Chapter 5](#). For each alarm, select whether the **Severity** is **Major** or **Minor** and whether the Mask for that alarm is **On** or **Off**. If an alarm is masked then when the alarm occurs it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list.

4.2 Additional Tasks

Displaying an Inventory of the Optimux-1551

The Optimux-1551 inventory displays information on the functional blocks of the unit, according to RFC 2737 – Entity MIB.

Optimux-1551 consists of the following components:

- Chassis
- Uplink card (up to two cards) supporting one STS-3/OC-3/STM-1 uplink
- Power supply (up to two cards)
- Main OP-63E1/OP-6384/OP-2128/OP-4256 (access and control) card (up to two cards)
- Six 64-pin Telco connectors supporting up to 63 channels
- Fan
- Temperature sensor
- Management Ethernet port
- Terminal control port
- Alarm input port
- Monitor port
- Station clock (option)
- CPU.

➤ **To display an inventory of the Optimux-1551:**

1. From the Main menu, select **Inventory**.

The Inventory menu is displayed (shown in part below).

Optimux-1551			
<u>Inventory</u>			
	Index	Description	Class
1	1001	RAD.Optimux-155.Chassis	Chassis
2	3001	RAD.Optimux-155.Uplink Slot	Container
3	3002	RAD.Optimux-155.Uplink Slot	Container
4	3003	RAD.Optimux-155.PS Slot	Container
5	3004	RAD.Optimux-155.PS Slot	Container
6	3005	RAD.Optimux-155.Main Card Slot	Container
7	3006	RAD.Optimux-155.Main Card Slot	Container
8	4001	RAD.Optimux-155.PS	Power Supply
9	4002	RAD.Optimux-155.PS	Power Supply
>			
ESC-prev. menu; !-main menu; &-exit			

Figure 4-54. Inventory Menu

2. Scroll up/down and left right to view all the data. Move to editable fields by pressing **TAB**.

Configuring Date and Time

► To configure the system date and time:

1. From the System Configuration menu, choose **Date/Time**.

The Date/Time menu appears:

Optimux-1551	
<u>Configuration>System Configuration>Date/Time</u>	
1.	Set Date ... (2003-01-01)
2.	Set Time ... (00:00:00)
>	
Please select item <1 to 2>	
ESC-prev. menu; !-main menu; &-exit	

Figure 4-55. Date/Time Menu

2. Set the **Date**: (format is yyyy:mm:dd).
3. Set the **Time**: (format is hh:mm:ss).

Resetting the Unit

Optimux-1551 supports two types of reset:

- Reset parameters to their default settings

- Reset the entire unit (without resetting parameters).

Resetting the Parameters to their Factory Defaults

The reset to default can be done in either of two ways:

- All parameters back to default values
- All parameters back to default values except for management parameters (IP address, community, manager list, management access, management DCC, mask and default gateway).

Note

*The uplink **Link Type** parameter (page 4-19) is not affected by either type of factory reset:*

- *If the link type is SONET, the tributary line type default value will be DS1*
- *If the link type is SDH, the tributary line type default value will be E1.*

The same behavior applies for the station clock source:

- *If tributary line type is set to DS1, station clock input is set to DS1*
- *If tributary line type is set to E1, station clock input is set to E1.*

► To reset the unit to factory defaults:

1. From the System Configuration Menu, choose **Factory Default**.

The Factory Default menu appears:

```

Optimux-1551
Configuration>System Configuration>Factory Default
1. All
2. W/O MNG
>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-56. Factory Default Menu

2. From the Factory Default Menu, perform one the following steps:
 - Select **All** to include the management parameters in the reset.
 - Select **W/O MNG** to reset all parameters, except for the management parameters.

Optimux-1551 displays a confirmation request.

3. Type **Y** to confirm the reset.

Optimux-1551 sets the parameters to their factory defaults.

Resetting the Entire Unit

► To reset Optimux-1551:

1. From the System Configuration menu, select **Reset Device**.

Optimux-1551 displays a confirmation request.

2. Type **Y** to confirm the reset.

The unit switches to the backup OP-63E1/OP-6384/OP-2128/OP-4256 card and the former active OP-63E1/OP-6384/OP-2128/OP-4256 card resets itself. It takes about a minute for the reset, after which the former active OP-63E1/OP-6384/OP-2128/OP-4256 card is ready to function as the new backup card.

Configuring the Channels

- To configure the channel ports:

1. From the Physical Ports Configuration menu, choose **Channel Configuration**.

The Channel Configuration menu appears:

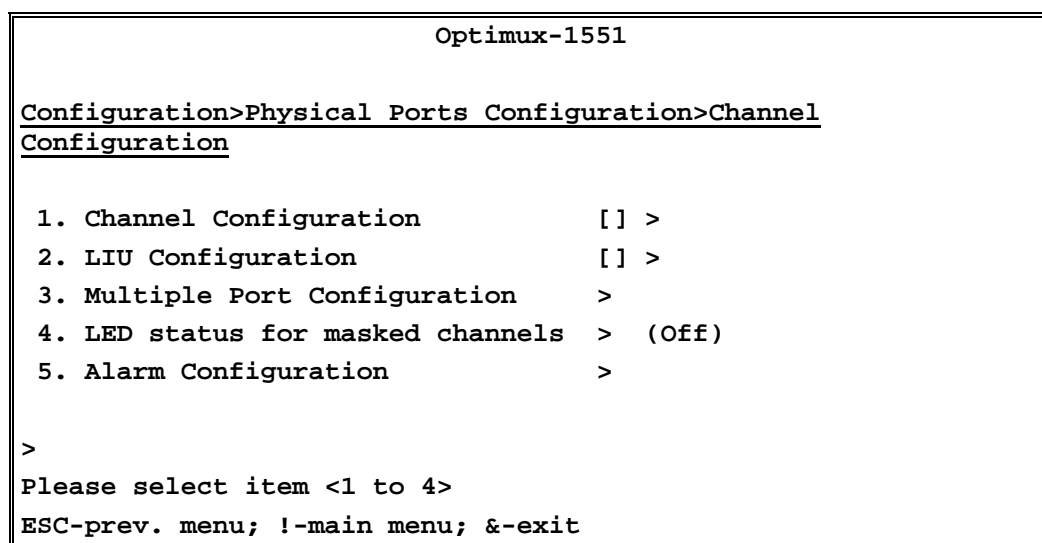


Figure 4-57. Channel Configuration Menu

2. From the Channel Configuration menu, choose **Channel Configuration**.

The Channel Configuration menu changes. If the **Line Type** is configured to E1, the menu is as follows:

```

Optimux-1551

...>Physical Ports Configuration>Channel Configuration>Channel
Configuration

Port          Port Description          Line Type      Channel Active
  1              E1              Yes
  2              E1              Yes
|  3              E1              Yes
v  4              E1              Yes
  5              E1              Yes

->>

1. Change cell          ... ( )

>

Channel Configuration Table

ESC-prev. menu; !-main menu; &-exit; ?-help

```

Figure 4-58. Channel Configuration Menu (E1)

If the **Line Type** is configured to DS1, the menu is as follows:

```

Optimux-1551

...>Physical Ports Configuration>Channel Configuration>Channel
Configuration

```

Port	Port Description	Line Type	DS1 Length
1		DS1	0 - 133 feet
2		DS1	0 - 133 feet
3		DS1	0 - 133 feet
v 4		DS1	0 - 133 feet
5		DS1	0 - 133 feet

```

->>

1. Change cell                ... ()

>
Channel Configuration Table
ESC-prev. menu; !-main menu; &-exit; ?-help

```

Figure 4-59. Channel Configuration Menu (DS1)

3. Use the navigation keys to move through the menu and edit fields.
4. Move the cursor to the selected **Port** row.
5. Move the cursor to the **Port description** column and enter a string up to 15 characters

6. Move the cursor to the **Line Type** column and choose **No** to mask the channel or **Yes** to keep the channel unmasked (transfer data).
7. Move the cursor to the **Line Type** column and choose **Low** or **High** priority. This setting affects the redundancy operation between the OP-63E1/OP-6384/OP-2128/OP-4256 cards: loss on a port that is configured **High** will cause immediate switching between the OP-63E1/OP-6384/OP-2128/OP-4256 cards (assuming that the new active card is functioning normally).
8. DS1 only: Move the cursor to the **DS1 Length** column and select a line length from one of the following values:
 - 0 - 133 feet (default)
 - 134 - 266 feet
 - 267 - 399 feet
 - 400 - 533 feet
 - 534 - 655 feet.

► To change the LIU line coding:

1. From the Channel Configuration menu, choose **LIU Configuration**.
2. The LIU Configuration menu appears. If the **Line Type** is configured to E1, the menu is as follows:

Optimux-1551			
<u>...>Physical Ports Configuration>Channel Configuration>LIU Configuration</u>			
LIU number	Line Type	Line Coding	Interface Type
LIU1 [Ports 1-7]	E1	HDB3	Balanced
LIU2 [Ports 8-14]	E1	HDB3	Balanced
LIU3 [Ports 15-21]	E1	HDB3	Balanced
v LIU4 [Ports 22-28]	E1	HDB3	Balanced
LIU5 [Ports 29-35]	E1	HDB3	Balanced
LIU6 [Ports 36-42]	E1	HDB3	Balanced
1. HDB3			
2. AMI			
>			
LIU Configuration Table			
>			
ESC-prev. menu; !-main menu; &-exit; ?-help			

Figure 4-60. LIU Configuration Menu (E1)

If the **Line Type** is configured to DS1, the menu is as follows:

Optimux-1551		
<u>...>Physical Ports Configuration>Channel Configuration>LIU Configuration</u>		
LIU number	Line Type	Line Coding
LIU1 [Ports 1-7]	DS1	B8ZS
LIU2 [Ports 8-14]	DS1	B8ZS
LIU3 [Ports 15-21]	DS1	B8ZS
LIU4 [Ports 22-28]	DS1	B8ZS
LIU5 [Ports 29-35]	DS1	B8ZS
LIU6 [Ports 36-42]	DS1	B8ZS
1. E1		
2. DS1		
>		
LIU Configuration Table		
>		
ESC-prev. menu; !-main menu; &-exit; ?-help		

Figure 4-61. LIU Configuration Menu (DS1)

Note

The LIU number that appears on Figure 4-60 and Figure 4-61 depends on the card that is installed. For example: For the OP-2128 card, only LIUs 1, 2, 3, 4 will appear on the screens.

- To change the **Line Type** for an LIU in the OP-6384, OP-2128 and OP-4256 cards, move the cursor to the appropriate column and select **E1** or **DS1** (default for OP-6384, OP-2128 and OP-4256 cards).

Note

A change in the **Line Type** does the following:

- Resets **Sniffing** to its default value
- Sets **Station Clock Source** to **Reference** if **Station Clock Type** is **External Channel**
- Clears all statistics.

For OP-63E1 card **Line Type** field is read-only with value **E1**.

- DS1 only: To change the **Line Coding** for an LIU, move the cursor to the appropriate column and select **B8ZS** (default) or **AMI**.
- E1 only: To change the **Line Coding** for an LIU, move the cursor to the appropriate column and select **HDB3** (default) or **AMI**.
- E1 only: To change the **Interface Type** for an LIU, move the cursor to the appropriate column and select **Balanced** (default) or **Unbalanced**.

Note

The **Interface Type** setting only changes the line impedance. When the **Interface Type** is set to **Unbalanced** external patch panels, the OP-A/ADAPTOR/21BNC needs to be attached to the product in order to enable the connection of a coax cable to the product.

► To configure the masking and priority for multiple ports:

1. From the Channel Configuration menu, choose **Multiple Port Configuration**.

The Multiple Port Configuration menu appears. If an OP-63E1 card is installed, the menu is as follows:

```

Optimux-1551

...>Physical Ports Configuration>Channel Configuration>Multiple
Port Configuration

1. Administrative Status    >
2. Channel Priority        >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-62. Multiple Port Configuration Menu (OP-63E1 Card Installed)

If an OP-84T1 card is installed, the menu is as follows:

```

Optimux-1551

...>Physical Ports Configuration>Channel Configuration>Multiple
Port Configuration

1. DS1 Length              >
2. Administrative Status    >
3. Channel Priority        >

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-63. Multiple Port Configuration Menu (OP-84T1 Card Installed)

Note

The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP 63E1: 63 ports (shown)
- OP-6384: 63 ports when set to E1 and 84 ports when set to T1
- OP-4256: 42 ports when set to E1 and 56 ports when set to T1
- OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

2. DS1 only: From the Multiple Port Configuration Menu, open the DS1 Length Menu and select the **First Port**, the **Last Port**, and the **DS1 Line Length**.
3. From the Multiple Port Configuration menu, open the Administrative Status menu and select the **First Port**, the **Last Port**, and the Administrative Status (Up or Down).

4. From the Multiple Port Configuration Menu, open the Channel Priority Menu and select the **First Port**, the **Last Port**, and the **Channel Priority Configuration (Low or High)**.

➤ **To set the LED status for masked channels:**

- From the Channel Configuration menu choose **LED Status for Masked Channels**.
 - **Off** - the channel SYNC LOSS/AIS LED is constantly off for all masked channels.
 - **Blinking (yellow)** - the channel SYNC LOSS/AIS yellow LED blinks for all masked channels.

➤ **To configure alarms:**

1. From the Channel Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

```

Optimux-1551

...>Physical Ports Configuration>Channel Configuration>Alarm
Configuration

1. Channel Alarms                [ ]>
2. Multiple Mask                 >
3. Multiple Severity             >
4. Default Alarms Setting        >

>
Please select item <1 to 4>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-64. Alarm Configuration Menu

2. From the Alarm Configuration menu, choose **Channel Alarms**.

The Channel Alarms menu appears:

Optimux-1551				
...>Channel Configuration>Alarm Configuration>Channel Alarms				
	Port	Alarm Name	Severity	Mask
1	1	LOS	Major	Off
2		AIS	Minor	Off
1. Change cell [1 - 63] ... (1) >				
>				
Please select item <1 to 1>				
ESC-prev. menu; !-main menu; &-exit; ?-help				

Figure 4-65. Channel Alarms Menu

3. Select a port by moving the cursor to the **Port** column and selecting **Change cell**.
4. Select severity for the port by moving the cursor to the **Severity** column and selecting **Major** or **Minor**.
5. If an alarm **Mask** is on, then when the alarm occurs, it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list. Choose **On** or **Off**.

► To configure the alarm masks for multiple channels:

1. From the Alarm Configuration menu, choose **Multiple Mask**.

The Multiple Mask Configuration menu appears:

Optimux-1551				
...>Channel Configuration>Alarm Configuration>Multiple Mask				
1. Enter First Port[1 - 63]	...	(1)		
2. Enter Last Port[1 - 63]	...	(1)		
3. LOS	>	(-)		
4. AIS	>	(-)		
>				
Please select item <1 to 4>				
ESC-prev. menu; !-main menu; &-exit				

Figure 4-66. Multiple Mask Configuration Menu

2. Select the **First Port**, the **Last Port**, and the **AIS** and **LOS** mask (**On** or **Off**).

Note The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP 63E1: 63 ports (shown)
- OP-6384: 63 ports when set to E1 and 84 ports when set to T1
- OP-4256: 42 ports when set to E1 and 56 ports when set to T1
- OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

► To configure the alarm severities for multiple channels:

1. From the Alarm Configuration menu, choose **Multiple Severity**.

The Multiple Severity menu appears:

Optimux-1551

...>Channel Configuration>Alarm Configuration>Multiple Severity

1. Enter First Port[1 - 63]	... (1)
2. Enter Last Port[1 - 63]	... (1)
3. LOS	> (-)
4. AIS	> (-)

>

Please select item <1 to 4>

ESC-prev. menu; !-main menu; &-exit

Figure 4-67. Multiple Severity Menu

2. For each alarm, select the **First Port**, the **Last Port**, and the **AIS** and **Loss** severity (**Major** or **Minor**).

Note The range of ports in the domain of menu choices 1 and 2 depends on the card used:

- OP 63E1: 63 ports (shown)
- OP-6384: 63 ports when set to E1 and 84 ports when set to T1
- OP-4256: 42 ports when set to E1 and 56 ports when set to T1
- OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

► To configure default channel alarm settings:

1. From the Alarm Configuration menu, choose **Alarm Configuration**.

The Alarm Configuration menu appears:

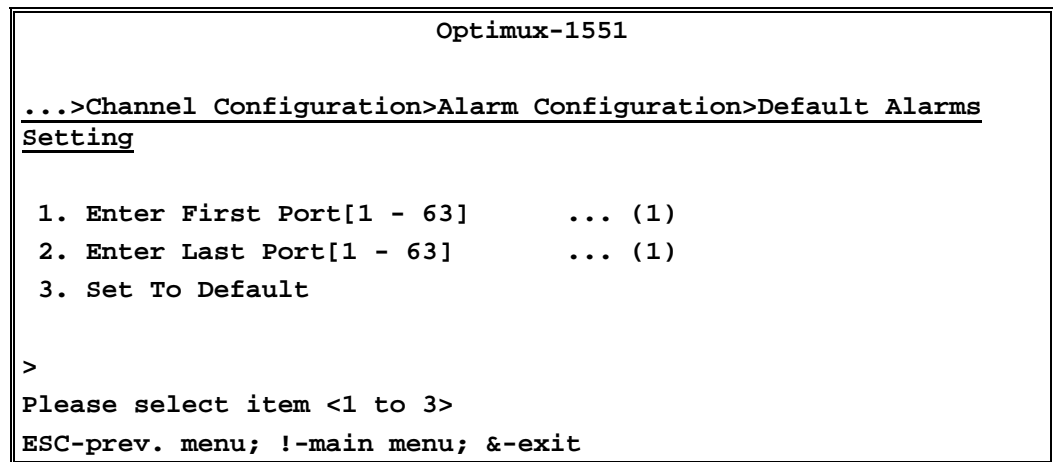


Figure 4-68. Default Alarms Setting Menu

2. Select the **First Port** and the **Last Port**.
3. Select **Set to Default** and enter **Y** to confirm.

Software Updates

Note

If a backup OP-63E1/OP-6384/OP-2128/OP-4256 (access and control) card is installed, then any software download should be done to both cards to maintain support for automatic redundancy.

This section presents procedures for installing new software releases on Optimux-1551, as well as swapping existing software versions (where a backup OP-63E1/OP-6384/OP-2128/OP-4256 card is installed).

The Optimux-1551 system software is stored in nonvolatile memory. There are two memory partitions (referred to as 0 and 1) in which to store a set of software files. The software is stored in compressed format. The active version is decompressed and loaded into the Optimux-1551 RAM upon power-up. The passive software is kept for the backup purposes. When performing any kind of download/upload, the TST LED blinks during the operation.

The user can select which partition is active and which serves as backup.

Each time that software is downloaded, it goes to the backup partition, which then becomes active. The previous active partition becomes backup (with its previous version of the software).

► To work with the software files on the Optimux-1551:

1. From the Main menu, choose **File Utilities**.

The File Utilities menu appears:

```

Optimux-1551

File Utilities

1. File System                >
2. S/W & File Transfer        >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-69. File Utilities Menu

2. Choose File System.

The File System menu appears:

```

Optimux-1551

File Utilities>File System

1. SW Files                   []
2. Swap SW Files

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-70. File System Menu

Viewing Software Status

- To view the status of the software:
 - Choose **SW Files** to view the current status of the memory partitions, including which partition is active and what software version it holds.

Swapping Active Software

- To swap the active software files on the Optimux-1551:
 1. To swap the software files on the partitions, select **Swap SW Files**.
Optimux-1551 displays a confirmation request.
 2. Type **Y** to confirm.

The swap is performed. The software that was active before the swap becomes the backup and the former backup software becomes active. Optimux-1551 is then reset automatically.

3. At this point redundancy is lost because the partitions on only one of the cards have been switched. Wait about a minute until "Redundancy Not Available" is displayed.
4. Repeat the software swapping procedure on the remaining card to regain redundancy.

Note

It is important to wait for the "Redundancy Not Available" message because it indicates that first card has come back up. If the software swap for the remaining card is done before that, service will be interrupted.

Downloading Software

New software releases are distributed on diskettes as ***.img** files, which can be downloaded to the local Optimux-1551 using the TFTP or XMODEM protocol.

Note

Once an active card has been updated with new software, and the unit has switched to the other card (was the backup card), there are two ways to update that other card:

- *Perform another download to the other card.*
 - *Select **Update SW Version** from the Main Card Redundancy menu (see [Figure 4-9](#)).*
-

During a download, the following occurs:

1. The backup software is erased (unless this is the first download, in which case there is no backup software yet).
2. The new software is downloaded to the partition that formerly held the backup software.
3. The unit resets itself (see [Resetting the Unit](#), page 4-44).
4. The new software is decompressed.
5. The new software becomes active.
6. The software that was active before the download becomes the backup.

If a failure occurs during downloading of the new software, the process is aborted (no reset is performed).

If a failure occurs during decompression of the new software, it is deleted and the software that was active before the download attempt remains active.

In both failure cases, only one software version remains in the flash memory (the software that was active before the download attempt).

➤ **To download software to the Optimux-1551:**

From the File Utilities menu, choose **S/W &File Transfer**.

The S/W &File Transfer menu appears:

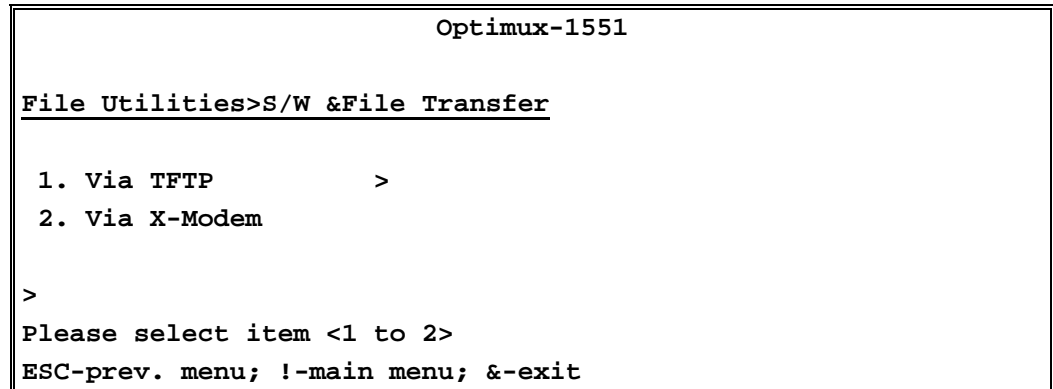


Figure 4-71. S/W & File Transfer Menu

Transferring Software via TFTP

➤ **To transfer software to/from the Optimux-1551 using TFTP protocol:**

Note

- In order to use TFTP, the unit's IP address must be configured.
- For best results, before using TFTP, configure the MNG-ETH port for full duplex (if supported by the network; see [Configuring the Ethernet Port](#), page 4-13).

1. Store the software distribution file on the TFTP server.
2. From the S/W &File Transfer menu, choose **Via TFTP** to download software using the TFTP protocol.

The Via TFTP Transfer menu appears:

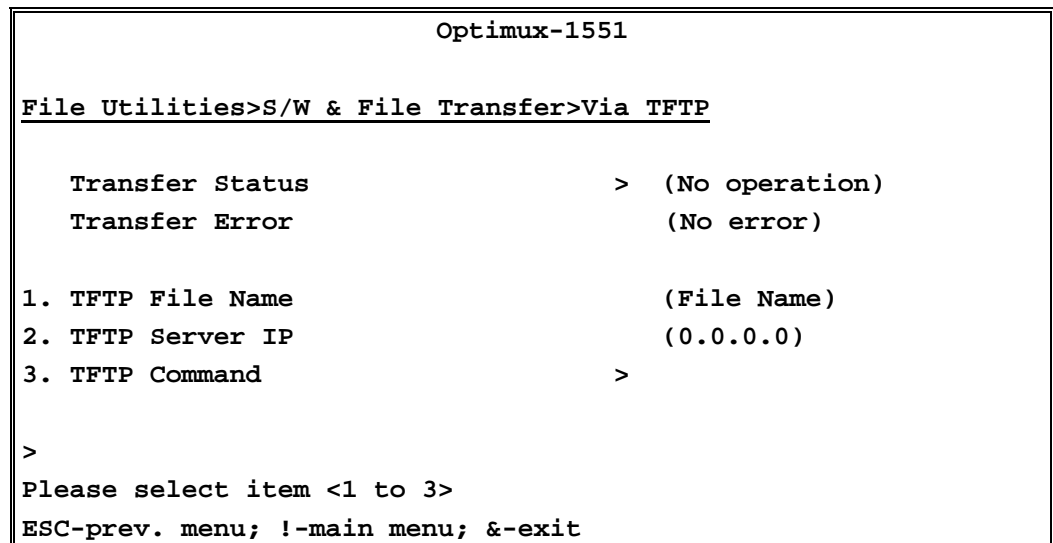


Figure 4-72. Via TFTP Transfer Menu

3. From the Via TFTP menu, perform the following steps:

1. Select **TFTP File Name** and enter the name of the software file (for example, **op1551.img**).
2. Select **TFTP IP Server** and enter the IP address of the TFTP server
4. From the Via TFTP Menu, select the **TFTP Command**. (This menu option is displayed only after the **TFTP File Name** and **TFTP IP Server** have been entered).

The TFTP Command menu appears:

```

Optimux-1551

File Utilities>S/W & File Transfer>Via TFTP>TFTP Command

1. Download User File
2. Upload User File

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 4-73. TFTP Command Menu

5. From the TFTP Command menu, select **Download User File** to start downloading file to Optimux-1551.

During the download, the **Transfer Status** is displayed. If the download fails, the **Transfer Error** that caused the failure is displayed (see [Table 4-1](#)).

Table 4-1. Transfer Errors

Error	Description	Error	Description
No error	No error	Error access	Access violation allocation
Error resources	Resources unavailable	Error disk full	Disk full or allocation exceeded
Error timeout	Timed out	Error illegal op	Illegal TFTP operation
Error use msg	Aborted by client request	Error bad tid	Unknown transfer ID
Error nofile	File not found	Error exists	File already exists
		Error no user	No such user

Optimux-1551 automatically erases the backup partition. Once the downloading is completed, Optimux-1551 saves the new release as an active partition; the former active partition becomes backup.

If the downloading is completed successfully, Optimux-1551 displays the download successful message.

Optimux-1551 saves the new release as an active partition. The former active partition becomes backup. Then the unit resets itself, which causes the new software to be loaded into the unit's RAM.

6. After downloading, the OP-63E1/OP-6384/OP-2128/OP-4256 card resets automatically and switch to the backup card (if available).

Transferring Software via X-Modem

► To download software to the Optimux-1551 via X-Modem protocol:

1. From the S/W &File Transfer menu, choose **Via X-Modem**.
2. Start the communication software.
3. Select XMODEM protocol.
4. Enter the name and path of the software distribution file to be downloaded.
5. Press Enter.

The new software version is loaded to the flash memory. Status messages appear in the bottom of the S/W &File Transfer menu.

6. After downloading, the OP-63E1/OP-6384/OP-2128/OP-4256 card resets automatically and switch to the backup card (if available).

Note

Downloading with XMODEM is unavailable through Telnet.

To minimize software download time, it is recommended to configure the Control port to the highest available data rate.

Note

Once an active card has been updated with new software, there are two ways to update the other (formerly the backup) card:

- *Perform another download to the other card.*
 - *Select **Update SW Version** from the Main Card Redundancy Menu (see [Figure 4-9](#)).*
-

Chapter 5

Configuring Typical Applications

This chapter gives detailed instructions for configuring Optimux-1551 units for typical point-to-point and fan-out connections.

A terminal can be used to configure a local Optimux-1551. However, to configure remote units, a Telnet, web, or SNMP application is required.

5.1 Configuring a Point-to-Point Application

Figure 5-1 illustrates a point-to-point connection extended by a pair of Optimux-1551 units.

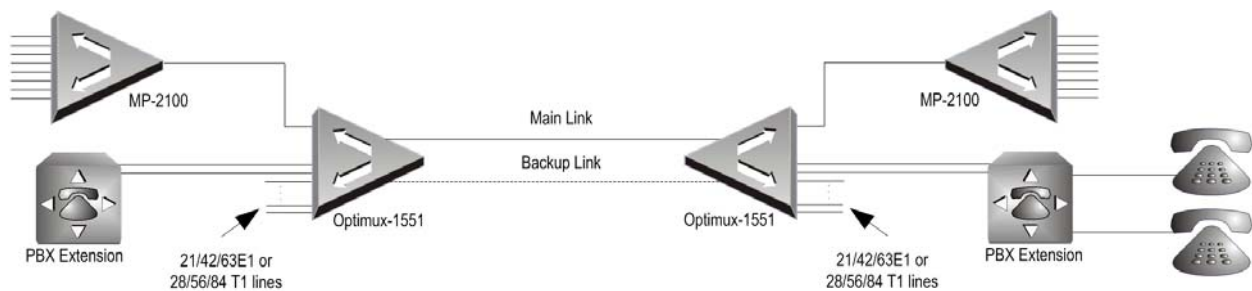


Figure 5-1. Point-to-Point Application

In most of the configuration procedure the same parameter values are used for both the Near End (NE) and Far End (FE) Optimux-1551 units. The exceptions are selecting the clock source and the IP address, both of which differ for the two units.

In this application example, the NE unit can be configured for an internal or external (requires optional station clock card) clock source and the FE unit for LBT clock source. The NE unit is connected to a LAN, thereby enabling remote management.

Note

The following procedure is first applied to the NE Optimux-1551. Then see step 16 for how to proceed with the FE unit.

➤ **To configure the Optimux-1551 system parameters:**

1. Configure an ASCII terminal to:

- 115.2 kbps*
- eight data bits*
- one stop bit
- VT100 emulation.
- one start bit*
- no parity
- no flow control

Note

** Rate, start bit, and data bit values do not have to have the values stated here: Optimux-1551 automatically detects the user-assigned values and configures itself to work with them.*

2. Connect a terminal application to the Control port of the NE Optimux-1551 unit.

The unit automatically configures itself to communicate with the terminal application and displays a password prompt.

3. Enter the password.

4. Select the Link Type: SONET or SDH (**Main Menu > Configuration > Physical Port Configuration > Uplink Configuration > Link Type**).

5. Perform SOH Configuration, HVC Configuration, and LVC Configuration (SDH only) according to the selected Link Type (**Main Menu > Configuration > Physical Port Configuration > Uplink Configuration**).

6. Configure the Channel Type: E1 or DS1 (**Main Menu > Configuration > Physical Port Configuration > Channel Configuration > LIU Configuration > Line Type**).

Note

The Channel Type value applies for all the channels.

7. Set channel Priority, Activity, and Length (Length parameter is not required for E1). This can be done for each channel individually or as a group (**Main Menu > Configuration > Physical Port Configuration > Channel Configuration > Multiple Port Configuration**).

8. Configure Uplink Redundancy parameters (**Main Menu > Configuration > System Configuration > Uplink Redundancy**).

9. Configure Main (OP-63E1/OP-6384/OP-2128/OP-4256) Card Redundancy parameters (**Main Menu > Configuration > System Configuration > Main Card Redundancy**).

10. Set Date and Time (**Main Menu > Configuration > System Configuration > Date/Time**).

11. Update Ethernet Port parameters according to the LAN configuration (**Main Menu > Configuration > System Configuration > Control Port > Ethernet Port**).

12. For the Serial Port, configure Mode, Parameters, and Dial Out Capability (**Main Menu > Configuration > System Configuration > Control Port > Serial Port**).

13. Configure the Management DCC parameters to create a management band between the NE and FE unit (**Main Menu > Configuration > Physical Port Configuration > Uplink Configuration > Management DCC**). The management

band serves to TELNET/web browser/MIB browser/RADview management sessions with the FE Optimux-1551.

14. On the NE unit, choose the appropriate timing mode: Internal, or External (requires optional Station Clock card) (**Main Menu > Configuration > System Configuration > Master Clock**).
15. Configure Management parameters (**Main Menu > Configuration > System Configuration > Management**) to prepare the NE unit for TELNET/web browser/MIB browser/RADview management sessions with the FE unit.
16. Repeat steps 1 to 14 for the FE Optimux-1551 unit, assigning it:
 - A far-end IP address
 - An LBT clock source.

5.2 Configuring a E1/DS1 Fan-Out for SONET/SDH Network Application

Figure 5-1 illustrates a E1/DS1 Fan-Out connection to a/an SONET/SDH network for an Optimux-1551 unit.

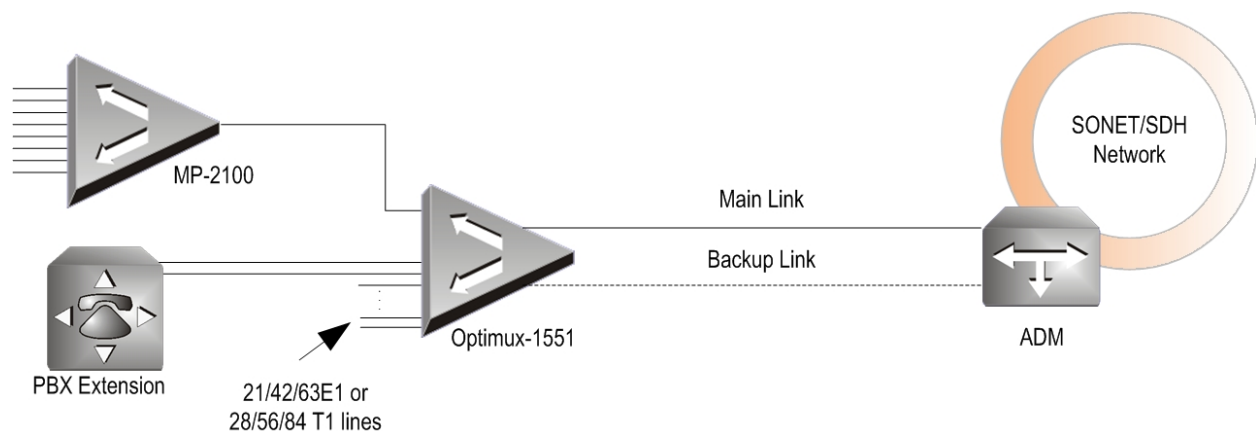


Figure 5-2. E1/DS1 Fan-Out for SONET/SDH Networks

► To configure the Optimux-1551 system parameters:

1. Configure an ASCII terminal to:
 - 115.2 kbps*
 - eight data bits*
 - one stop bit
 - VT100 emulation.
 - one start bit*
 - no parity
 - no flow control

Note

** Rate, start bit, and data bit values do not have to have the values stated here: Optimux-1551 automatically detects the user-assigned values and configures itself to work with them.*

2. Connect a terminal application to the Control port of the NE Optimux-1551 unit.

The unit automatically configures itself to communicate with the terminal application and displays a password prompt.

3. Enter the password.
4. Select the Link Type: SONET or SDH (**Main Menu > Configuration > Physical Port Configuration > Uplink Configuration > Link Type**).
5. Perform SOH Configuration, HVC Configuration, and LVC Configuration (SDH only) according to selected Link Type (**Main Menu > Configuration > Physical Port Configuration > Uplink Configuration**).
6. Configure the Channel Type: E1 or DS1 (**Main Menu > Configuration > Physical Port Configuration > Channel Configuration > Line Type**).

Note

The Channel Type value applies for all the channels.

7. Set channel Priority, Activity, and Length (Length parameter is not required for E1). This can be done for each channel individually or as a group (**Main Menu > Configuration > Physical Port Configuration > Channel Configuration > Multiple Port Configuration**).
8. Configure Uplink Redundancy parameters (**Main Menu > Configuration > System Configuration > Uplink Redundancy**).
9. Configure Main (OP-63E1/OP-6384/OP-2128/OP-4256) Card Redundancy parameters (**Main Menu > Configuration > System Configuration > Main Card Redundancy**).
10. Set Date and Time (**Main Menu > Configuration > System Configuration > Date/Time**).
11. Update Ethernet Port parameters according to the LAN configuration (**Main Menu > Configuration > System Configuration > Control Port > Ethernet Port**).
12. For the Serial Port, configure Mode, Parameters, and Dial Out Capability (**Main Menu > Configuration > System Configuration > Control Port > Serial Port**).
13. Select LBT timing mode (**Main Menu > Configuration > System Configuration > Master Clock**).

Note

LBT is the default timing mode.

14. Configure Management parameters (**Main Menu > Configuration > System Configuration > Management**) to prepare the unit for TELNET/web browser/MIB browser/RADview management sessions.

Chapter 6

Troubleshooting and Diagnostics

This chapter provides information on monitoring:

- Monitoring Performance
- Detecting Errors
- Handling Alarms
- Troubleshooting
- Testing the Optimux-1551
- Frequently Asked Questions
- Technical Support.

6.1 Monitoring Performance

Physical Port Statistics

Note *Only complete intervals are displayed in the statistic tables.*

Statistics collection is according to:

- RFC 3592 for the SONET/SDH uplink
- RFC 3895 for the E1/DS1 channels.

➤ **To monitor the physical port statistics:**

1. From the Main menu, select **Monitoring**.
2. From the Monitoring menu, select **Physical Port Monitoring**.
3. From the Physical Port Monitoring menu, choose **Physical Port Statistics**.

The Physical Port Statistics menu appears:

```

Optimux-1551

Monitoring>Physical Port Monitoring>Physical Port Statistics

1. Uplink Statistics                >
2. Channel Statistics              >
3. Clear All Statistics

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-1. Physical Port Statistics Menu

Clearing Statistics

Interval statistics (which are logged for up to the past 24 hours) can be cleared for just tributaries (see [Figure 6-12, Tributary Statistics Menu](#)), just channels (see [Figure 6-16, Channel Statistics Menu](#)) or for all the ports.

➤ To clear interval statistics for all ports:

- From the Physical Port Statistics menu, choose **Clear All Statistics** and confirm by entering Y.

This will clear all the statistics buffers.

Uplink Statistics

Detailed SOH performance statistics are available for the current 15 minute interval or for all 15-minute intervals for the last 24 hour period.

➤ To display the current uplink port SOH statistics:

- From the Physical Port Statistics menu, choose **Uplink Statistics**.

The Uplink Statistics menu appears:

```

Optimux-1551

...>Physical Port Monitoring>Physical Port Statistics>Uplink
Statistics

1. Link Statistics                >
2. Tributary Statistics          >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-2. Uplink Statistics Menu

2. From the Uplink Statistics menu, choose **Link Statistics**.

The Link Statistics menu appears:

```
Optimux-1551
...>Physical Port Monitoring>Physical Port Statistics>Uplink
Statistics>Link Statistics

1. Current Statistics          >
2. Interval Statistics        >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit
```

Figure 6-3. Link Statistics Menu

3. From the Link Statistics menu, choose **Current Statistics**.

The Current Statistics menu appears:

```
Optimux-1551
...>Uplink Statistics>Link Statistics>Current Statistics

1. SOH Statistics            >
2. HVC Statistics            >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit
```

Figure 6-4. Current Statistics Menu

4. From the Current Statistics menu, choose **SOH Statistics**.

The (current) SOH Statistics screen is displayed:

Optimux-1551			
<u>...>Uplink Statistics>Link Statistics>Current Statistics>SOH Statistics</u>			
Time Elapsed	... (6)	Line ES	... (6)
LOS Link A	... (0)	Line SES	... (3)
LOS Link B	... (0)	Line UAS	... (0)
Section ES	... (6)	Line CV	... (7)
Section SES	... (6)	Line Status	> (RDI)
Section SEFS	... (4)	Far End Line ES	... (6)
Section CV	... (6)	Far End Line SES	... (2)
Section Status	> (No Defect)	Far End Line UAS	... (0)
>			
ESC-prev. menu; !-main menu; &-exit			

Figure 6-5. SOH Statistics Screen

5. Refer to [Table 6-1](#) for a complete description of the details in the SOH screen.

Table 6-1. SOH Statistics

Display	Description	Range [15 min]
Time Elapsed	Seconds elapsed in current interval.	0 – 899
LOS Link A	Number of seconds that Loss of Signal errors occurred on uplink A during the current interval.	0 – 900
LOS Link B	Number of seconds that Loss of Signal errors occurred on uplink B during the current interval.	0 – 900
Section CV	Number of Coding Violations (B1) that occurred during the current interval.	
Section ES	Number of Errored Seconds that occurred during the current interval. A Section Errored Second is a second that contains one or more B1 BIP-8 errors or during which at least one or more incoming defects at that layer (LOS, LOF) has occurred.	0 – 900
Section SES	Number of Severely Errored Seconds that occurred during the current interval. A Section Severely Errored Second is a second that contains more than 16 B1 BIP-8 errors or during which at least one or more incoming defects at that layer (LOS, LOF) has occurred.	0 – 900

Table 6-1. SOH Statistics (Cont.)

Display	Description	Range [15 min]
Section SEFS	Number of Severely Errored Frame Seconds that occurred during the current interval. This counter is incremented by one for each second containing LOF defect.	0 – 900
Section Status		No detect, LOS, LOF
Line CV	Number of Line Coding Violations (B2) that occurred during the current interval. Line CV is not counted during line UAS.	
Line ES	Number of Line Errored Seconds that occurred during the current interval. A Line Errored second is a second that contains one or more B2 BIP-8 errors or during which at least one or more incoming defects at that layer (Line AIS) has occurred. Line ES is not counted during Line UAS.	0 - 900
Line SES	Number of Line Severely Errored Seconds that occurred during the current interval. A Line Severely Errored second is a second that contains more than 32 B2 BIP-8 errors or during which at least one or more incoming defects at that layer (Line AIS) has occurred. Line SES is not counted during Line UAS.	0 – 900
Line UAS	Number of Line Unavailable Seconds that occurred during the current interval. The line becomes unavailable if 10 contiguous Line SES appear. The 10 Line SES are included in the Line UAS time. The line becomes available after 10 contiguous seconds without Line SES. The 10 seconds without Line SES are excluded from the Line UAS.	0 - 900
Far End Line ES	Number of Errored Seconds that occurred during the current interval. A Far End Line Errored second is a second that contains one or more Line REI or during which at least one or more incoming defects at that layer (Line RD) has occurred. Far End Line ES is not counted during Far End Line UAS.	0 – 900
Line Status		No detect, AIS, RDI
Far End Line SES	Number of Far End Line Severely Errored Seconds that occurred during the current interval. A Far End Line Severely Errored second is a second that contains more than 32 Line REI errors or during which at least one or more incoming defects at that layer (Line RDI) has occurred. Far End Line SES is not counted during Far End Line UAS.	0 – 900

Table 6-1. SOH Statistics (Cont.)

Display	Description	Range [15 min]
Far End Line UAS	<p>Number of Far End Line Unavailable Seconds that occurred during the current interval.</p> <p>The far end line becomes unavailable if 10 contiguous Far End Line SES appear. The 10 Far End Line SES are included in the Far End Line UAS time. The far end line becomes available if 10 contiguous seconds are with no Far End Line SES. The 10 seconds with no Far End Line SES are excluded from the Far End Line UAS.</p>	0 - 900

➤ To display the current HVC statistics:

1. From the Current Statistics menu, choose **HVC Statistics**.

The (current) HVC Statistics screen appears. For a SONET uplink the menu is as follows:

```

Optimux-1551

...>Uplink Statistics>Link Statistics>Current Statistics>HVC
Statistics

Time Elapsed          (31)          Path CV          ... (960)
Path ES                ... (0)          Far End Path ES    ... (0)
Path SES               ... (0)          Far End Path SES    ... (0)
Path UAS               ... (14)         Far End Path UAS    ... (15)
Path Status            >  (No Defect)

1. Current Path        >  (HVC 1)
>
Please select item <1 to 1>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-6. HVC Statistics Menu for a SONET Uplink

For an SDH uplink the menu is as follows:

```

Optimux-1551

...>Uplink Statistics>Link Statistics>Current Statistics>HVC
Statistics

Time Elapsed          (0)      Path CV                . (0)
Path ES                ... (0)   Far End Path ES        . (0)
Path SES               ... (0)   Far End Path SES       .. (0)
Path UAS               ... (0)   Far End Path UAS       .. (0)
Path Status            >  (No Defect)

>
Please select item <1 to 1>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-7. HVC Statistics Screen for an SDH Uplink

2. SONET only: Choose **Current Path** from the HVC Statistics menu:

- HVC 1
- HVC 2
- HVC 3.

Note

See lists of E1/DS1 path mapping in [Multiplexing and Mapping](#).

3. Refer to [Table 6-2](#) for details on the HVC Statistic Parameters.

Table 6-2. HVC Statistic Parameters

Display	Description	Range [15 min]
Time Elapsed	Seconds elapsed in current interval.	0 - 899
Path CV	Number of Path Coding Violations (B3) that occurred during the current interval.	
Path ES	Number of Path Errored Seconds that occurred during the current interval. A Path Errored second is a second that contains one or more B3 BIP-8 errors or during which at least one or more incoming defects at that layer (Path AIS, LOP) has occurred.	0 - 900
Path SES	Number of path Severely Errored Seconds that occurred during the current interval. Path Severely Errored second is a second which contains more than 16 B3 BIP-8 errors, or a second during which at least one or more incoming defects at that layer (Path AIS, LOP) has occurred.	0 - 900
Path UAS	Number of path Unavailable Seconds that occurred during the current interval. The path becomes unavailable if 10 contiguous Path SES appears. The 10 Path SES are included in the Path UAS time. The path becomes available if 10 contiguous seconds are with no Path SES. The 10 seconds with no Path SES are excluded from the Path UAS.	0 - 900
Path Status		No defect, LOP, AIS, RDI, Unequipped, Signal Label Mismatch
Far End Path ES	Number of far end path Errored Seconds occurred during the current interval. Far End Path Errored second is a second, which contains one or more Path REI, or a second during which at least one or more incoming defects at that layer (Path RDI) has occurred. Far End Path ES is not counted during Far End Path UAS.	0 - 900
Far End Path SES	Number of far end path Severely Errored Seconds that occurred during the current interval. Far End Path Severely Errored second is a second, which contains more than 16 Path REI errors, or a second during which at least one or more incoming defects at that layer (Path RDI) has occurred. Far End Path SES is not counted during Far End Path UAS.	0 - 900
Far End Path UAS	Number of far end path Unavailable Seconds that occurred during the current interval. The far end path becomes unavailable if 10 contiguous Far End Path SES appears. The 10 Far End Path SES are included in the Far End Path UAS time. The far end path becomes available if 10 contiguous seconds are with no Far End Path SES. The 10 seconds with no Far End Path SES are excluded from the Far End Path UAS.	0 - 900

► To display SOH statistics of up to the last 24 hours:

1. From the Link Statistics menu, choose **Interval Statistics**.

The Interval Statistics menu appears:

```

Optimux-1551

...>Uplink Statistics>Link Statistics>Interval Statistics

1. SOH Interval Statistics      []
2. HVC Interval Statistics     []>

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-8. Interval Statistics Menu

2. From the Interval Statistics menu, choose **SOH Interval Statistics**.

The SOH Interval Statistics screen appears (the menu does not fit in a single screen):

Optimux-1551					
...>Uplink Statistics>Link Statistics>Interval Statistics>SOH Interval Statistics					
Interval	LOS A	LOS B	Section ES	Section SES	Section SEFS
1	4	0	10	10	6
2	5	0	10	9	6
3	7	0	10	6	9
4	2	0	10	7	9
5	6	0	10	10	6
6	5	0	10	10	9
7	6	0	10	10	9
8	4	0	10	9	9
9	3	0	10	8	9
->>					

Figure 6-9. SOH Internal Statistics Screen

3. Use the menu navigation keys described in [Chapter 4](#).
4. Refer to [Table 6-1](#) for details on SOH statistics.

► To display the HVC statistics of up to the last 24 hours:

1. From the Interval Statistics menu, choose **HVC Interval Statistics**.

The HVC Interval Statistics menu appears. For a SONET uplink the menu is as follows:

Optimux-1551				
<u>...>Uplink Statistics>Link Statistics>Interval Statistics>HVC Interval Statistics</u>				
Path	Interval	Path ES	Path SES	Path UAS
HVC 1	1	0	10	14
1. HVC 1				
2. HVC 2				
3. HVC 3				
->>				
HVC Interval Statistics Table				
ESC-prev. menu; !-main menu; &-exit; ?-help				

Figure 6-10. HVC Internal Statistics Menu for a SONET Uplink

For an SDH uplink the menu is as follows:

Optimux-1551						
<u>...>Uplink Statistics>Link Statistics>Interval Statistics>HVC Interval Statistics</u>						
Interval	Path ES	Path SES	Path UAS	Path CV	Far End	Path ES
1	4	0	10	10	6	9
2	5	0	10	9	6	9
3	7	0	10	6	9	10
4	2	0	10	7	9	10
5	6	0	10	10	6	9
6	5	0	10	10	9	10
7	6	0	10	10	9	10
8	4	0	10	9	9	10
9	3	0	10	8	9	10
->>						

Figure 6-11. HVC Internal Statistics Menu for an SDH Uplink

Note

See lists of E1/DS1 path mapping in [Chapter 1](#).

2. Use the menu navigation keys described in [Chapter 4](#).
3. Refer to [Table 6-2](#) for details on HVC statistics parameters.

► To display current tributary statistics:

1. From the Physical Port Statistics menu, select **Uplink Statistics**.

The Uplink Statistics menu appears.

2. From the Uplink Statistics menu, select **Tributary Statistics**.

The Tributary Statistics menu appears.

```

Optimux-1551

...>Physical Port Statistics>Uplink Statistics>Tributary
Statistics

1. Current Statistics                                >
2. Interval Statistics                             [ ] >
3. Clear Tributary Statistics                        >

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-12. Tributary Statistics Menu

3. From the Tributary Statistics menu, choose **Current Statistics**.

The Current Statistics menu appears:

```

Optimux-1551

...>Uplink Statistics>Tributary Statistics>Current Statistics

Time Elapsed                                (6)
VT ES                                       ... (0)
VT SES                                    ... (0)
VT UAS                                    ... (6)
VT CV                                     ... (6)
VT Status                                  > (Signal Label Mismatch)
Far End VT ES                             ... (0)
Far End VT SES                            ... (0)
Far End VT UAS                             ... (6)

1. Current Port [1 - 63]                   ... (1)

>
Please select item <1 to 1>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-13. Current Statistics Menu

4. Select a port by choosing **Current Port** and typing the port number.
5. Refer to [Table 6-3](#) for the description of the LVC statistics parameters.

Table 6-3. LVC Statistic Parameters

Display	Description	Range [15 min]
Time Elapsed	Seconds elapsed in current interval.	0 – 899
VT CV	Number of Path Coding Violation (V5) seconds that occurred during the current interval.	
VT ES	Number of VT Errored Seconds that occurred during the current interval. A VT Errored Second is a second that contains one or more B3 errors or a second in which one or more incoming defects at that layer (VT AIS, LOP) has occurred.	0 - 900
VT SES	Number of VT Severely Errored Seconds that occurred during the current interval. A VT Severely Errored Second is a second that contains more than six B3 errors or a second in which one or more incoming defects at that layer (VT AIS, LOP) has occurred.	0 - 900
VT UAS	Number of VT Unavailable Seconds that occurred during the current interval. The VT becomes unavailable if 10 contiguous VT SES appear. The 10 VT SES are included in the VT UAS time. The VT becomes available if 10 contiguous seconds pass with no VT SES. The 10 seconds with no VT SES are excluded from the VT UAS.	0 – 900
VT Status		No defect, LOP, AIS, RDI, RFI (only in SDH), Unequipped, Signal label mismatch.
Far End VT ES	Number of Far End VT Errored Seconds that occurred during the current interval. A Far End VT Errored Second is a second that contains one or more VT REI or a second in which one or more incoming defects at that layer (VT RDI) has occurred. Far End VT ES are not counted during Far End VT UAS.	0 – 900
Far End VT SES	Number of Far End VT Severely Errored Seconds that occurred during the current interval. A Far End VT Severely Errored Second is a second that contains more than six VT REI errors or a second in which at least one or more incoming defects at that layer (VT RDI) has occurred. Far End VT SES are not counted during Far End VT UAS.	0 – 900

Table 6-3. LVC Statistic Parameters (Cont.)

Display	Description	Range [15 min]
Far End VT UAS	Number of Far End VT Unavailable Seconds that occurred during the current interval. The Far End VT becomes unavailable if 10 contiguous Far End VT SES occur. The 10 Far End VT SES are included in the Far End VT UAS time. The Far End VT becomes available if 10 contiguous seconds pass with no Far End VT SES. The 10 seconds with no Far End VT SES are excluded from the Far End VT UAS.	0 – 900

➤ To display the tributary statistics for up to the past 24 hours:

1. From the Tributary Statistics menu, choose **Interval Tributary Statistics**.

The Interval Statistics menu appears:

Optimux-1551									
...>Uplink Statistics>Tributary Statistics>Interval Statistics									
Port	Interval	VT ES	VT SES	VT UAS	VT CV	FEVT ES	FEVT SES	FEVT UAS	
1	1	0	10	10	6	9	10	5	
	2	0	10	9	6	9	10	5	
	3	0	10	6	9	10	4	4	
	4	0	10	7	9	10	4	4	
	5	0	10	10	6	9	10	5	
	6	0	10	10	9	10	4	4	
	7	0	10	10	9	10	4	4	
	8	0	10	9	9	10	4	4	
	9	0	10	8	9	10	4	4	
1. Change cell [1 - 63] ... (1)									
>									
LVC Interval Statistics Table									
ESC-prev. menu; !-main menu; &-exit									

Figure 6-14. Interval Statistics Screen

2. Use the menu navigation keys described in [Chapter 4](#).
3. Select a port by choosing **Change Cell** and entering the port number.

➤ To clear the tributary statistics:

1. From the Tributary Statistics menu, choose **Clear Tributary Statistics**.

The Clear Interval Statistics menu appears:

```

Optimux-1551

...>Uplink Statistics>Tributary Statistics>Clear Tributary
Statistics

1. Enter First Port [1 - 63]    ... (1)
2. Enter Last Port [1 - 63]    ... (1)
3. Clear Statistics

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-15. Clear Tributary Statistics Menu

Note

The range of ports depends on the card used:

- For the OP 63E1: 63 ports (shown)
- For the OP-6384: 84 ports
- For the OP-2128: 28 ports
- For the OP-4256: 56 ports.

2. Enter a range by specifying the **First Port** and the **Last Port**.
3. Select **Clear Statistics** to clear the tributary statistics and confirm by entering Y.

Channel Statistics

➤ To display the current channel statistics:

1. From the Physical Port Statistics menu, choose **Channel Statistics**.

The Channel Statistics menu appears:

```

Optimux-1551

...>Physical Port Monitoring>Physical Port Statistics>Channel
Statistics

1. Current Statistics           >
2. Interval Statistics         [ ] >
3. Total Interval Statistics   >
4. Clear Statistics            >

>
Please select item <1 to 4>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-16. Channel Statistics Menu

2. From the Channel Statistics menu, choose **Current Statistics**.

The Current Statistics screen appears:

```

Optimux-1551

...>Physical Port Statistics>Channel Statistics>Current
Statistics

Time Elapsed                (120)
SES                        (0)
UAS                        (0)
BPV                        ... (0)

1. Current Port [1 - 63]    ... (1)
>
Please select item <1 to 1>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-17. Current Statistics Screen

3. Select a port by choosing **Change Cell** and entering the port number.
4. Refer to [Table 6-4](#) for details on the E1/DS1 channel statistics.

Table 6-4. E1/DS1 Channel Statistics

Display	Description	Range [15 min]
Time Elapsed	Seconds elapsed in current interval.	0 – 899
BPV	Number of Bipolar Violations that occurred during the current interval.	
SES	Number of Severely Errored Seconds that occurred during the current interval. A Severely Errored Second is a second containing more than 2048 BPV errors for E1 or 1544 BPV for DS1.	0 - 900
UAS	Number of Unavailable Seconds that occurred during the current interval. The channel becomes unavailable if 10 contiguous SES occur or at least one or more incoming defects (Channel AIS, Channel LOS) occurred in the past second. The 10 SES are included in the UAS time. The channel becomes available if 10 contiguous seconds are with no SES or if a second goes by without any more incoming defects. The 10 seconds with no SES are excluded from the UAS.	0 – 900

➤ **To display the interval statistics:**

1. From the Channel Statistics menu, choose **Interval Statistics**.

The Interval Statistics menu appears:

```

Optimux-1551

...>Physical Port Statistics>Channel Statistics>Interval
Statistics

```

Port	Interval	SES	UAS	BPV
1 v	1	4	10	9
	2	0	19	9
	3	7	12	9
	4	0	10	9
	5	0	10	9
	6	0	10	1
	7	0	10	3
	8	4	10	1
	9	3	0	9

```

1. Change cell [1 - 63]          ... (1)

>
LVC Interval Statistics Table
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-18. Internal Statistics Menu

2. Select a port by choosing **Change Cell** and entering the port number.

► To display the total interval statistics for a channel:

1. From the Channel Statistics menu, choose **Total Interval Statistics**.

The Total Interval Statistics menu appears:

Optimux-1551	
<u>...>Physical Port Statistics>Channel Statistics>Total Interval Statistics</u>	
Number of intervals	(1)
Total SES	(0)
Total UAS	(0)
Total BPV	... (0)
1. Current Port [1 - 63]	... (1)
>	
Total Interval Statistics Table	
ESC-prev. menu; !-main menu; &-exit	

Figure 6-19. Total Interval Statistics Menu

Note *The range of ports depends on the card used:*

- For the OP 63E1: 63 ports (shown)
- For the OP-6384: 84 ports
- For the OP-2128: 28 ports
- For the OP-4256: 56 ports.

2. Select a port by choosing **Change Cell** and entering the port number.

➤ **To clear statistics for one or more channels:**

1. From the Physical Statistics menu, choose **Clear Statistics**.

The Clear Statistics menu appears:

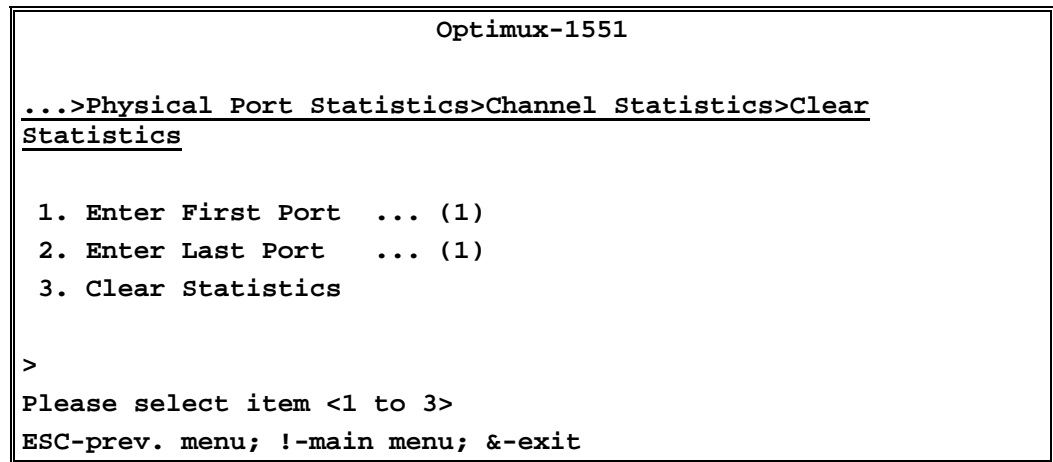


Figure 6-20. Clear Statistics Menu

Note *The range of ports depends on the card used:*

- For the OP 63E1: 63 ports (shown)
- For the OP-6384: 84 ports
- For the OP-2128: 28 ports
- For the OP-4256: 56 ports.

2. Select a group of ports by choosing the **First Port** in the group and the **Last Port** in the group.

3. Select **Clear Statistics** to clear the channel statistics for the selected group and confirm by entering **Y**.

➤ **To clear all physical port statistics:**

From the Physical Port Statistics menu, choose **Clear All Statistics** and confirm by entering **Y**.

6.2 Detecting Errors

Power-Up-Self-Test

Optimux-1551 performs hardware self-test upon power-on. The self-test sequence checks the critical circuit functions of Optimux-1551. If Optimux-1551 fails the self-test, the self-test failure alarm is stored in the alarm buffer and the FLT indicator turns red. In the System Status menu you can see what went wrong in the hardware status field.

If two OP-63E1/OP-6384/OP-2128/OP-4256 cards are installed, each card periodically performs a self-test on its components and sends the results to the other card. If the following three conditions hold, the unit will switch to the backup card:

- The self-test on the active card detects a problem
- Redundancy mode is set to automatic
- The self-test on the backup card detects no problem or a less serious problem.

System Log File

Optimux-1551 maintains alarm log files for alarms and events. The file stores up to 200 alarm messages. The log file specifies source, alarm or event name, status (major, minor, or OFF), and time and date when the alarm was initiated. An "OFF" status indicates that the fault condition that caused the alarm is cleared.

➤ **To display the system log file:**

1. From the System Monitoring menu, choose **System Log File**.

The System Log File screen appears. For a SONET uplink, the screen is as follows:

Optimux-1551					
<u>Monitoring>System Monitoring>System Log File</u>					
	Source	Alarm	Status	Time	Date
^	137 HVC 1	Far End Receive Fail (ROI)	Minor	2:1:13	2002-9-9
	138 HVC 1	Unequipped Signal Label	Minor	5:17:11	2002-9-8
	139 LVC 1	Unequipped Signal Label	Major	1:19:13	2002-9-7
v	140 LVC 1	Unequipped Signal Label	Major	6:19:13	2002-9-6
	141 LVC 1	Unequipped Signal Label	Minor	8:19:13	2002-9-5
	142 LVC 1	Unequipped Signal Label	Minor	5:19:13	2002-9-4
	143 LVC 1	Unequipped Signal Label	Major	7:19:13	2002-9-3
	144 LVC 1	Unequipped Signal Label	Major	5:19:13	2002-9-2
	145 LVC 1	Unequipped Signal Label	Major	5:19:13	2002-9-1
>					
ESC-prev. menu; !-main menu; &-exit; ^D-down; ^G-start					

Figure 6-21. System Log File Screen for a SONET Uplink

For an SDH uplink, the menu is as follows:

Optimux-1551					
<u>Monitoring>System Monitoring>System Log File</u>					
	Source	Alarm	Status	Time	Date
1	SOH	Line AIS occurred	OFF	2:1:13	2002-9-9
2	HVC	Loss Of Pointer	OFF	5:17:11	2002-9-8
3	HVC	Far End Receive Fail	OFF	5:19:13	2002-9-7
4	Device	Input Alarm	Minor	9:1:14	2002-9-6
5	LVC2	Signal Label Mismatch	Major	13:34:14	2002-9-5
6	LVC60	Unequipped Signal Label	OFF	15:41:12	2002-9-4
7	CH15	LOS	OFF	16:22:14	2002-10-3
8	CH45	AIS	Minor	22:3:14	2002-11-1
9	Event	Buffer Overflow	Minor	23:41:14	2002-12-1
>					
ESC-prev. menu; !-main menu; &-exit; ^D-down; ^G-start					

Figure 6-22. System Log File Menu for an SDH Uplink

2. Refer to [Table 6-6](#) and [Table 6-5](#) for descriptions of alarms and events respectively.

Table 6-5. System Events

Terminal Message	Description
Password changed	User changed password
Software download	The unit is performing software download
Software download fail	Software download failed
Log file buffer overflow	Log file is full – next entry will replace the oldest entry
Primary call fail	Call attempt to the primary dial-out number failed.
Alternate call fail	Call attempt to the alternate dial-out number failed.
Dial call fail	Current cycle of call attempts, both to primary and alternate number failed.
Uplink changed	Change in the actual uplink because of redundancy between the two uplinks.
Main card changed	Change in the actual OP-63E1/OP-6384/OP-2128/OP-4256 card because of redundancy between the two uplinks.
LOS defect	Loss of signal detected on uplink.
LOF defect	Loss of frame detected on uplink.
L-AIS defect	Line AIS detected on uplink.
B2 EED defect	B2 parity errors threshold exceeded.
Far end device event	Received burst of B2 errors due to change in remote device.
Link type change event	User changed link type (SDH to SONET or vice versa).

➤ **To clear the system log file:**

- From the System Monitoring menu, choose **Clear Log File**. Confirm by pressing **Y**.

6.3 Handling Alarms

Alarms and Events

Optimux-1551 reports about events and about two types of alarms: major and minor. Events are changes in state, while alarms are caused by fault conditions that can be changed or terminated. The following types of events and alarms are reported: system, SOH, HVC, tributary (LVC), and channel.

Each type of alarm (major and minor) activates a LED and a dry contact alarm relay. Events do not activate LEDs or alarm relays.

Optimux-1551 maintains a log file for up to 200 event and alarm entries.

When a fault condition becomes true, an "alarm on" entry is added to both the relevant alarm menu and the log file. The condition also activates the corresponding MAJ (major) or MIN (minor) relay and LED. When the fault condition that caused the alarm is cleared, the alarm is removed from the alarm menu, and an "alarm off" entry is added to the log file. The log file preserves a history of the unit's operation, maintaining both the record of when a fault occurred and when it ceased.

If an alarm is masked, then when the alarm occurs it is not entered in the log file, a trap is not sent, and the alarm relays are not affected. However, the alarm still appears in the active alarm list.

An alarm cutoff (ACO) button is located on the back panel. Once pressed, the dry contact is disengaged and remains so until a new alarm of the same type occurs.

Optimux-1551 also supports external alarm input via the Alarms connector.

The user can configure each alarm's severity (major, minor or none). See [Chapter 4](#).

Note

In the alarm menus, only (currently) active alarms are displayed.

The Optimux-1551 software enables display of system and port information. This section describes only status information of the Optimux-1551 device.

➤ **To monitor Optimux-1551 operation:**

- From the Main menu, choose **Monitoring**.

The Monitoring menu appears:

```

Optimux-1551

Monitoring

1. System Monitoring          >
2. Physical Port Monitoring   >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-23. Monitoring Menu

System Status Monitoring

- To monitor at the system level:
 - From the Monitoring menu, choose **System Monitoring**.

The System Monitoring menu appears:

```

Optimux-1551

Monitoring>System Monitoring>System Monitoring

1. System Status             >
2. System Alarms             []>
3. System Log File           []
4. Clear Log File

>
Please select item <1 to 4>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-24. System Monitoring Menu

From the System Monitoring menu, it is possible to access status information. If two OP-63E1/OP-6384/OP-2128/OP-4256 cards are installed with redundancy enabled, the status of both cards is displayed.

The content of the submenus can vary depending on whether a second, backup OP-63E1/OP-6384/OP-2128/OP-4256 card is installed and whether communication exists between the two cards.

- To display the system status when one OP-63E1/OP-6384/OP-2128/OP-4256 card is installed:

1. From the System Monitoring menu, choose **System Status**.

The first part of the System Status screen appears:

```

Optimux-1551
Monitoring>System Monitoring>System Status

Clock Source      > (Internal)
SW Version        (1.00)
HW Version        (0.0A)
BOOT Version      (2.00)
CPLD Version      (0.1)
FAN1              > (OK)
FAN2              > (OK)
Station Clock     > (OK)
Station Version   > (0.0A)
PSA Type          > (AC)
... (N)

>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-25. System Status Screen

2. Type **N** to view the rest of the screen and **P** to return to this screen.

When you type **N**, the second part of the System Status screen appears:

```

Optimux-1551
Monitoring>System Monitoring>System Status

... (P)
PSA Status        > (OK)
PSB Type          > (Not Exist)
MAC Address       (0020d2209e2b)
IP Address on     (172.17.154.64)
Alarm Indication  > (Major)
Test Indication   > (Off)
HW Status         > (NO HARDWARE FAILURE)

>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-26. System Status Screen

If at least one alarm condition with major severity is currently true, the **Alarm Indication** value is **Major**. If there are no major severity alarms but there is at least one minor severity alarm, the **Alarm Indication** value is **Minor**. Otherwise the value is **None**. Configuring alarm severities is described in [Chapter 4](#).

- To display system status when two OP-63E1/OP-6384/OP-2128/OP-4256 cards are installed and redundancy is enabled:
 1. From the System Monitoring menu, choose **System Status**.

The following System Status menu appears:

```

Optimux-1551
Monitoring>System Monitoring>System Status
1. Active Card System Status      >
2. Standby Card System Status     >
>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-27. System Status Menu

- From the System Status menu, choose **Active Card System Status**.

The first part of the Active Card System Status screen appears:

```

Optimux-1551
Monitoring>System Monitoring>System Status>Active Card System
Status
Clock Source      > (Internal)
SW Version        (1.00)
HW Version        (0.0A)
BOOT Version      (2.00)
CPLD Version      > (0.1)
FAN1              > (OK)
FAN2              > (OK)
FAN3              > (OK)
FAN4              > (OK)
Station Clock     > (OK)
Station Version   > (0.0A)
PSA Type          > (AC)
... (N)
>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-28. Active Card System Status Screen (Part 1)

- Type **N** to view the rest of the screen and **P** to return to this menu.

When you type **N**, the second part of the Active Card System Status screen appears:

```

Optimux-1551

Monitoring>System Monitoring>System Status>Active Card System
Status

... (P)
PSA Status          > (OK)
PSB Type            > (None)
MAC Address          (0020d2209e2b)
IP Address on        (172.17.154.64)
Alarm Indication     > (Major)
Test Indication      > (Off)
HW Status            > (NO HARDWARE FAILURE)

>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-29. Active Card System Status Screen (Part 2)

- From the System Status screen, choose **Standby Card System Status**.

The following Standby Card System Status screen appears:

```

Optimux-1551

Monitoring>System Monitoring>System Status>Standby Card System
Status

SW Version           (1.00)
HW Version            (0.0)
CPLD Version         > (0.1)
Station Clock         > (OK)
HW Status             > (NO HARDWARE FAILURE)

>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-30. Standby Card System Status Screen

System Alarms

The Optimux-1551 management software allows you to change alarm severity and perform alarm masking.

Displaying System Alarms

The menu structure for displaying system alarms differs depending whether a second OP-63E1/OP-6384/OP-2128/OP-4256 card is installed and redundancy is enabled.

- To display system alarms when only one OP-63E1/OP-6384/OP-2128/OP-4256 card is installed:

1. From the Main menu, select **Monitoring**.
2. From the Monitoring menu, select **System Monitoring**.
3. From the System Monitoring menu, choose **System Alarms**.

The following System Alarms menu appears:

Optimux-1551			
<u>Monitoring>System Monitoring>System Alarms</u>			
	Alarm Name	Severity	Mask
1	Self-test failure	Major	OFF
2	Signal loss on station clock	Major	ON
3	Real time clock battery failure	Major	OFF
>			
ESC-prev. menu; !-main menu; &-exit			

Figure 6-31. System Alarms Menu

4. Only alarms that are currently activated are displayed. For each alarm, the **Severity** (Major or Minor) and the status of the **Mask** (ON or OFF), is shown.

- To display system alarms when two OP-63E1/OP-6384/OP-2128/OP-4256 cards are installed:

1. From the Main menu, select **Monitoring**.
2. From the Monitoring menu, select **System Monitoring**.
3. From the System Monitoring menu, choose **System Alarms**.

The following System Alarms menu appears:

Optimux-1551	
<u>Monitoring>System Monitoring>System Alarm</u>	
1. Active Card System Alarm	>
2. Standby Card System Alarms	>
>	
Please select item <1 to 2>	
ESC-prev. menu; !-main menu; &-exit	

Figure 6-32. System Alarm Menu (with Two OP-63E1/OP-6384/OP-2128/OP-4256 Cards Installed)

4. From the System Alarms menu, choose **Active Card System Status**.

The following Active Card System Status menu appears:

Optimux-1551			
<u>Monitoring>System Monitoring>System Alarms>Active Card System Alarms</u>			
	Alarm Name	Severity	Mask
1	Self-test failure	Major	OFF
2	Signal loss on station clock	Major	ON
3	Real time clock battery failure	Major	OFF
>			
ESC-prev. menu; !-main menu; &-exit			

Figure 6-33. Active Card System Alarms Menu

- Only alarms that are currently activated are displayed. For each alarm, the **Severity** (Major or Minor) and the status of the **Mask** (ON or OFF), is shown. See [Table 6-6](#) for alarm descriptions.
- From the System Alarms menu, choose **Standby Card System Status**.

The following Standby Card System Status menu appears:

Optimux-1551			
<u>Monitoring>System Monitoring>System Alarms>Standby Card System Alarms</u>			
	Alarm Name	Severity	Mask
1	Self-test failure	Major	OFF
2	Signal loss on station clock	Major	ON
3	Real time clock battery failure	Major	OFF
>			
ESC-prev. menu; !-main menu; &-exit			

Figure 6-34. Standby Card System Alarms Menu

- Only alarms that are currently activated are displayed. For each alarm, the **Severity** (Major or Minor) and the status of the **Mask** (ON or OFF), is shown. See [Table 6-6](#) for alarm descriptions.

Table 6-6. System Alarms

Terminal Message	Description	Default Severity
Self-test failure	Failure occurred while testing the device hardware components.	Major
Uplink redundancy not unavailable	The backup uplink is either not installed or there is a failure detection.	Major
Signal loss on station clock	Signal loss detected on clock input located on back panel.	Major
Station clock in holdover state	Station clock in holdover state	Major
Input alarm	Input alarm on input Alarms connector	Minor
Power supply A failure	Failure in Power supply A	Major
Power supply B failure	Failure in power supply B	Major
High temperature	The ambient temperature inside the unit's box is too high.	Major
Fan 1 failure	Failure in fan 1	Major
Fan 2 failure	Failure in fan 2	Major
Fan 3 failure	Failure in fan 3 Note: This applies only if a fan tray exists.	Major
Fan 4 failure	Failure in fan 4 Note: This applies only if a fan tray exists.	Major
Real time clock battery failure	Failure in real time clock chip battery	Major
Loss connection between cards	Set to ON upon not receiving any message from the other OP-63E1/ OP-6384/OP-2128/OP-4256 card.	Major
Configuration not identical	The configurations stored in the OP-63E1/OP-6384/OP-2128/ OP-4256 cards are not identical.	Major
SW version not identical	The software version in the OP-63E1/OP-6384/OP-2128/ OP-4256 cards are not identical.	Major
Fan tray does not exist	The fan tray does not exist in a product that supports a fan tray.	Major
Hardware not identical	The two cards have different hardware components (OP-63E1/ OP-6384/OP-2128/OP-4256 card type, station clock card).	Major

Physical Port Status and Alarms

Port Monitoring

➤ To monitor at the port level:

1. From the Monitoring menu, choose **Physical Port Monitoring**.

The Physical Port Monitoring menu appears:

```

Optimux-1551

Monitoring>Physical Port Monitoring

1. Physical Port Status      >
2. Physical Port Alarms     >
3. Physical Port Statistics  >
>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-35. Physical Port Monitoring Menu

2. From this menu, it is possible to access statistics about physical port operation, including alarms. If two uplinks, or two OP-63E1/OP-6384/OP-2128/OP-4256 cards, are installed, statistics are provided for active uplink/card.

Physical Port Status

➤ To monitor the physical port status:

1. From the Physical Port Monitoring menu, choose **Physical Port Status**.

The Physical Port Status menu appears:

```

Optimux-1551

Monitoring>Physical Port Monitoring>Physical Port Status

1. Uplink Status      >
2. Channel Status     >
>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-36. Physical Port Status Menu

2. From the Physical Port Status menu, choose **Uplink Status**.

The Uplink Status screen appears:

```

Optimux-1551

Monitoring>Physical Port Monitoring>Physical Port Status>Uplink
Status

Test Status                (OFF)
Alarm Status               (ON)
Active Link                >(Link A)
Uplink Type A              (Fiber Optic)
Uplink Type B              (Fiber Optic)

>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-37. Uplink Status Screen

- From the Physical Port Status menu, choose **Channel Status**.

The Channel Status menu appears:

```

Optimux-1551

Monitoring>Physical Port Monitoring>Physical Port
Status>Channel Status

Administrative Status      (UP)
Test Status               (OFF)
Alarm Status              (ON)

1. Current Port [1 - 63] ... (1)

>
Please select item <1 to 1>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-38. Channel Status Menu

- Select a port in the **Current Port** field to view the port's status.

Physical Port Alarms

Uplink Alarms

- To monitor the physical port alarms:

- From the Main menu, select **Monitoring**.
- From the Monitoring menu, select **Physical Port Monitoring**.
- From the Physical Port Monitoring menu, choose **Physical Port Alarms**.

The Physical Port Alarms menu appears:

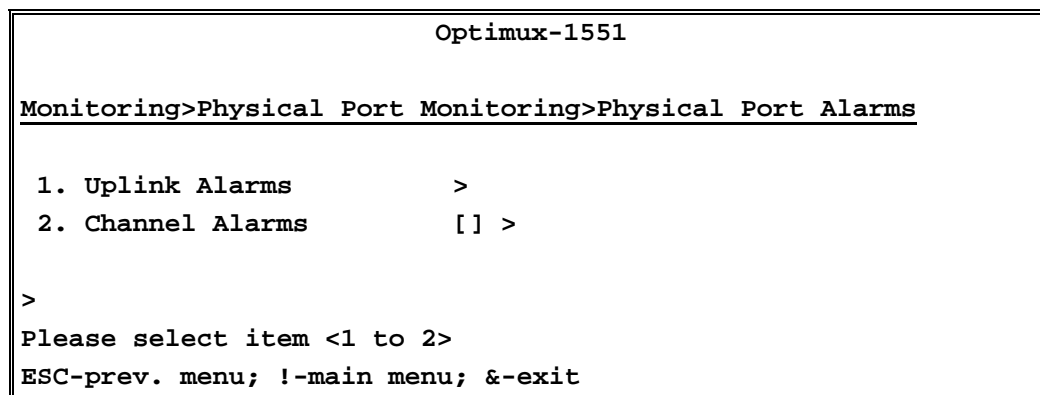


Figure 6-39. Physical Port Alarms Menu

Note If two OP-63E1/OP-6384/OP-2128/OP-4256 cards are installed, the physical port alarms for the active card or for the standby card can be displayed.

► Monitor the uplink alarms:

1. From the Physical Port Alarms menu, choose **Uplink Alarms**.

The Uplink Alarms menu appears:

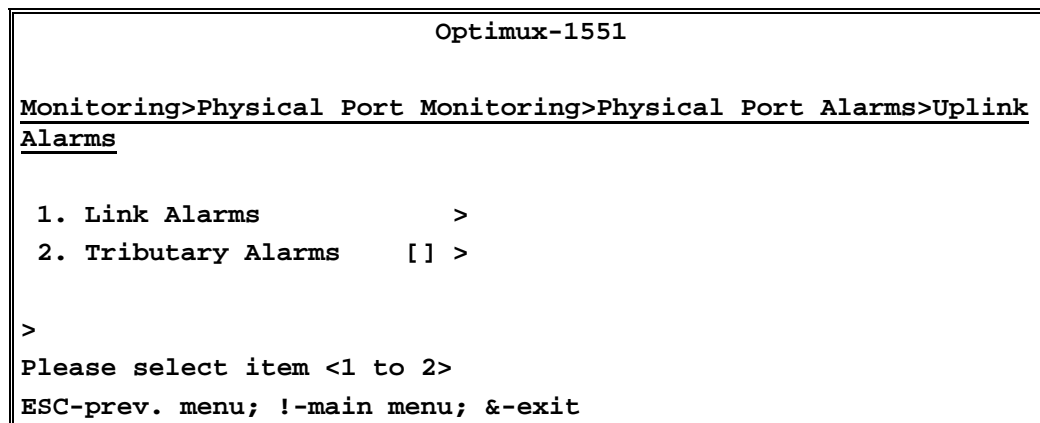


Figure 6-40. Uplink Alarms Menu

2. From the Uplink Alarms menu, choose **Link Alarms**.

The Link Alarms menu appears:

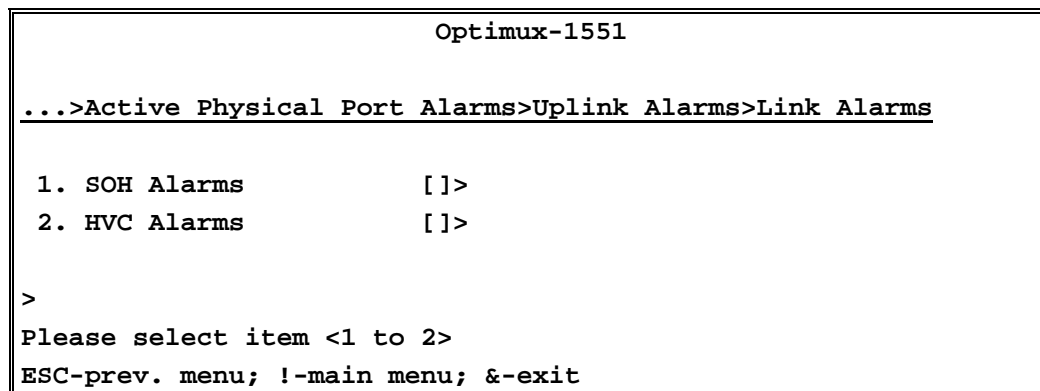


Figure 6-41. Link Alarms Menu

► **To monitor the SOH alarms:**

1. From the Link Alarms menu, choose **SOH Alarms**.

The SOH Alarms menu appears:

Optimux-1551			
<u>...>Active Physical Port Alarms>Uplink Alarms>Link Alarms>SOH Alarms</u>			
	Alarm Name	Severity	Mask
1	Loss Of signal uplink A	Major	OFF
2	Loss Of signal uplink B	Major	ON
>			
ESC-prev. menu; !-main menu; &-exit; ?-help			

Figure 6-42. SOH Alarms Menu

2. Only alarms that are currently activated are displayed. For each alarm, the **Severity** (**Major** or **Minor**) and the status of the **Mask** (**ON** or **OFF**), is shown. See [Table 6-7](#) for alarm descriptions.

SOH Alarms

Table 6-7. SOH Alarms

Terminal Message	Description	Severity
Loss of signal uplink A	Loss of signal defect is detected in uplink A	Major
Loss of signal uplink B	Loss of signal defect is detected in uplink B	Major
Loss of frame	Loss of frame defect is detected.	Major
Out of frame	Out of frame defect is detected	Minor
Line AIS occurred	Line AIS defect ("111" pattern in bits 6,7 & 8 of K2) is detected.	Major
Far End Receive Fail (RDI)	Line RDI defect ("110" pattern in bits 6,7 & 8 of K2) is detected.	Minor
Excessive bit error rate	EED defect (based on B2) is detected	Major
Signal Degraded	SD defect (based on B2) is detected.	Minor
SDH only: Path Trace ID Mismatch	Incoming path trace identifier (J0) is different from the transmitted path trace	Minor
SDH only: Path trace loss of lock	The alignment of path trace identifier (J0) has not been established.	Major

► To monitor the HVC alarms:

1. From the Link Port Alarms menu, choose **HVC Alarms**.

The HVC Alarms menu appears. For a SONET uplink the menu is as follows:

Optimux-1551			
<u>...>Active Physical Port Alarms>Uplink Alarms>Link Alarms>HVC Alarm</u>			
	Path	Alarm Name	Severity
1	HVC 1		
2		Far end receive fail (ROI)	Minor
3		Unequipped signal label	Minor
1. HVC 1			
2. HVC 2			
3. HVC 3			
>			
ESC-prev. menu; !-main menu; &-exit; ?-help			

Figure 6-43. HVC Alarm Menu

For an SDH uplink, the screen is as follows:

Optimux-1551			
<u>...>Active Physical Port Alarms>Uplink Alarms>Link Alarms>HVC Alarm</u>			
	Alarm Name	Severity	Mask
1	Path AIS occurred	Minor	OFF
>			
ESC-prev. menu; !-main menu; &-exit; ?-help			

Figure 6-44. HVC Alarm Screen

Note

See lists of E1/DS1 path mapping in [Chapter 1](#).

2. Select the HVC path to monitor.
3. Only alarms that are currently activated are displayed. For each alarm, the **Severity** (**Major** or **Minor**) and the status of the **Mask** (**ON** or **OFF**), is shown. Refer to [Table 6-8](#) for alarm descriptions.

Table 6-8. HVC Alarms

Terminal Message	Description	Default Severity
Path AIS occurred	Path AIS defect (all ones in H1 and H2) is detected.	Major
Loss of pointer	Loss of pointer defect is detected HVC (POH) layer.	Major
Far End Receive Fail (RDI)	Path RDI defect (occurrence of "1" in bit 5 of G1) is detected.	Minor
Excessive bit error rate	EED defect (based on B3) is detected	Major
Signal Degraded	SD defect (based on B3) is detected.	Minor
SDH only: Path Trace ID Mismatch	Incoming path trace identifier (J1) is different from the transmitted path trace	Minor
SDH only: Path trace loss of lock	The alignment of path trace identifier (J1) has not been established.	Major
Unequipped signal label	Signal label unequipped defect (C2 byte is zero) is detected.	Minor
Signal label mismatch	Incoming signal label (C2 byte) is different from the transmitted signal label.	Minor
SDH only: C2 VC-AIS	C2 VC-AIS defect (C2 byte is all ones) is detected.	Major
SONET only: C2 PDI occurred	Incoming payload defect indication detected in C2 byte.	Major

➤ **To monitor the tributary alarms:**

1. From the Uplink Port Alarms menu, choose **Tributary Alarms**.

The Tributary Alarms menu appears:

Note

Only alarms that are currently active are displayed.

Optimux-1551				
<u>...>Active Physical Port Alarms>Uplink Alarms>Tributary Alarm</u>				
Port	Alarm Name	Severity	Mask	
1 1	Loss Of Pointer	Minor	OFF	
1. Change cell [1 - 63] ... (1)				
>				
Please select item <1 to 1>				
ESC-prev. menu; !-main menu; &-exit; ?-help				

Figure 6-45. Tributary Alarm Menu

Note

The range of ports depends on the card used:

- For the OP 63E1 card: 63 ports (shown)
- For the OP-6384 card: 63 ports when set to E1 and 84 ports when set to T1
- For the OP-4256 card: 42 ports when set to E1 and 56 ports when set to T1
- For the OP-2128: 21 ports when set to E1 and 28 ports when set to T1.

2. Select a channel in the **Change Cell** field.
3. Only alarms that are currently activated are displayed. For each alarm, the **Severity** (**Major** or **Minor**) and the status of the **Mask** (**ON** or **OFF**), is shown. Refer to [Table 6-9](#) for alarm descriptions.

LVC Alarms

Table 6-9. LVC Alarms

Terminal Message	Description	Severity
Loss of pointer	Loss of pointer defect is detected in LVC (VT) layer.	Major
VT AIS occurred	Path AIS defect (occurrence of all ones in V1 and V2) is detected.	Major
Far End Receive Fail (RDI)	Path RDI defect (occurrence of "1" in bit 8 of V5) is detected.	Minor
Excessive bit error rate	EED defect (based on V5) is detected.	Major
Signal Degraded	SD defect (based on V5) is detected.	Minor
SDH only: Lower order Path Trace ID Mismatch	Incoming path trace identifier (J2) is different from the transmitted path trace	Minor
Unequipped signal label	Signal label unequipped defect (occurrence of "000" in bit 5,6 & 7 of V5) is detected.	Minor

Terminal Message	Description	Severity
Signal label mismatch	Incoming signal label (bits 5,6 & 7 of V5) is different from the transmitted signal label.	Minor
SDH only: V5 VC-AIS	V5 VC-AIS defect (occurrence of "111" in bit 5,6 & 7 of V5) is detected.	Major

Channel Alarms

- To monitor the channel alarms:
1. From the Main menu, select **Monitoring**.
 2. From the Monitoring menu, select **Physical Port Monitoring**.
 3. From the Physical Port Monitoring menu, choose **Physical Port Alarms**.
 4. From the Physical Port Alarms menu, choose **Channel Alarms**.

The Channel Alarms menu appears:

Optimux-1551			
<u>...>Physical Port Alarms>Active Physical Port Alarms>Alarms</u>			
Port	Alarm Name	Severity	Mask
1	AIS	Minor	OFF
1. Change cell [1 - 63] ... (1)			
>			
Please select item <1 to 1>			
ESC-prev. menu; !-main menu; &-exit; ?-help			

Figure 6-46. Channel Alarms Menu

5. Select a channel in the Change cell field.
6. Only alarms that are currently active are displayed. For each alarm, the **Severity** (**Major** or **Minor**) and the status of the **Mask** (**ON** or **OFF**), is shown.

Note

The range of the ports depends on the card used:

- For the OP-63E1 card: 63 ports (shown)
- For the OP-6384 card: 63 ports when set to E1 and 84 ports when set to T1
- For the OP-4256 card: 42 ports when set to E1 and 56 ports when set to T1
- For the OP-2128 card: 21 ports when set to E1 and 28 ports when set to T1.

6.4 Troubleshooting and Diagnostics

If a problem arises, check the displayed instructions and refer to this section to interpret and solve it.

Identify the trouble symptoms and perform the actions listed under "Corrective Measures" in the order given in [Table 6-10](#), until the problem is solved.

Table 6-10. Troubleshooting Chart

Trouble Symptoms	Probable Cause	Corrective Measures
Optimux-1551 is "dead".	No Power	<ol style="list-style-type: none"> 1. Check that both ends of the power cable are properly connected. 2. If Optimux-1551 is powered from DC, check the polarity of the power connections.
	Defective Power Supply	Replace Power Supply
	Defective Optimux-1551	Replace Optimux-1551
One of the PWR LEDs is red	A/B PWR LED	<ol style="list-style-type: none"> 1. If the PWR LED in one of the OP-63E1/OP-6384/OP-2128/OP-4256 cards in the front panel is red, replace the card. 2. If the PWR LED is red just in the back panel, have the active OP-63E1/OP-6384/OP-2128/OP-4256 card repaired.
	Power connection	Check the connection of the power supply
	Defective Power Supply	Replace Power Supply
The LINK SYNC LOSS LED is ON	Defective Removable Card	<ol style="list-style-type: none"> 1. Set the clock source to INT. 2. Loop the link connection (SONET/SDH) with a short fiber/coax. 3. If the LED is still ON replace the Uplink card. 4. If the LED is still ON replace the OP-63E1/OP-6384/OP-2128/OP-4256 card. 5. If the LED is still ON, have Optimux-1551 repaired.
	External problem	Check the link connections

Table 6-10. Troubleshooting Chart (Cont.)

Trouble Symptoms	Probable Cause	Corrective Measures
The channel SYNC LOSS LED is ON for one or all of the channels	Defective Removable Card	<ol style="list-style-type: none"> 1. Loop the channels connection (E1/DS1) with a short cable (transmit to receive). 2. If the LEDs are still ON replace the OP-63E1/OP-6384/OP-2128/OP-4256 card. 3. If the LEDs are still ON, have Optimux-1551 repaired.
	External problem	Check the equipment that connected to the problematic channels
One or more of "Loss of pointer", "Path AIS", "Excessive bit error rate", "Signal degraded" "Path trace loss of lock" (SDH) alarms appear	Defective Optimux-1551	<ol style="list-style-type: none"> 1. Set the clock source to INT. 2. Loop the link connection with a short fiber/coax. 3. If the alarm still exist, have Optimux-1551 repaired.
	External Problem	<ol style="list-style-type: none"> 1. Check cable connection. 2. Check the remote units.
"Unequipped signal label" and/or "Signal label mismatch" alarms appear	External Problem	Network mapping problem exists at corresponding level.
"Path trace mismatch" alarm appears	Configuration problem	Config Optimux-1551: Main Menu > Configuration > Physical Ports Configuration > Uplink Configuration > SOH Configuration/HVC configuration > J0 Tx/Rx path trace enable/J1 Tx/Rx path trace enable
Standby card extraction causes errors in the data	Configuration problem	Config Optimux-1551: Main Menu > Configuration > System Configuration > Redundancy > Main Card Redundancy > 'Standby Card State' to 'Shutdown' prior to removing standby card

6.5 Testing Optimux-1551

Both local and remote loopback tests can be run on the channels and on the uplinks.

When performing any kind of diagnostic test, the TST LED lights ON.

Loopback tests can be performed on one or more channels simultaneously. However they cannot be performed on both the uplink and channels simultaneously.

Channel LLB

This diagnostic test is used for checking the connections between a specific user tributary channel and the local Optimux-1551. This loop can be run on each channel independently. An AIS signal (All 1s) is transmitted on the relevant channel toward the uplink if it is enabled.

Note

When performing LLB on all channels, the device will transmit MS AIS towards the uplink.

Figure 6-47 illustrates the channel LLB loop.

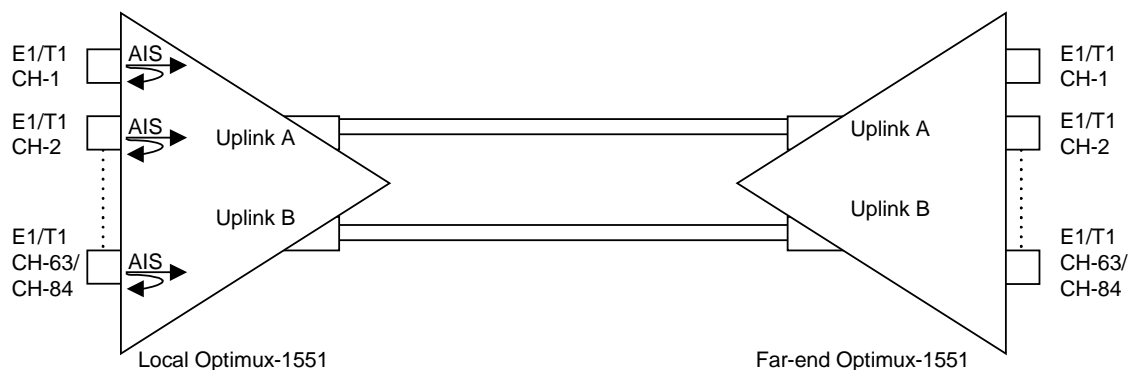


Figure 6-47. The Channel LLB Loop

Running an LLB on a Channel

► To activate an LLB on a channel:

1. From the Optimux-1551 Main menu, select **Diagnostics**.

The Diagnostics menu appears:

```

Optimux-1551

Diagnostics

1. Uplink Test      >
2. Channel Test    >

>
Please select item <1 to 2>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-48. Diagnostics Menu

2. Select Channel Test.

The Channel Test menu appears:

```

Optimux-1551

Diagnostics>Channel Test

1. LLB                      (OFF)
2. RLB                      (OFF)
3. Current Port [1 - 63]    ... (1)

>
Please select item <1 to 3>
ESC-prev. menu; !-main menu; &-exit

```

Figure 6-49. Channel Test Menu

Note The range of ports depends on the card used:

- For the OP-63E1 card: 63 ports (shown)
- For the OP-6384 card: 84 ports
- For the OP-2128 card: 28 ports
- For the OP-4256 card: 56 ports.

3. In the Current Port, select the channel for test.
4. Select **LLB** to activate LLB (toggles to **ON** state).
5. Select **LLB** again to stop the LLB (toggles to **OFF** state).

Channel RLB

This diagnostic test is used for checking the connections of the far-end user to the Optimux-1551, and the connections between the two Optimux-1551s. This loop can be run on each channel independently. An AIS signal (All 1s) is generated on the relevant channel toward the tributary channel output, if it is enabled.

Figure 6-50 illustrates the channel RLB loop.

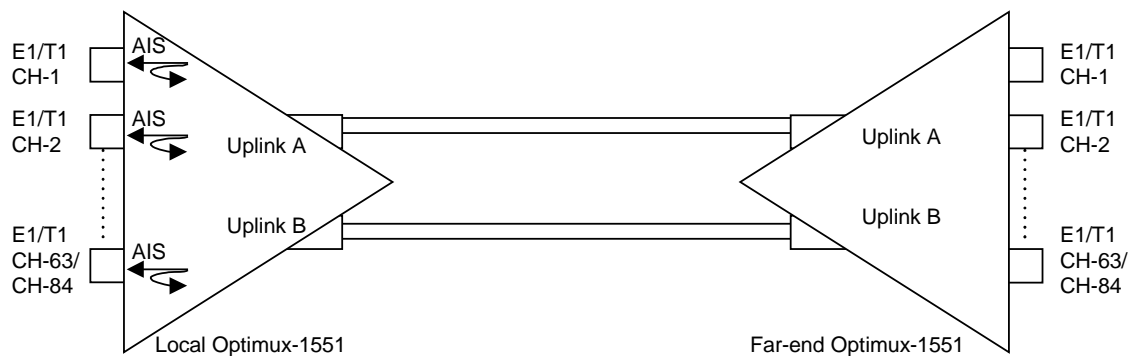


Figure 6-50. The Channel RLB Loop

Running an RLB on a Channel

- To activate an RLB on a channel
 1. In the Channel Test menu, for the Current Port, select the channel for test.
 2. Select **RLB** to activate RLB (toggles to **ON** state).
 3. Select **RLB** again to stop the RLB (toggles to **OFF** state).

Uplink LLB

This loop is performed on the uplink. It loops the uplink transmit signal back toward its receive path. Figure 6-51 illustrates the STS-3/OC-3/STM-1 LLB loop.

Note

Uplink local loop back is unavailable if Clock Source is configured to LBT.

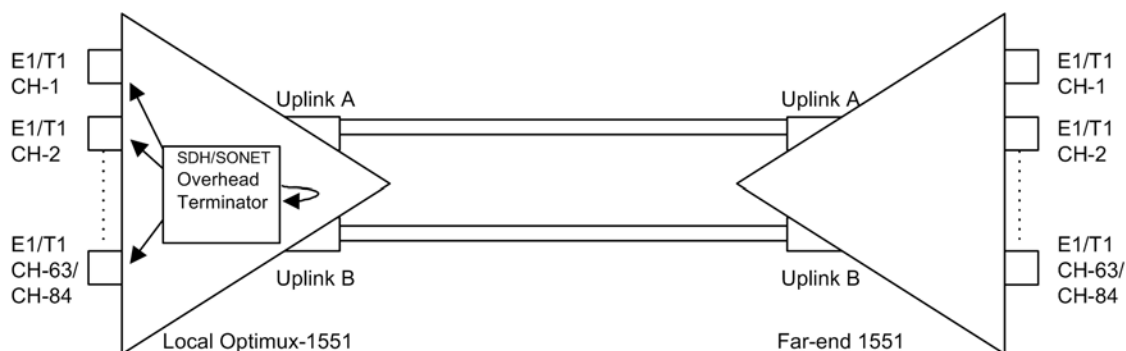


Figure 6-51. Uplink LLB Loop

Running an LLB on the Uplink

- To run an LLB on the uplink:

Note

When LBT mode is selected, this loop cannot be performed.

Caution

Do not enter 0 for the Test Timeout value if managing an uplink LLB on a far end Optimux-1551 via the local Optimux-1551 over the DCC channel. During the LLB, the DCC channel is down and there is no means for canceling the test.

1. On the Diagnostics menu select **Uplink Test**.

The Uplink Test menu appears:

Optimux-1551

Diagnostics>Uplink Test

1. LLB	(Off)
2. RLB	(Off)
3. Test Timeout(min)[0 - 4095]	... (5)

>

Please select item <1 to 3>

ESC-prev. menu; !-main menu; &-exit

Figure 6-52. Uplink Test Menu

2. Select **LLB** to activate LLB (toggles to **ON** state).
3. Select **LLB** again to stop the LLB (toggles to **OFF** state).

Uplink RLB

This loop is performed on the uplink. It loops back the uplink received signal, which arrived from the far-end unit, and transmits it back toward the far-end Optimux-1551 on uplink A (and uplink B if installed). AIS signal (All 1s) is generated toward the downstream E1 tributary channels if it is enabled.

Figure 6-53 illustrates the STS-3/OC-3/STM-1 RLB loop.

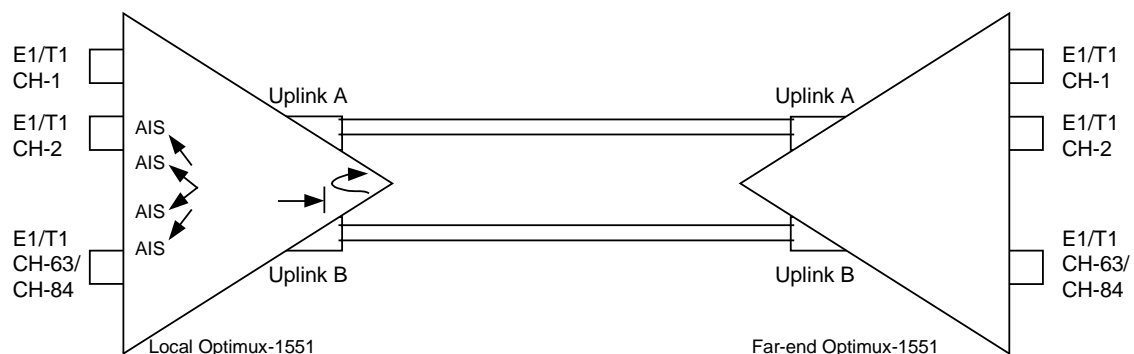


Figure 6-53. The Uplink RLB Loop

Running an RLB on the Uplink

➤ To run an RLB on the uplink

1. From the Uplink menu, select **RLB** to activate RLB (toggles to **ON** state).
2. Select **RLB** again to stop the RLB (toggles to **OFF** state).

6.6 Frequently Asked Questions

Question: In Optimux-1551, how can I manage the device when the serial port is configured to dial-out mode?

Answer: In Optimux-1551, when setting the serial port to dial-out mode, it is not possible to manage the device from terminal connected to the serial port. In order to manage the device it is recommended to set IP address before setting the dial-out mode, and to manage the device using Telnet over the Ethernet management port.

Question: How do I connect my E1s or T1s to a telco connector?

Answer: Telco connectors are quite popular in telecom companies. They can be acquired in any electronic store or the cable can be bought from RAD.

There are three options for this type of connection:

Telco-Open: This cable has a Telco connector on one side, and loose wires on the other. You can use these wires and RJ-45 (female) connectors, and you will have a solution for connecting your E1s or T1s to the Optimux-1551. The ordering option for this cable is CBL-TELCO-OPEN/2M.

Telco-Telco: This is a cable that has two Telco connectors (one at each end of the cable). One Telco connector you connect to the Optimux-1551, and the other to an adaptor (a box) from Telco to RJ-45. The adaptor is a box made by RAD, which will perform the conversion from Telco to RJ-45. It has 28 female RJ-45 connectors. You then will only have to connect your E1s or T1s to the RJ-45s in the adaptor. The ordering option for this solution is OP-A/ADAPTOR/28RJ. When ordering the adaptor, you also get the Telco-Telco cable; therefore it is not necessary to enter a separate order for this cable.

Telco-RJ45: This cable has a Telco connector on one side, and 14 RJ-45 male connectors on the other. You can use the RJ-45 male connectors to connect your E1s or T1s to the Optimux-1551. The ordering option for this cable is: CBL-TELCO-RJ45/2M.

Question: Can I connect Optimux-1551 to an STM-1?

Answer: Yes. Optimux-1551 is fully compatible with the STM-1 standard, both for Coax and Fiber Optic (no matter what type of FO interface). You just have to make sure that the other equipment is fully STM-1 compatible.

Question: Where can I find definitions of the cable colors for CBL-Telco-Open?

Answer: For a detailed description of each wire, see *Appendix A* (the section titled *I/O Telco Cables*) on page *A-16*.

6.7 Technical Support

Technical support for Optimux-1551 can be obtained from the local distributor from whom it was purchased.

For further information, please contact the [RAD distributor](#) nearest you or one of [RAD's offices](#) worldwide.

This information can be found at RAD's Web site: <http://www.rad.com/> (for offices location, click **About RAD > Worldwide Offices**; for distributors location, click **Where to Buy > End Users**).

Appendix A

Interface Specification

A.1 E1/DS1 64-Pin Telco Connectors

Two tributary interface cards are assembled in the Optimux-1551.

Each one of the tributary interface cards includes three Telco-64 unshielded connectors.

Both cards are placed on the back panel and are used for connecting the E1/DS1 channels.

In total, six Telco-64 connectors are supported and are marked as I/O 1 through I/O 6.

- I/O 1 connector connects channels 1-14 for both E1 and DS1.
- I/O 2 connector connects channels 15-21 for E1 and 15-28 for DS1.
- I/O 3 connector connects channels 22-35 for E1 and 29-42 for DS1.
- I/O 4 connector connects channels 36-42 for E1 and 43-56 for DS1.
- I/O 5 connector connects channels 43-56 for E1 and 57-70 for DS1.
- I/O 6 connector connects channels 57-63 for E1 and 71-84 for DS1.

Patch panel and cabling accessories are listed in [Table A-1](#). Patch panel connections are provided on page [A-8](#), cabling diagrams are provided on page [A-16](#).

Table A-1. I/O Accessories

Part Number	Description
OP-A/ADAPTOR/21BNC	Patch panel with 21 BNC Tx and 21 BNC Rx. Supports 21 unbalanced E1 channels.
OP-A/ADAPTOR/28RJ	Patch panel with 28 RJ-45. Supports 21 balanced E1 channels or 28 balanced DS1 channels.
CBL-TELCO-TELCO/2M	Telco-Telco cable
CBL-TELCO-OPEN/2M	Telco open cable
CBL-TELCO-RJ45/2M	Telco-RJ45 cable

Note *OP-A/ADAPTOR/28RJ has 28 channel ports. For balanced DS1 channels, all 28 ports are supported. For balanced E1 channels, only the first 21 ports are supported.*

I/O Connectors

Table A-2. I/O 1 Connector

Channel	Pin Name	Pin No.	Pin Name	Pin No.
CH1	TTIP1	1	TRING1	33
E1 & DS1	RTIP1	2	RRING1	34
CH2	TTIP2	3	TRING2	35
E1 & DS1	RTIP2	4	RRING2	36
CH2	TTIP3	5	TRING3	37
E1 & DS1	RTIP3	6	RRING3	38
CH4	TTIP4	7	TRING4	39
E1 & DS1	RTIP4	8	RRING4	40
CH5	TTIP5	9	TRING5	41
E1 & DS1	RTIP5	10	RRING5	42
CH6	TTIP6	11	TRING6	43
E1 & DS1	RTIP6	12	RRING6	44
CH7	TTIP7	13	TRING7	45
E1 & DS1	RTIP7	14	RRING7	46
CH8	TTIP8	15	TRING8	47
E1 & DS1	RTIP8	16	RRING8	48
CH9	TTIP9	17	TRING9	49
E1 & DS1	RTIP9	18	RRING9	50
CH10	TTIP10	19	TRING10	51
E1 & DS1	RTIP10	20	RRING10	52
CH11	TTIP11	21	TRING11	53
E1 & DS1	RTIP11	22	RRING11	54
CH12	TTIP12	23	TRING12	55
E1 & DS1	RTIP12	24	RRING12	56
CH13	TTIP13	25	TRING13	57
E1 & DS1	RTIP13	26	RRING13	58
CH14	TTIP14	27	TRING14	59
E1 & DS1	RTIP14	28	RRING14	60
	Not connected	29	Not connected	61
	Not connected	30	Not connected	62
	Not connected	31	Not connected	63
	GND	32	GND	64

Table A-3. I/O 2 Connector

Channel	Pin Name	Pin No.	Pin Name	Pin No.
CH15	TTIP15	1	TRING15	33
E1 & DS1	RTIP15	2	RRING15	34
CH16	TTIP16	3	TRING16	35
E1 & DS1	RTIP16	4	RRING16	36
CH17	TTIP17	5	TRING17	37
E1 & DS1	RTIP17	6	RRING17	38
CH18	TTIP18	7	TRING18	39
E1 & DS1	RTIP18	8	RRING18	40
CH19	TTIP19	9	TRING19	41
E1 & DS1	RTIP19	10	RRING19	42
CH20	TTIP20	11	TRING20	43
E1 & DS1	RTIP20	12	RRING20	44
CH21	TTIP21	13	TRING21	45
E1 & DS1	RTIP21	14	RRING21	46
CH22	TTIP22	15	TRING22	47
(DS1)	RTIP22	16	RRING22	48
CH23	TTIP23	17	TRING23	49
(DS1)	RTIP23	18	RRING23	50
CH24	TTIP24	19	TRING24	51
(DS1)	RTIP24	20	RRING24	52
CH25	TTIP25	21	TRING25	53
(DS1)	RTIP25	22	RRING25	54
CH26	TTIP26	23	TRING26	55
(DS1)	RTIP26	24	RRING26	56
CH27	TTIP27	25	TRING27	57
(DS1)	RTIP27	26	RRING27	58
CH28	TTIP28	27	TRING28	59
(DS1)	RTIP28	28	RRING28	60
	Not connected	29	Not connected	61
	Not connected	30	Not connected	62
	Not connected	31	Not connected	63
	GND	32	GND	64

Table A-4. I/O 3 Connector

Channel	Pin Name	Pin No.	Pin Name	Pin No.
CH22 (E1)	TTIP29	1	TRING29	33
CH29 (DS1)	RTIP29	2	RRING29	34
CH23 (E1)	TTIP30	3	TRING30	35
CH30 (DS1)	RTIP30	4	RRING30	36
CH24 (E1)	TTIP31	5	TRING31	37
CH31 (DS1)	RTIP31	6	RRING31	38
CH25 (E1)	TTIP32	7	TRING32	39
CH32 (DS1)	RTIP32	8	RRING32	40
CH26 (E1)	TTIP33	9	TRING33	41
CH33 (DS1)	RTIP33	10	RRING33	42
CH27 (E1)	TTIP34	11	TRING34	43
CH34 (DS1)	RTIP34	12	RRING34	44
CH28 (E1)	TTIP35	13	TRING35	45
CH35 (DS1)	RTIP35	14	RRING35	46
CH29 (E1)	TTIP36	15	TRING36	47
CH36 (DS1)	RTIP36	16	RRING36	48
CH30 (E1)	TTIP37	17	TRING37	49
CH37 (DS1)	RTIP37	18	RRING37	50
CH31 (E1)	TTIP38	19	TRING38	51
CH38 (DS1)	RTIP38	20	RRING38	52
CH32 (E1)	TTIP39	21	TRING39	53
CH39 (DS1)	RTIP39	22	RRING39	54
CH33 (E1)	TTIP40	23	TRING40	55
CH40 (DS1)	RTIP40	24	RRING40	56
CH34 (E1)	TTIP41	25	TRING41	57
CH41 (DS1)	RTIP41	26	RRING41	58
CH35 (E1)	TTIP42	27	TRING42	59
CH42 (DS1)	RTIP42	28	RRING42	60
	Not connected	29	Not connected	61
	Not connected	30	Not connected	62
	Not connected	31	Not connected	63
	GND	32	GND	64

Table A-5. I/O 4 Connector

Channel	Pin Name	Pin No.	Pin Name	Pin No.
CH36 (E1)	TTIP43	1	TRING43	33
CH43 (DS1)	RTIP43	2	RRING43	34
CH37 (E1)	TTIP44	3	TRING44	35
CH44 (DS1)	RTIP44	4	RRING44	36
CH38 (E1)	TTIP45	5	TRING45	37
CH45 (DS1)	RTIP45	6	RRING45	38
CH39 (E1)	TTIP46	7	TRING46	39
CH46 (DS1)	RTIP46	8	RRING46	40
CH40 (E1)	TTIP47	9	TRING47	41
CH47 (DS1)	RTIP47	10	RRING47	42
CH41 (E1)	TTIP48	11	TRING48	43
CH48 (DS1)	RTIP48	12	RRING48	44
CH42 (E1)	TTIP49	13	TRING49	45
CH42 (DS1)	RTIP49	14	RRING49	46
CH50 (DS1)	TTIP50	15	TRING50	47
	RTIP50	16	RRING50	48
CH51 (DS1)	TTIP51	17	TRING51	49
	RTIP51	18	RRING51	50
CH52 (DS1)	TTIP52	19	TRING52	51
	RTIP52	20	RRING52	52
CH53 (DS1)	TTIP53	21	TRING53	53
	RTIP53	22	RRING53	54
CH54 (DS1)	TTIP54	23	TRING54	55
	RTIP54	24	RRING54	56
CH55 (DS1)	TTIP55	25	TRING55	57
	RTIP55	26	RRING55	58
CH56 (DS1)	TTIP56	27	TRING56	59
	RTIP56	28	RRING56	60
	Not connected	29	Not connected	61
	Not connected	30	Not connected	62
	Not connected	31	Not connected	63
	GND	32	GND	64

Table A-6. I/O 5 Connector

Channel	Pin Name	Pin No.	Pin Name	Pin No.
CH43 (E1)	TTIP57	1	TRING57	33
CH57 (DS1)	RTIP57	2	RRING57	34
CH44 (E1)	TTIP58	3	TRING58	35
CH58 (DS1)	RTIP58	4	RRING58	36
CH45 (E1)	TTIP59	5	TRING59	37
CH59 (DS1)	RTIP59	6	RRING59	38
CH46 (E1)	TTIP60	7	TRING60	39
CH60 (DS1)	RTIP60	8	RRING60	40
CH47 (E1)	TTIP61	9	TRING61	41
CH61 (DS1)	RTIP61	10	RRING61	42
CH48 (E1)	TTIP62	11	TRING62	43
CH62 (DS1)	RTIP62	12	RRING62	44
CH49 (E1)	TTIP63	13	TRING63	45
CH63 (DS1)	RTIP63	14	RRING63	46
CH50 (E1)	TTIP64	15	TRING64	47
CH64 (DS1)	RTIP64	16	RRING64	48
CH51 (E1)	TTIP65	17	TRING65	49
CH65 (DS1)	RTIP65	18	RRING65	50
CH52 (E1)	TTIP66	19	TRING66	51
CH66 (DS1)	RTIP66	20	RRING66	52
CH53 (E1)	TTIP67	21	TRING67	53
CH67 (DS1)	RTIP67	22	RRING67	54
CH54 (E1)	TTIP68	23	TRING68	55
CH68 (DS1)	RTIP68	24	RRING68	56
CH55 (E1)	TTIP69	25	TRING69	57
CH69 (DS1)	RTIP69	26	RRING69	58
CH56 (E1)	TTIP70	27	TRING70	59
CH70 (DS1)	RTIP70	28	RRING70	60
	Not connected	29	Not connected	61
	Not connected	30	Not connected	62
	Not connected	31	Not connected	63
	GND	32	GND	64

Table A-7. I/O 6 Connector

Channel	Pin Name	Pin No.	Pin Name	Pin No.
CH57 (E1)	TTIP71	1	TRING71	33
CH71 (DS1)	RTIP71	2	RRING71	34
CH58 (E1)	TTIP72	3	TRING72	35
CH72 (DS1)	RTIP72	4	RRING72	36
CH59 (E1)	TTIP73	5	TRING73	37
CH73 (DS1)	RTIP73	6	RRING73	38
CH60 (E1)	TTIP74	7	TRING74	39
CH74 (DS1)	RTIP74	8	RRING74	40
CH61 (E1)	TTIP75	9	TRING75	41
CH75 (DS1)	RTIP75	10	RRING75	42
CH62 (E1)	TTIP76	11	TRING76	43
CH76 (DS1)	RTIP76	12	RRING76	44
CH63 (E1)	TTIP77	13	TRING77	45
CH77 (DS1)	RTIP77	14	RRING77	46
CH78 (DS1)	TTIP78	15	TRING78	47
	RTIP78	16	RRING78	48
CH79 (DS1)	TTIP79	17	TRING79	49
	RTIP79	18	RRING79	50
CH80 (DS1)	TTIP80	19	TRING80	51
	RTIP80	20	RRING80	52
CH81 (DS1)	TTIP81	21	TRING81	53
	RTIP81	22	RRING81	54
CH82 (DS1)	TTIP82	23	TRING82	55
	RTIP82	24	RRING82	56
CH83 (DS1)	TTIP83	25	TRING83	57
	RTIP83	26	RRING83	58
CH84 (DS1)	TTIP84	27	TRING84	59
	RTIP84	28	RRING84	60
	Not connected	29	Not connected	61
	Not connected	30	Not connected	62
	Not connected	31	Not connected	63
	GND	32	GND	64

I/O Patch Panel Connectors (Option)

The front of the patch panel has 21 BNC ports for unbalanced E1 channels (P/N: OP-A/ADAPTOR/21BNC) or 28 RJ-45 ports (P/N: OP-A/ADAPTOR/28RJ) for 21 balanced E1 or 28 balanced DS1 channels. The pin-out for the RJ-45 ports is provided in [Table A-8](#).

Table A-8. OP-A/ADAPTOR/28RJ: RJ-45-Type Channel Connector Pin-Out

Pin	Designation	Description
1	RTIP	Receive data (tip)
2	RRING	Receive data (ring)
3	Not Connected	-
4	TRING	Transmit data (ring)
5	TTIP	Transmit data (tip)
6	Not Connected	
7	"	
8	"	

The back of the patch panel has two Telco-connector I/O ports (I/O 1 and I/O 2). These ports connect the patch panel to I/O ports (I/O 1 to I/O 6) on the Optimux-1551.

A total of three patch panels are required to connect the full number of E1 (63) or DS1 (84) channels supported by the Optimux-1551. The connection order for three patch panel units is given in [Table A-9](#).

Table A-9. Patch Panel Connections

Patch Panel	Patch Panel Connector	Optimux-1551 Connector	Remarks
First	I/O 1	I/O 1	
First	I/O 2	I/O 2	
Second	I/O 1	I/O 3	Not relevant when OP-2128 card is used
Second	I/O 2	I/O 4	Not relevant when OP-2128 card is used
Third	I/O 1	I/O 5	Not relevant when OP-2128 or OP-4256 cards are used
Third	I/O 2	I/O 6	Not relevant when OP-2128 or OP-4256 cards are used

The pin-out from a patch channel connector to the corresponding patch I/O connector and on to the corresponding Optimux-1551 I/O connector depends on the patch panel model, the channel type, and the number of patch panel units.

The Telco connector pin-out for the I/O 1 and I/O 2 connectors on the back of the patch panel is the same as that for the I/O 1 ([Table A-2](#)) and I/O 2 ([Table A-3](#)) connectors on the Optimux-1551, with the following differences between I/O 2 of the patch panel and I/O 2 of the Optimux-1551:

- OP-A/ADAPTOR/21BNC: I/O 2 supports seven E1 channels

The connection between the channel connectors on the front of the patch panel and the Optimux-1551's I/O connectors are given in the group of tables starting with [Table A-8](#).

Example: Determine how to run channel 29 of a balanced DS1 connection:

Since the connection is balanced DS1, the OP-A/ADAPTOR/28RJ is required. Since each patch panel supports only 28 channels, two units will be required.

From [Table A-8](#): the channel should be connected to channel connector 1 of the second patch panel and will interface from the patch panel's I/O 1 connector to the Optimux-1551's I/O 3 connector.

From [Table A-2](#) the patch panel's I/O 1 connector pins are 1, 2, 33, and 34.

From [Table A-4](#): the Optimux-1551's I/O 3 connector pins are also 1, 2, 33, and 34.

Note *DS1 channels are supported only by OP-A/ADAPTOR/28RJ units (28 balanced channels).
E1 channels are supported by both OP-A/ADAPTOR/28RJ units (21 balanced) and by OP-A/ADAPTOR/21BNC units (21 unbalanced).*

Table A-10. DS1 Channel Connections for First OP-A/ADAPTOR/28RJ Unit

DS1 Channel	OP-A/ADAPTOR/28RJ Channel Connector	OP-A/ADAPTOR/28RJ I/O Connector	Optimux-1551 I/O Connector
1	1	I/O 1	I/O 1
2	2	"	"
3	3	"	"
4	4	"	"
5	5	"	"
6	6	"	"
7	7	"	"
8	8	"	"
9	9	"	"
10	10	"	"
11	11	"	"
12	12	"	"
13	13	"	"
14	14	"	"
15	15	I/O 2	I/O 2
16	16	"	"
17	17	"	"
18	18	"	"
19	19	"	"
20	20	"	"
21	21	"	"
22	22	"	"
23	23	"	"
24	24	"	"
25	25	"	"
26	26	"	"
27	27	"	"
28	28	"	"

Table A-11. DS1 Channel Connections for Second OP-A/ADAPTOR/28RJ Unit

DS1 Channel	OP-A/ADAPTOR/28RJ Channel Connector	OP-A/ADAPTOR/28RJ I/O Connector	Optimux-1551 I/O Connector
29	1	I/O 1	I/O 3
30	2	"	"
31	3	"	"
32	4	"	"
33	5	"	"
34	6	"	"
35	7	"	"
36	8	"	"
37	9	"	"
38	10	"	"
39	11	"	"
40	12	"	"
41	13	"	"
42	14	"	"
43	15	I/O 2	I/O 4
44	16	"	"
45	17	"	"
46	18	"	"
47	19	"	"
48	20	"	"
49	21	"	"
50	22	"	"
51	23	"	"
52	24	"	"
53	25	"	"
54	26	"	"
55	27	"	"
56	28	"	"

Table A-12. DS1 Channel Connections for Third OP-A/ADAPTOR/28RJ Unit

DS1 Channel	OP-A/ADAPTOR/28RJ Channel Connector	OP-A/ADAPTOR/28RJ I/O Connector	Optimux-1551 I/O Connector
57	1	I/O 1	I/O 5
58	2	"	"
59	3	"	"
60	4	"	"
61	5	"	"
62	6	"	"
63	7	"	"
64	8	"	"
65	9	"	"
66	10	"	"
67	11	"	"
68	12	"	"
69	13	"	"
70	14	"	"
71	15	I/O 2	I/O 6
72	16	"	"
73	17	"	"
74	18	"	"
75	19	"	"
76	20	"	"
77	21	"	"
78	22	"	"
79	23	"	"
80	24	"	"
81	25	"	"
82	26	"	"
83	27	"	"
84	28	"	"

Table A-13. E1 Channel Connections for First OP-A/ADAPTOR/28RJ or OP-A/ADAPTOR/21BNC Unit

E1 Channel	Patch Panel Connector	Channel	Patch Panel I/O Connector	Optimux-1551 I/O Connector
1	1		I/O 1	I/O 1
2	2		"	"
3	3		"	"
4	4		"	"
5	5		"	"
6	6		"	"
7	7		"	"
8	8		"	"
9	9		"	"
10	10		"	"
11	11		"	"
12	12		"	"
13	13		"	"
14	14		"	"
15	15		I/O 2	I/O 2
16	16		"	"
17	17		"	"
18	18		"	"
19	19		"	"
20	20		"	"
21	21		"	"

Table A-14. E1 Channel Connections for Second OP-A/ADAPTOR/28RJ or OP-A/ADAPTOR/21BNC Unit

E1 Channel	Patch Panel Channel Connector	Patch Panel I/O Connector	Optimux-1551 I/O Connector
22	1	I/O 1	I/O 3
23	2	"	"
24	3	"	"
25	4	"	"
26	5	"	"
27	6	"	"
28	7	"	"
29	8	"	"
30	9	"	"
31	10	"	"
32	11	"	"
33	12	"	"
34	13	"	"
35	14	"	"
36	15	I/O 2	I/O 4
37	16	"	"
38	17	"	"
39	18	"	"
40	19	"	"
41	20	"	"
42	21	"	"

Table A-15. E1 Channel Connections for Third OP-A/ADAPTOR/28RJ or OP-A/ADAPTOR/21BNC Unit

E1 Channel	Patch Panel Channel Connector	Patch Panel I/O Connector	Optimux-1551 I/O Connector
43	1	I/O 1	I/O 5
44	2	"	"
45	3	"	"
46	4	"	"
47	5	"	"
48	6	"	"
49	7	"	"
50	8	"	"
51	9	"	"
52	10	"	"
53	11	"	"
54	12	"	"
55	13	"	"
56	14	"	"
57	15	I/O 2	I/O 6
58	16	"	"
59	17	"	"
60	18	"	"
61	19	"	"
62	20	"	"
63	21	"	"

I/O Telco Cables (Option)

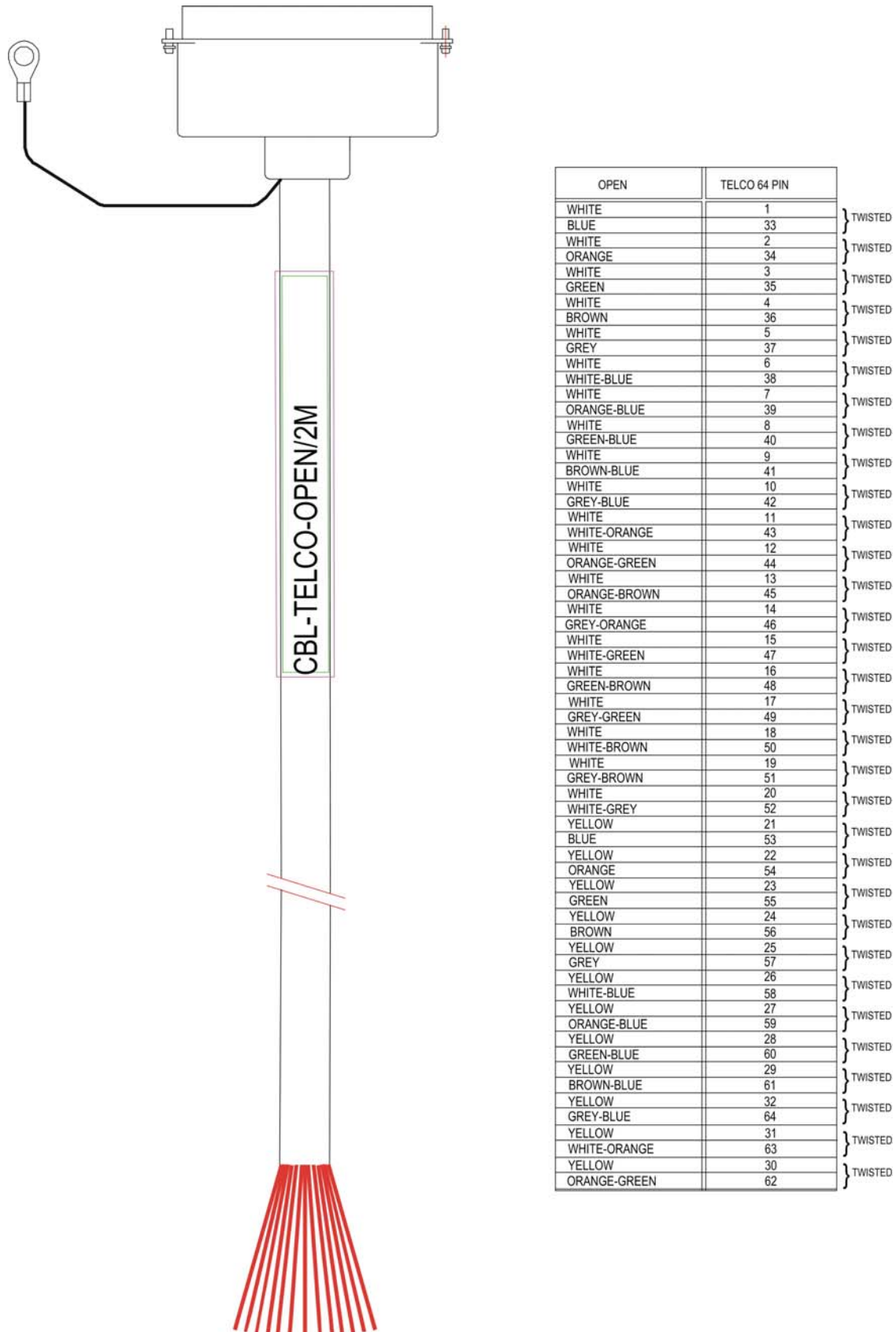


Figure A-1. Telco-Open Cable (P/N: CBL-TELCO-OPEN/2M)

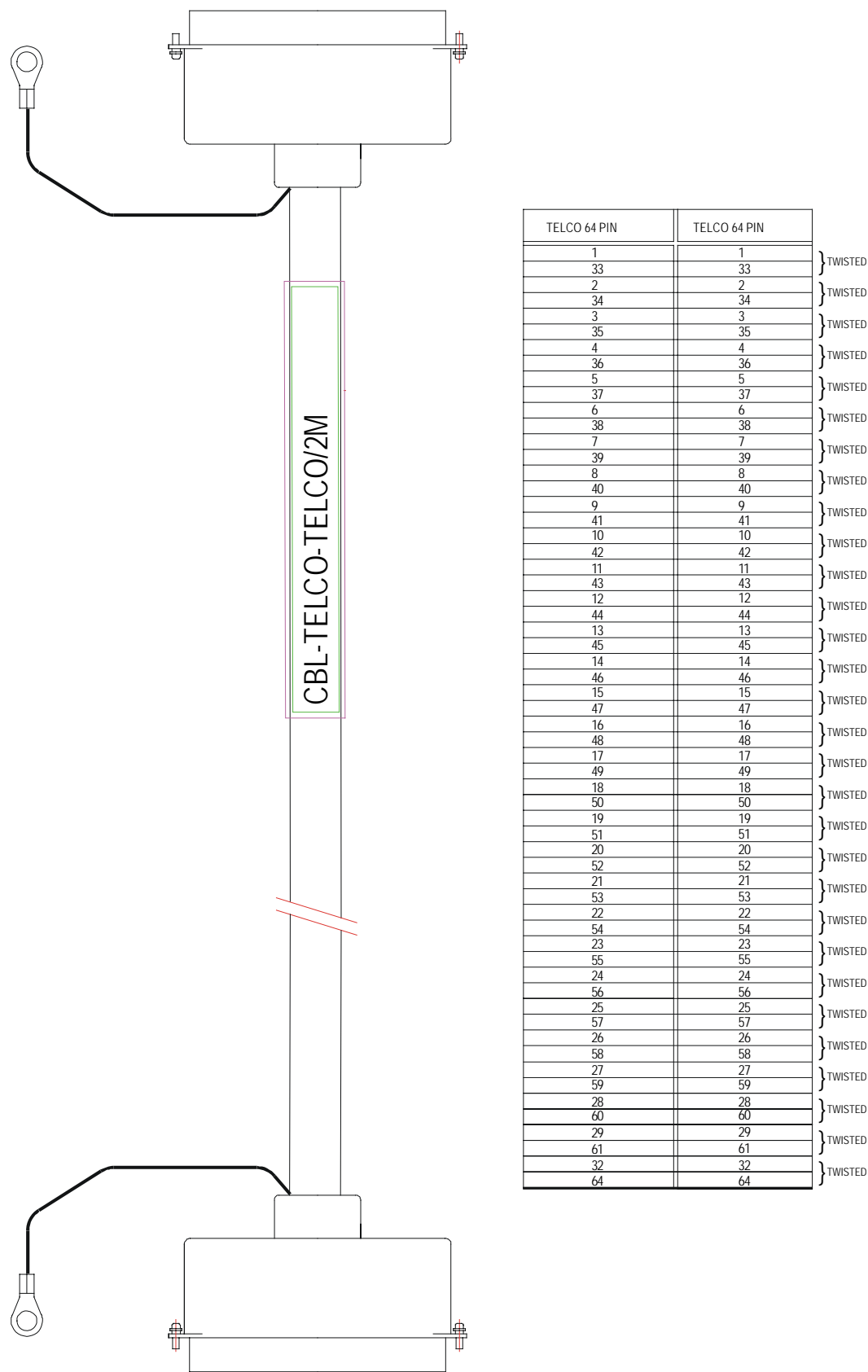


Figure A-2. Telco-Telco Cable (P/N: CBL-TELCO-TELCO/2M)

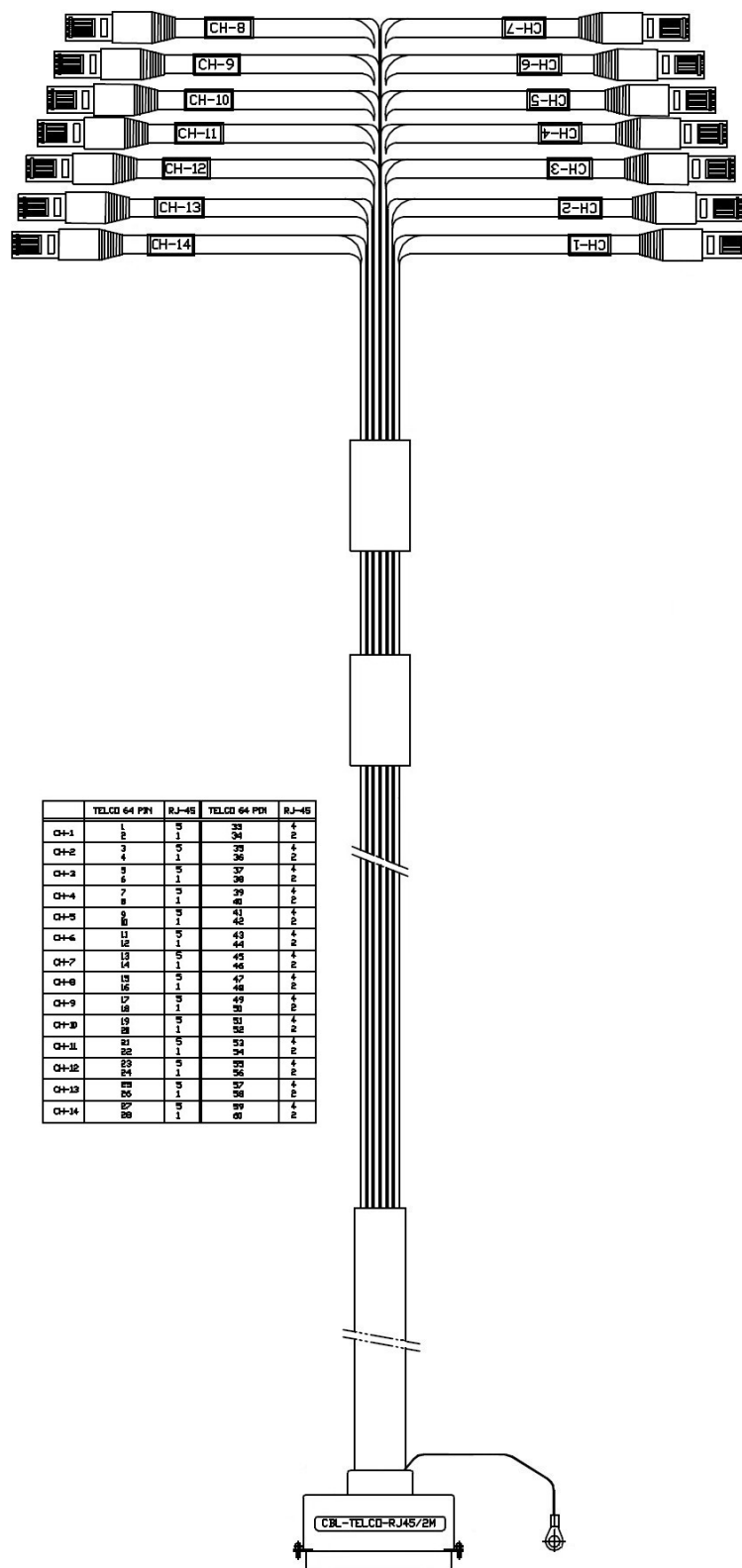


Figure A-3. Telco-RJ45 Cable (P/N: CBL-TELCO-RJ45/2M)

A.2 MNG-ETH Connector

One LAN Ethernet RJ-45 connector is located on the back panel. The pinout is as follows.

Table A-16. Ethernet RJ-45 Connector Pin Assignment

Pin	Designation	Description
1	ETH_RX_P	Ethernet positive Receive data
2	ETH_RX_N	Ethernet negative Receive data
3	ETH_TX_P	Ethernet positive transmit data
4	Not connected	Option to connect to GND through resistor
5	Not connected	Option to connect to GND through resistor
6	ETH_TX_N	Ethernet negative transmit data
7	Not connected	Option to connect to GND through resistor
8	Not connected	Option to connect to GND through resistor

A.3 Alarm Connector

The Optimux-1551 activates dry contact alarms. There are two relays: one for major alarms and the other for minor alarms.

Whenever the management software reports a minor or major alarm, the appropriate relay is activated. An external input alarm is also supported to enable the user to force an alarm externally.

To activate the input alarm, provide a minimum voltage of at least 10 VDC and a maximum of 48 VDC to pins 7 (INPUT_ALM_N) and 8 (INPUT_ALM_P).

Table A-17. Alarms Connector Pin Designations

Pin	Pin Name	Description
1	MIN_N_O	Connected to Pin no 6 when MINOR alarm relay is active. (Minor alarm OFF)
2	MIN_N_C	Connected to Pin no 6 when MINOR alarm relay is not active. (Minor alarm ON)
4	MAJ_N_O	Connected to Pin no 9 when MAJOR alarm relay is active. (Major alarm OFF)
5	MAJ_N_C	Connected to Pin no 9 when MAJOR alarm relay is not active. (Major alarm ON)
6	MIN_COMM	See Pins 1 and 2 for description.
7	INPUT_ALM_N	Input alarm negative input
8	INPUT_ALM_P	Input alarm positive input
9	MAJ_COMM	See Pins 4 and 5 for description.
3	Not connected	Option connection to GND through resistor

A.4 Clock Connector

This input supports E1/DS1 external input clock sources for the station clock module. If a backup OP-63E1/OP-84T1 card is used and with it a backup station clock card, both station clock cards receive the incoming E1/DS1 reference clock signal.

Table A-18. Station Clock Connector Pin Assignment

Pin	Designation	Description
1	STA_R_TIP	Input positive clock reference
2	STA_R_RING	Input negative clock reference
3	Not connected	
4	STA_T_TIP	Output positive clock reference for cascading (AIS Signal only)
5	STA_T_RING	Output Negative clock reference for cascading (AIS Signal only)
6	Not connected	
7	Not connected	
8	Not connected	

A.5 Control Connector

The terminal connector is used to connect a terminal to the Optimux-1551 with an asynchronous V24 interface connection. The terminal is used to monitor and control the unit. Alternatively the connection can be connected to dial-up modems to support the call-in/call-out feature.

Table A-19. Control Connector

Pin No.	Pin Name	Direction	Description
3	TXD	O	TXD data to terminal
4	DTR	O	DTR data terminal ready
2	RXD	I	RXD data from terminal
5	Not connected		Option to connect to GND through resistor
1	DCD	I	DCD input control from terminal
7	RTS	O	RTS output command to terminal
8	CTS	I	CTS input control from terminal
6	DSR	I	Not used
9	RI	I	Not used

Crossover Adaptor (DB9F-DB9M))

Note Crossover adaptor DB9F-DB9M is provided with Optimux-1551.

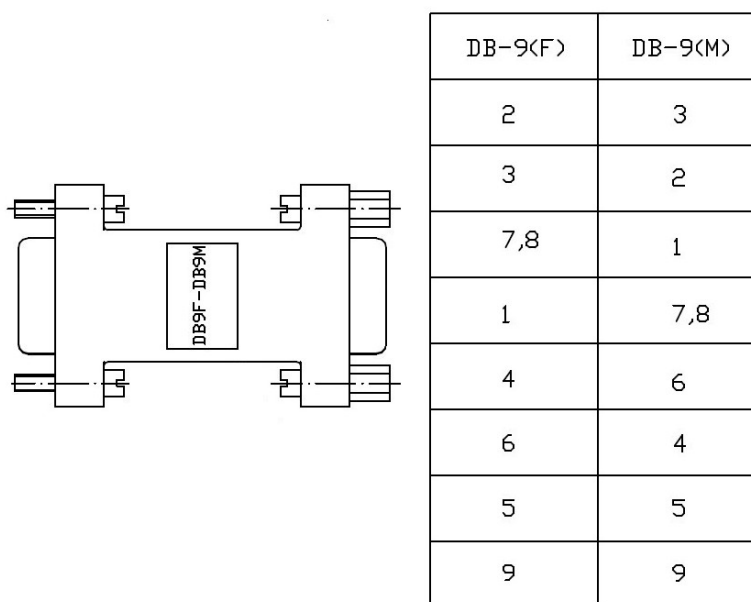


Figure A-4. Crossover Adaptor DB9F-DB9M

A.6 Monitor Connector

The monitor channel enables the user to select one of the tributary inputs for monitoring on external test equipment.

Table A-20. Pin-out for MONITOR Connector

Pin	Designation	Description
1	Not connected	
2	Not connected	
3	Not connected	
4	Monitor_TTIP	Output positive data for monitoring
5	Monitor_TRING	Output Negative data for monitoring
6	Not connected	
7	Not connected	
8	Not connected	

Appendix B

Glossary

AIS – Alarm Indication Signal – Special pattern used to notify connected equipment about a problem in the transmission lines

B8ZS – Zero suppression mechanism used in DS1

BER – Bit error

BPV – Bipolar Violation – A pulse with the same polarity as the previous pulse without being part of the zero suppression

EED – Excessive Error Defect – Number of received errors (BER) exceeds a threshold defined as e^{-3} , e^{-4} or e^{-5}

ETSI – European Telecommunication Standard Institute

EXZ – Excessive Zeros – A string of zeros longer than what HDB3 or B8ZS allows

FE – Far End

FO – Fiber Optic

HDB3 – Zero suppression mechanism used in E1

HVC – Higher-Order Virtual Container

LCV – Line Code Violation

LIU – Line Interface Unit

LLB – Local Loop Back

LOF – Loss Of Frame

LOS – Loss Of Signal

LVC – Lower-Order Virtual Container

MIB – Management Information Base

MM – Multimode

MS-AIS – AIS alarm received on the Multilex section of the SDH, high level AIS

NE – Near End

OC-3 – (SONET) Optical Carrier (OC) level 3

OP-63E1/OP-6384/OP-2128/OP-4256 Card – Contains many of the Optimux-1551 unit's primary circuits and accepts an optional station clock daughterboard. The OP-63E1 supports up to 63 E1 channels, the OP-6384 supports up to 63 E1 channels or up to 84 T1 channels, the OP-2128 supports up to 21 E1 channels or up to 28 T1 channels, and the OP-4256 supports up to 42 E1 channels or up to 56 T1 channels

PLL – Phase Lock Loop

RDI – Remote Defect Indication

RLB – Remote Loop Back

SD – Signal Degradation

SDH – Synchronous Digital Hierarchy – standard for telecommunications transport formulated by the International Telecommunication Union (ITU), previously called the International Telegraph and Telephone Consultative Committee (CCITT)

SM – Single-Mode

SOH – Section Overhead

SONET – Synchronous Optical Network – standard for optical telecommunications transport formulated by the Exchange Carriers Standards Association (ECSA) for the American National Standards Institute (ANSI), which sets industry standards in the US for telecommunications and other industries

STM-1 – (SDH) Synchronous Transport Module

STS-3 – (SONET) Synchronous Transport Signal level 3 - for electrical interface

WDM – Wavelength Division Multiplexer

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Manual Name: Optimux-1551 Ver. 2.2

Publication Number: 168-200-07/08

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Publication No. 168-200-07/08

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