

# LRS-24

12-slot Link Access Rack with SNMP

Version 3.00

## Installation and Operation Manual

---

### Notice

This manual contains information that is proprietary to RAD Data Communications. No part of this publication may be reproduced in any form whatsoever without prior written approval by RAD Data Communications.

No representation or warranties for fitness for any purpose other than what is specifically mentioned in this manual is made either by RAD Data Communications or its agents.

For further information contact RAD Data Communications at the address below or contact your local distributor.

| <b>RAD Data Communications<br/>Headquarters</b>                                                                     | <b>RAD Data Communications<br/>US East</b>                                                                             | <b>RAD Data Communications<br/>US West</b>                                                                    |
|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 12 Hanechoshet Street<br>Tel Aviv 69710 Israel<br>Tel: 972-3-6458181<br>Fax: 972-3-6498250<br>E-mail: rad@rad.co.il | 900 Corporate Drive<br>Mahwah, NJ 07430 USA<br>Tel: (201) 529-1100<br>Fax: (201) 529-5777<br>E-mail: market@radusa.com | 3631 South Harbor Boulevard<br>Suite 250<br>Santa Ana, CA 92704<br>Tel: (714) 850-0555<br>Fax: (714) 850-1555 |



## **Warranty**

This RAD product is warranted against defects in material and workmanship for a period of one year from date of shipment. During the warranty period, RAD will, at its option, either repair or replace products which prove to be defective. For warranty service or repair, this product must be returned to a service facility designated by RAD. Buyer shall prepay shipping charges to RAD and RAD shall pay shipping charges to return the product to Buyer. However, Buyer shall pay all shipping charges, duties and taxes for products returned to RAD from another country.

## **Limitation of Warranty**

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by Buyer, Buyer-supplied firmware or interfacing, unauthorized modification or misuse, operation outside of the environmental specifications for the product, or improper site preparation or maintenance.

## **Exclusive Remedies**

The remedies provided herein are the Buyer's sole and exclusive remedies. RAD shall not be liable for any direct, indirect special, incidental, or consequential damages, whether based on contract, tort, or any legal theory.

# Safety Warnings

## SEE INSTALLATION INSTRUCTIONS BEFORE CONNECTING TO THE SUPPLY!



The exclamation point within a triangle is intended to warn the operator or service personnel of operation and maintenance factors relating to the product and its operating environment which could pose a safety hazard.

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

## Telecommunication Safety

1. The unit should be installed within 1.5m (5 feet) of a grounded, easily accessible AC outlet, or in an adequately earthed rack mount. If the protective earth connection is not guaranteed by the mains supply, the unit must be externally connected to a reliable protective earth. DC powered units must be connected only to power sources which conform to the relevant safety standard.
2. In order to guarantee an uninterrupted flow of air stream, leave at least 15 mm spacing above and below the top and bottom sides of the unit. The recommended maximum temperature of the surrounding area is 40°C.
3. Vacant slots must always be covered with blank covers. This is necessary in order to guarantee a definite cooling stream of air and to prevent unintentional and unauthorized access inside the equipment.
4. The safety status of the ports on the LRS-24 is declared according to EN 41003 and is detailed in the table below. Interconnection of these ports with other apparatus should be made so that the equipment continues to comply with the requirements of EN 60950 connection of SELV and TNV circuits to other circuits after such a connection is made.

| Ports                                              | Safety Status                                                                                                                                                 |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| V.24, V.35, V.36, X.21, RS-530, Unbalanced E1, E&M | SELV      Circuit operating with Safety Extra-Low Voltage                                                                                                     |
| Baseband modems, ISDN, Balanced E1, T1, HDSL       | TNV-1      Circuit whose normal operating voltage is within the limits of SELV, on which overvoltages from Telecommunications Networks are possible.          |
| FXS                                                | TNV-2      Circuit whose normal operating voltage exceeds the limits of SELV, on which overvoltages from Telecommunications Networks are <i>not</i> possible. |
| FXO, Ports with remote power feeding (phantom)     | TNV-3      Circuit whose normal operating voltage exceeds the limits of SELV, on which overvoltages from Telecommunications Networks are possible.            |

Additional conditions concerning the safety of connection to telecommunication networks:

- The unit must be earthed prior to connection to telecommunication networks.
- The signal ground of the SELV circuits is connected at the factory to the protective earth. Interrupting this connection may invalidate the safety of the connection to unprotected telecommunication networks in certain locations where permanent excessive voltages are present on the lines.
- In order to comply with the requirements set out in EN 60950 for TNV-3 circuits, the maximum phantom supply voltage must not exceed 120 VDC. The remote power feeding supply must be floating and must comply with the requirements for TNV-3 circuits.
- DC powered units must be powered from EN 60950 or UL-1950 approved power source. In order to avoid a fire hazard, a suitable fuse or circuit breaker must be installed on the non-earthed DC line.

## **Regulatory Information**

### **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 instruction 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.

### **Warning per EN 55022**

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

### **LRS-PS-FEED Output Voltage**

The output voltage of the LRS-PS-FEED exceeds the limits of TNV-3 circuits. In the event of uncertainty about the regulatory status of connecting such voltages to leased lines provided by certain service providers, consult with a safety engineer.

# Declaration of Conformity

**Manufacturer's Name:** RAD Data Communications Ltd.

**Manufacturer's Address:** 12 Hanechoshet St.  
Tel Aviv 69710  
Israel

**declares that the product:**

**Product Name:** LRS-24

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

|                |                   |                                                                                                             |
|----------------|-------------------|-------------------------------------------------------------------------------------------------------------|
| <b>EMC:</b>    | EN 55022 (1994)   | Limits and methods of measurement of radio disturbance characteristics of information technology equipment. |
|                | EN 50082-1 (1992) | Electromagnetic compatibility - Generic immunity standards for residential, commercial and light industry.  |
| <b>Safety:</b> | EN 60950/A4       | Safety of information technology equipment, including electrical business equipment.                        |

## Supplementary Information:

The product herewith complies with the requirements of the EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC. The product was tested in a typical configuration.

Tel Aviv, March 19th, 2000



Haim Karshen  
VP Quality

**European Contact:** Rad Data Communications GmbH, Berner Strasse 77, 60437, Frankfurt am Main, Germany

# Quick Start Guide

If you are familiar with LRS-24, use this guide to prepare it for operation. Choose the section appropriate to the version of LRS-24 you are using.

---

## 1. LRS-24 with CM-1 Module

This section contains the startup instructions for LRS-24 with the CM-1 module.

### Power-On

- **To turn the power on:**
  1. Set the ON/OFF switches on the panels of the LRSI-PSP\*\* modules to ON.
  2. Supply the DC power, as applicable.
- **To supply external phantom feed voltages:**
  1. Turn on LRS-24.
  2. Turn on the source (for example, LRS-PS-FEED).

### Normal Indications

- **PS Module(s):** All the indicators on the panel(s) of the PS module(s) must light in green to indicate proper operation.
- **CM-1 Module:** The POWER indicator of the module must light. The TD and RD indicators may flash (or may light steadily) when a management session is in progress.

---

## 2. LRS-24 with CM-2 Module

This section contains the startup instructions for LRS-24 with the CM-2 module.

### Power-On

- **To turn the power on:**
  1. Set the ON/OFF switches on the panels of the LRSI-PSP\*\* modules to ON.
  2. Supply the DC power, as applicable.
- **To supply external phantom feed voltages:**
  1. Turn on LRS-24.
  2. Turn on the source (for example, LRS-PS-FEED).

### Normal Indications

- **PS Module(s):** All the indicators on the panel(s) of the PS module(s) must light in green to indicate proper operation.
- **CM-2 Module:** The POWER indicator of the module must light. The TD and RD indicators may flash (or light steadily) when a management session is in progress.

Normally, the STAT/ADD display shows the two least significant digits of the management number assigned to LRS-24. For normal startup, a rotating red circle is displayed. However, if a problem is detected during the power-up self-test, you will see a flashing error code (E1 through E9).

### Preliminary Configuration

Perform preliminary configuration on the LRS-24 hub (see *Chapter 4*).

# Contents

## Chapter 1. Introduction

|                                    |      |
|------------------------------------|------|
| 1.1 Overview .....                 | 1-1  |
| General .....                      | 1-1  |
| Versions.....                      | 1-3  |
| Application .....                  | 1-3  |
| Features.....                      | 1-4  |
| 1.2 Physical Description .....     | 1-6  |
| Chassis Description .....          | 1-6  |
| LRS-24 Module Slots.....           | 1-10 |
| 1.3 Functional Description .....   | 1-11 |
| Power Supply (PS) Modules .....    | 1-11 |
| Common Logic Modules.....          | 1-12 |
| Management .....                   | 1-13 |
| I/O (User) Modules .....           | 1-14 |
| 1.4 Technical Specifications ..... | 1-14 |

## Chapter 2. Installation and Setup

|                                                                 |      |
|-----------------------------------------------------------------|------|
| 2.1 Introduction .....                                          | 2-1  |
| Mechanical Data.....                                            | 2-1  |
| 2.2 Site Requirements and Prerequisites.....                    | 2-4  |
| AC Power .....                                                  | 2-4  |
| DC Power.....                                                   | 2-4  |
| Grounding.....                                                  | 2-4  |
| Interface Module Handling Precautions.....                      | 2-4  |
| Module Handling Precautions.....                                | 2-5  |
| Front Clearance .....                                           | 2-5  |
| Ambient Requirements .....                                      | 2-5  |
| Cooling.....                                                    | 2-5  |
| 2.3 Unpacking the Chassis .....                                 | 2-5  |
| 2.4 Installation and Setup.....                                 | 2-6  |
| PS Modules .....                                                | 2-6  |
| CM-1 Module.....                                                | 2-8  |
| CM-2 Module.....                                                | 2-12 |
| 2.5 Interfaces and Connections .....                            | 2-15 |
| PS Interface Modules .....                                      | 2-16 |
| LRSI-F-CM1 .....                                                | 2-17 |
| LRSI-F-1-CM2 / LRSI-B-1-CM2 Interface Modules with 10BaseT..... | 2-18 |
| LRSI-F-2-CM2 Interface Module with 10Base2 .....                | 2-21 |
| LRS-24 Enclosure.....                                           | 2-24 |
| 2.6 Initial Operation and Basic Checks.....                     | 2-27 |
| LRS-24 with CM-1 Module .....                                   | 2-27 |
| LRS-24 with CM-2 Module .....                                   | 2-28 |

**Chapter 3. Management via the CM-1 Module**

|                                                        |     |
|--------------------------------------------------------|-----|
| 3.1 Introduction .....                                 | 3-1 |
| CM-1 Functions .....                                   | 3-1 |
| Management Capabilities.....                           | 3-1 |
| 3.2 Hardware Requirements .....                        | 3-2 |
| Terminal Characteristics .....                         | 3-2 |
| Management RS-232 Port Interface Characteristics ..... | 3-2 |
| Connecting the Terminal.....                           | 3-2 |
| 3.3 Operating the CM-1 Supervision Terminal .....      | 3-4 |
| General .....                                          | 3-4 |
| Configuring the Terminal .....                         | 3-4 |
| Performing Preliminary Configuration.....              | 3-5 |
| Configuring Individual Modules.....                    | 3-5 |

**Chapter 4. Management via the CM-2 Module**

|                                                         |      |
|---------------------------------------------------------|------|
| 4.1 Introduction .....                                  | 4-1  |
| CM-2 Module Capabilities .....                          | 4-1  |
| CM-2 Functions .....                                    | 4-2  |
| Handling of Management Communication.....               | 4-3  |
| Management Priorities .....                             | 4-4  |
| Preliminary Configuration Activities.....               | 4-4  |
| Initializing CM-2 .....                                 | 4-5  |
| 4.2 Hardware Requirements .....                         | 4-6  |
| Terminal Characteristics .....                          | 4-6  |
| RS-232 Supervisory Port Interface Characteristics ..... | 4-7  |
| Terminal Connection Methods.....                        | 4-7  |
| Connection of Management Station .....                  | 4-7  |
| 4.3 CM-2 Supervision Terminal Language .....            | 4-11 |
| General .....                                           | 4-11 |
| Index of Commands .....                                 | 4-12 |
| 4.4 Supervision Terminal Operating Instructions.....    | 4-13 |
| General .....                                           | 4-13 |
| Configuring the Terminal .....                          | 4-13 |
| Changing the Password .....                             | 4-14 |
| Preliminary Configuration .....                         | 4-14 |
| Configuring Individual Modules.....                     | 4-14 |
| Configuration by SNMP Network Management Stations ..... | 4-15 |
| Transferring Control to the Supervision Terminal .....  | 4-15 |

**Chapter 5. Troubleshooting and Diagnostics**

|                            |     |
|----------------------------|-----|
| 5.1 Alarms.....            | 5-1 |
| 5.2 Diagnostic Tests ..... | 5-1 |
| 5.3 Troubleshooting .....  | 5-1 |
| 5.4 Error Messages .....   | 5-2 |

**Appendix A. Connector Wiring****Appendix B. LRS-PS-FEED Power Supply****Appendix C. SNMP Management****Appendix D. CM-2 Management Commands**

## List of Figures

|                                                                                 |      |
|---------------------------------------------------------------------------------|------|
| 1-1. Backbone Data Distribution up to Customer's Premises.....                  | 1-3  |
| 1-2. Management of Local and Remote Distribution Nodes .....                    | 1-4  |
| 1-3. LRS-24B 3-D View .....                                                     | 1-7  |
| 1-4. LRS-24B Enclosure .....                                                    | 1-8  |
| 1-5. LRS-24F 3-D View.....                                                      | 1-9  |
| 1-6. LRS-24F Enclosure.....                                                     | 1-10 |
| 1-7. LRS-24F Enclosure, Typical Front View .....                                | 1-11 |
| 1-8. Basic Management Configuration for LRS-24 with CM-2 Modules .....          | 1-14 |
| 2-1. LRS-24F Mechanical Diagram.....                                            | 2-2  |
| 2-2. LRS-24B Mechanical Diagram .....                                           | 2-3  |
| 2-3. PS Module Panels.....                                                      | 2-7  |
| 2-4. Module CM-1 Front Panel.....                                               | 2-9  |
| 2-5. Module CM-1, Internal Jumpers .....                                        | 2-10 |
| 2-6. Module CM-2 Front Panel.....                                               | 2-12 |
| 2-7. Module CM-2, Internal Jumpers .....                                        | 2-14 |
| 2-8. LRSI-F-PSP/230/114 and LRSI-F-PS/48 Interface Module Panels .....          | 2-17 |
| 2-9. Typical LRSI-F-CM1 Interface Module Panel.....                             | 2-18 |
| 2-10. LRSI-F-1-CM2 / LRSI-B-1-CM2 Interface Module Panel with 10BT .....        | 2-19 |
| 2-11. Interface Module LRSI-F-1-CM2 with UTP Connector, Internal Jumpers.....   | 2-20 |
| 2-12. LRSI-F-2-CM2 Interface Module Panel with 10B2 .....                       | 2-22 |
| 2-13. Interface Module LRSI-F-2-CM2 with BNC Connectors, Internal Jumpers ..... | 2-23 |
| 3-1. Typical Direct Connection of Supervision Terminal .....                    | 3-3  |
| 3-2. Typical Connection of Supervision Terminal Through Modem Link .....        | 3-4  |
| 4-1. Typical Direct Connection of Supervision Terminal .....                    | 4-8  |
| 4-2. Typical Connection of Supervision Terminal Through Modem Link .....        | 4-8  |
| 4-3. Typical Connection of Supervision Terminal Through Slip .....              | 4-9  |
| 4-4. Typical Connection to Network Management Station .....                     | 4-10 |
| 4-5. Password Menu Screen .....                                                 | 4-14 |
| 4-6. JP15 Settings.....                                                         | 4-14 |
| 5-1. Error Indicators.....                                                      | 5-2  |

## List of Tables

|                                                               |      |
|---------------------------------------------------------------|------|
| 2-1. PS Modules, Front Panel Indicators.....                  | 2-7  |
| 2-2. Module CM-1, Front Panel Components .....                | 2-9  |
| 2-3. Module CM-1 Jumper Settings.....                         | 2-11 |
| 2-4. Module CM-2, Front Panel .....                           | 2-13 |
| 2-5. Module CM-2 Jumper Settings.....                         | 2-15 |
| 2-6. PS Interface Module Types .....                          | 2-16 |
| 2-7. Management 10BT Ethernet LEDs .....                      | 2-19 |
| 2-8. LRSI-F-1-CM2 Module Jumper Settings.....                 | 2-21 |
| 2-9. LRSI-F-2-CM2 Interface Module Jumper Settings .....      | 2-23 |
| 2-10. CM-2 Module STATION CLK Connector, Pin Allocation.....  | 2-26 |
| 2-11. CM-1 Module Management RS-232 Pin Allocation.....       | 2-27 |
| 4-1. Terminal Command Set Index for CM-2 Module .....         | 4-12 |
| 4-2. Terminal Command Set Index for CM-2 Module (Cont.) ..... | 4-13 |
| 5-1. Front Panel Indicator Displays .....                     | 5-2  |
| 5-2. Error Messages.....                                      | 5-3  |

# Chapter 1

---

## Introduction

This chapter describes the basic physical and functional features of the LRS-24 modem rack, as well as some typical applications. The following topics are discussed:

- Overview
- Physical Description
- Functional Description
- Technical Specifications.

---

### 1.1 Overview

#### General

LRS-24 is a high-density SNMP managed modem chassis. The chassis has 12 slots that accommodate up to 24 modems. Using modular interface cards, LRS-24 can support xDSL, fiber or baseband modems in the same chassis under a single management application.

Supporting different modem technologies enables a wide range of data-rates, starting from 1.2 kbps in IDSL modems, through 2 Mbps with HDSL/fiber modems, and up to 43 Mbps using fiber modems. This also enables ranges from 4.8 km at 2 Mbps over copper to 100 km over fiber modems.

LRS-24 is available in two different physical hub versions: **LRS-24B (ANSI)** or **LRS-24F (ETSI)**.

All cards can be replaced or cables removed during operation, without causing interference to data transmission to/from other cards in the chassis.

Modular data interfaces allow modem connectivity via a wide range of data interfaces. These include: V.24, V.35, X.21, RS-530, V.36, G.703 codirectional, E1, built-in Ethernet bridge, or built-in IP router.

LRS-24 accepts a system clock via the DB-15 connector placed on the CM-2 card.

## Management/CM-2 functions

LRS-24 is managed by a UNIX-based or PC-based SNMP management system via the Central Management card (CM-2). The software is user-friendly, GUI-based and runs under PC/Windows (RADview-PC) or HP OpenView (RADview-HPOV) systems. Configuration and monitoring are also provided via TELNET or ASCII terminal.

Network management provides centralized control of all LRS-24 hubs, modem cards and remote modems in the network, including interface configuration, connection setup, alarm and monitoring. A single management station can control up to 64,000 LRS-24 hubs.

Direct 10BaseT Ethernet connection enables real-time management of central and remote sites. Performance information is available in graph and table format for the last 24 hours. This information can be saved in a file for accounting purposes.

If a major alarm occurs, the LRS-24 CM-2 card can dial out through an external dial-up modem to a central management site. This saves a direct connection to remote sites, while providing alerts if critical events occur. In addition alarms can activate dry contacts. The dry contacts are placed on the system clock connector on CM-2.

Two types of modem cards are available on the LRS-24:

- S-Mode: Cards with a built-in SNMP agent
- I-Mode: Cards without an SNMP agent. For these cards CM-2 serves as the SNMP proxy agent. The CM-2 built-in agent complies with SNMP MIB II and supports generic SNMP HPOV applications.

A new software version can be downloaded from a remote site onto the CM-2 via:

- LAN by TFTP protocol
- Terminal by XMODEM.

CM-2 saves up to three software versions.

When the management station includes BootP software, the CM-2 card automatically retrieves the IP address required for management connection. This eliminates the need to configure IP addresses for new hub installations.

LRS-24 can also be managed from an ASCII terminal. It allows all functions of SNMP except for GUI interface. The connection is made via a V.24 supervisory port using SLIP or PPP protocol.

Telnet support enables terminal connection over any IP network.

The CM-2 panel includes an alphanumeric display with two characters used for alerting on fault conditions and for the hub IP address.

## Power Supplies

LRS-24 operates with single or dual, AC or DC power supplies. Each power supply supports a full LRS-24 hub, including modem cards. Redundant power supply can be replaced during operation, without affecting system performance (hot-swapping).

Cards in the LRS-24 chassis are capable of providing remote power feeding for repeaters and remote standalone modems. To provide remote power feeding order a separate standalone power supply, LRS-PS-FEED.

## Versions

Two different physical versions of the LRS-24 hub are available:

- **ANSI** – card insertion, LEDs and switches are at the front, but cable connections are at the rear of the hub. This compact, 4U high unit complies with the American ANSI standard. Cards can be hot-swapped without removing cables.
- **ETSI** – card insertion, LEDs, switches and cable connections are at the front. This version is 30 cm high (almost 6U), and complies with European ETSI standard. Cards can be hot-swapped without removing cables.

## Application

Figure 1-1 shows an application of Backbone Data Distribution up to Customer's Premises.

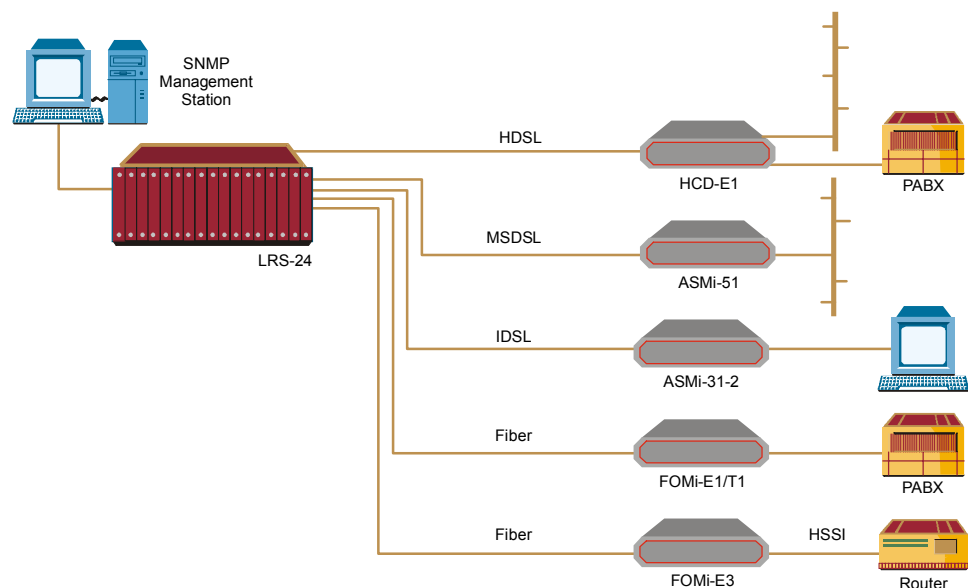


Figure 1-1. Backbone Data Distribution up to Customer's Premises

Figure 1-2 shows an application of Management of Local and Remote Distribution Nodes.

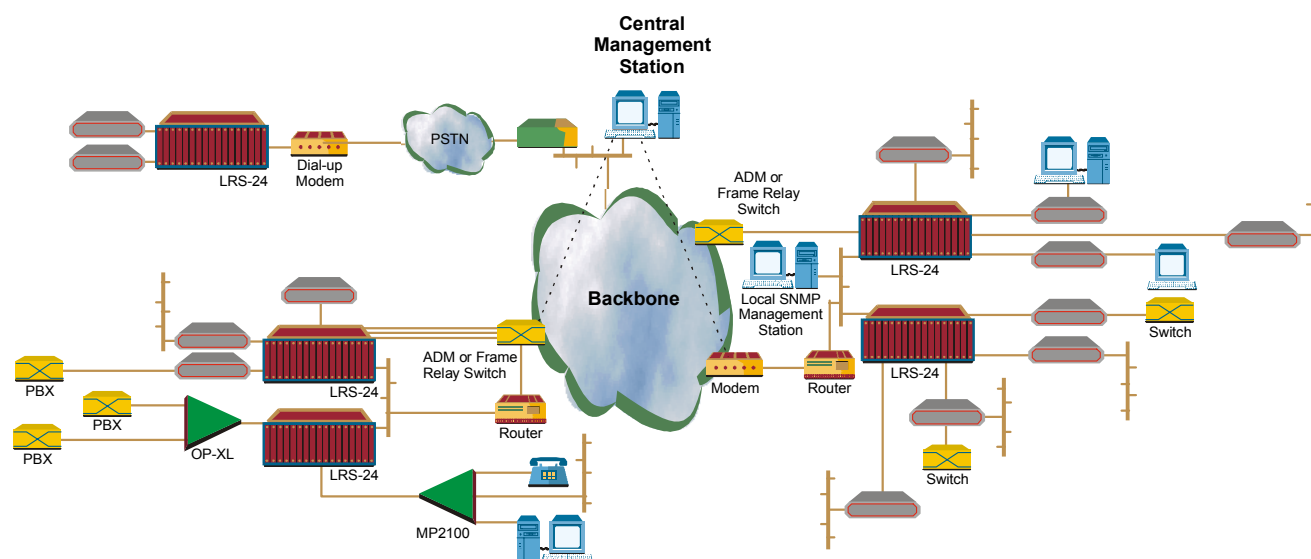


Figure 1-2. Management of Local and Remote Distribution Nodes

## Features

LRS-24 is a high-density, fully modular design with front-panel access to all the functions. It supports up to 48 user modules in addition to redundant power supply and management access modules.

It combines different technologies in a centrally-managed rack: DSL, fiber and baseband.

LRS-24 offers single-point management access to the individual equipment modules installed in the hub, and to the remote equipment units connected by links to these modules. LRS-24 supports SNMP management, as well as management by means of an ASCII terminal. No special software is required for the terminal, which is controlled by the management software of the modules installed in LRS-24.

Clock signals are distributed from an external source (station clock) to all the equipment modules installed in the hub.

There is a standard set of regulated supply voltages. Power supply redundancy ensures continuous availability of power.

The unit supports remote (phantom) feed of equipment connected to LRS-24.

The mechanical design separates user hardware modules from interface (connector) modules, facilitates maintenance tasks.

The form factor is suitable for installation in standard 300 mm and 600 mm ETSI racks; can be easily adapted for installation in 19" racks.

The flexible modular construction and management capabilities that are available for the equipment installed in LRS-24 enable the user to easily configure individual systems for specific requirements and applications.

## Remote Management

The modem cards in the LRS-24 can be remotely managed by the RADview-HPOV SNMP management system, the PC-based RADview-PC/MDM management system or by a dumb terminal. The same RADview application can manage the LRS-24, modems in the hub and other RAD products.

Audible and visual indicators provide status of alarms and tests at the network, card and port levels, and include all links connected to the hub. Alarms are automatically logged and presented upon request, unless otherwise masked.

## RADview-HPOV SNMP Management System

Both electrical and fiber optic modem cards can be managed by the RADview-HPOV SNMP management system. All cards in the hub, except for ASM-40CD, have remote control abilities for monitoring and/or controlling remote units, and several types of cards contain an internal SNMP agent. In some cases, managed cards can work opposite non-manageable modems.

RADview-HPOV management is available for modules with or without integrated SNMP agent, via the SNMP Control Module (CM-2). The RADview-HPOV station is connected to LRS-24 via an integrated Ethernet connection on the CM-2 module; CM-2 acts as a proxy SNMP agent for those cards without an agent.

## RADview-PC/MDM Management System

The RADview-PC/MDM management station communicates with LRS-24 using out-of-band communication via Ethernet.

The RADview-PC/MDM has a windows-based Graphical User Interface (GUI) platform for LAN and WAN networks. The graphical user interface allows configuration with easy-to-use operations on graphical representations of the hub. The configuration can be performed at the port, card, hub and network levels.

## Management by Dumb Terminal

LRS-24 can also be managed from a dumb terminal. Control Module CM-1 is used for ASCII terminal management of modules with SNMP agent on-board, such as HTU-E1C.

## Clock

Both control modules, CM-1 and CM-2, have a station clock connection enabling clock distribution to all cards, so that all cards can be synchronized to the same station clock. Refer to the specific card operation manual for a description of station clock support.

## Power Supplies

LRS-24 operates with single or dual power supplies: AC or DC. Each power supply supports a full rack of cards of any combination. The redundant power supply can be replaced during operation, without affecting the system performance (hot- swapping).

## 1.2 Physical Description

### Chassis Description

There are two different physical versions of LRS-24: LRS-24B and LRS-24F.

#### **LRS-24B ANSI UNIT**

LRS-24B is a modular chassis suitable for installation in standard ANSI racks. It has a height of 200 mm (4U). The chassis has physical slots arranged on the front and back sides:

- The front side accepts 4U-high functional modules (the modules that perform the various processing functions).
- The back side accepts 2U-high interface modules which contain the connectors used to access the modules on the front side.

*Figure 1-3* shows a 3-dimensional view of LRS-24B.

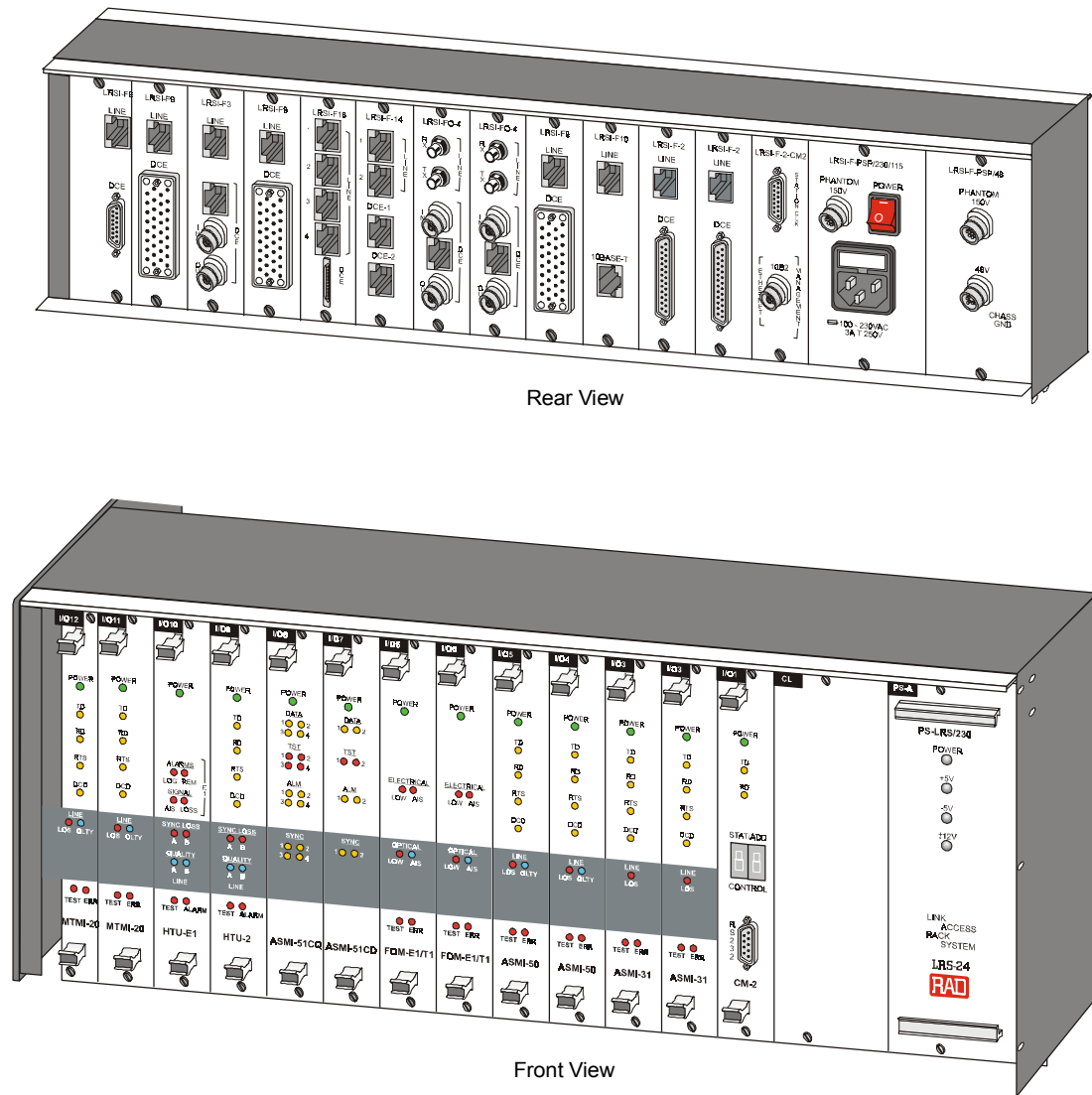
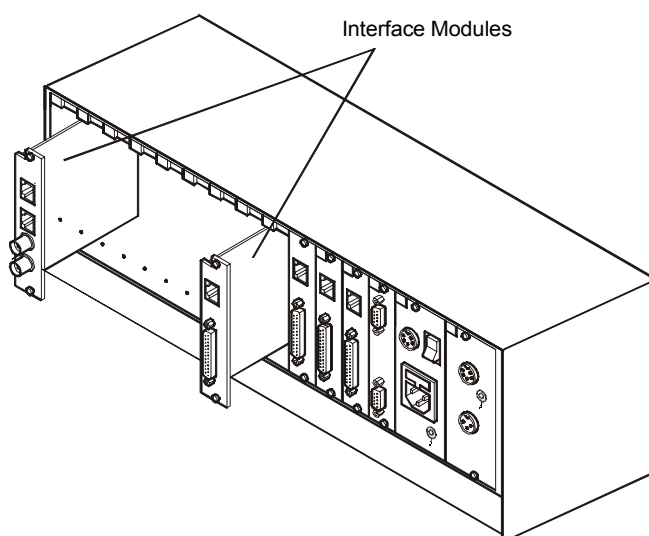
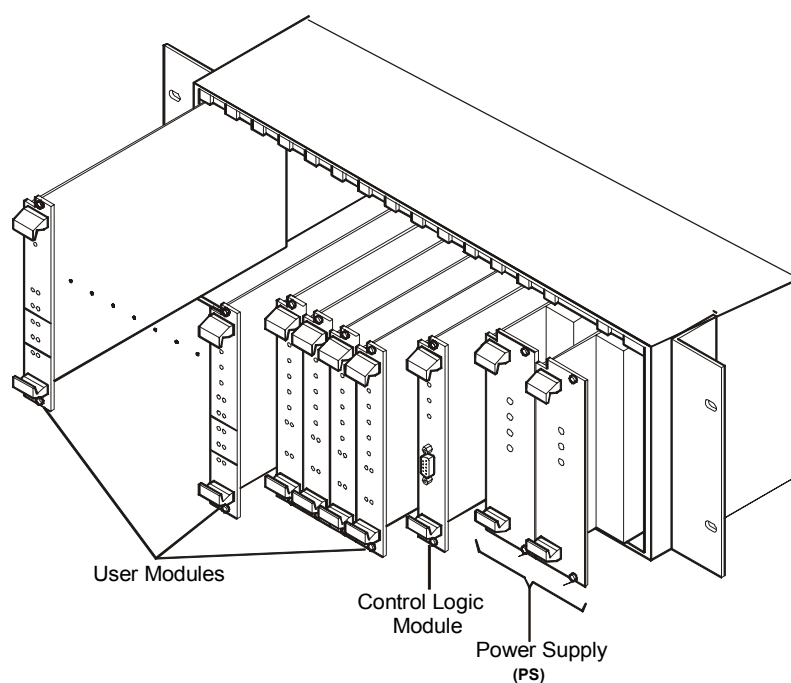


Figure 1-3. LRS-24B 3-D View

Figure 1-4 shows the LRS-24B enclosure with the Interface Modules, User Modules, Control Logic Module, and Power Supply Module.



LRS-24B Rear Section



LRS-24 Front Section

*Figure 1-4. LRS-24B Enclosure*

## LRS-24F ETSI UNIT

LRS-24F is a modular chassis suitable for installation in standard ETSI racks, having a height of 300 mm (6U). The chassis has physical slots arranged in two rows:

- The lower row accepts 4U-high functional modules (the modules that perform the various processing functions).
- The top row accepts 2U-high interface modules, which contain the connectors used to access the modules in the lower row. The interface modules enable the connection of cables from the front side, and thus functional modules can be easily removed for maintenance without disconnecting cables.

Figure 1-5 shows a 3-dimensional view of LRS-24F.

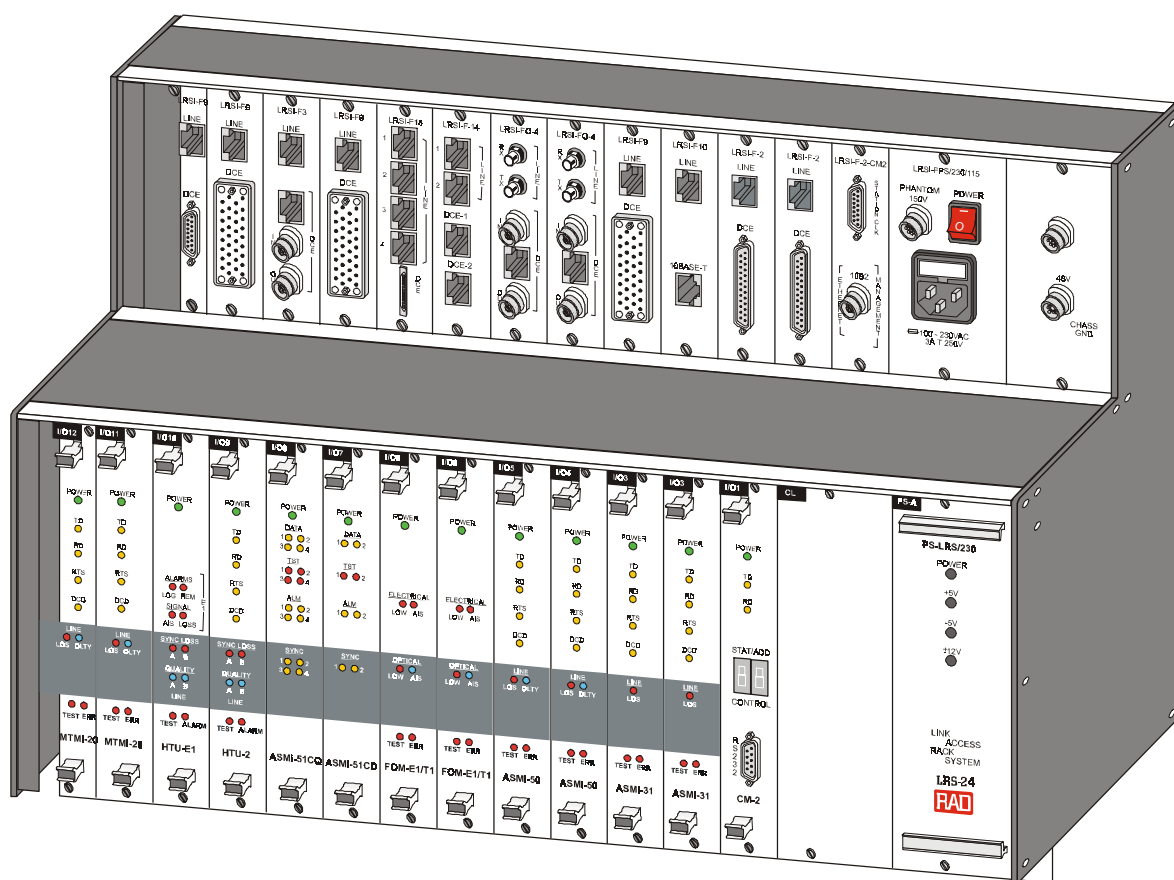


Figure 1-5. LRS-24F 3-D View

## LRS-24F Enclosure

Figure 1-6 shows the LRS-24F enclosure including User Modules and Interface Modules, Control Logic module, and Power Supply module.

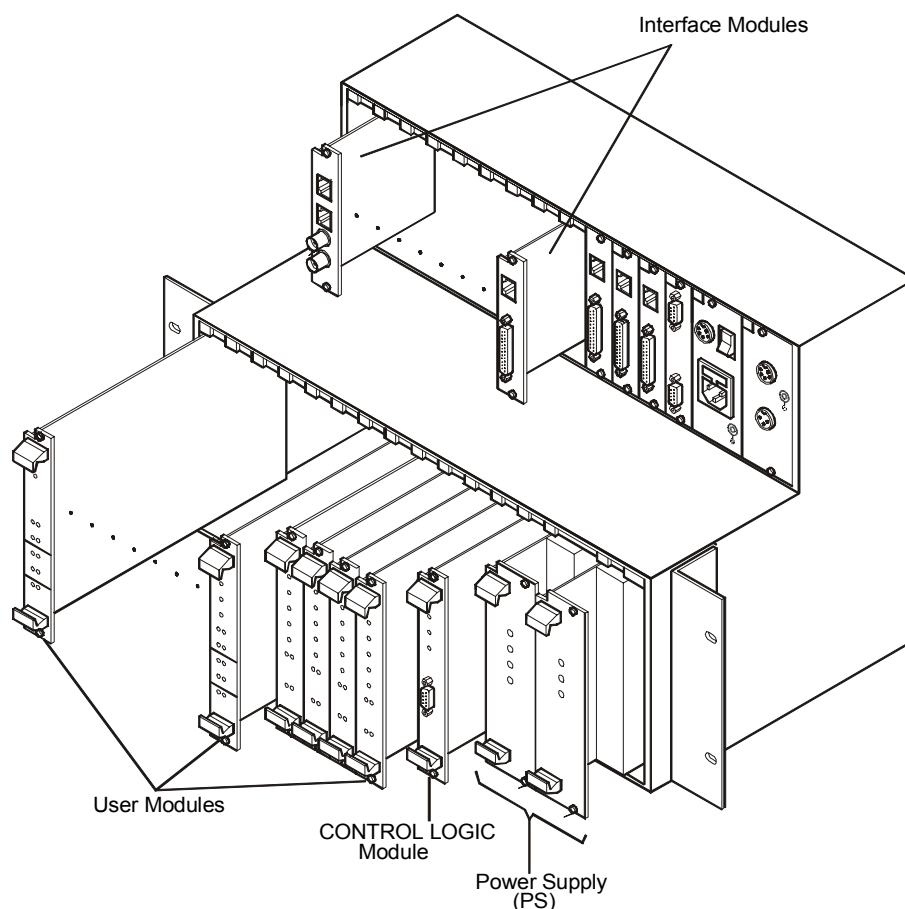


Figure 1-6. LRS-24F Enclosure

## LRS-24 Module Slots

The LRS-24F enclosure has a lower section for the functional modules and a top section for interface modules. The LRS-24B enclosure has a front section for the functional modules and a rear section for interface modules.

Each section has 15 module slots:

- Two slots are reserved for PS modules.
- One slot is reserved for the common logic module (CM-1 or CM-2).
- The other 12 slots are intended for user (I/O) modules. Each I/O slot can accept any type of I/O module. The modules are inserted from the front side. The top section of LRS-24F (back section of LRS-24B) includes slots for the interface modules.

### Front View

Figure 1-7 shows a typical front view of the LRS-24F enclosure, and identifies the slots and their use. Note the labels that designate the type of module that can be installed in each slot.

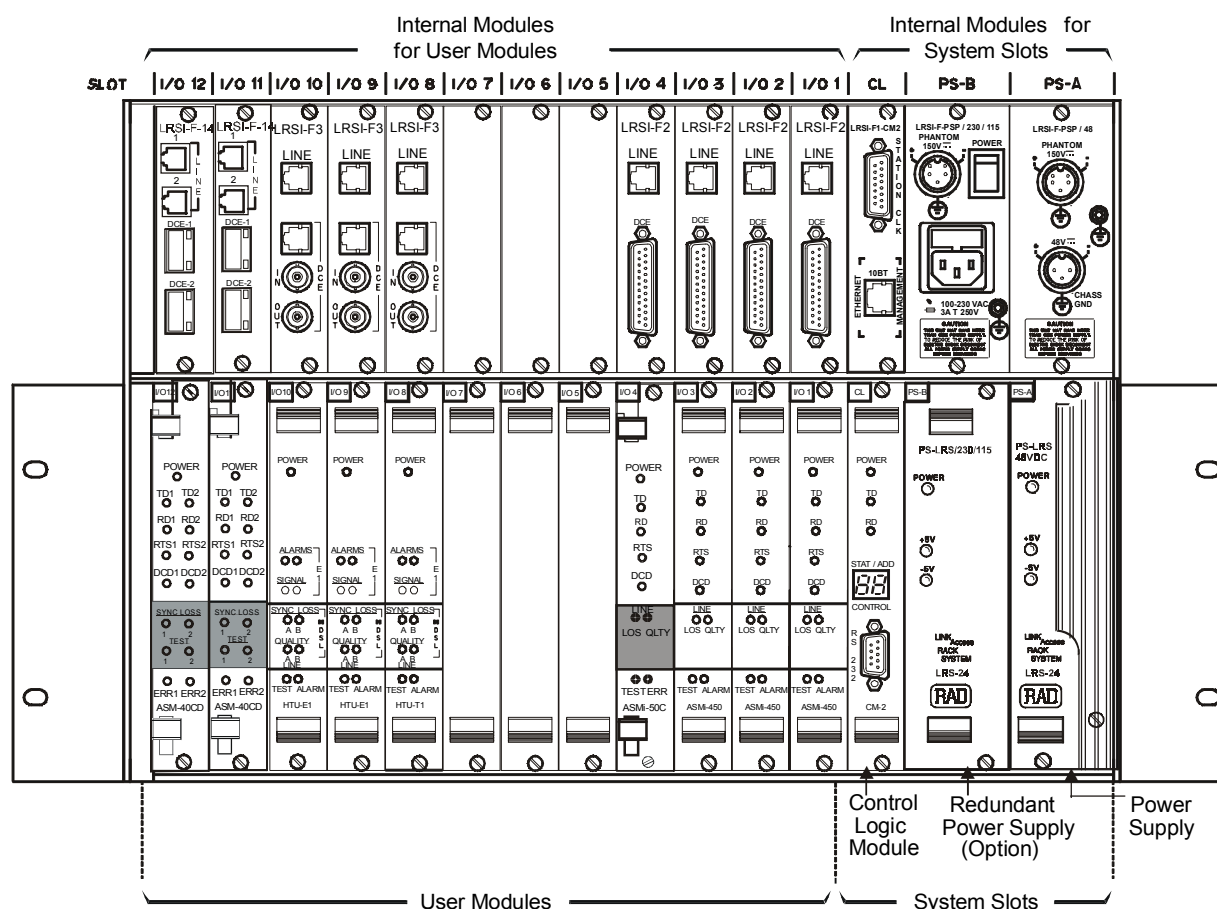


Figure 1-7. LRS-24F Enclosure, Typical Front View

### 1.3 Functional Description

The main functions of the LRS-24 chassis are to provide mechanical support and connections between the various modules.

The main modules are:

- Power Supply (PS) Modules
- Common Logic Modules
- I/O (User) Modules.

## Power Supply (PS) Modules

The LRS-24 hub can be powered by AC and DC power supply modules. Two power supply modules can be installed to provide redundancy. The following types of AC and DC power supply modules are available for LRS-24:

- AC power supply module, PS-LRS/230/115 – operates on 100 to 240 VAC nominal, and provides a maximum total output power of 120W.

- DC power supply module, PS-LRS/48 – operates on –48 VDC, and provides a maximum total power of 120W.

The PS modules are installed in dedicated chassis slots. The chassis has two PS slots, enabling the installation of two PS modules, for redundancy. When both modules are operational, they share the load; in case of failure or loss of input power, the remaining module continues to supply the power alone. Switchover is thus automatic and does not interrupt normal operation.

A redundant module can be installed in an operating enclosure without turning off the enclosure power. An AC and a DC PS module can be installed simultaneously.

Several I/O modules installed in the chassis can supply remote (phantom) feed voltage for the remote equipment connected to the modules installed in the LRS-24. This voltage must be provided by an external source.

RAD offers a standalone unit, LRS-PS-FEED, that can provide the required voltage for the remote power source. LRS-PS-FEED is explained in *Appendix B* of this manual.

The phantom feed voltage is connected through the power supply interface module and through the corresponding PS to the internal phantom feed distribution bus of the LRS-24.

## Common Logic Modules

LRS-24 is managed by either of the two CM modules, CM-1 or CM-2. The main functions of the two module types are:

- Interfacing between a management facility and the equipment modules installed in LRS-24. The CM-1 module only supports management by means of a supervision terminal; the CM-2 module also supports network management stations.
- Distribution of an external clock signal (station clock) to the equipment modules. The station clock interface circuits of the common logic modules have the following user-selectable modes:
  - T1 DSU interface per ANSI TR-62411 and ANSI T1.403, with 100 $\Omega$  balanced T1 line interface. This mode accepts an AMI-coded clock signal of 1544 kHz. The maximum signal attenuation is 10 dB.
  - E1 DSU interface per ITU-T Rec. G.703, which accepts an HDB3-coded clock signal of 2048 kHz. The E1 interface can be configured to operate as a 120 $\Omega$  balanced line interface, or a 75 $\Omega$  unbalanced interface. The maximum line attenuation is 10 dB.
  - Square interface per TTL input.

The recovered clock signal is returned toward the equipment providing the clock signal (remote loop condition, controlled by a user jumper).

## Management

### CM-1 Management Capabilities

An ASCII terminal can be used as a supervision terminal to manage the CM-1 module. The supervision terminal is connected to one of the RS-232 asynchronous serial supervisory ports (one port is located on the CM-1 module itself and the second port is located on the interface module serving the CM-1 module).

The CM-1 module operates as an interface module that does not process the management information, but only transfers the management traffic transparently to the modules installed in the LRS-24. Therefore, the supervision terminal is controlled by the software stored in the managed modules, and the management capabilities depend on the capabilities of the managed modules.

For a description of the management activities supported by a terminal connected to the CM-1 module, refer to the *Installation and Operation Manuals* available for the modules installed in LRS-24.

### CM-2 Management Capabilities

The CM-2 module enhances the management capabilities available to the user by including three different management functions:

- **SNMP management.** For SNMP management, the CM-2 module communicates via an additional management interface located on the interface module serving the CM-2 module. Currently, two types of interfaces are available: an Ethernet 10BaseT interface (for UTP and STP media), and an Ethernet 10Base2 interface (for coaxial media). This configuration is illustrated in *Figure 1-8*.
- **SNMP management communication with an LRS-24 module that includes an SNMP agent** is handled by an internal SNMP agent and bridge/router located on the CM-2 module. To enable SNMP management of modules without SNMP agents, the CM-2 module includes a proxy agent that converts the management traffic to the proprietary internal protocol used to manage such modules.
- **Management by an ASCII terminal operating as a supervision terminal.** The terminal, which is controlled by the software stored in the managed modules, connects to the serial RS-232 asynchronous supervisory port located on the CM-2 module (see *Figure 1-8*). The management capabilities available through the terminal are similar to those available through the CM-1 module.
- **Management by means of Telnet.** The CM-2 also supports the Telnet protocol. This enables remote management via the same command line interface used with a supervision terminal. Telnet uses TCP/IP communication through the Ethernet port of the CM-2 card.
- **Management via RS-232** by Slip Protocol with SNMP management.

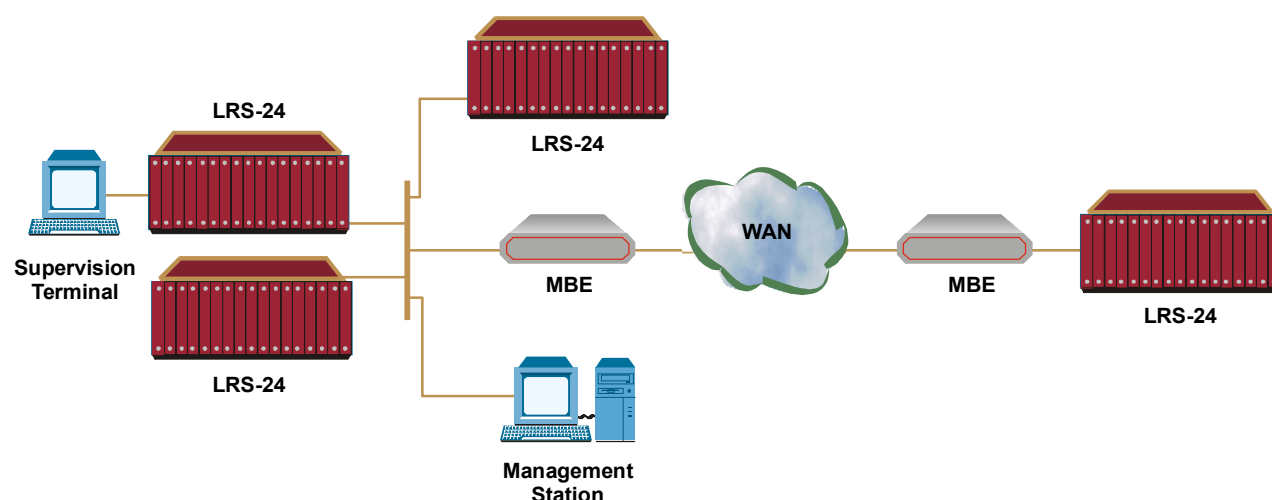


Figure 1-8. Basic Management Configuration for LRS-24 with CM-2 Modules

## I/O (User) Modules

LRS-24 can be equipped with various types of input/output (I/O) modules to provide the required system functions. These include ASMi-24C, ASMi-31C, ASMi-31CQ, ASMi-50C, ASMi-450C, HTU-E1C, FOMi-40C, FOMi-E1/T1C, FOMi-E3C, FOMi-T3C, MTMi-20C, FOMi-40CD, ASM-40CD, FOMi-E1/T1/CD, ASMi-50CD, and ASMi-51CQ.

The range of modules and options available for LRS-24 is continuously expanding. Refer to the *Installation and Operation Manuals* of the corresponding modules for information.

---

## 1.4 Technical Specifications

|                                |                                          |                                                                                          |
|--------------------------------|------------------------------------------|------------------------------------------------------------------------------------------|
| <b>Chassis Characteristics</b> | <i>Number of Functional Module Slots</i> | 15 – Each slot is connected to an interface module slot                                  |
|                                | <i>Slot Usage</i>                        | 2 power supply slots<br>1 common logic slot<br>12 identical slots for I/O (user) modules |
|                                | <i>Module PS-LRS/230/115</i>             | 100 – 240 VAC nominal, 50/60 Hz, maximum 160W                                            |
| <b>Power</b>                   | <i>Module PS-LRS/48</i>                  | –48 VDC nominal, maximum 160W                                                            |
|                                | <i>Remote (Phantom) Source</i>           | LRS-PS-FEED standalone unit                                                              |

**External Clock Interface**

|                |                       |                                                                   |
|----------------|-----------------------|-------------------------------------------------------------------|
| <b>T1 Mode</b> | <i>Type</i>           | T1                                                                |
|                | <i>Clock Rate</i>     | 1.544 MHz                                                         |
|                | <i>Line Interface</i> | 100 $\Omega$ , balanced                                           |
|                | <i>Line Code</i>      | Bipolar AMI                                                       |
|                | <i>Receive Level</i>  | 0 through -10 dB                                                  |
|                | <i>Transmit Level</i> | $\pm 3V \pm 10\%$ , balanced                                      |
| <b>E1 Mode</b> | <i>Type</i>           | E1                                                                |
|                | <i>Bit Rate</i>       | 2.048 MHz                                                         |
|                | <i>Line Interface</i> | 120 $\Omega$ , balanced<br>75 $\Omega$ , unbalanced               |
|                | <i>Line Code</i>      | AMI                                                               |
|                | <i>Receive Level</i>  | 0 through -10 dB                                                  |
|                | <i>Transmit Level</i> | $\pm 3V \pm 10\%$ , balanced<br>$\pm 2.73V \pm 10\%$ , unbalanced |
|                | <i>Square</i>         | Minimum 2.2V peak-to-peak amplitude                               |

**CM-1 Management Interface**

|                      |                                                                                                                                                                           |
|----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Functionality</i> | Transparent interfacing to internal management ports of I/O modules                                                                                                       |
| <i>Hardware</i>      | RS-232 asynchronous port, compatible with VT-52, VT-100, FREEDOM-100, FREEDOM-110, FREEDOM-220<br><br>Data rates up to 9.6 kbps<br><br>Word format: software-configurable |
| <i>Software</i>      | Terminal driven by software stored in each I/O module                                                                                                                     |

**CM-2 Management Interface**

|                      |                                                                                                                                                                                                                                  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Functionality</i> | Terminal management interface<br><br>SNMP agent with internal bridge/router and ARP server for internal modules<br><br>Protocol conversion between internal management protocols of I/O modules and external management function |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                          |                                                                                                    |
|------------------------------------------|----------------------------------------------------------------------------------------------------|
| <i>Hardware</i>                          | Ethernet 10BaseT interface for UTP and STP media                                                   |
|                                          | Ethernet 10Base2 interface for coaxial media                                                       |
|                                          | RS-232 asynchronous port, compatible with VT-52, VT-100, FREEDOM-100, FREEDOM-110, and FREEDOM-220 |
| <i>Asynchronous Port Characteristics</i> | Data rate: 38.4 kbps<br>Word format: one start bit, eight data bits, no parity, one stop bit       |
| <i>Software</i>                          | SNMP over Ethernet LAN port<br>Terminal interface controlled by software stored in the CM-2 module |

**Physical Data*****LRS-24F***

|                                 |                   |
|---------------------------------|-------------------|
| <i>Height</i>                   | 299 mm/ 11.8 in   |
| <i>Width including brackets</i> | 533.8 mm/ 21 in   |
| <i>Width without brackets</i>   | 437.8 mm/ 17.2 in |
| <i>Depth</i>                    | 252 mm/ 9.9 in    |

***LRS-24B***

|                                 |                   |
|---------------------------------|-------------------|
| <i>Height</i>                   | 177 mm/ 7.0 in    |
| <i>Width including brackets</i> | 533.8 mm/ 21 in   |
| <i>Width without brackets</i>   | 437.8 mm/ 17.2 in |
| <i>Depth</i>                    | 324 mm/ 12.8 in   |

**Environment**

|                              |                               |
|------------------------------|-------------------------------|
| <i>Operating Temperature</i> | 32°F to 113°F / 0°C to 45°C   |
| <i>Storage Temperature</i>   | 0°F to 150°F / -20°C to +70°C |
| <i>Humidity</i>              | Up to 90%, non-condensing     |

# Chapter 2

---

## Installation and Setup

This chapter provides installation and operation instructions for the LRS-24 system, and the basic system configuration of the power supply (PS) and common logic (CM-1 and CM-2) modules. It includes the following topics:

- Site requirements and prerequisites
- Equipment needed
- Package contents
- Installation and setup
- Interfaces and connections
- Initial operation and basic checks

See *Chapter 3* for management via a CM-1 module and *Chapter 4* for management via a CM-2 module.

---

### 2.1 Introduction

If LRS-24 includes a CM-2 module, you must configure management parameters of the CM-2 module before the management functions are operable. This procedure is explained in *Chapter 4*.

After installing the basic system, install the user modules according to the system installation plan, as explained in the *Installation and Operation Manual* of the individual modems.



**Warning**

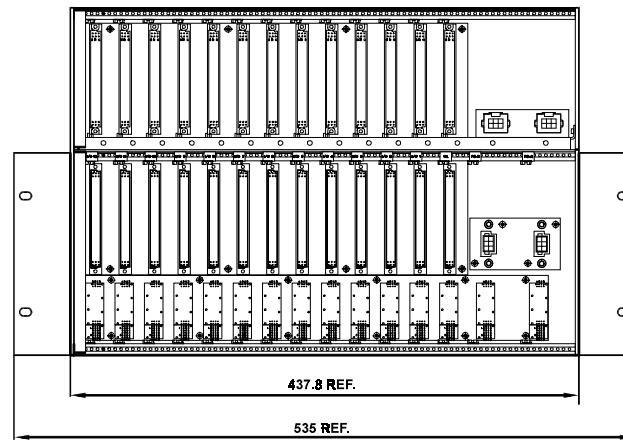
**No internal settings, adjustment, maintenance, and repairs may be performed by either the operator or the user; such activities may be performed only by a skilled technician who is aware of the hazards involved.**

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

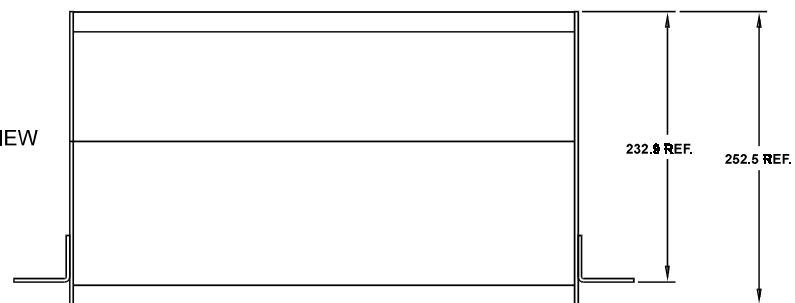
---

### Mechanical Data

*Figure 2-1* provides mechanical data on the LRS-24F chassis. *Figure 2-2* provides mechanical data on the LRS-24B chassis.

LRS-24F FRONT VIEW  
WITHOUT MODULES

LRS-24F TOP VIEW



LRS-24F SIDE VIEW

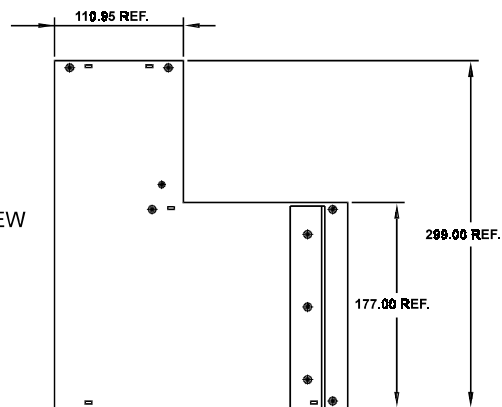
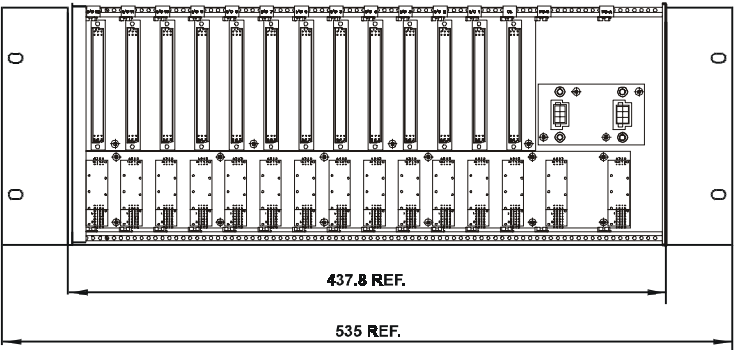
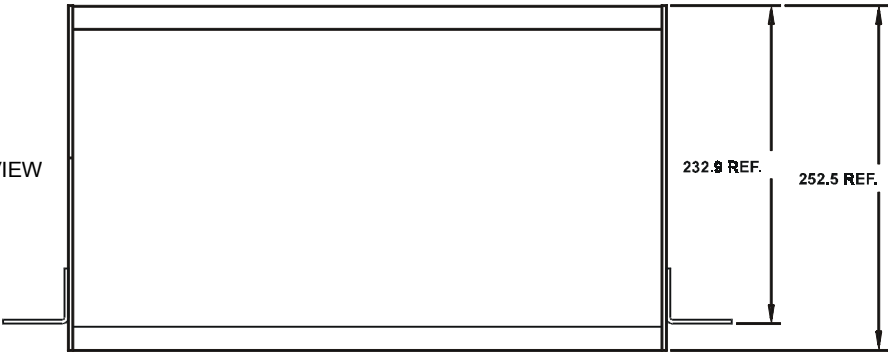


Figure 2-1. LRS-24F Mechanical Diagram

LRS-24B FRONT VIEW  
WITHOUT MODULES



LRS-24B TOP VIEW



LRS-24B SIDE VIEW

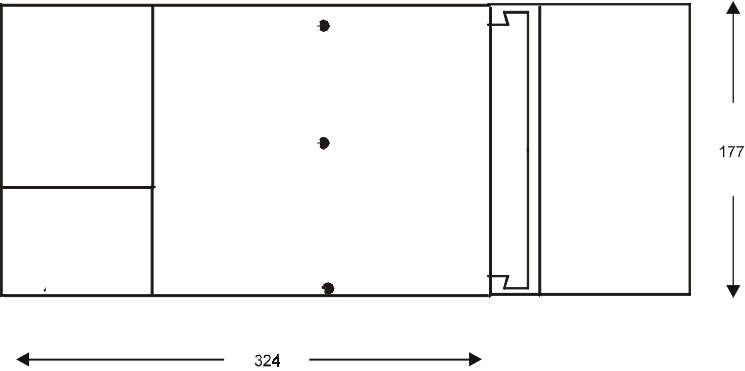


Figure 2-2. LRS-24B Mechanical Diagram

---

## 2.2 Site Requirements and Prerequisites

This section describes how to prepare the site for installation of the LRS-24 hub.

### AC Power

Install the LRS-24 chassis with AC power supply modules within 1.5m (5 feet) of an easily accessible, grounded, 100 to 240 VAC outlet.

### DC Power

LRS-24 chassis with DC power supply modules require a –48 VDC power source. Since no power switch is provided for the DC power supply modules, connect the DC power to LRS-24 through a circuit breaker located close to LRS-24. This provides overcurrent protection for the input power line, and enables turning off power to LRS-24.

### Grounding



---

**The LRS-24 case must be properly grounded at all times, both to protect the user and to prevent possible damage to equipment. It will prevent damage when a fault condition occurs on the lines connected to the equipment, such as lightning stroke or contact with high-voltage power lines.**

**Never connect cables to an LRS-24 that is not properly grounded. Any interruption of the protective (grounding) connection inside or outside the equipment or the disconnection of the protective ground terminal can make this equipment dangerous. Intentional interruption is prohibited. Before switching on this equipment and before connecting any other cable, the protective ground terminal of the enclosure must be connected to a protective ground.**

---

The LRS-24 enclosures are grounded through the protective (grounding) conductor of the power cable. In addition, each of the LRS-24 power supply interface modules has a grounding screw located on its front panel. Connect this screw by a short, wide copper strap to a reliable, low-resistance grounding system.

---

**Caution** When LRS-24 is installed in racks, the rack itself should also be grounded in accordance with standard practice and the locally applicable regulations. Installing LRS-24 in a grounded rack provides additional protection against fault conditions.

---

### Interface Module Handling Precautions

LRS-24 interface modules are grounded by installation in a grounded LRS-24 chassis.

**Caution**

For your safety, always disconnect all the cables connected to an LRS-24 interface module before removing that module from LRS-24. Do not connect cables to an interface module that is not installed in a grounded LRS-24.

## Module Handling Precautions

**Caution**

The LRS-24 modules contain components sensitive to electrostatic discharge (ESD). To prevent ESD damage, always hold a module by its sides, and do not touch the module components or connectors. Before touching a module, we recommend that you discharge the electrostatic charge of your body by touching the frame of a grounded equipment unit.

Modules can be installed and removed from LRS-24 while LRS-24 is powered and operating. However, if LRS-24 is not yet powered, turn off the input power while inserting a PS module into LRS-24.

## Front Clearance

Allow at least 90 cm (36 inches) of frontal clearance for operator access.

## Ambient Requirements

The ambient operating temperature of LRS-24 should be 32° to 113°F (0° to 45°C), at a relative humidity of up to 90%, non-condensing.

## Cooling

LRS-24 units are cooled by free air convection. The cooling vents are located in the top and bottom covers.

**Caution**

Do not obstruct these vents. Allow at least 1U of space below and above the unit.

---

---

## 2.3 Unpacking the Chassis

Before unpacking, make a preliminary inspection of the container. Evidence of damage should be noted and reported immediately.

**To unpack the equipment:**

1. Place the container on a flat surface, cut all straps, and open the top of the container.
2. Carefully take LRS-24 out of the container and place it securely on a flat, clean surface.
3. Inspect the unit for signs of damage. Report immediately any damage found.

4. Check the packing list against your order to ensure that the supplied modules match your order. If modules have been pre-installed in accordance with your order, check that all modules are in their proper slots and are secure. Report immediately any deviations.
5. Check that all necessary cables have been included.

---

## 2.4 Installation and Setup

This section describes how to perform the mechanical installation of the following items:

- PS module
- CM-1 module
- CM-2 module.

### PS Modules

This section covers the installation of the PS modules in an LRS-24 enclosure. For installation of the associated PS interface modules, see *Section 2.5*. Obtain the system installation plan before starting the installation.



---

**Dangerous voltages are present inside the PS modules when connected to power.**

**Do not connect a PS interface module to power before it is properly installed within the LRS-24 enclosure. Disconnect the input power from the module before removing it from the enclosure.**

---

Two types of PS modules are currently available: PS-LRS/230/115, and PS-LRS/48. Each module is also available with the /P option, which supports the supply of remote feed voltage from an external source.

### Front Panels

Typical front panels for PS modules are shown in *Figure 2-3*. Indicator functions are listed in *Table 2-1*.

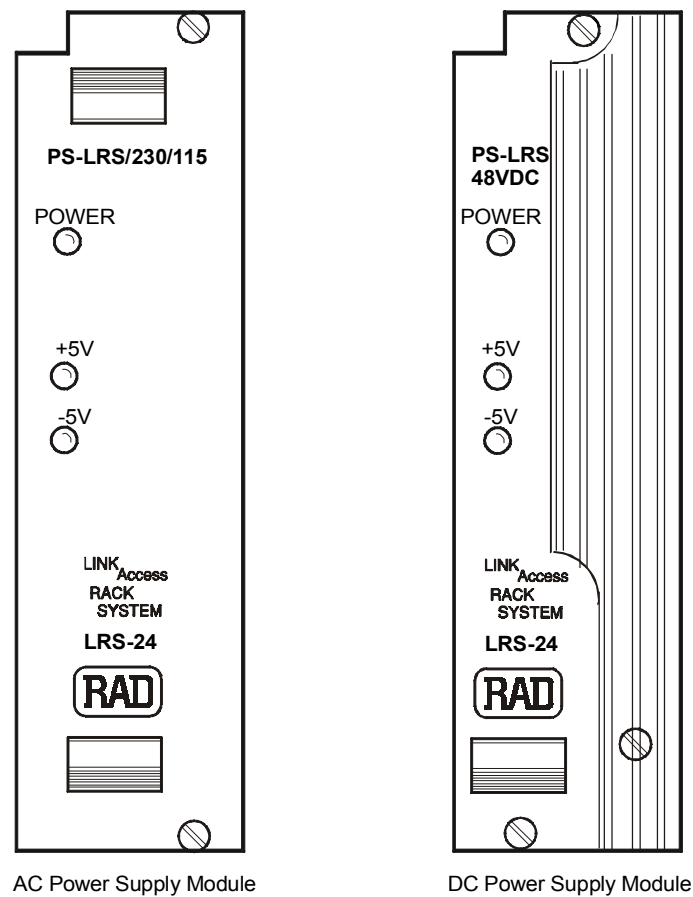


Figure 2-3. PS Module Panels

Table 2-1. PS Modules, Front Panel Indicators

| Indicator | Function                                                                                        | Status            |
|-----------|-------------------------------------------------------------------------------------------------|-------------------|
| POWER     | At least one of the PS modules installed in LRS-24 is receiving input power and can provide +5V | Lights up (green) |
|           | LRS-24 is not receiving power                                                                   | Off               |
| +5V       | This PS module is providing a normal +5V output voltage                                         | Green             |
|           | +5V is not available in LRS-24                                                                  | Off               |
| -5V       | This PS module is providing a normal -5V output voltage                                         | Green             |
|           | -5V is not available in LRS-24                                                                  | Off               |

## Fuses

The PS modules include internal fuses that should not be replaced by the user. In addition, the AC power supply (PS-LRS/230/115) is protected by an external, user-replaceable fuse located in the AC power connector of the corresponding interface module, which protects the input line.

## PS Module Installation

### ► To install the first PS module:

1. Make sure that the POWER switches on the two LRSI-PS interface modules are set to OFF.
2. Insert the specified PS module in the PS-A slot, referring to the system installation plan in *LRS-24 Module Slots, Chapter 1*.
3. Fasten the PS module with the two screws.
4. If an additional redundant module is used, install it in the PS-B slot.

### Note

*You can install a redundant module in an operating enclosure without turning off the enclosure power. After the module is installed, connect the power cable and set the power switch located on the corresponding interface module to ON.*

*An AC and a DC PS module can be installed at the same time.*

## CM-1 Module

This section covers installation of the CM-1 module and of the associated interface module in an LRS-24 enclosure. The first part covers the installation of the CM-1 module. The second section covers the installation of the interface module for the CM-1 module: LRSI-F-CM1.

### Front Panel

A typical front panel for the CM-1 module is shown in *Figure 2-4*. The functions of the components located on the front panel are listed in *Table 2-2*.

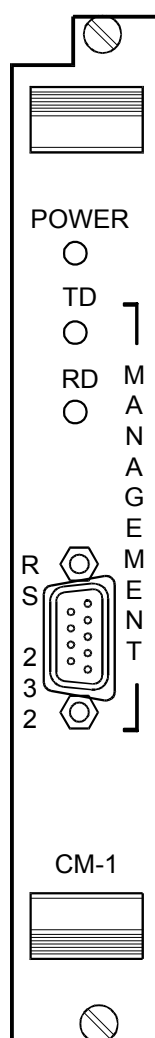


Figure 2-4. Module CM-1 Front Panel

Table 2-2. Module CM-1, Front Panel Components

| Item                        | Function                                                                                  |
|-----------------------------|-------------------------------------------------------------------------------------------|
| POWER Indicator             | Lights up when the CM-1 module is receiving input power (+5V)                             |
| TD Indicator                | Lights up to indicate activity on the transmit (input) line of the RS-232 MANAGEMENT port |
| RD Indicator                | Lights up to indicate activity on the receive (output) line of the MANAGEMENT RS-232 port |
| MANAGEMENT RS-232 Connector | Direct connection of supervision terminal to LRS-24 management port                       |

## Internal Jumpers

Figure 2-5 shows the location of the user-selectable jumpers located on the CM-1 module. Figure 2-3 lists the jumper settings.

The CM-1 module includes additional factory-set jumpers, which must not be moved by the user.

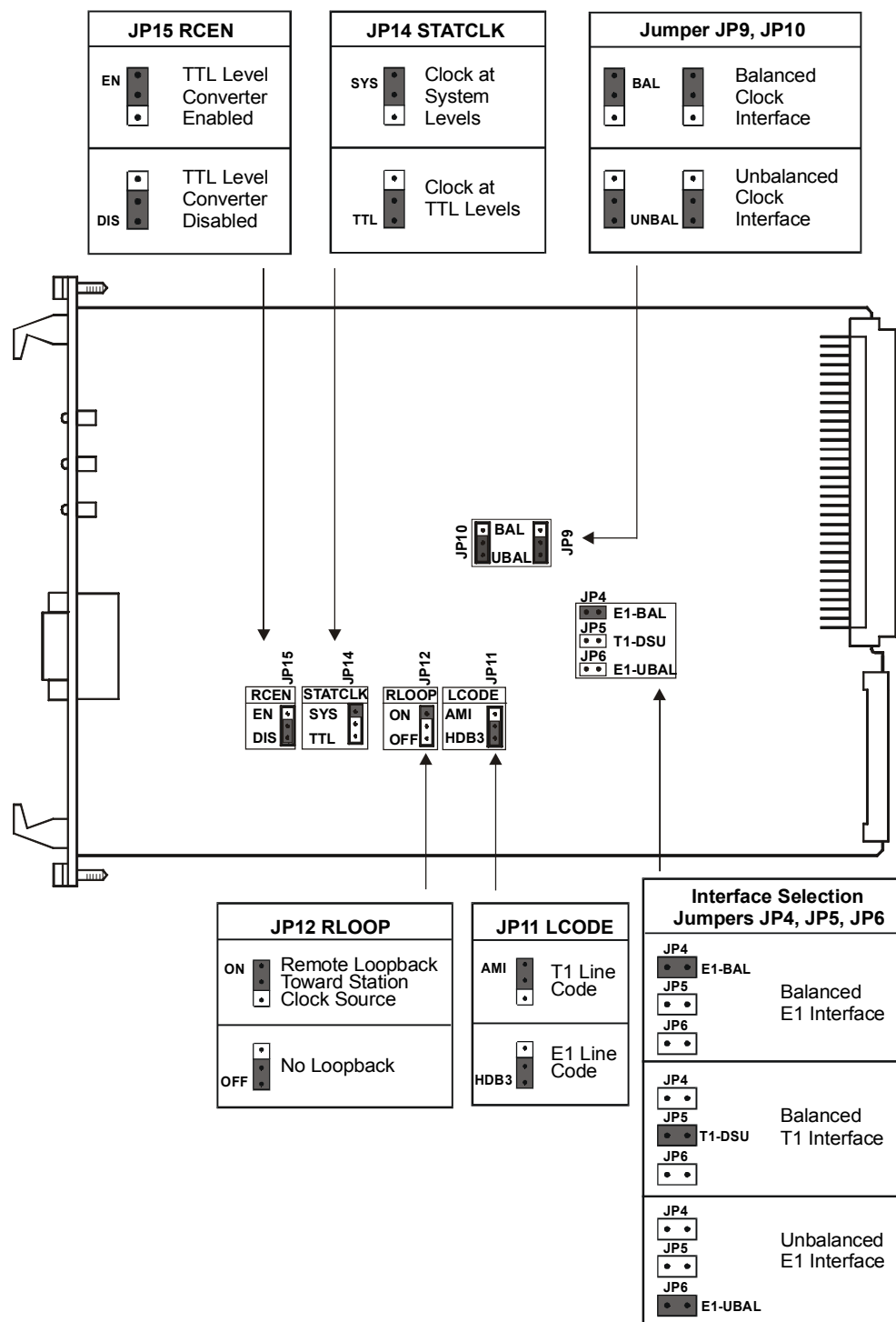


Figure 2-5. Module CM-1, Internal Jumpers

Table 2-3. Module CM-1 Jumper Settings

| Jumpers                   | Description                                                                                                                            | Values                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JP4, JP5, JP6, JP9, JP10, | Select the station clock interface in the STATION CLK connector of the LRSI-F-CM1 interface module.                                    | <p><b>T1 interface</b> (1544 kHz clock): Set jumper JP5 in the T1-DSU position and jumpers JP9 and JP10 to BAL.</p> <p><b>Balanced E1 interface</b> (2048 kHz clock): Set jumper JP4 in the E1-BAL position, and jumpers JP9 and JP10 to BAL.</p> <p><b>Unbalanced E1 interface</b> (2048 kHz clock): Set jumper JP6 in the E1-UBAL position, and jumpers JP9 and JP10 to UBAL.</p> <p><b>Default setting: Balanced E1 interface</b></p> |
| LCODE, JP11               | Selects the line code accepted by the station clock interface in the STATION CLK connector of the LRSI-F-CM1 interface module.         | <p><b>AMI—AMI line code:</b> Use this selection for the T1 interface.</p> <p><b>HDB3—HDB3 line code:</b> Use this selection for the E1 interfaces.</p> <p><b>Default setting: HDB3</b></p>                                                                                                                                                                                                                                               |
| RLOOP, JP12               | Controls the operating mode of the station clock interface in the STATION CLK connector of the LRSI-F-CM1 interface module.            | <p><b>ON:</b> The station clock interface returns the regenerated clock signal toward the clock source.</p> <p><b>OFF:</b> The station clock interface does not return clock signal toward the clock source.</p> <p>Unless your system has special requirements, always set the jumper JP12 to ON.</p> <p><b>Default setting: JP12 ON</b></p>                                                                                            |
| STATCLK, JP14             | Selects the levels of the clock signal provided by the CM-1 module as a station clock signal for the user modules installed in LRS-24. | <p><b>SYS:</b> Clock signal at G.703 levels regenerated from the STATION CLK connector.</p> <p><b>TTL:</b> Clock signal at TTL levels, provided by a dedicated line receiver.</p> <p>Select the position best suited to the requirements of the user modules installed in LRS-24: for HTU-E1C module, always set the jumper JP14 to SYS and the jumper JP15 to DIS.</p> <p><b>Default setting: SYS</b></p>                               |
| RCEN, JP15                | Connects the supply voltage to the line receiver which provides a clock signal at TTL levels when the jumper JP14 is set to TTL.       | <p><b>EN:</b> Line receiver enabled. Always select this position when the jumper JP14 is set to TTL.</p> <p><b>DIS:</b> Line receiver disabled. Always select this position when the jumper JP14 is set to SYS.</p> <p><b>Default setting: DIS</b></p>                                                                                                                                                                                   |

## CM-1 Installation Procedure

### ► To install CM-1:

- Insert the CM-1 module into the CL slot, and fasten it with the two screws.

## CM-2 Module

This section covers the installation of the CM-2 module in an LRS-24 enclosure.

### Front Panel

A typical front panel for the CM-2 module is shown in *Figure 2-6*. The functions of the components located on the front panel are listed in *Table 2-4*.

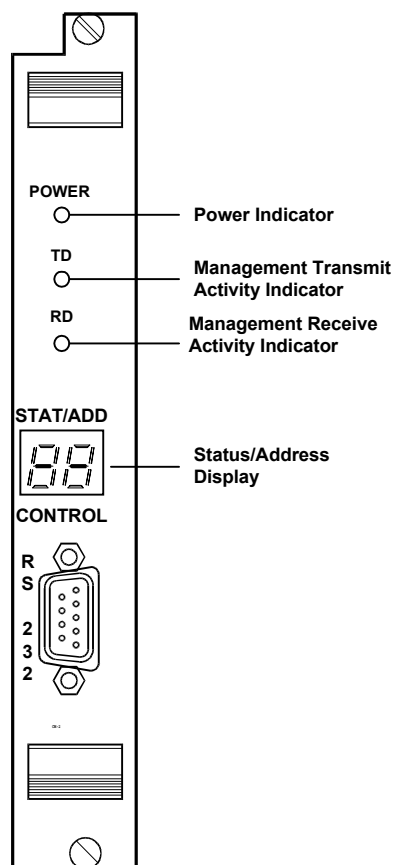


Figure 2-6. Module CM-2 Front Panel

Table 2-4. Module CM-2, Front Panel

| Indicator                   | Function                                                                                                                                                                                             |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| POWER                       | Lights up when CM-2 is receiving input power (+5V)                                                                                                                                                   |
| TD                          | Lights up to indicate activity on the transmit (input) line of the ETHERNET MANAGEMENT port                                                                                                          |
| RD                          | Lights up to indicate activity on the receive (output) line of the ETHERNET MANAGEMENT port                                                                                                          |
| STAT/ADD Display            | If a failure is detected during the power-up self-test, displays a code that identifies the failure type<br><br>During normal operation, displays the two least significant digits of the hub number |
| MANAGEMENT RS-232 Connector | Direct connection of supervision terminal to LRS-24 management port                                                                                                                                  |

### Internal Jumpers

Figure 2-7 shows the location of the user-selectable jumpers located on the CM-2 module.

The module includes additional factory-set jumpers, which must not be moved by the user.

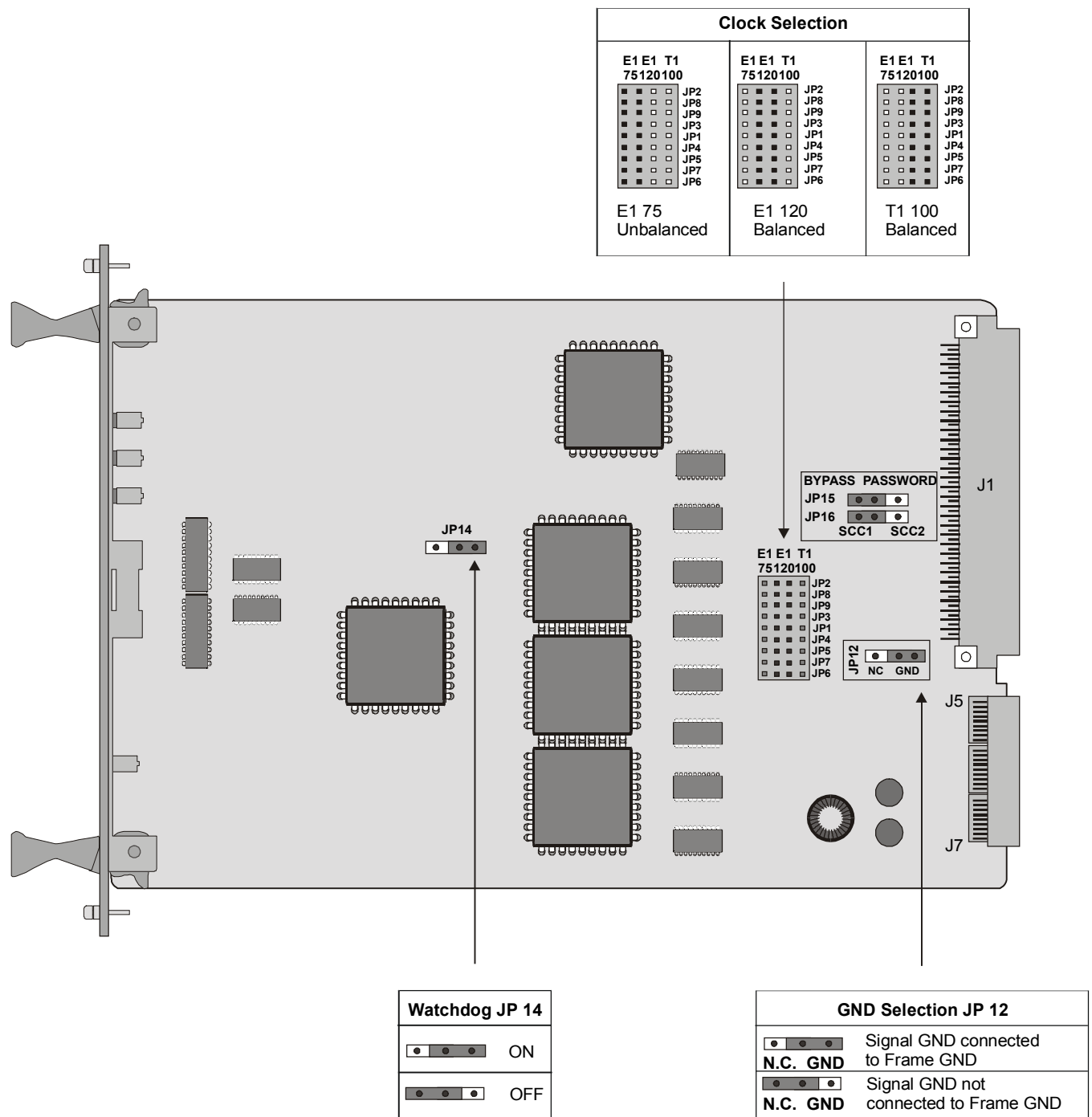


Figure 2-7. Module CM-2, Internal Jumpers

Table 2-5 lists the functions of the jumpers located on the CM-2 module.

Table 2-5. Module CM-2 Jumper Settings

| Jumpers   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Factory Settings |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| JP1 – JP9 | Sets the jumpers according to the station clock applied to the STATION CLK connector of the LRSI-F*-CM2 interface module. The available selections are T1 clock source (1544 kHz clock), or E1 clock source (2048 kHz clock): <ul style="list-style-type: none"> <li>T1 source: always select the balanced interface</li> <li>E1 source: select either the balanced or unbalanced interface, in accordance with the source providing the clock signal</li> </ul> | <b>E1 120</b>    |
| JP12      | Selects connection of Signal Ground to Frame Ground: <ul style="list-style-type: none"> <li>GND – Connected</li> <li>N.C. – Disconnected</li> </ul>                                                                                                                                                                                                                                                                                                              | <b>GND</b>       |
| JP14      | Enables Watchdog:<br>(see Figure 2-7)                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>ON</b>        |
| JP15      | Enables Password: <ul style="list-style-type: none"> <li>Bypass – Password not required</li> <li>Password – Password required</li> </ul>                                                                                                                                                                                                                                                                                                                         | <b>Bypass</b>    |
| JP16      | Terminal Select: <ul style="list-style-type: none"> <li>SCC1</li> <li>SCC2</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            | <b>SCC1</b>      |

\* Interface module version, for example, LRSI-F-1, LRSI-F-2, etc.

Figure 2-7 identifies the jumper settings for each clock source interface.

## CM-2 Installation

### ► To install CM-2:

1. Check that the POWER switch of the interface module is set to OFF.
2. Insert the CM-2 module in the CL slot.
3. Fasten with the two screws.

## 2.5 Interfaces and Connections

This section describes the installation and connections for:

- PS Interface Modules
- LRSI-F-CM1 Interface Module
- LRSI-F-1-CM2 Interface Module
- LRSI-F-2-CM2 Interface Module
- LRS-24 Enclosure.

## PS Interface Modules

This section explains the installation of the interface modules for PS modules.



**Warning**

**Dangerous voltages are present inside the PS interface modules when connected to power.**

**Do not connect a PS interface module to power before it is properly installed within the LRS-24 enclosure, and disconnect the input power from the module before removing it from the enclosure.**

Table 2-6 shows the types of PS interface modules that are currently available for LRS-24.

Table 2-6. PS Interface Module Types

| Power Supply Module Type | Interface Modules | Description                                                                                                                                                                                                                                                                                      |
|--------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AC PS-LRS/230/114        | LRS-PS/230/115    | Connection to AC power source                                                                                                                                                                                                                                                                    |
|                          | LRSI-PSP/230/115  | Connection to AC power source and to an external remote (phantom) feed power supply, type LRS-PS-FEED. The LRS-PS-FEED is required for powering remote units, for example, when an HTU-E1L is connected through an HTU-E1C module, and is intended for use with PS modules having the IP option. |
| DC PS-LRS/48             | LRSI-PSP/48       | Connection to DC power source and to an external remote (phantom) feed power supply, type LRS-PS-FEED, and is intended for use with PS modules having the /P option.                                                                                                                             |

### Front Panels

Typical front interface panels for PS modules are shown in *Figure 2-8*:

- AC-PS modules (LRSI-PS/230/115)
- DC-PS module (LRSI-PS/48)
- Typical interface panel with remote feeding connector (LRSI-PSP/230/115).

Each panel includes the following items:

- Power input connector – For AC modules, the power input connector includes an integral fuse
- For AC modules – power switch
- Grounding screw
- PHANTOM feed input connector.

*Figure 2-8* shows the location of this connector only on the interface panel for AC modules. The same option is also available on the interface panel for DC PS modules.

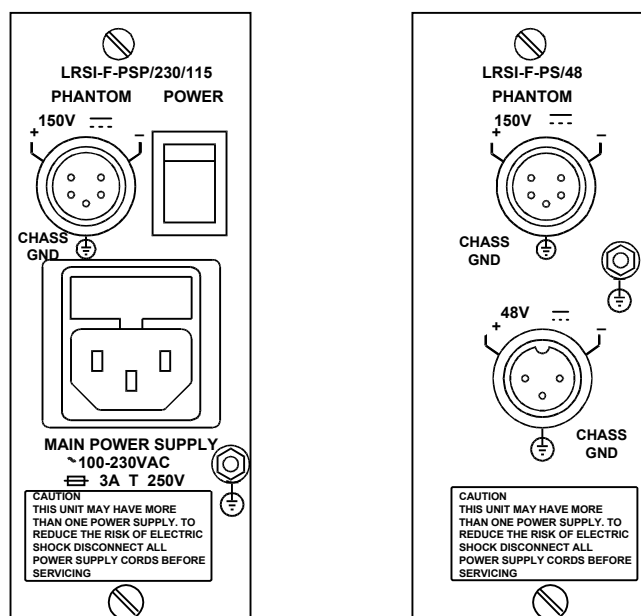


Figure 2-8. LRSI-F-PSP/230/114 and LRSI-F-PS/48 Interface Module Panels

## Interface Module Installation

### ► To install the PS interface module:

1. Check that the POWER switch of the interface module is set to OFF.
2. Insert the specified type of module in the PS-A interface slot, referring to the system installation plan, in *LRS-24 Module Slots, Chapter 1*.
3. Fasten with the two screws.
4. If an additional (redundant) PS module is used, install the corresponding module in the PS-B interface slot.

## LRSI-F-CM1

This section explains the installation of the interface module for the CM-1 module, LRSI-F-CM1.

## Interface Module Front Panel

A typical LRSI-F-CM1 module front panel is shown in *Figure 2-9*.

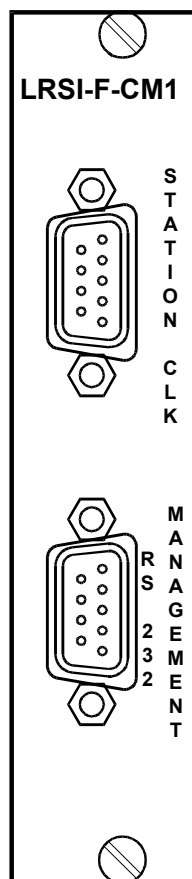


Figure 2-9. Typical LRSI-F-CM1 Interface Module Panel

The module panel includes two connectors:

- MANAGEMENT RS-232 connector, for connection to a supervision terminal.
- STATION CLK, for connection to an external (station) clock source. The station clock is distributed to all the modules installed in LRS-24.

### Interface Module Installation

► **To install LRSI-F-CM1 Interface module:**

1. Check that the POWER switch of the interface module is set to OFF.
2. Insert the LRSI-F-CM-1 module in the CL interface slot.
3. Fasten with the two screws.

### LRSI-F-1-CM2 / LRSI-B-1-CM2 Interface Modules with 10BaseT

This section explains the installation of the 10BaseT Interface module for the CM-2 module: LRSI-F-1-CM2 or LRSI-FB-1-CM2.

#### LRSI-F-1-CM2 10BT / LRSI-B-1-CM2 Front Panel

A typical LRSI-F-1-CM2 or LRSI-B-1-CM2 module front panel, with 10BaseT, is shown in Figure 2-10.

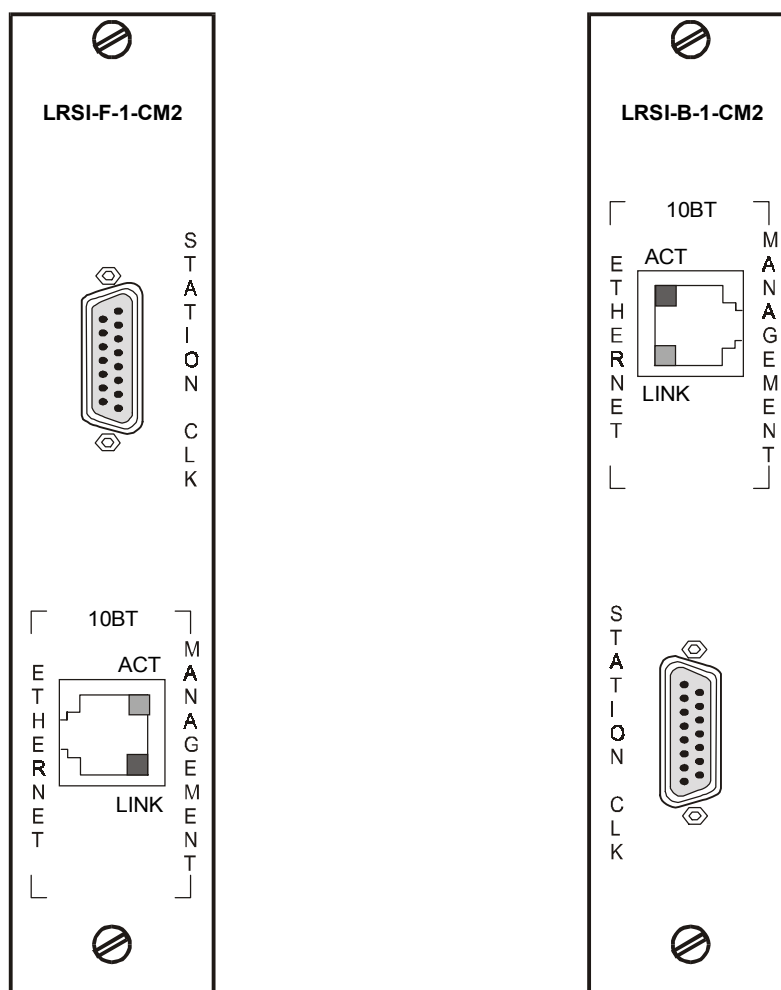


Figure 2-10. LRSI-F-1-CM2/LRSI-B-1-CM2 Interface Module Panel with 10BT

The module panel includes two connectors:

- **MANAGEMENT 10BT ETHERNET** – RJ-45 connector to connect the 10BaseT management interface of the CM-2 module to the LAN that carries the management traffic. Two LEDs indicate status of connector (Table 2-7).
- **STATION CLK** – to connect to an external (station) clock source. The station clock is distributed to all the modules installed in LRS-24.

Table 2-7. Management 10BT Ethernet LEDs

| LED  | Color    | Indication                       |
|------|----------|----------------------------------|
| LINK | Link     | Connection is made               |
| ACT  | Activity | Data is passed through connector |

In addition to the clock interface, the connector also includes the major and minor alarm indication lines (optional, provided by dry relay contacts).

## LRSI-F-1-CM2 Internal Settings

Figure 2-11 shows the internal settings available on the LRSI-F-1-CM2 module.

The interface module includes additional factory-set jumpers, which must not be moved by the user.

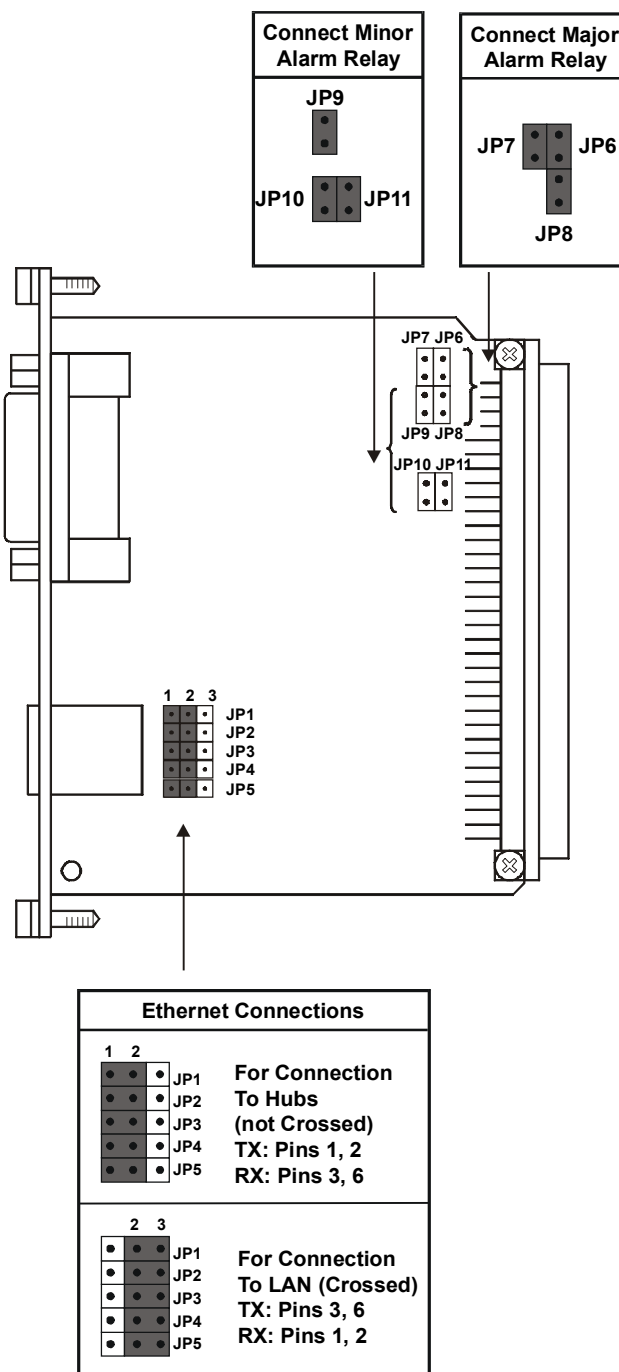


Figure 2-11. Interface Module LRSI-F-1-CM2 with UTP Connector, Internal Jumpers

Table 2-8 lists the functions of the jumpers located on the LRSI-F-1-CM2 module.

Table 2-8. LRSI-F-1-CM2 Module Jumper Settings

| Jumpers         | Controls                                                                                                                                                                                                                                                                             | Settings/Options                                                                                                                                                                                  |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JP6, JP7, JP8   | Major alarm relay connection                                                                                                                                                                                                                                                         | To use the major alarm relay, install jumpers as shown in <i>Figure 2-11</i> .<br><br>To disconnect the relay, remove the jumpers (for storage, you may leave the jumpers inserted over one pin). |
| JP9, JP10, JP11 | Minor alarm relay connection                                                                                                                                                                                                                                                         | To use the minor alarm relay, install jumpers as shown in <i>Figure 2-11</i> . To disconnect the relay, remove the jumpers.                                                                       |
| JP1 through JP5 | Connect internal transmit and receive pairs to the external UTP pairs (10BaseT connector) to allow direct connection (without cross cables) as below:                                                                                                                                |                                                                                                                                                                                                   |
|                 | <u>Jumper Settings</u>                                                                                                                                                                                                                                                               | <u>Receive Pair</u> <u>Transmit Pair</u>                                                                                                                                                          |
|                 | Over pins 1-2                                                                                                                                                                                                                                                                        | Pins 1,2      Pins 3,6                                                                                                                                                                            |
|                 | Over pins 2-3                                                                                                                                                                                                                                                                        | Pins 3,6      Pins 1,2                                                                                                                                                                            |
|                 | The correct selection depends on the wiring conventions used in your particular network, however.                                                                                                                                                                                    |                                                                                                                                                                                                   |
|                 | Normal jumper setting:                                                                                                                                                                                                                                                               |                                                                                                                                                                                                   |
|                 | <ul style="list-style-type: none"> <li>CM-2 module connects directly to the LAN (this interchanges the connections of the receive and transmit pairs): set the jumpers to position 2-3</li> <li>CM-2 module connects to an Ethernet hub: set the jumpers to position 1-2.</li> </ul> |                                                                                                                                                                                                   |

## LRSI-F-1-CM2 Installation

### ► To install LRSI-F-1-CM2:

1. Check that the POWER switch of the interface module is set to OFF.
2. Insert the LRSI-F-1-CM2 module in the CL interface slot.
3. Fasten it with the two screws.

## LRSI-F-2-CM2 Interface Module with 10Base2

This section explains the installation of the 10Base2 Interface module for the CM-2 module, LRSI-F-2-CM2.

### LRSI-F-2-CM2 10B2 Front Panel

A typical LRSI-F-2-CM2 module front panel is shown in *Figure 2-12*.

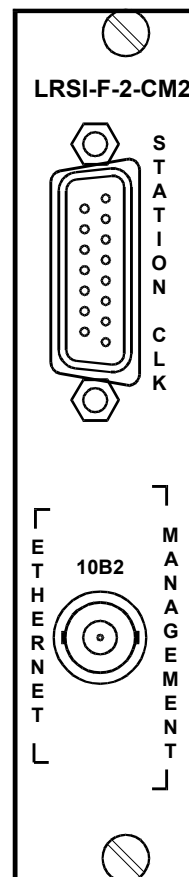


Figure 2-12. LRSI-F-2-CM2 Interface Module Panel with 10B2

The module panel includes two connectors:

- MANAGEMENT 10B2 Ethernet connector – a BNC connector for connecting the 10Base2 management interface of the CM-2 module to the LAN that carries the management traffic.
- STATION CLK – for connection to an external (station) clock source. The station clock is distributed to all the modules installed in LRS-24. In addition to the clock interface, the connector also includes the major and minor alarm indication lines (optional, provided by dry relay contacts).

### LRSI-F-2-CM2 Internal Settings

Figure 2-13 shows the internal settings available on the LRSI-F-2-CM2 module.

The interface module includes additional factory-set jumpers that must not be moved by the user.

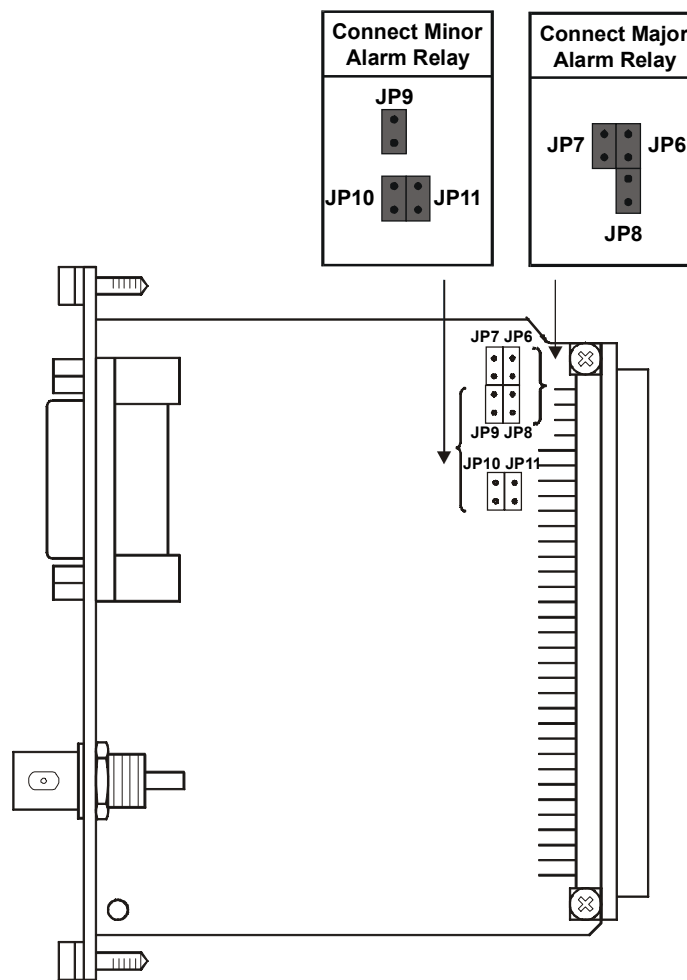


Figure 2-13. Interface Module LRSI-F-2-CM2 with BNC Connectors, Internal Jumpers

Table 2-9 lists the functions of the jumpers located on the LRSI-F-2-CM2 module.

Table 2-9. LRSI-F-2-CM2 Interface Module Jumper Settings

| Jumpers         | Controls                     | Settings/Options                                                                                                                                                                                                              |
|-----------------|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| JP6, JP7, JP8   | Major alarm relay connection | <p>To use the major alarm relay, install jumpers as shown in <i>Figure 2-11</i> or <i>Figure 2-13</i>.</p> <p>To disconnect the relay, remove the jumpers (for storage, you may leave the jumpers inserted over one pin).</p> |
| JP9, JP10, JP11 | Minor alarm relay connection | <p>To use the minor alarm relay, install jumpers as shown in <i>Figure 2-11</i> or <i>Figure 2-13</i>.</p> <p>To disconnect the relay, remove the jumpers.</p>                                                                |

### LRSI-F-2-CM2 Installation

➤ **To install the LRSI-F-2-CM2 module:**

1. Insert the LRSI-F-2-CM2 module in the CL interface slot.
2. Fasten with the two screws.

## LRS-24 Enclosure

This section describes the mechanical installation for the LRS-24B/LRS-24F enclosure and the various connections to it.

### Mechanical Installation

LRS-24 is intended for installation in 300 mm and 600 mm ETSI racks. Before installing the enclosure, check whether the required modules are in place, in accordance with the installation plan.

The enclosure is fastened to the rack by four screws (two on each side).

---

**Caution**

Do not connect any cables to the enclosure before it is installed in the designated position.

---

### Ground Connection

Connect a thick copper wire or braid between each grounding screw located on a power supply interface module and the designated grounding point of LRS-24.

### Cable Connections

---

**Warning**

**Before applying power to LRS-24 and before connecting any cable, the protective ground terminals of this equipment must be connected to a protective ground system.**

**Any interruption of the protective (grounding) conductor (inside or outside the instrument) or disconnecting the protective ground terminal can make this equipment dangerous. Intentional interruption is prohibited.**

**Make sure that only fuses of the required rating, are used for replacement. The use of repaired fuses and the short-circuiting of fuse holders is forbidden.**

**Whenever it is likely that the protection offered by fuses has been impaired, the equipment must be made inoperative and be secured against any unintended operation.**

---

### Power Connection

LRS-24 accepts two PS modules. When two PS modules are installed, either module can provide the power to LRS-24. The modules installed in LRS-24 start operating when one of the PS modules is powered up.

### AC Power Connection

➤ **To connect LRS-24 to AC power:**

1. Check that the switch on the PS is set to OFF.
2. Use the 5-ft. (1.5m) standard power cable terminated by a standard 3-prong plug to connect AC power to the LRS-24.
3. Connect the power cable to the connector on the panel of LRSI-PSP/230/115 interface module.
4. Connect to the mains outlet.
5. Turn the POWER switch to ON to initiate the LRS-24.

### DC Power Connection

➤ **To connect LRS-24 to DC power:**

1. Connect the power cable between the DC distribution panel and the DC power connector of the LRSI-PSP/48 interface module.
2. Check that you have correct polarity.

---

**Note**

*DC power supply interface modules do not have power switches. Therefore, the DC power supply will start operating when DC power is applied.*

---

To avoid turning on LRS-24 when connecting the power cables, use an external circuit breaker located near LRS-24 to control the supply of DC power, and protect the DC input line. Set the circuit breaker to OFF before connecting the DC power cable to LRS-24.

---

**Note**

*When redundant power supplies are used, it is recommended to connect the power cables to outlets powered by different circuits.*

---

### Connection of External Phantom Feed Voltage

An external power supply unit is necessary to supply external feed voltages. HTU-E1C/P, etc. require phantom feed voltage.

The recommended source for external voltages is LRS-PS-FEED, offered by RAD. LRS-PS-FEED is a standalone unit, intended for rack mounting (refer to *Appendix B*). To minimize cable runs, install LRS-PS-FEED directly above LRS-24 (leave 1U free space between LRS-24 and the LRS-PS-FEED). In this situation, connect the output cable of the LRS-PS-FEED (supplied with the LRS-PS-FEED unit) to the PHANTOM connector of the LRSI-PSP/48 or LRSI-PSP/230/115 interface module.

**Note** The external feed voltage passes through the interface module and through the corresponding PS module to the internal bus. Therefore, you can ensure constant external feed voltage (in case one of two installed power supply modules is removed) by connecting LRS-PS-FEED to both modules.

It is recommended that you turn on the external voltage source only after LRS-24 is turned on.

### Station Clock Connections

➤ **To connect an external (station) clock signal to LRS-24:**

1. Connect the clock source to the STATION CLK connector located on the interface module serving the CM-1 or CM-2 module, using a Shielded Cable.
2. Select the required clock.

**Note** When configured to External, but no External Clock is connected, Internal Clock is applied.

### Dry Contact Alarm Connections

The CM-2 module enables the connection of major and minor alarm relay contacts to a bay alarm system. Connect the bay alarm cable to the STATION CLK connector located on the interface module serving the CM-2 module. Table 2-10 lists the STATION CLK connections.

Table 2-10. CM-2 Module STATION CLK Connector, Pin Allocation

| Pins             | Function/Connection |
|------------------|---------------------|
| 3, 11            | STATION CLK In      |
| 1, 9             | STATION CLK Out     |
| 7, 8, 15         | Major Alarm         |
| 6, 13, 14        | Minor Alarm         |
| 2, 4, 5, 10, 12, | N. C.               |

### Management Connections

Refer to the installation plan to determine the cable intended for connection to the enclosure. Management connections depend on the type of module installed in LRS-24.

#### CM-1 Module

Connect the supervisory cable to the MANAGEMENT RS-232 connector on the LRSI-F-CM1 interface module.

#### CM-2 Module

Connect the management cable to the MANAGEMENT Ethernet connector (an RJ-45 connector on the LRSI-F-1-CM2 interface module and a BNC connector on the LRSI-F-2-CM2 interface module).

Table 2-11 lists the supervisory cable pin arrangement.

Table 2-11. CM-1 Module Management RS-232 Pin Allocation

| Pin     | Function/Connection      |
|---------|--------------------------|
| 2       | Transmit data            |
| 3       | Receive data             |
| 7       | Signal ground            |
| 2 and 3 | Crossed                  |
| 4 and 6 | Crossed                  |
| 2, 3    | Transmit or receive data |
| 1, 6    | Receive or transmit data |

### Connection to I/O (User) Modules

Refer to the *Installation and Operation Manual* of the corresponding module.

---

---

## 2.6 Initial Operation and Basic Checks

This section describes the operation instructions and basic checks for the following configurations:

- LRS-24 with CM-1 Module
- LRS-24 with CM-2 Module.

### LRS-24 with CM-1 Module

#### Power On

- **To turn on LRS-24 (CM-1):**
  1. Set the ON/OFF switches on the panels of the LRSI-PSP\*\* modules to ON.
  2. Supply the DC power, if applicable.
- **To supply external phantom feed voltages:**
  1. Turn on LRS-24.
  2. Turn on the source, i.e. LRS-PS-FEED.

#### Normal Indications

- **PS Module(s):** All the indicators on the panel(s) of the PS module(s) turn green to indicate proper operation.
- **CM-1 Module:** The POWER indicator of the module lights up. The TD and RD indicators flash (or light steadily) when a management session is in progress.

- **I/O Module(s):** Refer to the *Installation and Operation Manual* of the I/O modules.

If LRS-24 does not show normal indications, see *Chapter 5, Troubleshooting and Diagnostics*.

### Power Off

➤ **To turn off LRS-24 (CM-1):**

1. If an external phantom feed voltage source is connected to LRS-24, turn off that source (for example, the LRS-PS-FEED).
2. Set the ON/OFF switch(es) of the PS module(s) to OFF.
3. Disconnect the DC power, if applicable.

### Troubleshooting

If a malfunction occurs in one or more of the links served by a module installed in LRS-24, perform the following preliminary checks:

- If the problem affects all the links:
  - Check that all the indicators on the panels of the PS modules are green.
  - If any indicator is red, replace the corresponding PS module.
- Check that all the modules are properly installed.
- Check that all the cable connections are made in accordance with the installation plan.
- Check that all the communication equipment on the link is operating properly.
- Check for proper configuration of the local and remote equipment.

If these checks do not correct the problem, use a supervision terminal connected to the MANAGEMENT RS-232 port of the CM-1 module to identify the fault and replace the corresponding module, see *Chapter 5, Troubleshooting and Diagnostics*.

## LRS-24 with CM-2 Module

### Power On

➤ **To turn on LRS-24 (CM-2):**

1. Set the ON/OFF switches on the panels of the LRSI-PSP\*\* modules to ON.
2. Supply the DC power, if applicable.

➤ **To supply external phantom feed voltages:**

1. Turn on LRS-24.
2. Turn on the source, i.e. LRS-PS-FEED.

## Normal Indications

- **PS Module(s):** All the indicators on the panel(s) of the PS module(s) must turn green to indicate proper operation.
- **CM-2 Module:** The POWER indicator of the module must light up. The TD and RD indicators may flash (or light steadily) when a management session is in progress.
- On start-up, Mask says IGNORE ALARM FROM REMOTE MANAGEMENT. The default is MASK ON. You must change configuration to MASK OFF.
- Normally, the STAT/ADD display shows the two least significant digits of the management number assigned to LRS-24. For normal startup, a rotating red circle is displayed. However, if a problem is detected during the power-up self-test, you will see a flashing error code (E1 through E9), see *Chapter 5 Troubleshooting and Diagnostics*.
- **I/O Module(s):** Refer to the *Installation and Operation Manual* of the corresponding module.

## Power Off

### ► To turn off LRS-24 with CM-2:

1. If an external phantom feed voltage source is connected to LRS-24, turn off that source (i.e. LRS-PS-FEED).
2. Set the ON/OFF switch(es) of the PS module(s) to OFF.
3. Disconnect the DC power, if applicable.

## Troubleshooting

In case a malfunction occurs, perform the following preliminary checks:

- If the problem affects all the links:
  - Check that all the indicators on the panels of the PS modules are green.
  - If any indicator is red, replace the corresponding PS module.
- Check that all the modules are installed properly.
- Check that all the cable connections are made in accordance with the installation plan.
- Check that all the communication equipment on the link is operating properly.
- If the error code **E5** appears on the STAT/ADD display of the CM-2 module, reconfigure the management parameters of the module in accordance with *Chapter 4*. Any other code indicates a technical problem, and the CM-2 module must be replaced.
- Check for proper configuration of the local and remote equipment.
- See Mask section (*Defining Card Configuration / Defining I/O Module Operational Parameters*).

If these checks do not correct the problem, identify the fault and replace the corresponding module using the management station connected to the management Ethernet port, or a supervision terminal connected to the management RS-232 port of the CM-2 module.

# Chapter 3

---

## Management via the CM-1 Module

This chapter provides information on the management of LRS-24 enclosures equipped with CM-1 control logic modules. It includes:

- General description of CM-1 functions and their integration in the system
- Supervision terminal hardware requirements
- Methods to connect supervision terminal or network management station to LRS-24
- Starting a management session by means of the supervision terminal.

For information regarding the management of LRS-24 enclosures equipped with CM-2 control logic module, refer to *Chapter 4*.

---

### 3.1 Introduction

#### CM-1 Functions

The functions of the CM-1 module are limited to physical interfacing between a supervision terminal and the equipment modules installed in the LRS-24. No processing takes place in the CM-1 module. The supervision terminal can be connected to one of the RS-232 management ports either directly, or through a low-speed modem link.

The RS-232 management ports of the CM-1 module are connected through a digital sharing circuit to each of the internal control ports of the equipment modules. Thus, only one of the modules, the module selected by the user, can interact with the terminal at any time. Therefore, it is not possible to simultaneously monitor the operation of the whole LRS-24.

The user specifies the desired module by adding a node number before any command. The node number is the number of the LRS-24 slot in which the desired module is installed, 1 through 12. The module specified evaluates the command, executes it, and sends a response to the terminal, i.e. NODE 10.

#### Management Capabilities

The transfer of management traffic by the CM-1 module, to the modules installed in the LRS-24 is transparent. Therefore, only modules that include software for controlling a supervision terminal, for example, ASMi-450C, HTU-E1C, etc., can be managed through the CM-1 module.

---

## 3.2 Hardware Requirements

### Terminal Characteristics

You can use most types of standard ASCII terminals in order to manage the modules installed in an LRS-24, via a CM-1 module. The terminal, which can be a “dumb” terminal or a personal computer emulating an ASCII terminal, requires an RS-232 communication interface.

The terminal types supported by the modules that can be installed in the LRS-24 are VT-52, VT-100, TV-920, FREEDOM-100, FREEDOM-110, FREEDOM-220, or other terminals that are fully compatible with one of these terminals.

The software used to operate the supervision program is contained in the managed modules. Refer to the *Installation and Operation Manual* of the relevant modules for detailed terminal operating instructions.

The managed modules store all the configuration information generated or altered during the communication with the terminal: no information is stored in the terminal.

Modules must be initialized properly to ensure correct terminal operation as explained in *Section 3.3*; otherwise some of the commands may not work properly.

### Management RS-232 Port Interface Characteristics

The CM-1 module has an RS-232 asynchronous DCE port designated **Management RS-232**. This port has a 9-pin D-type female connector, which enables direct connection to terminals. Since terminals usually have DTE interfaces, their connection is made by means of a straight-through cable. For connection to a modem, use a cross cable (also called a null modem cable). For detailed instructions on connecting terminals, see below.

The control lines and their directions appear in *Appendix A*.

After establishing communication with a module, you can select the data rate and the word format (number of data bits, parity type, and number of stop bits). This information is provided in the *Installation and Operation Manuals* of the modules installed in the LRS-24.

For initial operation, it is recommended to start with the default parameters:

**Default data rate:** 38.4 kbps

**Default word format:** one start bit, eight data bits, odd parity, one stop bit.

### Connecting the Terminal

A supervision terminal can be connected either directly to the supervisory port, or through a modem or any other type of full-duplex data link. The CM-1 module supports only dial-in; it cannot dial out.

This section presents typical methods for the connection of a supervision terminal to the CM-1 module installed in the LRS-24 unit.

### Direct Connection of Supervision Terminal

Figure 3-1 shows typical connections of a terminal. Both types of connections (direct connection to the MANAGEMENT RS-232 port located on the CM-1 module, or to the corresponding connector on the LRSI-F-CM1 module serving the CM-1 module) are shown. Note that the cable used to connect to the terminal is a straight-through cable.

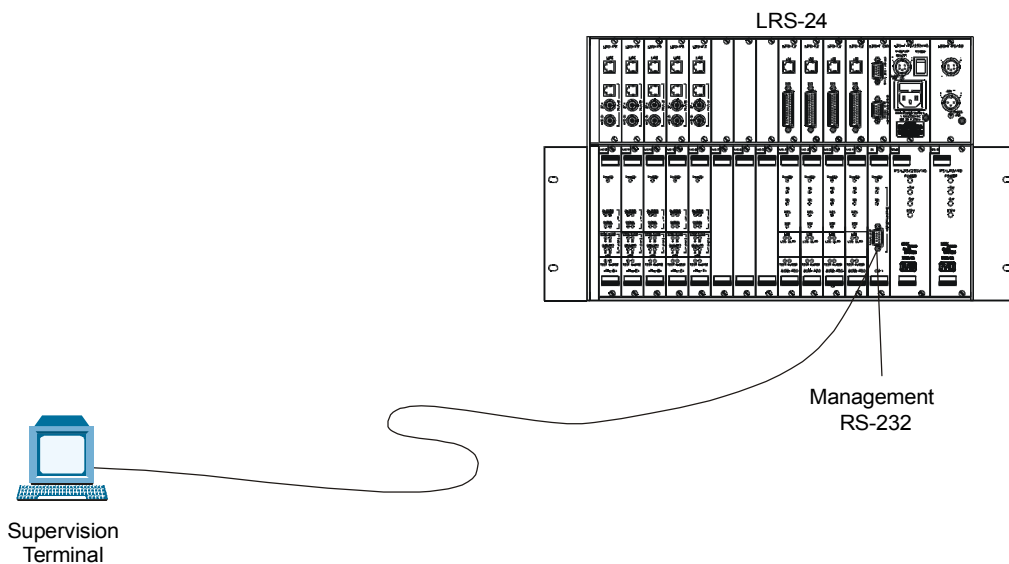


Figure 3-1. Typical Direct Connection of Supervision Terminal

### Connection through Modem Link

Figure 3-2 shows a typical connection through a modem link (or other type of low-speed data link). Note that the cable used to connect to the terminal is a cross cable.

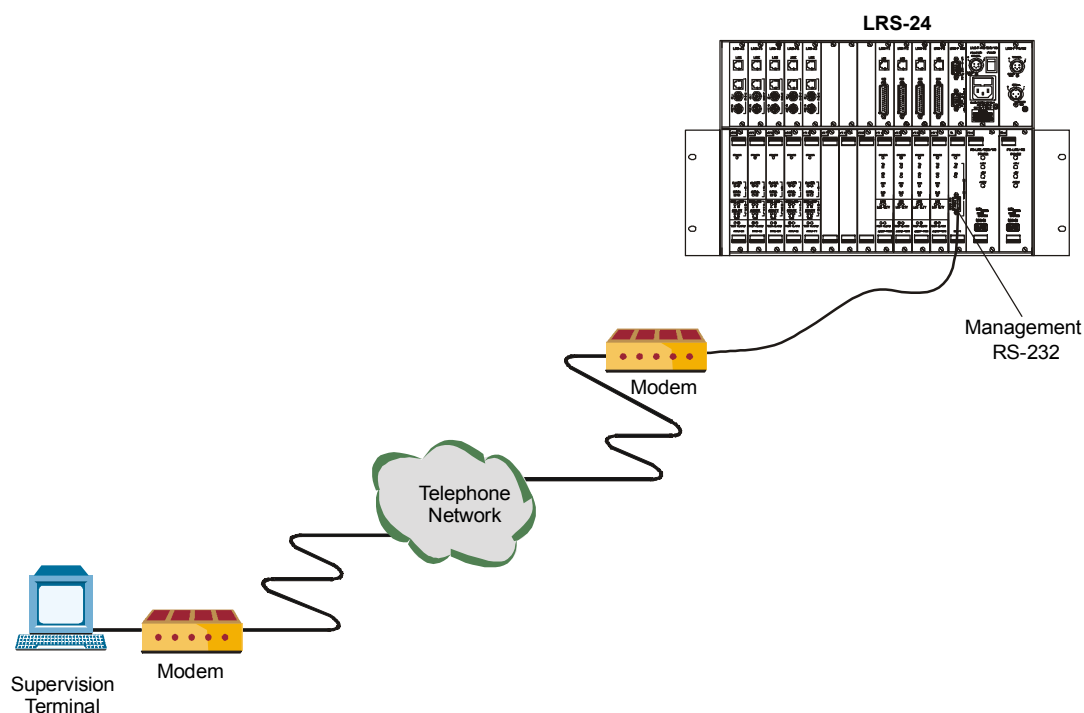


Figure 3-2. Typical Connection of Supervision Terminal Through Modem Link

---

## 3.3 Operating the CM-1 Supervision Terminal

### General

This section provides general procedures for using a supervision terminal to perform the preliminary configuration and to manage the individual CM-1 modules installed in LRS-24.

Before starting, make sure you are familiar with the configuration parameters and management procedures of each module type installed in LRS-24, as described in *Installation and Operation Manuals* for each module. The procedures given in this section supplement the procedures appearing in these manuals.

To reconfigure or troubleshoot modules already configured, obtain the current communication parameters and passwords from the system manager before starting.

### Configuring the Terminal

- **To configure the terminal for communication parameters used by the module:**
  1. Select the full-duplex mode.
  2. Turn off the terminal echo.
  3. The recommended communication parameters are the default parameters: 9600 bps, 1 start bit, 8 data bits, odd parity, 1 stop bit, no flow control.

4. Connect the communication cable of the supervision terminal to either the management RS-232 connector on the LRSI-F-CM1 module (serving the CM-1 module), or to the connector with the same name located on the CM-1 module (refer to *Section 3-2* for details).
5. Make sure LRS-24 is powered. Turn on the supervision terminal. When applicable, also turn on the modems and any other communication equipment used to connect the terminal to LRS-24.

You are now ready to start the configuration session.

---

**Note** *For instructions on how to select default communication parameters, default terminal type and default password, refer to the Installation and Operation Manuals for the various modules.*

---

## Performing Preliminary Configuration

Perform the following activities on each module that is to be managed by means of the supervision terminal:

➤ **To configure each module:**

1. Define the terminal type you are using by entering the command **NODE nn**, followed by the command used to define the terminal type for the desired module, i.e., **DEF TERM**.
2. To change the communication parameters after establishing communication: Use the command **NODE nn DEF SP**.
3. To change the current password: Use the command **NODE nn DEF PWD**.

---

**Note** *In the following sections, **nn** represents the number of the slot in which the desired module is installed.*

---

## Configuring Individual Modules

After completing the preliminary configuration, start the configuration of the individual I/O modules. Before each command, add the prefix **NODE nn**.



# Chapter 4

---

## Management via the CM-2 Module

The information presented in this chapter includes:

- CM-2 functions
- Description of supervision terminal hardware requirements, and of methods for connecting a supervision terminal or network management station to LRS-24
- Supervision terminal commands
- Supervision terminal operating instructions.

The instructions appearing in this chapter assume that the supervision terminal operator is familiar with the configuration parameters of the modules installed in LRS-24.

---

### 4.1 Introduction

This chapter describes how to use a supervision terminal to manage an LRS-24 enclosure that contains a CM-2 control logic module.

The CM-2 module also enables management of the LRS-24 system by means of a RADview network management station, or other SNMP-based network management station. For information regarding the use of the RADview network management station, refer to the *RADview User's Reference Manual*.

### CM-2 Module Capabilities

The CM-2 module includes an internal SNMP agent, and therefore it requires preliminary configuration. The preliminary configuration of LRS-24 must always be performed using a standard ASCII terminal connected to the CM-2 front panel supervisory port, designated MANAGEMENT RS-232. You can use terminals of the following types: VT-52, VT-100, TV-920, FREEDOM-100, FREEDOM-110, FREEDOM-220, or other terminals that are fully compatible with one of these terminals.

After performing the preliminary configuration, you can also manage the modules installed in LRS-24 (equipped with the CM-2 module) using the following options:

- Manage all the modules installed in LRS-24 (including modules without internal SNMP agents) by means of **SNMP-based network management stations**. This is accomplished by connecting the station to the Ethernet port located on the interface module serving the CM-2 module, LRSI-F1-CM2 or LRSI-F2-CM2 through RS-232 using the SLIP Protocol. For example, you can use the RADview network management station offered by RAD.
- Use the terminal as a **supervision terminal** under control of the software installed in the CM-2 module, or in modules with supervision-terminal support software.
- Manage via **TELNET** (terminal emulation).

- 
- Notes**
1. If a key is not pressed for 10-15 minutes a message appears informing you that you are disconnected from LRS-24. You must reconnect your terminal to LRS-24.
  2. Only one user can connect to LRS-24 at a time. If a second user tries to connect to LRS-24 a message appears (see Chapter 5).
  3. If Password Enable = YES and you do not press a key for 20 minutes a message appears informing you that "You're disconnected". Press any key and the Password Screen appears.
- 

## CM-2 Functions

CM-2 includes an advanced management module that enables using SNMP-based network management stations to fully manage the equipment installed in LRS-24, and monitor its status.

CM-2 performs the following functions:

- **Identification of cards** – automatically identifies the modules installed in the LRS-24 hub and determines the internal management protocols supported by each card. Basically, two types of protocols are used, one for managing modules with internal SNMP agent, and another for managing modules without agent.
- **Initialization** – automatically initializes the management parameters for each module installed in LRS-24. This feature provides plug-and-play capabilities, because the management system can always make contact and manage any new module installed in LRS-24.
- **Traps** – remote connection involves an update in the management station's screen in order to receive Traps.
- **Interface** – provides the interface to SNMP-based network management stations, and the interface required for using an ASCII terminal connected to the CM-2 module as a supervision terminal.

- **Identification of Failures** – automatically identifies failure of the management communication, and enables alternate management modes, in accordance with the following priorities:
  - Network management stations
  - Supervision terminal
  - For a module without internal SNMP agent—allows remote configuration in accordance with the parameters of the remote module connected in a link with the LRS-24 module.  
When communication with a management function with higher priority is restored, the management capabilities are automatically returned to it.
- **Routing** – routes the management traffic received through the various ports to its intended destination (module), and processes the messages received from the modules for transmission through the appropriate management port.
- **Format** – automatically translates the format of the incoming and outgoing messages to the internal management protocols used by various modules. Moreover, when simultaneous access is attempted, the CM-2 module arbitrates handling management requests according to a built-in system of priorities.
- **Manages Hub Functions** – manages the general hub functions (for example, power supplies).
- **Data Storage** – stores LRS-24 configuration data in non-volatile memory.

## Handling of Management Communication

The services provided by the CM-2 module depend on the type of management communication (ASCII terminal, network management station, or remote module) and the type of modules (with or without internal SNMP agent) which are addressed by the external management function.

Internal handling of the SNMP management communication is as follows:

- **Modules with Internal SNMP Agent** – the internal protocol is SNMP over SLIP. (However such modules also include management software for directly operating an ASCII terminal).

Routing of SNMP messages is made in accordance with IP addresses assigned to the various modules by the CM-2 module, which provides their initialization parameters.

Refer to *Appendix C* for additional information.

Terminal messages are routed directly to the addressed module. After the addressed module starts communicating with the terminal, it takes control and the terminal then operates under direct control of that module.

- **Modules without Internal SNMP Agent** – a proprietary protocol is used for internal management communication. SNMP messages are accepted through the dedicated management (Ethernet) interface, are converted to the proprietary protocol, and routed to the slot with the desired module. The CM-2 module serves as a proxy agent for these modules.

The CM-2 module also includes the functions required to handle the exchange of management communication with a supervision terminal connected to the serial port of the CM-2 module. The supervision terminal addresses a specific module by specifying its **node number**. The node number is actually the number of the LRS-24 physical slot in which the module is installed (1 through 12 for user I/O modules, 13 for the CM-2 module itself).

For each message, the CM-2 module uses its terminal interfacing functions to read the node number, and then processes the message according to the capabilities of the addressed module.

The processing is as follows: a proprietary protocol is used for the internal communication. Therefore, the CM-2 module uses its terminal interfacing function to convert any message to the proprietary protocol, and route it to the addressed module. This conversion also ensures that the user always sees a consistent interface.

When a link to a remote module connected to a module installed in LRS-24 is set up, the CM-2 module also enables the management function to access the remote module. The available remote management capabilities depend on module characteristics (see the relevant module *Installation and Operation Manual*).

## Management Priorities

The CM-2 module is designed to give the highest priority to SNMP-based management. Therefore, when the CM-2 module is connected to an SNMP-based management station through the dedicated management interface, the serial supervisory port cannot be used for management unless the network management station operator specifically transfers the management to the supervisory port. The serial port can, however, be used at any time for reading the module configuration and status.

The supervisory port is also automatically enabled in case the management station is not active, however, when the station becomes active it automatically takes control and disables management through the serial port.

If neither the network management station nor the terminal is active, the CM-2 module can also read configuration parameters from the remote module in a link with a local module.

## Preliminary Configuration Activities

The CM-2 module, as well as other modules installed in LRS-24, requires preliminary configuration. Preliminary configuration is performed using an ASCII terminal connected to the CM-2 serial supervisory port. The serial port characteristics are as follows:

**Default data rate:** 38.4 kbps

**Default word format:** 1 start bit, 8 data bits, no parity, 1 stop bit

### Preliminary Configuration of CM-2 module

- Configuration of the terminal type supported by its supervisory port.
- Configuration of its SNMP agent parameters. This function is needed to establish communication with SNMP-based management stations, and to designate the management stations authorized to manage LRS-24.

The configuration activities are a prerequisite for performing other activities. They must be performed whenever a new CM-2 module is installed in an LRS-24 system.

### Preliminary Configuration of Other Modules.

- Preliminary configuration required by I/O modules is described in their *Installation and Operation Manuals*. A complete set of preliminary configuration activities, which are actually required only for modules with internal SNMP agent, must also include configuration of I/O module supervisory port.
- Remote connection involves an update in the management station's screen in order to receive Traps.

## Initializing CM-2

The management module of the CM-2 module is designed for plug-and-play support. As explained above, this includes automatic identification of the modules installed in LRS-24, the management protocols that can be used for each module, the preliminary configuration data, and other relevant information.

These activities are performed automatically, without any user intervention:

- Upon power-up
- Upon inserting or removing a module
- Upon moving a module to a new position in the enclosure.

These capabilities are essential to enable the replacement of modules while LRS-24 is powered, without disrupting the operation of the equipment. In addition, the CM-2 module includes provisions to ensure that the service provided by the links supported by the modules installed in LRS-24 is not disrupted when the module is temporarily removed, or even when the CM-2 module is completely replaced. However, when the CM-2 module is removed, it is not possible to perform monitoring and configuration activities.

The functions performed during initialization are adapted to the management requirements of each type of module.

### Modules with Internal SNMP Agent

The CM-2 module does not store parameters for modules with an internal SNMP agent because they store their configuration data locally. However, the CM-2 module must detect the presence of these modules (whether present upon power-up or inserted later), and transfer the configuration parameters needed for starting the management communication.

## Modules without Internal Agent

The CM-2 module will store configuration data locally for modules where such data is provided by an external management function. Therefore, special arrangements are needed to enable the provision of the configuration parameters for each individual module:

- **Power-up** – upon power-up, the goal is to restore the last operational configuration automatically and reliably. For this purpose, the CM-2 module analyzes the configuration parameters stored in the local module, in the remote module connected in a link with the local module, and also its own configuration data associated with the module:
  - If the parameters in the local and remote equipment are **identical and valid** (valid means that all the parameters are consistent and within the allowed ranges), these parameters are automatically copied to the CM-2 data base, and used as the operational parameters.
  - If the parameters of the local and remote modules **differ**, or invalid parameters are detected in at least one of them, but valid parameters are stored in the CM-2 data base, these parameters are automatically downloaded to the equipment and used to determine the operational configuration after power-up.
  - If the CM-2 module has been **powered off**, its configuration data is no longer considered valid. In this case the operator is prompted to reconfigure the equipment parameters.
- **Replacement of CM-2 module** – the procedure explained above is also used if a CM-2 module is plugged into an operating system.
- **Replacement of local module or remote equipment** – the appropriate parameters are automatically downloaded from the CM-2 database. If the CM-2 database is not valid, the operator must determine the desired configuration.

---

---

## 4.2 Hardware Requirements

### Terminal Characteristics

Any standard ASCII terminal (“dumb” terminal or personal computer emulating an ASCII terminal) equipped with an RS-232 communication interface can be used to perform the preliminary configuration and manage an LRS-24 equipped with the CM-2 module.

The software used to operate the supervision program is contained in the CM-2 module. Moreover, the CM-2 module stores all the configuration information generated or altered during the communication with the terminal: no information is stored in the terminal.

Modules must be initialized properly to ensure correct terminal operation, as explained in *Section 4.4*; otherwise, some of the commands may not work properly.

## RS-232 Supervisory Port Interface Characteristics

The CM-2 module has an RS-232 asynchronous DCE port, designated Management RS-232. This port has a 9-pin D-type female connector, which enables direct connection to terminals. Since terminals usually have DTE interfaces, their connection is made by means of a straight-through cable. For connection to a modem, use a cross cable (also called a null modem cable). For detailed instructions on connecting terminals, see below.

The control lines that are used, and directions for connections are listed in *Appendix A*.

The data transfer characteristics are as follows.

**Default data rate:** 38.4 kbps

**Default word format:** 1 start bit, 8 data bits, no parity, 1 stop bit

## Terminal Connection Methods

This section presents typical methods for the connection of a supervision terminal to the CM-2 module installed in the LRS-24 unit.

### Connection of Supervision Terminal

A supervision terminal can be connected either directly to the supervisory port, or through a modem or any other type of full-duplex data link. The CM-2 module supports unrestricted dial-in and only major alarms in dial-out.

*Figure 4-1, Figure 4-2, and Figure 4-3* show typical connections. Note that the cable used to connect directly to the terminal is a straight-through cable, whereas the connection to the modem requires a cross-cable.

## Connection of Management Station

The Network Management Station connection is made through the Ethernet interface, available in the Management Ethernet connector of the CM-2 interface module (this is a 10BaseT interface for the LRSI-F1-CM2 module and a 10Base2 interface for the LRSI-F2-CM2 module).

*Figure 4-4* shows a typical connection in which a network management station with 10BaseT Ethernet interface is connected through a hub to several LRS-24 units installed in a rack.

*Figure 4-1* shows a typical configuration without hub. In this case, the Management Ethernet connectors of the LRS-24 units connect directly to the Ethernet media. For convenience, the 10BaseT interface in the LRSI-F1-CM2 module can be adapted by means of internal jumpers (*Installation and Setup* in *Chapter 2*) to enable connection by means of straight cables, either to a hub or directly to the LAN media.

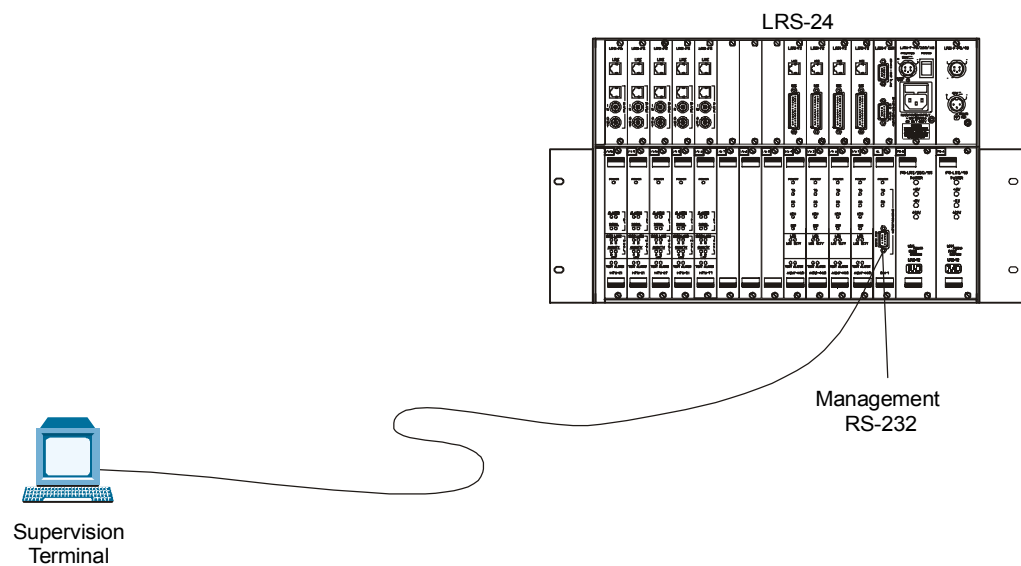


Figure 4-1. Typical Direct Connection of Supervision Terminal

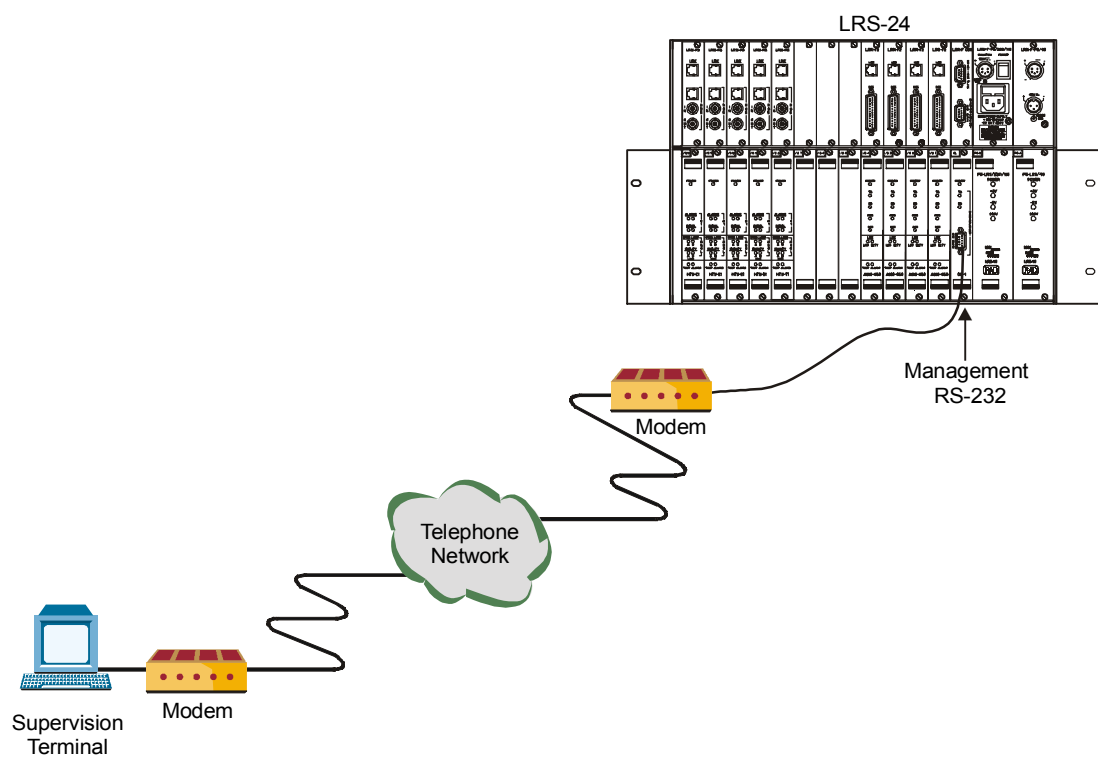


Figure 4-2. Typical Connection of Supervision Terminal Through Modem Link

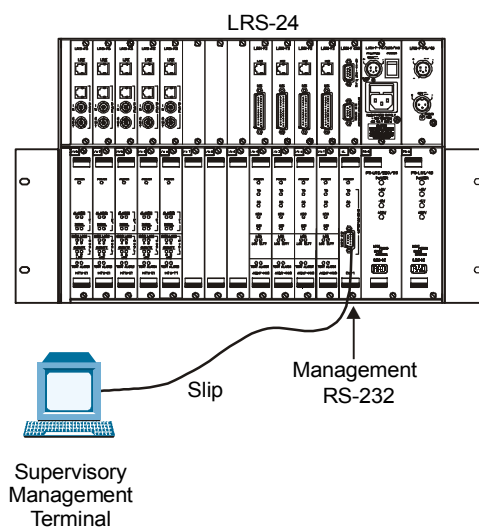


Figure 4-3. Typical Connection of Supervision Terminal Through Slip

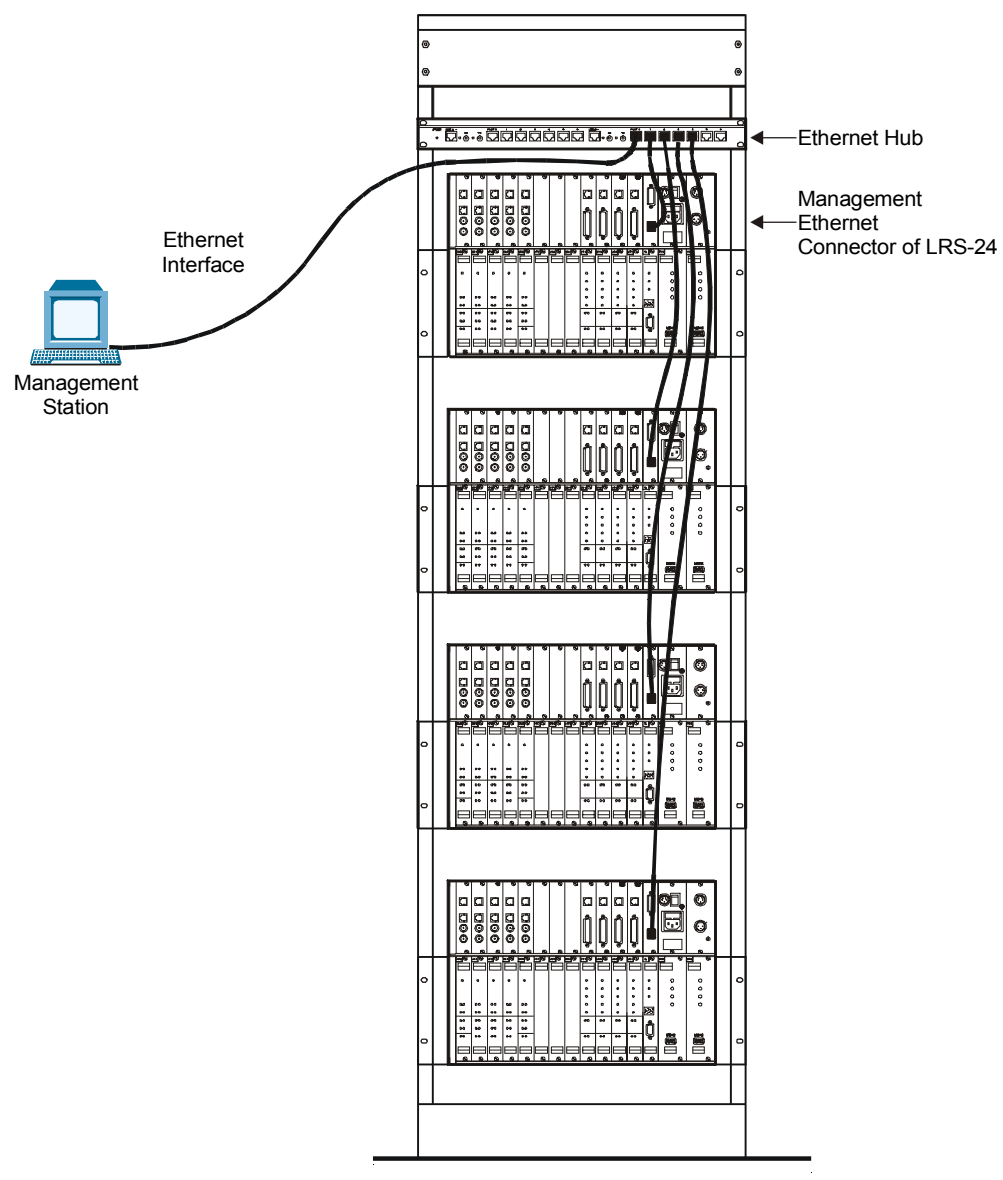


Figure 4-4. Typical Connection to Network Management Station

---

## 4.3 CM-2 Supervision Terminal Language

### General

This section presents the syntax, usage, and an index of the commands available to a supervision terminal controlled by the software in the CM-2 module.

For a complete description of each command, see *Appendix D*.

Similar procedures are available when the terminal is controlled by one of the I/O modules installed in LRS-24; for detailed instructions, refer to the *Installation and Operation Manuals* of the I/O modules.

### Command Language Syntax

|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Prompt</b>        | Commands can be entered only when a prompt is displayed. The prompt always appears at the beginning of a new line, and the cursor appears to the right of the prompt. The prompt identifies the module controlling the terminal.<br>The prompt displayed when the software in the CM-2 module controls the terminal is <b>CM2&gt;</b> .<br>When the software controls the terminal in one of the I/O modules that can directly control it, the prompt is supplied by that module. |
| <b>Case</b>          | Commands are case-insensitive, for example, you can type commands in either lower case and/or upper case letters, and they will be interpreted as upper case only. The exception is SNMP community strings, which <u>are</u> case-sensitive.                                                                                                                                                                                                                                      |
| <b>Node ID</b>       | Commands addressed to a specific module must identify the module using the node number. By default, the node number is identical to the chassis slot number. For example, prefixing the command with <b>NODE 7</b> identifies a module installed in slot 7; commands for the CM-2 module are identified by the prefix <b>NODE 13</b> .                                                                                                                                            |
| <b>Corrections</b>   | To correct typing errors, press <b>&lt;Back space&gt;</b> until the error is cleared, and then type the correct characters.                                                                                                                                                                                                                                                                                                                                                       |
| <b>&lt;Enter&gt;</b> | Commands must end with a carriage return <b>&lt;Enter&gt;</b> .                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Help</b>          | To obtain help, type <b>NODE 13 HLP</b> .                                                                                                                                                                                                                                                                                                                                                                                                                                         |

### Command Protocol

|                             |                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Duplex Communication</b> | after a working prompt is displayed, every character typed on the terminal keyboard is immediately evaluated by the module that sent the prompt, and then echoed to the terminal screen. Full duplex communication with the terminal is therefore necessary to provide on-line feedback to the terminal operator, and terminal echo must be turned off. |
| <b>Cursor</b>               | When a screen has several fields, use the TAB key to move the cursor among the various fields. However, for fields with textual entries, press the <b>&lt;Enter&gt;</b> key to end the entry and move the cursor to the next field. (This is indicated in the command description).                                                                     |

**Scrolling Values** When a field has a limited range of values, the available values are displayed by scrolling. To scroll, bring the cursor to the desired field, and then press <F> or <U> to scroll forward, press <B> or <D> to scroll backward. Press <+> or <-> to scroll to the next or previous command, for up to 10 commands.

**Command evaluation** Starts only when the <Enter> key is pressed.

**Errors** In general, if an error is detected during command evaluation, the command is not executed. Instead, the module will send an error message to the terminal. The correct command must then be sent again.

**Execution** The command is executed only after it is validated.

## Index of Commands

Table 4-1 lists the set of commands recognized by the CM-2 module in alphabetical order.

In addition to the commands listed in Table 4-1, the CM-2 module will recognize commands addressed to I/O modules that can control directly the supervision terminal. For information on the commands available for any particular I/O module, refer to the *Installation and Operation Manuals* of that module.

Table 4-1. Terminal Command Set Index for CM-2 Module

| Command  | Function/Action                                                                                                                                               |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DEF CALL | Defines parameters for the dial-up modem.                                                                                                                     |
| DEF CRD  | Defines modem type per slot and connection to remote site                                                                                                     |
| DEF DWL  | Defines operational parameters or command for Download Software version                                                                                       |
| DEF HUB  | Defines parameters of CM-2 SNMP agent and general LRS-24 parameters                                                                                           |
| DEF MNG  | Defines list of management stations receiving traps generated by CM-2 module                                                                                  |
| DEF OPR  | Defines general management parameters of an I/O module (applicable only to modules which do not support direct management by terminal or SNMP)                |
| DEF PRM  | Defines basic operational parameters of an I/O module (applicable only to modules which do not support direct management by terminal or SNMP)                 |
| DEF TRM  | Defines supervision terminal type                                                                                                                             |
| DEF TST  | Performs test on an I/O module (applicable only to modules which do not support direct management by terminal or SNMP)                                        |
| DSP ALM  | Displays general alarm status of LRS-24                                                                                                                       |
| DSP ALT  | Displays module alarm status (applicable only to modules which do not support direct management by terminal or SNMP)                                          |
| DSP HUB  | Displays modules installed in LRS-24                                                                                                                          |
| DEF CFG  | Displays Auto Config screen                                                                                                                                   |
| DEF MDL  | Downloads to the modem                                                                                                                                        |
| DSP LOG  | Displays list of alarms for CM-2 module, or for a selected I/O module (applicable only to modules which do not support direct management by terminal or SNMP) |
| DSP STT  | Displays I/O module status and diagnostics (applicable only to modules which do not support direct management by terminal or SNMP)                            |

Table 4-2. Terminal Command Set Index for CM-2 Module (Cont.)

| Command | Function/Action                                    |
|---------|----------------------------------------------------|
| DSP VER | Displays modem versions                            |
| DEF RST | Defines reset                                      |
| DEF PWD | Define password                                    |
| HLP     | Displays list of commands supported by CM-2 module |

---

---

## 4.4 Supervision Terminal Operating Instructions

### General

This section provides procedures for using a supervision terminal to perform the following activities:

- Preliminary configuration of the CM-2 module
- Preliminary configuration of I/O modules with internal SNMP agent
- Management of individual modules.

Before starting, make sure you are familiar with the configuration parameters and management procedures of the CM-2 module, and of each module type installed in LRS-24.

The procedures given in this section assume that no management station is actively managing LRS-24. However, the same procedures also apply when the management station relinquishes control to the supervision terminal.

Refer to the section *Transferring Control to the Supervision Terminal* below for an explanation of the procedures used to transfer control from the management station to the supervision terminal.

### Configuring the Terminal

- **To configure terminal for communication parameters used by the CM-2 Management RS-232 port:**
  1. Select the full-duplex mode and turn off the terminal echo.  
The required communication parameters are 38.4 kbps, 1 start bit, eight data bits, no parity, 1 stop bit, and no flow control.
  2. Connect the supervision cable of the terminal to the MANAGEMENT RS-232 connector of the CM-2 module (refer to *Section 4-2* for details).
  3. Make sure LRS-24 is powered-up, and then turn on the supervision terminal.  
When applicable, also turn on the modems and any other communication equipment used to connect the terminal to LRS-24.
  4. Start the configuration session.
  5. Enter password.

## Changing the Password

The factory set password is **radlrs**.

➤ **To change the password:**

1. Type **NODE 13 DEF PWD <Enter>**.

The Password Menu Screen appears (see *Figure 4-5*).

```

PASSWORD MENU
-----
Enter new password      : radlrs
Enable password        : NO
  
```

*Figure 4-5. Password Menu Screen*

2. Type the new password (up to 27 characters, for terminal and TELNET).
3. If you forget the password, switch JP15 on CM-2 to **BYPASS**.

BYPASS PASSWORD  
JP15 

*Figure 4-6. JP15 Settings*

## Preliminary Configuration

➤ **To perform preliminary configuration:**

1. Press the **<Enter>** key several times to see the working prompt of LRS-24, which is by default **CM2>**.
2. Define the terminal type you are using by entering the command **NODE 13 DEF TRM**.
3. Use the command **NODE 13 DEF HUB** to define the parameters of the CM-2 module, and the general parameters of LRS-24 that you are configuring.
4. Use the command **NODE 13 DEF MNG** to define the management stations to which to send traps generated by the CM-2 module.
5. Define the modem cards by entering **NODE 13 DEF CRD** to define the modules installed in the LRS-24 hub.

Refer to *Chapter 4* for detailed command syntax and protocol.

## Configuring Individual Modules

After completing the preliminary configuration, begin configuration of the individual I/O modules. Before starting this activity, it is recommended to use the **NODE 13 DSP HUB** command to identify the modules installed in LRS-24, since configuration procedures depend on the module management type (IMOD or SMOD), and model.

➤ **To configure an SMOD-type module on the DSP HUB data form:**

1. Follow the procedures described in the *Installation and Operation Manual* of the appropriate module.
2. Pay special attention to the configuration of the parameters of the internal SNMP agent of the module and its supervisory port parameters.
3. Before each command, type the node number in the format:  
**Node nn command <Enter>**  
**nn** stands for the node number of the desired module, with values 1 through 12, and **command** is the desired command string.  
The prompt changes from CM2> to the module prompt.

---

**Note** If the prompt changes to **PASSWORD>**, this indicates that password protection is enabled on the addressed module. Enter the current password to proceed. If the password is not known, refer to the module *Installation and Operation Manual* for instructions.

---

➤ **To configure an IMOD-type module on the DSP HUB data form:**

1. Refer to the module *Installation and Operation Manual*.
2. Enter the following sequence of commands:  
**NODE nn DEF TST** – to ensure no test is active.  
**NODE nn DEF OPR** – to verify that you are in master mode.  
**NODE nn DEF PRM** – to configure the appropriate parameters.  
**nn** stands for the node number of the desired module, with values 1 through 12.  
During this procedure, the prompt displayed by the terminal remains **CM2>**.

## Configuration by SNMP Network Management Stations

After preliminary configuration, by means of the terminal, the network management station manages LRS-24. The basic preliminary parameters cannot be modified.

## Transferring Control to the Supervision Terminal

When a network management station actively communicates with LRS-24, the supervision terminal can only be used to read status and configuration information. It cannot modify parameters.

Three minutes after communication between a network management station and the CM-2 module fails, the CM-2 module automatically changes its operation mode to **management by terminal**. When communication is restored, the CM-2 module automatically resumes being controlled by the network management station.

If it is necessary to manage LRS-24 by means of a terminal, the operator of the network management station can transfer the control. For generic SNMP management stations, use the MIB browser function to change the parameter

**private.radWan.modmSys.modmSystem.modmHub.modmHubParam.modmHubController**

to the value corresponding to terminal management.

For CM-2 management commands, see *Appendix D*.

---

**Note**

*This method of transferring control to the supervision terminal is valid only for SMOD modems.*

---

The remote connection involves an update in the management station screen in order to receive traps.

# Chapter 5

---

## Troubleshooting and Diagnostics

This chapter describes alarms, diagnostic tests and troubleshooting for the LRS-24 system.

---

### 5.1 Alarms

Audible and visual indicators provide status of alarms and tests at the network, card and port level, and include all links connected to the hub. Alarms are automatically logged and presented upon request, unless otherwise masked.

For more information about alarms, refer to the following sections in *Appendix D*:

- *Displaying General Alarm Status*
  - *Displaying I/O Module Alarm Status*
  - *Displaying Alarms Log.*
- 

### 5.2 Diagnostic Tests

Refer to the diagnostics tests in the *Installation and Operation Manual* of the individual module.

---

### 5.3 Troubleshooting

The front panel displays indicators E1, E2, E3, E4 and E5 that show the current state of the LRS-24 (see *Figure 5-1*). The states are detailed in *Table 5-1*.

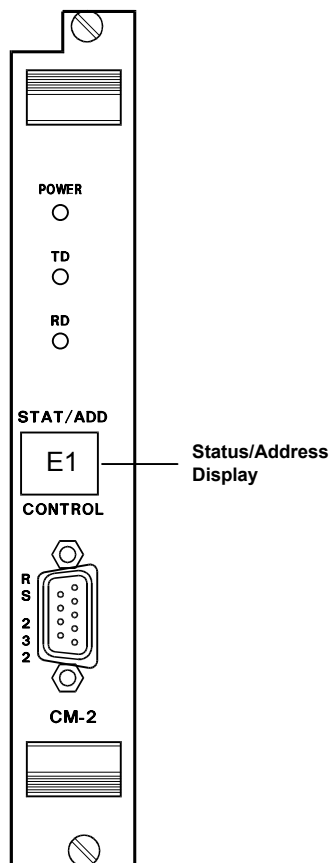


Figure 5-1. Error Indicators

Table 5-1. Front Panel Indicator Displays

| Indicator | Status               |
|-----------|----------------------|
| E1        |                      |
| E2        |                      |
| E3        | No LAN communication |
| E4        |                      |
| E5        |                      |

## 5.4 Error Messages

LRS-24 displays Error Messages that can be used or troubleshooting (see Table 5-2).

Table 5-2. Error Messages

| Message                                                        | Interpretation                                                                                     |
|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| **** No Key hit activity. Closing TELNET Connection! ****      | No key activity for 10 – 15 minutes                                                                |
| Sorry TELNET is being used by another user, try again later!!! | More than one user is trying to connect to LRS-24 via TELNET                                       |
| Not authorized user, closing connection to agent.              | Password is enabled.Five unsuccessful attempts have been made to enter password; TELNET is closed  |
| Enter password: <pressing 'enter' will enter the LRS>          | Password is not enabled, press <Enter> to begin session.                                           |
| **** No Key hit activity. Closing TERMINAL Connection! ****    | No key activity for 20 minutes.To begin a session, press any key and the password message appears. |



# Appendix A

---

## Connector Wiring

This appendix provides connector information on:

- CM-1 module
- CM-2 module
- PS modules.

For information about the connectors located on the I/O (user) modules, and the corresponding interface modules, refer to the corresponding *Installation and Operation Manual*.

---

### A.1 Station Clock Interface – LRSI-F-CM1 Module

The station clock interface located on the LRSI-F-CM1 module terminates in a 9-pin D-type female connector, designated STATION CLK, and wired in accordance with *Table A-1*.

*Table A-1. Pin Allocation for STATION CLK Connector*

| Pin  | Function                     |
|------|------------------------------|
| 1    | Frame Ground                 |
| 2, 3 | Not Connected                |
| 4    | Receive Clock Input (tip)    |
| 5    | Receive Clock Input (ring)   |
| 6    | Transmit Clock Output (tip)  |
| 7    | Not Connected                |
| 8    | Transmit Clock Output (ring) |
| 9    | Not Connected                |

## A.2 Management RS-232 Port Interface—LRSI-F-CM1 Module

The Management RS-232 port on the LRSI-F-CM1 module has an RS-232 interface terminating in a 9-pin female connector wired in accordance with *Table A-2*.

*Table A-2. Pin Allocation for MANAGEMENT RS-232 Connector*

| Pin | Function                  | Direction |
|-----|---------------------------|-----------|
| 1   | Data Carrier Detect (DCD) | Output    |
| 2   | Receive Data (RXD)        | Output    |
| 3   | Transmit Data (TXD)       | Input     |
| 4   | Data Terminal Ready (DTR) | Input     |
| 5   | Signal Ground (SIG)       | N/A       |
| 6   | Data Set Ready (DSR)      | Output    |
| 7   | Request to Send (RTS)     | Input     |
| 8   | Clear to Send (CTS)       | Output    |
| 9   | Ring Indicator (RI)       | Output    |

## A.3 Management RS-232 Port Interface—CM-1/CM-2 Modules

The Management RS-232 port on the CM-1 and CM-2 modules has an RS-232 interface terminating in a 9-pin female connector wired in accordance with *Table A-3*.

*Table A-3. Pin Allocation for Management RS-232 Connector on CM-1/CM-2 Modules*

| Pin | Function                  | Direction                           |
|-----|---------------------------|-------------------------------------|
| 1   | Data Carrier Detect (DCD) | Connected to pins 7, 8              |
| 2   | Receive Data (RXD)        | Output                              |
| 3   | Transmit Data (TXD)       | Input                               |
| 4   | Data Terminal Ready (DTR) | Input, connected directly to pin 6  |
| 5   | Signal Ground (SIG)       | N/A                                 |
| 6   | Data Set Ready (DSR)      | Output, connected directly to pin 4 |

*Table A-3. Pin Allocation for Management RS-232 Connector on CM-1/CM-2 Modules (Cont.)*

| Pin | Function              | Direction              |
|-----|-----------------------|------------------------|
| 7   | Request to Send (RTS) | Connected to pins 1, 8 |
| 8   | Clear to Send (CTS)   | Connected to pins 1, 7 |
| 9   | Ring Indicator (RI)   | N/A                    |

## A.4 Station CLK Connector – LRSI-F-CM2 Modules

The station clock interface located on the LRSI-F-CM2 modules are terminated in a 15-pin D-type female connector, designated STATION CLK, and wired in accordance with *Table A-4*.

The connector also includes the contacts of the major and minor alarm relays.

*Table A-4. Pin Allocation for LRSI-F-CM2 Modules, Station Clk Connector*

| Pin  | Function                                                  |
|------|-----------------------------------------------------------|
| 1    | Station Clock Transmit Output (tip)                       |
| 2    | Not Connected                                             |
| 3    | Station Clock Receive Input (tip)                         |
| 4, 5 | Not Connected                                             |
| 6    | Minor Alarm Relay – Normally Closed (NC) to pin 14        |
| 7    | Major Alarm Relay – Normally Open (NO) relative to pin 8  |
| 8    | Major Alarm Relay – Common Contact                        |
| 9    | Station Clock Transmit Output (ring)                      |
| 10   | Not Connected                                             |
| 11   | Station Clock Receive Input (ring)                        |
| 12   | Not Connected                                             |
| 13   | Minor Alarm Relay – Normally Open (NO) relative to pin 14 |
| 14   | Minor Alarm Relay – Common Contact                        |
| 15   | Major Alarm Relay – Normally Closed (NC) to pin 8         |

## A.5 Ethernet Interface Connector – LRSI-F1-CM2 Module

The 10BaseT Ethernet interface located on the LRSI-F1-CM2 module is terminated in an RJ-45 connector, designated Management Ethernet 10BT, and wired in accordance with *Table A-5*. Note that the wiring depends on the settings of the jumpers on the LRSI-F1-CM2 module, as explained in *Section 2-5*.

*Table A-5. LRSI-F1-CM Module, Ethernet Interface Connector*

| Pin  | Function                      |                               |
|------|-------------------------------|-------------------------------|
|      | Jumpers JP1 - JP5 on Pins 1-2 | Jumpers JP1 - JP5 on Pins 2-3 |
| 1    | Input: Receive Data wire +    | Output: Transmit Data wire +  |
| 2    | Input: Receive Data wire –    | Output: Transmit Data wire –  |
| 3    | Output: Transmit Data wire –  | Input: Receive Data wire –    |
| 4    | Not connected                 | Not connected                 |
| 5    | Not connected                 | Not connected                 |
| 6    | Output: Transmit Data wire +  | Input: Receive Data wire +    |
| 7, 8 | Not connected                 | Not connected                 |

## A.6 Ethernet Interface Connector – LRSI-F2-CM2 Module

The 10Base2 Ethernet interface located on the LRSI-F2-CM2 module is terminated in a BNC connector designated Management Ethernet 10B2.

## A.7 Power Connectors

The AC-powered PS modules have one standard IEC three-pin socket with integral fuse, for the connection of the AC power.

The DC-powered PS modules have one three-pin circular connector, for the connection of the –48 VDC input voltage. Connector wiring is listed in *Table A-6*.

*Table A-6. DC Power Connector, Pin Functions*

| Pin | Function      |
|-----|---------------|
| 1   | Ground        |
| 2   | Not connected |
| 3   | –48 VDC       |

# Appendix B

---

## LRS-PS-FEED Power Supply

---

---

### B.1 Functional Description

LRS-PS-FEED is a standalone power supply unit designed to serve as a source of remote (phantom) feed power.

LRS-PS-FEED is intended for use in conjunction with modules equipped with a remote power feeding interface, e.g., HTU-E1C/P, installed in the 24-Card HDSL/Modem Hub with SNMP Management, LRS-24. The remote power feeding interface of such modules enables the supply of feed voltage to the remote equipment connected to the module through standard twisted-pair lines. Each interface can provide up to 60 mA per output line.

LRS-PS-FEED has one output, terminated in a short cable with a five-pin connector that can be directly connected to the Phantom Feed connector on the LRSI-PSP/230/115 or LRSI-PSP/48 interface module.

LRS-PS-FEED is available in two versions:

- AC-powered version that can operate on 115 VAC or 230 VAC
- DC-powered version that operates on –48 VDC.

LRS-PS-FEED is intended for installation in 300 mm and 600 mm ETSI racks, as well as in ANSI and 19" racks. Unit height is 1U.

---

#### **Note**

*When used with LRS-24, the LRS-PS-FEED should be installed above LRS-24.*

---

---

### B.2 LRS-PS-FEED Panels

#### **AC-Powered Unit**

Figure B-1 shows the front panel of the AC-powered LRS-PS-FEED unit. The front panel includes a power switch, a Power indicator that lights when the unit is powered, and a standard 3-pin IEC AC input power socket with integral fuse.

The output voltage (Phantom Out) is provided by means of a short cable terminated in a five-pin connector.

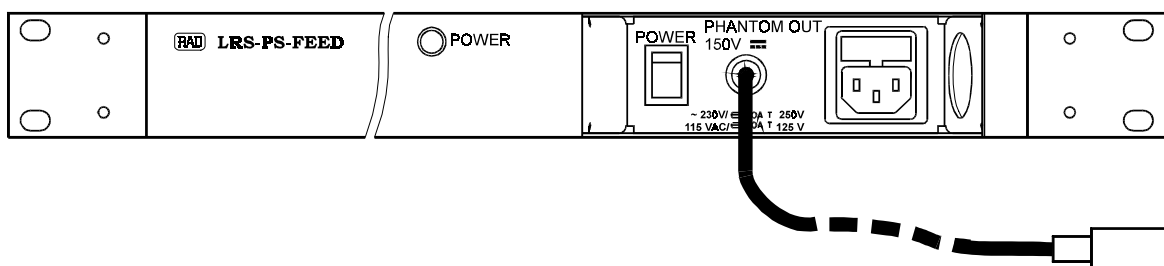


Figure B-1. AC-Powered LRS-PS-FEED Front Panel

Figure B-2 shows the rear panel of the LRS-PS-FEED unit, which includes POWER indicator that lights when the unit is powered (ANSI option).

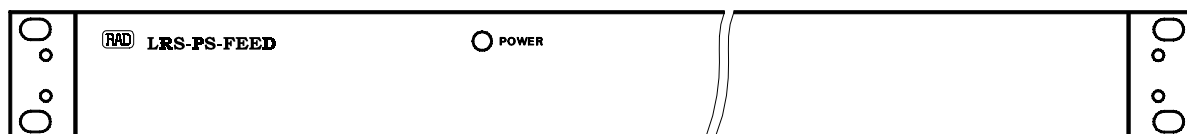


Figure B-2. LRS-PS-FEED Rear Panel

## DC-Powered Unit

Figure B-3 shows the front panel of the DC-powered LRS-PS-FEED unit. The front panel includes a POWER indicator, a DC input power connector, and a fuse.

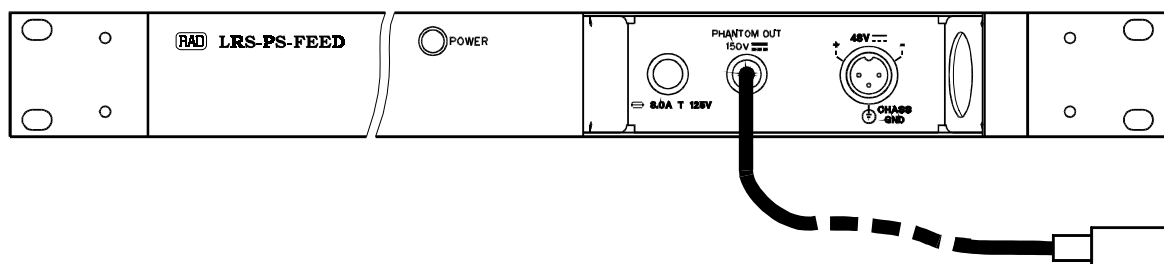


Figure B-3. DC-Powered LRS-PS-FEED Front Panel

The output voltage (PHANTOM OUT) is provided by means of a short cable terminated in a five-pin connector.

The rear panel of the DC-powered LRS-PS-FEED unit is similar to that of the AC-powered unit (see Figure B-2).

## B.3 Site Requirements

### AC Power

Install AC-powered LRS-PS-FEED units within 1.5m (5 feet) of an easily accessible grounded AC outlet capable of furnishing the required supply voltage, 115 VAC or 230 VAC.

## DC Power

DC-powered LRS-PS-FEED units require a –48 VDC power source.

---

**Note** *No power switch is provided for the DC power supply modules, and therefore it is recommended to connect the DC power to the LRS-PS-FEED through a circuit breaker located close to the LRS-PS-FEED, that will also permit turning off the power to the LRS-PS-FEED.*

---

## Grounding



### Warning

**For your protection and to prevent possible damage to equipment when a fault condition (e.g., lightning stroke or contact with high-voltage power line) occurs on the lines connected to the equipment, the LRS-PS-FEED case must be properly grounded at all times. Never connect cables to an LRS-PS-FEED that is not properly grounded.**

**Any interruption of the protective (grounding) connection inside or outside the equipment, or the disconnection of the protective ground terminal makes this equipment dangerous. Intentional interruption is prohibited.**

**Before switching on this equipment and before connecting any other cable, connect the protective ground terminal of the enclosure to a protective ground.**

**LRS-PS-FEED units are grounded through the protective (grounding) conductor of the power cable.**

**When LRS-PS-FEED is installed in racks, the rack itself should also be grounded in accordance with standard practice and the locally applicable regulations. Installing the unit in a grounded rack provides additional protection against fault conditions.**

---

## Front Clearance

Allow at least 90 cm (36 inches) of frontal clearance for operator access.

## Ambient Requirements

The ambient operating temperature of the LRS-PS-FEED should be 32° to 113°F (0° to 45° C), at a relative humidity of up to 90%, non-condensing.

## Cooling

LRS-PS-FEED units are cooled by free air convection. The cooling vents are located in the top and bottom covers. Do not obstruct these vents. Allow at least 1U of space below and above the unit.

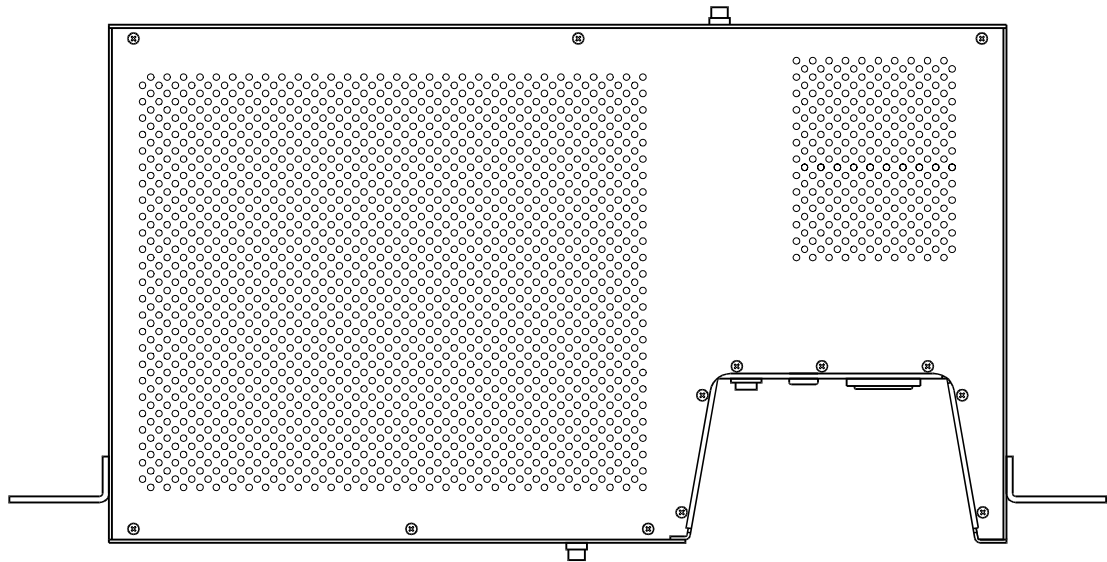
## B.4 Installation and Operation

### Preparation for Installation

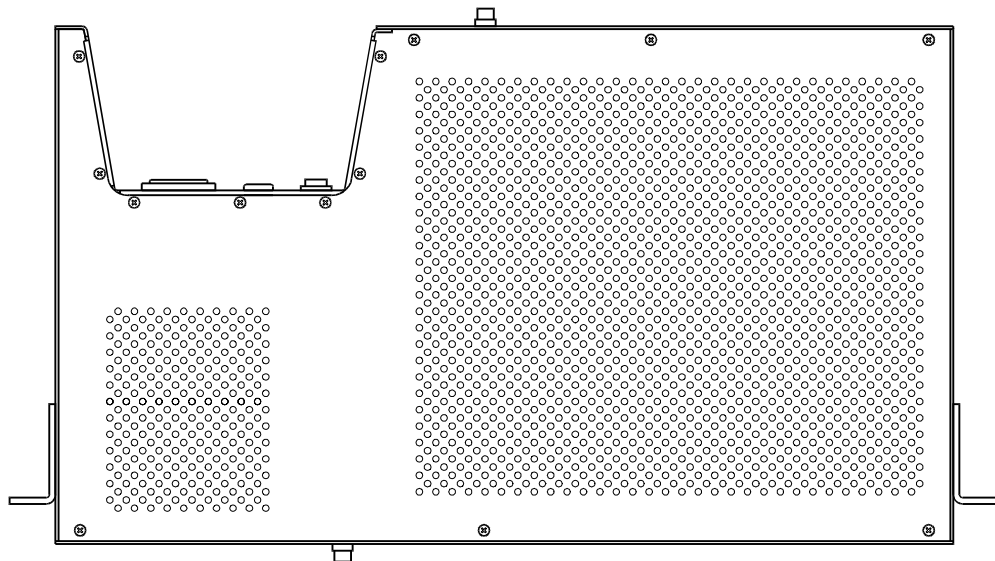
LRS-PS-FEED can be installed in ETSI racks with front-side access for cable connection, as well as in ANSI racks, which require rear access. The adaptation is made by installing the brackets supplied with the unit in the position corresponding to the desired installation position.

*Figure B-4* shows how to install the brackets for front-panel access. *Figure B-5* shows bracket installation for rear-panel access.

For installation above the LRS-24, install the brackets as shown in *Figure B-4*.



*Figure B-4. Installation of Brackets for Front Panel Access*



*Figure B-5. Installation of Brackets for Rear Panel Access*

## Rack Installation

Position the LRS-PS-FEED unit above LRS-24, leaving at least 1U free space, and fasten the unit with four screws to the rack side rails.

## Power Connection

Note that only the AC-powered LRS-PS-FEED has a POWER (On/Off) switch; the DC-powered unit does not have a power switch, and therefore it will start operating when DC power is applied.

➤ **To avoid turning on LRS-PS-FEED when connecting the power cables:**

1. Before connecting LRS-PS-FEED to AC power, set the On/Off switch on the LRS-PS-FEED panel to Off.
2. Use an external circuit breaker located near LRS-PS-FEED to control the supply of DC power, and protect the DC input line. Set circuit breaker to Off before connecting the DC power cable to the LRS-PS-FEED.

### AC Power Connection

Supply AC power to LRS-PS-FEED through the 5 feet (1.5m) standard power cable terminated by a standard 3-prong plug.

Connect the power cable first to the connector on the panel of the LRS-PS-FEED, and then to the mains outlet.

### DC Power Connection

Connect the power cable between the DC distribution panel and the DC power connector of the LRS-PS-FEED. Pay attention to correct polarity.

### Phantom Voltage Connection

Connect the connector of the Phantom Out cable of the LRS-PS-FEED to the designated Phantom Feed connector of the LRSI-PSP\* interface module installed in the LRS-24.

---

**Note**     \* *Interface module version, for example, LRS-PSPF1, LRS-PSPF2, etc.*

---

## Operation

➤ **To operate LRS-24 with LRS-PS-FEED:**

1. Turn on LRS-24 before powering up LRS-PS-FEED.
2. After LRS-24 is operating, apply power to LRS-PS-FEED. The Power indicators of the LRS-PS-FEED light up.
3. When turning off the system, first turn off LRS-PS-FEED; then turn off LRS-24.



# Appendix C

---

## SNMP Management

---

---

### C.1 Scope

This appendix:

- Provides specific information required to manage LRS-24 (equipped with the CM-2 module) via a Simple Network Management Protocol (SNMP)
  - Includes information regarding the operation of the CM-2 SNMP agent.
- 

### C.2 SNMP Environment

#### General

The SNMP management functions of LRS-24 are provided by an internal SNMP agent, located on the CM-2 module.

The SNMP management communication uses the User Datagram Protocol (UDP), which is a connectionless-mode transport protocol, part of the suite of protocols of the Internet Protocol (IP). This section covers the information related to the SNMP environment. For a description of the IP environment, refer to *Section C-3*.

#### SNMP Principles

The SNMP management protocol is an asynchronous command/response polling protocol: all management traffic is initiated by the SNMP-based network management station (except for trap messages), which addresses the managed entities in its **management domain**. Only the addressed managed entity answers the polling of the management station.

The managed entities include a function called “SNMP agent”, which is responsible for interpretation and handling of the management station requests to the managed entity, and the generation of properly-formatted responses to the management station.

#### SNMP Operations

The SNMP protocol includes four types of operations:

**GetRequest**      Command for retrieving specific management information from the managed entity. The managed entity responds with a **getResponse** message.

|                       |                                                                                                                                                             |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>GetNextRequest</b> | Command for retrieving sequentially specific management information from the managed entity. The managed entity responds with a <b>getResponse</b> message. |
| <b>SetRequest</b>     | Command for manipulating specific management information within the managed entity. The managed entity responds with a <b>setResponse</b> message.          |
| <b>Trap</b>           | Management message carrying unsolicited information on extraordinary events, e.g., alarms, reported by the managed entity.                                  |

## The Management Information Base

The Management Information Base (MIB) includes a collection of **managed objects**. A managed object is defined as a parameter that can be managed, such as a performance statistics value.

MIB includes the definitions of relevant managed objects. Various MIBs can be defined for various management purposes, types of equipment, etc.

An object's definition includes the range of values and the "access" rights:

|                       |                                             |
|-----------------------|---------------------------------------------|
| <b>Read-only</b>      | Object value can be read, but cannot be set |
| <b>Read-write</b>     | Object value can be read or set             |
| <b>Write-only</b>     | Object value can be set, but cannot be read |
| <b>Not accessible</b> | Object value can be neither read nor set    |

## MIB Structure

MIB has an inverted tree-like structure, with each definition of a managed object forming one leaf, located at the end of a branch of that tree. A unique path reaches each *leaf* in the MIB. Therefore, by numbering the branching points from the top, each leaf can be uniquely defined by a sequence of numbers. The formal description of the managed objects and the MIB structure is provided in a special standardized format, called Abstract Syntax Notation 1 (ASN.1).

Since the general collection of MIBs can also be organized in a similar structure, under the supervision of the Internet Activities Board (IAB), any parameter included in a MIB that is recognized by the IAB is uniquely defined.

To provide the flexibility necessary in a global structure, MIBs are classified in various classes (branches), one of them being the experimental branch, and another the group of private (enterprise-specific) branches. Under the private enterprise-specific branch of MIBs, each enterprise (manufacturer) can be assigned a number, which is its enterprise number. The assigned number designates the top of an enterprise-specific sub-tree of non-standard MIBs. Within this context, RAD has been assigned the enterprise number **164**. Therefore, enterprise MIBs published by RAD can be found under **1.3.6.1.4.1.164**.

MIBs of general interest are published by the IAB in the form of a Request for Comment (RFC) document. In addition, MIBs are also often assigned informal names that reflect their primary purpose. Enterprise-specific MIBs are published and distributed by their originator, which is responsible for their contents.

## MIBs Supported by the LRS-24 SNMP Agent

The interpretation of the relevant MIBs is a function of the SNMP agent of each managed entity. CM-2 SNMP agent supports the standard MIB-II (RFC 1158).

In addition, LRS-24 SNMP agent supports the RAD-private (enterprise-specific) MIB identified as (read the following as a continuous string):

**iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).rad(164).radWan(6).TBD**

Enterprise-specific MIBs supported by RAD equipment, including the LRS-24, are available in ASN.1 format from the RAD Technical Support Department.

## Management Domains Under SNMP

In principle, SNMP enables each management station that knows the MIBs, supported by a device, to perform all the management operations available on that device. However, this is not desirable in practical situations, so it is necessary to provide a means to delimit management domains.

### SNMP Communities

To enable the delimitation of management domains, SNMP uses “communities”. Each community is identified by a name, which is a case-sensitive alphanumeric string defined by the user (LRS-24 SNMP agents support community names of up to 20 characters).

Any SNMP entity (this term includes both managed entities and management stations) can be assigned by its user community names.

### Access Restriction Using SNMP Communities

In general, SNMP agents support two types of access rights:

- |                   |                                                                                                                                                                       |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Read-only</b>  | SNMP agent accepts and processes only SNMP <b>getRequest</b> and <b>getNextRequest</b> commands from management stations that have the same read-only community name. |
| <b>Read-write</b> | SNMP agent accepts and processes all the SNMP commands received from a management station with the same read-write community name.                                    |

For each SNMP entity it is possible to define a list of the communities which are authorized to communicate with it, and the access rights associated with each community (this is the SNMP community name table of the entity). For example, the SNMP community name table of the SNMP agent of LRS-24 can include three community names.

In accordance with the SNMP protocol, the SNMP community of the originating entity is sent in each message. When an SNMP message is received by the addressed entity, it first checks the originator's community first. If the community name of the message originator differs from the community name specified for that type of message in the SNMP community names table of the recipient, the message is discarded (SNMP agents of managed entities usually report this event by means of an authentication failure trap).

## CM-2 Communities

The SNMP agent of the CM-2 can use and recognize the following community types:

|                   |                                                                                                                                                                                                                                                                                      |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Read-only</b>  | SNMP community that has read-only authorization, i.e., the SNMP agent will accept only <b>getRequest</b> and <b>getNextRequest</b> commands from management stations using that community.<br>The default read-only community for RAD network management stations is <b>Public</b> . |
| <b>Read-write</b> | SNMP community that has read-write authorization, i.e., the SNMP agent will also accept <b>setRequest</b> commands from management stations using that community.<br>The default write community for RAD network management stations is <b>Public</b> .                              |
| <b>Trap</b>       | SNMP community to which the SNMP agent will send traps.<br>The default trap community for RAD network management stations is <b>Public</b> .                                                                                                                                         |

---

---

## C.3 IP Environment

### General

The SNMP agent of the CM-2 can use its dedicated interface, located on its interface module (LRSI-F1-CM2 or LRSI-F2-CM2), or the serial supervisory port on the CM-2 module.

In addition, the SNMP agent also handles some of the messages received from a supervision terminal, as explained in *Chapters 1-3*.

This section describes the IP environment, and the functions performed by the SNMP agent.

### IP Environment

This section describes the IP environment, and the considerations related to the assignment of IP addresses.

#### IP Address Structure

Under the IP protocol, each IP network element (SNMP agents, network management stations, etc.) is called an IP host and must be assigned an IP address. This is also true for the Serial Port IP protocol (SLIP). The main difference with respect to the handling of messages is that to route an IP message to its destination it is also necessary to provide a MAC address, whereas for SLIP messages this is irrelevant, because the messages must reach a specific serial port.

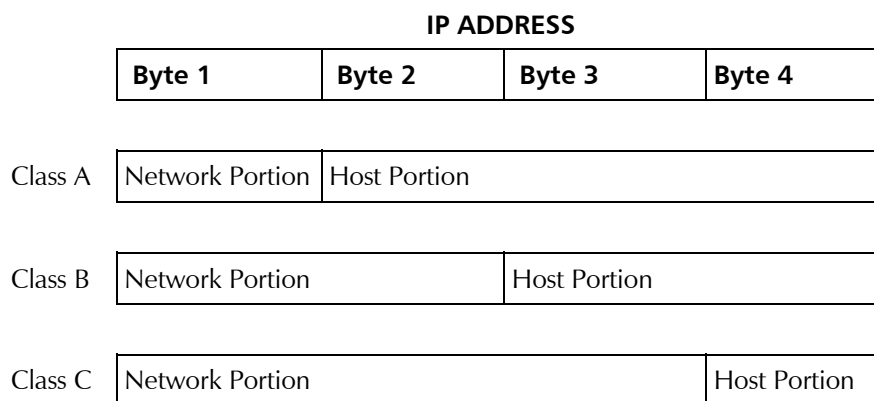
An IP address is a 32-bit number, usually represented as four 8-bit bytes. Each byte represents a decimal number in the range of 0 through 255.

The address is given in decimal format, with the bytes separated by decimal points, i.e., 164.90.70.47. This format is called **dotted quad notation**.

An IP address is logically divided into two main portions:

- **Network Portion**—assigned by the Internet Assigned Numbers Authority (IANA). There are five IP address classes: A, B, C, D, and E. However, only the classes A, B and C are used for IP addressing. Consult your network manager with respect to the class of IP addresses used on your network.

The network portion of an IP address can be one, two or three bytes long, in accordance with the IP address class. This arrangement is illustrated below:



*Figure C-1 IP Address*

The class of each IP address can be determined from its leftmost byte, in accordance with the chart in *Table C-1*.

*Table C-1. IP Address Class*

| Address Class | First Byte   | Address Range               |
|---------------|--------------|-----------------------------|
| Class A       | 0 thru 127   | 0.H.H.H through 127.H.H.H   |
| Class B       | 128 thru 191 | 128.N.H.H through 191.N.H.H |
| Class C       | 192 thru 223 | 192.N.N.H through 223.N.N.H |

**N** Bytes that are part of the network portion  
**H** Bytes that are part of the host portion

- **Host Portion**—used to identify an individual host connected to the network. The host identifier is assigned by the using organization, in accordance with its specific needs.

**Note** *The all-zero host identifier is always interpreted as a network identifier, and must not be assigned to an actual host.*

Often the host portion is further subdivided into two portions:

**Subnet number** Used to identify departmental subnetworks. The subnet number follows the network identifier.

**Host number** Last bits of the IP address.

## Net and Subnet Masks

Net and subnet masks are used to help filter the relevant traffic more efficiently: the function of the net and subnet mask is to specify how many of the IP address bits are actually used for the net identifier and for the subnet number.

The mask is a 32-bit word that includes **ones** in the positions used for net and subnet identifications, followed by **zeros** up to the end of the IP address. Therefore, a subnet mask can be specified by its **length** (the number of **ones**).

## Assignment of Addresses

The CM-2 module and the I/O modules installed in the LRS-24 must be assigned consecutive IP addresses: the first (lowest) address must be assigned to the CM-2 module, and the following 12 IP addresses must be reserved for the I/O modules (the first address is associated with I/O slot 1, and the last address with slot 12). Unused addresses must be skipped: that is, when an I/O module with internal SNMP agent is configured, it must be assigned the IP address corresponding to the slot in which it is installed, even if previous addresses are not assigned.

## Default Gateway

When the CM-2 module and the network management station are both connected to the same IP network, the network identifier part of the CM-2 IP address must be identical to the network identifier part of the management station IP address.

However, the CM-2 module and the management station can also be on different IP networks, and therefore each one will be assigned IP addresses according to its IP network. In this case, it is necessary to define a default gateway (IP router) for the CM-2 module, to handle the transfer of management traffic between the CM-2 and the management station.

## Handling of Management Communication

The handling of the management communication within the CM-2 module depends on the type of management communication (ASCII terminal, SLIP, or UDP/IP) and the type of modules (with or without internal SNMP agent) which are addressed by the external management function.

### Modules with Internal SNMP Agent

This section describes the handling of the SNMP management communication when this communication is related to modules with internal SNMP agents.

For such modules, the management communication is internally transferred using SNMP over SLIP. The SNMP management communication is handled as follows:

- SNMP messages over UDP/IP (the protocol used when a network management station is connected through the dedicated management interface on the Ethernet interface modules) are converted to the SLIP protocol.
- SNMP messages over SLIP (the protocol used when a network management station is connected through the serial supervisory port of the CM-2 module), are routed to the addressed module.

## Routing of IP Management Traffic

The routing of SNMP messages is made in accordance with the IP addresses assigned to the various modules (the CM-2 module also has its own IP address). IP addresses are assigned during the preliminary configuration activities. The CM-2 module automatically learns the IP addresses of all the existing I/O modules, without any user intervention. For this purpose, updates are automatically performed upon power-up, whenever a module is inserted or moved to a new position in the enclosure, and also when a new CM-2 module is installed.

Using this information, the CM-2 module can operate as a bridge/router and ARP (address resolution protocol) server with respect to the modules with SNMP agents installed in the LRS-24:

- The first time that a management station which is authorized to manage the LRS-24 needs to send a message to one of the modules installed in it, it does not know the MAC address to be used; therefore it issues an ARP request with the IP address of the desired module. The CM-2 module of LRS-24 containing the module with the desired IP address answers the message, and includes the MAC address of the Ethernet interface located on its interface module (LRSI-F1-CM2 or LRSI-F2-CM2).  
The next time, the CM-2 module routes the management message to the appropriate module in accordance with the IP address included in the message.
- A similar procedure is used when an I/O module needs to send a message to a management station. In this case, the module sends a SLIP message with the desired IP address, and the CM-2 module converts the SLIP message to a regular message, by adding the MAC information for the addressed management station.  
If the CM-2 module does not yet know the MAC address, it temporarily queues the message, and then sends an ARP request to learn that address. After receiving the answer, the original message is sent.

---

---

## C.4 SNMP Traps

The SNMP agent of LRS-24 supports the MIB-II authentication trap, and in addition generates enterprise-specific traps for each alarm message, and for errors detected as a result of the **sanity check** performed by modules after changes in configuration.



# Appendix D

---

## CM-2 Management Commands

This appendix describes the set of commands recognized by the CM-2 module. It explains how to define:

- Dial-up Modem Parameters
- LRS-24 and CM-2 SNMP Agent Parameters
- Management Stations
- CM-2 Download Parameters
- Modem Version
- I/O Module Management Parameters
- Card Configuration
- I/O Module Operational Parameters
- Supervision Terminal Type
- I/O Module Diagnostics
- Auto-Configuration
- Password
- CM-2 Reset.

It explains how to display:

- General Alarm Status
- System Status
- Alarms Log
- I/O Module Status
- Command Options.

Each section includes command format, procedure, and options.

For notational convenience, the symbol *nn* is used to indicate the node number, in the range of 1 through 13.

## D.1 Defining Dial-Up Modem Parameters

### Purpose

Defines the call-out parameters for the CM-2 dial-out port. The specified call-out parameters are used by the CM-2 to build the call command that is sent to the dial-up modem.

The modem connected to the out port must be set up as follows: (For convenience, the Hayes commands required to select the specified parameters are listed in brackets.)

- At least 38.4 kbps per second dial modem
- Modem reports call progress result codes: OK, CONNECT, RING, NO CARRIER, NO ANSWER, ERROR, BUSY (AT X0)
- Modem sends result code to DTE (AT Q0)
- No echo (AT E0)
- Modem sends long form result codes (AT V1)
- DTR is ignored (AT &D0)
- DSR forced on (AT &S0)
- Escape code character must be + (AT S2=43).

### Format

DEF CALL

### Procedure

➤ **To define the CM-2 call-out parameters:**

- Type: **NODE 13 DEF CALL<Enter>.**

The call-out parameters' data form is displayed. A typical data form is shown in *Table D-1*.

| <u>DIAL MODEM CONFIGURATION</u> |         |
|---------------------------------|---------|
| DIAL MODEM STATUS:              | ACTIVE  |
| COMMAND:                        | ATD     |
| NUM OF RETRIES:                 | 2       |
| WAIT FOR CONNECT:               | 60 SECS |
| DIAL MODE:                      | TONE    |
| PHONE NUMBER:                   | 29      |
| ALT NUM MODE:                   | YES     |
| ALT NUM:                        |         |

*Figure D-1. Dial Modem Configuration Screen*

## Command Fields

Table D-1 lists the fields appearing on the data form.

Table D-1. DEF CALL Fields

| Field Name        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Options                                                                                                                                                                                                         |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DIAL MODEM STATUS | <p>Sets the dial modem to active or inactive.</p> <p>After you set the CM-2 to active status, it becomes available for use after 10 seconds. A message is shown on the terminal.</p> <p>In order to change the modem from active to inactive, disconnect the terminal port for about one minute.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>ACTIVE – Dial-up modem is active</p> <p>INACTIVE – Dial-up modem is inactive</p>                                                                                                                             |
| COMMAND           | Command to dial-up modem. For example, ATD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                 |
| NUM OF RETRIES    | <p>Specifies the number of dialing retries:</p> <p>NUM OF RETRIES applies to both the primary and the alternate numbers as follows:</p> <ul style="list-style-type: none"> <li>If the call is not established after dialing the primary number the specified number of times, the CM-2 attempts to establish the call by dialing the alternate number (provided the use of an alternate number is enabled by means of the ALT NUM MODE parameter below).</li> <li>If the call cannot be established with the specified number of redialing attempts on either of the two numbers, the CM-2 stops the call attempt. When a new alarm report must be sent, the call attempts are started again.</li> </ul> <p>The user is notified about a failed call attempt by a message recorded in the alarm buffer. Separate messages are provided for each number called.</p> | <p>0 – No redial is attempted if the call is not established on the first attempt</p> <p>1 through 8 – If the call is not established on the first attempt, the CM-2 redials the specified number of times.</p> |
| WAIT FOR CONNECT  | Specifies time that the CM-2 waits for an answer after each dialing attempt. If the called station does not answer within the specified time, the CM-2 disconnects. If additional call attempts are allowed, the CM-2 redials 30 seconds after disconnecting.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>30, 45, and 60 seconds</p> <p><b>Default value: 60 seconds</b></p>                                                                                                                                           |
| DIAL MODE         | <p>Selects dialing mode</p> <p>The appropriate dialing mode to use depends on dialing mode supported by the network.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>TONE – The modem is instructed to use DTMF dialing</p> <p>PULSE – The modem is instructed to use pulse dialing</p>                                                                                           |
| PHONE NUMBER      | Primary phone number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                 |

Table D-1. DEF CALL Fields (Cont.)

| Field Name   | Description                           | Options                                                                                                                                                                                                                                                                                                                                                                   |
|--------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALT NUM MODE | Enables dialing the alternate number. | <p>NO – Dialing the alternate number is disabled. CM-2 stops the call attempt after the NUM OF RETRIES call attempts on the primary number have failed.</p> <p>YES – Use of the alternate number is enabled. The alternate number is dialed after the NUM OF RETRIES call attempts on the primary number have failed.</p> <p>NA – Not available, same as the value NO</p> |
| ALT NUM      | Alternate phone number                |                                                                                                                                                                                                                                                                                                                                                                           |

### Returning to Terminal Mode

➤ **To return to the terminal mode while the Dial Modem Status is Active:**

1. Disconnect the modem from the terminal port.
2. Wait for one minute.

The Dial Modem Status automatically becomes INACTIVE.

## D.2 Defining LRS-24 And CM-2 SNMP Agent Parameters

### Purpose

Defines or modifies the parameters of the CM-2 module (including the parameters of the SNMP agent), and the general LRS-24 parameters. This command is always addressed to the CM-2 module. Therefore the node address must always be 13.

The SNMP agent parameters must be defined before it is possible to manage the LRS-24 using SNMP-based management stations. Refer to *Appendix C* for additional information related to IP and SNMP parameters.

### Format

NODE 13 DEF HUB

### Procedure

➤ **To define the LRS-24 and SNMP agent parameters:**

1. Type: **NODE 13 DEF HUB<Enter>**.

The first line of the data entry form (name entry form) appears.

2. Enter name of hub. Press **<Enter>** to store the data.

3. Press **<Tab>** to move to the next field.
4. Continue until all the required lines have been filled in.

**Note** *SNMP community names are case-sensitive.*

5. Press **<Enter>** to load all the data appearing on the screen into the CM-2 memory.

A typical data form is shown in *Figure D-2*.

```

                                LRS_HUB_SETUP
                                -----
HUB NAME                       : 'name'
HUB NUMBER                     : '1234'
HUB LOCATION IS                : 'location'
CONTACT PERSON IS              : 'person'
CM CARD SOFTWARE VER : 0.0      MAIN CARD HW REV : VER 2.0
INTERFACE CARD HW REV: 0.0
TIME (HH:MM:SS)               : 16:18:37      DATE                : 2000-05-23
IP ADDR                       : 192.114.24.30  IP MASK                : 255.255.255.0
READ COMMUNITY                 : PUBLIC
TRAP COMMUNITY                 : PUBLIC
READ/WRITE COMMUNITY           : PUBLIC
DEFAULT GATEWAY                : 000.000.000.000
BURN IN MAC ADDRESS           : 9920D2FE838D    BOOTP ON/OFF              : OFF
BOOTP TIME OUT                 : 1 SEC          BOOTP RETRIES            : 30
HUB IP MODE                    : MULTIPLE
SERIAL LINE PROTOCOL           : RS232
STATION CLOCK                  : INTERNAL CLOCK

```

*Figure D-2. LRS Hub Setup*

## Command Fields

*Table D-2* describes fields on the data form.

*Table D-2. DEF HUB Command Fields*

| Field Name | Description                                                                                                                                     | Options                                                          |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| HUB NAME   | Logical name assigned to the LRS-24 unit.                                                                                                       | Maximum 10 alphanumeric characters<br><br><b>Default: LRS-24</b> |
| HUB NUMBER | LRS-24 management number. The two least significant digits are displayed on the STAT/ADD display located on the front panel of the CM-2 module. | Mmaximum four hexadecimal digits<br><br><b>Default: 5544</b>     |

Table D-2. DEF HUB Command Fields (Cont.)

| Field Name               | Description                                                                                                                                                                                                                                                                                                                                                                                                                 | Options                                                                   |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| HUB LOCATION IS          | Concise description of the hub location                                                                                                                                                                                                                                                                                                                                                                                     | Maximum 20 alphanumeric characters                                        |
| CONTACT PERSON IS        | Name of person to be notified in case of problems /contact information                                                                                                                                                                                                                                                                                                                                                      | Maximum 20 alphanumeric characters                                        |
| CM CARD SOFTWARE VERSION | Software version of CM-2 module                                                                                                                                                                                                                                                                                                                                                                                             |                                                                           |
| MAIN CARD HW REV         | Hardware version of CM-2 module                                                                                                                                                                                                                                                                                                                                                                                             |                                                                           |
| INTERFACE CARD HW REV    | Hardware version of CM-2 interface module                                                                                                                                                                                                                                                                                                                                                                                   |                                                                           |
| TIME                     | <p>Time of internal CM-2 real-time clock (the time is correct for the instant the command has been received by the CM-2 module).</p> <p>To change the time, type the correct time according to the format: <b>hh:mm:ss</b>.</p> <p>Set the time at least one minute beyond the current time, so you will be able to press <b>&lt;Enter&gt;</b> at the correct instant after completing all the fields on the data form.</p> | Display format is <b>hours:minutes:seconds</b> .                          |
| DATE                     | <p>Date of internal CM-2 real-time clock.</p> <p>To change the date, type the correct date according to the format: <b>YYYY-MM-DD</b>. When done, press <b>&lt;Enter&gt;</b> to move to the next field.</p>                                                                                                                                                                                                                 | Display format is <b>year:month:day</b> .                                 |
| IP ADDRESS               | <p>IP address assigned to CM-2 module, in dotted-quad format.</p> <p>When assigning the IP address, remember that the following 12 IP addresses must be reserved for I/O modules (the first address will be associated with I/O slot 1, and the last address with slot 12).</p>                                                                                                                                             | Four groups of digits in the range of 0 through 255, separated by periods |
| IP MASK                  | Subnet mask corresponding to the IP addresses used by the CM-2 module                                                                                                                                                                                                                                                                                                                                                       | Dotted-quad format.                                                       |
| READ COMMUNITY           | Name of SNMP community that has read-only authorization (the CM-2 SNMP agent will accept only getRequest and getNextRequest commands from management stations using that community).                                                                                                                                                                                                                                        | Up to seven alphanumeric characters                                       |
| READ/WRITE COMMUNITY     | Name of SNMP community that has read-write authorization (the CM-2 SNMP agent will also accept setRequest commands from management stations using that community).                                                                                                                                                                                                                                                          | Up to seven alphanumeric characters                                       |
| TRAP COMMUNITY           | Name of SNMP community to which the CM-2 SNMP agent will send traps                                                                                                                                                                                                                                                                                                                                                         | Up to seven alphanumeric characters                                       |
| DEFAULT GATEWAY          | <p>IP address of default gateway to be used by CM-2 module to contact a management station located on a different IP network.</p> <p>If the CM-2 module and the management station are located on the IP same network, enter 0.0.0.0.</p>                                                                                                                                                                                   | Dotted-quad format                                                        |

Table D-3 DEF HUB Command Fields (Cont.)

| Field Name           | Description                                                                                                                                                                                                                                                    | Options                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BURN IN MAC ADDRESS  | Fctory MAC address used by BOOTP server to declare the IP address of the CM-2.                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| BOOTP ON/OFF         | <p>Toggle to select BOOTP.</p> <p>To maintain backwards compatibility (with any LRS-12 version), set BOOTP ON/OFF to OFF. Otherwise, BOOTP ON/OFF should be set ON.</p> <p>In either case, BOOTP ON/OFF should be set to OFF while setting the IP address.</p> | <p>ON– use BOOTP</p> <p>OFF–no BOOTP.</p> <p><b>Default value: OFF</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| BOOTP TIME OUT       | Maximum waiting time for a BOOTP response                                                                                                                                                                                                                      | <p>1, 2, 3, 4, 6, 8, 10, 15, 20 seconds.</p> <p><b>Default value: 10 seconds</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BOOTP RETRIES        | Number of times to retry sending a request for the BOOTP server                                                                                                                                                                                                | <p>3, 4, 5, 10, 15, 20, 25, 30 times.</p> <p><b>Default value: 30 times</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| HUB IP MODE          |                                                                                                                                                                                                                                                                | <p>SINGLE – only one IP address. (The LRS-24 address is the CM-2 address.). CM-2 receives SMOD message and transfers to it to the SMOD modem after adjusting the IP. The IP is resolved from the community field. In this mode, ping and Telnet cannot be used directly on an SMOD; only the CM-2 IP address is relevant.</p> <p>MULTIPLE – normal mode. Every SMOD has its own IP address and the CM-2 does not interfere at the IP level. Every SMOD IP is calculated by adding the CM-2 IP address and the SMOD slot number.</p> |
| SERIAL LINE PROTOCOL | SLIP Protocol                                                                                                                                                                                                                                                  | RS232 – terminal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| STATION CLOCK        | Set clock for station                                                                                                                                                                                                                                          | <p>Internal</p> <p>External – Square</p> <p>Ext-AMI</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## D.3 Defining Management Stations

### Purpose

Define the list of management stations to receive traps generated by the CM-2 module. You can define up to 10 management stations, by specifying their IP addresses. The trap community is defined by means of the DEF HUB command.

This command is always addressed to the CM-2 module, therefore the node address must always be 13.

### Format

NODE 13 DEF MNG

### Procedure

- **To define management stations that will receive traps:**
  1. Type: **NODE 13 DEF MNG <Enter>**.  
The first line of the data entry form appears.
  2. Type in the desired IP address in the dotted-quad format for each station to be defined.
  3. Press **<Enter>** to display the next line.
  4. Continue until all 10 lines display the required addresses.
  5. To delete an IP address, enter **000.000.000.000**.  
A typical data form is shown in *Figure D-3*.

| HUB NMS TRAP UPDATE |                 |
|---------------------|-----------------|
| No.                 | IP ADDR         |
| 1                   | 192.114.24.45   |
| 2                   | 192.114.24.70   |
| 3                   | 000.000.000.000 |
| 4                   | 000.000.000.000 |
| 5                   | 000.000.000.000 |
| 6                   | 000.000.000.000 |
| 7                   | 000.000.000.000 |
| 8                   | 000.000.000.000 |
| 9                   | 000.000.000.000 |
| 10                  | 000.000.000.000 |

*Figure D-3. Hub NMS Trap Update Screen*

---

## D.4 Defining CM-2 Download Parameters

### Purpose

Controls the program version and allows four options:

- Download via LAN
- Download via XMODEM: Enables downloading the CM-2 program from the XMODEM server.
- Change the current version: Enables choosing which version will run after the CM-2 automatically resets.
- View the Version table: Displays the currently running version. The first version on the table is currently running; the other two versions are backups. One — a fixed version — is located in the EPROM. The other is located in Flash, and can be altered.

### Format

NODE 13 DEF DWL

### Procedure

➤ **To define CM-2 Download Parameters:**

1. Type: **NODE 13 DEF DWL <Enter>**.

A typical data form is shown in *Figure D-4*.

```
DOWNLOAD MAIN MENU
-----
1. CM2 or Modems Download via LAN
2. CM2 or Modems Download via XMODEM
3. Modems Download via CM2 FLASH
4. Change CM-2 software version
5. View existing versions in the CM2
Enter download option number ____ >
```

*Figure D-4. Download Main Menu*

2. Select an option (see *Table D-4*).

The appropriate screen appears.

Table D-4. Download Main Menu Options

| Selection                           | Description                                                                                                                                                                        |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 CM2 or Modems Download via LAN    | Enables downloading the software version for CM-2 or modems from the TFTP server                                                                                                   |
| 2 CM2 or Modems Download via MODEM  | Enables downloading the software version for CM-2 or modems via XMODEM protocol (the terminal connected to the CM-2 must be configured at 38.4 kbps, 8-bit, no parity, 1 stop bit) |
| 3 Modems Download via CM2 FLASH     | Enables downloading the software version for files that were previously saved in CM-2 FLASH.                                                                                       |
| 4 Change CM-2 software version      | Change to a different version of CM-2 software                                                                                                                                     |
| 5 View existing versions in the CM2 | View list of software versions                                                                                                                                                     |

## CM2 Download via LAN

### ► To download via LAN:

1. Type **1**.

The Download via LAN screen appears.

```

Download via LAN
IP Address of TFTP server: 000.000.000.000
File name: Insert file name for download
Remote modems: N/A

```

Figure D-5. Download via LAN Screen

2. Type the TFTP server IP address – a dotted quad format (four groups of digits in the range of 0 to 255, separated by periods).
3. Press **<Enter>** to store the data.
4. **<Tab>** to the File Name field.
5. Type the name of the file to be transferred to the CM-2 –supplied by RAD or another authorized body.
6. Press **<Enter>** to store the data.

**Note** After typing the data for all of the parameters, press **<Enter>** to start the download process. After downloading, the CM-2 will perform a reset, and the new version will be loaded. The CM-2's seven-segment screen displays a rotating **o** until reboot is complete.

## CM2 Download via XMODEM

In this option you can define one parameter. Remember that the terminal connected to the **CM-2 must be configured at 38.4 kbps, 8-bit, no parity, one stop bit.**

➤ **To download via XMODEM:**

1. Type **2**.

**Note** After typing the parameter data, press **<Enter>** to start the download process. After the message **"The CM-2 is waiting to the XMODEM data. Start the process within one min."** appears, you must start the XMODEM server. When successful, the message **"The download action is done"** appears. If after one minute the XMODEM server has not connected properly to the CM-2, the message **The download action has failed** appears.

## CM2 Download via CM2 FLASH

➤ **To download via CM2 FLASH:**

1. Type **3**.

| MODEMS DOWNLOAD VIA CM2 FLASH                                                |            |             |         |      |          |
|------------------------------------------------------------------------------|------------|-------------|---------|------|----------|
| CM2 containing the following versions:                                       |            |             |         |      |          |
| ID                                                                           | Modem Type | Version No. | Date    | Size | Location |
| 1                                                                            | NULL       | 0.0         | 0- 0- 0 | 0k   | EMPTY    |
| 2                                                                            | NULL       | 0.0         | 0- 0- 0 | 0k   | EMPTY    |
| 3                                                                            | NULL       | 0.0         | 0- 0- 0 | 0k   | EMPTY    |
| Please choose the ID number                                                  |            |             |         |      |          |
| 1. ID NUMBER: 1                                                              |            |             |         |      |          |
| 2. Download to Remote Modems: N/A                                            |            |             |         |      |          |
| To change the ID number press f to scroll forward<br>or b to scroll backward |            |             |         |      |          |

Figure D-6. Modems Download Via Cm2 Flash Screen

## Change CM-2 Software Version

➤ **To change CM-2 Software Version:**

1. Type **4**.

The Change CM2 Software Version screen appears.

CHANGE CM2 SOFTWARE VERSION

CM2 containing the following versions:

| ID | Version No. | Date       | Size | Location |
|----|-------------|------------|------|----------|
| 1  | 3.0         | 2000- 3- 8 | 353k | FLASH1   |
| 2  | 3.0         | 2000- 3- 8 | 353k | FLASH2   |
| 3  | 3.0         | 2000- 2-16 | 353k | EPROM    |

Please choose the ID number

1. ID NUMBER: 2

2. Password: This field is not applicable

To change the ID number press f to scroll forward  
or b to scroll backward

NOTE: the first version (ID number 1) is the one we will run from

Figure D-7. Change CM2 Software Version

2. Press **<F>** (forward) or **<B>** (backward) to select the ID Number of the version you want to run.
3. To exit the screen, without changing parameters, press **<Esc>**.

---

**Note** Type the parameter data, and press **<Enter>** to start the download process. When a version is selected, the CM-2 resets, and loads the chosen version. The CM-2's seven-segment screen displays a rotating **o** until the reboot is complete.

---

## View CM-2 Software Version

### ➤ To view CM-2 Software Version:

1. Type 5.

The View CM2 Software Version screen appears.

VIEW CM2 SOFTWARE VERSION

CM2 containing the following versions:

| ID | Version No. | Date       | Size | Location |
|----|-------------|------------|------|----------|
| 1  | 3.0         | 2000- 3- 8 | 353k | FLASH1   |
| 2  | 3.0         | 2000- 3- 8 | 353k | FLASH2   |
| 3  | 3.0         | 2000- 2-16 | 353k | EPROM    |

VIEW MODEMS SOFTWARE VERSION ON CM2

CM2 containing the following versions:

| ID | Modem Type    | Version | Date       | Size | Location |
|----|---------------|---------|------------|------|----------|
| 1  | ASMI-31CQ (m) | 9.3     | 2000- 3- 5 | 230k | FLASH3   |
| 2  | ASMI-31CQ (m) | 0.3     | 2000- 2-15 | 230k | FLASH2   |
| 3  | ASMI-31CQ (m) | 0.3     | 2000- 3- 5 | 230k | FLASH1   |

Figure D-8. View CM2 / Modems Software Version

The first line describes the version that is currently running.

---

## D.5 Defining Modem Download Parameters

### Purpose

Controls the program version and allows six options.

### Format

NODE nn DEF MDL

nn is the slot number.

### Procedure

➤ **To define Modem Download Parameters:**

1. Type: **NODE 13 DEF MDL <Enter>**.

A typical data form is shown in *Figure D-4*.

```
MODEM_DOWNLOAD_MAIN_MENU
-----
1. Modem Download via LAN
2. Modem Download via XMODEM
3. Modem Download via CM2 FLASH
4. Modem Download via MODEM FLASH
5. Change Modem software version
6. View existing versions of Modem
Enter download option number ____ >
```

Figure D-9. Modem Download Main Menu

## Modem Download via LAN

➤ **To download Modem via LAN:**

- Type 1.

The Modem Download via LAN appears (see *Figure D-10*).

```
DOWNLOAD via LAN
-----
IP Address of TFTP server: 000.000.000.000
File name: Insert file name for download
Remote modem: N/A
```

Figure D-10. Modem Download via LAN

## Modem Download via XMODEM

➤ **To download Modem via LAN:**

- Type 2.

The Download via XMODEM appears (see *Figure D-11*).

```
DOWNLOAD via XMODEM
-----
Remote modems: N/A
```

Figure D-11. Download via XMODEM

## Modem Download via CM2 FLASH

➤ **To download Modem via CM2 FLASH:**

- Type 3.

The Modems Download via CM2 Flash Screen appears (see *Figure D-12*).

MODEMS DOWNLOAD via CM2 FLASH

CM2 containing the following versions:

| ID | Modem Type   | Version No. | Date       | Size | Location |
|----|--------------|-------------|------------|------|----------|
| 1  | ASMI-31CQ(m) | 9.3         | 2000- 3- 5 | 230k | FLASH3   |
| 2  | ASMI-31CQ(m) | 0.3         | 2000- 2-15 | 230k | FLASH2   |
| 3  | ASMI-31CQ(m) | 0.3         | 2000- 2-15 | 230k | FLASH1   |

Please choose the ID number

1. ID NUMBER: 1

2. Download to Remote Modems: N/A

To change the ID number press f to scroll forward  
or b to scroll backward

Figure D-12. Modems Download via CM2 Flash Screen

## Download to Remote Modem via Modem FLASH

### ► To download to remote modem via Modem FLASH:

- Type 4

The Download To Remote Modem Via Modem Flash screen appears  
(see Figure D-13).

DOWNLOAD TO REMOTE MODEM VIA MODEM'S FLASH

MODEM NAME: ASMI-31CQ(m)

MODEM STATUS : MASTER PERMANENT

SELECT MODEM : MODEM 1 LOCAL

Modem containing the following version:

| ID | Version No. | Date       |
|----|-------------|------------|
| 1  | 0.1         | 2000- 3- 8 |
| 2  | EMPTY       |            |
| 3  | EMPTY       |            |

Please choose the ID number

1. ID NUMBER: 1

To change the ID number press f to scroll forward  
or b to scroll backward

Figure D-13. Download To Remote Modem Via Modem Flash

## Changing Modem Version

➤ **To change the Modem Version:**

- Type 5.

The Changing Modem Version screen appears (see *Figure D-14*).

```

CHANGING MODEM'S VERSION
-----
      MODEM NAME: ASMI-31CQ (m)
MODEM STATUS           : MASTER PERMANENT
SELECT MODEM           : MODEM 1 LOCAL
Modem containing the following versions:
ID      Version No.      Date
1         0.1            2000- 3- 8
2         EMPTY
3         EMPTY

Please choose the ID number
1. ID NUMBER: 2
To change the ID number press f to scroll forward
or b to scroll backward
  
```

*Figure D-14. Changing Modem Version*

## View Modem Version on Modem FLASH

➤ **To view the Modem Version on Modem FLASH:**

- Type 6.

The View Modem on Modem FLASH screen appears (see *Figure D-15*).

```

VIEW MODEM ON MODEM'S FLASH
-----
      MODEM NAME: ASMI-31CQ (m)
MODEM STATUS           : MASTER PERMANENT
SELECT MODEM           : MODEM 1 LOCAL
Modem containing the following versions:
ID      Version No.      Date
1         0.1            2000- 3- 8
2         EMPTY
3         EMPTY
  
```

*Figure D-15. View Modem on Modem Flash Screen*

## D.6 Viewing Modem Version

### Purpose

Views current version of modem in each slot of LRS-24 hub. This command is relevant only for I-type modems.

### Format

NODE 13 DSP VER

### Procedure

➤ **To view version of Modem software:**

- Type: **NODE13 DSP VER <Enter>**.

The Modem Version screen appears (see *Figure D-16*).

| MODEMS VERSION |                 |            |          |            |
|----------------|-----------------|------------|----------|------------|
| Slot/Modem     | NE Modem        | NE Version | FE Modem | FE Version |
| IO-03/1        | ASMI-31CQ (m)   | 00.10      | ASMI-31  | 01.00      |
| IO-03/2        | ASMI-31CQ (m)   | 00.10      |          |            |
| IO-03/3        | ASMI-31CQ (m)   | 00.10      |          |            |
| IO-03/4        | ASMI-31CQ (m)   | 00.10      |          |            |
| IO-08/1        | FOMi-E1/T1C (m) | 00.00      |          |            |
| IO-09/1        | ASMI-31CQ (m)   | 00.00      |          |            |
| IO-10/1        | ASMi-24CQ (m)   | 03.09      |          |            |
| IO-09/1        | ASMI-31CQ (m)   | 00.00      |          |            |
| CM>2           |                 |            |          |            |

Figure D-16. Modem Version Screen

Table D-5. Modem Version Parameters

| Parameter  | Description                                                                                |
|------------|--------------------------------------------------------------------------------------------|
| Slot/Modem | Slot number in LRS-24 chassis and Modem number:<br>1-2 for CD modems<br>1-4 for CQ modems) |
| NE Modem   | Name of near-end (local) modem                                                             |
| NE Version | Software version of near-end (local) modem                                                 |
| FE Modem   | Name of far-end (remote) modem                                                             |
| FE Version | Software version of far-end (remote) modem                                                 |

## D.7 Defining I/O Module Management Parameters

### Purpose

Defines general operational and access parameters for an I/O module.

This command is relevant only for I/O modules that do not support direct management by SNMP or by supervision terminal, for example ASMi-24, ASMi-30, ASMi-31, ASMi-32, etc. For such modules, the CM-2 module provides the terminal interface.

### Format

NODE nn DEF OPR

### Procedure

➤ **To define general and access parameters:**

1. Type: **NODE nn DEF OPR <Enter>**.

*nn* stands for the module node number in the range of 1 through 12.

The first line of the module data entry form appears (see *Figure D-17*).

```

MODEM ADVANCED SETUP
-----
      MODEM NAME: ASMI-31CQ (m)
DEFINE MODEM PORT NUMBER      : 1
DEFINE STATUS                  : MASTER PERMANENT
SELECT MODEM                   : MODEM 1 LOCAL
1) STOP STATUS UPDATE         : DISABLE
2) CHANGE LOCAL MODEM STATUS  : MASTER
3) MANAGEMENT FROM REMOTE MODEM : NO
4) MDOEM MANAGEMENT LINK     : ENABLE
5) LOAD CONFIGURATION FROM    : N/A MODEM
6) I-TYPE (Far End Modem type) : YES
7) MODEM RESET                : NO
8) FACTORY RESET              : NO
9) CARD RESET                 : NO
  
```

*Figure D-17. Modem Advanced Setup Screen*

Use the general procedures to define the parameter values, as required.

**Note** *The contents of the form depend on the module type. Refer to the Installation and Operation Manual of the corresponding module for detailed information.*

## D.8 Defining Card Configuration

### Purpose

Defines card type, name, and connection to a remote modem.

### Format

NODE 13 DEF CRD

### Procedure

➤ **To define card type, name, and connection:**

- Type: **NODE 13 DEF CRD <Enter>**.

Information about all the cards in the hub is displayed. A typical form is shown in *Figure D-18*.

| DEFINE CARD TYPE |         |                 |         |         |         |         |
|------------------|---------|-----------------|---------|---------|---------|---------|
| Slot             | Type    | Modem           | Remote1 | Remote2 | Remote3 | Remote4 |
| Card 1           | : EMPTY | NULL            | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 2           | : EMPTY | NULL            | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 3           | : IMODE | ASMi-31CQ (m)   | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 4           | : EMPTY | NULL            | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 5           | : EMPTY | NULL            | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 6           | : EMPTY | NULL            | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 7           | : EMPTY | NULL            | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 8           | : IMODE | FOMi-E1/T1C (m) | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 9           | : IMODE | ASMi-31C (m)    | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 10          | : IMODE | ASMi-24C (m)    | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 11          | : IMODE | ASMi-31C (m)    | LINKED  | LINKED  | LINKED  | LINKED  |
| Card 12          | : IMODE | ASMi-50C (m)    | LINKED  | LINKED  | LINKED  | LINKED  |

Figure D-18. Define Card Type Screen

Each slot number shows the type of modem, name, and connection to a remote modem.

For parameters Type and Modem:

- If Type is **IMODE** both fields are *read-only*.
- If Type is **EMPTY** you can define Type and Modem name, only when in Terminal Mode.
- If Type is **SMODE** you can define Modem name.

Remote1 defines whether the modem is connected to (LINKED) or disconnected from (UNLINKED) a remote modem. A double modem card, such as FOMi-E1/T1CD, is defined for two remote modems - Remote1 and Remote2.

A card containing four modems, such as ASMI-31CQ, is defined for four remote modems.

---

**Note** When you select *UNLINKED* for *Remote1*, *Remote2*, *Remote3*, or *Remote4*, then traps from the remote modem are masked.

---

---

---

## D.9 Defining I/O Module Operational Parameters

### Purpose

Defines the operational parameters for an I/O module.

This command is relevant only for I/O modules that do not support direct management by SNMP or by supervision terminal, for example ASMi-24, ASMi-30, ASMi-31, ASMi-32, etc. For such modules, the CM-2 module provides the terminal interface.

### Format

NODE nn DEF PRM

### Procedure

➤ **To define I/O Module Operational Parameters:**

- Type: **NODE nn DEF PRM <Enter>**.

*nn* stands for the node number of the desired module, in the range of 1 through 12.

The first line of the module data entry form appears (see *Figure D-19*).

| MODEM SETUP                                                              |        |                  |                             |
|--------------------------------------------------------------------------|--------|------------------|-----------------------------|
| MODEM NAME: ASMI-31CQ (m)                                                |        |                  |                             |
| DEFINE MAODEM PORT NUMBER                                                | :      | 1                |                             |
| MODEM STATUS                                                             | :      | MASTER PERMANENT |                             |
| SELECT MODEM                                                             | :      | MODEM 1 LOCAL    |                             |
| SYNC/ASYNC                                                               | :      | SYNC             | CHARACTER LENGTH : N/A      |
| No. STOP BIT                                                             | :      | N/A              | DATA RATE : 128K            |
| PARITY                                                                   | :      | N/A              | CD SENSE : N/A              |
| CLOCK SOURCE LOC/REM: L (INT) R (RCV) EXT SOURCE: Modem #1 PORT: DCE-EXT |        |                  |                             |
| INTERFACE                                                                | :      | 2 WIRE           | RTS/CTS DELAY (0:255) : N/A |
| RTS TO DCD                                                               | :      | YES              | DTR TO DSR : N/A            |
| OUTPUT LEVEL                                                             | :      | N/A              | INPUT LEVEL : N/A           |
| OUTPUT IMPEDANCE                                                         | :      | N/A ohm          | INPUT IMPEDANCE : N/A ohm   |
| CARRIER CONTROL                                                          | :      | N/A              | ERROR COLLECTION : N/A      |
| RATE ADAPTION METHOD: PRIVATE                                            | :      | AIS              | : N/A                       |
| LINE CODING                                                              | :      | N/A              | PHANTOM : N/A               |
| T1 LINE LENGTH                                                           | :      | N/A              |                             |
| BRIDGING                                                                 | :      | N/A              | ETHERNET NODE : N/A         |
| MASK SIGNAL STATUS :                                                     | DATA : | NO               | RTS:NO TD: NO RD: NO        |
|                                                                          | DCD :  | NO               | TEST: NO ERR: NO LOS: NO    |

Figure D-19. Modem Setup Screen

Use the general procedures to define the parameter values, as required.

**Note** The contents of the form depend on the module type. Refer to the Installation and Operation Manual of the corresponding module for detailed information.

## D.10 Defining Supervision Terminal Type

### Purpose

Defines the supervision terminal type.

This command enables the CM-2 module to provide the proper control codes to the supervision terminal and in particular the codes for the following terminal control functions:

- Clear screen
- Move cursor to screen home position

- Move cursor to the right by one position.

The terminal types supported by the CM-2 module are: VT-52, VT-100, TV-920, FREEDOM-100, FREEDOM-110, FREEDOM-220, and terminals that are compatible with these types. Selecting an incorrect terminal type may prevent correct display of data entry forms on the terminal.

Table D-6 shows the codes used by the supported terminals.

Table D-6. Terminal Types

| Function     | Terminal Type |          |          |                            |             |
|--------------|---------------|----------|----------|----------------------------|-------------|
|              | TV- 920       | VT-52    | VT-100   | Freedom-100<br>Freedom-110 | Freedom-220 |
| Clear Screen | 1B2A0000      | N/A      | 1B5B324A | 1B2A0000                   | 1B5B324A    |
| Cursor Home  | 1E000000      | 1B480000 | 1B5B4800 | 1E000000                   | 1B5B4800    |
| Cursor Right | 0C000000      | 1B430000 | 1B5B3143 | 0C000000                   | 1B5B0143    |

This command is always addressed to the CM-2 module. Therefore the node address must always be 13.

## Format

NODE 13 DEF TRM

## Procedure

- **To configure the CM-2 module for the desired terminal:**

- Type: **NODE 13 DEF TRM <Enter>**.

The terminal selection form appears. A typical form is shown in Figure D-20.

DEFINE TERMINAL TYPE

1. TV920

2. VT52

3. VT100

4. FREEDOM 100/110

5. FREEDOM 200

DEFAULT TYPE IS VT 100

ENTER TERMINAL TYPE NO. -->

Figure D-20. Define Terminal Type Screen

- **To select a terminal:**

1. Type the corresponding number.
2. If the resulting display is not correct, try selecting another terminal.

## D.11 Defining I/O Module Diagnostics

### Purpose

Enables/disables a test or diagnostic function to be performed on a selected I/O module.

This command is relevant only for I/O modules that do not support direct management by SNMP or by supervision terminal, for example ASMi-24, ASMi-30, ASMi-31, ASMi-32, etc. For such modules, the CM-2 module provides the terminal interface.

### Format

NODE nn DEF TST

### Procedure

➤ **To enable/disable a test or diagnostic function:**

- Type: **NODE nn DEF TST <Enter>**.

nn stands for the node number of the desired module, in the range of 1 through 12.

The first line of the data form appears. Use the general procedures to define the parameter values, as required.

**Note** *The contents of the form depend on the module type. Refer to the Installation and Operation Manual of the corresponding module for detailed information.*

#### MODEM DIAGNOSTIC

```

                                MODEM NAME: ASMI-31CQ (m)
DEFINE MODEM PORT NUMBER      : 1
MODEM STATUS                  : MASTERE PERMANENT
SELECT MODEM                  : MODEM 1 LOCAL
LOOP & BERT                   : CANCEL          LOOP TIMEOUT : N/A
REMOTE DIG ENABLE              : N/A
BERT RESULTS                   : 0.0 E- 07
LED TEST                      : OFF
LOCAL LOOP BACK                : N/A
REMOTE LOOP BACK               : N/A
REMOTE DIG                     : N/A
ENABLE TEST FROM REM MODEM    : OFF
BERT ERR INJECTION            : N/A

```

Figure D-21. Modem Diagnostic Screen

---

---

## D.12 Defining Auto-Configuration

### Purpose

Defines Auto-Configuration for modems or LRS-24 hub:

- For all the modems in the LRS-24 hub
- For any number of modems, selected by type of modem, or specific list of modems.

You can set other modems/hubs with the file configuration that was created by a specific modem/hub.

You can perform the following activities with the auto-configuration file:

- Save to a file on the CM-2 or on a remote station for future use
- Read to the screen
- Write to a file
- Send and receive to/from a station.

You can perform Auto-Configuration by file transfer or from a screen.

The number of files on CM-2 will be limited to available memory space (up to three modem files and two hub files).

Error check and masking will be performed on the received file before the configuration is executed.

### Format

DEF CFG

### Procedure

- **To define the Auto-Configuration options:**

Type: **NODE 13 DEF CFG <Enter>**.

The Auto-Configuration Menu screen appears (see *Figure D-22*).

|                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;"><u>AUTO CONFIGURATION MENU</u></p> <p>1. Edit configuration</p> <p>2. Send file to HUB</p> <p>3. Create file from existing configuration</p> <p>4. View configuration files in HUB</p> <p>Enter Auto Configuration option number -&gt;</p> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

*Figure D-22. Auto Configuration Menu Screen*

## Editing the Configuration

You can edit existing individual modem configuration files that have been previously saved or create a new file. You cannot edit or view the Hub configuration files; they may only be sent or executed.

### ► To edit the Configuration:

1. Type **1** from the Auto-Configuration Menu.  
The Edit Configuration screen appears (see *Figure D-23*).
2. Choose the **number** of the file that you want to edit, or type **NEW**.
  - You can only edit modem files.
  - If you choose NEW, a screen for a modem file appears with all the fields listed as N/A.
  - If you choose a Hub file, you will open a screen where you choose operations for the file.

```

EDIT CONFIGURATION
-----

Modem Configuration files:
ID      User String      Date                               Size
1       test             1999-11-21 11:25:16              62 byte
2       asmi31tst        1999-11-21 11:59:01              68 byte
3       asmi31tst        1999-11-21 11:59:01              68 byte

HUB Configuration files:
4       hub1             1999-11-18 14:11:58              0.4 Kbyte
5       hub2             1999-11-18 14:12:20              0.4 Kbyte

A HUB file cannot be viewed on screen.
Please choose a file number or "NEW" for an empty screen: [1/2/3/4/5/NEW]

To select a file number press 'f' for forward or 'b' for backward.
  
```

*Figure D-23. Edit Configuration Screen*

### Screen Fields

|                    |                                       |
|--------------------|---------------------------------------|
| <b>ID</b>          | File number                           |
| <b>User String</b> | Name or remarks (up to 22 characters) |
| <b>Date</b>        | Date file was created                 |
| <b>Size</b>        | Size of file.                         |

## Hub Configuration Operations

You can send or execute Hub Configuration files.

► **To execute a Hub Configuration file:**

1. Select **1** from the Auto-Configuration Menu.
2. Select file **4** or **5** (if the Hub files exist) in the Edit Configuration screen (see *Figure D-23*).

The Operations for HUB Configuration screen appears (see *Figure D-24*).

### OPERATIONS FOR HUB CONFIGURATION FILE

Execute file: [NO/YES]

Send file via: [N/A/TFTP/XMODEM]

To select an option press 'f' for forward or 'b' for backward.

*Figure D-24. Operations For Hub Configuration File*

3. Select **YES** to execute the configuration.  
An error message is returned if the configuration specifies parameters but:
  - Slot is empty
  - Modem in slot does not exist
  - Type of modem in slot doesn't match type in file configuration.
4. Select method for sending file to the station.
  - **N/A**: file is not sent
  - **TFTP**: Upload via LAN screen appears (see *Figure D-25*)
  - **XMODEM**
5. Press **<Enter>** to continue the process.

### Upload via LAN

IP Address of TFTP client: [000.000.000.000]

Filename: [Filename]

*Figure D-25. Upload via LAN Screen*

6. Enter station IP Address and Filename.  
After the TFTP process has completed, a confirmation screen will appear (see *Figure D-26*).

```
Send process: [size] byte transferred
The send process was completed successfully.
```

Figure D-26. Send Process Confirmation Screen

## Editing a Modem File

### ► To configure a modem file:

1. Type **1** from the Auto-Configuration Menu.  
The Edit Configuration screen appears (see *Figure D-23*).
2. Choose:
  - **NEW**: a screen appears with all the fields listed as N/A (see *Figure D-27*)
  - **1, 2, or 3**: a screen appears with the parameters from the file you have selected.

```

EDIT AUTO-CONFIGURATION
-----
PARAMETERS:
SYNC/ASYNC           : N/A           CHARACTER LENGTH       : N/A
No. STOP BIT         : N/A           DATA RATE               : N/A
PARITY               : N/A           CD SENSE                 : N/A
CLOCK SOURCE LOC/REM : N/A           EXT SOURCE : N/A         ALL PORTS : N/A
INTERFACE            : N/A           RTS/CTS DELAY (0.255)   : N/A
RTS TO DCD           : N/A           DTR TO DSR              : N/A
OUTPUT LEVEL         : N/A           INPUT LEVEL              : N/A
OUTPUT IMPEDANCE     : N/A ohm       INPUT IMEDANCE           : N/A ohm
CARRIER CONTROL     : N/A           ERROR CORRCTION         : N/A
RATE ADATPTION METHOD : N/A           AIS                     : N/A
LINE CODING          : N/A           PHANTOM                 : N/A
T1 LINE LENGTH       : N/A

OPERATIONS:
MODEM RESET          : DISABLE        STOP STATUS UPDATE       :DISABLE
CHANGE LOCAL MODEM STATUS : MASTER    MANAGEMENT FROM REMOTE MODEM: N/A
MODEM MANAGEMENT LINK   : N/A         LOAD CONFIGURATION FROM  :N/A  MODEM
I-TYPE(Far End Modem type): N/A

```

Figure D-27. Edit Auto-Configuration for New Modem File

3. Enter information for the parameters.  
If you do not enter any parameters, you receive an error message.

4. Press **<Enter>** to continue.

The third Edit screen appears for you to select operations for the file (see *Figure D-28*).

```
EDIT AUTO-CONFIGURATION
-----
Execute configuration: [NO/YES]
Save configuration to HUB: [NO/YES]
Send configuration via: [N/A/TFTP/XMODEM]
User String(Up to 22 characters): [UserString]

To select an option press 'f' for forward or 'b' for backward.
```

*Figure D-28. Edit Auto-Configuration for New File – Second Screen*

5. Select **YES** to execute the configuration.
6. Select **YES** to save the configuration.
7. To send the files, select the method: **TFTP** or **XMODEM**.
8. Enter a User String of up to 22 characters (optional).

► **To execute the modem configuration file:**

1. Select **YES** to Execute Configuration.

The Select Method for Configuration screen appears (see *Figure D-29*).

```
EDIT AUTO CONFIGURATION
-----
Configure according to:
1. Modem Type
2. Specific Slot/Modem list

Enter option number - >
```

*Figure D-29. Select Method for Configuration Screen*

2. Select the configuration by type of modem or by a specific slot / modem list).

► **To configure according to modem type:**

1. Select **Modem Type** from Select Method for Configuration screen (see *Figure D-29*).

The Auto-Configuration According to Modem Type screen appears (see *Figure D-30*). Only those modems of the type you have selected, which are currently in the Hub, can be chosen.

AUTO-CONFIGURATION ACCORDING TO MODEM TYPEExecute configuration for all modems of type:

- |           |           |    |    |
|-----------|-----------|----|----|
| 1. Asmi50 | 2. Asmi24 | 3. | 4. |
| 5.        | 6.        | 7. | 8. |

Press Enter to choose type. Repeated choice will delete it from the list.

To continue press <tab>.

*Figure D-30. Auto-Configuration According To Modem Type Screen*

2. Press <F> to tab forward or <B> to tab backwards.
3. Press <Enter> to select a Modem Type.  
The selected type will be displayed in the list. To delete it from the list, select it a second time.
4. Press <Tab> for execution.

➤ **To configure according to a specific slot/modem list:**

1. Select **Specific Slot/Modem list** from Select Method of Configuration screen (see *Figure D-29*).  
The Auto-Configuration According to Slot / Modem List screen appears (see *Figure D-31*).

| AUTO-CONFIGURATION ACCORDING TO SLOT/MODEM LIST |       |       |        |       |        |                |        |       |        |
|-------------------------------------------------|-------|-------|--------|-------|--------|----------------|--------|-------|--------|
| Execute configuration for SLOT [NUMBER]         |       |       |        |       |        | MODEM [NUMBER] |        |       |        |
|                                                 | Modem | 1     | 1      | 2     | 2      | 3              | 3      | 4     | 4      |
| Slot                                            | all   | local | remote | local | remote | local          | remote | local | remote |
| 1                                               |       |       |        |       |        |                |        |       |        |
| 2                                               |       |       |        |       |        |                |        |       |        |
| 3                                               |       |       |        |       |        |                |        |       |        |
| 4                                               |       |       |        |       |        |                |        |       |        |
| 5                                               |       |       |        |       |        |                |        |       |        |
| 6                                               |       |       |        |       |        |                |        |       |        |
| 7                                               |       |       |        |       |        |                |        |       |        |
| 8                                               |       |       |        |       |        |                |        |       |        |
| 9                                               |       |       |        |       |        |                |        |       |        |
| 10                                              |       |       |        |       |        |                |        |       |        |
| 11                                              |       |       |        |       |        |                |        |       |        |
| 12                                              |       |       |        |       |        |                |        |       |        |

Press Enter to choose option. Repeated choice will delete it from the list.  
To continue press <tab>.

Figure D-31. Auto-Configuration According To Slot/Modem List Screen

The screen appears with blank fields.

Each slot can hold a modem card that contains:

- A single modem
- Two modems
- Four modems.

2. Enter Slot Number by pressing <F> for forward or <B> for backward.
3. <Tab> from Slot to Modem.
4. Enter Modem Number.
5. Press <Enter>.

An **X** appears in the correct place in the table. To delete it from the list, select it a second time.

6. Select **ALL** if you want to configure all the modems in the slot (this includes local and remote for all modems on the card).
7. To continue, press <Tab>.

## Sending Configuration Files

### ➤ To send a configuration file to the LRS-24 hub:

1. Type **2** on the Auto-Configuration Menu.

The Send File to Hub screen appears (see *Figure D-32*).

```
SEND FILE TO HUB
Send file via: [N/A/TFTP/XMODEM]
Save file to HUB: [NO/YES]
Execute configuration: [No/YES]

To elect an option press 'f' for forward or 'b' for backward.
```

*Figure D-32. Send File To Hub Screen*

2. Select at least one of the following:
  - **YES** to save the file.
  - **YES** to execute the file (see *Hub Configuration Operations/Editing the Configuration*).

### ➤ To send the file by TFTP:

1. Select **TFTP**.

The Download via LAN Screen appears (see *Figure D-33*)

```
Download via LAN
IP Address of TFTP server: [000.000.000.000]
File name: [filename]
```

*Figure D-33. Download via LAN Screen*

2. Enter the IP Address of TFTP server and File name.

A download confirmation message appears (see *Figure D-34*)

```
Download progress: [size] byte transferred
The download action was completed successfully.
```

*Figure D-34. Download Confirmation message Screen*

### ➤ To send file by XMODEM:

1. Select **XMODEM**.

A message appears that you can start sending the file (see *Figure D-35*)

```
CM2> The CM2 is waiting to the XMODEM data: start the process within one min
```

*Figure D-35. Start Sending the File Message*

2. If Execute was selected, the process will continue as described in *Hub Configuration Operations/Editing the Configuration*.

## Creating Files from an Existing Configuration

### ► To create a file from the existing configuration:

1. Type **3** from the Auto-Configuration Menu.

The Create File Form Existing Configuration screen appears (see *Figure D-36*).

```
CREATE FILE FORM EXISTING CONFIGURATION
-----
Create file from: [HUB/MODEM]
      Slot: [NUMBER]  Modem: {NUMBER} (relevant only for modem files)
User String(up to 22 characters): [user_string]
Save file to HUB: [NO/YES]
Send file via: [N/A/TFTP/XMODEM]

To select an option press 'f for forward or 'b' for backward.
```

*Figure D-36. Create File Form Existing Configuration Screen*

2. Select method to create file:
  - **HUB**: the file configuration is created from all the modems that are presently in the hub. The cursor jumps to **User String**.
  - **MODEM**: enter the **Slot Number** and **Modem Number** of the modem whose configuration you want to save.
3. Select **YES** if you want to save the file.
4. If you want to send the file, select the method for sending the file to the station:
  - **TFTP**: the Upload/Download via LAN screen appears (see *Figure D-33*)
  - **XMODEM**: a message appears that you can start receiving the file (see *Figure D-35*).

## Viewing Configuration Files in the Hub

### ► To view configuration files in the LRS-24 hub:

- Type **4** from the Auto-Configuration Menu.

The View Configuration Files in Hub screen appears (see *Figure D-37*).

VIEW CONFIGURATION FILES IN HUB

Modem Configuration files:

| ID | User String | Date                | Size    |
|----|-------------|---------------------|---------|
| 1  | test        | 1999-11-21 11:25:16 | 62 byte |
| 2  | asmi31tst   | 1999-11-22 11:59:01 | 68 byte |
| 3  | asmi31tst   | 1999-11-22 11:59:01 | 68 byte |

HUB Configuration files:

|   |      |                     |           |
|---|------|---------------------|-----------|
| 4 | hub1 | 1999-11-18 14:11:58 | 0.4 Kbyte |
| 5 | hub2 | 1999-11-18 14:12:20 | 0.4 Kbyte |

CM2&gt;

*Figure D-37. View Configuration Files in Hub Screen*

---

## D.13 Displaying General Alarm Status

### Purpose

Displays the general alarm status of the LRS-24.

This command is always addressed to the CM-2 module. Therefore the node address must always be 13.

### Format

NODE 13 DSP ALM

### Procedure

➤ **To display the LRS-24 alarm status:**

- Type: **NODE 13 DSP ALM <Enter>**.

The alarm status display form appears. A typical form is shown in *Figure D-38*.

```

HUB_ALARM

POWER SUPPLY A: FAIL
POWER SUPPLY B: FAIL
CARD STATUS CHANGE: N/A
CURRENT MANAGEMENT: TERMINAL
MODEM IN SLOT 1 HAS ACTIVE ALARM      : N/A
MODEM IN SLOT 2 HAS ACTIVE ALARM      : N/A
.
.
.
.
MODEM IN SLOT 12 HAS ACTIVE ALARM     : N/A
STATION CLK - SQUARE LOSS SIGNAL     : YES
STATION CLK - AMI LOSS SIGNAL         : YES

```

Figure D-38. Hub Alarm Screen

## Display Format

The Alarm Status is displayed as a table that shows relevant information related to the LRS-24:

- One line is provided for each power supply module and for I/O module slot. The line indicates whether the corresponding power supply module operates normally (OK) or failed (FAIL), and whether an active alarm condition is present in each module.  
You can display the last 256 alarms using the DSP LOG command. To display the alarms of a specific module, use the DSP ALT command.
- The CARD STATUS CHANGE line displays YES if a status change has been detected in the LRS-24.
- The CURRENT MANAGEMENT line indicates the management system that controls the LRS-24, as shown in *Table D-7*.

Table D-7. Current Management Fields

| Message      | Description                                                                                                       |
|--------------|-------------------------------------------------------------------------------------------------------------------|
| TERMINAL     | LRS-24 is managed by the terminal                                                                                 |
| NMS          | LRS-24 is managed by a network management station                                                                 |
| REMOTE MODEM | Parameters of the modules installed in the LRS-24 are determined by the remote equipment connected to each module |

## D.14 Displaying I/O Module Alarm Status

### Purpose

Displays the status and the alarms for a specific I/O module.

This command is relevant only for I/O modules that do not support direct management by SNMP or by supervision terminal, for example, ASMi-24, ASMi-30, ASMi-31, ASMi-32, etc. For such modules, the CM-2 module provides the terminal interface.

### Format

NODE nn DSP ALT

### Procedure

➤ **To display I/O Module Alarm Status:**

- Type: **NODE nn DSP ALT <Enter>**.

*nn* stands for the node number of the desired module, in the range of 1 through 12.

The status and alarm display form for the specified module appears.

The contents of the form depend on the module type.

Refer to the *Installation and Operation Manual* of the corresponding module for detailed information.

| MODEM ALARM STATUS              |   |               |                         |
|---------------------------------|---|---------------|-------------------------|
| MODEM NAME: ASMI-31CQ (m)       |   |               |                         |
| DEFINE MODEM PORT NUMBER        | : | 1             |                         |
| SELECT MODEM                    | : | MODEM 2 LOCAL |                         |
| LINE DISCONNECT                 | : | OFF           |                         |
| REMOTE MODEM POWER OFF          | : | OFF           |                         |
| TRANSMIT CARRIER                | : | OFF           |                         |
| RECEIVE CARRIER                 | : | OFF           |                         |
| LLB BY DTE                      | : | OFF           |                         |
| RLB BY DTE                      | : | OFF           |                         |
| SYNC LOSS                       | : | ON            |                         |
| CONFIGURATIO MISMATCH           | : | OFF           |                         |
| NVRAM FAILED                    | : | OFF           |                         |
| ILLEGAL EXTERNAL CLOCK SOURCE   | : | ON            |                         |
| NO MANGEMENT LINK               | : | ON            |                         |
| NO MODEM PORT (IR)              | : | OFF           | LAN NOT CONNECTED : OFF |
| NO FIBER INTERFACE              | : | OFF           | NO EXT CLK INPUT : OFF  |
| IR RATE MISMATCH                | : | OFF           | ILL. CLK-ERR : OFF      |
| ELF TEST FAILED                 | : | OFF           | OLD REM VERSION : OFF   |
| XILINX FAILES                   | : | OFF           | WRONG CONNECTION : OFF  |
| MINOR ALARM - AIS-ELC           | : | OFF           | ASI-OPT : OFF           |
| MAJOR ALARM - LINE DISCON.-ELEC | : | OFF           | LINE DISCON.-OPT : OFF  |

Figure D-39. Modem Alarm Status Screen

## D.15 Displaying System Status

### Purpose

Displays LRS-24 system information.

This command is always addressed to the CM-2 module. Therefore the node address must always be 13.

### Format

NODE 13 DSP HUB

- **To display current system information:**
  - Type **NODE 13 DSP HUB <Enter>**.

A typical display is shown in Figure D-40.

| LRS-24 CARDS (Device name - LRS-12) |       |               |                 |
|-------------------------------------|-------|---------------|-----------------|
| SLOT NO.                            | TYPE  | NAME          | IP              |
| 01                                  | EMPTY |               |                 |
| 02                                  | EMPTY |               |                 |
| 03                                  | IMOD  | ASMi-31CQ (M) | 192.168.216.156 |
| 04                                  | EMPTY |               |                 |
| 05                                  | EMPTY |               |                 |
| 06                                  | EMPTY |               |                 |
| 07                                  | EMPTY |               |                 |
| 08                                  | IMOD  | FOMI-E1/T1C   | 192.168.216.156 |
| 09                                  | IMOD  | ASMI-31C      | 192.168.216.156 |
| 10                                  | IMOD  | ASMI-24C      | 192.168.216.156 |
| 11                                  | IMOD  | ASMI-31C      | 192.168.216.156 |
| 12                                  | IMOD  | ASMi-50C      | 192.168.216.156 |
| 13                                  | CM-2  |               | 192.168.216.156 |
| 14                                  | PS-B  | EMPTY         | 192.168.216.156 |
| 15                                  | PS-A  | 120W/AC_P     | 192.168.216.156 |

Figure D-40. Module Status Screen

Table D-8 describes the fields in the display.

Table D-8. Module Status Fields

| Data | Description                                                                                                                                                                                                                                                                                                                                                     |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SLOT | Displays the number of the LRS-24 slot                                                                                                                                                                                                                                                                                                                          |
| TYPE | Indicates the management capabilities of module installed in the slot:<br><br>SMOD – The module supports direct management by SNMP or by supervision terminal.<br><br>IMOD – The module can only be managed through the CM-2 module (for such modules, the terminal interface is provided by the CM-2 module)<br><br>EMPTY – No module is installed in the slot |
| NAME | Indicates the type of module installed in the slot                                                                                                                                                                                                                                                                                                              |
| IP   | Displays the IP address used for managing the corresponding module:<br><br>For SMOD modules, displays the IP address assigned to its SNMP agent<br><br>For IMOD modules, displays the IP address assigned to the CM-2 SNMP agent<br><br>No information is displayed for empty slots                                                                             |

## D.16 Displaying Alarms Log

### Purpose

Displays the contents of the alarm history buffer of the CM-2 module, or of other selected I/O module. This buffer contains the last 20 alarms and events (for example, module insertion/removal).

The alarm log is cleared automatically when LRS-24 is turned off.

### Format

NODE nn DSP LOG

### Procedure

- **To display the desired log:**
  - Type: **DSP nn DSP LOG <Enter>**.

nn stands for the node number of the desired module, in the range of 1 through 12.

The log of the specified module appears.

The contents of the form depend on the module type. Refer to the *Installation and Operation Manual* of the corresponding module for detailed information.

A typical alarm display for the hub log, displayed in response to a request addressed to the CM-2 module (node 13), is shown in *Figure D-41*.

| MODEM_LOG_FILE                        |       |                    |               |            |
|---------------------------------------|-------|--------------------|---------------|------------|
| MODEM NAME: ASMI-31CQ (m)             |       |                    |               |            |
| DEFINE PORT NUMBER                    |       | :                  | 1             |            |
| SELECT MODEM                          |       | :                  | MODEM 1 LOCAL |            |
| CODE                                  | STATE | DESCRIPTION        | TIME          | DATE       |
| 12                                    | OFF   | NearEndMngLinkFail | 09:01         | 2000-03-09 |
| 08                                    | OFF   | NearEndSyncLoss    | 09:01         | 2000-03-09 |
| 12                                    | ON    | NearEndSyncLoss    | 09:01         | 2000-03-09 |
| THERE ARE NO MORE PAGES AT THE MOMENT |       |                    |               |            |

Figure D-41. Hub Log File Screen

## D.17 Displaying I/O Module Status

### Purpose

Displays complete status and diagnostic information for selected I/O module.

This command is relevant only for I/O modules that do not support direct management by SNMP or by supervision terminal. For such modules, the CM-2 module provides the terminal interface.

### Format

NODE nn DSP STT

### Procedure

- **To display the information:**
  - Type: **DSP nn DSP STT <Enter>**.

nn stands for the node number of the desired module, in the range of 1 through 12.

The status and diagnostic information data form for the specified module appears.

The contents of the form depend on the module type. Refer to the *Installation and Operation Manual* of the corresponding module for detailed information.

|                                                                 |   |                                     |                                          |
|-----------------------------------------------------------------|---|-------------------------------------|------------------------------------------|
| <u>MODEM STATUS</u>                                             |   |                                     |                                          |
| MODEM NAME                                                      | : | ASMI-31CQ (m)                       |                                          |
| DEFINE MODEM PORT NUMBER                                        | : | 1                                   |                                          |
| SELECT MODEM                                                    | : | MODEM 1 LOCAL                       | REMOTE MODEM : ASMI-31                   |
| INTERFACE MODULE                                                | : | SCASI-68 & RJ11*4 REMOTE SLOT : N/A |                                          |
| MODEL PORT                                                      | : | RS-530                              | REMOTE MODEM LINE CONNECTOR: TERM. BLOCK |
| SW VERSION                                                      | : | 00.10                               | REMOTE MODEM FRONT PANEL : LCD           |
| HW VERSION                                                      | : | 00.00                               | HW PANEL VERSION : 03                    |
| LED STATUS: 1) RTS OFF 2) DCD OFF 3) TEST OFF 4) ERR OFF        |   |                                     |                                          |
| 5) ELE-LOW ---- 6) ELE-AIS ---- 7) OPT-LOW ---- 8) OPT-AIS ---- |   |                                     |                                          |
| LINK QUALITY                                                    | : | GOOD                                | PS PHANTOM STATUS : N/A                  |
| BPV ERROR                                                       | : | 37 E+01                             | CHASSIS : N/A                            |
| FIBER OPTIC ERROR                                               | : | 37 E+01                             | WAVE LENGTH : N/A                        |
| LINE UTILITY                                                    | : | 00 %                                |                                          |
| BERT RUN TIME                                                   | : | 0                                   | BERT ERR SECONDS : 0                     |
| BERT SYNC LOSS                                                  | : | 0                                   | BERT PRE FEC : 0                         |
|                                                                 |   |                                     | BERT POST FEC : 0                        |

Figure D-42. Modem Status Screen

---

## D.18 Define CM-2 Reset

### Purpose

Remote reset for CM-2 card.

### Format

NODE 13 DEF RST

### Procedure

- **To reset the CM-2 card:**
  1. Type: NODE 13 DEF RST <Enter>.  
A confirmation screen appears.



CM-2 RESET CONFIRMATION

DO YOU REALLY WANT TO RESET CM-2 : NO

*Figure D-43. CM-2 Reset Confirmation Screen*

2. Select **YES** or **NO**.

---

## D.19 Define Password

### Purpose

Defines password.

Default password: **radlrs**.

### Format

NODE 13 DEF PWD

### Procedure

- **To define the password:**
  1. Type: **NODE 13 DEF PWD<Enter>**.  
The Password Menu screen appears (see *Figure D-44*).

|                      |          |
|----------------------|----------|
| <u>PASSWORD MENU</u> |          |
| Enter new password   | : radlrs |
| Enable password      | : NO     |

Figure D-44. Password Menu Screen

2. Type password.
3. Select **YES** or **NO** to Enable Password.

---

## D.20 Displaying Command Options

### Purpose

Displays an index of the supervisory port commands and the options available for each command.

### Format

NODE 13 HLP

### Procedure

➤ **To enter the help system:**

1. Type: **HLP <Enter>**.

The help page appears (see *Figure D-45*). The page consists of two sections:

- The top section displays the commands available for modules that do not support direct management by SNMP or by supervision terminal.
- The bottom section displays the commands available for the CM-2 module.

```

                                HUB_TERMINAL_COMMANDS

DEF TST - MODEM DIAGNOSTIC.
DSP ALT - MODEM ALARM STATUS.
DSP LOG - MODEM LOG FILE.
DEF MDL - MODEM DOWNLOAD MENU.
- - - - -
DEF HUB - LRS HUB SETUP.
DSP HUB - MODULE STATUS.
DEF MNG - HUB NMS TRAP UPDATE.
DSP ALM - HUB ALARM.
DSP LOG - HUB LOG FILE.
DEF TRM - DEFINE TERMINAL TYPE.
DEF CRD - DEFINE CARD TYPE IN SLOT.
DEF DWL - DEFINE AND VIEW PARAMETERS FOR DOWN LOAD.
DEF CALL- DEFINE PARAMETERS FOR DIAL OUT MODEM.

Press any key to continue. . .

```

Figure D-45. Hub Terminal Commands Screen

2. Press any key to continue viewing the lists of commands (see Figure D-46).

```

DEF RST - DEFINE RESET OF THE CM-2 CARD
DEF CFG - AUTO CONFIGURATION OPERATIONS.
DEF PWD - DEFINE THE TELNET PASSWORD.
DSP VER - DISPLAY THE MODEMS (IMOD ONLY) VERSION.

BEFORE EACH COMMAND, PLEASE INDICATE THE MODE YOU WANT TO WORK WITH.
CM2>

```

Figure D-46. Hub Terminal Commands Screen (Cont.)

*Table D-9. Hub Terminal Commands Screen*

| <b>Command</b> | <b>Description</b>                      |
|----------------|-----------------------------------------|
| DEF TST        | Modem diagnostic                        |
| DSP ALT        | Modem alarm status                      |
| DSP LOG        | Modem log file                          |
| DEF MDL        | Modem download menu                     |
| DEF HUB        | LRS hub setup                           |
| DSP HUB        | Module status                           |
| DEF MNG        | Hub NMS trap update                     |
| DSP ALM        | Hub alarm                               |
| DSP LOG        | Hub log file                            |
| DEF TRM        | Define terminal type                    |
| DEF CRD        | Define card type in slot                |
| DEF DWL        | Define and view parameters for download |
| DEF CALL       | Define parameters for dial out modem    |
| DSP VER        | Displays modem versions                 |
| DEF RST        | Defines reset                           |
| DEF CFG        | Defines Auto-Configuration              |
| DEF PWD        | Define password                         |



# Index

---

## —A—

- Abstract Syntax Notation 1 (ASN.1), C-2, C-3
- AC module, 1-12, 2-16
- Address Resolution Protocol (ARP), C-7
- alarms, 1-5, 2-26, 4-7, 4-12, 5-1, C-2, D-34
  - buffer, D-38
  - log, displaying, D-38
  - relay, 2-26, A-3
  - status, 4-12
  - status display, D-33
- ambient requirements, 2-5
- ANSI racks, 1-6, 1-12, B-1, B-2, B-4
- ASCII terminal management, 1-4, 1-5, 1-13, 3-2, 4-1, 4-2, 4-3, 4-4, 4-6, C-6
- ASM-40CD, 1-5
- Auto Configuration, D-24

## —C—

- cables, 4-7
- Card Configuration, D-19
- chassis, 1-11, 1-14
- circuit breaker, 2-4, 2-25, B-3, B-5
- clock, 1-5, 1-15, 2-11, 2-15, 2-18, 2-19, 2-22, 2-26, A-1, A-3
- Clock, 1-15, 2-11, A-1, A-3
- CM-1 module
  - communication parameters, 3-5
  - connection via modem, 3-3
  - functions, 3-1
  - installation, 2-8–2-12
  - management, 1-5, 1-10, 1-12, 1-13
  - supervision terminal operation, 3-4–3-5
- CM-2 module
  - alarm buffer, D-38
  - alarm status, D-33
  - capabilities, 4-1
  - commands, 4-10–4-13
  - communities, C-4
  - configuration, 4-13
  - cross cable, 4-7
  - default gateway, D-6
  - failure, 4-3
  - initialization, 4-5–4-6
  - management, C-6

- node ID, 4-11
- operating instructions, 2-28–2-30
- parameters, 2-29, D-2, D-4
- SNMP, C-1
- CM-2 Reset, D-40
- command options, displaying, D-41
- commands, CM-2, 4-12, 4-10–4-13
- common logic modules, 1-11, 1-12–1-14
- communication parameters
  - CM-1, 3-5
- communities
  - CM-2, C-4
  - SNMP, C-3–C-4, D-6
- configuration, 4-5, 4-6
  - CM-1, 3-4, 3-5
  - CM-2, 4-1, 4-13
  - I/O module, 4-13
  - individual modules, 3-5, 4-14
  - SNMP, 1-13
- connectors, 1-4, 2-16, 2-19, 4-7, 4-13
  - AC power, 2-7
  - Ethernet, 2-22, 2-26
  - LRS-PS-FEED, B-1, B-5
  - PHANTOM, 2-16, 2-25
  - PS module, A-4
  - remote feed, 2-16
  - RJ-45, 2-19
  - RS-232, 2-18, 2-26, 3-2, 3-3, 3-5, 4-7
  - station clock, 2-11, 2-15, 2-18, 2-19, 2-22, 2-26, A-1, A-3
  - UTP, 2-21
- corrections, 4-11
- cross cable, 2-21, 3-2, 3-3, 4-7
- cursor, 4-11, D-22

## —D—

- data storage, 4-3
- DC PS modules, 1-12
- diagnostic tests, 5-1
- displaying alarm status, 4-12, D-33
- Download, D-9
- duplex communication, 4-11

**—E—**

enclosure, installation, 2-24–2-27  
error code, 2-29  
errors, 2-29, 4-11, 4-12  
Ethernet, 1-5, 1-13, 1-16, 2-19, 2-21, 2-22, 2-26,  
2-30, 4-2, 4-3, 4-7, A-4, C-6, C-7  
ETSI racks, 1-4, 1-9, 2-24, B-1, B-4

**—F—**

failure, CM-2, 4-3  
features of LRS-24, 1-4  
feed voltage, phantom, 1-12, 2-25, 2-27, 2-28, 2-  
29  
front clearance, 2-5

**—H—**

HELP, D-41  
help, CM-2, 4-11  
HPOV, 1-5

**—I—**

I/O (user) modules, 1-11, 1-14, 2-28  
configuration, 3-5, 4-13  
connectors, A-1  
diagnostics, defining, D-23  
display status, 4-12  
IP address, C-6, C-7  
messages, C-7  
node number, 4-4  
parameters, D-20  
parameters, D-18  
status, D-39  
I/O (User) modules  
connectors, 2-27  
IMOD module, 4-14, D-37  
index of commands, CM-2, 4-12  
indicators, 1-5, 2-9, 2-13, 2-27, 2-28, 2-29, 5-1, B-  
5  
initialization, CM-2, 4-5–4-6  
installation  
CM-1, 2-12, 3-4  
interface modules, 2-17  
LRS-24 enclosure, 2-24  
LRSI-F2-CM2, 2-21  
LRSI-F-CM-1 module, 2-17–2-18  
PS modules, 2-16–2-17  
Installation, B-4  
interface modules, A-1, C-6  
interface, CM-2 and SNMP, 4-2  
internal settings, 2-20, 2-22  
Internet Activities Board (IAB), C-2  
Internet Protocol (IP), 1-13, 2-16, 4-3, C-1, C-4–C-  
7, C-5, D-4, D-5, D-6, D-7, D-8, D-10, D-37  
IP environment, C-4  
IP Environment, C-4–C-7

**—J—**

jumper settings, 2-15

**—L—**

LAN, 1-5, 1-16, 2-19, 2-21, 2-22, 4-7, D-9, D-14  
LRS-24B, 1-6, 1-7, 1-10  
LRS-24F, 1-6, 1-9, 1-10  
LRSI-F1-CM2  
installation, 2-18–2-21  
LRSI-F2-CM2, 4-2, 4-7, A-4, C-4, C-7  
installation, 2-24  
LRSI-F-CM1 module, 2-17–2-18, 3-3, 3-5, A-1,  
A-2  
LRSI-PSP module, B-1, B-5  
LRS-PS FEED, power supply, B-1–B-5  
LRS-PS module, B-1  
LRS-PS-FEED, B-1–B-5

**—M—**

MAC address, C-4, C-7, D-7  
malfunction, 2-28, 2-29  
management  
ASCII, 1-4, 1-13, 3-2, 4-1, 4-2, 4-3, 4-4, 4-6, C-6  
ASCII terminal, 1-5  
CM-2, C-6  
dumb terminal, 1-5  
Ethernet connectors, 2-26  
MDM, 1-5  
RADview-PC/MDM, 1-5  
RS-232 connectors, 2-26  
SNMP, 1-4, 1-5, 1-13, 4-3, 4-16, C-1, C-6  
Telnet, 1-13  
Management Information Base (MIB), 4-16, C-2,  
C-3, C-7  
management stations  
defining, 1-12, 4-2, 4-3, 4-5, 4-12, 4-14, 4-16, C-3,  
C-4, D-4, D-6, D-8  
SNMPI, 4-1  
MDM management, 1-5  
memory, 4-3, D-5  
message format, CM-2, 4-3  
MIB. See Management Information Base  
Modem Alarm Status, D-35  
modem cards, 1-5  
Modem Download, D-13  
modem link, CM-1, 3-3  
Modem Version, D-17  
modems, 1-1, 1-5, 3-1, 3-2, 3-3, 4-7, 4-12, D-2,  
D-3, D-4, D-7  
module identification  
CM-2, 4-2  
module slots, 1-10  
Module Status, D-39  
modules:. See *individual modules*

**—N—**

network management station, RADview, 4-1  
node ID, CM-2, 4-11  
node number, 3-1, 4-4, 4-11, 4-15, D-18, D-20,  
D-23, D-35, D-38, D-39

**—O—**

operating instructions  
CM-1 supervision terminal, 3-4–3-5  
CM-2 module, 2-28–2-30  
operating temperature, 2-5  
operational parameters, I/O module, D-20

**—P—**

package contents, 2-5–2-6  
parameters, 4-3, 4-5, 4-12, 4-13, 4-14, 4-15  
CM-1 communication, 3-5  
CM-1 configuration, 3-4  
CM-2, 2-29, 4-2, D-2, D-4  
configuration, 4-1, 4-4, 4-5, 4-6, 4-13  
default communication, 3-4  
I/O (user) module, D-18  
initialization, CM2, 4-3  
RS-232, 3-2  
SNMP agent, 4-5, D-4  
Password, D-40  
passwords, 3-4  
change, 3-5  
default, 3-4  
phantom feed voltage, 1-12, 2-25, 2-27, 2-28,  
2-29  
pin function, 2-27, A-1, A-2, A-3, A-4  
polarity, 2-25, B-5  
power supply, 1-4, 1-5, 1-11, 1-12, 1-14, 2-1, 2-4,  
2-5, 2-7, 2-9, 2-13, 2-16, 2-24, 2-25, 2-26, 2-  
27, 2-28, 2-29, 4-3, 4-5, 4-6, A-4, B-1, B-2, B-3,  
B-5, C-7, D-34  
preliminary configuration, 3-4, 3-5, 4-1, 4-2, 4-4,  
4-5, 4-6, 4-14, 4-15, C-7  
prompt, 4-11, 4-14, 4-15  
PS modules, 1-10, 1-11, 1-12, 2-6, 2-7, 2-16,  
2-24, 2-27, 2-28, 2-29, A-1, A-4

**—R—**

RADview, 4-1  
RADview-PC/MDM management, 1-5  
RD indicators, 2-27  
remote module, 4-3, 4-4, 4-6  
remote power source, 1-12, B-1  
remote units, controlling, 1-5, 2-16

RJ-45 connector, 2-19, 2-26  
routing, CM-2, 4-3  
RS-232, 3-1, 3-2, 3-3, 4-1, 4-6, 4-7, 4-13, A-2  
connectors, 2-18, 2-26, 3-5  
interface, 3-2

**—S—**

scrolling values, 4-12  
settings, internal, 2-20, 2-22  
SLIP, 4-3, C-4, C-6, C-7  
SMOD module, 4-14, D-7, D-37  
SNMP, 1-4, 1-5, 1-13, 1-15, 1-16, 4-1, 4-2, 4-3,  
4-4, 4-5, 4-1–4-5, 4-11, 4-12, 4-15, 4-16, B-1,  
C-1, D-4, D-5, D-6, D-18, D-20, D-23, D-37,  
D-39, D-41  
communities, D-6  
configuration, 1-13  
internal agent  
in CM-2, 4-1  
management, C-1, C-6  
SNMP agent parameters, defining, 4-5, D-4  
station clock, 2-11, 2-15, 2-18, 2-19, 2-22, 2-26,  
A-1, A-3  
supervision terminal, 3-1, 3-2, 3-3  
CM-1, 3-3  
CM-1 module operation, 3-4–3-5  
defining, 4-12, D-21  
System Status, D-36

**—T—**

TD indicator, 2-9, 2-13, 2-27, 2-29  
terminal connection, CM-1, 3-2  
terminal echo, 3-4, 4-11, 4-13  
tests, diagnostic, 5-1  
traps, C-1, C-3, C-4, D-8  
SNMP, C-7  
troubleshooting, 2-28  
CM-1 modules, 2-28  
CM-2 modules, 2-29  
installed modules, 2-28  
turn off, 2-28, 2-29, 4-13  
turn on, 2-27, 2-28

**—U—**

unpacking, 2-5–2-6  
User Datagram Protocol (UDP), C-1, C-6

**—X—**

XMODEM, D-9, D-14

