

ASMi-450

High-Speed HDSL Modem

Installation and Operation Manual

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Telecommunication Safety

The safety status of each of the ports on the ASMi-450 is declared according to EN 41003 and is detailed in the table below:

Safety Status	Ports
SELV	RS-530, X.21, V.35, V.24, V.36
TNV operating within the limits of SELV	HDSL

SELV = Safety Extra-Low Voltage

TNV = Telecommunications Network Voltage

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.

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Manufacturer's Name: RAD Data Communications Ltd.

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declares that the product:

Product Name: **ASMi-450**

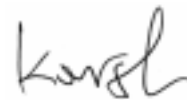
Conforms to the following standard(s) or other normative document(s):

EMC:	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.
Safety:	EN 60950 (1992/93)	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, January 23rd, 1997



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Quick-Start Guide

If you are familiar with HDSL transmission equipment, use this guide to prepare (configure) an ASMi-450 for operation. The configuration activities can be carried out either before or after the ASMi-450 is installed in its intended location.

1. Starting the Configuration

Preliminary Preparations

To configure the ASMi-450, you need an ASCII terminal, e.g., a VT-100, etc., or a PC running a terminal emulation program. You also need a standard cable terminated in a 9-pin D-type male connector, for connecting the serial port of your terminal to the CONTROL DCE connector located on the front panel of the ASMi-450.

Configure your terminal for eight data bits, no parity, one stop bit, echo off, and no flow control. You can use 300, 1200, 2400, 4800, or 9600 bps - the ASMi-450 will automatically recognize the data rate you are using.

Starting Procedure

1. Turn the ASMi-450 on.
2. Connect the terminal cable to the CONTROL DCE connector of the ASMi-450.
3. Press the Carriage Return (<CR> or ENTER) key three times in sequence: you should see the ASMi-450 prompt, ASMI> .

If you see PASSWORD>, type ASMI and then press <CR> to obtain the prompt.

If you do not see the prompt:

- Check the terminal configuration, and its connections to the ASMi-450, and then repeat step 3 above.
- Turn the ASMi-450 off about 15 seconds, and then turn it on again and repeat step 3 above.
- If this is the first time you are working on this ASMi-450 unit, refer to Section 4-3 for preliminary configuration instructions.
- Read ASMi-450 display. If the second row shows EMPTY, everything is OK. If it shows SCROLL, press SCROLL and read the alarm messages. Refer to Chapter 5 for instructions.

2. Configuration Procedure

You are ready to start ASMi-450 configuration. After typing a command, press <CR> to see the data entry form:

- Use the space bar to move the cursor to the desired field.
- Use the F key to scroll forward, and the B key to scroll backward among the available values. For free text fields, type the desired text.
- When ready, press <CR> to display the next data entry page of the current command. Pressing <CR> after the last data entry, executes the command.
- You can exit without executing the changes by pressing CTRL-C at any time before pressing <CR>.

To obtain correct display of data forms on your terminal, you must select the terminal control sequences:

1. Type the command F.
2. In each field, type the code corresponding to your terminal type. The chart below lists the codes for common terminal types:

Function	Terminal Type				
	TV920	VT52	VT100	Freedom 100/110	Freedom 220
Clear Screen	1B2A0000	N/A	1B5B324A	1B2A0000	1B5B324A
Cursor Home	1E000000	1B480000	1B5B4800	1E000000	1B5B4800
Cursor Right	0C000000	1B430000	1B5B3143	0C000000	1B5B0143

3. When done, press <CR>.

Configure the ASMi-450 in the following order:

Step	Action	Use the Command
1	Set ASMi-450 system time	TIME
2	Set ASMi-450 system date	DATE
3	Define control port characteristics	DEF SP
4	Define system characteristics	DEF SYS
5	Define general system parameters	DEF AGENT DEF NAME DEF NODE DEF PWD

3. Command Index

Display the index of commands by typing the help command, **H**. The following table lists the available commands.

Type	Configuration Commands	Display Commands	Control Commands
System	DEF SYS	DSP ST SYS	RESET
	DEF AGENT		
	DEF NAME	DSP ALM	INIT DB
	DEF PWD	DSP ALM REM	CLR ALM
	DEF NODE	DSP HDR TST	CLR REM ALM
	DATE		
	TIME		
HDSL Lines		DSP ST LINE	
		DSP HDSL PM LP1 or LP2	
		DSP R HDSL PM LP1 or LP2	
User's Port		DSP ST PORT	
		DSP TS	
Supervisory Port	DEF SP	DSP ST SP	H
	INIT F		EXIT
	F		
Tests			LOOP L PORT
			LOOP R R PORT
			CLR TST
			CLR LOOP L PORT
			CLR LOOP R PORT

Notes

Chapter 1

Introduction

Purpose and Main Features

1.1 Functional Description

The ASMi-450 is a high-speed HDSL modem that enables long-range data transmission over one unconditioned twisted-pair line, using the High Bit Rate Digital Subscriber Line (HDSL) technology.

The HDSL technology offers a cost-effective and reliable solution for delivering high-speed data to the subscriber premises over the existing copper cables and subscriber loops of the local distribution plant.

The ASMi-450 is fully compatible with the ASMi-450C high-speed HDSL modem card, which is intended for installation in the 12-Card HDSL/Modem Hub with SNMP Management, LRS-12, offered by RAD.

The ASMi-450 can transmit full duplex over unconditioned AWG-22, AWG-24, and AWG-26 twisted pair loops. Using advanced equalization, adaptive filtering, and echo cancellation techniques, the ASMi-450 compensates for line impairments, bridged taps, and mixed cables commonly encountered in the local distribution network. Moreover, due to its high immunity to background noise, the ASMi-450 enables the transmission of multiple HDSL signals in the same physical cable without requiring pair selection.

The ASMi-450 is available in two versions, optimized for maximum range in accordance with the user's payload data rate:

- **ASMi-450/1152:** can transmit data rates of $n \times 64$ kbps, where n is 1 through 18 (corresponding to data rates of 64 to 1152 kbps). Typical ranges are up to 4.5 km over AWG-24 (0.5 mm) cable, and up to 3.6 km over AWG-26 (0.4 mm) cable.
- **ASMi-450/768:** can transmit data rates of $n \times 64$ kbps, where n is 1 through 12 (corresponding to data rates of 64 to 768 kbps). Typical ranges are up to 5.7 km over AWG-24 (0.5 mm) cable, and up to 4.1 km over AWG-26 (0.4 mm) cable.

Both ASMi-450 versions are available with two types of user interfaces:

- Serial data port. The port can be ordered with V.35, RS-530, or X.21 interface (the RS-530 interface also supports V.36/RS-422/RS-442 by means of an adapter cable).

- Ethernet 10BaseT interface. The interface can use unshielded and shielded twisted pair (UTP and STP) media. The ASMi-450 also includes a remote bridge, that can be enabled/disabled by the user.

Figure 1-1 shows a typical application for an ASMi-450 with serial data interface, and figure 1-2 shows a typical application for an ASMi-450 with Ethernet interface.

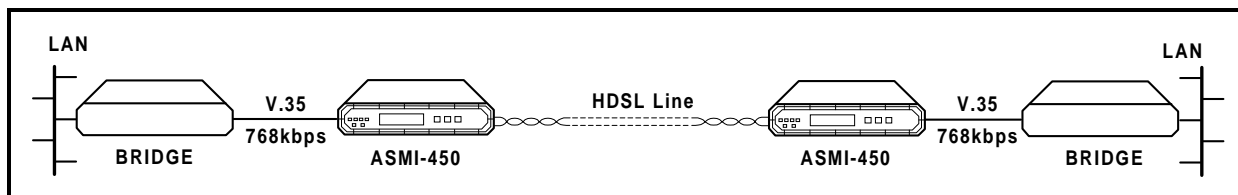


Figure 1-A. Typical Application for ASMi-450 with Data Interface

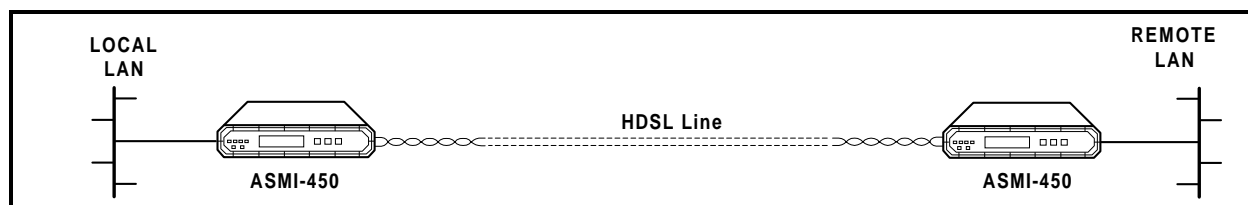


Figure 1-B. Typical Application for ASMi-450 with Ethernet Interface

Serial Data Port Characteristics

The user's data port of the ASMi-450/768 and ASMi-450/1152 can be ordered with the following interface options:

- V.35 interface: 34-pin female connector.
- X.21 interface: 15-pin D-type female connector.
- RS-530/RS-422 interface: 25-pin D-type female connector.
- V.36/RS-422/RS-449 interface: a 37-pin D-type male connector is provided by means of an adapter cable that connects to the RS-530/RS-422 connector.

The user's port interface has two timing options:

- Internal clock - the ASMi-450 user's port provides transmit and receive clock to the equipment connected to the port.
- External clock - the equipment connected to the ASMi-450 provides the transmit clock to the user's port, and the ASMi-450 returns a receive clock locked to the external transmit clock.

Ethernet Interface Characteristics

The Ethernet interface has a 10BaseT interface complying with the IEEE 802.3 standard, and is terminated in an RJ-45 shielded connector, which can operate over UTP and STP media.

The interface includes a full-feature remote bridge, that operates at the physical and data link layers of the OSI model, and is therefore completely transparent to higher level protocols, such as TCP/IP, DECnet, XNS, ISO, and to operating systems, such as NetWare, VINES, and 3COM+.

The bridge operates as a media access (MAC) layer remote bridge with self-learning capabilities: it learns and automatically recognizes the addresses of the nodes attached to the local LAN (the LAN directly attached to the ASMi-450 interface), and uses this information to filter the LAN traffic. The address information is stored in tables, which can store up to 10,000 addresses. The address information is automatically updated (aging time is 5 minutes, that is, if no frames are received from a node for 5 minutes, the node address is automatically removed from the tables to ensure that only fresh addresses are used).

Therefore, the bridge blocks the packets addressed to local nodes, and forwards through the ASMi-450 link only multicasts, broadcasts, and packets addressed to nodes attached to the remote LAN. To increase transmission efficiency, the bridge compresses short packets by automatically recognizing the padding bits in 64-bit frames, transmitting only the payload, and reconstructing the packets at the remote end.

The filtering and forwarding can be performed at a rate of up to 15,000 packets per second (provided the bandwidth selected on the HDSL link is sufficient to carry the resulting payload rate).

When bridging is not necessary, e.g., for LAN extender applications, the user can disable the bridge: in this case, the ASMi-450 operates as a repeater that transfers transparently all the traffic to the remote end.

HDSL Subsystem Characteristics

The ASMi-450 HDSL subsystem uses duplex transmission over one 2-wire line. The ASMi-450 can operate on unloaded AWG-22, AWG-24, and AWG-26 twisted-wire pairs, and other similar pairs. Up to two bridged taps, having a length of up to 500 meters, are tolerated.

The HDSL line interface is terminated in an RJ-45 eight-pin connector.

The line code on the HDSL lines is 2B1Q at a symbol rate approximately equal to half the maximum data rate:

- ASMi-450/768: 392 kbaud
- ASMi-450/1152: 584 kbaud.

The increased symbol rate is used to provide framing and synchronization, and an embedded operations channel, which enables end-to-end system management and supervision.

The HDSL subsystem operates in a master-slave mode:

- The central unit, located at the central office side of the link, which serves as the line termination unit (LTU), controls the system start-up procedure, and provides the timing reference for HDSL line transmission.

- The remote unit, located at the remote end of the link (customer side), serves as the network termination unit (NTU).

The ASMi-450 supports both the central (LTU) and the remote (NTU) operating modes; the actual operating mode (LTU or NTU) is user-selectable.

System Timing

The ASMi-450 offers selectable timing options, which enable the distribution of timing over the HDSL system, from the central office to the remote end.

- **ASMi-450 Unit Configured as Central Unit (LTU).** The ASMi-450 unit configured as central unit has two timing modes: external timing and internal timing.
 - **External timing.** With external timing, the ASMi-450 system timing is locked to the clock signal received from the user's equipment (this mode is not supported when the ASMi-450 is equipped with an Ethernet interface). This mode allows locking the system timing to the timing of the network to which the local ASMi-450 unit is connected, and thus it enables providing the network timing to the equipment on the customer's premises.

The local HDSL transmit timing is locked to the incoming clock signal, therefore the transmit path of the local ASMi-450 transparently transfers the timing from the user's equipment to the HDSL line.

Figure 1-3 shows the flow of timing signals through the ASMi-450 system in the external timing mode.

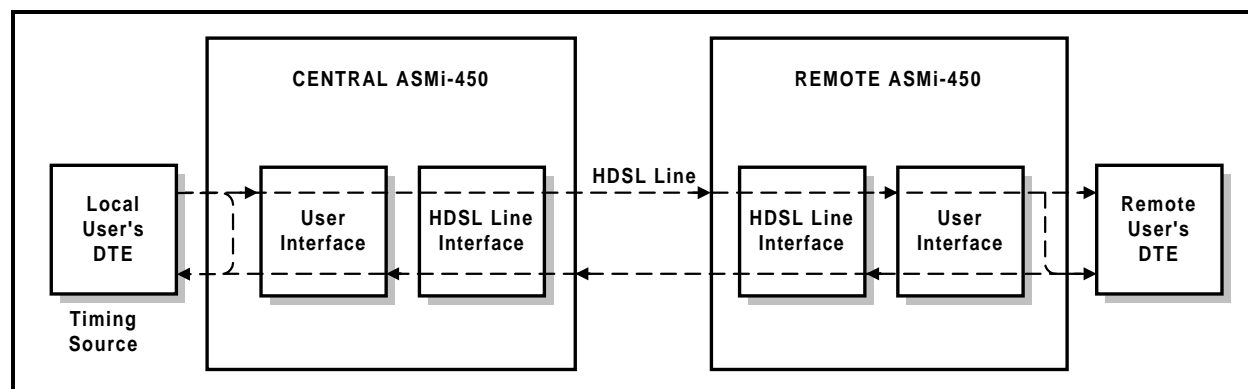


Figure 1-C. Flow of Timing Signals through ASMi-450 System in the External Timing Mode

- **Internal timing.** With internal timing, the ASMi-450 system timing is determined by the clock signal generated by an internal crystal oscillator. This clock signal is supplied to the HDSL transmit path and to the user's equipment.

The internal timing mode is suitable for point-to-point configurations.

Figure 1-4 shows the flow of timing signals through the ASMi-450 system in the internal timing mode.

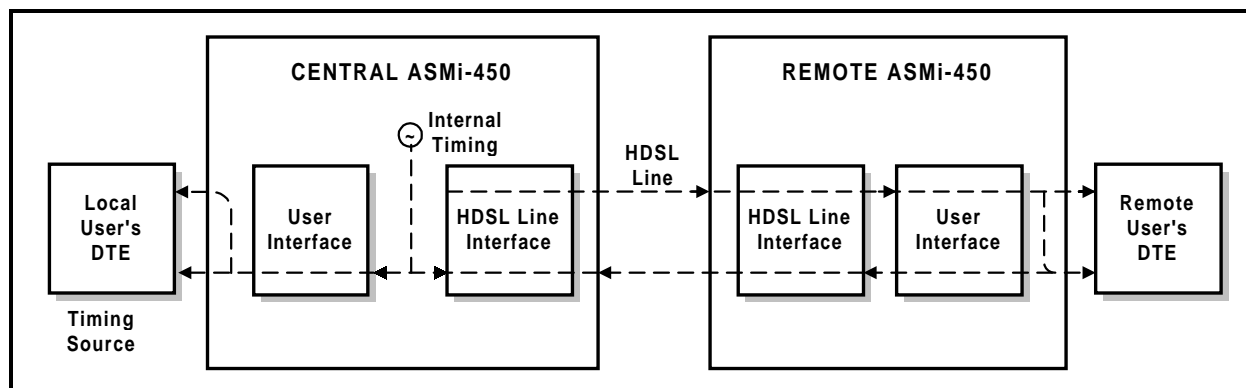


Figure 1-D. Flow of Timing Signals through ASMi-450 System in the Internal Timing Mode

- ASMi-450 Unit Configured as Remote Unit (NTU).** The ASMi-450 unit configured as remote unit always locks its internal system timing to the incoming HDSL signal, which is received from the ASMi-450 unit configured as central unit. The receive path of the ASMi-450 uses the recovered timing to generate the data stream supplied to the equipment connected to the remote user's port. Therefore, the receive path of the remote ASMi-450 transparently transfers the timing from the HDSL line to the remote user's equipment.

Control of ASMi-450 Operation

The ASMi-450 system is designed for unattended operation. The configuration of the ASMi-450, that is, a complete collection of operating parameters, is determined by a data base stored in non-volatile memory.

Local Control

The ASMi-450 can be controlled by means of a simple menu, operated by push-buttons located on the front panel. During set-up, an LCD display guides the operator in the execution of the desired operations. The display provides information concerning the current system configuration and operating mode, and the available values of each programmable parameter. In case of operator errors, the ASMi-450 displays a message that explains the error and helps the operator take the correct action.

Remote Management

In addition to front panel control, the ASMi-450 supports management from a remote location. The remote management capabilities can be used to perform the following activities:

- ASMi-450 configuration.
- Reading of ASMi-450 status.
- ASMi-450 testing.
- Display of alarm status and history.

The remote management functions are performed through a serial RS-232 port that enables serial communication with a supervision terminal.

Using the supervision terminal functions, the user can also enable remote management using IP communications, i.e., Telnet and SNMP. The IP communication uses the Serial Link Internet Protocol (SLIP).

Note

Support for Telnet and SNMP is available for ASMi-450 with software version 1.0 and higher. If your ASMi-450 does not support Telnet and SNMP, contact RAD Technical Support Department for upgrade information.

The remote management capabilities available through the serial RS-232 port are as follows:

- **Management by means of a Supervision Terminal.** Any “dumb” ASCII terminal connected to the RS-232 port of the ASMi-450 (or a PC running a terminal emulation program), controlled by the program stored in the ASMi-450, can be used as a supervision terminal. The control port can be used to perform the following activities:

- ASMi-450 configuration.
- Reading of ASMi-450 status.
- ASMi-450 testing.
- Display of alarm status and history.

The supervision terminal can communicate with the ASMi-450 using either point-to-point, or polled (multidrop) communication. For polling purposes, each ASMi-450 can be assigned an eight-bit address, for a maximum of 255 nodes (the zero address is reserved for non-polled communication).

As an option, a dial-up modem can be connected to the control port, to provide call-in capabilities.

In addition to the remote management functions listed above, the supervision terminal is also used for the preliminary configuration of the ASMi-450, to enable the use of IP communication for Telnet and SNMP management.

- **Management by means of Telnet.** The ASMi-450 also supports the Telnet protocol, which enable remote management using the same command line interface available with a supervision terminal. Telnet uses TCP/IP communication through the RS-232 port of the ASMi-450.
- **SNMP Management.** The SNMP management capability enables fully graphical, user-friendly management using the RADview network management stations offered by RAD, as well as management by other SNMP-based management systems.

Test and Diagnostics Capabilities

The ASMi-450 has comprehensive diagnostics capabilities. ASMi-450 models with serial data port support the following types of test functions:

- Local loopback on the user's port of the local ASMi-450 (LOOP LOCAL PORT).
- Remote loopback on the user's port of the remote ASMi-450 (LOOP REM REM PORT).

These loopbacks may not be activated for an ASMi-450 equipped with Ethernet interface, because this would cause a continuous state of collision on the LAN, thereby disrupting the traffic on the LAN.

Maintenance is further enhanced by advanced self-test capabilities, and by an automatically performed power-up self-test that provides circuit-level diagnostics data.

Alarms

The ASMi-450 stores alarms detected during its operation in a buffer that can hold up to 100 alarms. During regular operation, the front panel LCD display shows if there are any alarms in the alarm buffer, to notify the local operator that alarm conditions have been detected. The local operator can then review the contents of the alarm buffer on the front panel display, and can delete old alarms.

In addition to the alarm buffer, front-panel LED indicators display in real time the activity on the ASMi-450 user's port, the state of the LAN, and the synchronization status and transmission quality of the HDSL line, and alert when test loops are present in the system.

Physical Characteristics

The ASMi-450 is a compact unit, intended for installation on desk tops or shelves. Unit height is only 1U (1.75").

An optional rack-mount adapter kit enables the installation of one or two ASMi-450 units in a 19" rack.

Power Requirements

The ASMi-450 can be powered by 115 VAC and 230 VAC, 47 to 63 Hz. As an option, the ASMi-450 can also be ordered with a -48 VDC power supply.

1.2 Operating Environment

This section describes the HDSL environment, with special emphasis on the implementation used in the ASMi-450 to provide the background information required for understanding the configuration parameters of the ASMi-450 system.

Transmission Media

HDSL systems are intended to operate on the local subscriber plant, which typically uses a mixture of unshielded twisted-wire pairs. Moreover, it is also necessary to tolerate bridges taps. Therefore, HDSL systems must operate properly on this media. The only requirement is that the lines must not be loaded. In addition, it is assumed that the nominal impedance of the loops is 135 ohms, and that the loops are balanced with respect to ground.

HDSL Line Signal

The line code on the HDSL loop is 2B1Q (2 Binary, 1 Quaternary). This is a four-level pulse-amplitude modulation code without redundancy, under which each pair of information bits is converted to a quaternary symbol, called quat (bits can assume two signal levels, whereas quats have four levels).

The encoding rule of the 2B1Q code is as follows:

Binary Digits	Quaternary Symbol
00	-3
01	-1
10	+3
11	+1

The levels of the quaternary signal are symmetrically located around the 0V, and the nominal peak symbol level specified by the HDSL standards is 2.64V. Figure 1-5 illustrates the 2B1Q encoding rule.

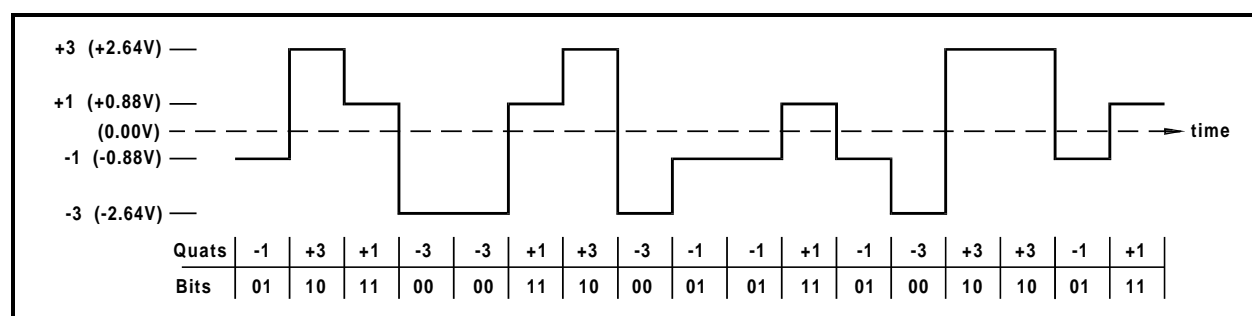


Figure 1-E. 2B1Q Encoding Rule

Due to the encoding of two bits into one symbol, the symbol rate on the HDSL line is half the bit rate. Taking into consideration the highest payload rate supported by the ASMi-450, 1152 kbps, and some overhead, the required line data rate is 1168 kbps (equivalent to a symbol rate of 584 kbaud).

By reducing the line symbol rate, the maximum range that can be reached is increased. This is achieved by offering several versions of ASMi-450, each operating up to a given maximum rate. Together with the advanced digital signal processing techniques implemented in HDSL systems, this results in a robust data transmission system that can reliably operate over regular unconditioned local loops.

HDSL Signal Structure

The HDSL signal is organized in frames. The HDSL frames carry user data, framing and synchronization data, and overhead data. The overhead data is used for a supervision and management channel, called embedded operations channel (EOC) that serves for status transfer, diagnostic loopbacks and tests, etc.

HDSL-Related System Functions

The HDSL subsystem performs the following main functions:

- Mapping of input data bits into frames.
- Start-up process.
- Frame alignment.
- System management by means of the EOC channel.

To achieve proper operation, one of the unit<F14P11>s serves as the master that controls the system start-up procedure, provides the timing reference for HDSL loop transmission, and manages the communication on the EOC channel. The master unit is called line termination unit (LTU) and is located at the central office side of the link; the other unit is called network termination unit (NTU) and is located at the remote end of the link.

The transmission of data on the HDSL loop is full duplex. To enable duplex transmission, HDSL transceivers use an echo canceller, based on advanced digital signal processing (DSP) techniques. When starting system operation, the echo canceller is “trained”, to enable the separation of the received signal from the transmit signal. The training is performed by transmitting a special sequence for a predetermined period. This process is called “start-up process”; data transmission can start only after its successful completion.

1.3 Technical Specifications

HDSL Interface

Signal Format	2B1Q line coding
Line Type	One unconditioned, unloaded twisted pair
Nominal Impedance	135 Ω
Transmit Pulse Shape	Per ANSI T1E1.4/92-002RI and ETSI ETR-152
Transmit Signal Power	+13 dBm
Loop Loss	– 35 dB max. at 200 kHz (392 kbaud) – 31 dB max. at 150 kHz (584 kbaud)
Typical Range (AWG 24 Wire (0.5 mm))	
392 kbaud	5.7 km
584 kbaud	4.5 km
Return Loss (Relative to 135 Ω)	– 16 dB minimum, 40 kHz to 200 kHz @ 392 kbaud – 16 dB minimum, 25 kHz to 317 kHz @ 584 kbaud
Loop Loss	– 35 dB maximum at 200 kHz (392 kbaud) – 31 dB maximum at 150 kHz (584 kbaud)
Noise Margin	– 6 dB at 392 kbaud – 3.3 dB for 584 kbaud
Equalizer	Automatic adaptive equalizer
Connector	RJ-45
User's Serial Data Port Interface	
Interface Type	V.35, V.36/RS-422, RS-530, or X.21, in accordance with order
Bit Rates	
ASMi-450/768	n \times 64 kbps, up to 768 kbps
ASMi-450/1152	n \times 64 kbps, up to 1152 kbps
Interface Connectors	
V.35	34-pin, female
RS-530	25-pin D-type, female
RS-449/V.36	37-pin D-type, female (via adapter cable)
X.21	15-pin D-type, female

Ethernet Interface

Compliance	IEEE 802.3
Interface Type	10BaseT for use on UTP and STP media
Interface Connector	RJ-45 shielded eight-pin connector
Internal Bridge	Remote MAC-layer bridge with self-learning

Indicators

User's Serial Data Port	<ul style="list-style-type: none">– Transmit Data (TD)– Receive Data (RD)
Ethernet Port	<ul style="list-style-type: none">– Link status– Collision indicator– Transmit and receive data activity
HDSL Line	<ul style="list-style-type: none">– LOS (loss of synchronization)– QLTU (good quality)
Status	<ul style="list-style-type: none">– TEST– ALARM

Diagnostics

Loopbacks	<ul style="list-style-type: none">– Local loopback on the user's serial data port of the local ASMi-450– Remote loopback on the user's serial data port of the remote ASMi-450
-----------	---

Timing Modes

Central Unit	<ul style="list-style-type: none">– Internal timing, derived from local oscillator– External timing, locked to user's port receive clock
Remote Unit	Loopback timing, derived from incoming HDSL receive clock

Front Panel Controls

LCD	2×16 characters
Push-buttons	CURSOR, SCROLL, ENTER

Control Port

Interface	ITU-T Rec. V.24/EIA RS-232, asynchronous DCE interface for direct connection of control terminal
Data Rate	300, 1200, 2400, 9600, with Autobaud option

Word Format

- One start bit
- 7 or 8 data bits
- Parity: none, odd, or even
- One stop bit

Connector 9-pin D-type, female

Physical Characteristics

Depth 243 mm (9.5")

Width 215 mm (8.5")

Height 43 mm (1.7")

Weight 1.5 kg (3.5 lb.)

Power

AC Source 110V to 240VAC, 47 to 63 Hz, 5W

DC Source -48VDC

Environment

Operating Temperature 0 to 50°C (32 to 122°F)

Relative Humidity Up to 90%, non-condensing

Chapter 2

Installation

2.1 General

The ASMi-450 is delivered completely assembled. It is designed for installation as a desk-top unit or for mounting in a 19" rack.

Mechanical and electrical installation procedures for the ASMi-450 are provided in the following paragraphs. For rack installation instructions, refer to Appendix C.

After installing the unit:

- Refer to Chapter 3 for system configuration information and procedures using the front panel controls.
- Refer to Chapter 4 for system configuration procedures using an ASCII terminal connected to the ASMi-450 control port.

In case a problem is encountered, refer to Chapter 5 for test and diagnostics instructions.

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.

2.2 Unpacking

A preliminary inspection of the equipment container should be made before unpacking. Evidence of damage should be noted and reported immediately.

Unpack the equipment as follows:

- Place the container on a clean flat surface, cut all straps, and open or remove top.
- Take out the ASMi-450 carefully and place it securely on a clean surface.
- Inspect the product for damage. Report immediately any damage found.

2.3 Site Requirements

Power

AC-powered ASMi-450 units should be installed within 1.5m (5 feet) of an easily-accessible grounded AC outlet capable of furnishing the nominal supply voltage (115 or 230 VAC, in accordance with your order).

DC-powered ASMi-450 units require a -48 VDC power source.

User's Port Connections

The user's port connector, designated DCE, depends on the interface type installed on the unit:

- V.35 interface: 34-pin female connector.
- X.21 interface: 15-pin D-type female connector.
- RS-530/RS-422 interface: 25-pin D-type female connector.
- V.36/RS-422/RS-449 interface: a 37-pin D-type male connector is provided by means of an adapter cable that connects to the RS-530/RS-422 connector.
- Ethernet interface: shielded RJ-45 connector (supports both UTP and STP media).

Appendix A provides information on the pin allocation of the user's port connectors, and for the adapter cable.

HDSL Line Connections

The HDSL line of the ASMi-450 is terminated in an RJ-45 connector. Appendix A provides the pin allocation for this connector.

Front and Rear Panel Clearance

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

Ambient Requirements

The ambient operating temperature of the ASMi-450 should be 32 to 122°F (0 to 50°C), at a relative humidity of up to 90%, non-condensing.

2.4 ASMi-450 Configuration Information

General

This paragraph provides information on the functions of the internal jumpers and switches, to help in the selection of the correct setting for particular application, and gives step-by-step instructions for performing the internal settings. The default settings are also listed.

All the other configuration actions can be performed from the front panel or from a control terminal, after the installation is completed. Information and detailed instructions for these operations appear in Chapters 3 and 4, respectively.

Prior to ASMi-450 installation, it is necessary to check the positions of its internal jumpers and switches. If necessary, change the settings in accordance with the specific requirements of your application.

Warning - Electrical Shock Hazard

Access to the inside of the unit is permitted only to qualified and authorized service personnel.

Disconnect the unit from the power line and from all the cables before removing cover.



Line voltages are present inside the ASMi-450 when it is connected to power and/or to the lines. Moreover, under external fault conditions dangerous voltages may appear on the lines connected to the ASMi-450. Any adjustment, maintenance, and repair of the opened instrument under voltage should be avoided as much as possible and, when inevitable, should be carried out only by a skilled technician who is aware of the hazard involved. Capacitors inside the instrument may still be charged even after the instrument has been disconnected from its source of supply.

Caution



The ASMi-450 contains components sensitive to electrostatic discharge (ESD). To prevent ESD damage, avoid touching the internal components, and before moving jumpers, touch the ASMi-450 frame.

Opening ASMi-450 Case

To reach the internal jumpers and switches of the ASMi-450, it is necessary to open its case. The case cover is held by four screws, identified in figure 2-1. After releasing the screws, the cover can be removed.

Use the following procedure:

- Disconnect all the cables connected to the ASMi-450.
- Refer to figure 2-1, turn the unit over, and unscrew the four cover screws. Keep the screws in a safe place.
- After the four screws are released, remove ASMi-450 top cover by pulling it straight up.

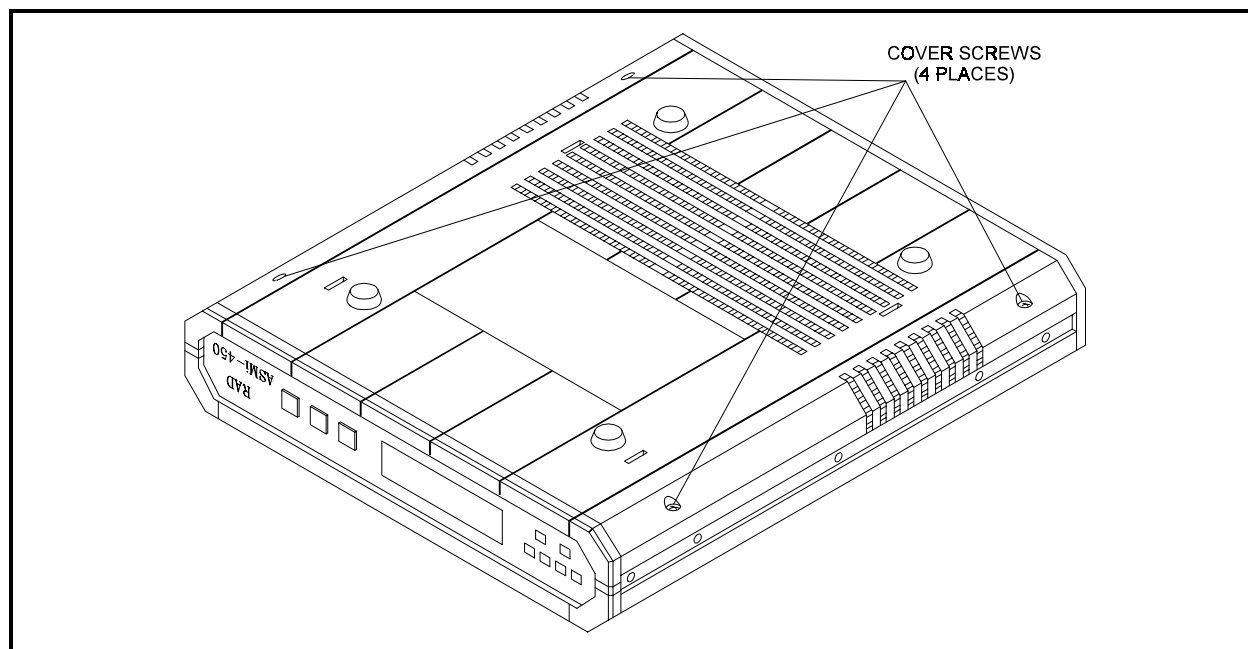


Figure 2-1. Identification of Cover Screws

Jumper and Switch Location and Functions

The ASMi-450 consists of a main board and a user's port interface board. The jumpers and switches located on the ASMi-450 main board are identified in figure 2-2. Their functions are described below.

In addition to the jumpers listed below, the ASMi-450 has additional jumpers, that are set by the manufacturer and must not be changed by you.

Note

Figure 2-2 also indicates the location of the 1A protection fuses, F1 and F2, used to protect the line side of the isolation transformers of the HDSL line.

The type of user's port interface board depends on the interface installed on your ASMi-450. None of the user's port interface boards offered with the ASMi-450 includes user-selectable jumpers.

Switch S1

The ASMi-450 is delivered with a set of default parameters that allow the user to start the configuration activities from a known state. These parameters are stored in its program EPROM, and therefore cannot be modified. By configuring the ASMi-450, the user specifies custom parameter values; these parameter values are stored in the ASMi-450 data base (located in non-volatile memory), and are automatically loaded each time the ASMi-450 is powered up.

Note

If during the power-up self-test, it is found that the user's configuration has been corrupted, the ASMi-450 will automatically reload the default parameters from its EPROM.

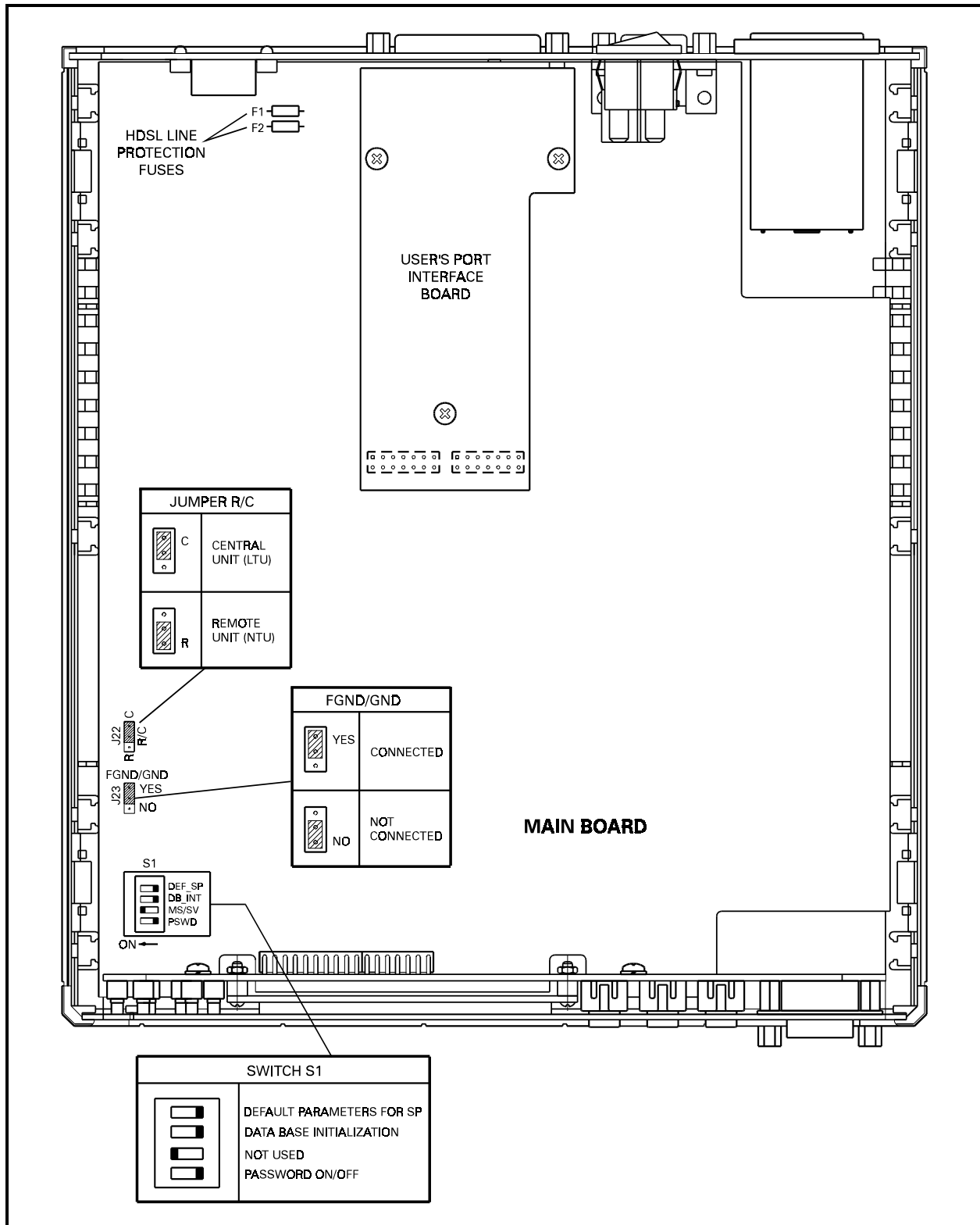


Figure 2-2. ASMi-450 Internal Settings

DIP switch S1 allows the user to control the reloading of the desired group of default parameters. The switch has four sections used for the following purposes:

- **Switch section DEF SP.** This section selects the source of the control port parameters:

ON ASMi-450 uses the default parameters stored in its program EPROM. The default values are Autobaud, eight data bits, and no parity.

OFF ASMi-450 uses the user-selected parameters.

Upon first-time operation, you should use the ON position to start the configuration. You can select this position again to restart with the default parameters in case the current values are not known, and it is not possible to communicate with the ASMi-450 through its control port.

The ASMi-450 is shipped with this section set at OFF.

- **Switch section DB INT.** This section selects the source of the data base configuration parameters:

ON ASMi-450 uses the default parameters stored in its program EPROM.

OFF ASMi-450 uses the user-selected parameters.

The ASMi-450 is delivered with the data base loaded with the default parameters. You can select this position again to restart with the default parameters in case the current values are not known.

The ASMi-450 is shipped with this section set at OFF.

- **Switch section MS/SV.** This section is reserved for future features, and must be always set at ON.

The ASMi-450 is shipped with this section set at ON.

- **Switch section PSWD.** A password, consisting of up to eight alphanumeric characters, can be used to prevent unauthorized personnel from using the ASMi-450 control program. The ASMi-450 is delivered with a default password, **ASMI**, but normally the password is selected by the user.

The PSWD section is used to select between the default ASMi-450 password (the ON position) and the user-selected password (the OFF position). The ASMi-450 address (node number) is also affected by the setting of the PSWD section: with the jumper set at ON, the node number is set to 0.

Upon first-time operation, you should use the ON position to start the configuration. You can select this position again to restart with the default password and node address 0 in case the current user password was lost.

The ASMi-450 is shipped with this section set at OFF.

Note

User-selected parameter values are not erased by setting one or more switch sections to ON: this action merely causes the ASMi-450 to use the default values. However, if the ASMi-450 is turned off and then powered up again, the default values replace the user values.

Jumper R/C

The jumper designated R/C, is used to select the function of the ASMi-450 unit:

- | | |
|----------|---|
| C | The ASMi-450 unit operates as a central unit (LTU). |
| R | The ASMi-450 unit operates as a remote unit (NTU). |

The ASMi-450 shipped with the jumper set at C.

Jumper FGND/GND

The jumper FGND/GND controls the connection between the ASMi-450 signal ground and the frame (chassis) ground.

- | | |
|------------|---|
| YES | Signal ground is connected to the frame (chassis) ground. |
| NO | Signal ground is not connected to the frame ground. |

The ASMi-450 is shipped with the jumper set at YES (connected).



Setting the jumper to NO may invalidate the safety of connection to telecommunication networks in certain locations, where permanent excessive voltages are present on the lines.

Internal Settings Procedure

Refer to figure 2-2, and identify jumper and switch locations and settings. Change settings as required.

Reinstalling ASMi-450 Cover

After completing the internal settings, reinstall the top cover as follows:

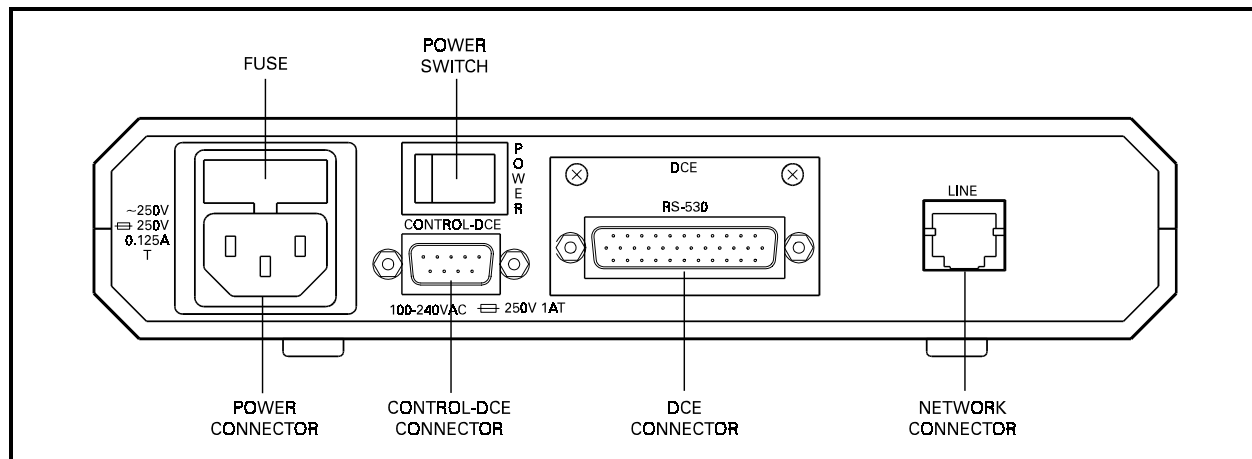
- Position the lower half of the ASMi-450 case on a flat, clean surface.
- Check that the decorative black plastic strips on the sides on the unit are still in place (if not, place the strips in the grooves on the sides of the lower half).
- Identify the front and rear of the top cover, and position the cover on the lower half of the ASMi-450, so that the cover guides are located just above the holes in the lower half. Close the cover and ensure that the protruding tips of the cover guides enter the corresponding recesses in the lower half.
- Hold the cover in place, and turn the assembly over, to gain access to the bottom of the unit.
- Insert the original cover screws in their positions and tighten carefully. Do not use excessive torque.

2.5 Connections

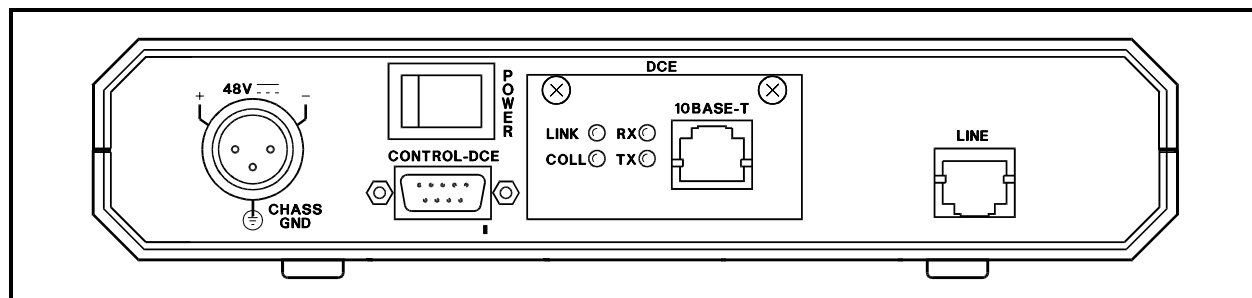
Connector Location

Figure 2-3 shows typical rear panels of ASMi-450 units, and identifies connector locations:

- Figure 2-3.A shows the rear panel of an AC-powered ASMi-450 unit (the unit shown in this figure has an RS-530 interface).
- Figure 2-3.B shows the rear panel of a DC-powered ASMi-450 unit (the unit shown in this figure has an Ethernet interface; for an explanation of the indicator functions, refer to Chapter 3).



A. Typical AC Powered Unit



B. Typical DC-Powered Unit

Figure 2-3. Typical ASMi-450 Rear Panels

Grounding

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

Warning



Before switching on this instrument and before connecting any other cable, the protective earth terminals of this instrument must be connected to the protective ground conductor of the (mains) power cord. The mains plug shall only be inserted in a socket outlet provided with a protective earth contact. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding). Make sure that only fuses with the required rated current, as marked on the ASMi-450 rear panel, 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 instrument must be made inoperative and be secured against any unintended operation.

Power Connection

Before starting, check that the ON/OFF switch on the ASMi-450 rear panel is set to OFF.

AC Power Connection

Skip this section if the ASMi-450 is powered from a DC source.

AC power should be supplied to the ASMi-450 through the 5 feet (1.5m) standard power cable terminated by a standard 3-prong plug.

First, connect the power cable to the connector on the ASMi-450 rear panel, and then to the mains outlet.

DC Power Connection

Skip this section if the ASMi-450 is powered from an AC source.

Connect the power cable to the DC power connector, and then connect the other end to the DC distribution panel. Pay attention to correct polarity.

User's Port Connections

The connection to the user's equipment is made to the rear panel connector marked DCE. The interface type installed in the ASMi-450 is indicated by the label located above the DCE connector (for example, figure 2-3.A shows a ASMi-450 rear panel with RS-530 interface).

- | | |
|-------------------------|--|
| V.35 Interface | The V.35 interface has a 34-pin female connector, wired for direct connection to V.35 DTE interfaces. |
| X.21 Interface | The X.21 interface has a 15-pin D-type female connector, wired for direct connection to X.21 DTE interfaces. |
| RS-530 Interface | The RS-530 interface has a 25-pin D-type female connector wired for direct connection to RS-530/-RS-422/V.24 DTE interfaces. |
| V.36 Interface | If the required interface is V.36/RS-449/422, connect |

first the interface adapter cable to the RS-530 connector, then connect the user's data cable to the 37-pin D-type male connector at the other end of the adapter cable.

Ethernet Interface The Ethernet interface has an RJ-45 connector for direct connection to Ethernet 10BaseT LAN's.

Connector pin allocations and adapter cable wiring data appear in Appendix A.

HDSL Line Connections

The HDSL lines connect to the RJ-48C connector designated NETWORK HDSL.

Control Port Connection

Connect a cable prepared in accordance with Appendix A between the control port connector, designated CONTROL DCE, and the control terminal. If the control terminal is connected via modems, use a cross-over cable.

Note

The various user interface cables should be shielded, in order to comply with FCC rules. The ASMi-450 and its data interfaces will work well even if the cables are not shielded, but some radio interference may occur.

Chapter 3

Front-Panel Operating Instructions

3.1 Scope

In this chapter you will find detailed instructions for operating the ASMi-450 from the front panel. The information presented in this chapter includes:

- ASMi-450 front panel - Section 3-2.
- General description of ASMi-450 control, display and push-button functions, and menu organization - Section 3-3.
- ASMi-450 configuration parameters - Section 3-4 and 3-5.
- ASMi-450 operating procedures (turn-on, front-panel indications, and turn-off) - Section 3-6.
- ASMi-450 local configuration set-up - Section 3-7.
- ASMi-450 configuration error messages - Section 3-8.

Refer to Chapter 4 for instructions on the use of a control terminal to remotely control and monitor ASMi-450 operation.

3.2 Front Panel Controls, Connectors, and Indicators

Figure 3-1 shows the front panel of the ASMi-450. Table 3-1 lists the functions of the ASMi-450 controls, connectors and indicators, located on the ASMi-450 front panel. The index numbers in Table 3-1 correspond to the item numbers in figure 3-1.

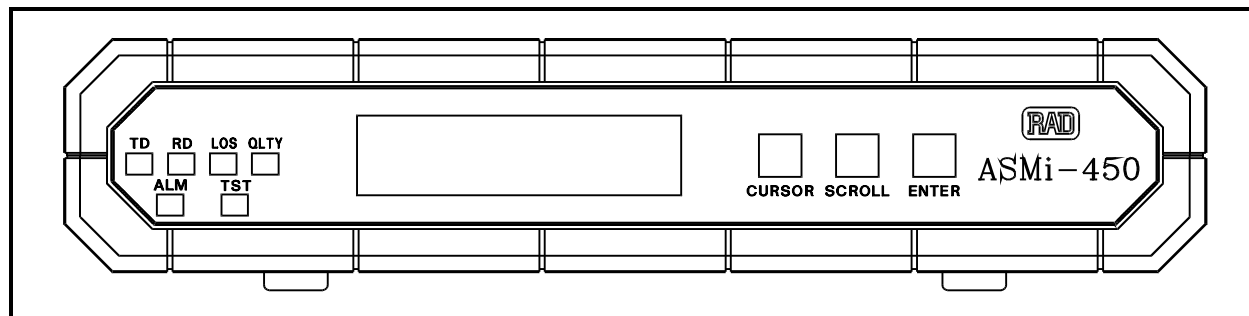


Figure 3-A. ASMi-450 Front Panel

Table 3-A. ASMi-450 Controls, Connectors and Indicators

No.	Control or Indicator	Function
1	TD indicator	Lights to indicate activity on the transmit line of the local DCE port.
2	RD indicator	Lights to indicate activity on the receive line of the local DCE port.
3	LOS indicator	Lights when the HDSL line circuits lose synchronization to the incoming signal
4	QLTY indicator	Lights when the far-end HDSL block error (FEBE) rate reported by the remote equipment is less than 10^{-7} (good quality)
5	ALM indicator	Lights when alarms are stored in the ASMi-450 alarm buffer
6	TST indicator	Lights when a test is active
7	Alphanumeric display	Liquid crystal display (LCD) used to display messages and status information. The display contains 2 rows of 16 characters each
8	CURSOR push-button	Used to move among the information fields
9	SCROLL push-button	Used to scroll among the available options of the displayed functions
10	ENTER push-button	Used to enter the changes made in the ASMi-450 operation, and initiate operation under the new set-up

Ethernet Interface Indicators

Figure 3-2 shows the indicators located on the rear panel of an ASMi-450 unit with Ethernet interface, and Table 3-2 explains the functions of the Ethernet interface indicators.

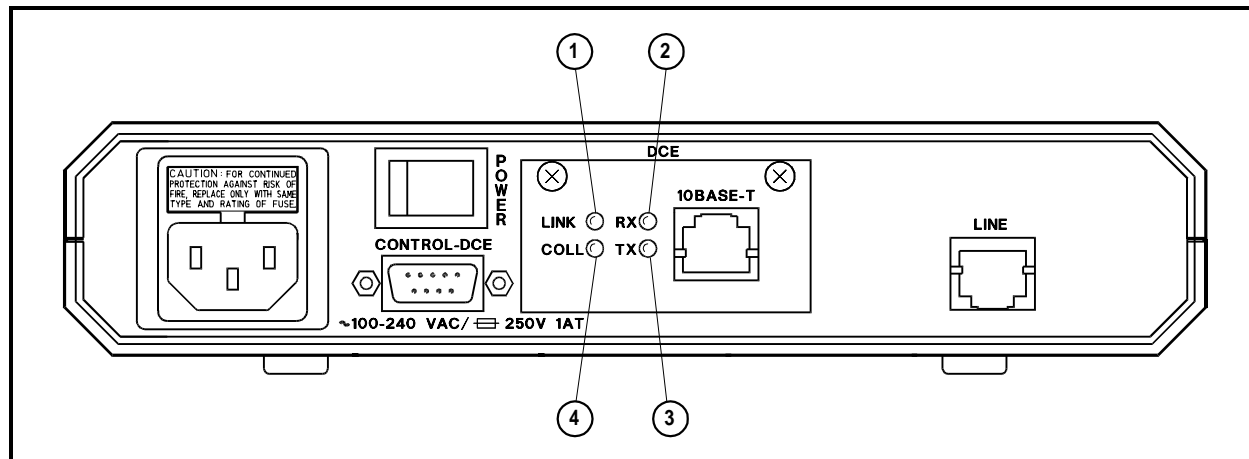


Figure 3-B. ASMi-450 Rear Panel (Ethernet Interface)

Table 3-B. Ethernet Interface Indicators

No.	Indicator	Function
1	LINK indicator	Lights when the Ethernet interface is connected to an active LAN (i.e., a LAN with at least one active station)
2	RX indicator	Lights when receive activity is present on the Ethernet interface
3	TX indicator	Lights when transmit activity is present on the Ethernet interface
4	COLL indicator	Lights momentarily for each collision

3.3 Control of ASMi-450 Operation, General

General

ASMi-450 operating mode is determined by a set of parameters stored in an internal non-volatile memory. These parameters are selected by the user, using the ASMi-450 front panel push-buttons, a supervision terminal, or a network management station (either a generic SNMP management station, or the RADview management station offered by RAD). When a supervision terminal, or a network management station is in control, the ASMi-450 cannot be controlled from the front panel; however, when under the control of a network management station, the front panel can still be used to read the current parameters, status, and statistics.

After the operating parameters have been selected, a process called configuration set-up, the ASMi-450 no longer requires operator attendance. The configuration stored in the ASMi-450 memory is not affected when power is turned off.

Upon turn-on, the ASMi-450 checks the validity of the stored configuration data, and if everything is OK, it assumes the last selected configuration.

- If the configuration does not require modification, the ASMi-450 is then ready for operation immediately after power is applied.
- If the configuration data is not valid, the ASMi-450 lets you load instead a default configuration. The default configuration, prepared by the manufacturer, is stored in the program EPROM.

General Operating Instructions

All operations are performed using an interactive, menu-driven user-friendly interface. The interface is controlled by means of the display and three push-buttons. The ASMi-450 guides you in the execution of the required task by means of simple and clear messages, presents the range of available parameter values and checks your inputs. Moreover, the ASMi-450 will present to you only those parameter values available on your ASMi-450 model in the selected operating mode.

If you make a configuration error, e.g., you select a parameter value that conflicts with the current operating mode, the ASMi-450 rejects the erroneous selection and displays an error message that identifies the error.

You will find detailed instructions for operating the ASMi-450 in Section 3-6 and 3-7. Section 3-8 explains the configuration error messages, and presents instructions for correcting the problem.

Display Functions

The ASMi-450 display has the following functions:

- Display of status messages.
- Display of test functions.
- Display of configuration parameters.

Status Messages

When the ASMi-450 is not being configured and no test is active, its display shows status messages. The alarm buffer can store up to 100 alarms. The presence of status messages in the alarm buffer is indicated by the ALM indicator.

The status messages appear under the header ALARM BUFFER. The status messages are described in Chapter 5.

Test Functions

The test functions include:

- Local and remote loopbacks on the user's port, for rapid isolation of faults.
- BER test (future option).

Note

Do not activate any loopback when using an ASMi-450 with Ethernet interface.

The test function messages appear under the header TEST OPTIONS.

Chapter 5 describes the available test functions.

Configuration Parameters

The ASMi-450 has two groups of configuration parameters:

- System parameters.
- Control port parameters.

The configuration parameter groups are detailed in the following chart.

Display	Description	See...
SYSTEM PARAMETER	Display and selection of system parameters: - Master clock source - Selection of active time slots	Sec. 3-4
SP PARAMETER	Display and selection of ASMi-450 control port parameters: - Data rate - Number of data bits - Parity - Interface type	Sec. 3-5

In addition to the parameters configured from the front panel, there are parameters that can be controlled only via the control port. These are presented in Chapter 4.

After configuration, if alarm messages are stored in its ALARM BUFFER and no test is active, the ASMi-450 automatically returns to the display of alarm messages.

Organization of ASMi-450 Display

The ASMi-450 display has two rows:

- Upper row. Shows the name of the displayed function, group of configuration parameters, or test option.
- Lower row. The lower row displays:
 - Parameter name and value.
 - Status messages.
 - Loopback status.
 - Error messages.
 - Diagnostics messages.

Using Front-Panel Push-buttons

ASMi-450 operation is controlled by means of the display and the three push-buttons designated **CURSOR**, **SCROLL** and **ENTER**. The same control actions are consistently used for all the activities:

CURSOR Use this push-button to indicate what you want to change. Pressing the **CURSOR** push-button moves the cursor among the fields in the current display. The cursor is a bar that appears under first character of the selected field.

Some fields list several different items, and then you move the cursor under the desired item. The item displayed above the cursor can be changed (“scrolled”) by pressing **SCROLL**.

SCROLL Press repeatedly to display the alternatives for the current field/item indicated by the cursor. Holding the push-button depressed causes automatic scrolling of the available alternatives.

ENTER Press it once to select the value displayed in the field/item indicated by the cursor.

- If the selected value is valid, it replaces the old value and the change takes effect immediately.
- If you make an incorrect selection, the selection is not accepted. In this case, you see a **CONFIG ERROR** message with a two-digit code in the second display row. The code indicates what is wrong. After a short time, the error message disappears and you see again the original display. Now you can correct the error.

Section 3-8 explains the error codes and what to do to correct the error.

The **ENTER** key has an additional function: when the alarm buffer is displayed, the **ENTER** key can be used to delete all the alarms in the buffer.

If you make an incorrect selection, the selection is not accepted. In this case, you see a CONFIG ERROR message with a code number. The code indicates what is wrong. Section 3-8 explains the codes.

After a short time, the error message disappears and you see again the original display. Now you can correct the error.

3.4 System Configuration Parameters

Table 3-3 lists the available system configuration parameters and their functions. The table also lists the parameter values included in the ASMi-450 default configuration.

Table 3-C. System Parameters

Designation	Function	Values
CLK MASTER	<p>Selects the master timing reference.</p> <p>The available selections depend on the ASMi-450 function. Refer to Section 1-2 for details</p>	<p>ASMi-450 configured as central (CNTR) unit:</p> <p>EXT Locked to the clock signal provided by the user's equipment (this locks the HDSL transmit timing to the timing of the incoming user's signal).</p> <p>INT Internal oscillator.</p> <p>Default: EXT</p> <p>ASMi-450 configured as remote (REM) unit: Always locked to the recovered receive clock of the HDSL line. This locks the user's equipment timing to the timing of the HDSL signal.</p>
ACTIVE TS	<p>Determines the number of active HDSL time slots, which determines user's data rate.</p> <p>The maximum number of active time slots depends on the ASMi-450 model:</p> <ul style="list-style-type: none"> - ASMi-450/768: 12 time slots - ASMi-450/1152: 18 time slots 	<p>The number of time slots can be set from 1 up to the maximum supported by the corresponding ASMi-450 model</p> <p>Default: Maximum number of time slots supported by the corresponding ASMi-450 model</p>
ETHERNET MODE	<p>Selects the Ethernet LAN traffic transfer mode (displayed only for ASMi-450 version with the Ethernet interface)</p>	<p>HALF Half duplex operation</p> <p>FULL Full duplex operation</p> <p>Default: HALF</p>
BRIDGING	<p>Selects the Ethernet traffic control function (displayed only for ASMi-450 version with the Ethernet interface)</p>	<p>FILTER The internal bridge of the ASMi-450 is enabled, and filters the traffic transferred to the remote end</p> <p>TRANS The internal bridge of the ASMi-450 is disabled, and the Ethernet traffic is transparently transferred (LAN extender function)</p> <p>Default: FILTERED</p>

3.5 Control Port Configuration Parameters

Table 3-4 lists the available control port configuration parameters and their functions. The table also lists the parameter values included in the ASMi-450 default configuration.

In addition to the parameters listed below, the ASMi-450 supports additional parameters, which can be modified only via the control port. These parameters are explained in Chapter 4.

Table 3-D. Control Port Parameters

Designation	Function	Values
SPEED BPS	Selects control port data rate	300, 1200, 2400, Control port data rate (bps) 4800, 9600 AUTO Autobaud operation. The ASMi-450 automatically identifies the control port data rate. To enable positive identification the transmission must start with three consecutive Carriage Returns. Default: AUTO
DATA	Selects the number of data bits in the word format	7 or 8 data bits. Default: 8
PARITY	Controls the use of parity	ODD Odd parity EVEN Even parity NONE Parity disabled (only available with 8 data bits) Default: NONE
INTERFACE	Selects control port interface	DCE The ASMi-450 appears as a DCE for the control terminal DTE The ASMi-450 operates as a DTE for connection via modem to the control terminal (future option) Default: DCE
AUX DEV	Selects an auxiliary device	TERMINAL Management by means of supervision terminal NMS-SLIP Management by means of TCP/IP over SLIP (Telnet or SNMP) NONE Not in use Default: TERMINAL

3.6 Operating Instructions

This paragraph covers the following activities:

- Turn-on
- Checking ASMi-450 configuration
- Normal ASMi-450 operating indications
- ASMi-450 turn-off.

Refer to Section 3-7 for local configuration set-up instructions.

Turn-on

To turn the ASMi-450 on, set the rear POWER switch to ON. Upon turn-on, the ASMi-450 performs self-test: observe the front-panel indications.

During the self-test, the ASMi-450 displays the software version in the format X.Y:

ASMi-450 REV: X.Y
SELF TEST

After successfully completing the self-test procedure, the ASMi-450 will switch to the default display - the ALARM BUFFER.

Notes

1. *If the ASMi-450 fails the self-test, you will see a description of the fault in the second row. In this case, the ASMi-450 must be repaired before it can be used again. Refer to Chapter 5 for instructions.*
2. *If the configuration data stored by the ASMi-450 is corrupted, the DATABASE CKS ERR alarm message is generated. In this case, it is necessary to initialize the data base (after initialization, you can select again the desired parameters). To initialize the data base, set section DB INIT of the internal switch S1 to ON, turn the ASMi-450 on, and then turn it off and return the switch section to OFF (refer to Chapter 2 for detailed procedures).*

The parameter values included in the default configuration are listed in Section 3-4 and 3-5.

You can verify the ASMi-450 configuration as explained below. If the configuration does not require modification, the ASMi-450 is ready for operation immediately after self-test is completed. To change the configuration, refer to Section 3-7.

Checking Current Operating Configuration

Review Section 3-4 and 3-5 for an explanation of the ASMi-450 configuration parameters.

Note

During the following procedure, do not press the ENTER push-button, to prevent accidental change of parameters.

Step	Action	Key	Display
1	Bring the cursor under the top row (if not already there)	CURSOR	
2	Scroll to display SYSTEM PARAMETER in the top row	SCROLL	Second row shows the first system parameter, CLK MASTER, and its current selection
3	Bring the cursor under the left-hand field in the second row	CURSOR	
4	Scroll to see the other system parameters	SCROLL	After each pressing of the SCROLL button, the second display row shows the current value of the next system parameters. Continue until CLK MASTER appears again
5	Bring the cursor under the right-hand field in the top row	CURSOR	
6	Bring to display the next group of configuration parameters (the control port parameters, SP PARAMETER)	CURSOR, SCROLL	
7	Repeat steps 3 and 4 to display the control port parameters - SP PARAMETER	CURSOR, SCROLL	

Normal Indications This section explains the indications provided on the front-panel LCD and the indicators of the ASMi-450.

Display

The normal message displayed in the top row is ALARM BUFFER. However, if no alarm is stored in the alarm buffer (ALM indicator off), the ASMi-450 will continue displaying the last user-selected display.

In addition, the ASMi-450 will automatically abort the current activity and will redisplay the ALARM BUFFER message if no front-panel button is pressed for 1 minute, thereby ensuring that it will not remain in an indeterminate state even if the operator does not complete a configuration activity.

When the top row shows ALARM BUFFER, the second row displays the following information:

- During normal operation, the second row should show EMPTY (no alarm messages).
- If the alarm buffers contains alarms, you will see SCROLL in the left-hand field of the second row, and CLEAR in the right-hand field.

The alarms can be displayed by bringing the cursor under SCROLL, and then pressing ENTER: you can now scroll between the alarms stored in the alarm buffer.

To interpret the alarm messages displayed in the second row, refer to Table 5-1.

In Table 5-1, you will find two types of alarms, designated as ON/OFF and ON:

- A message indicating an ON/OFF alarm is displayed only when the alarm condition is present, and is automatically removed when the condition is cleared (if the alarm is being displayed, it will disappear only when the display is refreshed by scrolling).
- A message indicating an ON alarm persists even after the event that caused the alarm condition is cleared.

If the ASMi-450 operates normally, but an alarm message of the ON type is displayed, you can clear the event alarm message from the display by the following procedure:

Step	Action	Key	Display
1	Bring the cursor in the second row, under CLEAR	CURSOR	
2	Press ENTER to clear the event messages in the alarm buffer	ENTER	If no state alarms are present, the second row should show EMPTY

Normal Front-Panel Indications

During normal operation, all the ASMi-450 front-panel indicators are off.

Ethernet Interface Indications

During normal operation, the LINK indicator must light continuously. The COLL, TX, and RX light according to LAN traffic conditions.

Fault Indications

If the LOS indicator and/or the TST indicator lights, data transfer is interrupted.

- The TST indicator lights when a test is active. If the test is activated from the local ASMi-450, you can see the test type by entering the TEST OPTIONS (Chapter 5). You can disconnect a local or remote loop as explained in Chapter 5.
- The HDSL LOS indicator lights when a local loss of synchronization alarm condition is present on the corresponding line.
- When using the Ethernet interface, the rear LINK indicator will turn off if the Ethernet LAN is not connected, or not operating properly.

If the COLL indicator lights continuously, this indicates that a permanent state of collision is present on the LAN. This may be caused by malfunctioning LAN equipment, however it may also occur in case a test loopback is activated on the ASMi-450. Check and deactivate any test loopback on the local and remote ASMi-450 units.

Turn-off

For AC-powered ASMi-450 units, set the rear power switch to OFF.

For DC-powered ASMi-450 units, disconnect the power cable.

3.7 Local Configuration Set-Up Procedure

Before starting any configuration action:

- Review the relevant configuration parameters given in Section 3-4 and 3-5.
- Obtain a list of the required parameters from your system administrator.

ASMi-450 configuration consists of the selection of the system parameters. When a control terminal will be used to control the ASMi-450, you should also select the parameters of the control port.

The general configuration procedure is explained on the following page. The general procedure is followed by special considerations for each group of parameters.

The ASMi-450 presents only those parameters available in the selected mode, therefore it is important to perform the configuration according to the order specified above.

The ASMi-450 is intended for configuration via the control port, using an ASCII terminal. If you cannot use a terminal for performing the configuration procedures, it is necessary to configure the ASMi-450 from the front panel. This, however, is possible only when the use of the password is disabled: if the password is enabled, you can use the ASMi-450 front panel to display the current parameter values, but cannot modify them. If you try to modify a parameter, or to perform a test function, from the front panel when the password is enabled, you will see CONFIG ERROR 5.

When the ASMi-450 uses the default parameters values, the use of the password is disabled (to load the default parameters, use the DB INI section of the internal switch S1, as explained in Section 2-4). The use of the password can be enabled or disabled by means of the control terminal, by entering the DEF SP command (refer to Chapter 4 for detailed instructions).

The following steps are used to perform any configuration activity:

Notes

1. *Before starting the configuration procedure, always disconnect all the user-initiated loopbacks (select OFF on TEST OPTIONS).*
2. *Refer to Section 3-8 for an explanation of the configuration error messages the ASMi-450 displays when you make an error.*

Password Protection

General Configuration Procedure

Step	Action	Key	Display
1	Bring the cursor under the top row (if not already there)	CURSOR	
2	Scroll to display the desired group of parameters in the top row NOTE When the desired group of parameters must be independently selected for each link, the top row includes an additional field (at the rightmost side of the top row): this field is used to select the desired link number. In this case, use the CURSOR key to bring the cursor to the rightmost field, then SCROLL to show the desired link number.	SCROLL	Second row shows the first parameter in the selected group and its current value
3	When the second row has more than one field, bring the cursor under the left-hand field (parameter name) in the second row, and then scroll to display the desired parameter in the selected group	CURSOR SCROLL	The second row shows the parameter name and its current value
4	Bring the cursor under the right-hand field (the parameter value) in the second row	CURSOR	
5	Scroll to set the required value for the displayed parameter	SCROLL	The second row shows the available values
6	When the desired parameter value is displayed, select the new parameter value NOTE You must press ENTER after changing parameters of a certain group, e.g., SYSTEM. If you change parameter values, but return the cursor to the first field and scroll to another group without pressing ENTER, the changes are discarded and you will see the message CONFIG LOST.	ENTER	The cursor returns to the first field in the top row. The second row displays shortly CONFIG ENTER, then returns to the normal display
7	Repeat steps 3 through 6 until values are assigned to all the parameters in the group	SCROLL	The second row shows the current selection
8	Repeat steps 1 through 7 until values are assigned to all the parameters in the desired groups	SCROLL	The second row shows the current selection

Step	Action	Key	Display
9	<p>After completing the configuration actions, you can use steps 1, 2 to return to the ALARM BUFFER.</p> <p>If alarm messages are stored in the alarm buffer, ALARM BUFFER will be automatically displayed if no push-button is pressed for one minute.</p>	SCROLL	The top row shows: ALARM BUFFER

Specific Configuration Guidelines

This section presents specific configuration guidelines for the selection of parameter values. You may also wish to refer to Section 1-2, that provides a concise description of the ASMi-450 operating environment, including explanations for many of the relevant terms.

SYSTEM PARAMETER

See parameter definitions in Section 3-4.

CLK MASTER The selection can be made only at the unit configured as CNTR.

- For connection to carrier lines, select EXT.
- For a point-to-point application with stand-alone equipment at both link ends, you can also select INT.
- For ASMi-450 with Ethernet interface, select INT.

ACTIVE TS

- For ASMi-450 models with DCE interface, the number of active time slots must be equal to the multiplier of the basic data rate (64 kbps) which yields the required user's data rate. The maximum number of active time slots depends on the ASMi-450 model:

- ASMi-450/768: 12 time slots
- ASMi-450/1152: 18 time slots

ETHERNET MODE Select the method used to handle the LAN traffic, half-duplex (HALF_DUP) or full-duplex (FULL_DUP). This parameter appears only for ASMi-450 version with the Ethernet interface.

BRIDGING Select FILTERED if you want to operate the E1 link as a remote bridge (the recommended method). To operate the link as a LAN extender (or repeater), select TRAN. This parameter appears only for ASMi-450 version with the Ethernet interface.

SP PARAMETERS

See parameter definitions in Section 3-5.

SPEED_BPS Select AUTO whenever feasible. In this case, start the communication with three Carriage Returns, to ensure positive identification of terminal data rate.

Note

The automatic baud rate recognition procedure must be repeated after the DTR line in the control port connector had been switched to OFF and then ON again.

DATA Select the required number of data bits (same as on the terminal).

PARITY Select the required parity (same as on the terminal).

INTERFACE

- Select DCE when directly connected to the control terminal.
- Select DTE when connected to a modem (future option).

Note

The INTERFACE parameter only changes the direction of the interface control (handshaking) signals, but not the functions of the interface pins. Therefore, when connecting to a modem, it is necessary to use a cross cable.

3.8 LCD Configuration Error Messages

The ASMi-450 detects configuration errors and displays a CONFIG ERROR XY message. The code XY identifies the error. You will find below the list of error messages and instructions that will help you correct the problem.

- | | |
|-----------------------|---|
| CONFIG ERROR 1 | Illegal combination of loopbacks: you are trying to activate simultaneously local and remote loopbacks. Only one loopback can be connected at a time. |
| CONFIG ERROR 2 | You are trying to activate the REM REM loopback while synchronization is lost. |
| CONFIG ERROR 3 | You are trying to select the internal clock mode on the remote side. |
| CONFIG ERROR 4 | You are trying to disconnect a loopback that is not active. |
| CONFIG ERROR 5 | You are trying to change a parameter from the front panel when the password is enabled. |
| CONFIG ERROR 6 | You are trying to select a node number greater than 255. |

Notes

Chapter 4

ASMi-450 Control from the Control Port

4.1 General

This Chapter provides detailed instructions for the management of ASMi-450 by means of ASCII terminals and IP hosts using the Telnet protocol.

The initial configuration of the ASMi-450 must always be performed using a standard ASCII terminal connected to the ASMi-450 control port, CONTROL DCE. However, after performing the initial configuration, you can also manage the ASMi-450 using any of the following three options:

- Use the terminal as a supervision terminal, for performing all the management activities supported by the ASMi-450.
- Manage the ASMi-450 from any IP host using the Telnet protocol. After establishing a Telnet session with the ASMi-450, the Telnet protocol offers the same functionality as the supervision terminal, and in addition enables remote access over IP networks.
- Manage the ASMi-450 by means of SNMP-based network management stations, e.g., the RADview network management station offered by RAD, using the SLIP protocol for communication.

The information presented in this chapter includes:

- Description of control terminal hardware requirements, communication and handshaking - Section 4-2.
- Preparation for use of control terminal - Section 4-3.
- Description of control terminal set of commands and command syntax - Section 4-4, 4-5.
- General operating instructions, including start-up, routine operations, and stopping of remote control - Section 4-6.
- Configuration error messages - Section 4-7.

The instructions appearing in this Chapter assume that the supervision terminal operator is familiar with the ASMi-450 system and with its configuration parameters.

For instructions regarding the use of the RADview network management station, refer to the RADview User's Reference Manual.

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 control ASMi-450 operation. The software necessary to run the ASMi-450 control program is contained in the ASMi-450.

Communication Requirements

The control terminal can be connected either directly to the ASMi-450 control port (the CONTROL DCE connector), or through a modem or any other type of full-duplex data link. The ASMi-450 control port interface type must be set in accordance with the connection method (see Section 3-5):

- DCE for direct connection.
- DTE for connection through a modem or data link (cross cables must then be used at the ASMi-450 CONTROL DCE connector).

The ASMi-450 can communicate with the control terminal at rates of 300, 1200, 2400, 4800 or 9600 bps. The word format consists of one stop bit and 7 or 8 data bits. Parity can be odd, even or disabled.

The communication interface of the terminal and the ASMi-450 must be configured for operation with the same parameters.

The ASMi-450 supports two types of modems:

- Dial-up Hayes™ compatible modems, e.g., the RAD miniature DLM/AT modem. The ASMi-450 has only a call-in capability, that is, it can accept external calls, but cannot initiate calls.
- Multidrop modems, e.g., the RAD SRM-6 miniature multidrop modem.

For multidrop operation, each ASMi-450 can be assigned a node address in the range of 1 through 255. Assigning address 0 to the ASMi-450 means that it will accept and answer any message: this is not permitted in multidrop operation. Address 0 is however recommended for use with both point-to-point and dial-up modes.

Each ASMi-450 can be assigned a logical name of up to eight characters. The logical name is sent in each transmission of alarm messages. The name helps the operator to identify the source of messages that are received by the control terminal.

The relevant ASMi-450 configuration parameters are described in Section 3-5 and 4-5. Instructions for configuring the ASMi-450 control port appear in Section 3-7.

Handshaking Protocol

The handshaking between the ASMi-450 and the control terminal uses the control lines in the CONTROL DCE connector located on the rear panel of the ASMi-450.

The control lines being used in each mode and the direction of the control signals is detailed in the following chart.

Control Line	Interface Type	
	DCE	DTE
CTS	Out	Not used
DCD	Out	Out
DSR	Out	Out
DTR	In	In
RI	Not used	In
RTS	In	In

Data Terminal Ready (DTR)

The terminal sets the DTR line ON (active) to gain control over the ASMi-450 and start a configuration/monitoring session.

When the DTR is ON, the front panel controls are disabled, and the LCD displays a message that notifies the operator the ASMi-450 is under remote management:

- When the management mode defined by means of the DEF SP command is the supervision terminal (**AUXILIARY DEVICE = TERMINAL**), the LCD shows **TERMINAL ON LINE**.
- When the management mode is the Telnet or SNMP (**AUXILIARY DEVICE = NMS_SLIP**), the LCD shows **NETWORK ON LINE**.

The DTR line is OFF (inactive) when terminal control is not required. This ends the terminal control connection, and returns the control to the ASMi-450 front panel. If password protection is used, the password must be entered again the next time the DTR line is set ON to start a new session.

Request to Send (RTS)

The RTS line is normally ON (active) when the control terminal is in session.

When the RTS line is OFF (inactive), the ASMi-450 interprets any data received from the terminal on the TD line as MARK.

Clear to Send (CTS)

The state of the CTS line is determined by the CTS parameter:

- ON** The CTS line is always ON (active).
- =RTS** The CTS line follows the RTS line.

Data Carrier Detect (DCD)

The state of the DCD line depends on the communication address (node number):

- When the node address is 0, the DCD line is always ON (active).
- When a non-zero node address is used, the DCD line becomes ON (active) when data is detected on the RD line, provided the ASMi-450 recognizes its own address in the data stream.

To simulate DTE operation, the delay between these events can be set by the user (by means of the DCD-DELAY parameter).

Ring Indication (RI)

The RI line is used only with dial-up modems (INT=DTE).

The RI line is normally OFF (inactive), and switches to the ON (active) state when the modem attached to the ASMi-450 CONTROL DCE connector detects an incoming call. See also the DSR line.

Data Set Ready (DSR)

- Usually, the DSR line is configured to track the DTR line. In this case, if the control port interface is DTE, the DSR line will be set to ON for 5 seconds when the RI line is ON while the DTR line is OFF.
- If the control port interface is DCE, the DSR line can also be configured to be continuously ON. However, if the DTR line switches to OFF, the DSR line will also switch to OFF for 5 seconds.

In addition, the ASMi-450 always sets DSR OFF (inactive) for 5 seconds when the EXIT command is executed, or the disconnect time-out expires.

AUTOBAUD Function

When the AUTOBAUD function is enabled, the ASMi-450 can identify the operating data rate of the terminal by analyzing the timing of three consecutive Carriage Return + Line Feed characters (generated by pressing three times the carriage return key). The detected data rate is then used for the current communication session.

The automatic baud rate identification procedure is performed (or repeated) whenever three consecutive carriage returns are received after one of the following events occurs:

- The DTR line has been switched OFF.
- The EXIT command has been executed.
- The idle disconnect time-out expired because no data has been exchanged with the control terminal.

In case one of these events occurred, the ASMi-450 assumes that the current communication session has been terminated. Therefore, when the password protection is enabled, the password must be entered again before the control terminal can resume communication with the ASMi-450.

Note that when SLIP communication is required, the AUTOBAUD function must be disabled.

4.3 Preparation for Use of Supervision Terminal

ASMi-450 Preparations

Internal Settings

See Section 2-4 for detailed information.

In general you must enter a password when you start a control session. If the password is incorrect, the ASMi-450 will not respond. This can be corrected by appropriate setting of the PSWD section of switch S1. Set the PSWD section of switch S1 as follows:

- OFF** In this position, you can define your own password and node address.
- ON** Set the switch section to ON to restore the default ASMi-450 password (ASMI), and change the node address to the default value of 0. The change will be made after you turn the ASMi-450 off for a short time, and then turn it back on.

Control Port Configuration

Configure the ASMi-450 control port as required. See Sections 3-5 through 3-7.

If the control port parameters are not correct, the ASMi-450 will not respond. This can be corrected by appropriate setting of the DEF SP section of switch S1. Set the DEF SP section of switch S1 as follows:

- OFF** In this position, you can define the desired control port parameters.
- ON** Set the switch section to ON to restore the default control port parameters. The change will be made after you turn the ASMi-450 off for a short time, and then turn it back on.

Supervision Terminal

Configure the terminal for the same communication parameters you selected for the ASMi-450 control port.

Connections

Connect the control cable (coming directly from the terminal, or from the modem used to connect the terminal) to the CONTROL DCE connector of the ASMi-450. See Appendix A for cable wiring information.

Turn the control terminal on and when applicable, turn on the modems and the other communication equipment used to connect the terminal to the ASMi-450.

4.4 ASMi-450 Supervision Language

This paragraph presents the ASMi-450 supervision language syntax, usage, and set of commands.

Command Language Syntax

- Commands can only be entered when the ASMi-450 control port prompt is displayed. The prompt is **ASMI>**, and it always appears at the beginning of a new line. The cursor appears to the right of the prompt.
- Commands are case-insensitive, e.g. you can type commands in either lower case and/or upper case letters.
- To correct typing errors, backspace by pressing the BACKSPACE key until the error is cleared, and then type again the correct command.
- Use space as a separator between command fields and/or parameters.
- Commands must end with a carriage return <CR>.
- To cancel the current command, press BREAK or type CTRL-C. You will obtain again the ASMi-450 prompt.

Command Options

The following general types of options are available with some commands. See details in the command set index, Table 4-1.

Option	Meaning	Example of Usage
/A	All	CLR ALM /A Clears all the alarms stored by the alarm buffer
/C	Clear	DSP ALM /C Displays all the alarms stored by the alarm buffer, and then clears all the alarms in the ON state stored by the alarm buffer
/CA	Clear all	DSP ALM /CA Displays all the alarms stored by the alarm buffer, and then clears all the alarms stored by the alarm buffer
/R	Repeat automatically command execution. Available only when node address is 0	DSP ST PORT /R Enables you to monitor the status of the user's data port.

Command Protocol

- If AUTOBAUD is on, start any session by pressing the <CR> key three times in sequence. This will ensure identification of terminal data rate.
- When the ASMi-450 uses a non-zero node address, it expects an address before responding to the terminal commands. No response will occur until the node number is received and acknowledged by the addressed ASMi-450.

Acknowledgment is indicated by the echoing of the node address part, i.e. Node<SP>nnn<SP>, where <SP> stands for space.

- The address is in the range of 1 through 255 (0 indicates that the selective addressing function is disabled). The address is a prefix sent in the following format: Node<SP>nnn<SP>.
- When password protection is on, the addressed ASMi-450 waits for the password before continuing. After the correct password is received, the ASMi-450 sends the working prompt, **ASMI>**.

If password protection is off, this step is omitted and the working prompt appears after the node address conditions are fulfilled.

- After the working prompt is displayed, every character typed on the terminal keyboard is immediately evaluated by the ASMi-450 and echoed to the terminal screen. Full duplex communication with the terminal is therefore necessary, to provide on-line feedback to the terminal operator.
- Command evaluation starts only when the <CR> key is pressed.
- In case an error is detected during command evaluation, the command is not executed. Instead, the ASMi-450 will send the erroneous command back to the terminal, and you will see BAD COMMAND OR PARAMETER. TYPE 'H' FOR HELP in the next row. The correct command must then be sent again.
- The command is executed only after it is validated.
- Command execution can be interrupted by pressing BREAK or CTRL-C. This will result in the display of the ASMi-450 prompt, and a new command can be entered.

Use the BREAK key (or CTRL-C) to stop the automatic repetition of commands (/R option).

- If an idle disconnect time-out is specified, the ASMi-450 will automatically disconnect the ongoing session if no command is received from the terminal for the specified time-out interval.

Index of Commands

Table 4-1 lists the ASMi-450 commands in alphabetical order.

Table 4-A. ASMi-450 Command Set Index

Command	Purpose	Options
CLR ALM	Clear the alarms stored in the ASMi-450 alarm buffer	/A
CLR LOOP L PORT CLR LP L PORT CLR LOOP R R PORT CLR LP R R PORT	Clear user-initiated loopbacks or tests	
CLR TST	Clear all the user-initiated tests and loopbacks	
DATE	Set the date for the ASMi-450 internal clock	
DEF AGENT	Define the SNMP agent configuration parameters	
DEF NAME	Define the logical name of the ASMi-450	
DEF NODE	Define the node number of the ASMi-450	
DEF PWD	Define new password	
DEF SP	Define control port parameters	
DEF SYS	Define system parameters	
DEF TERM	Define the supervision terminal type and control sequences	
DSP ALM	Display the contents of the alarm buffer and optionally clear the buffer	/C /CA
DSP HDR TST	Display hardware faults (detected during the power-on self-test, and during normal operation)	
DSP ST LINE	Display status information on the HDSL lines	/R
DSP ST PORT	Display status information on the user's data port	/R
DSP ST SYS	Display system status information	
EXIT	End the current control session	
F	Select the codes for the "clear the screen", "cursor right", and "cursor home" commands sent to the control terminal	
HELP	Displays a concise index of commands and option switches	
INIT DB	Load the default configuration instead of the user configuration. Table 4-3 lists default parameter values	
INIT F	Reset the codes for "clear the screen", "cursor right", and "cursor home" to 0	
LOOP L PORT LP L PORT LOOP R R PORT LP R R PORT	Activate a specified user-controlled loopback or test	
NODE	Select an ASMi-450 before starting a management session on a multidrop connection	
PASSWORD	Enter the password when prompted to type the password upon the start of a control session	
RESET	Reset the ASMi-450 system	
TIME	Set the time of the ASMi-450 internal clock	

4.5 ASMi-450 Command Set Description

This section describes the ASMi-450 commands. The commands are listed in alphabetical order. The description includes command format, use, and options.

The following notational conventions are used below:

- [] square brackets indicate optional entry/parameter
- ' ' single quotes delimit user entry
- <CR> indicates the pressing of the carriage return key

CLR ALM

- Purpose** Clear the alarm buffer.
- Format** CLR ALM [/A]
- Use**
1. To clear only alarms of the ON type stored in the alarm buffer (see Table 5-1):
CLR ALM<CR>
 2. To clear all the alarms stored in the alarm buffer (including ON/OFF alarms):
CLR ALM /A<CR>
 3. You will see the time and date, followed by the ASMi-450 prompt.

CLR LOOP

- Purpose** Deactivate the specified user-initiated loopback or test.
- Format** CLR LOOP [looptype] or CLR LP [looptype]
- Use**
1. To deactivate the local (L) loopback on the user's port of the local ASMi-450, type:
CLR LOOP L PORT<CR> or CLR LP L PORT<CR>
 2. To deactivate the remote (R) loopback on the user's port of the remote ASMi-450, type:
CLR LOOP R R PORT<CR> or CLR LP R R PORT<CR>
 3. You will see the time and date, followed by the ASMi-450 prompt.
 4. If no loopback of the specified type is now activated, you will receive ERROR 2.

CLR TST-----

Purpose Deactivate all the user-initiated tests and loopbacks.

Format CLR TST

- Use**
1. To deactivate all the user-initiated tests and loopbacks, type:
CLR TST<CR>
 2. You will see the time and date, followed by the ASMi-450 prompt.
 3. If no test or loopback is now activated, you will receive ERROR 2.

DATE-----

Purpose Set the date for the ASMi-450 internal real-time clock.

Format DATE

- Use**
1. Type
DATE<CR>
 2. The ASMi-450 sends the date entry form:
DAY = 06
MONTH = 09
YEAR = 1995
 3. Bring the cursor to the first field to be changed by pressing <CR>.
 4. To change the selected field, press F to increase and B to decrease the displayed values. When done, press <CR> to move to the next field.
 5. To end, press <CR> after the YEAR field. The ASMi-450 will display the TIME and DATE fields (note that DATE has changed), followed by the ASMi-450 prompt.

DEF AGENT-----

Purpose Display and modify the current SNMP agent parameters. Refer to Appendix B for additional explanations.

To enable SNMP and Telnet management, it is necessary to define all the parameters.

Format DEF AGENT

- Use**
1. To define the SNMP agent parameters, type:
DEF AGENT<CR>
 2. You will see the entry line for the first parameter, **TELNET_APATHY_TIME**.
 3. After selecting the desired value, press <CR> to display the second line. If you do not want to change the current value of a parameter, press <CR> to confirm it and continue to the next line, otherwise type in the new value and then press <CR>. Repeat the procedure until all the parameters are defined, and then press <CR> to end.

4. A typical display, as seen after all the parameters are selected, is shown below:

```
TELNET_APATHY_TIME      10 MIN
IP_ADDRESS   XXX.XXX.XXX.XXX
READ COMMUNITY   public
WRITE COMMUNITY  private
TRAP COMMUNITY  ISpublic
```

where X stands for the digits of the IP address.

Display Fields

The agent parameters displayed on the data form, and their range of values, are as follows:

- TELNET_APATHY_TIME** Press the F or B keys to select the time, in minutes, after which a Telnet connection will be automatically terminated if no incoming activity is detected.

The available values are 10MIN, 15MIN, and 20MIN.
- IP_ADDRESS** Type in the IP address assigned to the ASMi-450 SNMP agent in the dotted-quad format (four groups of digits in the range of 0 through 255, separated by periods).
- READ COMMUNITY** Type in the name of the SNMP community that has read-only authorization (the ASMi-450 SNMP agent will accept only `getRequest` and `getNextRequest` commands from management stations using that community). You may enter up to 32 alphanumeric characters.
- WRITE COMMUNITY** Type in the name of the SNMP community that has read-write authorization (the ASMi-450 SNMP agent will also accept `setRequest` commands from management stations using that community). You may enter up to 32 alphanumeric characters.
- TRAP COMMUNITY** Type in the name of the SNMP community to which the ASMi-450 SNMP agent will send traps. You may enter up to 32 alphanumeric characters.

DEF NAME-----

Purpose Define the node name (up to eight alphanumeric characters).

Format DEF NAME

Use 1. To define the ASMi-450 node name, type:

```
DEF NAME<CR>
```

- The ASMi-450 displays the node name entry form:

```
ENTER NODE NAME (MAX 8 CHARACTERS) =
CURRENT NODE NAME = 'name'
```

where 'name' is the node name the ASMi-450 is currently assigned.

- Type the desired name, and then press <CR>. The ASMi-450 will display the TIME and DATE fields, followed by the ASMi-450 prompt.

Note

Before entering a node name, make sure that the PSWD section of the ASMi-450 internal switch S1 is not set to ON, because in such a case the default name (blank) is enforced.

DEF NODE-----

Purpose Define the node number, or address, of the ASMi-450. The allowed range is 0 to 255.

Format DEF NODE

- Use**
- To define the ASMi-450 node number, type:

```
DEF NODE<CR>
```

- The ASMi-450 displays the node entry form:

```
NODE (0 to 255) = 0
```

- Type the desired number in the range of 0 to 255, and then press <CR>. The ASMi-450 will display the TIME and DATE fields, followed by the ASMi-450 prompt.

Note

Before entering a node number, make sure that the PSWD section of the ASMi-450 internal switch S1 is not set to ON, because in such a case the default number (0) is enforced.

DEF PWD-----

Purpose Define a new user password for the ASMi-450. The password must have 4 to 8 characters.

Format DEF PWD

- Use**
- Type

```
DEF PWD<CR>
```

2. The password entry screen appears, e.g.:

```
NEW PASSWORD (4 to 8 CHARS) =
CURRENT PASSWORD = 'password'
```

where 'password' is the current password.

3. Type the required password. Carefully check that the specified password has been indeed typed in, and then press <CR>. The ASMi-450 will display the TIME and DATE fields, followed by the ASMi-450 prompt.

Note

Before entering a new password, make sure that the PSWD section of the ASMi-450 internal switch S1 is not set to ON, because in such a case the default password (ASMI) is enforced.

DEF SP-----

Purpose Assign values to control port parameters. See Section 3-5 for parameter description and allowable ranges, and Section 3-7 for practical selection recommendations.

Format DEF SP

Use

1. Type

```
DEF SP<CR>
```

2. The first page of the control port parameters data form is displayed. A typical form is shown below. The form presents the current parameter values as defaults.

```
SPEED DATA PARITY INTERFACE CTS DCD_DEL DSR
AUTO 8 NO DCE =RTS 0_MSEC ON
```

3. Change the parameter values as follows:

- Bring the cursor to the beginning of the first field to be changed by pressing the space bar.
- To change the selected field, press F or B to scroll among the available selections.
- When the desired selection is displayed, press the space bar to move to the next field.

4. When done, press <CR> to display the next page of control port parameters. A typical form is shown below.

```
POP_ALM PWD LOG_OFF AUXILIARY DEVICE
NO NO NO TERMINAL
```

5. Repeat the procedure given in Section 3 above to select new parameter values.

Notes

In addition to the parameters listed in Section 3-5, the following parameters can be programmed only from the terminal:

PWD	<i>Password protection: select YES or NO</i>
LOG_OFF	<i>Idle disconnect time:</i> <i>NO</i> <i>automatic session disconnection disabled.</i> <i>10_MIN</i> <i>automatic disconnection after ten minutes if no input data is received by the ASMi-450.</i>
CTS	<i>Determines CTS state:</i> <i>ON</i> <i>The CTS line is always ON (active).</i> <i>=RTS</i> <i>The CTS line follows the RTS line.</i>
DCD_DEL	<i>With ASMi-450 control port defined as DTE, indicates delay (in msec) between DCD=ON and the sending of data.</i> <i>Values: 0, 10, 50, 100, 200, 300 msec.</i>
POP_ALM	<i>Controls the automatic display of alarms in the terminal</i> <i>YES</i> <i>The terminal automatically displays every 10 minutes the alarm status (or whenever an alarm changes state to ON)</i> <i>NO</i> <i>The automatic display feature is disabled</i>
DSR	<i>Determines the DSR state:</i> <i>ON</i> <i>The DSR line is continuously on. It will switch to OFF for five seconds after the DTR line is switched OFF.</i> <i>DTR</i> <i>The DSR line tracks the DTR line. When INTERFACE=DTE, the DSR line will switch to ON for five seconds when the RI line is ON while the DTR line is OFF.</i>
AUXILIARY DEVICE	<i>Selects the management mode supported by the control port of the ASMi-450:</i> <i>TERMINAL</i> <i>management by means of a supervision terminal.</i> <i>NMS_SLIP</i> <i>management by means of Telnet host, or an SNMP network management station.</i>

6. After the desired parameter values are selected, press <CR> to end. The ASMi-450 will display the TIME and DATE fields, followed by the ASMi-450 prompt.

DEF SYS-----

Purpose Assign values to system parameters.

Format DEF SYS

Use

1. Type

```
DEF SYS<CR>
```

2. The system parameters data form is displayed. A typical form for an ASMi-450/1152 with Ethernet interface is shown below. The form presents the current parameter values as defaults. For ASMi-450 with serial data port, the ETHERNET_MODE and BRIDGING fields always show N/A.

CLK_MASTER	ACTIVE_TS	ETHERNET_MODE	BRIDGING
EXT	18	HALF_DUP	FILTER

See Section 3-4 for a description of the various parameters, and Section 3-7 for practical selection recommendations.

3. Change the parameter values as follows:

- Bring the cursor to the beginning of the first field to be changed by pressing the space bar.
- To change the selected field, press F or B to scroll among the available selections.
- When the desired selection is displayed, press the space bar to move to the next field.

4. After the desired parameter values are selected, press <CR> to end. The ASMi-450 will display the TIME and DATE fields, followed by the ASMi-450 prompt.

DEF TERM-----

Purpose Define the control sequences to be sent to the supervision terminal to perform the following terminal control functions:

- Clear screen.
- Move cursor to screen home position.
- Move cursor to the right by one position.

This command is similar to the F command (see *F* section below), except that it also enables you to specify a terminal type and the ASMi-450 will automatically configure itself for using the corresponding control sequences. The terminal types supported by this command are: VT-52, VT-100, TV-920, FREEDOM-100, FREEDOM-110, FREEDOM-220, and terminals compatible with one of them.

The codes used by the supported terminals are listed in the following chart:

Function	Terminal Type				
	TV- 920	VT-52	VT-100	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

Format DEF TERM 'terminal'

Use 1. To configure the ASMi-450 for using the control sequences corresponding to a supported terminal, type:

```
DEF TERM 'terminal' <CR>
```

where 'terminal' stands for one of the types listed in the table above.

2. In response, you will see the new control sequences, in the format shown below:

```
New Control Sequences:
CLEAR SCREEN = hhhhhhhh
CURSOR HOME = hhhhhhhh
CURSOR RIGHT = hhhhhhhh
```

where **h** indicates hexadecimal digits.

DSP ALM -----

Purpose Display the contents of the alarm buffer. This buffer can contain up to 100 alarms.

Format DSP ALM [Option]

Use 1. To display the complete contents of the buffer, type:

```
DSP ALM<CR>
```

2. To display the complete buffer contents and then clear the type-ON alarms, type:

```
DSP ALM /C<CR>
```

3. To display the complete buffer and then clear all the stored alarms, type:

```
DSP ALM /CA<CR>
```

Display Format The contents of the alarm buffer are displayed as a table with four columns: the alarm number and alarm syntax (description), alarm state, and time of alarm occurrence. Each block of alarms received from a ASMi-450 is preceded by a header. The header lists the assigned node name and the node number of the ASMi-450 unit which sent the alarm block, and thus it serves as an easily-identified separator between alarms transmitted by different ASMi-450 units.

Table 4-2 lists all the alarm messages that can be displayed by the terminal.

Table 4-B. Control Terminal Alarm Messages

Alarm No.	Alarm Syntax	Meaning	State	Time
1	LOCAL DB CHECKSUM ERROR	The data base currently stored in the non-volatile memory of the local ASMi-450 is corrupted. Message can appear only upon power-up	[ON]	hh:mm:ss
2	LOCAL ALARM BUFFER OVERFLOW	The alarm buffer of the local ASMi-450 is full, and new alarms overwrite the older alarms	[ON] [OFF]	hh:mm:ss
3	LOCAL SELF TEST ERROR	A fault has been detected in the local ASMi-450 during the power-up self-test	[ON]	hh:mm:ss
4	LOCAL HARDWARE FAILURE	A hardware fault has been detected in the local ASMi-450	[ON]	hh:mm:ss
5	LOCAL PSWRD SWITCH IS ON	Section PSWD of switch S1 of the local ASMi-450 is set to ON	[ON]	hh:mm:ss
6	LOCAL SP-PAR SWITCH IS ON	Section DEF SP of switch S1 of the local ASMi-450 is set to ON	[ON]	hh:mm:ss
7	LOCAL DB-INIT SWITCH IS ON	Section DB INIT of switch S1 of the local ASMi-450 is set to ON	[ON]	hh:mm:ss
8	LOCAL REAL TIME CLOCK BATTERY FAILURE	The battery that powers the local ASMi-450 internal real-time clock when ASMi-450 is not powered has failed	[ON]	hh:mm:ss
9	LOCAL REVERSE POLARITY	Reversed loop polarity has been detected by the local ASMi-450	[ON]	hh:mm:ss
10	LOCAL SIGNAL LOSS	Loss of HDSL line input signal at the local ASMi-450	[ON] [OFF]	hh:mm:ss
11	LOCAL SYNC LOSS	The local ASMi-450 lost synchronization to the HDSL line signal	[ON] [OFF]	hh:mm:ss
12	LOCAL LOW QUALITY ALARM	The CRC-6 error rate detected on the incoming HDSL signal exceeds 10^{-7}	[ON]	hh:mm:ss
13	LOCAL TRANSMIT SLIP	A slip has been detected on the local transmit path	[ON]	hh:mm:ss
14	LOCAL RECEIVE SLIP	A slip has been detected on the local receive path	[ON]	hh:mm:ss
15	LAN NOT CONNECTED	No data is received from the user's port (for ASMi-450 version with serial data port). or The Ethernet interface is not connected to an operating LAN (at least one station must be active on the LAN)	[ON] [OFF]	hh:mm:ss

Table 4-2. Control Terminal Alarm Messages (Cont'd)

Alarm No.	Alarm Syntax	Meaning	State	Time
16	REMOTE DB CHECKSUM ERROR	The data base currently stored in the non-volatile memory of the remote ASMi-450 is corrupted. Message can appear only upon power-up	[ON]	hh:mm:ss
17	REMOTE ALARM BUFFER OVERFLOW	The alarm buffer of the remote ASMi-450 is full, and new alarms overwrite the older alarms	[ON] [OFF]	hh:mm:ss
18	REMOTE SELF TEST ERROR	A fault has been detected in the remote ASMi-450 during the power-up self-test	[ON]	hh:mm:ss
19	REMOTE HARDWARE FAILURE	A hardware fault has been detected in the remote ASMi-450	[ON]	hh:mm:ss
20	REMOTE PSWRD SWITCH IS ON	Section PSWRD of switch S1 of the remote ASMi-450 is set to ON	[ON]	hh:mm:ss
21	REMOTE SP-PAR SWITCH IS ON	Section DEF SP of switch S1 of the remote ASMi-450 is set to ON	[ON]	hh:mm:ss
22	REMOTE DB-INIT SWITCH IS ON	Section DB INIT of switch S1 of the remote ASMi-450 is set to ON	[ON]	hh:mm:ss
23	REMOTE REAL TIME CLOCK BATTERY FAILURE	The battery that powers the remote ASMi-450 internal real-time clock when ASMi-450 is not powered has failed	[ON]	hh:mm:ss
24	REMOTE REVERSE POLARITY	Reversed loop polarity has been detected by the remote ASMi-450	[ON]	hh:mm:ss
25	REMOTE SIGNAL LOSS	A report of loss of HDSL input signal at the remote ASMi-450 has been received via the HDSL line	[ON] [OFF]	hh:mm:ss
26	REMOTE SYNC LOSS	A report of HDSL loss of synchronization at the remote ASMi-450 has been received via the HDSL line	[ON] [OFF]	hh:mm:ss
27	REMOTE LOW QUALITY ALARM	The far-end block error rate (FEBE) reported via the HDSL line exceeds 10^{-7}	[ON]	hh:mm:ss
28	REM TRANSMIT SLIP	A slip has been detected on the remote transmit path	[ON]	hh:mm:ss
29	REM RECEIVE SLIP	A slip has been detected on the remote receive path	[ON]	hh:mm:ss

Table 4-2. Control Terminal Alarm Messages (Cont'd)

Alarm No.	Alarm Syntax	Meaning	State	Time
30	REM LAN NOT CONNECTED	No data is received from the remote user's port (for ASMi-450 version with serial data port) or The Ethernet interface of the remote ASMi-450 is not connected to an operating LAN (at least one station must be active on the LAN)	[ON] [OFF]	hh:mm:ss

DSP HDR TST -----

Purpose Display the results of the last hardware test (made during power-on self-test and during regular operation).

Format DSP HDR TST

Use 1. To display the hardware test report, type:
DSP HDR TST<CR>

Display Format The display has one field that shows NO ERROR if everything checks good, or lists the detected problem:

- EPROM FAILURE
- I/O EXPANDER ERROR

DSP ST LINE -----

Purpose Display status information on the HDSL line of the local ASMi-450.

Format DSP ST LINE [Option]

Use 1. To display the current status information, type:
DSP ST LINE<CR>

2. To monitor continuously the status information, type:
DSP ST LINE /R<CR>

The display will be automatically updated. To stop the monitoring, press BREAK (or CTRL+C).

Display Format

A typical HDSL line status display is shown below.

```
STATUS OF LINE
ANALOG FRONT END TYPE = 784K
LOCAL LINE ALARMS = SYNC LOSS    SIGNAL LOSS
                   OFF           OFF
```

The fields included in the status information display are listed below:

- ANALOG FRONT END TYPE** Displays the nominal data rate on the HDSL line: 784 kbps for ASMi-450/768.
- LINE ALARMS** Displays the state of the line alarms on the HDSL line:
 - SIGNAL LOSS** ON indicates loss of HDSL input signal.
 - SYNC LOSS** ON indicates loss of synchronization to the HDSL signal.

DSP ST PORT -----

Purpose

Display status information on the user's port.

Format

DSP ST PORT [Option]

Use

1. To display the current status information for the user's port, type:

```
DSP ST PORT
```

Display Format

A typical user's port status display is shown below.

```
STATUS OF PORT
INTERFACE TYPE           = 'interface'
LOCAL UNIT ACTIVATED LOOPS = LOCAL PORT  REM REM PORT
                           NO             NO
REMOTE UNIT INITIATED LOOPS = REM PORT
                           NO
```

The fields included in the ASMi-450 status information display are listed below:

- TYPE** Displays the type of the user's port interface ('**interface**' stands for the interface type: V.35, X.21, RS-422, RS-530, or ETHERNET).
- LOCAL UNIT** Displays the state of each type of loopback that can be activated **ACTIVATED LOOPS** by command from the local ASMi-450 unit on either the local, or the remote unit:
 - **LOCAL PORT**: local port loopback on the local unit.
 - **REM REM PORT**: remote port loopback

on the remote unit.

REMOTE UNIT INITIATED LOOPS Displays the state of the loopback that can be activated by command from the remote ASMi-450 unit on the local unit (this is **REPORT**, remote port loopback on the local unit, toward the remote unit).

DSP ST SYS-----

Purpose Display system status information.

Format DSP ST SYS [option]

Use To view the current system status, type:
 DSP ST SYS<CR>

Display Format A typical status information display is shown below.

```

NODE                = 0
NAME                = 'ASMi-450 name '
NODAL CLOCK        = EXT
ASMI TYPE          = CNTR
NUM OF ACTIVE TS   = 24
SOFTWARE REV       = X.Y
HARDWARE REV       = X.Y
    
```

The system status fields are described below (from top to bottom)

NODE Displays the node number of the ASMi-450

NAME Displays the node name of the ASMi-450

NODAL CLOCK Indicates the current source for the ASMi-450 system clock: INT or EXT (see Section 3-4).

NUM OF ACTIVE TS Indicates the number of active time slots configured on the ASMi-450 (see Section 3-4).

ASMI TYPE Indicates the function of the ASMi-450: central or remote.

SOFTWARE REV Displays the ASMi-450 software version

HARDWARE REV Displays the ASMi-450 hardware version

EXIT-----

Purpose End the current session and return control to the ASMi-450 front panel.

Format EXIT

Use Type:
 EXIT<CR>

F-----

Purpose Define the codes used to be sent to the control terminal to perform the following terminal control functions:

- Clear screen
- Move cursor to screen home position.
- Move cursor to the right by one position.

This command lets you enter manually the desired codes. However, if you are using a terminal of the following type: VT-52, VT-100, TV-920, FREEDOM-110, FREEDOM-220, or a terminal which is compatible with one of the terminals listed above, you can use the DEF TERM command (see **DEF TERM** command) to select automatically the corresponding control sequences.

Format F

Use

1. To display the current codes, type:

F<CR>

2. The terminal function entry screen is displayed. The screen includes three separate lines, displayed one after the other. A typical screen, showing all the three lines, is shown below:

```
CLEAR SCREEN      =hhhhhhh (clear screen code)
CURSOR HOME       =hhhhhhh (cursor home code)
CURSOR RIGHT      =hhhhhhh (cursor right code)
```

where h indicates hexadecimal digits.

3. To change a code, bring the cursor under the first digit of the code to be changed, by pressing <CR>, then enter the appropriate hexadecimal digit.
4. Repeat the procedure until all the necessary digits are changed.

HELP-----

Purpose Display an index of the control port commands and the options available for each command.

Format & Use H<CR>

You will see the first HELP page. Press any key to see the next page.

INIT DB -----

Purpose Load a specified set of default parameters values instead of the user configuration (Table 4-3).

Format INIT DB

- Use**
1. Type

```
INIT DB<CR>
```
 2. The ASMi-450 will display the TIME and DATE fields followed by the ASMi-450 prompt.

Table 4-C. ASMi-450 Default Configuration Used with Control Terminal

Parameter Type	Parameter Designation	Default Value
General	PASSWORD	ASMI
	NODE (node number)	0
	CLEAR SCREEN	00000000
	CURSOR HOME	00000000
System	CURSOR RIGHT	00000000
	CLK_MASTER	EXT
SP (Control Port)	ACTIVE TS	Maximum supported on the ASMi-450 model
	SPEED	AUTO
	DATA	8
	PARITY	NONE
	INT	DCE
	PWD	NO
	LOG_OFF	NO
	CTS	=RTS
	DSR	ON
	DCD_DEL	0_MSEC
POP_ALM	NO	

INIT F -----

Purpose Resets the terminal control codes used to clear the terminal screen, to move the cursor to the right, and to return the cursor to the home position to 0.

Format & Use INIT F<CR>

LOOP-----

- Purpose** Activate a user-controlled loopback or test on the ASMi-450 (see Section 5-3 for test and loopbacks descriptions).
- Format** LOOP [looptype]
- Use** 1. To activate the local (L) loopback on the user's port of the local ASMi-450, type:
 LOOP L PORT<CR> or LP L PORT<CR>
2. To activate the remote (R) loopback on the user's port of the remote ASMi-450, type:
 LOOP R R PORT<CR> or LP R R PORT<CR>
3. You will see the time and date, followed by the ASMi-450 prompt.
- At any time, you can activate only one loopback. If you try to activate a second loopback, you will see an error message (illegal loop combination). You must deactivate the other loopback before you can activate the new one.

NODE-----

- Purpose** Select an ASMi-450 for establishing a control session.
- Format** NODE 'node number'
- Use** 1. To connect to the desired ASMi-450, type:
 NODE 'node number' <CR>
 where 'node number' is the three-digit node number, in the range of 1 through 255.
2. When the addressed ASMi-450 is on-line, it will echo the complete string:
 NODE<SP>nnn<SP>. After you see the echo, type the desired command.

PASSWORD-----

- Purpose** Enter the password when prompted to type the password upon the start of a control session.
- Format** PWD<SP>'password'
- Use** 1. When you see the prompt
 PASSWORD>
 type:
 'password' <CR>
 where 'password' is the string of four to eight alphanumeric characters that has been defined by the user (or the default, ASMI, as appropriate).
2. The ASMi-450 sends the current time and date, and then the prompt ASMI> is displayed on the next line.

RESET -----

Purpose Reset the ASMi-450. This will cause the ASMi-450 to initialize, therefore the traffic through the ASMi-450 will be disrupted until the ASMi-450 returns to normal operation. For this function to operate the internal WD jumper (Section 2-4) must be set to ON.

Format RESET

Use 1. To reset the ASMi-450, type:
 RESET<CR>

TIME -----

Purpose Set the time for the ASMi-450 internal real-time clock.

Format TIME

Use 1. Type
 TIME<CR>

2. The ASMi-450 sends the time entry form:

```
      HOUR     = 12
      MINUTE  = 25
      SECOND  = 16
```

3. If necessary, change the time as follows:.

- Bring the cursor to the beginning of the first field to be changed by pressing the space bar.
- To change the selected field, press F or B to scroll among the available selections.
- When the desired selection is displayed, press the space bar to move to the next field.

4. Set the time about one minute beyond the current time, and then press <CR> at the correct instant. The ASMi-450 will display the TIME and DATE fields (note that TIME has changed), followed by the ASMi-450 prompt.

4.6 Control Terminal Operating Instructions

Before using the control terminal, make sure the preparations listed in Section 4-3 were completed and all the relevant equipment has been turned on.

Starting a Session - Single ASMi-450

When the terminal is used to control a single ASMi-450, always assign node address 0 to the ASMi-450. Use the following start-up sequence to connect to a ASMi-450 that has been assigned node number 0.

1. If you use the AUTO (Autobaud) mode, press the <CR> key three times. This allows the ASMi-450 to identify the terminal data rate.
2. Assuming that the ASMi-450 successfully identified the data rate of the control terminal, you will be notified if the ASMi-450 failed the power-up self-test:
 - If you see `ASMi-450 SELFTTEST FAILED`, the ASMi-450 must be repaired before you can continue using it.
 - If ASMi-450 successfully passed the power-up self-test (`ASMi-450 SELFTTEST OK`), it sends the following message:
`ASMI SUPERVISORY PORT ON LINE. TYPE "H" FOR HELP`
3. By now, the ASMi-450 prompt should already be displayed on the terminal screen, after the ON-LINE announcement. If you see

```
PASSWORD>
```

this indicates that password protection is enabled. In this case, type the password:

```
'password' <CR>
```

where 'password' stands for the current password (four to eight characters). For each password character typed by you, the terminal displays an asterisk *.

The default password is **ASMI**.

If your password is accepted, you will see the prompt `ASMI>`.

4. The ASMi-450 is now in session, under your control:
 - On your terminal, you will see the prompt:
`ASMI>`
 - On the ASMi-450 front panel, you will see the message:

```
TERMINAL ON LINE
```

The front panel controls are disabled as long as the ASMi-450 is under remote control.

Note

While the control terminal is in session with the ASMi-450, the ASMi-450 local operator can regain control by disconnecting the cable from the ASMi-450 CONTROL DCE connector, or by sending the EXIT command from the control terminal.

The ASMi-450 will automatically return to front panel control if no commands are received for a certain period of time (controlled by the LOG_OFF parameter). This time-out can however be disabled.

**Starting a Session
- Multiple ASMi-450**

When one terminal is used to control several ASMi-450 connected via modems, non-zero node addresses are assigned to each ASMi-450. The node addresses, in the range of 1 through 255, are assigned during the first session, by means of the command DEF NODE. Use the following procedure to establish a session with a specific ASMi-450.

Important

If you are using a multidrop configuration, do not assign address 0 to any of the ASMi-450 connected to a given terminal. Make sure the interface type is set as DTE, and select the appropriate DCD_DEL parameter.

1. Press the <CR> key three times.
2. Type NODE, space, the desired ASMi-450 node address and another space, and then type the desired command and press <CR>. For example, with node address 234, type:

```
NODE<SP>234<SP> 'command' <CR>
```

3. If the addressed ASMi-450 does not use password protection, it will immediately execute the command.
4. If the addressed ASMi-450 is password protected, you will see the prompt:

```
PASSWORD>
```

Type again the node address and then the password. For example, for node address 234, type :

```
NODE<SP>234<SP> 'password' <CR>
```

5. If the password is correct, the ASMi-450 will execute the command. Otherwise, you will see:

```
ENTER PASSWORD>
```

Control Session

1. During the control session, type the desired commands at the terminal keyboard. You must see the ASMi-450 echo character by character. If a bad command appears, backspace to clear the error, and then type again the correct character.

- When you see the correct and complete command in the echo line, press <CR> to execute the command. The ASMi-450 will process the command and display the appropriate response.
At the end of the command execution, the ASMi-450 displays the current time and date, and then provides a new prompt for the next command line.
- If you changed your mind, and want to abort the command, press BREAK or CTRL-C. You will again receive the prompt, so you can enter another command.

Note

You can also use BREAK or CTRL+C to stop automatic repetition of commands sent with the /R option.

2. If your command is not correct, the ASMi-450 will not execute it, but will echo again the command, with a bad command message in the following line. Type again the correct command.
3. If the terminal screen fills up during the exchange with the ASMi-450, you will see the message:

HIT ANY KEY TO CONTINUE

After pressing any key except BREAK, the terminal scrolls to the next page.

Ending a Control Session

1. To end the control session, type:
EXIT
2. The ASMi-450 prompt will disappear. Now you can control the ASMi-450 from its front panel.

Note

A control session may also be terminated by the ASMi-450 if the idle disconnect time-out is enabled, or when the DTR line switches to the inactive (OFF) state.

4.7 Configuration Error Messages

The ASMi-450 provides configuration error messages for the control terminal user. The configuration messages have the format ERROR, followed by a two-digit code. The ASMi-450 will display a short description of the error message after the ERROR code.

The error messages are explained below.

ERROR 01	ILLEGAL LOOP COMBINATION Illegal combination of loopbacks: you are trying to activate simultaneously local and remote loopbacks. Only one loopback can be connected at a time.
ERROR 02	REM REM LOOP WHILE SYNC LOSS You are trying to activate REM REM loopback while synchronization is lost.
ERROR 03	ILLEGAL CLOCK MODE ON REMOTE SIDE You are trying to select the internal clock mode at the remote side.
ERROR 04	LOOP IS NOT ACTIVE You are trying to disconnect a loopback that is not active.
ERROR 06	ILLEGAL NODE NUMBER You are trying to select a node number greater than 255.

Notes

Chapter 5

Diagnostics

5.1 General

The ASMi-450 diagnostics functions include:

- Status indications and messages - Section 5-2.
- Test functions - Section 5-3.
- Power-up self-test - Section 5-4.
- Troubleshooting - Section 5-5.

5.2 Status Indications and Messages

Indicators

ASMi-450 status is indicated by the front panel indicators. Indicator functions are listed in Table 3-1.

The Ethernet LAN and interface status is indicated by the rear panel indicators. Indicator functions are listed in Table 3-2.

Display

The ASMi-450 maintains an alarm buffer. The buffer can store one alarm event of each type, and a maximum of 100 alarms can be stored for display on the control terminal.

The ASMi-450 operator can view the contents of the alarm buffer on the front panel LCD display, and can delete the event alarms from the buffer when no longer needed. This procedure is explained in Section 3-6.

Table 5-1 presents the alarm messages displayed by the ASMi-450 in alphabetical order, and lists the actions required to correct the alarm condition (the messages displayed on the control terminal have a similar syntax).

To correct the reported problem, perform the corrective actions in the given order, until problem is corrected. If the problem cannot be corrected by carrying out the listed actions, have the ASMi-450 checked by the technical support personnel.

Table 5-A. ASMi-450 Alarm Buffer Messages

Message	Description	Corrective Actions	Alarm Type
LAN NOT CONNECTED	The Ethernet interface is not connected to an operating LAN	Check the cable connecting the LAN, the LAN media, and check that at least one station is active on the LAN	ON/OFF
LOCAL ALARM BUFFER OVERFLOW	More than 100 alarms entries have been written in the alarm buffer of the local ASMi-450 since the last clear command. New alarms are overwriting the older alarms	Read the messages and then clear the buffer: <ul style="list-style-type: none"> - If you are using the front panel, delete all the event alarms by selecting CLEAR. - From the control terminal, send the CLR ALM command 	ON/OFF
LOCAL DB CHECKSUM ERROR	The data base currently stored in the non-volatile memory of the local ASMi-450 is corrupted. Message can appear only upon power-up	<ol style="list-style-type: none"> 1. Load the default configuration in the place of the current data base (from the control terminal, enter the INIT DB command) 2. Replace the ASMi-450 	ON/OFF
LOCAL DB-INIT SWITCH IS ON	Section DB INI of switch S1 of the local ASMi-450 is set to ON	If it is no longer necessary to enforce the default data base parameter values, change setting to OFF	ON
LAN NOT CONNECTED	No data is received from the user's port (for ASMi-450 version with serial data port). or The Ethernet interface is not connected to an operating LAN (at least one station must be active on the LAN)	Check the LAN or DTE connection	ON/OFF
LOCAL HARDWARE FAILURE	Local ASMi-450 technical failure (failure of one of the internal programmable components)	Replace the ASMi-450	ON/OFF
LOCAL LOW QUALITY ALARM	A CRC-6 error has been detected in the HDSL input signal of the local ASMi-450	If the number of CRC-6 errors is significant (more than a few errors per hour), perform the following: <ol style="list-style-type: none"> 1. Check the HDSL line connecting the two ASMi-450 units. 2. Perform self-test on the two ASMi-450 and replace the ASMi-450 that fails the self-test 	ON

Table 5-1. ASMi-450 Alarm Buffer Messages (Cont'd)

Message	Description	Corrective Actions	Alarm Type
LOCAL PSWRD SWITCH IS ON	Section PSWD of switch S1 of the local ASMi-450 is set to ON	If it is no longer necessary to enforce the default password and node number, change setting to OFF	ON
LOCAL REAL TIME CLOCK BATTERY FAILURE	The battery that powers the local ASMi-450 internal real-time clock when ASMi-450 is not powered has failed	Have the ASMi-450 repaired	ON
LOCAL RECEIVE SLIP	A slip has been detected by the local ASMi-450 in the receive path	Check the selection of clock sources at the local and remote ASMi-450 units	ON
LOCAL REVERSE POLARITY	Reserved loop polarity has been detected by the local ASMi-450	The ASMi-450 continues normal operation	ON
LOCAL SELF TEST ERROR	A problem has been detected during local ASMi-450 self-test	Repeat self-test, and replace the ASMi-450 if it fails the self-test	ON
LOCAL SIGNAL LOSS	Loss of HDSL line input signal at the local ASMi-450	1. Check the HDSL line. 2. Perform self-test on the two ASMi-450 and replace the ASMi-450 that fails the self-test	ON/OFF
LOCAL SP-PAR SWITCH IS ON	Section DEF SP of switch S1 of the local ASMi-450 is set ON	If it is no longer necessary to enforce the default control port parameters, change setting to OFF	ON
LOCAL SYNC LOSS	Loss of synchronization on the HDSL line at the local ASMi-450	1. Check the HDSL line 2. Perform self-test on the two ASMi-450, and replace the ASMi-450 that fails the self-test	ON/OFF
LOCAL TRANSMIT SLIP	A slip has been detected by the local ASMi-450 in the transmit path	Check the selection of clock sources at the local and remote ASMi-450 units	ON
REM TRANSMIT SLIP	A slip has been detected by the remote ASMi-450 in the receive path	Check the selection of clock sources at the local and remote ASMi-450 units	ON
REM RECEIVE SLIP	A slip has been detected by the remote ASMi-450 in the receive path	Check the selection of clock sources at the local and remote ASMi-450 units	ON

Table 5-1. ASMi-450 Alarm Buffer Messages (Cont'd)

Message	Description	Corrective Actions	Alarm Type
REMOTE ALARM BUFFER OVERFLOW	More than 256 alarms entries have been written in the alarm buffer of the remote ASMi-450 since the last clear command. New alarms are overwriting the older alarms	Read the messages and then clear the buffer: - If you are using the front panel, delete all the event alarms by selecting CLEAR. - From the control terminal, send the CLR ALM command	ON/OFF
REMOTE DB CHECKSUM ERROR	The data base currently stored in the non-volatile memory of the remote ASMi-450 is corrupted. Message can appear only upon power-up	1. Load the default configuration in the place of the current data base (from the control terminal, enter the INIT DB command) 2. Replace the ASMi-450	ON/OFF
REMOTE DB-INIT SWITCH IS ON	Section DB INI of switch S1 of the remote ASMi-450 is set to ON	If it is no longer necessary to enforce the default data base parameter values, change setting to OFF	ON
REMOTE DTE NOT CONNECTED	No data is received from the remote user's port (for an ASMi-450 version with serial data port). or The remote Ethernet interface is not connected to an operating LAN (at least one station must be active on the LAN)	Check the remote LAN or DTE connection	ON/OFF
REMOTE HARDWARE FAILURE	Remote ASMi-450 technical failure (failure of one of the internal programmable components)	Replace the ASMi-450	ON/OFF
REMOTE LOW QUALITY ALARM	The far-end block error rate (FEBE) reported via the HDSL line exceeds 10^{-7}	1. Check the HDSL line connecting the two ASMi-450 units. 2. Perform self-test on the two ASMi-450 and replace the ASMi-450 that fails the self-test	ON
REMOTE PSWRD SWITCH IS ON	Section PSWD of switch S1 of the remote ASMi-450 is set to ON	If it is no longer necessary to enforce the default password and node number, change setting to OFF	ON
REMOTE REAL TIME CLOCK BATTERY FAILURE	The battery that powers the remote ASMi-450 internal real-time clock when ASMi-450 is not powered has failed	Have the ASMi-450 repaired	ON

Table 5-1. ASMi-450 Alarm Buffer Messages (Cont'd)

Message	Description	Corrective Actions	Alarm Type
REMOTE REVERSE POLARITY	Reversed loop polarity has been detected by the remote ASMi-450	The ASMi-450 continues normal operation	ON
REMOTE SELF TEST ERROR	A problem has been detected during remote ASMi-450 self-test	Repeat self-test, and replace the ASMi-450 if it fails the self-test	ON
REMOTE SIGNAL LOSS	Loss of HDSL line input signal at the remote ASMi-450.	<ol style="list-style-type: none"> 1. Check the HDSL line. 2. Perform self-test on the two ASMi-450 and replace the ASMi-450 that fails the self-test 	ON/OFF
REMOTE SP-PAR SWITCH IS ON	Section DEF SP of switch S1 of the remote ASMi-450 is set ON	If it is no longer necessary to enforce the default SP-PAR and node number, change setting to OFF	ON
REMOTE SYNC LOSS	Loss of synchronization on the HDSL line at the remote ASMi-450	<ol style="list-style-type: none"> 1. Check the HDSL line 2. Perform self-test on the two ASMi-450 and replace the ASMi-450 that fails the self-test 	ON/OFF

5.3 Test Functions

Test Functions

The ASMi-450 supports the following types of test functions:

- Local loopback on the user's port of the local ASMi-450 (LOOP LOCAL PORT).
- Remote loopback on the user's port of the remote ASMi-450 (LOOP REM REM PORT).

The loopbacks are not available for an ASMi-450 with the Ethernet interface.

The user-controlled test functions are accessed from the TEST OPTIONS menu. In addition, when the internal jumpers ALB and RLB are set to EN (see Section 2-4 for detailed instructions), the LOOP LOCAL PORT and LOOP REM REM PORT loopbacks, respectively, can also be enabled via the corresponding CCITT Rec. V.52 pins in the DCE connector.

The available test functions are described in the following paragraphs. The test functions are identified by the designation displayed by the ASMi-450.

LOOP LOCAL PORT

When activated, the local user's port loopback returns the signal received from the user's DTE, after passing through the user's port interface of the ASMi-450.

The local loopback is formed by connecting the transmit signal, provided by the user's port interface to the processing circuits, to the input of the receive path of the user's port interface. The test signal is provided by the DTE connected to the ASMi-450, that must receive its own transmission without errors while the loopback is activated. During the loopback, the local ASMi-450 continues sending the user's data to the link.

Figure 5-1 shows a typical local user's port loopback.

This test is generally used to check the connections between the DTE and the ASMi-450.

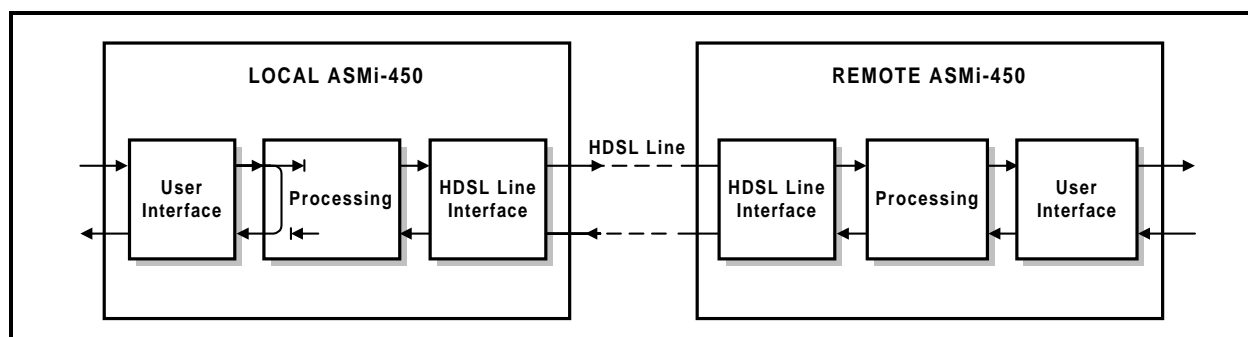


Figure 5-A. LOOP LOCAL PORT Loopback

LOOP REM REM PORT

When the remote user's port loopback is activated, the user's port interface of the remote ASMi-450 returns the received data signal toward the local user's DTE. The remote loopback is performed by internally connecting the DCE receive signal, to the input of the transmit path. The received data signal remains connected to the remote user's DTE. The test signal is provided by the local user's DTE, that must receive its own transmission without errors while the loopback is activated.

Figure 5-2 shows a typical remote user's port loopback.

This test fully checks the data link, including the cables connecting the two ASMi-450 to the HDSL line, the transmission plant connecting the two ASMi-450, and the cable connecting the local user's DTE to the local ASMi-450.

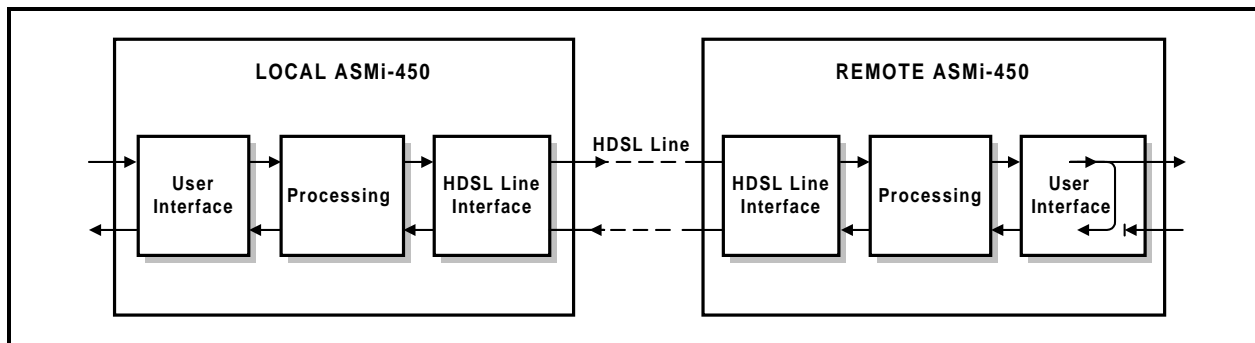


Figure 5-B. LOOP REM REM PORT Loopback

TEST OPTIONS Operating Instructions

Before starting the execution of a test, note that in general you should activate only one loopback at a time.

To activate or deactivate a specific test, use the following procedure:

Step	Action	Key	Display
1	Bring the cursor under the left-hand field in the top row (if not already there)	CURSOR	
2	Scroll to display TEST OPTIONS in the top row	SCROLL	The right-hand field of the top row should show OFF, to indicate that no test is active. LOOPS indicates that a test is currently active (in this case, the front-panel TST indicator lights). Second row is empty
3	To enable the activation of tests, bring the cursor under the right-hand field in the top row, and scroll to display LOOPS	CURSOR, SCROLL	The second row displays the first test option

(Cont'd)

Step	Action	Key	Display
4	Bring the cursor under the left-hand field in the second row, and scroll to display the desired type of loopback: <ul style="list-style-type: none"> • LOCAL PORT (local user's port loopback) • REM REM PORT (remote user's port loopback) 	CURSOR, SCROLL	Second row shows the current state of the selected test, OFF or ON
5	To change the test state, bring the cursor under the right-hand field in the second row, and scroll to display the desired state	CURSOR, SCROLL	The second row shows the new state of the selected test, e.g., ON
6	Press ENTER to activate the displayed test		The TST indicator turns on if the test is activated, or turns off if no test is activated

To deactivate all the tests, perform steps 1, 2, 3 above: in step 3 select OFF, and then press ENTER. The TST indicator will turn off.

Activating the Test Functions from a Control Terminal

The test functions can be activated by means of a control terminal, using the LOOP and CLR LOOP commands, as explained in Chapter 4.

5.4 Power-Up Self-Test

The ASMi-450 performs a power-up self-test upon turn-on. The self-test sequence, described in Section 3-6, tests the critical circuit functions and the display.

In case of failure, the ASMi-450 displays an alarm message in the second row.

5.5 Troubleshooting Instructions

In case a problem occurs, check the displayed alarm messages and refer to Section 5-2 and Table 5-1 for their interpretation. If trouble cannot be corrected by performing the actions listed in Table 5-1, use Table 5-2: identify the trouble symptoms and perform the actions listed under “Corrective Measures” in the order given in Table 5-2, until the problem is corrected.

Table 5-B. Troubleshooting Chart

No.	Trouble Symptoms	Probable Cause	Corrective Measures
1	The ASMi-450 is “dead”	1. No power	1. Check that both ends of the power cable are properly connected (for AC-powered units, also check that the POWER switch is ON). 2. If the ASMi-450 is powered from DC, check the polarity of the power connections
		2. Blown fuse	Disconnect the power cable from both ends and replace the fuse with another fuse of proper rating
		3. Defective ASMi-450	Replace the ASMi-450
2	Local DTE does not receive the remote DTE. No alarm indicator lights	1. Problem in local router connections	Activate the local port loopback. The TD and RD indicators should light to indicate data activity. If the local DTE does not receive its own signal, check the connections of the local DTE, and the DTE itself
		2. Defective ASMi-450	Perform power-up self-test and replace the ASMi-450 if defective
3	HDSL LOS indicator lights (local loss of synchronization alarm on the HDSL line)	1. External problem	1. Activate the local user's channel loopback. If the local DTE does not receive its own transmission, check the cable connecting it to the ASMi-450 DCE connector
		2. Defective ASMi-450	2. Perform power-up self-test and replace the ASMi-450 if defective
4	Ethernet interface COLL indicator lights most of the time, and LAN cannot operate	1. Loopback connected on the ASMi-450	1. If the TST indicator lights, check and disconnect the loopback 2. Check and replace if necessary the cable that connects the ASMi-450 10BaseT connector to the LAN 3. Disconnect the ASMi-450 from the LAN: if problem persists, troubleshoot the LAN 4. Perform power-up self-test and replace the ASMi-450 if defective

Table 5-2. Troubleshooting Chart (Cont'd)

No.	Trouble Symptoms	Probable Cause	Corrective Measures
5	Ethernet interface LINK indicator not lit	<ol style="list-style-type: none">1. No active station on the LAN2. Cable problem3. Problem on the LAN4. Defective ASMi-450	<ol style="list-style-type: none">1. Check that at least one station is active on the LAN2. Check and replace if necessary the cable that connects the ASMi-450 10BaseT connector to the LAN3. Check LAN media4. Perform power-up self-test and replace the ASMi-450 if defective

Appendix A

Connector Wiring

A.1 RS-530 DCE Connector and Adapter Cables

When the ASMi-450 is ordered with an RS-530 DCE interface, the physical interface is a 25-pin female connector wired in accordance with Table A-1.

Table A-1. RS-530 DCE Connector

Pin	Designation	Direction	Function
1	FG	↔	Frame Ground
2	SDA	To ASMi-450	Send Data - wire A
3	RDA	From ASMi-450	Receive Data - wire A
4	RTSA	To ASMi-450	Request to Send (RTS) - wire A
5	CTSA	From ASMi-450	Clear to Send (CTS) - wire A
6	DSRA	From ASMi-450	Data Set Ready (DSR) - wire A
7	SG	↔	Signal Ground
8	DCDA	From ASMi-450	Carrier Detect (DCD) - wire A
9	RCB	From ASMi-450	Receive Clock - wire B
10	DCDB	From ASMi-450	Carrier Detect (DCD) - wire B
11	SCEB	To ASMi-450	Send External Clock - wire B
12	SCB	From ASMi-450	Send Clock - wire B
13	CTSB	From ASMi-450	Clear to Send (CTS) - wire B
14	SDB	To ASMi-450	Send Data - wire B
15	SCA	From ASMi-450	Send Clock - wire A
16	RDB	From ASMi-450	Receive Data - wire B
17	RCA	From ASMi-450	Receive Clock - wire A
18	LL	To ASMi-450	Local Loopback (V.54 Loop 3)
19	RTSB	To ASMi-450	Request to Send (RTS) - wire B
20	DTRA/RCEA	To ASMi-450	Data Terminal Ready(DTR) - wire A/Receive External Clock - wire A
21	RL	To ASMi-450	Remote Loopback (V.54 Loop 2)
22	DSRB	From ASMi-450	Data Set Ready (DSR) - wire B
23	DTRB/RCEB	To ASMi-450	Data Terminal Ready (DTR) - wire B/Receive External Clock - wire B
24	SCEA	To ASMi-450	Send External Clock - wire A
25	TM	From ASMi-450	Test Indicator

Table A-2. V.36/RS-449/422 DCE Interface Adapter Cable

Pin	Designation	Direction	Function	V.36/RS-449/422
1	FG	↔	Frame Ground	1
2	SDA	To ASMi-450	Send Data - wire A	4
3	RDA	From ASMi-450	Receive Data - wire A	6
4	RTSA	To ASMi-450	Request to Send (RTS) - wire A	7
5	CTSA	From ASMi-450	Clear to Send (CTS) - wire A	9
6	DSRA	From ASMi-450	Data Set Ready (DSR) - wire A	11
7	SG	↔	Signal Ground	19
8	DCDA	From ASMi-450	Carrier Detect (DCD) - wire A	13
9	RCB	From ASMi-450	Receive Clock - wire B	26
10	DCDB	From ASMi-450	Carrier Detect (DCD) - wire B	31
11	SCEB	To ASMi-450	Send External Clock - wire B	35
12	SCB	From ASMi-450	Send Clock - wire B	23
13	CTSB	From ASMi-450	Clear to Send (CTS) - wire B	27
14	SDB	To ASMi-450	Send Data - wire B	22
15	SCA	From ASMi-450	Send Clock - wire A	5
16	RDB	From ASMi-450	Receive Data - wire B	24
17	RCA	From ASMi-450	Receive Clock - wire A	8
18	–	N/A	Not Connected	–
19	RTSB	To ASMi-450	Request to Send (RTS) - wire B	25
20	RCEA	To ASMi-450	Receive External Clock - wire A	–
21	–	N/A	Not Connected	–
22	DSRB	From ASMi-450	Data Set Ready (DSR) - wire B	29
23	RCEB	To ASMi-450	Receive External Clock - wire B	–
24	SCEA	To ASMi-450	Send External Clock - wire A	17
25	–	N/A	Not Connected	–

Note

The V.36/RS-449/422 connector is a 37-pin D-type male connector.

A.2 V.35 DCE Connector

When the ASMi-450 is ordered with an V.35 DCE interface, the physical interface is a 34-pin female connector wired in accordance with Table A-3.

Table A-3. V.35 DCE Connector

Pin	Designation	Direction	Function
A	PG	↔	Protective Ground
B	SG	↔	Signal Ground
C	RTS	To ASMi-450	Request to Send
D	CTS	From ASMi-450	Clear to Send
E	DSR	From ASMi-450	Data Set Ready
F	DCD	From ASMi-450	Data Carrier Detect
P	TDA	To ASMi-450	Transmit Data - wire A
R	RDA	From ASMi-450	Receive Data - wire A
S	TDB	To ASMi-450	Transmit Data - wire B
T	RDB	From ASMi-450	Receive Data - wire B
U	ETCA	To ASMi-450	External Transmit Clock - wire A
V	RCA	From ASMi-450	Receive Clock - wire A
W	ETCB	To ASMi-450	External Transmit Clock - wire B
X	RCB	From ASMi-450	Receive Clock - wire B
Y	TCA	From ASMi-450	Transmit Clock - wire A
Z	ERCB	To ASMi-450	External Receive Clock - wire B
AA	TCB	From ASMi-450	Transmit Clock - wire B
BB	ERCA	To ASMi-450	External Receive Clock - wire A

A.3 X.21 DCE Connector

When the ASMi-450 is ordered with an X.21 interface, the physical interface is a 15-pin female D-type connector wired in accordance with Table A-4.

Table A-4. DCE Connector, X.21 Interface

Pin	Designation	Direction	Function
1	FG	↔	Frame Ground
2	TA	To ASMi-450	Transmit Data - wire A
3	CA	To ASMi-450	Control - wire A
4	RA	From ASMi-450	Receive Data - wire A
5	IA	From ASMi-450	Indication Data - wire A
6	SA	From ASMi-450	Signal Timing - wire A
7	BA	To ASMi-450	External Timing - wire A
8	G	↔	Signal Ground
9	TB	To ASMi-450	Transmit Data - wire B
10	CB	To ASMi-450	Control - wire B
11	RB	From ASMi-450	Receive Data - wire B
12	IB	From ASMi-450	Indication Data - wire B
13	SB	From ASMi-450	Signal Timing - wire B
14	BB	To ASMi-450	External Timing - wire B
15	–	N/A	Not Connected

A.4 HDSL Line Connector

The HDSL line is terminated in an eight-pin RJ-45 connector, designated LINE, and wired in accordance with Table A-5.

Table A-5. LINE Connector, Pin Allocation

Pin	Function
1	Line
2	
3 through 8	Not Connected

A.5 RS-232 (V.24) Control Port Connector

The ASMi-450 control port has a standard RS-232 interface. The physical interface is a 9-pin female connector, designated CONTROL DCE, wired in accordance with Table A-6.

Table A-6 also lists the connections to the RS-232 interface of a control terminal, and the connection to a modem (the terminal and the modem are assumed to have 25-pin connectors).

Table A-6. Control Port Interface Signals

Pin	Line	Notes	Connected to Terminal	Connected to Dial-Out Modem
1	Data Carrier Detect (DCD)	From ASMi-450	8	4
2	Receive Data (RD)	From ASMi-450	3	2
3	Transmit Data (TD)	To ASMi-450	2	3
4	Data Terminal Ready (DTR)	To ASMi-450	20	6
5	Signal Ground (SIG)	Common reference and DC power supply ground	7	7
6	Data Set Ready (DSR)	From ASMi-450	6	20
7	Request to Send (Request to Send (RTS))	To ASMi-450	4	8
8	Clear to Send (CTS)	From ASMi-450	5	-
9	Ring Indicator (RI)	To ASMi-450	-	22

A.6 Ethernet Interface Connector

When the ASMi-450 is ordered with an Ethernet interface, the physical interface is an RJ-45 connector wired in accordance with Table A-7.

Table A-7. Ethernet Interface Connector

Pin	Designation	Direction	Function
1	TxD+	To ASMi-450	Transmit Data - wire +
2	TxD-	To ASMi-450	Transmit Data - wire -
3	RxD-	From ASMi-450	Receive Data -
4	-	N/A	Not connected
5	-	N/A	Not connected
6	RxD+	From ASMi-450	Receive Data +
7, 8	-	N/A	Not connected

Appendix B

SNMP Management

B.1 Scope

This Appendix provides the specific information required for the management of the ASMi-450 by means of the Simple Network Management Protocol (SNMP).

An ASMi-450 unit configured as the central unit serves as a proxy agent for the remote unit to which it is connected. Therefore, an SNMP-based network management station connected to a central ASMi-450 unit can perform all the management functions available on the remote unit.

B.2 SNMP Environment

General

The SNMP management functions of the ASMi-450 are provided by an internal SNMP agent, which is communicate through the ASMi-450 control port using the Serial Link Internet Protocol (SLIP).

The SNMP management communication uses the User Datagram Protocol (UDP). UDP is a connectionless-mode transport protocol, part of the suite of protocols of the Internet Protocol (IP).

Note

Telnet management uses the TCP protocol over IP for management communication. After a Telnet session is started, the management interface is similar to that used for the supervision terminal (Chapter 3).

This section covers the information related to the SNMP environment. For a description of the IP environment, refer to Section B-3.

SNMP Principles

The SNMP management protocol is an asynchronous command/response polling protocol: all the management traffic, except for trap messages, is initiated by the SNMP-based network management station, 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 an “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. |
| getNextRequest | Command for retrieving sequentially specific management information from the managed entity. The managed entity responds with a getResponse message. |
| setRequest | Command for manipulating specific management information within the managed entity. The managed entity responds with a setResponse message. |
| trap | Management message carrying unsolicited information on extraordinary events (that is, events which occurred not in response to a management operation) 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.

The 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 (also called “instances”) and the “access” rights:

Read-only	Object value can be read, but cannot be set.
Read-write	Object value can be read or set.
Not accessible	Object value cannot be read, nor set.

MIB Structure

The 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. Each “leaf” in the MIB is reached by a unique path, therefore by numbering the branching points, starting with 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) branch. 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 ASMi-450 SNMP Agent

The interpretation of the relevant MIBs is a function of the SNMP agent of each managed entity. The ASMi-450 SNMP agent supports the standard MIB-II RFC 1158.

In addition, the ASMi-450 SNMP agent supports the RAD-private (enterprise-specific) MIB.

- For ASMi-450/1152, the RAD-private MIB is identified as (read the following as a continuous string):

```
iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).rad(164).radGen(6).systems(1).radSysWAN(3).radASMi450R1152Sa
```

- For ASMi-450/768, the RAD-private MIB is identified as:

```
iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).rad(164).radGen(6).systems(1).radSysWAN(3).radASMi450R768Sa
```

Enterprise-specific MIBs supported by RAD equipment, including those for the ASMi-450, are available in ASN.1 format from the RAD Technical Support Department.

Management Domains Under SNMP

SNMP enables, in principle, 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 an alphanumeric string of up to 32 characters defined by the user.

Any SNMP entity (this term includes both managed entities and management stations) is assigned by its user a community name.

Access Restriction Using SNMP Communities

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

- **Read-only:** the SNMP agent accepts and processes only SNMP **getRequest** and **getNextRequest** commands from management stations which have the same read-only community name.
- **Read-write:** the 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 names table of the entity). For example, the SNMP community names table of the ASMi-450 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, first it checks the originator's community: if the community name of the message originator differs from the community name specified for that type of message in the agent, the message is discarded (SNMP agents of managed entities report this event by means of an authentication failure trap).

ASMi-450 Communities

The SNMP agent of the ASMi-450 can use the following community types:

- | | |
|--------------|--|
| Read | SNMP community that has read-only authorization, i.e., the SNMP agent will accept only <code>getRequest</code> and <code>getNextRequest</code> commands from management stations using that community.

The default read-only community for RAD network management stations is <code>public</code> . |
| Write | SNMP community that has read-write authorization, i.e., the SNMP agent will also accept <code>setRequest</code> commands from management stations using that community. |
| Trap | SNMP community which the SNMP agent will send within trap messages. |

B.3 IP Environment

General The SNMP agent of the ASMi-450 communicates using the Serial Link Internet Protocol (SLIP).

IP Environment The SNMP agent of the ASMi-450 uses either the UDP or the TCP transport protocol, part of the suite of IP protocols.

IP Address Structure

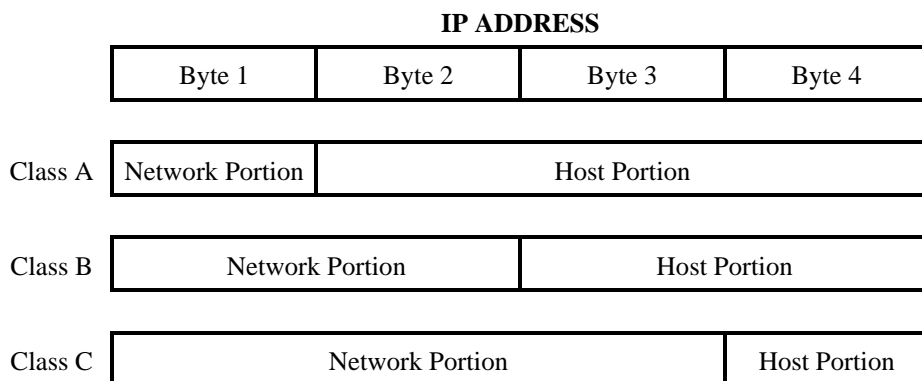
Under the IP protocol, each IP network element (SNMP agents, network management stations, etc.) is called an IP host and must be assigned an IP address. An IP address is a 32-bit number, usually represented as four 8-bit bytes. Each byte represents a decimal number in the range of 0 through 255.

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

An IP address is logically divided into two main portions:

- **Network Portion.** The network portion is 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:



The class of each IP address can be determined from its leftmost byte, in accordance with the following chart:

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

N - indicates bytes that are part of the network portion

H - indicates bytes that are part of the host portion

- **Host Portion.** The host portion is 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 sub-divided into two portions:

- **Subnet number.** For example, subnet numbers can be used to identify departmental subnetworks. The subnet number follows the network identifier.
- **Host number** - the last bits of the IP address.

B.4 SNMP Traps

The SNMP agent of the ASMi-450 supports the standard MIB-II traps. In addition, ASMi-450 reports alarm conditions to the management station by mean of specific traps:

- When an alarm condition occurs, the ASMi-450 sends a `modmSaAlarmTrap` which carries all the alarms active at the time the trap is sent.
- Whenever LED's on its front panel change state, the ASMi-450 sends a `modmSaLedTrap` which reports the state of the LED's on both the local (central) and remote ASMi-450 units.

Appendix C

Installation in 19" Racks

C.1 General

The ASMi-450 can be installed in 19" racks. Unit height corresponds to 1U (1.75"), and the width is slightly less than half of the available mounting width. Two rack adapter kits are available; one kit provides the hardware necessary for installation of a single unit, and the other provides the hardware necessary for installation of two units, side by side.

This Appendix provides step-by-step installation instructions for each option.

Warning

Disconnect all the cables from the units, and then disconnect the units from power while performing the following procedures.

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

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.



C.2 Installation of Single Unit

The rack adapter kit for single unit installation includes one short bracket and one long bracket. The brackets are fastened by means of screws to the two side walls of the case, as shown in Figure C-1.

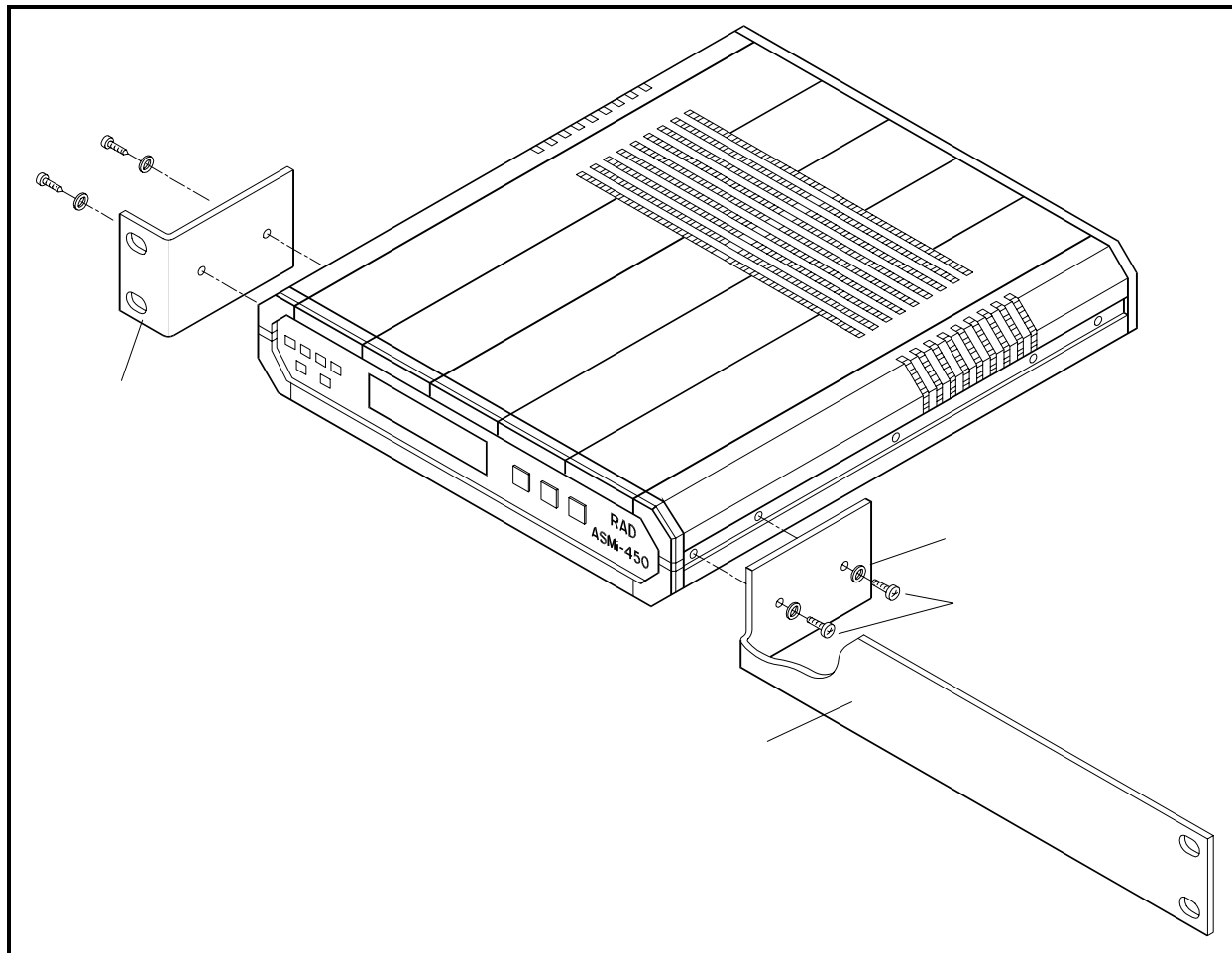


Figure C-1. Installation of Single Unit in 19" Rack

To prepare the unit for rack installation:

- Attach the two brackets to the side walls of the unit. Each bracket is fastened by means of two screws (with flat washers), which are inserted into the two front holes on the wide wall (nuts are already in place, on the inner side of the wall).
- After attaching the brackets, the unit is ready for installation in the 19" rack. Fasten the brackets to the side rails of the 19" rack by means of four screws (not included in the kit), two each side.

C.3 Installation of Two Units

General

The two-unit rack adapter kit includes two adapter brackets, and various hardware for attaching the two units side by side.

Preparations

Refer to figure C-2 and prepare the two ASMi-450 units for attachment as follows:

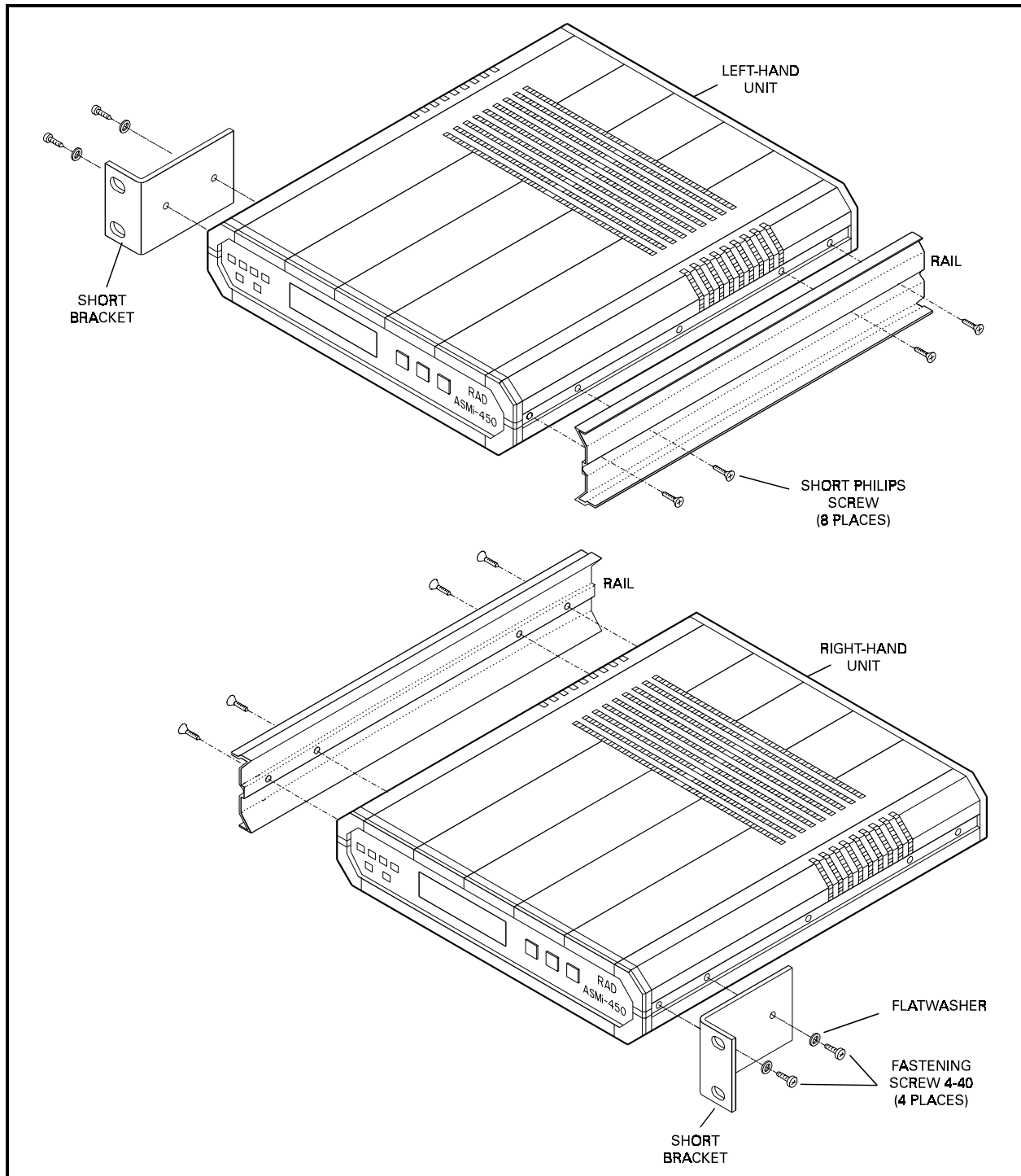


Figure C-2. Preparation of Two ASMi-450 Units for Installation in 19" Rack

- Fasten one short adapter bracket to the left-hand side wall of the unit intended to be on the left. Use two of the four longer screws supplied in the kit, and insert flat washers.
- Use the same procedure to fasten the second short adapter to the right-hand wall of the unit intended to be on the right.
- Position one of the two rails supplied in the kit on the right-hand wall of the unit intended to be on the left, and align its holes with the holes on the wall.
- Insert four short Philips screws and screw them through the rail into the holes on the unit wall.
- Use the same procedure to attach the second rail to the left-hand wall of the unit intended to be on the right. Make sure the wider rim of this rail is opposite the short rim of the other rail, as shown in figure C-2.

Fastening the Two Units

Refer to figure C-3 and attach the two units as follows:

- Position the ends of the rails attached to the two units so that the rails can slide one into the other, and then slide the units to bring the panels in line.
- Now insert plastic I-shaped caps between the two units, to cover the empty spaces left at the ends of the two rails.

The assembled units can now be fastened to the side rails of the 19" rack by means of four screws (not included in the kit), two on each side.

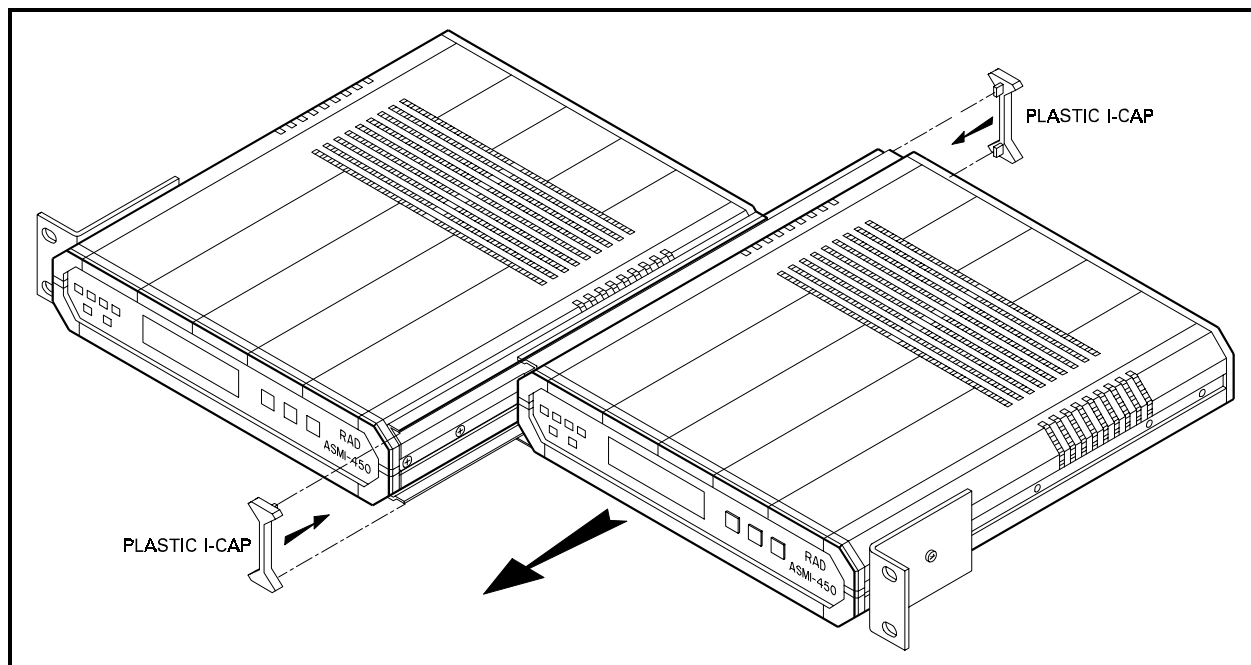


Figure C-3. Attachment of Two ASMi-450 Units Before Installation in 19" Rack

ASMi-450

Installation Instructions for Compliance with EMC Requirements

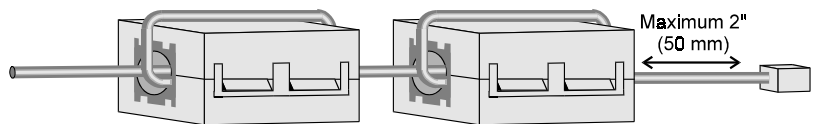
To comply with electromagnetic compatibility requirements, **two** ferrite cores should be installed on any:

- HDSL line cable with an RJ-45 connector (using a STEWARD catalog number 28A2029-0A0 core or equivalent).
- DCE port line unshielded data cable with any connector (using a STEWARD catalog number 28A2024-0A0 core or equivalent).

This limits the electromagnetic energy emitted from the cables.

To install the ferrite cores:

- Run the cable through the first open core.
- Wrap the cable around the core and run it through again.
- Snap the core shut.
- Repeat for the second ferrite core, placing it next to the first core.
- Allow no more than 2 inches (50 mm) between the near core and the connector to the unit.



V.35 only: to protect against electro-static discharge (ESD) into the V.35 port, use a connector with a hood which completely covers the pin connection.

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