

AG Communication Systems

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Lucent Technologies

Bell Labs Innovations



SuperLine™ Access System

Applications and Engineering
Release 3.0 (R3.0)



SD-100300-SAEP
363-225-101
Issue 2
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The AG Communication Systems order number for this IP is SD-100300-SAEP.

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Support Telephone Numbers**Information Product Support Number**

Refer to **How to comment** in the About this information product section of this IP.

Technical Support Telephone Number

Refer to **Technical support** in the About this information product section of this IP.



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About this information product

Purpose	This document provides a high-level description of the AG Communication Systems <i>SuperLine</i> ™ Access System and its associated hardware, highlights its features, and explains how the <i>SuperLine</i> Access System fits into an existing telephone operating company (Telco) environment.
Reason for reissue	This product is reissued to reflect the following: <ul style="list-style-type: none">• Only one <i>SuperLine</i> Access Shelf per session is supported by the <i>SuperLine</i> Element Manager when using a Microsoft® 95 or 98 operating system.• New DS0 derived line mapping values and the addition of a figure to the DS0 channel assignments for EM telephony configurations appendix.
Intended audience	The intended audience for this document includes planners, database administrators, Telco administrative personnel, and AG Communication Systems customer service personnel.
Systems supported	The information in this information product is valid for Release 3.0 (R3.0) of the <i>SuperLine</i> Access System.

Safety labels

Admonishments (DANGER, WARNING, and CAUTION statements) tell customers that the actions they are about to perform may harm them or the equipment. Following are the three types of admonishments in the order of priority.



DANGER Electric shock

Danger indicates the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.



WARNING

Warning indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.



CAUTION

Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate bodily injury or calls attention to operating or servicing instructions that must be followed in order to reduce the risk of damaging equipment or degrading service.

Electrostatic Discharge (ESD)

Considerations to avoid ESD damage.



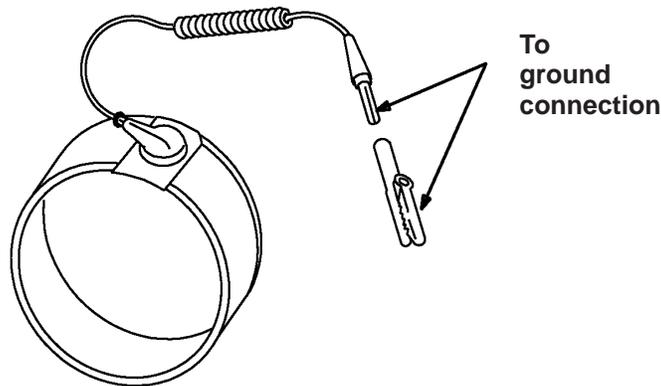
WARNING

Industry experience has shown that all integrated circuit packs can be damaged by static electricity that builds up on work surfaces and personnel. The static charges are produced by various charging effects of movement and contact with other objects. Dry air allows greater static contact charges to accumulate. Higher potentials are measured in areas with low relative humidity, but potentials high enough to cause damage can occur anywhere.

Observe the following list of precautions when handling circuit packs to prevent damage by electrostatic discharge.

- Assume all circuit packs contain solid state electronic components that can be damaged by ESD.
- When handling circuit packs (storing, inserting, removing, etc.) or when working on the backplane, always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat. If a static-dissipating floor mat is used, be sure that it is clean to ensure a good discharge path.
- Handle all circuit packs by the faceplate or latch and by the top and bottom outermost edges. Never touch the components, conductors, or connector pins.
- Observe warning labels on bags and cartons. Whenever possible, do not remove circuit packs from antistatic packaging until ready to insert them into slots.
- Open, if possible, all circuit packs at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats. If a static-dissipating table mat is used be sure that it is clean to ensure a good discharge path.
- Always store and transport circuit packs in static-safe packaging. Shielding is not required unless specified.
- Keep all static-generating materials such as food wrappers, plastics, and foam packaging away from all circuit packs. On removal from the bay, immediately put circuit packs into static-safe packages.
- Whenever possible, maintain relative humidity above 20 percent.

To reduce the possibility of ESD damage, shelves are equipped with grounding jacks to enable personnel to ground themselves using wrist straps with a minimum resistance of 250 k Ω while handling circuit packs or working on a shelf/shelves. Connect the wrist straps to the jacks. When grounding jacks are not available, use an alligator clip adapter to connect to the bay frame ground.



How to use this information product

In general, this document adheres to a structured writing format that helps you gain access to information easily and quickly. This topic describes the following conventions used in this document.

- Organization aids
- Typographical conventions
- Safety alert symbols and messages
- Indexing figures and tables

Terminology

Refer to the [Glossary](#) for the terminology used in this document.

Indexing figures and tables

The location of figures and tables included in this manual appear in the Index under the entries Figures and Tables, respectively.

Conventions used

The following typographical conventions help you navigate through this document.

Convention	Description
Bold text	Represents a reference to a chapter, a topic within a chapter, a procedure, a menu option you must select, or a button you must select.
<u>Bold text, underlined</u>	Indicates a hyperlink to a specific topic, procedure, figure, table, etc.
<i>Italicized text</i>	Indicates the title of a published document. Also used for emphasis and for names of screen fields.
Non-bold Courier text	Indicates command names, file names, or output.
Courier text	Indicates text you enter, such as commands or responses to system output.
ALL CAPITAL LETTERS	Emphasizes the text.

Convention	Description
<u>Important:</u>	Supplies useful information that can help users in setting up, operating, or servicing equipment.
□	Identifies the end of a topic or a chapter.

Related documentation

The complete *SuperLine*™ Access System documentation set consists of the following information products:

Document Name	Vendor
<i>SuperLine Access System Applications and Engineering, Release 3.0, SD-100300-SAEP</i>	AG Communication Systems
<i>SuperLine Access System Applications and Engineering, Release 3.0, 363-225-101</i>	Lucent Technologies
<i>SuperLine Access System Element Manager User's Guide, Release 3.0, SD-110300-EMUP</i>	AG Communication Systems
<i>SuperLine Access System Element Manager User's Guide, Release 3.0, 363-225-104</i>	Lucent Technologies
<i>SuperLine Access System Release Notes, Release 3.0, SD-100300-SRNP</i>	AG Communication Systems
<i>SuperLine Access System Release Notes, Release 3.0, 363-225-102</i>	Lucent Technologies
<i>SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance, Release 3.0, SD-100300-IOMP</i>	AG Communication Systems
<i>SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance, Release 3.0, 363-225-105</i>	Lucent Technologies
<i>SuperLine Access System Troubleshooting, Release 3.0, SD-100300-TSGP</i>	AG Communication Systems
<i>SuperLine Access System, Troubleshooting, Release 3.0, 363-225-103</i>	Lucent Technologies

<i>SuperLine Integrated Access Device Model 6512-A2 Installation Instructions</i>	Paradyne Corporation (This document is provided with each <i>SuperLine</i> IAD)
<i>Model 6035 Phone Filter Installation Instructions</i>	Paradyne Corporation (This document is provided with each <i>SuperLine</i> IAD and is included in the CPE filter package.)

Related training

The following training provides additional information about the *SuperLine* Access System. Contact the appropriate supplier, either AG Communication Systems or Lucent Technologies, as follows:

AG Communication Systems

For information on related training, contact your AG Communication Systems' sales representative.

Lucent Technologies

The National Product Training Center in Altemonte Springs, Florida, provides management courses for planning, engineering, and ordering as well as training for telecommunications technicians in installation, operations, and maintenance. Suitcasing of these courses may be available. Consult your Local Lucent Technologies Account Executive for more information or reservations. Enroll in a course using one of the following methods.

- 1-888-LUCENT8 (1-888-582-3688). Call the training coordinator for your company to get information on these and other training courses available, on schedules, fees, and registration. If your company does not have an assigned training coordinator, call this toll-free number [1-888-LUCENT8 (1-888-582-3688)] Monday through Friday, 7:30 a.m. to 5:30 p.m. EST. Use this number to order a product training catalog, get more information about a course, find out about new courses, or to register for a class. However, in Canada, please call 1-800-221-1647.

When you call 1-888-LUCENT8, select Option 2 (press 2 one time on a touchtone phone) for Lucent Technologies product training.

- COMCATS. You may also use a computer and modem to log into the online catalog, computerized catalog system (COMCATS). Set your terminal options to the following values.
 - 300/1200/2400 baud rate
 - Full duplex
 - Space parity
 - 7 data bits
 - 1 stop bit

dial:	1-800-662-0662 or 614-764-5566
login:	comcats
password:	at&tcat

If you have trouble accessing COMCATS, call 1-888-LUCENT8 and ask to speak with the COMCATS Administrator.

Technical support

For technical support, contact the appropriate supplier, either AG Communication Systems or Lucent Technologies, as follows:

AG Communication Systems

AG Communication Systems provides customer assistance for the *SuperLine* Access System including, but not limited to, troubleshooting assistance, technical consultation, operational problem consultation, procedural advice, and emergency recovery assistance from a qualified system support professional.

If you have technical information questions, contact the Customer Support Center (CSC) by telephone at 1-888-888-AGCS (1-888-888-2427) or by electronic mail at superlinehelp@agcs.com.

If you need help with installing or operating *SuperLine* EM or Multi-EM, contact the Customer Support Center.

If you need help to resolve problems with *SuperLine* IADs, refer to the *SuperLine Access System Troubleshooting* manual or the *SuperLine Integrated Access Device Model 6512-A2 Installation Instructions* document provided by Paradyne Corporation, a partner in *SuperLine* development.

For more information about the *SuperLine* Access System, contact your AG Communication Systems technical sales staff or visit our Web site at www.agcs.com (from outside the United States: www.agcs.com.us).

Lucent Technologies Regional Technical Assistance Center (RTAC)

Lucent Technologies provides customer assistance for the *SuperLine* Access System including, but not limited to, troubleshooting assistance, technical consultation, operational problem consultation, procedural advice, and emergency recovery assistance from a qualified system support professional from the Regional Technical Assistance Center (RTAC).

- 1-800-225-RTAC (1-800-225-7822). Service is provided from the RTAC at 1-800-225-RTAC (1-800-225-7822). This telephone number is monitored 24 hours a day, 7 days a week. During regular business hours, your call will be answered by your local regional RTAC. Outside normal business hours, all calls will be answered at a centralized technical assistance center where service-affecting problems will be dispatched immediately to your local RTAC. All other problems will be referred to your local RTAC on the next regular business day.

How to comment Contact the appropriate supplier, either AG Communication Systems or Lucent Technologies, as follows:

AG Communication Systems

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Lucent Technologies

Please use one of the two feedback forms that are located immediately after the legal page of this document.

Missing feedback forms

If the feedback forms are missing, please send your comments and suggestions to the following location.

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Lucent Technologies
240 E. Central Parkway
Altamonte Springs, FL 32701-9928

How to order Contact the appropriate supplier, either AG Communication Systems or Lucent Technologies, as follows:

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To order copies of documents, send or call in an order.

Mail Order	Telephone Order (Monday through Friday)
AG Communication Systems ATTN: Order Fulfillment P.O. Box 52179 Phoenix, AZ 85027	Within USA: 1-623-581-4263 7:30 a.m. to 4:00 p.m. MST FAX: 1-623-582-7840

For more information

For more information about other *SuperLine* Access System products, contact your AG Communication Systems technical sales staff or visit our Web site at www.agcs.com (from outside the United States: www.agcs.com.us).

Lucent Technologies

To order copies of documents and/or to request placement on the standing order list, send or call in an order.

Customer	Mail Order	Telephone Order (Monday through Friday)
Commercial Customers a.	Lucent Technologies Customer Information Center ATTN: Order Entry Center 2855 N. Franklin Road P.O. Box 19901 Indianapolis, IN 46219	Within USA: 1-888-LUCENT8 or 1-888-582-3688 7:30 a.m. to 6:30 p.m. EST From Canada: 1-800-255-1242 Worldwide: 1-317-322-6416 FAX: 1-317-322-6699
RBOC/BOC	Process through your Company documentation coordinator.	
a. For commercial customers, a check, money order, purchase order number, or charge card number is required with all orders. Make checks payable to Lucent Technologies. Lucent Technologies entities should use Form IND 1-80.80 FA, available through the Customer Information Center.		





1 *SuperLine* Access System overview

Overview

Introduction This chapter presents high level descriptions of the AG Communication Systems *SuperLine*[™] Access System concept and provides examples of its application in a business and home environment.

In this chapter This chapter covers the following topics.

Topic	Page
Introduction to the <i>SuperLine</i> Access System	1-2
<i>SuperLine</i> Access System application models	1-5



Introduction to the *SuperLine* Access System

***SuperLine* Access System defined**

Important: Additional phone lines are called derived because the *SuperLine* devices “derive” them from the data transmitted above the normal voice or baseband line.

SuperLine Access System technology enables telephony service providers to provide subscribers up to two additional derived phone lines as well as a 10Base-T Ethernet data channel. All three transports share the same copper twisted pair connection as the baseband voice line (on the existing subscriber loop). In addition, Telephone Company (Telco) personnel are not needed at the customer premises.

To accomplish this, the subscriber installs the *SuperLine* Integrated Access Device (IAD) at their premises. One or more *SuperLine* Access Shelves are installed at the Central Office (CO) local digital switch.

Installing the *SuperLine* IAD does not affect the voice service the subscriber is accustomed to receiving on their baseband phone line.

***SuperLine* telephony services**

Each additional derived line has a unique Directory Number (DN), in addition to the existing line and DN already assigned to a subscriber’s baseband phone service. A subscriber can also make and receive calls on both derived voice phone lines while simultaneously making or receiving a baseband phone call.

The *SuperLine* phone service provides full support for Custom Local Area Signaling Services (CLASS) features, Caller ID service, touchtone-based custom calling features, and other custom calling features that use a hookflash.

***SuperLine* data services**

Important: Voice calls take priority over the Ethernet data connection. The Ethernet data rate delivered to subscribers is a function of loop loss, and whether the derived voice lines are in use.

SuperLine data services offer data bandwidth that is shared between derived telephony and Ethernet data services.

SuperLine data services allow a subscriber to access a data network by connecting a computer, with a standard 10Base-T Ethernet Network Interface Card (NIC), to the 10Base-T Ethernet port of the *SuperLine* IAD. Subscriber data is routed to the Local Area Network (LAN) or Wide Area Network (WAN) using the *SuperLine* Access Shelf.

A subscriber can use the baseband line, both derived telephone lines, and the data connection at the same time (assuming sufficient bandwidth is available).

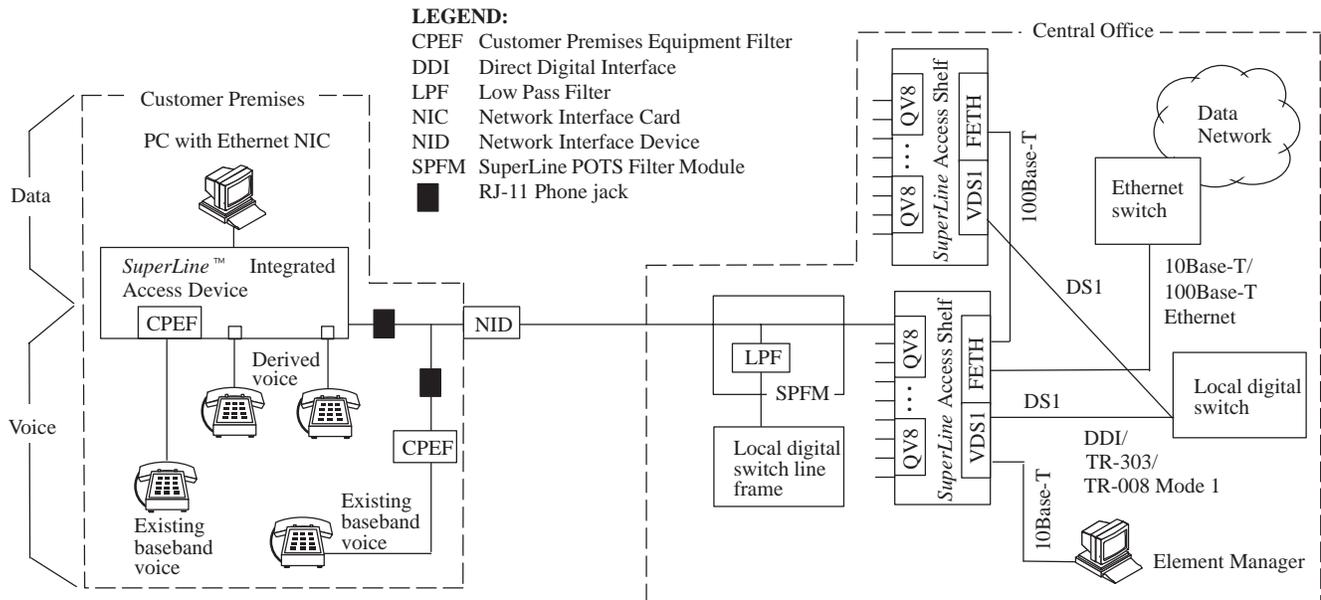
- SuperLine* technology** *SuperLine* technology uses standard Dual Tone Multifrequency (DTMF) or touchtone phones.
- A *SuperLine* subscriber loop is spectrally compatible with Integrated Services Digital Network (ISDN) technology, so the impact of *SuperLine* on the network is minimal. The standard 0- to 4-kHz Plain Old Telephone Service (POTS) spectrum supports baseband voice services.
- Software functions** The *SuperLine* Access Shelf has an Element Manager (EM) interface. Telco personnel can use the EM to do configuration management, fault management, and system management tasks.
- For more information, refer to ***SuperLine* Element Manager** and **Multi-Element Manager** in the Element Management chapter.
- For detailed information, refer to the *SuperLine Access System Element Manager User's Guide*.
- Network architecture** The *SuperLine* Access System provides a flexible framework for multiplexing user traffic from multiple derived lines into a network feeder connection to a standard local digital switch. In a typical *SuperLine* network:
- One or more *SuperLine* Access Shelves, equipped with line cards and common cards, are installed at the CO local digital switch.
 - The POWR card provides the power to the *SuperLine* Access Shelf.
 - The Voice Digital Signal 1 (VDS1) card has Digital Signal Level 1 (DS1) connections to the local digital switch.
 - The Fast Ethernet (FETH) card has a 10/100Base-T Ethernet connection, using an Ethernet switch or router, to a customer's data network or another *SuperLine* Access Shelf.
 - The Quadrature Amplitude Modulation Voice 8 (QV8) line card connects up to eight *SuperLine* IADs.
 - The *SuperLine* POTS Filter Module (SPFM) provides the interface between the local digital switch and the *SuperLine* Access Shelf
 - The *SuperLine* IAD provides the derived telephony and data connections at the subscriber's premises.

Network architecture figure

Important:

1. Refer to the *SuperLine Integrated Access Device Model 6512-A2 Installation Instructions* for information on the configuration of the SuperLine IAD, and the *Model 6035 Phone Filter Installation Instructions* for information on the CPE filter.
2. To connect a PC, a crossover cable is required. To connect a hub, a straight-through Ethernet cable is required.
3. When connecting multiple PCs to the SuperLine IAD, a hub is required.

The following figure shows a typical SuperLine Access System network.



SuperLine™ is a trademark of AG Communication Systems.



SuperLine Access System application models

Work-at-home model

The following are work-at-home *SuperLine* Access System models:

- The existing baseband voice line plus two additional derived business lines. Each of the new derived lines supports V.90 analog modems, fax, and all standard business features.
- The existing baseband voice line plus two additional derived business lines and a full-time Ethernet connection. Each of the new derived lines supports V.90 analog modems, fax, and all standard business features.

Small business model

The *SuperLine* Access System small business model supports an existing baseband voice line and a second and third business line. In this arrangement, the second and third business lines can carry dial-up modems for internet access or data transfer (for example, electronic bill payment).

A *SuperLine* IAD with high-speed Internet access supports a primary business line and second and third business lines. In addition, a connection to a community-of-interest server may be available.

Examples:

- Doctor's office connected to a regional hospital health network
- Real estate office connected to a multiple listing service
- Insurance company connected to a network of providers





2 *SuperLine* Access System Hardware

Overview

Introduction This chapter details the operation of each card in the AG Communication Systems *SuperLine*™ Access Shelf and explains the role of the *SuperLine* Integrated Access Device (IAD) and the *SuperLine* POTS Filter Module (SPFM) in the *SuperLine* Access Shelf.

This chapter covers the following topics.

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<i>SuperLine</i> Access Shelf	2-2
<i>SuperLine</i> Integrated Access Device	2-6
POWR card	2-8
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FETH card	2-13
QV8 line card	2-15
<i>SuperLine</i> POTS Filter Module assembly	2-16



SuperLine Access Shelf

Introduction The *SuperLine* Access Shelf is used as a concentrator to connect *SuperLine* derived voice lines and Ethernet data channels on a single copper pair that carries the existing baseband voice line.

The maximum number of derived voice lines depends on the telephony protocol, as shown in the table below.

Telephony protocol	Maximum number of lines		
	Baseband voice*	Derived voice	Ethernet
DDI, TR-008 Mode 1	96	96	96
TR-303	96	192	96
*Two-wire single-party loop start.			

Effect on existing CO environment Installing the *SuperLine* Access Shelf has little effect on existing equipment at the CO local digital switch except for new cable connections. For information about these connections refer to the *SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance* manual.

Shelf components The *SuperLine* Access Shelf has the following components:

- A shelf housing that includes a shelf and a backplane circuit board with connectors for shelf electronics
- A baffle for convection cooling and ventilation

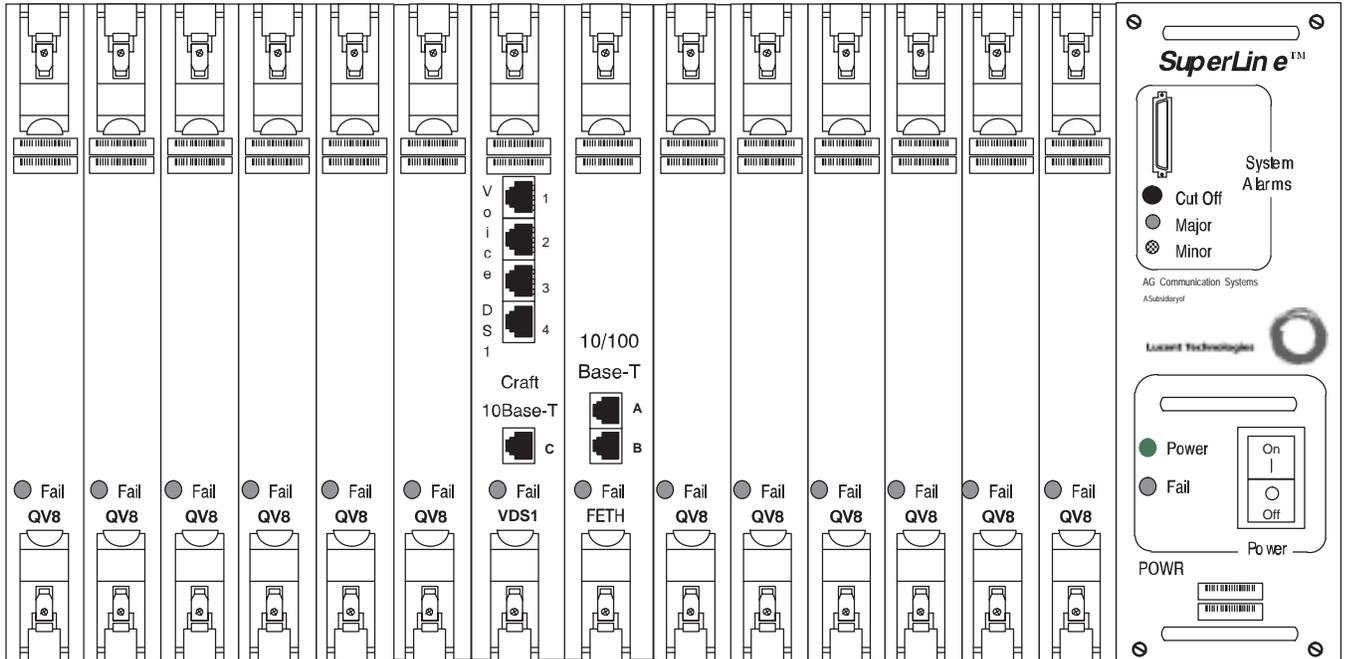
SPFM assembly Each *SuperLine* Access Shelf must be equipped with an SPFM assembly. Refer to the **SuperLine POTS Filter Module assembly** topic in this chapter.

Card types There are four types of cards in the *SuperLine* Access Shelf:

- The Voice Digital Signal 1 (VDS1), which manages voice traffic
- The Fast Ethernet (FETH) card, which handles Ethernet traffic
- Quadrature Amplitude Modulation Voice 8 (QV8) line card, which supports eight *SuperLine* circuits
- The POWR card, which provides power to shelf electronics and acts as the primary display panel for the shelf.

The *SuperLine* shelf cards are described in greater detail in this chapter.

Shelf front view The following figure shows the front of the *SuperLine* Access Shelf.



Traffic routing The *SuperLine* IAD creates packetized voice data and sends the voice packets to the *SuperLine* Access Shelf VDS1 card where the packets are interworked with the voice DS1s.

The *SuperLine* IAD forwards packetized Ethernet data to the *SuperLine* Access Shelf FETH card where it is forwarded to the 10/100Base-T port A. (This is the top port of the two 10/100Base-T ports on the FETH card.)

The *SuperLine* Access Shelf uses the 10/100Base-T port A to provide access to a data network. The 10/100Base-T port B may be daisy-chained to a single subtended *SuperLine* Access Shelf.

Example: Port A of the subtended *SuperLine* Access Shelf connects to port B of the superordinate *SuperLine* Access Shelf.

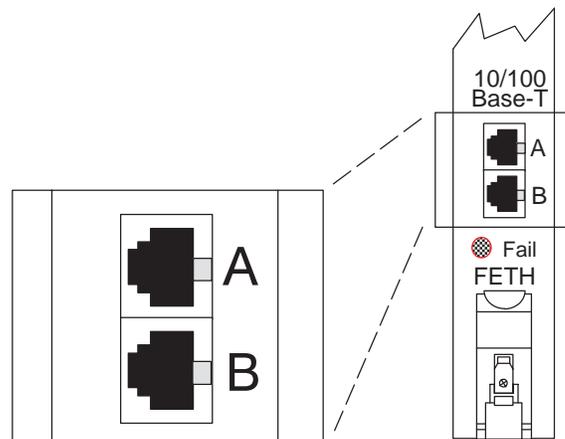
Ethernet interfaces

The *SuperLine* Access Shelf provides the following interfaces, which comply with Institute of Electrical and Electronic Engineers (IEEE) 802.3:

- For access to the *SuperLine* Element Manager (EM) interface, craft personnel can use the 10Base-T Ethernet port on the VDS1 card. This interface provides 10 MB over two pairs of Unshielded Twisted Pair (UTP) cable per IEEE-802.3 Clause 14.
- Access to the EM can also be provided using the 10/100Base-T ports on the FETH card. For detailed information and configuration procedures refer to the *SuperLine Access System Element Manager User's Guide*.
- A *SuperLine* Access Shelf supports two additional, dual speed (10/100Base-T) interfaces on the FETH card. These interfaces provide 100 MB over UTP cable per IEEE-802.3 Clauses 24 and 25. One of the 100Base-T interfaces provides a connection to the Local Area Network (LAN) or Wide Area Network (WAN). The other 100Base-T interface is used to interconnect *SuperLine* Access Shelves. The 10/100Base-T interfaces are supported by the FETH card. The desired port running speed is user-provisionable; however, the actual rate is determined by the hardware and does not exceed the user-specified rate.

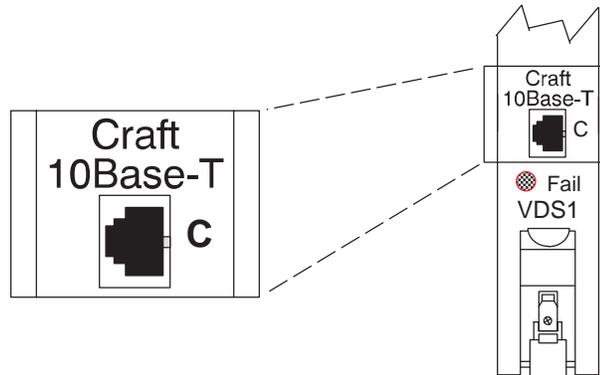
FETH card 10/100Base-T connectors

This figure shows the 10/100Base-T ports on the FETH card.



VDS1 card 10Base-T connector

This figure shows the 10Base-T connector on the VDS1 card.

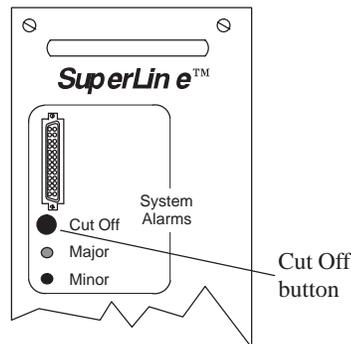


Alarms

The *SuperLine* Access Shelf detects all system equipment failures, power failures at local and remote facilities, DS1 faults, and DS1 loopback conditions. It reflects such failures by setting appropriate system alarms, fail indicators, or both. An alarm cutoff button on the *SuperLine* Access Shelf allows Telco personnel to silence audible alarms triggered by major alarm conditions. Refer to the *SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance* manual for descriptions of specific alarms.

Cut Off button

This figure shows the Cut Off button on the POWR card.



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Daisy-chaining shelves

Two *SuperLine* Access Shelves may be connected together (daisy-chained) to connect to one network access point. Two *SuperLine* Access Shelves can be daisy-chained to minimize the number of Wide Area Network (WAN) ports required on a WAN access device. Data not destined for a shelf is transported transparently from one shelf to the next until it reaches its destination or leaves the daisy-chain and enters the data network. This has no effect on the derived line services from each shelf.

□

SuperLine Integrated Access Device

SuperLine IAD described

Important: A PC is required for high-speed Ethernet data services.

The *SuperLine* IAD is a voice/data device that allows a residential or business subscriber to have up to two derived phone lines and an Ethernet line in addition to their existing baseband phone line, with all services using the existing copper pair. The *SuperLine* IAD resides at the customer premises to support *SuperLine* Access System services.

Once a subscriber installs the *SuperLine* IAD at their site, they may use the lines as though they were provided by traditional means. These lines may be wired into additional rooms and can support extensions.

Each *SuperLine* IAD contains one internal Customer Premises Equipment (CPE) filter that serves the baseband voice line and one CPE filter for an additional baseband voice line.

For additional information about the *SuperLine* IAD, refer to the *SuperLine Integrated Access Device Model 6512-A2 Installation Instructions*.

Relationship to SuperLine Access Shelf

To make *SuperLine* Access System service possible, the subscriber's baseband cable pair must be wired to the *SuperLine* Access Shelf.

The *SuperLine* Access Shelf and *SuperLine* IAD pair, along with connection support devices such as RJ-11, RJ-45, RJ-48C and 10Base-T Ethernet cables, are required to provide the complete *SuperLine* Access System service for the Telco.

Fit with customer premises equipment

One of the main advantages of the *SuperLine* Access System services is that installing the *SuperLine* IAD requires no changes, by the Telco, to home wiring or to the existing copper pair telephone connection. The only new wiring required for *SuperLine* Access System service consists of cables between the *SuperLine* IAD and the existing RJ-11 phone jack and between the *SuperLine* IAD and the subscriber's telephones, fax machines, or modems.

In addition:

- All phones at the customer premises must be touchtone phones.
- The subscriber must install a CPE filter on all phones attached to the original baseband line within the customer premises. CPE filters eliminate interference from the derived phone lines on baseband voice service, and vice versa. CPE filters are NOT needed for the derived phone lines. One external CPE filter is provided with each *SuperLine* IAD. For additional CPE filters contact your *SuperLine* sales representative.

Other SuperLine IAD characteristics

Other SuperLine IAD characteristics include:

- Supports V.90 modem speeds
- Supports a fax device of type ITU-T V.17 class I, II, or III on either the baseband voice line or a derived phone line
- Front panel indicators that show the status of:
 - SuperLine IAD power (PWR)
 - Active alarms, if any (ALM)
 - Test indicator LED (TST)
 - The connection to the local telephone company (LINE)
 - The Ethernet connection to the subscriber's PC or Ethernet Hub (ETHERNET)
- Powered locally using house current regulated by an AC power transformer (provided)

□

POWR card

Power supply

The POWR card provides regulated power conversion for the *SuperLine* Access Shelf. The POWR card:

- Indicates out-of-tolerance power outputs by illuminating a red Fail Light Emitting Diode (LED)
- Provides power for the shelf's red major alarm LED and a yellow minor alarm LED
- Stops audible alarm connections when a Telco technician presses the alarm Cut Off button
- On/Off rocker switch
- Output for major alarms

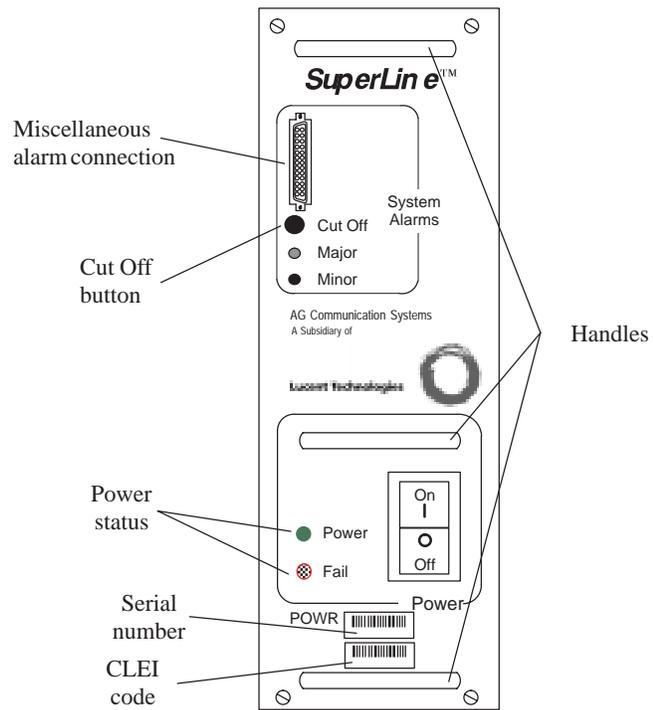


CAUTION

The SuperLine Access Shelf must be powered down (using the On/Off switch on the POWR card) before the POWR card can be installed or replaced.

The POWR card is NOT hot swappable.

POWR card figure The following figure shows the front panel of the POWR card.



POWR card alarms For detailed definitions of POWR card alarms and alarm pinout information, refer to the *SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance* manual.

□

VDS1 card

Description The VDS1 card performs the following functions for the *SuperLine* Access Shelf:

- Host Central Processor Unit (CPU)
- Craft 10Base-T connection
- DS0 channel assignments and timeslot interchange
- DS1 physical interfacing to local digital switch
- Network clock synchronization

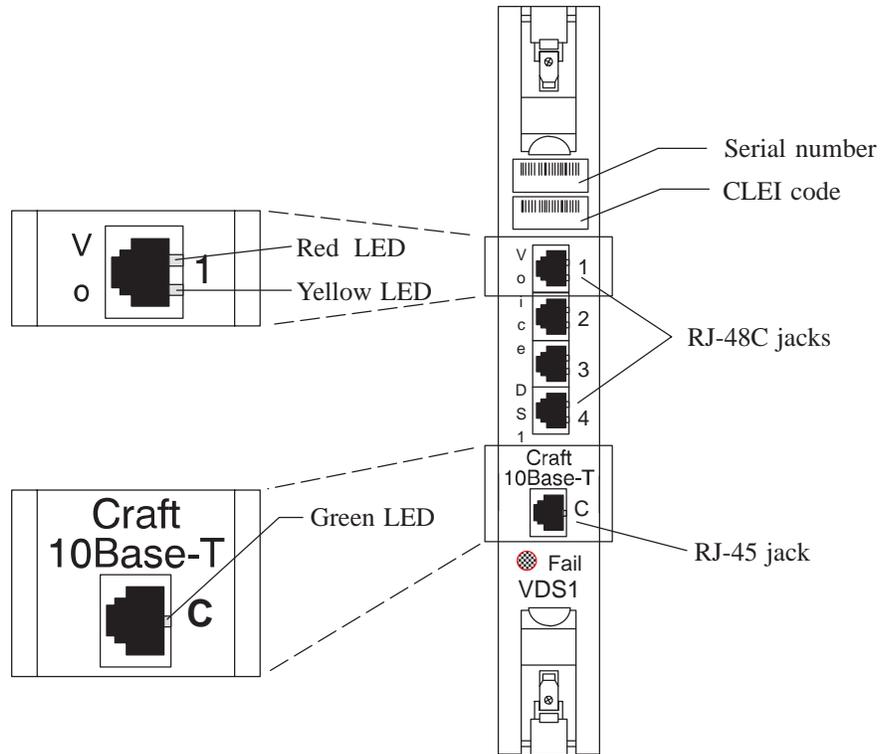


CAUTION

The SuperLine Access Shelf must be powered down (using the On/Off switch on the POWR card) before the VDS1 card can be installed or replaced.

The VDS1 card is NOT hot swappable. Equipment damage may result if the VDS1 card is removed and the shelf is NOT powered off.

VDS1 card The following figure shows the front view of the VDS1 card. The card has four DS1 ports, labeled 1–4, and one Craft 10Base-T connection, labeled C.



LED indicators

When red or yellow LEDs light after normal power-up during initialization, the red local alarm LED or yellow remote alarm LED light to indicate an alarm condition.

The green link integrity LED on the Craft 10Base-T port lights when the port has a valid connection.

During normal power-up, the Fail LED lights until the card has initialized, then goes dark. The Fail LED also lights when the card is re-initialized, when the card has failed, or during certain reset and initialization processes.

Host CPU function

The host CPU on the VDS1 card acts as the control point for collecting and reporting data about the shelf and the SuperLine IAD to the SuperLine Element Manager. It receives and distributes the software load images for subtending processors. It also does provisioning and timeslot management for the voice DS1s.

All administrative messages associated with the SuperLine EM, including provisioning messages, data collection messages, and software download data, flow through the host CPU. The VDS1 card also includes the Craft 10Base-T connection (port C) for the SuperLine Element Manager.

DS0 channel assignments and timeslot interchange

The VDS1 card contains circuitry that allows the card to perform DS0 channel assignments, as instructed by the host CPU, and the voice Timeslot Interchange (TSI) function.

- DS1 physical interface** A Quad DS1 transceiver, a Quad line driver, and accompanying magnetics provide the DS1 physical interface.
- The DS1 transceiver provides the Extended Superframe (ESF) framing for DDI and TR-303 telephony types and SLC 96 Superframe (SF) Format for TR-008 Mode 1 telephony type.
 - The DS1 line driver provides Alternate Mark Inversion (AMI) used in TR-008 Mode 1 telephony mode and Bipolar 8 Zero Substitution (B8ZS), used in DDI and TR-303 telephony modes.
- Network clock synchronization** The *SuperLine* Access Shelf uses two DS1 lines for attaining network clock synchronization. The DS1 input stream (from the network) switches automatically from the primary DS1 (DS1-1) to the secondary DS1 (DS1-2) to provide synchronization to the shelf when synchronization is not attainable using the primary DS1. The reverse is true if synchronization is lost on the secondary DS1. If a signal is not available from either DS1, the shelf uses its internal clock source (free runs).
- 10Base-T support** The Craft 10Base-T port supports a half duplex 10Base-T connection.
- RJ-45 and RJ-48C jack and pin connections** For a detailed explanation of these connections and pinout tables, refer to the *SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance* manual.

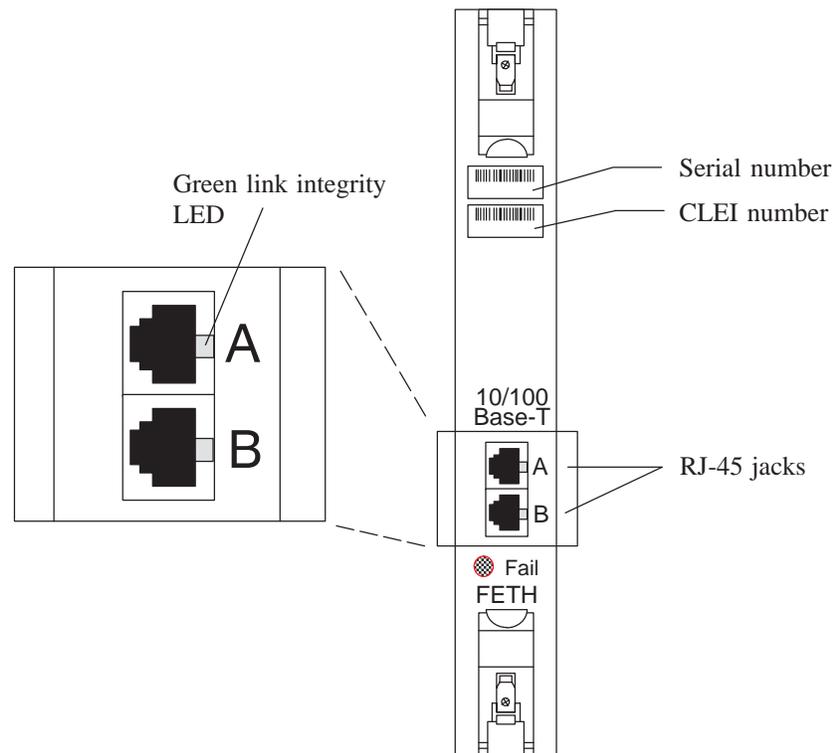
□

FETH card

Purpose Important: Only two *SuperLine* Access Shelves may be daisy-chained.

The Fast Ethernet (FETH) card interconnects up to 12 QV8 line cards to the VDS1 card using a 10Base-T Ethernet connection, one connection per card. The FETH card also has two 10/100Base-T Ethernet ports, labeled A and B. port A provides the shelf connection to the data network. Port B, if it is used, connects the master (main) shelf to Port A on a subordinate shelf when shelves are daisy-chained. The subordinate shelf has no connection to the data network except through the master.

FETH card The following figure shows the front panel of the FETH card.



CAUTION

The SuperLine Access Shelf must be powered down (using the On/Off switch on the POWR card) before the FETH card can be installed or replaced.

The FETH card is NOT hot swappable. Equipment damage may result if the FETH card is removed and the shelf is NOT powered off.

LED indicators The green link integrity LEDs, located on the RJ-45 connectors, light when the port has a valid connection.

During normal power-up, the Fail LED lights until the card has initialized, then goes dark. The Fail LED also lights when the card is re-initialized, when the card has failed, or during certain reset and initialization processes.

10Base-T support Important: When external equipment is attached to the FETH card, the best rate is automatically negotiated. However, the rate does not exceed the limit imposed by provisioning.

From the *SuperLine* EM, the FETH's maximum port running speed can be provisioned. The running speed choices are:

- 10Base-T half duplex
- 10Base-T full duplex
- 100Base-T half duplex
- 100Base-T full duplex

Craft interface Access to the *SuperLine* Element Manager (EM) craft interface can be attained using the 10/100Base-T ports on the FETH card. For specific information and configuration procedures, refer to the *SuperLine Access System Element Manager User's Guide*.

RJ-45 jack and pin connections For a detailed explanation of this connection and a pinout table, refer to the *SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance* manual.

□

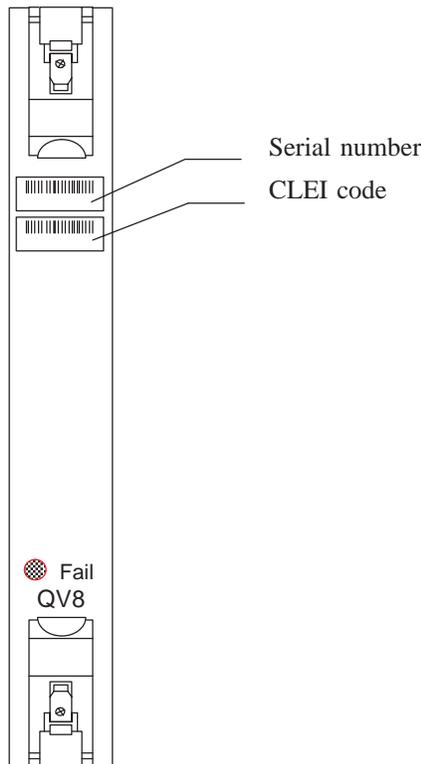
QV8 line card

Purpose Each QV8 line card multiplexes up to 8 Ethernet ports and 16 derived voice lines.

Card installation/removal QV8 line cards ARE hot swappable. That is, Telco personnel can install them into, or remove them from, a *SuperLine* Access Shelf when shelf power is on without damaging the card or disrupting service (voice or Ethernet) on other shelf cards.

LED indicator A single Light Emitting Diode (LED) on the QV8 front panel, labeled Fail, shows the card's status. During normal power-up, the Fail LED lights until the card has initialized, then goes dark. The Fail LED also lights when the card is re-initialized or when the card has failed.

QV8 card figure The figure below shows the front panel of the QV8 line card. A maximum of 12 QV8 line cards can be installed in one *SuperLine* Access Shelf.



SuperLine POTS Filter Module assembly

SPFM described The *SuperLine* POTS Filter Module (SPFM) is a passive filter splitter. It provides the interface between the local digital switch and the *SuperLine* subscriber lines (baseband voice lines) connected to the *SuperLine* Access Shelf and the External Facilities equipment.

The SPFM assembly has the following functions:

- Provides the bandsplitting function for the *SuperLine* Access Shelf.
- Supports up to 96 baseband voice lines.
- Provides low-pass filtering to protect baseband voice line cards against interference from derived line frequencies.
- Provides secondary lightning and power cross protection.

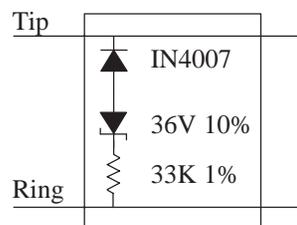
The SPFM is connected to the *SuperLine* Access Shelf with 50-pin Telco connectors.

Added maintenance test signature circuit

To allow the SPFM to be managed by the network maintenance systems and to be identified by metallic loop test systems, the SPFM contains maintenance test signatures that are recognized only by the metallic test systems. The maintenance test signature is active only during the maintenance test mode and does not interfere with normal operation of the line.

Maintenance test signature

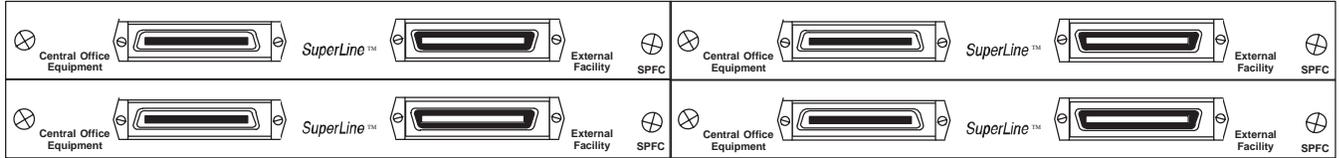
As required by ANSI T1.413 Annex E, all CO-end SPFMs have the same maintenance test signature on each tip and ring pair.



SPFM front and rear views

Four *SuperLine* POTS Filter Cards (SPFC) are provided per SPFM, as shown in the figure below.

SPFM, front view



SPFM, rear view



SuperLine™ is a trademark of AG Communication Systems

CO Equipment and External Facilities connections

CO Equipment and External Facility connectors are located on the front panel of the SPFM.

The CO Equipment and External Facility cables may be connected together to maintain baseband voice service should an SPFC be removed and replaced.

For a detailed connection instructions, refer to the *SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance* manual.





3 Element Management

Overview

Introduction This chapter provides an overview of the AG Communication Systems' *SuperLine*™ Element Manager, the Multi-Element Manager, hardware requirements, parameters used to configure the *SuperLine* Access Shelf, and network configurations.

This chapter covers the following topics.

Topic	Page
<i>SuperLine</i> Element Manager	3-2
Multi-Element Manager	3-3
Hardware requirements	3-4
Setting <i>SuperLine</i> Access Shelf parameters	3-5
<i>SuperLine</i> Element Manager network configurations	3-8

□

SuperLine Element Manager

Introduction To provide Telco personnel with access locally or across the network data interface, the *SuperLine* Access Shelf uses an element manager interface. This interface enables Telco personnel to provision (set and retrieve) shelf attributes. The *SuperLine* EM uses Simple Network Management Protocol (SNMP) and enterprise Management Information Bases (MIBs).

What *SuperLine* EM does The *SuperLine* EM application enables Telephone company (Telco) craftpersons and technicians to do the following:

- Use a laptop, a Personal Computer (PC), or a Sun workstation to configure, manage, and monitor the status of *SuperLine* Access Shelf equipment.
- View alarms for trouble conditions at the *SuperLine* Access Shelf or on TR-303 message channels.
- Enable, disable, or monitor status of all derived lines and voice Digital Signal 1s (voice DS1s).
- Monitor and manage Internet Protocol (IP) routing for a *SuperLine* Access System's network and local interfaces.

Uses of *SuperLine* EM *SuperLine* EM is designed for use by:

- Small Independent Telephone Operating Companies (ITOCs) and other *SuperLine* Access System customers whose communication networks are small, or who want to minimize costs of system management.
- The craftperson who configures *SuperLine* Access Shelves or maintains shelf equipment (for example, replaces circuit packs).
- Craft or other personnel at the local digital switch who do local network administration.
- The person responsible for provisioning subscriber lines, the *SuperLine* Access Shelf, or both.

Operating systems *SuperLine* EM runs under the following operating systems:

- Microsoft *Windows NT*® version 4.0 (supported)
- Sun™ Microsystems *Solaris*™ version 2.6 or higher (supported)
- Microsoft *Windows*® 95 or 98 (only one *SuperLine* Access Shelf per session is supported by the *SuperLine* Element Manager).

SuperLine EM operates as a stand-alone application that runs directly under the operating system where it is installed.

□

Multi-Element Manager

Introduction For customers who use Hewlett-Packard *OpenView*® Network Node Manager (NNM) product to manage their data networks, Lucent Technologies and AG Communication Systems provide an application called Multi-Element Manager (Multi-EM). Sold separately as an enhancement to *SuperLine* Access Systems, Multi-EM is a version of *Superline* EM that runs under *OpenView*; it allows *OpenView* NNM to monitor and manage *SuperLine* Access Shelves as network nodes.

What Multi-EM does Many Network Operations Centers (NOCs) and other organizations that operate large communication networks prefer to automate network management, using an application such as the *OpenView* NNM application. For such organizations, Lucent Technologies and AG Communication Systems offer Multi-EM, a version of *SuperLine* EM that runs as an integrated add-on to *OpenView* NNM.

Multi-EM enables *OpenView* NNM to monitor and manage *SuperLine* Access Shelves as network nodes. *OpenView* NNM uses Multi-EM as a Simple Network Management Protocol (SNMP) agent for collecting status and alarm information about *SuperLine* Access Shelves and their equipment.

Uses of Multi-EM Multi-EM is designed for use by:

- Administrators of large communication networks that include multiple *SuperLine* Access Shelves and other devices. These devices may all be installed at one local facility, or they may be scattered among multiple remote locations. Multi-EM allows network administrators at this level to see what is happening locally at *SuperLine* Access Shelves.

When a problem occurs on a *SuperLine* Access Shelf at a remote site, the administrator can notify craftpersons at that site that they need to take corrective actions.

Operating systems Multi-EM runs under the following operating systems

- *Windows NT*
- *Solaris* version 2.6

Multi-EM users must meet the same software and hardware requirements as users of *SuperLine* EM, but must also meet *OpenView* NNM's software and hardware requirements.

Multi-EM operation depends on *OpenView* NNM, and vice versa. For example, you receive a warning message if you try to install Multi-EM on a PC or a UNIX server when *OpenView* NNM is not already installed.

□

Hardware requirements

Introduction The EM runs on an IBM-compatible PC or laptop that serves as the craft interface terminal for the *SuperLine* equipment. The EM application has the following hardware requirements.

Recommended hardware Recommended hardware requirements include an IBM-compatible PC with Intel Corporation's *Pentium*® or *Pentium II* (266 MHz or more) processor, 96 MB of RAM, and at least 20 MB of free hard disk space. The PC should also have a mouse, a color monitor with a minimum screen resolution of 1024 x 768 pixels, and a Network Interface Card (NIC).

Minimum hardware Minimum hardware requirements include an IBM-compatible PC with a 166 MHz or faster processor, 64 MB of RAM, and at least 20 MB of free hard disk space. The PC should also have a mouse, a color monitor with a minimum screen resolution of 600 x 800 pixels, and a NIC.

Additional requirements In addition, a crossover cable is required to directly connect the *SuperLine* Access Shelf to the PC running the EM if a local connection is required. This cable can be purchased from AG Communication Systems as part number EC-26806-Axx, where xx is one of the following:

- an increment of 5 feet, if the cable is between 5 and 25 feet long
- an increment of 25 feet, if the cable is between 25 and 325 feet long

□

Setting *SuperLine* Access Shelf parameters

Introduction The *SuperLine* EM interface is used to set parameters that control the *SuperLine* Access Shelf. This topic provides a comprehensive list of each parameter, a description of each parameter, and the *SuperLine* EM tab screen where the parameter is located.

For detailed procedures, refer to the *SuperLine Access System Element Manager User's Guide*.

Setting the Management field This parameter protects the security of *SuperLine* Access Systems by allowing you to determine if someone at the remote side of the *SuperLine* Access System can do system management.

The *Management* drop-down list box is located on the System tab screen.

Setting the Trap ID field This parameter sets the Internet Protocol (IP) address of a permanent trap log. This log can be a *SuperLine* EM that is always running on a computer on the network, or can be a workstation running *OpenView* NNM or any other trap collection software. Only one permanent trap IP is allowed, so only that IP can receive traps from *SuperLine* Access Shelves in the network.

The *Trap ID* field is located on the System tab screen.

Setting or changing SNMP community strings This parameter sets the Get and Set Community text strings currently in use. The Community toolbar button is located on the System tab screen.



CAUTION

Changing SNMP Get and Set Community strings requires any entities who can access the SuperLine Access Shelf by way of SNMP to know the new strings. If you change the community strings, be sure to record the new strings somewhere. You will need to enter the new strings the next time you try to connect to the shelf.

Enabling or disabling error/alarm traps This parameter enables or disables trapping. Setting the box to Enable allows SNMP to detect alarm or error conditions on the *SuperLine* Access Shelf and notify *SuperLine* EM or Multi-EM that the condition exists. *SuperLine* EM then notifies you by documenting the alarm in its Event Logs (Multi-EM documents the item in the *OpenView* NNM event log) and by indicating the alarm on other tab screens.

The Traps drop-down list box is located on the System tab screen.

Enabling or disabling authentication

This parameter enables or disables authentication traps. SNMP authenticates all SNMP messages that are sent to the *SuperLine* Access Shelf, by checking to see if the Get and Set Community strings sent in each message match those stored in the *SuperLine* Access Shelf. If the strings do not match, the SNMP message is rejected. If authentication traps are enabled, a trap is sent to the device at the Trap IP each time an SNMP message is rejected for lack of authentication.

The *Authentication Traps* drop-down list box is located on the System tab screen.

Setting time and date information

These parameters set the time zone at the *SuperLine* Access Shelf location and set the system date and time of the shelf's internal clock. In addition, up time is displayed; that is, the amount of time since the shelf was last powered up or reset.

The *Time Zone* pull-down list box, the *System Date* field, and *System Time* field are located on the System tab screen. The *Up Time* field is read-only.

Selecting the data mode

This parameter allows you to select one of four data modes: None, Point to Point, Switched, and Directed Switched. The data mode setting determines if subscriber lines support data service.

The *Data Mode* pull-down list box is located on the System tab screen.

For descriptions of each data mode available, refer to [Allocating data](#) in the Engineering guidelines chapter.

Selecting a transmission rate

Important: Setting the desired rate to a given value does *NOT* mean that the actual rate becomes that value. The actual rate reflects what the data rate is after the *SuperLine* IP port negotiates a rate with the IP device connected to that port. If the device connected to port A or port B supports the desired rate, that rate is used. If the port does not support that rate, then the actual rate becomes the rate supported by the connected device that is closest to the desired rate.

These parameters allow you to set the desired transmission rate of the 10/100Base-T port A and port B on the FETH card. In addition, actual transmission rates are displayed.

The *Desired Rate* pull-down list boxes are located on the IP Routing tab screen. The *Actual Rate* field is read-only.

Setting a shelf's IP address/mask

This parameter allows you to define an IP address and subnet mask for the *SuperLine* Access Shelf that the *SuperLine* EM or Multi-EM is currently monitoring. You can define an IP and mask for the shelf's network interface, its LAN interface, or both.

For important network configuration information, refer to [SuperLine Element Manager network configurations](#) in this chapter.

The Set IP/Mask toolbar button is located on the IP Routing tab screen.

- Setting line build outs** **Important:** Specify the line build out before you enable its associated DS1. These parameters allow you to change the line build out for each enabled DS1. There can be one to four DS1s. A line build out is the distance between a *SuperLine* Access Shelf and the local digital switch. The *Line Build Out* drop-down list boxes are located on the Telephony tab screen.
- Enabling DS1s** This parameter allows you to enable from one to four DS1s for the *SuperLine* Access Shelf. The *DS1s Enabled* pull-down list box is located on the Telephony tab screen.
- Selecting a telephony protocol** This parameter allows you to select the type of telephony protocol that the *SuperLine* Access Shelf uses. Four options are available: None, DDI, TR-303, and TR-008 Mode 1. The *Telephony Type* drop-down list box is located on the Telephony tab screen.
- Setting derived lines/loop** This parameter allows you to select the number of derived lines per telephony loop. Seven options are available. For details about each of these seven options, refer to the [Setting derived lines per loop on the line cards](#) appendix. The *Derived Lines/Loop* drop-down list box is located on the Telephony tab screen.
- Enabling or disabling data support** This parameter allows you to enable or disable support for data transmission on *SuperLine* subscriber lines. You can enable or disable data support on multiple lines with one operation. The *Set Data State* drop-down list box is located on the Adapters tab screen.
- Setting the data ratio** This parameter allows you to specify the percentage of the data bandwidth that should be used to send data upstream, with the remaining bandwidth used for downstream data. The *Data Ratio Up/Down* drop-down list box is located on the Adapters tab screen.

□

SuperLine Element Manager network configurations

Management configuration types

You can configure management of the *SuperLine* Access System in one of three ways:

- Simple Local Area Network (LAN) configuration
- Complex LAN configuration
- Complex data configuration with simple LAN

For specific installation, configuration, and operating instructions, refer to the *SuperLine Access System Element Manager User's Guide*.

Simple LAN configuration

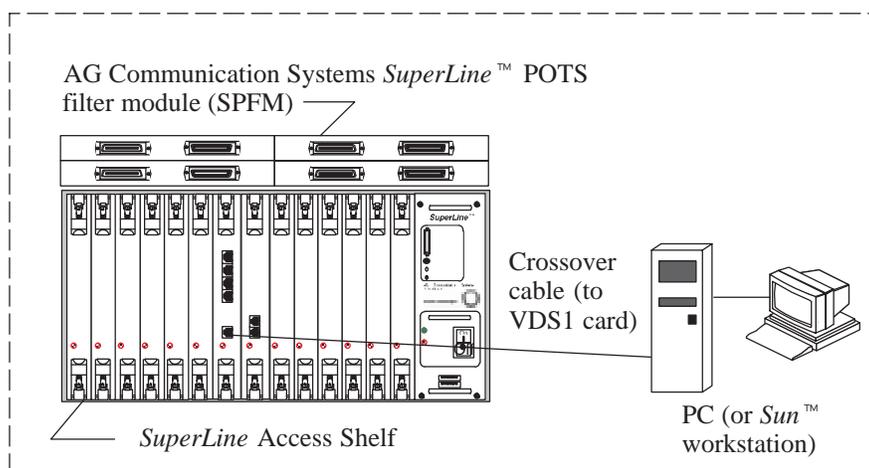
Important: In this configuration, both Multi-EM and *OpenView* NNM must be installed on the same PC or *Sun* workstation.

The simple LAN management configuration is identical to the configuration used to set up communication between *SuperLine* EM and the *SuperLine* Access Shelf; that is, the PC or workstation running *SuperLine* EM or Multi-EM connects directly to the *SuperLine* Access Shelf through the Craft 10Base-T port on the VDS1 card. This configuration is required to install *SuperLine* Access Shelf firmware for the first time, because the data port on the FETH card initially is disabled.

This configuration provides direct, out-of-band management. This type of management protects network security, because the channels carrying customer data and network management data are physically separate.

Simple LAN figure

The following figure shows a simple LAN management configuration.



Complex LAN configuration

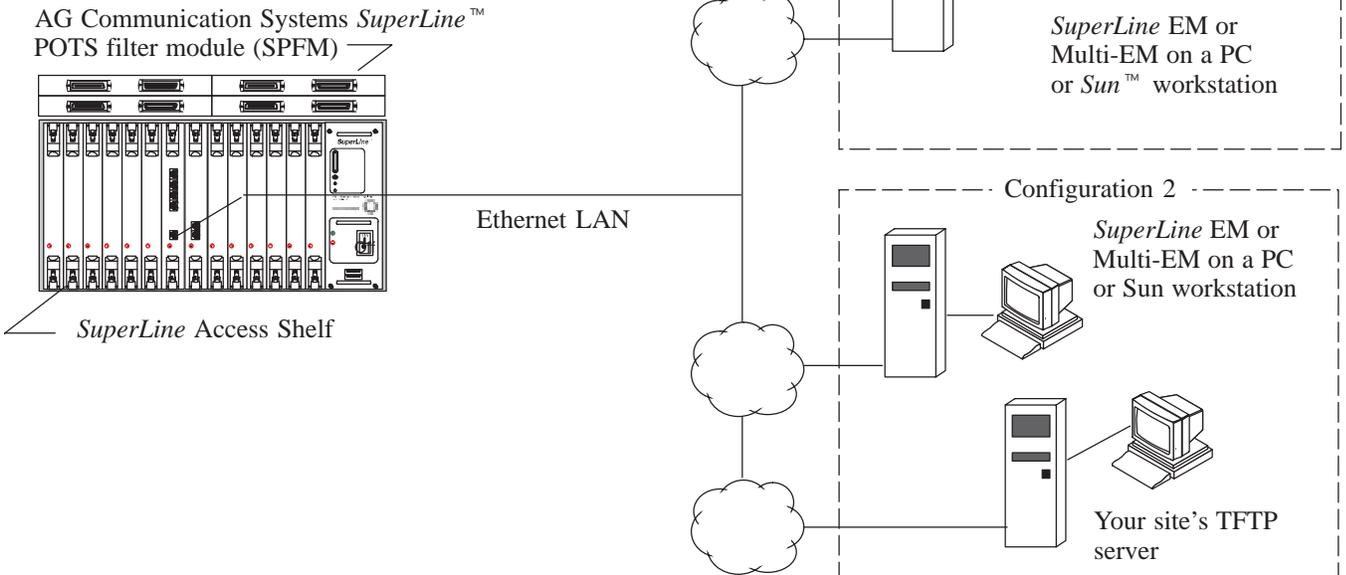
This management configuration resembles the simple LAN configuration, except that:

- The *SuperLine* Access Shelf is located on a subnetwork and has an *indirect* IP route to the default gateway.
- The PC or Sun workstation running *SuperLine* EM or Multi-EM is located remotely from the shelf.
- The PC and shelf are connected through a hub on the LAN that is connected to the Craft 10Base-T port on the VDS1 card.

Complex LAN configuration figure

The following figure shows the possible complex LAN management configurations.

Note: Ethernet cable is plugged into the Craft 10Base-T port on the VDS1 card.



Complex data network with simple LAN management

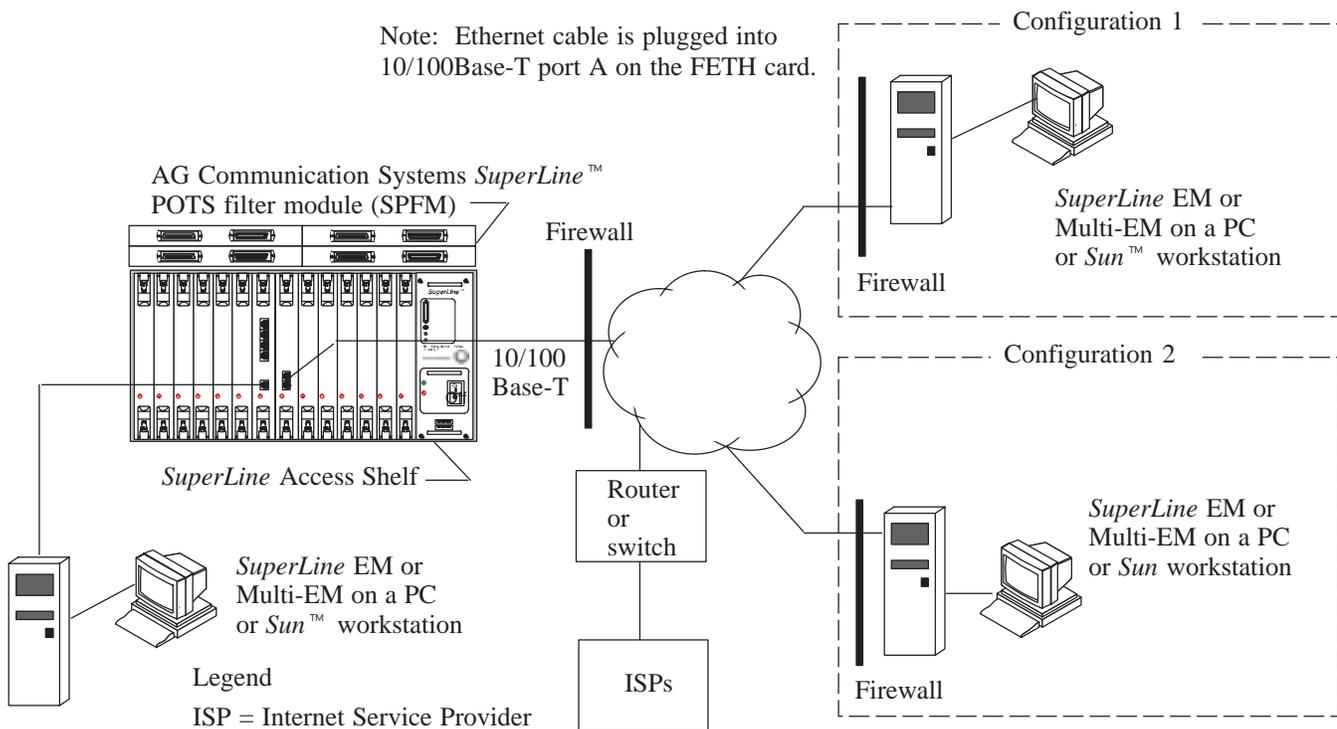
The third possible management configuration is a complex data network with a simple LAN. In this scenario:

- The PC or workstation running *SuperLine* EM or Multi-EM is connected remotely to the 10/100Base-T port on the *SuperLine* Access Shelf's FETH card.
- Another PC or workstation running *SuperLine* EM or Multi-EM uses a local LAN connection to the shelf through the VDS1 card. (A third PC or workstation may also be connected through the LAN.)
- The default gateway is an indirect route through the IP address for the data network.
- The type of network management is in-band, meaning that data and other traffic use the same network channel.

Be aware that *when you manage the SuperLine System using in-band management through the FETH card, people not authorized to access or make changes to your network may be able to do so.* To protect network security, insert firewalls between the *SuperLine* Access Shelf and the network, and between the machines hosting the TFTP server and *SuperLine* EM or Multi-EM.

Complex data/simple LAN configuration figure

The following figure shows the recommended configurations for a complex data network with a simple LAN. You can use either configuration to manage equipment once *SuperLine* Access Shelf firmware is installed and operating.



Configuration notes

Note the following:

- In both Configuration 1 and Configuration 2, *SuperLine* EM or Multi-EM can have access to several *SuperLine* Access Shelves.
- *SuperLine* EM software has built-in TFTP capability. However, you optionally can provide TFTP services to *SuperLine* EM through a TFTP server already existing at your site.
- Multi-EM software must be installed on the same machine as *OpenView* NNM software. In addition, Multi-EM requires access to a TFTP server.
- Connect no more than three PCs or *Sun* workstations to a *SuperLine* Access Shelf.





4 Engineering guidelines

Overview

Introduction This chapter presents engineering information useful in planning, configuring, and using AG Communication Systems *SuperLine*™ Access System services.

In this chapter This chapter covers the following topics.

Topic	Page
Allocating derived lines	4-2
Allocating data	4-4
Customer premises operating environment	4-7



Allocating derived lines

Allocating *SuperLine* phone lines

The *SuperLine* IAD supports up to two derived voice lines and one baseband voice line. Each line has a unique DN. There is no requirement to have derived lines and baseband lines terminate on the same switch. A Directory Number (DN) already assigned to an existing baseband phone line is typically not changed.

The *SuperLine* IAD has connections for two derived phone lines:

- An RJ-11 connector, labeled PHONE 2
- An RJ-11 or RJ-14 connector, labeled PHONE 1/2 (a two-line phone must use an RJ-14 connector)

In addition, the *SuperLine* IAD has a connector, labeled ETHERNET, that connects to high-speed Ethernet data services. This connection does not have an assigned DN.

The subscriber can identify the line associated with a specific phone by the socket ID to which it is connected (PHONE 2 or PHONE 1/2).

The connection labeled PHONE 1/2 can support two-line phones (derived lines 1 and 2). If a two-line phone is connected to PHONE 1/2, then both derived lines terminate on the PHONE 1/2 connector. In this configuration, the PHONE 2 jack should not be used to connect a fax machine or modem.

REN support

Three Ringer Equivalence Number (REN) are supported on each of the two derived lines. Five REN is supported on the baseband.

Derived line support protocol

If the *SuperLine* line rate falls below the necessary bandwidth to sustain a single derived line, while derived calls are active, the active derived voice call is dropped.

If two derived calls are active and the *SuperLine* line rate falls below the necessary bandwidth to sustain two derived lines, but is greater than what is needed to support one derived line, then derived line 2 is dropped.

If the *SuperLine* line rate is below the necessary bandwidth to sustain two derived lines, but is greater than what is needed to support one derived line, either derived line 1 or derived line 2 is able to become active and use the bandwidth. If the other derived line attempts to become active while the first derived line is active, it is not able to become active until either the first derived line becomes inactive or more bandwidth becomes available.

Wire gauge requirements

SuperLine phone lines can use standard gauge twisted copper wire pair (for example, 24 American Wire Gauge [AWG] or 26 AWG). Longer loop reach capabilities are possible on cable with a lower gauge number (the larger the cable diameter, the lower the resistance).

Load coil restrictions

The *SuperLine* Access System cannot run on any loop that contains a load coil.



Allocating data

How is data enabled?	<p>The <i>SuperLine</i> Access System can be configured to support one of four data modes and determine if data services are supported. Data modes are provisioned using the <i>SuperLine</i> Element Manager. The four data modes are:</p> <ul style="list-style-type: none"> • None • Point to point • Switched • Directed switched <p>For provisioning procedures, refer to the <i>SuperLine Access System Element Manager User's Guide</i>.</p>
Feeder and distribution ports	<p>A feeder port is a connection to a network (for example, port A or port B on the FETH card). A distribution port is a connection to the subscriber (for example, a <i>SuperLine</i> Integrated Access Device [IAD]).</p>
None	<p>With this mode enabled, derived lines do not support data transmission.</p>
Point to point	<p>The point to point data mode provisions derived lines to support data transmission. This option allows the <i>SuperLine</i> Access System's administrators to manage and track the entry of users into the network. This mode allows packet transport only from feeder port to feeder port or from distribution port to feeder port.</p>
Switched	<p>The switched data mode provisions data support to emulate an Ethernet switch. All ports on a <i>SuperLine</i> Access shelf can send or receive packets from any other port.</p>
Directed switched	<p>The directed switched data mode provisions data support to emulate an Ethernet switch, except that unknown packets are forwarded only to feeder ports and not to distribution ports.</p>

How is data controlled?

Important: When no derived lines are active, the data rate is dynamically set on a demand basis up to the demand rate. When at least one derived line is active, the data ratio for the circuit is used. It is recommended that the data ratio be kept at the default value 20/80.

Using the *SuperLine* Element Manager, an upstream/downstream data ratio can be set (in 10 percent increments). This data ratio specifies the percentage of data bandwidth that should be used to send data upstream, with the remaining bandwidth used for downstream data.

**CAUTION**

Setting the data ratio to 10/90 or 90/10 is neither recommended nor supported, because these settings can impair data service.

Data ratio provisioning example

Setting the ratio to 20/80 causes 20 percent of the available data bandwidth to be used to send data up from the *SuperLine* IAD, while the other 80 percent of the bandwidth is used to send data down to the *SuperLine* IAD from the *SuperLine* Access Shelf.

How is data monitored?

There are two methods for monitoring data provided by the *SuperLine* Element Manager: Port A and B actual rate and *SuperLine* IAD trained rate.

Using the IP Routing tab screen, a desired transmission rate can be set for port A and port B of the FETH card. Setting the desired rate to a given value does *NOT* mean that the actual rate becomes that value. The actual rate reflects what the data rate is after the *SuperLine* IP port negotiates a rate with the IP device connected to that port (for example, 10Mb/s Half Duplex).

Using the Adapters tab screen, the upstream/downstream data ratio can be set as explained previously. Once provisioned, this screen allows you to view the actual trained rate for a *SuperLine* IAD (for example, 704 kbs).

Factors affecting bandwidth

SuperLine dynamically manages the bandwidth between derived telephony and data. The bandwidth available for data is always whatever is available on the *SuperLine* phone line after derived line needs are satisfied.

Calls on derived lines reduce the data bandwidth only for the duration of the call. After a call is completed, all bandwidth is available for data.

The data bandwidth is available as a mixture of upstream and downstream.

The condition of the customer loop (for example, wire condition, gauge, and the number of bridge taps) affects how much bandwidth is available to the voice and data services on the *SuperLine*. The *SuperLine* devices monitor the line continuously to ensure that the best line rate is available.

- Ethernet connection** The *SuperLine* Access Shelf provides one Ethernet data connection between the *SuperLine* IAD and the *SuperLine* Access Shelf FETH card 10/100Base-T port A. The *SuperLine* Access System behaves as a Layer 2 Ethernet multiplexor.
- Ethernet packets** Ethernet packets from the adapter are forwarded to the 10/100Base-T port. Ethernet packets from the 10/100Base-T port A are forwarded to the adapter, by using the learned Media Access Control (MAC) addresses from subscribers upstream data traffic.
- Broadcast packets** Broadcast packets from the FETH 10/100Base-T port are not forwarded, with the exception of Address Resolution Protocol (ARP) requests, which are forwarded to all subscribers, and Dynamic Host Configuration Protocol (DHCP) responses which are forwarded only to the requesting subscriber.
- MAC addresses** Important: The MAC address is the physical address of each Ethernet station connected to the network. An address can represent one station, a predefined group of stations (group address), or all stations on the network (broadcast address). The MAC layer provides access to the Local Area Network (LAN), enabling stations on the LAN to transmit information.
- A single line card at the central office communicates with the *SuperLine* IAD at the customer premises. Each *SuperLine* IAD handles up to 16 MAC addresses, corresponding to 16 host addresses.

□

Customer premises operating environment

SuperLine setup process

SuperLine Access System setup at a residential or business subscriber's premises proceeds as follows:

- The subscriber orders *SuperLine* Access System service.
- The subscriber receives a unique telephone number for each derived phone line, a date of activation, and a *SuperLine* IAD.
- The subscriber plugs the *SuperLine* IAD into an RJ-11 phone jack at their premises.
- The subscriber plugs devices into the *SuperLine* IAD.
- If the subscriber requires in-house wiring, they must hire an electrician, a security or computer service, or their local phone company to do the work.
- If data service is requested, the customer is told the service is enabled.

CPE filter

One CPE filter is built into each *SuperLine* IAD. An additional CPE filter is provided. One CPE filter is required on each phone that is connected to the existing baseband phone line at the customer premise. To order additional CPE filters, contact your sales representative.

For additional information, refer to the *SuperLine Integrated Access Device Model 6512-A2 Installation Instructions* for filter requirements.

Premises wiring

SuperLine Access System services run on all types of in-house wiring; however, works best on twisted pair wiring. If the in-house wiring supports baseband voice service, it should also support the *SuperLine* Access System.

The *SuperLine* IAD has been tested in the presence of typical customer-premise noise sources such as major appliances, electric motors, and dimmer switches.

If phone jacks at the subscriber premises are wired internally with four wires, the subscriber can connect the *SuperLine* IAD to phones located in different rooms. These connections require an extra RJ-11 twisted pair phone cable and "T" type connectors, which the subscriber can purchase from their local electronics or phone store.

For additional information about hardware required for various types of *SuperLine* IAD connections, refer to the *SuperLine Integrated Access Device Model 6512-A2 Installation Instructions*.

□



5 *SuperLine* loop performance

Overview

Introduction The information and tables in this chapter provide the means to predict the loss of the channel in the frequency range of the AG Communication Systems *SuperLine*[™] Access System.

This chapter covers the following topics.

Topic	Page
About <i>SuperLine</i> loop performance	5-2
<i>SuperLine</i> loop reach tables	5-3
<i>SuperLine</i> qualification	5-6



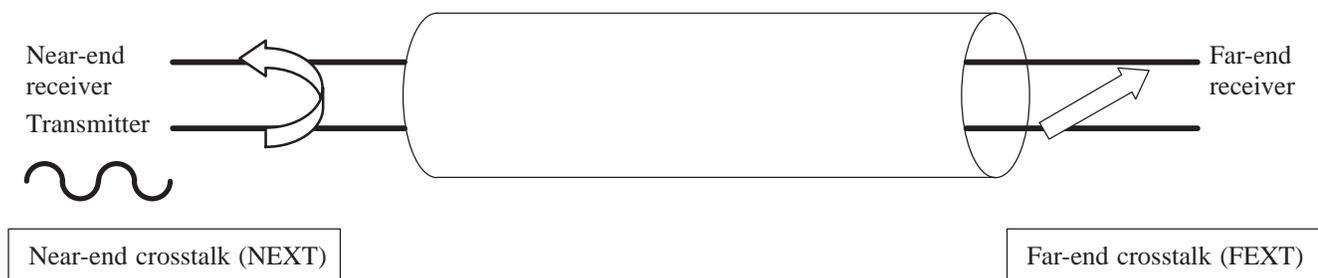
About *SuperLine* loop performance

***SuperLine* spectrum comparisons**

- *SuperLine* is spectrally comparable to, or better than, Integrated Services Digital Network (ISDN) in all cases
- The upstream and downstream Near-end Crosstalk (NEXT) is within 1 dB of ISDN
- The upstream and downstream NEXT is 5 dB better than HDSL
- The upstream NEXT is 5 dB less than HDSL and within 1 dB of ISDN for Asymmetric Digital Subscriber Line (ADSL)
- *SuperLine* has much less NEXT on ADSL downstream than ISDN, HDSL, T1, or ADSL
- *SuperLine* and T1 frequency bands are very far apart

Crosstalk

This figure graphically represents crosstalk fundamentals.



Binder test conclusions

- *SuperLine* impacts ISDN no more than ISDN
- *SuperLine* impacts HDSL no more than ISDN
- *SuperLine* impacts Carrierless Amplitude and Phase modulation (CAP) ADSL less than ISDN
- *SuperLine* impacts Discrete Multi-Tone (DMT) no more than DMT
- ISDN has no effect on *SuperLine*
- HDSL has no effect on *SuperLine*
- HDSL with repeaters has no effect on *SuperLine*
- CAP ADSL/Rate Adaptive Digital Subscriber Line (RADSL) has no effect on *SuperLine*
- T1 has no effect on *SuperLine*

Spectral analysis conclusions

SuperLine's impact on all evaluated services is similar to ISDN. No service significantly affects the *SuperLine* Access System.

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SuperLine loop reach tables

50-kHz loss measurement

The 50-kHz loss measurement accurately depicts the loss of the channel in the frequency range of the *SuperLine* Access System, and so gives a reliable indication of the bit rate the *SuperLine* Access System operates when installed on a loop with equivalent 50-kHz loss. The center frequency of *SuperLine* is approximately 50 kHz. The termination impedance of 135 ohms is the most common termination used for this particular measurement.

The 50-kHz loss measurement for the specified operating conditions does not vary with wire gauge.

Disturbers

Any service such as ISDN, HDSL, ADSL, Single Line DSL (SDSL), T1, Digital Data System (DDS), or *SuperLine* which is operating on other pairs in the same binder can generate crosstalk which introduces noise onto the loop which *SuperLine* is using. These other services are referred to as disturbers, since they introduce noise.

Only *SuperLine* services or ISDN services in the same 25-pair binder group have an affect on *SuperLine* performance.

Temperature variations

Temperature variations do effect the loss measurement in a linear fashion. Two sets of temperature measurements are shown: one for aerial (120°F) and one for buried (70°F).

Loop reach tables

Important: One derived line requires 192 Kbits. Two derived lines require 384 Kbits.

The following tables show the reach of the *SuperLine* Access System under various loop conditions. The **Loop reach tables** also show the bit rate resulting from 24 American Wire Gauge (AWG) and 26 AWG cables with and without disturbers.

Pure 26 AWG with 24 SuperLine disturbers			
Bit Rate	50-kHz loss (dB)	Aerial 120°F (kFT)	Buried 70°F (kFT)
640 Kbits	18.1	5.8	6.3
576 Kbits	24.2	7.7	8.4
512 Kbits	28.2	9.0	9.7
448 Kbits	32.2	10.3	11.1
384 Kbits	34.2	10.9	11.8
320 Kbits	36.2	11.6	12.5
256 Kbits	40.3	12.9	13.9
192 Kbits	42.3	13.5	14.6

Pure 26 AWG without disturbers			
Bit Rate	50-kHz loss (dB)	Aerial 120°F (kFT)	Buried 70°F (kFT)
640 Kbits	26.2	8.4	9.1
576 Kbits	34.2	10.9	11.8
512 Kbits	36.2	11.6	12.5
448 Kbits	40.3	12.9	13.9
384 Kbits	44.3	14.2	15.3
320 Kbits	46.3	14.8	16.0
256 Kbits	50.3	16.1	17.4
192 Kbits	54.4	17.4	18.8

Pure 24 AWG with 24 SuperLine disturbers			
Bit Rate	50-kHz loss (dB)	Aerial 120°F (kFT)	Buried 70°F (kFT)
640 Kbits	18.1	8.3	9.0
576 Kbits	24.2	11.0	12.0
512 Kbits	28.2	12.9	14.0
448 Kbits	32.2	14.7	16.0
384 Kbits	34.2	15.6	17.0
320 Kbits	36.2	16.5	18.0
256 Kbits	40.3	18.4	20.0
192 Kbits	42.3	19.3	21.0

Pure 24 AWG without disturbers			
Bit Rate	50-kHz loss (dB)	Aerial 120°F (kFT)	Buried 70°F (kFT)
640 Kbits	26.2	11.9	13.0
576 Kbits	34.2	15.6	17.0
512 Kbits	36.2	16.5	18.0
448 Kbits	40.3	18.4	20.0
384 Kbits	44.3	20.2	22.0
320 Kbits	46.3	21.1	23.0
256 Kbits	50.3	22.9	25.0
192 Kbits	54.4	24.8	27.0

□

SuperLine qualification

Example for using the 50-kHz loss table

Important: A disturber is another *SuperLine* or ISDN service in the same binder group.

Your line consists of 10 kFT of 24 AWG aerial cable and 3 kFT of 26 AWG buried cable.

- Using the **50-kHz loss table**, find the dB loss for aerial cable. (For example, the loss for 10 kFT of 24 AWG aerial cable is 21.9 dB.)
- Using the **50-kHz loss table**, find the dB loss for the buried cable. (For example, 3 kFT of 26 AWG buried cable is 8.7 dB.)
- Add these numbers to determine the total loss of the loop. The total loss is 21.9 plus 8.7 which equals 30.6 dB.
- Next, use the **Reach data table** (in this topic) and this 30.6 db loss value to determine the expected bit rate of the *SuperLine* based on the number of disturbers in the same binder group.
 - 24 disturbers in binder: 30.6 dB falls somewhere between 512 Kbits or 448Kbits.
 - No disturbers in binder: 30.6 dB falls somewhere between 576 Kbits or 640Kbits.
 - 12 disturbers in binder: you could estimate the bit rate to be 512 Kbits or 576Kbits.
 - 5 disturbers in binder: you could estimate the bit rate to be 576 Kbits.
 - 19 disturbers in binder: you could estimate the bit rate to be 512 Kbits.

50-kHz loss table

This table is used to compute the total loss of the loop by adding up the segments of various gauges and structure. The table is for 50-kHz loss in dB (wire, gauge, and temperature).

Temperature Wire Gauge Length (kFT)	Aerial 120°F 24 AWG Loss (dB)	Buried 70°F 24 AWG Loss (dB)	Aerial 120°F 26 AWG Loss (dB)	Buried 70°F 26 AWG Loss (dB)
1.0	2.2	2.0	3.1	2.9
2.0	4.4	4.0	6.3	5.8
3.0	6.6	6.0	9.4	8.7
4.0	8.8	8.1	12.5	11.6
5.0	11.0	10.1	15.6	14.5
6.0	13.2	12.1	18.8	17.4
7.0	15.4	14.1	21.9	20.3
8.0	17.5	16.1	25.0	23.2

Temperature Wire Gauge Length (kFT)	Aerial 120°F 24 AWG Loss (dB)	Buried 70°F 24 AWG Loss (dB)	Aerial 120°F 26 AWG Loss (dB)	Buried 70°F 26 AWG Loss (dB)
9.0	19.7	18.1	28.2	26.1
9.5	20.8	19.1	29.7	27.5
10.0	21.9	20.1	31.3	29.0
10.5	23.0	21.1	32.9	30.4
11.0	24.1	22.1	34.4	31.8
11.5	25.2	23.1	36.0	33.3
12.0	26.3	24.2	37.5	34.7
12.5	27.4	25.2	39.1	36.2
13.0	28.5	26.2	40.7	37.6
13.5	29.6	27.2	42.2	39.1
14.0	30.7	28.2	43.8	40.5
14.5	31.8	29.2	45.4	42.0
15.0	32.9	30.2	46.9	43.4
15.5	34.0	31.2	48.5	44.9
16.0	35.1	32.2	50.1	46.3
16.5	36.2	33.2	51.6	47.8
17.0	37.3	34.2	53.2	49.2
17.5	38.4	35.2	54.8	50.7
18.0	39.5	36.2	56.3	52.1
18.5	40.6	37.2	57.9	53.6
19.0	41.7	38.2	59.5	55.0
19.5	42.8	39.3	61.0	56.5
20.0	43.9	40.3	62.6	57.9
21.0	46.1	42.3	65.7	60.8
21.5	47.1	43.3	67.3	62.2
22.0	48.2	44.3	68.8	63.7
22.5	49.3	45.3	70.4	65.1
23.0	50.4	46.3	72.0	66.6
23.5	51.5	47.3	73.5	68.0
24.0	52.6	48.3	75.1	69.5
24.5	53.7	49.3	76.7	70.9
25.0	54.8	50.3	78.2	72.4
25.5	55.9	51.3	79.8	73.8

Reach data table

This table is used to determine the bit rate of *SuperLine* based on disturbers. A disturber is another *SuperLine* or ISDN service in the same binder group.

The minimum planning rate for one derived line is 192 kbps and 384 kbps is the minimum planning rate for two derived lines.

Bit rate	24 disturbers 50 kHz loss (dB)	No disturbers 50 kHz loss (dB)
640 kbits	18.1	26.2
576 kbits	24.2	34.2
512 kbits	28.2	36.2
448 kbits	32.2	40.3
384 kbits	34.2	44.3
329 kbits	36.2	46.3
256 kbits	40.3	50.3
192 kbits	42.3	54.4





6 Telephony protocols

Overview

Introduction The AG Communication Systems *SuperLine*[™] Access System can work with different telephony protocols. This chapter provides a description of each telephony protocol that can be used. The *SuperLine* Element Manager (EM) interface is used to select the protocol.

For specific procedures, refer to the *SuperLine Access System Element Manager User's Guide*.

In this chapter This chapter covers the following topics.

Topic	Page
No protocol	6-2
Direct Digital Interface protocol	6-3
TR-008 Mode 1 protocol	6-4
TR-303 protocol	6-5



No protocol

Introduction The selection of None (no protocol), from the *SuperLine* EM, is used for a data-only application.

Important: None (no protocol) is selected on the EM's Telephony tab screen.

None operations When None is selected:

- The system is configured to disable the telephony services of the *SuperLine* Access Shelf.
- The Voice DS1s are not used and the associated alarms are suppressed.

The number of Voice DS1s should be set to 0 and the number of derived lines per loop is 0 (no interface).

When using the EM to set the data-only option, the *Data Mode* field cannot be set to None, the *Set Data State* field must be set to Enabled, and the *Data Ratio Up/Down* field must be provisioned.

For detailed instructions, refer to the *SuperLine Access System Element Manager User's Guide*.



Direct Digital Interface protocol

Introduction Direct Digital Interface (DDI) configures the system to operate with GTE Corporation's *GTD-5*[®] EAX local digital switch using the GTD-5 EAX DDI feature. The DDI can be configured to map each derived phone line to a DS0. A DS0 is a channel within a DS1. The relationship between a DS0 and a subscriber voice line never varies.

For more information about the GTD-5 EAX DDI feature, refer to the *GTD-5 EAX User's Guide*.

DS0 channels Important: Telephony services are not available to subscribers associated with a disabled DS0 (for example, a line card is pulled).

The DDI provides each derived line with a DS0 time slot in a non-concentrated mode on the DS1 interface to the local digital switch. The DS0 channel is dedicated to the derived line.

Each DS0 can receive ring, no-ring, UNICODE, and forced disconnect signals from the GTD-5 EAX. A DS0 can transmit on-hook, off-hook, and UNICODE signaling bits to the GTD-5 EAX.

Voice DS1s Important: Telephony services are not available to subscribers associated with disabled DS1s.

The number of enabled DS1s should be set to match the number of DS1s configured and connected to the switch. For each of the enabled Voice DS1s, the line build out should be set based on the distance between the SuperLine system and the local digital switch.

Derived lines per loop For detailed information, refer to the [Setting derived lines per loop on the line cards](#) appendix.

DS0 channel assignments for derived lines Each derived line is mapped to a specific DS0.
For detailed information, refer to the [DS0 channel assignments for EM telephony configurations](#) appendix.

□

TR-008 Mode 1 protocol

Introduction The TR-008 Mode 1 interface configures the *SuperLine* Access Shelf to operate with a TR-008 Mode 1-compliant switch (for example, Lucent Technologies *5ESS*® local digital switch or Nortel Networks Corporation's *DMS*™ local digital switch) using the TR-008 Mode 1 specification.

DS0 channels The TR-008 Mode 1 interface provides each derived line with a DS0 time slot in a non-concentrated mode on the DS1 interface to the switch. A DS0 is a channel within a DS1. The relationship between a derived line and a DS0 never varies.

Voice DS1s The first Voice DS1 contains the TR-008 Mode 1 datalink (carried in DS1 overhead framing bits) and is used to report summary alarms to the switch using the DS1 overhead. The reported summary alarms are Major, Minor, Power, and Miscellaneous. For each of the enabled Voice DS1s, the line build out should be set based on the distance between the *SuperLine* Access System and the CO local digital switch.

DS1 interfaces use the bipolar Alternate Mark Inversion (AMI) line coding format, and the SLC 96 and D4 Superframe Format (SF).

Derived lines per loop For detailed information, refer to the [Setting derived lines per loop on the line cards](#) appendix.

DS0 channel assignments for derived lines

Each derived line is mapped to a specific DS0.

For detailed information, refer to the [DS0 channel assignments for EM telephony configurations](#) appendix.

□

TR-303 protocol

Introduction TR-303 interface configures the *SuperLine* Access Shelf to operate with a TR-303-compliant switch (for example, 5ESS®, GTD-5™ EAX, or DMS™) using the TR-303 specification. *SuperLine* implements the Embedded Operations Channel (EOC) protocols required to support virtual analog line termination, which map the derived lines. *SuperLine* management features using the EOC include:

- Data link management, including path switching for Timeslot Management Channels (TMC) and EOC
- Call processing profile management
- Analog line termination management, including removing or restoring lines
- Equipment management
- DS1 facility management, including loopbacks

Configured DS1s When using the TR-303 protocol, a minimum of two DS1s and a maximum of four DS1s can be configured using the EM. The number of EM-configured DS1s should match the number of configured DS1s connected to the host switch.

Concentration ratio Important: Four of the DS0s are required to support datalinks to the TR-303 switch of which two are EOC and two are TMC channels.

Due to the dynamic assignment of DS0s to derived lines, which TR-303 supports, the concentration ratio is adjusted based on the number of DS1s configured. Each derived phone line is mapped dynamically to a DS0 by the local digital switch using a message on the TMC.

Service availability Service is available to all subscriber derived lines as long as there is an available DS0 on the switch interface. Once the number of enabled Voice DS1s are set, the line build out should be set based on the distance between the *SuperLine* Access Shelf and the CO local digital switch.

Derived lines per loop For detailed information, refer to the [Setting derived lines per loop on the line cards](#) appendix.

DS0 channel assignments for derived lines Each derived line is mapped dynamically to a DS0 by the local digital switch from a message sent over the TMC.

□



7 Engineering *SuperLine* for specific switch types

Overview

Introduction This chapter explains how an AG Communication Systems *SuperLine*[™] Access System is engineered, depending on the switch type and telephony protocol used at the local digital switch.

In this chapter This chapter covers the following topics.

Topic	Page
<i>GTD-5 EAX</i> local digital switch using DDI	7-2
<i>GTD-5 EAX</i> local digital switch using TR-303	7-4
<i>5ESS</i> local digital switch using TR-303	7-6
<i>5ESS</i> local digital switch using TR-008 Mode 1	7-8
<i>DMS</i> local digital switch using TR-303	7-9
<i>DMS</i> local digital switch using TR-008 Mode 1	7-10



GTD-5 EAX local digital switch using DDI

Overview The *GTD-5*® EAX Extended Superframe Digital Trunk (EDT-FIU) hardware provides Direct Digital Interface (DDI) to the *SuperLine* Access Shelf using up to four Extended Superframe Format (ESF) spans. For each *SuperLine* Access Shelf DS1 (T-carrier facility), a *GTD-5* EAX MAKE PIU database is engineered to support the DDI application.

Line characteristics Only single-party, two-wire, loopstart DTMF services to *SuperLine* Access Shelf derived lines are allowed. The lines are provided by using the *GTD-5* EAX ADD DN command. The hardware identifier DLIN is used for these derived lines in the ADD DN command.

Derived line diagnostics There is no metallic access to derived lines. Because of this, *4TEL*®, or specific line diagnostics on these derived lines, are not provided.

The following access tests can be performed on a derived line to check the continuity and transmission qualities:

- Apply Digital Tone (ADT) continuity test
- Apply Tone (AT) continuity test
- Measure Frequency and Level (MFAL) transmission test
- C-Message Noise Test (CMNT) transmission test
- C-Notched Noise Out Test (CNOT) transmission test
- Three kHz Flat Noise Test (TKFN) transmission test

The following *GTD-5* EAX installer tests are supported on a derived line.

- Installer Dual Tone Multi-Frequency (DTMF) tests (Outgoing Loop Trunk [OLTK] trunk is used for accessing Proctor DTMF test set)
- Installer Automatic Number Announcer (ANA) tests
- Installer RING tests
- Installer LINE OPENING tests (OLTK trunk is used for accessing Proctor DTMF test set)

Refer to the *GTD-5* EAX *User's Guide* in Part 6 for detailed information.

Baseband line diagnostics *4TEL* or *GTD-5* EAX line diagnostic/access tests can be performed to test baseband lines.

Baseband testing effects

The following are the effects of baseband testing:

- When baseband lines are tested, established derived to derived manual voice calls are not dropped. However, for some metallic tests, derived line PCMs are corrupted during the baseband line test.
- Baseband metallic line tests may corrupt Ethernet traffic in progress; however, lost packets are soon retransmitted.
- Baseband metallic line tests may interfere when a 56 kbps modem call is in a dialing state on a derived line. This may cause a modem V.34 connection instead of a V.90 connection.

Maintenance

For maintenance, derived line status, span status, and span loopback capabilities are provided from the *GTD-5 EAX* local digital switch.



GTD-5 EAX local digital switch using TR-303

Overview The *GTD-5 EAX* EDT-FIU hardware provides Remote Digital Terminal (RDT) interface for Telcordia Technologies, Inc. TR-TSY-000303 Specification to the *SuperLine* Access Shelf using two to four ESF spans.

The first two DS1s of the *SuperLine* Access Shelf are engineered to carry Embedded Operations Channel (EOC) and Time Slot Management Channel (TMC) datalinks over the time slots 12 and 24, respectively.

The *GTD-5 EAX* Integrated Remote Operations Controller (IROC) platform is required to interpret the EOC datalink Abstract Syntax Notation One (ASN.1) messages.

GTD-5 EAX MAKE PIU and MAKE RLU database is engineered to support the TR-303 application.

Line characteristics Only single-party, two-wire, loopstart DTMF services to the *SuperLine* Access Shelf derived lines are allowed. The lines are provided by using the *GTD-5 EAX* ADD DN command. The hardware identifier RAL.T is used for these derived lines in the ADD DN command.

Derived line diagnostics There is no metallic access to derived lines. Because of this, *4TEL*, or specific line diagnostics on these derived lines, are not provided.

The following *GTD-5 EAX* installer tests are supported on a derived line.

- Installer DTMF tests (OLTK trunk is used for accessing Proctor DTMF test set)
- Installer ANA tests
- Installer RING tests
- Installer LINE OPENING tests (OLTK trunk is used for accessing Proctor DTMF test set)

Refer to the *GTD-5 EAX User's Guide* in Part 6 for detailed information.

Baseband line diagnostics *4TEL* or *GTD-5 EAX* line diagnostic/access tests can be performed to test baseband lines.

Baseband testing effects

The following are the effects of baseband testing:

- When baseband lines are tested, established derived to derived manual voice calls are not dropped. However, for some metallic tests, derived line Pulse Code Modulations (PCM) are corrupted during the baseband line test.
- Baseband metallic line tests may corrupt Ethernet traffic in progress; however, lost packets are soon retransmitted.
- Baseband metallic line tests may interfere when a 56 kbps modem call is in a dialing state on a derived line. This may cause a modem V.34 connection instead of a V.90 connection.

Maintenance

For maintenance, the *SuperLine* Access Shelf provides span loopback, derived line status, span status, EOC/TMC data links status, and alarm capabilities from the *GTD-5 EAX* local digital switch.



5ESS local digital switch using TR-303

Overview The Lucent Technologies 5ESS® local digital switch Integrated Digital Carrier Unit (IDCU) hardware provides RDT interface for Telcordia Technologies Inc. TR-TSY-000303 Specification to the *SuperLine* Access Shelf using two to four ESF spans. The first two DS1s of the *SuperLine* Access Shelf are engineered to carry EOC and TMC datalinks over the time slots 12 and 24, respectively. The 5ESS TR-303 Remote Terminal database in Recent Change (RC) is needed to support the TR-303 application.

Line characteristics Only single-party, two-wire, loopstart DTMF services to the *SuperLine* Access Shelf derived lines are allowed. The lines are provided by using the 5ESS RC Insert Line command. The Operational Equipment IDCU Line Equipment Number (ILEN) is used for these derived lines in the RC Insert Line command.

Derived line diagnostics There is no metallic access to derived lines. Because of this, Mechanized Loop Testing (MLT) or 5ESS Metallic Tests on these derived lines are not provided.

The following Trunk Line Workstation (TLWS) transmission and supervision tests are supported on a derived line.

- Send frequency and tone (404 Hz, 1004 Hz, and 2804 Hz)
- Send ROH
- Ring line
- Send PPtone

Baseband line diagnostics 4TEL, MLT, or 5ESS TLWS tests (for example, metallic, supervision, transmission, and alit) can be performed to test baseband lines.

Baseband testing effects

The following are the effects of baseband testing:

- When baseband lines are tested, established derived to derived manual voice calls are not dropped. However, for some metallic tests, derived line PCMs are corrupted during the baseband line test.
- Baseband metallic line tests may corrupt Ethernet traffic in progress; however, lost packets are soon retransmitted.
- Baseband metallic line tests may interfere when a 56 kbps modem call is in a dialing state on a derived line. This may cause a modem V.34 connection instead of a V.90 connection.

Maintenance

For maintenance, the *SuperLine* Access Shelf provides the span loopback, derived line status, span status, EOC/TMC data links status, and alarm capabilities from the 5ESS local digital switch.



5ESS local digital switch using TR-008 Mode 1

Overview The 5ESS Digital Carrier Line Unit (DCLU) or IDCU provides RDT interface for Telcordia Technologies Inc. TR-TSY-000008 Specification to the *SuperLine* Access Shelf using four spans. The first span has a Subscriber's Loop Carrier (SLC) 96 format and the remaining three spans have Superframe Format (SF). The frame datalink in the first DS1 (span) of the *SuperLine* Access Shelf carries alarm information and control commands. The 5ESS TR-008 Mode 1 Remote Terminal database in RC is needed to support the TR-008 Mode 1 application.

Line characteristics Only single-party, two-wire, loopstart DTMF services to the *SuperLine* Access Shelf derived lines are allowed. The lines are provided using the 5ESS RC Insert Line command. The Operational Equipment SLC Line Equipment Number (SLEN)/ILEN is used for these derived lines in the RC Insert Line command.

Derived line diagnostics There is no metallic access to the derived lines. Because of this, MLT or 5ESS metallic tests on these derived lines are not provided.

The following TLWS transmission and supervision tests are supported on a derived line.

- Send frequency and tone (404 Hz, 1004 Hz, and 2804 Hz)
- Send ROH
- Ring line
- Send PPtone

Baseband line diagnostics 4TEL, MLT, or 5ESS TLWS tests (for example, metallic, supervision, transmission, and alit) can be performed to test baseband lines.

Baseband testing effects The following are the effects of baseband testing:

- When baseband lines are tested, established derived to derived manual voice calls are not dropped. However, for some metallic tests, derived line PCMs are corrupted during the baseband line test.
- Baseband metallic line tests may corrupt Ethernet traffic in progress; however, lost packets are soon retransmitted.
- Baseband metallic line tests may interfere when a 56 kbps modem call is in a dialing state on a derived line. This may cause a modem V.34 connection instead of a V.90 connection.

Maintenance For maintenance, the *SuperLine* Access Shelf provides the derived line status, span status, and alarm capabilities from the 5ESS local digital switch.

□

DMS local digital switch using TR-303

Overview	The Nortel Networks Corporation <i>DMS</i> [™] Subscriber Carrier Module Access (SMA2) hardware provides RDT interface for Telcordia Technologies Inc. TR-TSY-000303 Specification to the <i>SuperLine</i> Access Shelf using two to four ESF spans. The first two DS1s of the <i>SuperLine</i> Access Shelf are engineered to carry EOC and TMC datalinks over the time slots 12 and 24, respectively. The <i>DMS</i> TR-303 Remote Terminal database in table RDTINV is needed to support the TR-303 application. In addition, use any other appropriate tables as described in the <i>DMS</i> User's Guide for TR-303.
Line characteristics	Only single-party, two-wire, loopstart DTMF services to the <i>SuperLine</i> Access Shelf derived lines are provided by using the <i>DMS</i> POTS line datafill (table LNINV). The operational equipment Line Equipment Number (LEN) is used for these derived lines in the LNINV table.
Derived line diagnostics	There is no metallic access to derived lines. Because of this, MLT, <i>4TEL</i> tests, or <i>DMS</i> metallic tests on these derived lines are not provided. The installer can perform RING/DGTTST tests to verify the ringing and keypad digits (0 through 9) of a derived line phone.
Baseband line diagnostics	<i>4TEL</i> , MLT, or <i>DMS</i> card diagnostic/line test/alit can be performed to test baseband lines.
Baseband testing effects	The following are the effects of baseband testing: <ul style="list-style-type: none"> • When baseband lines are tested, established derived to derived manual voice calls are not dropped. However, for some metallic tests, derived line PCMs are corrupted during the baseband line test. • Baseband metallic line tests may corrupt Ethernet traffic in progress; however, lost packets are soon retransmitted. • Baseband metallic line tests may interfere when a 56 kbps modem call is in a dialing state on a derived line. This may cause a modem V.34 connection instead of a V.90 connection.
Maintenance	For maintenance, the <i>SuperLine</i> Access Shelf provides the derived line status, span status, EOC/TMC data links status, and alarm capabilities from the <i>DMS</i> local digital switch.
DMS local digital switch environment	The <i>SuperLine</i> Access Shelf is characterized by unique operating behaviors within a <i>DMS</i> local digital switch environment. For detailed information refer to the <i>SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance manual</i> .

□

DMS local digital switch using TR-008 Mode 1

Introduction	The <i>DMS</i> Subscriber Module SLC-96 (SMS) hardware provides RDT interface for Telcordia Technologies Inc. TR-TSY-000008 Specification to the <i>SuperLine</i> Access Shelf using four spans. The first span has an SLC-96 format and the remaining three spans have a Superframe Format (SF). The frame datalink in the first DS1 (span) of the <i>SuperLine</i> Access Shelf carries alarm information and control commands. The <i>DMS</i> TR-008 Mode 1 Remote Terminal database in table RCSINV is needed to support the TR-008 Mode 1 application. In addition, use any other appropriate tables as described in the <i>DMS</i> User's Guide for TR-008 Mode 1.
Line characteristics	Only single-party, two-wire, loopstart DTMF services to the <i>SuperLine</i> Access Shelf derived lines are provided using the <i>DMS</i> POTS line datafill (table LNINV). The operation equipment Subscribers Loop Carrier (SLC) Line Equipment Number (LEN) is used for these derived lines in the LNINV table.
Derived line diagnostics	There is no metallic access to the derived lines. Because of this, MLT, <i>4TEL</i> tests, or <i>DMS</i> metallic tests on these derived lines are not provided. The installer can perform RING/DGTTST tests to verify the ringing and keypad digits (0 through 9) of a derived line phone.
Baseband line diagnostics	<i>4TEL</i> , Mechanized Loop Testing (MLT), or <i>DMS</i> card diagnostic/line test/alit can be performed to test baseband lines.
Baseband testing effects	The following are the effects of baseband testing: <ul style="list-style-type: none"> • When baseband lines are tested, established derived to derived manual voice calls are not dropped. However, for some metallic tests, derived line PCMs are corrupted during the baseband line test. • Baseband metallic line tests may corrupt Ethernet traffic in progress; however, lost packets are soon retransmitted. • Baseband metallic line tests may interfere when a 56 kbps modem call is in a dialing state on a derived line. This may cause a modem V.34 connection instead of a V.90 connection.
Maintenance	For maintenance, the <i>SuperLine</i> Access Shelf provides derived line status, span status, and alarm capabilities from the <i>DMS</i> local digital switch.
DMS local digital switch environment	The <i>SuperLine</i> Access Shelf is characterized by unique operating behaviors within a <i>DMS</i> local digital switch environment. For detailed information refer to the <i>SuperLine Access System SuperLine Access Shelf Installation, Operations, and Maintenance manual</i> .

□



8 *SuperLine* Access Shelf configurations

Overview

Introduction This chapter provides information that is useful for planning and creating the proper environment for AG Communication Systems *SuperLine*™ Access System hardware.

In this chapter This chapter covers the following topics.

Topic	Page
Floor planning requirements	8-2
Frame configurations	8-3



Floor planning requirements

Guidelines Floor planning requirements for the *SuperLine* Access Shelf should follow switch equipment manufacturer's guidelines. GTE Corporation's *GTD-5*® EAX local digital switch users should consult AG Communication Systems Practice, *Floor Plan Requirements Engineering and Planning Guidelines*, 780-224-071.

Lucent Technologies *5ESS*® local digital switch users should consult equivalent documentation.

Nortel Networks Corporation *DMS*™ users should consult equivalent documentation.

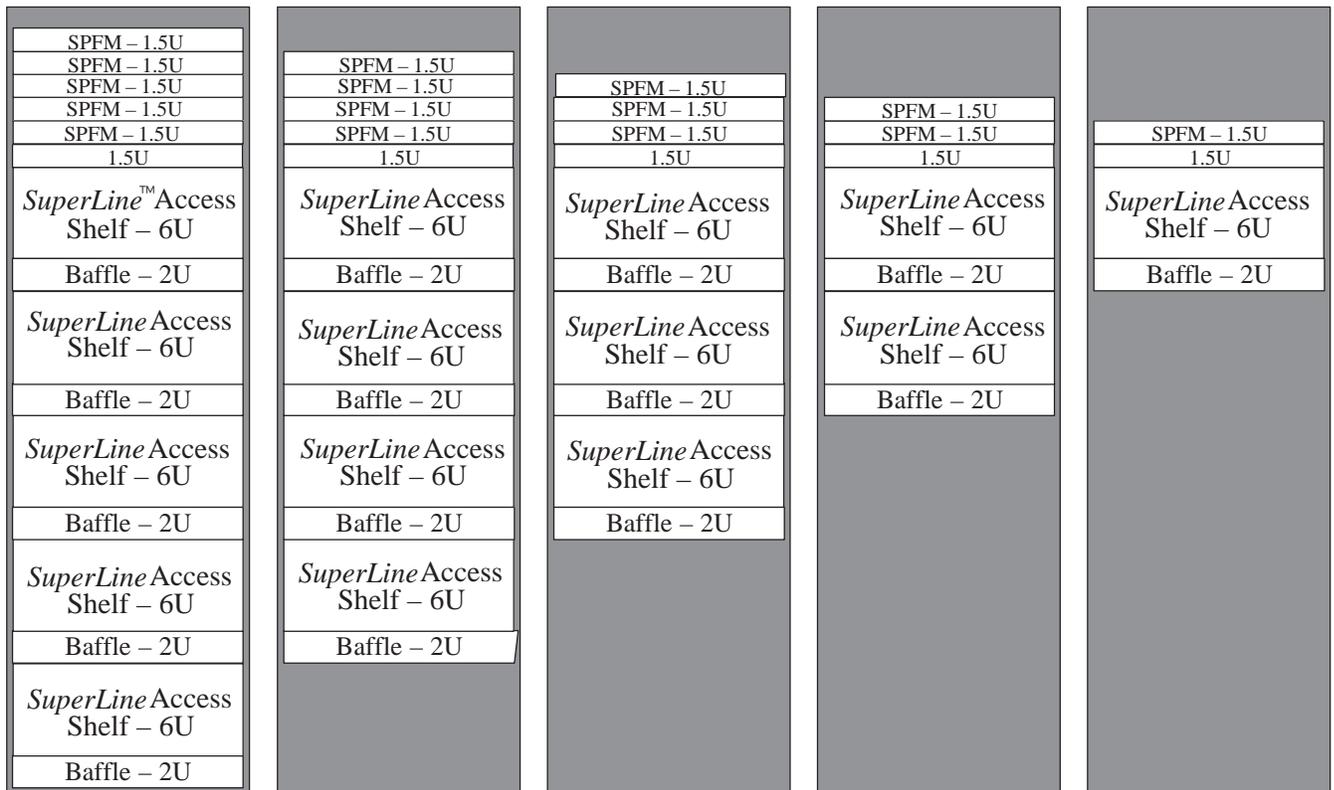


Frame configurations

Frame configurations *SuperLine* Access System equipment can be purchased preinstalled in a standard telco frame, with all internal wiring installed by the factory, or it can be purchased individually and mounted in any standard Telco frame with 23-inch rack mounting and universal spacing.

NEBS requirements The *SuperLine* Access Shelf and the SPFM may be used in a CO environment or remote cabinet. Either configuration meets Network Equipment Building Standard (NEBS), Level 3 requirements. Up to five *SuperLine* Access Shelves and their associated SPFMs can reside in a single 8-foot (49U) rack frame and remain NEBS compliant.

SuperLine Access Shelves and SPFMs in telco frames The following figure shows the possible frame configurations when *SuperLine* Access Shelves and *SuperLine* POTS Filter Module (SPFM) assemblies are installed in an 8-foot rack frame (refer to the [Caution](#), on the following page).



SuperLine™ is a trademark of AG Communication Systems.



CAUTION Equipment damage hazard

To meet GR-63-CORE requirements, always install the SuperLine POTS Filter Module or modules ABOVE the SuperLine Access Shelf or shelves with at least a 1.5U (2.625 inch) space between the bottom SPFM and the top SuperLine Access Shelf. If equipment other than an SPFM is installed above a SuperLine Access Shelf, install a 2U baffle.

Frame configuration guidelines

Telco customers can install multiple *SuperLine* Access Shelves and SPFMs in a dedicated rack or in a miscellaneous rack with other equipment by adhering to the following guidelines:

- Meet the floor planning requirements as specified in the switch equipment manufacturer's guidelines.
- One-to-five *SuperLine* Access Shelves and their associated SPFMs can be installed in an 8-foot rack by maintaining either a 2U baffle (similar to the one supplied in a *SuperLine* Access Shelf) above each shelf or placing an SPFM 1.5U above the *SuperLine* Access Shelf.
- If equipment other than *SuperLine* Access Shelves or SPFMs are installed in the rack, it is recommended that this equipment be placed below the *SuperLine* Access Shelf.
- If equipment other than *SuperLine* Access Shelves and SPFMs is installed above *SuperLine* Access System equipment, it is required that an SPFM be placed below the other equipment, leaving a space between the other equipment and the SPFM as recommended by the other manufacturer's guidelines.

Mounting requirements

Observe the following mounting requirements:

- If installed in a *GTD-5* EAX site, the *SuperLine* Access Shelf and SPFM each require the following:
 - One set of mounting hardware.
 - Four D-76604-B screws and four EF-16917-A nylon inserts if they are mounted in a frame configured for isolation mounting.
- If the *SuperLine* Access Shelf and SPFM are mounted in a rack configured for isolation mounting and the rack has round mounting holes, use suitable nylon flat washers and screws capable of isolating and supporting the weight of the mounted equipment.





Appendix A: DS0 channel assignments for EM telephony configurations

Introduction Important: You can set the telephony type for the *SuperLine*[™] Access Shelf using the Telephony tab screen of the *SuperLine* Element Manager application. Refer to the *SuperLine Access System Element Manager User's Guide* for more information.

In TR-008 Mode 1 and DDI telephony modes, each derived phone line is mapped to a specific DS0—a channel within a DS1. In the TR-008 Mode 1 and DDI modes, the relationship between a derived phone line and a DS0 never varies. In TR-303 telephony mode, however, each derived phone line is mapped dynamically to a DS0 by the central office (CO) sending a message over the Timeslot Management Channel (TMC).

How to read the tables Five telephony configurations are supported by the *SuperLine* Element Manager in the TR-008 Mode 1 and DDI telephony modes. They are as follows:

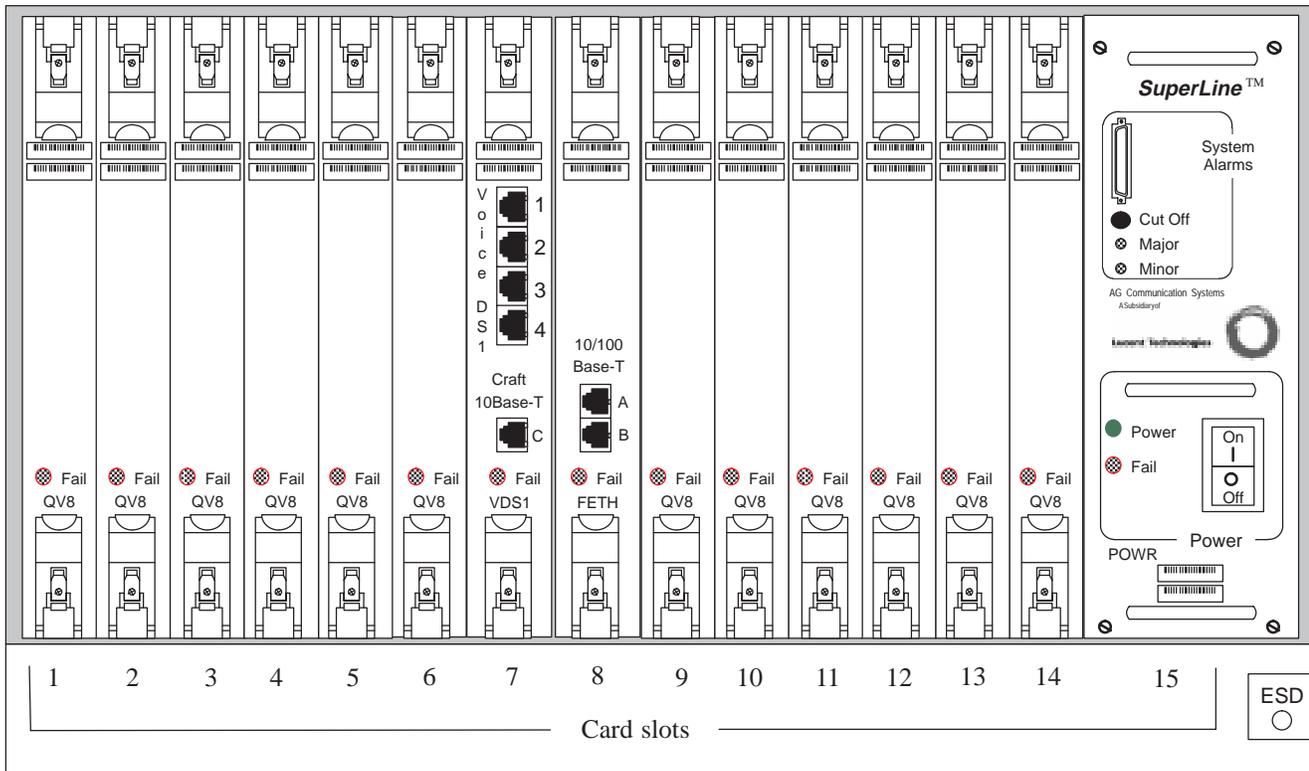
- 2 on Ports 1–4
- 2 on Slots 1–6
- 2, 1, 0 Repeated
- 1 on Slots 1–6, 2 on 9–11
- 1 on all Ports

The following tables list the DS0 derived line mapping for both TR-008 Mode 1 and DDI telephony. In columns DS1-1 through DS1-4, the first number refers to the QV8 card slot number; the second number to the QV8 circuit number; and the third number to the derived line number.

Example: On DS0 channel 3 for TR-008 Mode 1 telephony type, the mapping for DS1-1 is 1–1–2, meaning QV8 card slot 1, QV8 circuit 1, and derived line 2.

QV8 cards in a fully equipped SuperLine Access Shelf

The following figure shows a fully equipped *SuperLine* Access Shelf. The 12 QV8 cards are positioned in card slots 1–6 and 9–14. Other cards in the shelf are the VDS1 card in card slot 7, the FETH card in card slot 8, and the POWR card in card slot 15.



2 on Ports 1–4

In the Telephony tab screen of the *SuperLine* Element Manager, you can select this configuration from the **Derived Lines/Loop** drop-down list box as **2 on Ports 1–4**. When that option is selected, two derived lines are placed on ports 1 through 4 on all QV8 cards. Ports 5–8 have no derived lines available but can be used for data traffic and baseband telephony.

The following table lists the DS0 derived line mapping for both TR-008 Mode 1 and DDI telephony types in the format card slot number–circuit number–derived line number.

DS1-1	DS1-2	DS1-3	DS1-4	DS0 channels for TR-008 Mode 1	DS0 channels for DDI
1-1-1	4-1-1	9-1-1	12-1-1	1	1
1-1-2	4-1-2	9-1-2	12-1-2	3	2
1-2-1	4-2-1	9-2-1	12-2-1	5	3
1-2-2	4-2-2	9-2-2	12-2-2	7	4
1-3-1	4-3-1	9-3-1	12-3-1	9	5
1-3-2	4-3-2	9-3-2	12-3-2	11	6
1-4-1	4-4-1	9-4-1	12-4-1	13	7
1-4-2	4-4-2	9-4-2	12-4-2	15	8
2-1-1	5-1-1	10-1-1	13-1-1	17	9
2-1-2	5-1-2	10-1-2	13-1-2	19	10
2-2-1	5-2-1	10-2-1	13-2-1	21	11
2-2-2	5-2-2	10-2-2	13-2-2	23	12
2-3-1	5-3-1	10-3-1	13-3-1	2	13
2-3-2	5-3-2	10-3-2	13-3-2	4	14
2-4-1	5-4-1	10-4-1	13-4-1	6	15
2-4-2	5-4-2	10-4-2	13-4-2	8	16
3-1-1	6-1-1	11-1-1	14-1-1	10	17
3-1-2	6-1-2	11-1-2	14-1-2	12	18
3-2-1	6-2-1	11-2-1	14-2-1	14	19
3-2-2	6-2-2	11-2-2	14-2-2	16	20
3-3-1	6-3-1	11-3-1	14-3-1	18	21
3-3-2	6-3-2	11-3-2	14-3-2	20	22
3-4-1	6-4-1	11-4-1	14-4-1	22	23
3-4-2	6-4-2	11-4-2	14-4-2	24	24

2 on Slots 1–6

In the Telephony tab screen of the *SuperLine* Element Manager, you can select this configuration from the **Derived Lines/Loop** drop-down list box as **2 on Slots 1–6**. When that option is selected, two derived lines are placed on all ports found on the QV8 cards in card slots 1 through 6. QV8 cards in any other card slot have no derived lines available but can be used for data traffic and baseband telephony.

The following table lists the DS0 derived line mapping for both TR-008 Mode 1 and DDI telephony types in the format card slot number–circuit number–derived line number.

DS1-1	DS1-2	DS1-3	DS1-4	DS0 channels for TR-008 Mode 1	DS0 channels for DDI
1-1-1	2-5-1	4-1-1	5-5-1	1	1
1-1-2	2-5-2	4-1-2	5-5-2	3	2
1-2-1	2-6-1	4-2-1	5-6-1	5	3
1-2-2	2-6-2	4-2-2	5-6-2	7	4
1-3-1	2-7-1	4-3-1	5-7-1	9	5
1-3-2	2-7-2	4-3-2	5-7-2	11	6
1-4-1	2-8-1	4-4-1	5-8-1	13	7
1-4-2	2-8-2	4-4-2	5-8-2	15	8
1-5-1	3-1-1	4-5-1	6-1-1	17	9
1-5-2	3-1-2	4-5-2	6-1-2	19	10
1-6-1	3-2-1	4-6-1	6-2-1	21	11
1-6-2	3-2-2	4-6-2	6-2-2	23	12
1-7-1	3-3-1	4-7-1	6-3-1	2	13
1-7-2	3-3-2	4-7-2	6-3-2	4	14
1-8-1	3-4-1	4-8-1	6-4-1	6	15
1-8-2	3-4-2	4-8-2	6-4-2	8	16
2-1-1	3-5-1	5-1-1	6-5-1	10	17
2-1-2	3-5-2	5-1-2	6-5-2	12	18
2-2-1	3-6-1	5-2-1	6-6-1	14	19
2-2-2	3-6-2	5-2-2	6-6-2	16	20
2-3-1	3-7-1	5-3-1	6-7-1	18	21
2-3-2	3-7-2	5-3-2	6-7-2	20	22
2-4-1	3-8-1	5-4-1	6-8-1	22	23
2-4-2	3-8-2	5-4-2	6-8-2	24	24

2, 1, 0 Repeated

In the Telephony tab screen of the *SuperLine* Element Manager, you can select this configuration from the **Derived Lines/Loop** drop-down list box as **2, 1, 0 Repeated**. When that option is selected, two derived lines are placed on QV8 cards in card slots 1, 4, 9, and 12. One derived line is placed on QV8 cards in slots 2, 5, 10, and 13. No derived lines are placed on QV8 cards in slots 3, 6, 11, and 14, but those lines can be used for data traffic and baseband telephony.

The following table lists the DS0 derived line mapping for both TR-008 Mode 1 and DDI telephony types in the format card slot number–circuit number–derived line number.

DS1-1	DS1-2	DS1-3	DS1-4	DS0 channels for TR-008 Mode 1	DS0 channels for DDI
1-1-1	4-1-1	9-1-1	12-1-1	1	1
1-1-2	4-1-2	9-1-2	12-1-2	3	2
1-2-1	4-2-1	9-2-1	12-2-1	5	3
1-2-2	4-2-2	9-2-2	12-2-2	7	4
1-3-1	4-3-1	9-3-1	12-3-1	9	5
1-3-2	4-3-2	9-3-2	12-3-2	11	6
1-4-1	4-4-1	9-4-1	12-4-1	13	7
1-4-2	4-4-2	9-4-2	12-4-2	15	8
1-5-1	4-5-1	9-5-1	12-5-1	17	9
1-5-2	4-5-2	9-5-2	12-5-2	19	10
1-6-1	4-6-1	9-6-1	12-6-1	21	11
1-6-2	4-6-2	9-6-2	12-6-2	23	12
1-7-1	4-7-1	9-7-1	12-7-1	2	13
1-7-2	4-7-2	9-7-2	12-7-2	4	14
1-8-1	4-8-1	9-8-1	12-8-1	6	15
1-8-2	4-8-2	9-8-2	12-8-2	8	16
2-1-1	5-1-1	10-1-1	13-1-1	10	17
2-2-1	5-2-1	10-2-1	13-2-1	12	18
2-3-1	5-3-1	10-3-1	13-3-1	14	19
2-4-1	5-4-1	10-4-1	13-4-1	16	20
2-5-1	5-5-1	10-5-1	13-5-1	18	21
2-6-1	5-6-1	10-6-1	13-6-1	20	22
2-7-1	5-7-1	10-7-1	13-7-1	22	23
2-8-1	5-8-1	10-8-1	13-8-1	24	24

1 on Slots 1–6, 2 on 9–11

In the Telephony tab screen of the *SuperLine* Element Manager, you can select this configuration from the **Derived Lines/Loop** drop-down list box as **1 on Slots 1–6, 2 on 9–11**. When that option is selected, one derived line is placed on QV8 cards in card slots 1 through 6, and two derived lines are placed on QV8 cards in card slots 9 through 11. QV8 cards in card slots 12–14 have no derived lines but can be used for data traffic and baseband telephony.

The following table lists the DS0 derived line mapping for both TR-008 Mode 1 and DDI telephony types in the format card slot number–circuit number–derived line number.

DS1-1	DS1-2	DS1-3	DS1-4	DS0 channels for TR-008 Mode 1	DS0 channels for DDI
1-1-1	4-1-1	9-1-1	10-5-1	1	1
1-2-1	4-2-1	9-1-2	10-5-2	3	2
1-3-1	4-3-1	9-2-1	10-6-1	5	3
1-4-1	4-4-1	9-2-2	10-6-2	7	4
1-5-1	4-5-1	9-3-1	10-7-1	9	5
1-6-1	4-6-1	9-3-2	10-7-2	11	6
1-7-1	4-7-1	9-4-1	10-8-1	13	7
1-8-1	4-8-1	9-4-2	10-8-2	15	8
2-1-1	5-1-1	9-5-1	11-1-1	17	9
2-2-1	5-2-1	9-5-2	11-1-2	19	10
2-3-1	5-3-1	9-6-1	11-2-1	21	11
2-4-1	5-4-1	9-6-2	11-2-2	23	12
2-5-1	5-5-1	9-7-1	11-3-1	2	13
2-6-1	5-6-1	9-7-2	11-3-2	4	14
2-7-1	5-7-1	9-8-1	11-4-1	6	15
2-8-1	5-8-1	9-8-2	11-4-2	8	16
3-1-1	6-1-1	10-1-1	11-5-1	10	17
3-2-1	6-2-1	10-1-2	11-5-2	12	18
3-3-1	6-3-1	10-2-1	11-6-1	14	19
3-4-1	6-4-1	10-2-2	11-6-2	16	20
3-5-1	6-5-1	10-3-1	11-7-1	18	21
3-6-1	6-6-1	10-3-2	11-7-2	20	22
3-7-1	6-7-1	10-4-1	11-8-1	22	23
3-8-1	6-8-1	10-4-2	11-8-2	24	24

1 on all Ports

In the Telephony tab screen of the *SuperLine* Element Manager, you can select this configuration from the **Derived Lines/Loop** drop-down list box as **1 on all Ports**. When that option is selected, one derived line is placed on every port on every QV8 card.

The following table lists the DS0 derived line mapping for both TR-008 Mode 1 and DDI telephony in the format card slot number–circuit number–derived line number.

DS1-1	DS1-2	DS1-3	DS1-4	DS0 channels for TR-008 Mode 1	DS0 channels for DDI
1-1-1	4-1-1	9-1-1	12-1-1	1	1
1-2-1	4-2-1	9-2-1	12-2-1	3	2
1-3-1	4-3-1	9-3-1	12-3-1	5	3
1-4-1	4-4-1	9-4-1	12-4-1	7	4
1-5-1	4-5-1	9-5-1	12-5-1	9	5
1-6-1	4-6-1	9-6-1	12-6-1	11	6
1-7-1	4-7-1	9-7-1	12-7-1	13	7
1-8-1	4-8-1	9-8-1	12-8-1	15	8
2-1-1	5-1-1	10-1-1	13-1-1	17	9
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3-6-1	6-6-1	11-6-1	14-6-1	20	22
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□



Appendix B: Setting derived lines per loop on the line cards

Derived lines per loop table

The number of derived lines per subscriber loop that are served by the *SuperLine*™ Access Shelf are provisioned using the Telephony tab screen of the *SuperLine* EM. Settings are made at a shelf-level and effect all lines serviced by the shelf.

For more information, refer to the *SuperLine Access System Element Manager User's Guide*.

Option name	Description
No telephony	Turns off ALL derived line telephony for the shelf.
2 on Ports 1–4	Places two derived lines on ports 1 through 4 on all line cards.
2 on Slots 1–6	Places two derived lines on all ports found on line cards in slots 1 through 6. Line cards in any other slots have no derived lines available but can be used for data.
2, 1, 0 repeated	Places two derived lines on line cards in slots 1, 4, 9, and 12 and places one derived line on line cards in slots 2, 5, 10, and 13. No derived lines are placed on line cards in slots 3, 6, 11, and 14, but those lines can be used for data traffic.
1 on Slots 1–6, 2 on 9-11	Places one derived line on line cards in slots 1 through 6 and two derived lines on line cards in slots 9, 10, and 11. Slots 7 and 8 are reserved for the Voice Digital Signal 1 (VDS1) and Fast Ethernet (FETH) cards respectively. Line cards in slots 12, 13, and 14 have no derived lines, but can be used for data traffic.
2 on all Ports	<u>Important</u> : This option is available only for the TR-303 telephony protocol. Places two derived lines on every port available in the shelf.
1 on all Ports	Places one derived line on every port in the shelf.





Glossary

10Base-T

An Ethernet Local Area Network (LAN) that operates on Shielded Twisted-Pair (STP) or Category 5 Unshielded Twisted-Pair (UTP) cable. Runs at 10 Mbps.

100Base-T

An Ethernet Local Area Network (LAN) that operates on Shielded Twisted-Pair (STP) or Category 5 Unshielded Twisted-Pair (UTP) cable. Runs at 100 Mbps.

4TEL®

Computer-controlled diagnostic system.

5ESS®

Lucent Technologies Class 5 local digital switch. *5ESS* is a registered trademark of Lucent Technologies.

A

AC

Alternating current

ADSL

Asymmetric Digital Subscriber Line

AMI

Alternate Mark Inversion

ARP

Address Resolution Protocol

ASN.1

Abstract Syntax Notation One

authentication

An SNMP process that determines the validity of an SNMP message. For instance, SNMP configuration messages sent to a device in the *SuperLine* Access System must contain a password that indicates they originated from a source authorized to issue such messages.

AWG

American Wire Gauge

B B8ZS

Bipolar 8 Zero Substitution

Baseband voice line

A telephone line that supports standard telephone service only over the baseband voice band, plus all standard telephony services.

C CAP

Carrierless Amplitude and Phase modulation

CD-ROM

Compact Disc-Read Only Memory

Circuit pack

A printed circuit board with microprocessors, transistors, and other electronics components that slides into the *SuperLine* Access Shelf. Circuit packs include the POWR card, the QV8 line card, the FETH, and the VDS1 cards.

CLASS

Custom Local Area Signaling Services

CLEI

Common-Language Equipment Identification. A number assigned to an individual *SuperLine* device that uniquely identifies it.

CPE filter

Customer Premises Equipment filter. CPE filters must be installed on all phones attached to the original baseband line within the customer premises.

CPU

Central Processing Unit

CSC

Customer Support Center at AG Communication Systems.

D Data ratio

The percentage of bandwidth on a derived voice line that carries upstream data traffic, vs. the percentage of bandwidth that carries downstream data transmissions.

dB

Decibel. A unit of measure of signal strength, usually the relation between a transmitted signal and a standard signal source.

dc

Direct current

DCLU

Digital Carrier Line Unit

DDI

Direct Digital Interface

DDS

Digital Data System

Derived voice line

A standard 64 Kbps μ -law voice offering, supporting normal telephony services such as Caller ID, special ringing, message waiting, V.34 and V.90 modems, and so on. From the subscriber's perspective, a derived voice looks and behaves like standard telephony service.

DHCP

Dynamic Host Configuration Protocol

DLIN

Direct Digital Interface (DDI) Line

DMS™

Class 5 local digital switch. *DMS* is a trademark of Nortel Networks Corporation

DMT

Discrete Multi-Tone

DN

Directory Number

DS1

Digital Signal, level 1. A T-carrier facility.

DS0

Digital Signal, level 0

DSP

Digital Signal Processor

DTMF

Dual-Tone Multifrequency. A synonym for pushbutton or touchtone telephone dialing.

E Element Manager (EM)

A software application for personal computers that enables Telco personnel to configure, administer, and monitor *SuperLine* Access Systems.

EOC

Embedded Operations Channel

ESF

Extended Superframe

Ethernet

A network topology that supports high-speed data communication among systems. A widely used standard for LANs.

Event log

A record of alarms and other events on the *SuperLine* Access System. *SuperLine* Element Manager records events in an individual event log for each *6*Access Shelf with which it has opened as session, and records events on all *SuperLine* Access Shelves in a global event log. Multi-Element Manager uses *OpenView* NNM's event log to record such events.

F FETH

Fast Ethernet card for the *SuperLine* Access Shelf.

FEXT

Far-end crosstalk

Free run

A condition in which the *SuperLine* Access Shelf's first two DS1s are no longer synchronized with the network clock. This condition causes all shelf DS1s to become disconnected.

G GTD-5® EAX

GTE's Class 5 local digital switch. *GTD-5* is a registered trademark of GTE Corporation.

GUI

Graphical User Interface

H HDSL

High-bit-rate Digital Subscriber Line

Hertz

A measurement of frequency in cycles per second. A hertz is one cycle per second.

I IDCU

Integrated Digital Carrier Unit

IEEE

Institute of Electrical and Electronic Engineers

ILEN

IDCU Line Equipment Number

IP

Internet Protocol

IP route

Defined path between two network devices that allows the devices to exchange data packets.

IROC

Integrated Remote Operations Controller

ISDN

Integrated Services Digital Network

ISP

Internet Service Provider

ITOC

Independent Telephone Operating Companies

ITU-T

International Telecommunications Union – Telecommunications

K Kbits

Standard measure of data rate and transmission capacity

kbps

Kilobits per second (1,000 bits per second).

kFT

One thousand feet

kHz

Kilohertz. One thousand hertz. see Hertz.

L LAN

Local Area Network

LED

Light Emitting Diode

Line build out

Distance between a *SuperLine* Access Shelf and the local digital switch.

M MAC

Media Access Control

Mask

See *Subnet mask*.

MB

Megabytes

Mbps

Megabits per second (1,000,000 bits per second).

MHz

Megahertz

MIB

Management Information Base

Multi-Element Manager (Multi-EM)

Software application from Lucent Technologies and AG Communication Systems that provides a graphical user interface for monitoring and administering *SuperLine* Access Shelves and their equipment. Multi-EM is a version of *SuperLine* Element Manager that runs integrated with OpenView Network Node Manager.

N Network element

A managed object that represents telecommunications equipment within the telecommunications network and performs network element functions; that is, provide support, service, or both to the subscriber.

NEXT

Near-end crosstalk

NIC

Network Interface Card

NNM

Network Node Manager. Part of the Hewlett-Packard Company *OpenView*® product.

NOC

Network Operations Center

O ohms

Measures of resistance

O OOT

Out of Tolerance

OpenView Network Node Manager (NNM)

Network management software application. OpenView is a registered trademark of Hewlett-Packard Company.

P PC

Personal Computer

PCI

Peripheral Component Interconnect

PCM

Pulse Code Modulation. A method of encoding an analog voice signal into a digital bit stream

POTS

Plain Old Telephone Service. A standard 64 kbps μ -law PCM voice offering, supporting normal telephony services such as Caller ID, special ringing, and message waiting. From the end user's perspective, a *SuperLine* voice line looks and behaves like standard telephony service.

Q QV8

Quadrature Amplitude Modulation Voice 8 card for the *SuperLine* Access Shelf. Supports up to eight baseband telephone lines and an additional sixteen derived lines.

R RADSL

Rate Adaptive Digital Subscriber Line

RALT

Remote Analog Line Termination

RAM

Random Access Memory

RLU

Remote Line Unit

S SDSL

Single Line DSL

SF

Superframe

SLC

Subscriber Loop Carrier

SLEN

SLC Line Equipment Number

SNMP

Simple Network Management Protocol

SPFC

SuperLine POTS Filter Cards

SPFM

SuperLine POTS Filter Module. The SPFM provides the interface between the local digital switch and the *SuperLine* subscriber lines (baseband voice lines) connected to the *SuperLine* Access Shelf and the External Facilities lines.

Subnet mask

A number that is used to identify a subnetwork; allows an IP address to be shared on a LAN.

SuperLine Access Shelf

A module that houses *SuperLine* line cards (QV8), VDS1, FETH, and POWR cards.

SuperLine Access System

AG Communication Systems product that enables a single standard copper, twisted-pair customer telephone connection to support multiple lines carrying either voice or data traffic.

SuperLine Element Manager (SuperLine EM)

Software application from Lucent Technologies and AG Communication Systems that provides a graphical user interface for monitoring and administering *SuperLine* Access Shelves and their equipment.

SuperLine Integrated Access Device (IAD)

A modem that makes *SuperLine* service possible at the customer premises.

T Telco

Telephone company

TFTP

Trivial File Transfer Protocol

TMC

Timeslot Management Channel

TR-008 Mode 1

Protocol that defines an interface between a CO switch and a remote terminal to handle all call processing and operational functions. Developed by Telcordia Technologies Inc. (formerly Bellcore).

TR-303

Protocol that defines an interface between a CO switch and a remote terminal to handle all call processing and operational functions. Developed by Telcordia Technologies Inc. (formerly Bellcore).

Trapping

SNMP capability to detect problem or error conditions related to network events and issue alarms.

TSI

Timeslot Interchange

U UNICODE

Unique supervision pattern defined for an individual DS0 channel

UTP

Unshielded Twisted Pair

V VDS1

Voice Digital Signal 1 card for the *SuperLine* Access Shelf.

W WAN

Wide Area Network





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