AVAYA

Avaya Call Management System

Switch Connections, Administration, and Troubleshooting

Avaya Call Management System
Switch Connections, Administration, and Troubleshooting

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Preface

Avaya Call Management System (CMS) is an application for businesses and organizations that use Avaya communication servers to process large volumes of telephone calls using the Automatic Call Distribution (ACD) feature. Avaya CMS supports solutions for routing and agent selection, multi-site contact centers, remote agents, reporting, interfaces to other systems, workforce management, desktop applications, system recovery, and quality monitoring.

Avaya CMS is part of the Operational Effectiveness solution of the Avaya Customer Interaction Suite.

This section includes the following topics:

Purpose

This document describes how to connect and administer Avaya communication servers (switches) that are used with the Avaya Call Management System (CMS).

Intended users

This document is written for:

- Avaya support personnel
- Contact center administrators

This document assumes a minimum level of technical knowledge on the part of its readers. It assumes, for example, that a reader knows how to use the switch administration interfaces and how to connect switch hardware.

Overview

This document is organized as follows:

Conventions and terminology

The following terminology is used in this document:

● Unless specified otherwise, all information and procedures in this document apply to the Sun Fire V880/V890 computer, the Sun Blade 100/150 workstation, the Sun Enterprise 3500 computer, the Sun Ultra 5 computer, the Sun Enterprise 3000 computer, and the Sun SPARCserver computers. Since all of these computers use the CMS software, they are referred to as the "CMS computer."

● Unless otherwise specified, all switch connectivity and administration applies to all models of Avaya switch software and hardware, including the following:

  - DEFINITY Enterprise Communications Server (ECS)

  - Avaya DEFINITY Server CSI, SI, and R

  Note:
  > Support for the DEFINITY Server R ended beginning with Communication Manager 2.0. Support for the DEFINITY Server SI ended beginning with Communication Manager 3.0.

  - DEFINITY One

  - Avaya IP600

  - Avaya S8xxx media servers

  - Avaya G-series media gateways (for example, G700, G650, G350, and so on) that are certified for call center configurations

● Automatic Call Distribution (ACD) is a feature of the switch software. The ACD feature is used to route incoming calls to groups of agents. When this document refers to "connecting to an ACD," it refers to connecting to a switch that has ACD capabilities.

If you see any of the following safety labels in this document, take careful note of the information presented.

⚠ CAUTION:

Caution statements call attention to situations that can result in harm to software, loss of data, or an interruption in service.

⚠ WARNING:

Warning statements call attention to situations that can result in harm to hardware or equipment.

⚠ DANGER:

Danger statements call attention to situations that can result in harm to personnel.

⚠ SECURITY ALERT:

Security alert statements call attention to situations that can increase the potential for unauthorized use of a telecommunications system.

Reasons for reissue

Issue 6.0 of this document has the following changes:

- To add information about CMS R13 and Communication Manager 3.x, including release compatibility and new media servers and gateways.
- To add information about the Sun Fire V890 computer.
- To make general wording and format corrections to the document.

Issue 5.0 of this document has the following changes:

- To move all X.25 link information into appendixes since all new installs required LAN TCP/IP connections.
- To add information about configuration using Avaya Operational Analyst (OA).
- To add information about CMS R12 and Communication Manager 2.x, including release compatibility.
- To update connection options for S87xx Media Servers.
- To make general wording and format corrections to the document.

Issue 4.2 of this document has the following changes:

● To add information about X.25 support being discontinued in a future release of CMS. This means that any new installations should use TCP/IP for switch links.

● To clarify administration of the processor interface port on an S8300 Media Server.

Issue 4.1 of this document has the following changes:

● To remove references to DEFINITY Generic 2 (G2) and DEFINITY Generic 3 Version 1 (G3V1), which are no longer supported by Avaya.

● To add information about the Sun Fire V880 computer and the Sun Blade 150 workstation.

● To remove a configuration diagram showing PPP connectivity over DS1. This configuration is not supported at this time.

● To make wording corrections for information about connections to the S8100, S8300, and S8700 Media Servers and the G600, G700, CMC1, SCC1, and MCC1 Media Gateways. See Switch connections with TCP/IP over a LAN on page 25.

● To make general wording and format corrections to the document.

Issue 4.0 of this document has the following changes:

● To transition from the CentreVu CMS name to the Avaya CMS name.

● To add information about CMS R3V11.

● To add administration changes for MultiVantage Software.

● To add connectivity and administration information for the following platforms:

    - DEFINITY One

    - Avaya IP600

    - Avaya S8100 Media Server

    - Avaya S8300 Media Server

    - Avaya S8700 Media Server

● To specify that the Isolating Data Interface (IDI) model 105D is the correct model for X.25 IDI connections.

● To add administration information for the speed settings on the TN799DP C-LAN circuit pack.

● To make general wording and format corrections to the document.

Issue 3.0 of this document has the following changes:

● To add administration changes for the R9.5 software release.

● To add information about CMS R3V9.

● To add information about the Sun Blade 100 CMS hardware platform.

Issue 2.2 of this document has the following changes:

- To rearrange content to eliminate redundancy about TCP/IP connectivity and administration.

- To change from Lucent Technologies to Avaya.

- To note that the two C-LAN configuration is the best way to provide link isolation (Two ethernet ports option on page 37).

- To change the TCP/IP administration to support the R9 software release (starting on Administering a TCP/IP connection on page 55).

- To make general wording corrections to the document.

Issue 2.1 of this document has the following changes:

- To add planning information for TCP/IP network configurations.

- To add sample TCP/IP network configurations.

- To clarify the relationship between the interface channel and remote and local ports on the Communications Interface Channel form.

- To add an appendix that explains how to convert an X.25 link to a TCP/IP link.

- To make general wording corrections to the document.

Availability

Copies of this document are available from one or both of the following sources:

Note:
> Although there is no charge to download documents through the Avaya Web site, documents ordered from the Avaya Publications Center must be purchased.

- The Avaya online support Web site, http://www.avayadocs.com

- The Avaya Publications Center, which you can contact by:

  Voice:

  +1-207-866-6701
  +1-800-457-1764 (Toll-free, U.S. and Canada only)

  Fax:

  +1-207-626-7269
  +1-800-457-1764 (Toll-free, U.S. and Canada only)

  Mail:

  GlobalWare Solutions
  200 Ward Hill Avenue
  Haverhill, MA 01835 USA
  Attention: Avaya Account Manager

  E-mail:

  totalware@gwsmail.com

Related documentation

You might find the following Avaya CMS documentation useful. This section includes the following topics:

Change description

For information about the changes made in Avaya CMS R13, see:

- *Avaya Call Center 3.0 and Call Management System (CMS) Release 13 Change Description*, 07-300304

Software documents

For more information about Avaya CMS software, see:

- *Avaya Call Management System Release 13 Software Installation, Maintenance, and Troubleshooting Guide,* 07-300340
- *Avaya CMS Open Database Connectivity Version 4.2,* 585-780-701
- *Avaya Call Management System Release 13 LAN Backup User Guide,* 07-300338
- *Avaya Call Management System Release 13 External Call History Interface,* 07-300332
- *Avaya CMS Custom Reports,* 585-215-822
- *Avaya CMS Forecast User Guide,* 585-215-825
- *Avaya Visual Vectors Release 13 Installation and Getting Started*, 07-300353
- *Avaya Visual Vectors Release 13 User Guide*, 07-300354
- *Avaya Call Management System (CMS) Supervisor Release 13 Report Designer*, 07-300335

Administration documents

For more information about Avaya CMS administration, see:

- *Avaya Call Management System Release 13 Administration,* 07-300331
- *Avaya Call Management System (CMS) Release 13 Database Items and Calculations,* 07-300330
- *Avaya Call Management System Supervisor Release 13 Reports*, 07-300334
- *Avaya Call Management System (CMS) Supervisor Release 13 Installation and Getting Started*, 07-300333
- *Avaya Call Management System High Availability User Guide*, 07-300066
- *Avaya Call Management System High Availability Connectivity, Upgrade and Administration*, 07-300065

Hardware documents

For more information about Avaya CMS hardware, see:

- *Avaya Call Management System Sun Fire V880/V890 Computer Hardware Installation, Maintenance, and Troubleshooting,* 585-215-116
- *Avaya Call Management System Sun Blade 100/150 Workstation Hardware Installation, Maintenance, and Troubleshooting,* 585-310-783
- *Avaya Call Management System Terminals, Printers, and Modems,* 585-215-874

Call Center documents

For more information about Avaya Call Center documents, see:

- *Avaya Communication Manager Call Center Software Basic Call Management System (BCMS) Operations,* 07-300061
- *Avaya Call Management System Switch Connections, Administration*, and *Troubleshooting*, 585-215-876
- *Avaya Communication Manager Call Center Software Call Vectoring and Expert Agent Selection (EAS) Guide*, 07-300303
- *Avaya Communication Manager Call Center Software Automatic Call Distribution (ACD) Guide*, 07-300301
- *Avaya Business Advocate User Guide*, 07-300336

Avaya CMS upgrade documents

There are several upgrade paths supported with Avaya CMS. There is a document designed to support each upgrade.

This section includes the following topics:

- Base load upgrades on page 16
- Platform upgrades and data migration on page 16
- Avaya Call Management System Upgrade Express (CUE) on page 16

Base load upgrades

Use a base load upgrade when upgrading CMS to the latest load of the same version (for example, r13ak.g to r13al.k). A specific set of instructions is written for the upgrade. The instructions are shipped to the customer site with the CMS software CD-ROM as part of a Product Correction Notice (PCN).

For more information about base load upgrades, see:

- *Avaya Call Management System Release 13 Base Load Upgrade*

Platform upgrades and data migration

Use a platform upgrade when upgrading to a new hardware platform (for example, upgrading from a SPARCserver 5 to a Sun Blade 150). The new hardware platform is shipped from the Avaya factory with the latest CMS load. Therefore, as part of the upgrade you will have the latest CMS load (for example, R3V9 to R13).

For more information about platform upgrades and data migration, see:

- *Avaya Call Management System Release 13 Platform Upgrade and Data Migration*, 07-300339

Avaya Call Management System Upgrade Express (CUE)

Use CUE when CMS is being upgraded from an earlier version (for example, R3V9) to the latest version (for example, R13).

A specific set of upgrade instructions is written for the upgrade. These instructions are included on the CUE software CD-ROM that is shipped to the customer site with the CUE kit.

For information about customer requirements for CUE upgrades, see:

- *Avaya Call Management System Release 13 CMS Upgrade Express (CUE) Customer Requirements,* 700356744

For information about CUE upgrade procedures, see:

- *Avaya Call Management System Release 13 Sun Blade 100/150 Workstation Mirrored and Nonmirrored Systems CMS Upgrade Express (CUE)*, 07-300481

- *Avaya Call Management System Release 13 Sun Fire V880/V890 Computer CMS Upgrade Express (CUE),* 07-300344

Documentation Web sites

For Avaya product documentation, go to http://www.avayadocs.com. Additional information about new software or hardware updates will be contained in future issues of this book. New issues of this book will be placed on the Web site when available.

Use the following Web sites to view related support documentation:

- Information about Avaya products and service

    http://www.avaya.com

- Sun hardware documentation

    http://docs.sun.com

- Informix documentation

    http://www.informix.com

- Tivoli Storage Manager documentation

    http://www.tivoli.com

Support

Contacting Avaya technical support

Avaya provides support telephone numbers for you to report problems or ask questions about your product.

For United States support:

1- 800- 242-2121

For international support:

See the 1-800 Support Directory listings on the Avaya Web site.

Escalating a technical support issue

Avaya Global Services Escalation Management provides the means to escalate urgent service issues. For more information, see the Escalation Management listings on the Avaya Web site.

Introduction

CMS is a software application offered in association with the Automatic Call Distribution (ACD) feature of Avaya systems. The CMS application provides monitoring and recording of ACD calls, agents handling these calls, and the use of Vector Directory Numbers (VDNs) for these calls to measure system and agent performance.

Different releases of CMS software are certified to interface with the following switch software releases.

Communication server software release	CMS software release						
	R3V5[1]	R3V6	R3V8	R3V9	R3V11[3]	R12	R13
DEFINITY G3V2 Load 82 and later	Yes	Yes	Yes	Yes	No	No	No
DEFINITY G3V3	Yes	Yes	Yes	Yes	No	No	No
DEFINITY G3V4	Yes	Yes	Yes	Yes	No	No	No
DEFINITY R5	Yes[2]	Yes	Yes	Yes	No	No	No
DEFINITY R6	Yes	Yes[2]	Yes	Yes	Yes	No	No
DEFINITY R7	Yes	Yes[2]	Yes	Yes	Yes	No	No
DEFINITY R8	Yes	Yes	Yes[2]	Yes	Yes	Yes	Yes
DEFINITY R9.1, R9.2	Yes	Yes	Yes	Yes[2]	Yes	Yes	Yes
Avaya Call Processing R9.5	Yes	Yes	Yes	Yes[2]	Yes	Yes	Yes
Avaya Call Processing R10	Yes	Yes	Yes	Yes[2]	Yes	Yes	Yes
Communication Manager 1.1, 1.2, 1.3[3]	Yes	Yes	Yes	Yes	Yes[2]	Yes	Yes
Communication Manager 2.0, 2.1, 2.2	No	Yes	Yes	Yes	Yes	Yes[2]	Yes
Communication Manager 3.0	No	No	No	Yes	Yes	Yes	Yes[2]

1. CMS R3V5 only supports X.25 links.

2. Recommended release combination.

3. Systems that are upgraded to this software release can use existing X.25 links. New systems must use TCP/IP ethernet links.

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Connecting a TCP/IP switch link

This section explains how to connect the CMS computer to the switch using TCP/IP over a local area network (LAN)

This section includes the following topics:

- Overview on page 21
- Switch connections with TCP/IP over a LAN on page 25

Overview

The connection between the CMS computer and a switch allows the CMS software on the computer to receive, store, and format the Automatic Call Distribution (ACD) information it receives from one or more switches.

A switch technician should be on-site to make the connection from the CMS computer to the switch and, if necessary, to administer the switch for the ACD feature and CMS. The CMS software will not communicate with the switch if the ACD feature, CMS, or the switch hardware is not properly administered. See Administering a TCP/IP switch link on page 45 for more information.

This section includes the following topics:

- Local vs remote connections on page 22
- Multiple ACDs (switches) on page 22
- High availability option on page 22
- Connecting blocks on page 22
- Planning for TCP/IP switch links on page 23

Local vs remote connections

This section shows both local and remote connections between the switch and the CMS computer. For clarification, these connections are defined as follows:

● Local - The connections between the switch and the CMS computer use facilities local to the switch, such as a direct connection over a LAN.

● Remote - The connections between the switch and the CMS computer use wide area network (WAN).

Multiple ACDs (switches)

One CMS computer can collect data from up to eight different switches. From the CMS computer point of view, each switch represents one ACD. Each switch requires a link to the CMS computer.

High availability option

The High Availability option provides dual links between the switch and two separate CMS computers. If the customer has purchased the High Availability option, you must connect a link from one ethernet port on the switch to one CMS computer, and a second link from a different ethernet port on the switch to another CMS computer. The High Availability option is not allowed using X.25 links.

Note:

> For the S8300 Media Server, you cannot have dedicated links to each CMS computer; if you want true duplication, you must use a different solution.

In addition to having the correct CMS R3V8 or later load, the switch must be optioned with software version of V8 or later, Call Center Release of 8.1 or later, and Adjunct CMS Release of R3V8 or later. See Common switch administration on page 50 for more information.

Connecting blocks

In this section, references are made to 103A connecting blocks, which have one RJ45 connector per block. If needed, you can substitute the 104A connecting block, which has two RJ45 connectors per block. The wiring for both connecting blocks are identical.

Planning for TCP/IP switch links

When setting up a switch link using TCP/IP over a LAN, planning information must be gathered before you begin. In particular, you must take into account if the LAN connection includes both a connection to CMS, Intuity AUDIX with integrated messaging, and Avaya Operational Analyst (OA). Some of the information needed includes:

● How is the connection being made from the CMS computer to the switch?

- Private LAN, no connectivity to customer LAN (uses private LAN addresses).

  ● Preferred method, most robust and reliable, no dependency on customer's network

  ● A dedicated LAN port on the CMS computer provides the switch link

  ● The primary LAN port (the built-in ethernet port) is used for other connectivity (printers, terminals, Avaya CMS Supervisor, Intuity integrated messaging, and Avaya OA) using a different subnet from the switch link

  ● If desired, a second ethernet port can be used to provide additional isolation for the CMS link

  ● A dedicated LAN hub to connect the links.

- Customer LAN with private segment.

  ● Uses a network switch or router to provide a private network or network segment

  ● Minimal dependency on customer's network

  ● A dedicated LAN port on the CMS computer provides the switch link

  ● The primary LAN port (the built-in ethernet port) is used for other connectivity (printers, terminals, Avaya CMS Supervisor, Intuity integrated messaging, and Avaya OA) using a different subnet from the switch link

  ● Customer must provide equipment and administer network for private segment

  ● Customer LAN administrator must be present during setup.

- Direct connect to Customer LAN, without private segment.

  ● Least preferred method

  ● Complete dependency on performance and reliability of customer's LAN

  ● Allows remote location of endpoints when customer LAN connectivity is convenient

  ● Customer LAN administrator must be present during setup.

- If the customer LAN is used, the following information is needed from the customer:
  - Customer network physical connectivity:
    - Location of network access point (hub, router, and so on)
    - Distance between the ethernet port on the switch and the network access point (328 ft, 100 m maximum)
    - Wiring to access point, existing or new, Category 5 minimum required.
  - Customer network administration:
    - IP address of switch ethernet ports, CMS computer, Intuity, and gateways
    - Node names of switch ethernet ports, CMS computer, Intuity, and gateways
    - Subnet masks for all LAN segments containing switch ethernet ports or adjuncts
    - Gateway IP address for all LAN segments containing switch ethernet ports, adjuncts, or routers
    - Are all endpoints (switch ethernet ports and adjuncts) on the same local LAN segment?
    - Network routes.

    Network administration information needs to be mapped into specific administration fields.
- Sanity check of information obtained from customer:
  - If switch and adjuncts are on different LAN subnets (recommended), gateway IP addresses are different
  - If switch and adjuncts (CMS or Intuity) are on the same LAN subnet (not recommended):
    - Gateway IP address (if present) and subnet mask information is valid
    - All IP addresses contain the same subnet address

Without the above information, the technician may not be able to complete the installation. Installations that require the technicians to return because information was not available incur additional charges.

Switch connections with TCP/IP over a LAN

Any switch with R7 or later software equipped with either the TN799 C-LAN circuit pack or a processor ethernet port can interface to an R3V6 or later CMS computer using a LAN. This connection can be made in the following ways:

- Connecting with a LAN hub or a network switch (recommended configuration)
- Connecting over a customer LAN

This section includes the following topics:

Connecting one or more ACDs using TCP/IP over a LAN

An ethernet port and Category 5 unshielded twisted pair (UTP) cabling are used to connect a CMS computer to a LAN for switch connectivity. In most new installations since CMS R3V8, CMS computers have been equipped with at least two ethernet ports for network connections. The connection to the switch must be dedicated to a second ethernet port which is provided on a PCI or SBus card in the CMS server. The primary, built-in ethernet port can be used for Network Terminal Servers (NTS), printers, CMS Supervisor, and connections to Avaya OA. Avaya recommends that these two network connections be on different subnets.

> ⚠ **Important:**
> If a CMS computer has a Token Ring card installed, this port cannot be used for the switch link.

Detailed parts lists and cabling diagrams are shown later in this document for each switch that supports a LAN connection. This LAN connection is available only with CMS R3V6 or later and switch software Release 7 or later.

Ethernet ports on the switch

The switch provides an ethernet port using either the TN799 C-LAN circuit pack or the processor ethernet port. For connectivity purposes, it does not matter what ethernet port is used, but the correct port must be administered on the switch.

The TN799 C-LAN supports CMS links on the following platforms:

- DEFINITY ECS, R7 and later
- DEFINITY Server CSI using the CMC1 Media Gateway
- DEFINITY Server SI and R using the SCC1 and MCC1 Media Gateway

    Note:

    Support for the DEFINITY Server R ended beginning with Communication Manager 2.0. Support for the DEFINITY Server SI ended beginning with Communication Manager 3.0.

- Avaya IP600
- DEFINITY One
- Avaya S8100 Media Server using the G600, G650, or CMC1 Media Gateway
- Avaya S87xx Media Server using the SCC1, MCC1, or G700 Media Gateway

The processor ethernet port supports CMS links on the following platforms that do not support C-LAN circuit packs:

- Avaya IP600 using the TN2314
- DEFINITY One using the TN2314
- Avaya S8100 Media Server
- Avaya S8300 Media Server
- Avaya S8500/X8500B Media Server
- Avaya S87xx Media Server using the IP Connect option

Ethernet ports on a CMS computer

In most new installations since CMS R3V8, CMS computers have been equipped with at least two ethernet ports for network connections. The connection to the switch must be dedicated to a second ethernet port which is provided on a PCI or SBus card in the CMS server. The primary, built-in ethernet port can be used for NTS, printers, CMS Supervisor, and connections to Avaya OA. Avaya recommends that these two network connections be on different subnets.

> ⚠ **Important:**
> It is recommended that, if possible, the switch connection be isolated to a dedicated LAN port without any other network connections.

LAN speeds - 10 Mbps vs 100 Mbps

All TN799 C-LAN circuit packs support 10 Mbps ethernet connections. The TN799DP and later supports 10 and 100 Mbps ethernet connections as long as all the connecting equipment supports that speed. If you use 10 Mbps hubs between the switch and the CMS, the speed of the connection will be 10 Mbps.

The TN799DP C-LAN circuit pack also uses the IP Media Processor adapter (comcode 848525887) to provide an ethernet modular jack connection on the switch backplane. This adapter must be used to attain 100 Mbps connections.

The processor ethernet port on the Avaya IP600, DEFINITY One, and S8xxx media servers support 10 Mbps and 100 Mbps, autosensing.

C-LAN lead designations for cross-connects

The TN799 C-LAN circuit pack ethernet lead designations are as follows:

Lead Name	25-Pair Cable Wire Color	25-Pair Cable Connector Pin-out	RJ45 Jack Pin-out	Terminal Block Pin-out on Connecting Block
TD+	white/orange	27	1	3
TD-	orange/white	2	2	4
RD+	white/green	28	3	5
RD-	green/white	3	6	6

Use this information when making connections from the TN799 when using an IP Media Processor adapter (100 Mbps), a 259A adapter (10 Mbps), or using standard cross-connect wiring (100 Mbps or 10 Mbps).

Sample configurations

The CMS computer can connect to a switch in a number of ways using a LAN. This section shows some examples of how this can be done. Though several sample configurations are shown, there will be variations not shown here. All but the most basic configurations require planning by the customer and account team.

Note:

> Please note that the IP addressing shown in these examples reflects a basic recommended scheme that can be used if the customer does not have their own addressing requirements.

This section includes the following topics:

Note:

> In certain permissive-use cases beginning with CMS R12, customers can continue to use an NTS for serial connectivity. Contact Avaya support for information about Avaya's permissive use policy and using an NTS with CMS. These sample configurations show NTS connectivity to support releases that allow NTS usage.

Basic configuration

In the most basic configuration, you can create a LAN between a CMS computer to a switch using a dedicated hub. This setup provides isolation from the customer data network, keeping all switch-to-CMS messaging traffic on a dedicated private network. The CMS computer is directly connected to the switch, and neither is part of another network.

This configuration is adequate if there is no NTS, printer, CMS Supervisor traffic, or Intuity Message Manager traffic.
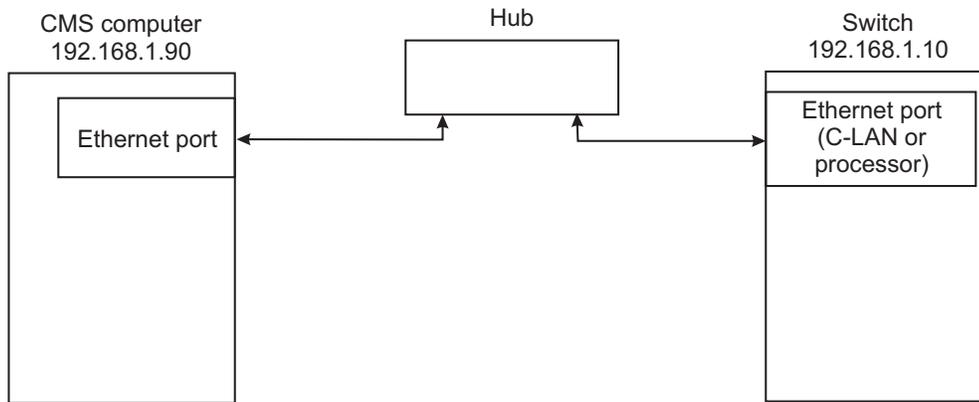
Basic_net.cdr

Basic configuration with NTS

Building on the previous example, the following diagram shows how you can add a LAN hub to provide additional LAN points of connection for NTS equipment. Using the same LAN segment for NTS and switch traffic is not recommended, but can be done if the CMS computer has only one ethernet port.

> **Note:**
>
> In certain permissive-use cases beginning with CMS R12, customers can continue to use an NTS for serial connectivity. Contact Avaya support for information about Avaya's permissive use policy and using an NTS with CMS.

CMS computer
192.168.1.90

Hub

Switch
192.168.1.10

Ethernet port

Ethernet port
(C-LAN or
processor)

NTS #1
192.168.1.101

NTS #x
192.168.1.1xx

closed_net.cdr
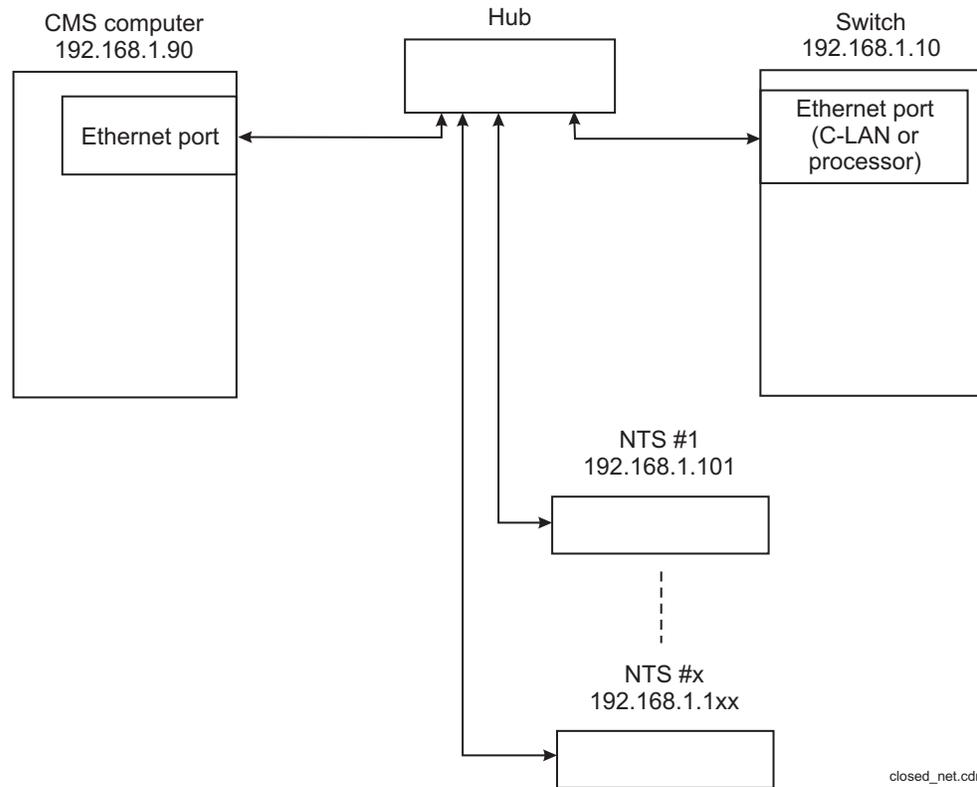
Multiple ACDs (switches)

A CMS computer can collect data from more than one switch. The following figure shows how several ACDs (local or remote) would connect to a CMS computer over a LAN. This example isolates the switch-to-CMS traffic from any other network traffic.
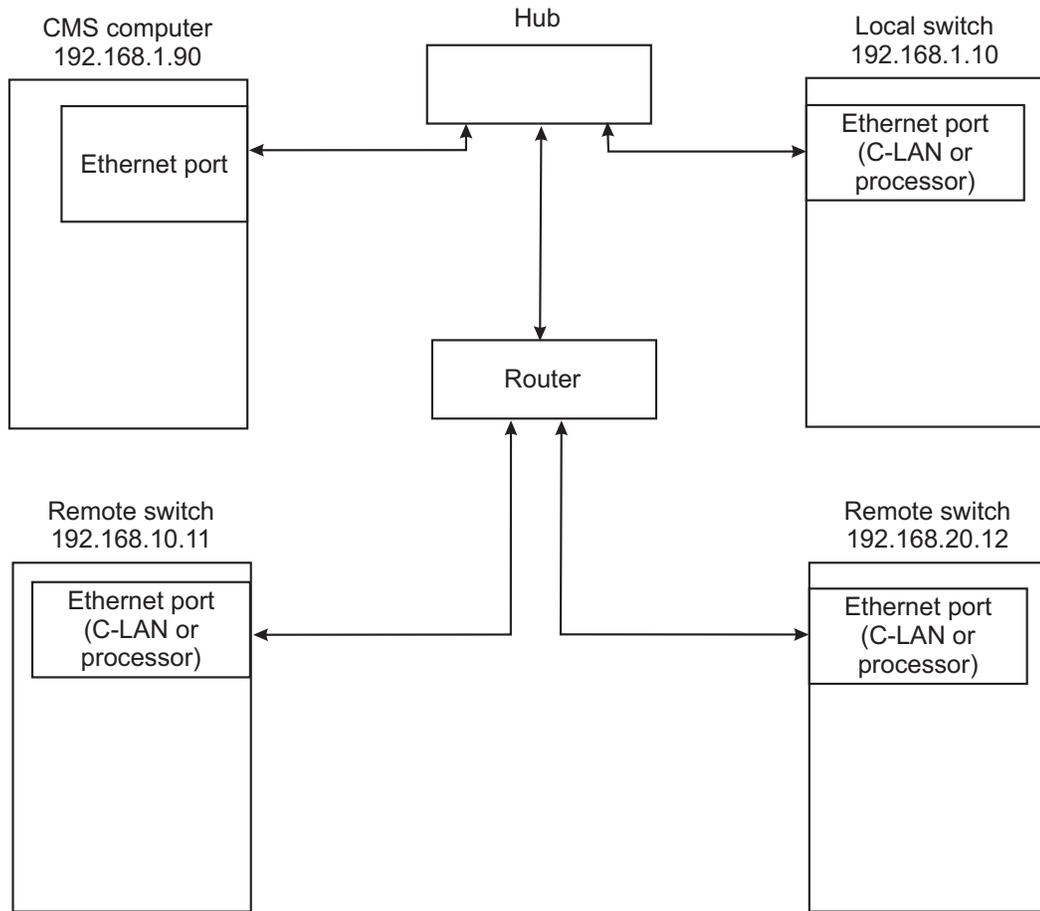
multiple_switch.cdr

Two ethernet ports on CMS computer

If the CMS computer is using a LAN for both switch link traffic and connections to CMS Supervisor, Avaya OA, and other network applications, the CMS computer should be equipped with two ethernet ports. In this configuration, the primary ethernet port is used for all non-switch applications. The secondary ethernet port is dedicated for carrying switch link traffic. This link can be connected using either a LAN hub or a crossover cable. Each ethernet port must be administered on different networks, so switch-to-CMS traffic does not mix with other traffic.
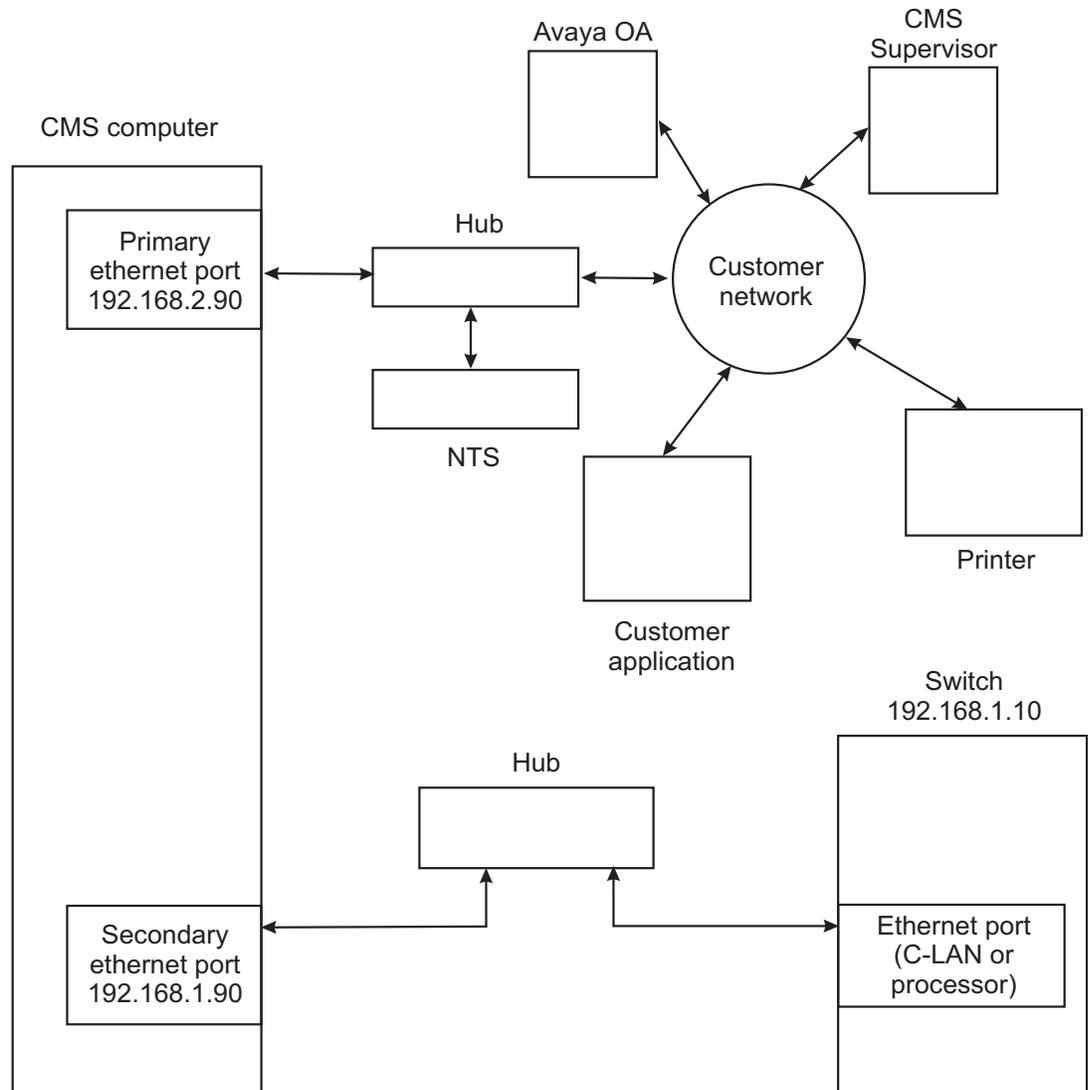
two_ports.cdr

Integrating Intuity AUDIX on the link

This configuration shows how you can integrate an Intuity AUDIX system (without integrated messaging) as part of the switch-to-CMS link. The additional traffic load should not cause any loss of data on the link.

two_ports_intuity.cdr
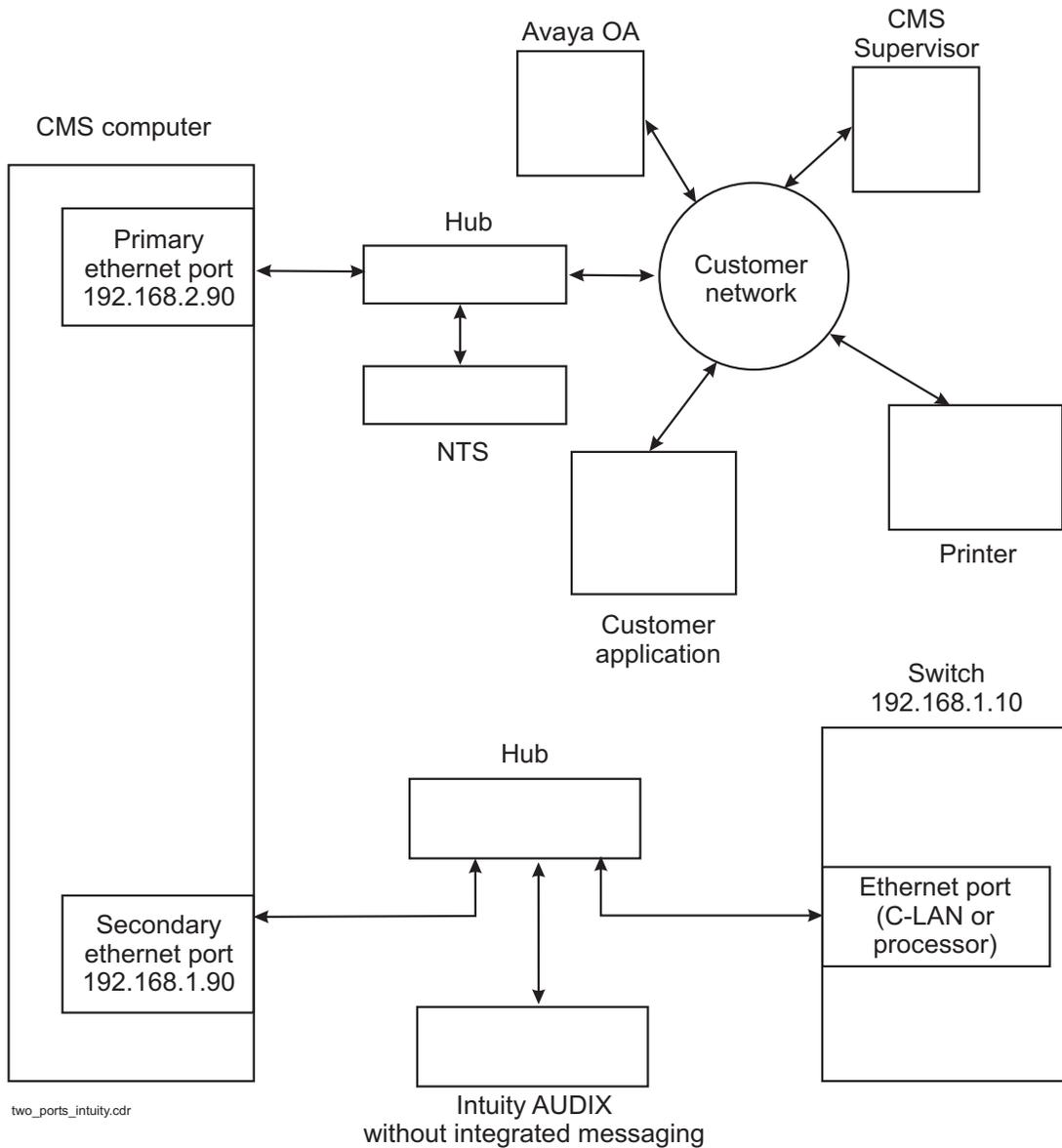
Intuity AUDIX with integrated messaging traffic on the customer network

This configuration does have a connection to the customer network. However, the bulk of the traffic is isolated from the switch link using the router and a network switch. The router and network switch separate the integrated messaging traffic originating by the customer PCs from the switch link traffic.

two_ports_msgmgr.cdr
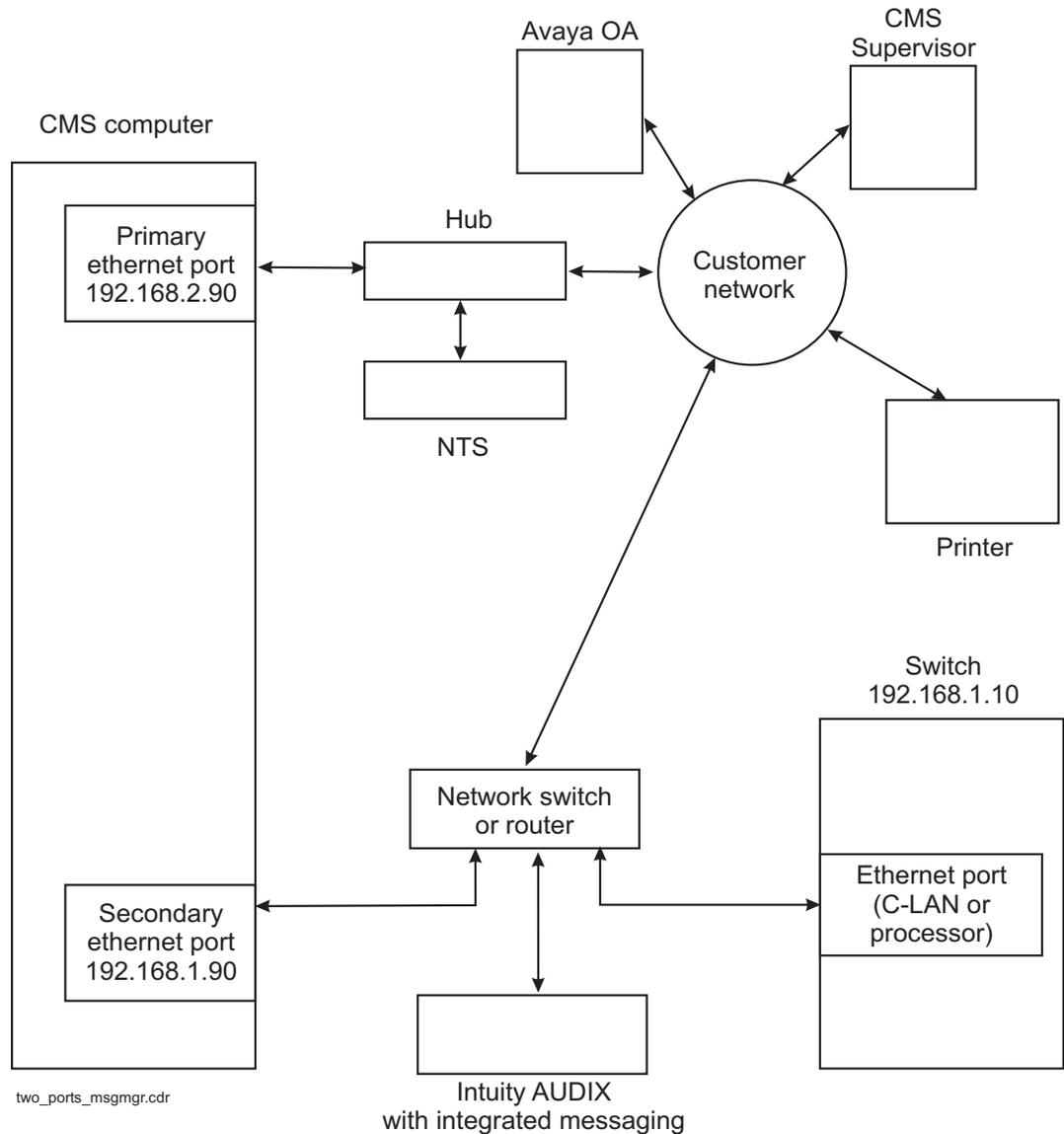
Remote switch on the customer network

A remote switch can also be connected through the customer network. using a router and a network switch to isolate the switch link traffic from the Message Manager traffic and the other customer network traffic.

two_ports_remote.cdr
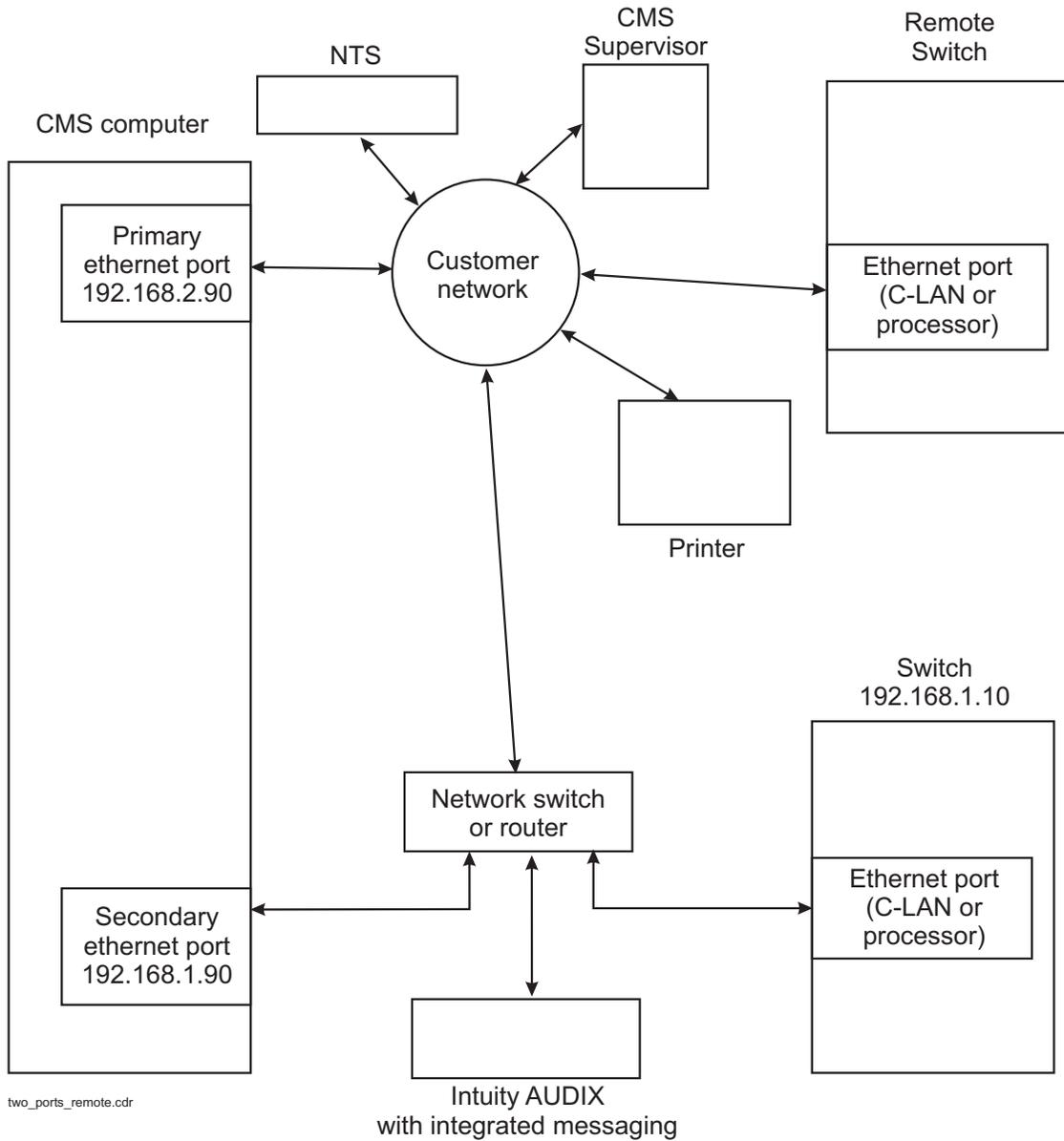
Two ethernet ports option

This configuration shows the best way to isolate the CMS and Intuity links to the switch. This configuration uses two ethernet ports on the switch. A router must be used to send traffic from the customer network to the Intuity, or if there is a remote switch that connects to the CMS computer. For true link isolation, this is the best option available.

two_ports_2clan.cdr
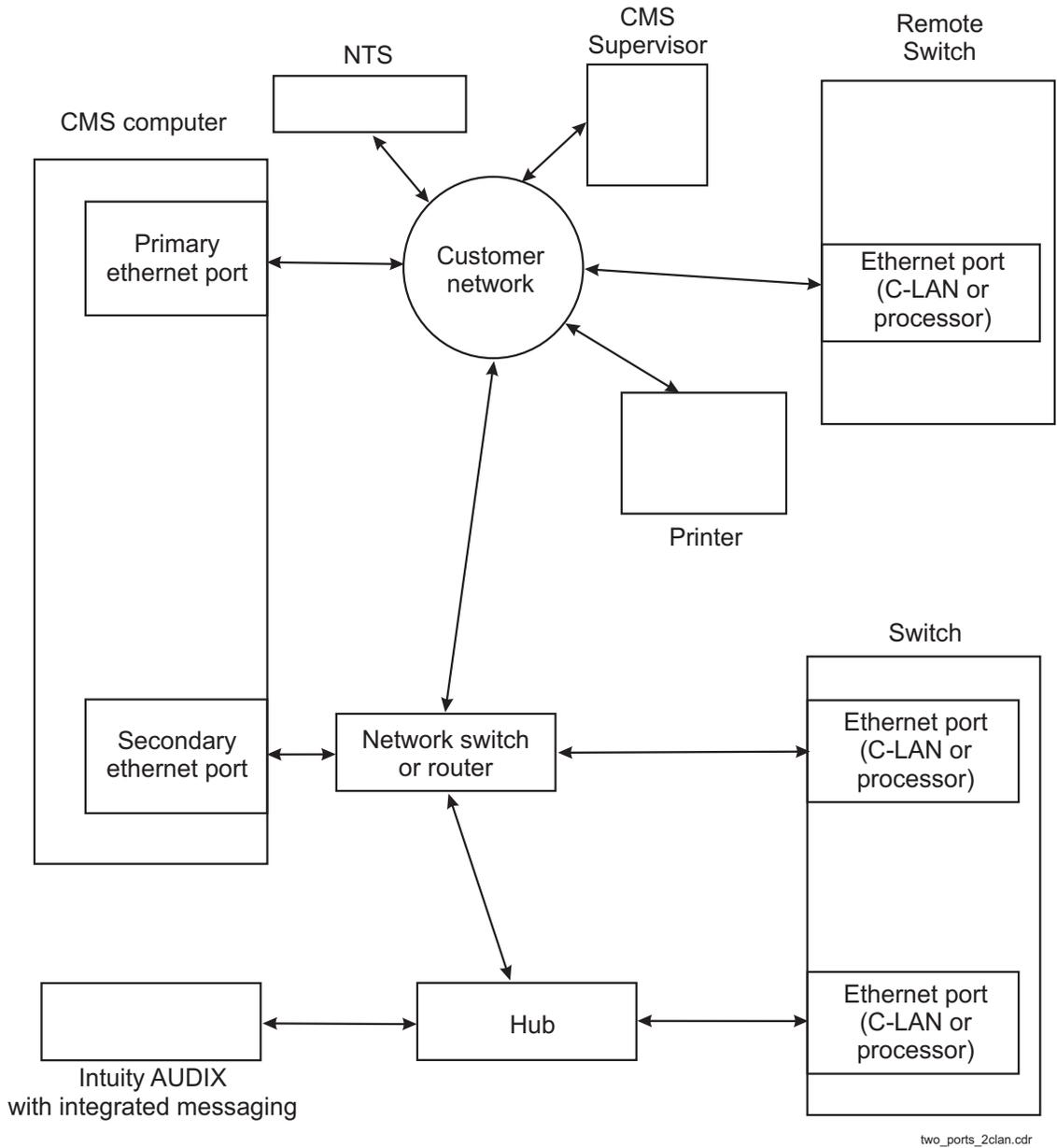
High availability option

The High Availability option uses dual links from the switch to different CMS computers. This option helps ensure that CMS data is not lost if one of the links goes down or if one of the CMS computers goes down. This option is available on CMS R3V8 or later, and switch release R8 or later equipped with two ethernet ports. The following figure shows a typical High Availability configuration. Though not shown here, a second ethernet port on the CMS computers can be used to isolate the NTS, printer, and CMS Supervisor traffic.

Note:

> For the S8300 Media Server, you cannot have dedicated links to each CMS computer; if you want true duplication, you must use a different solution.

high_option.cdr
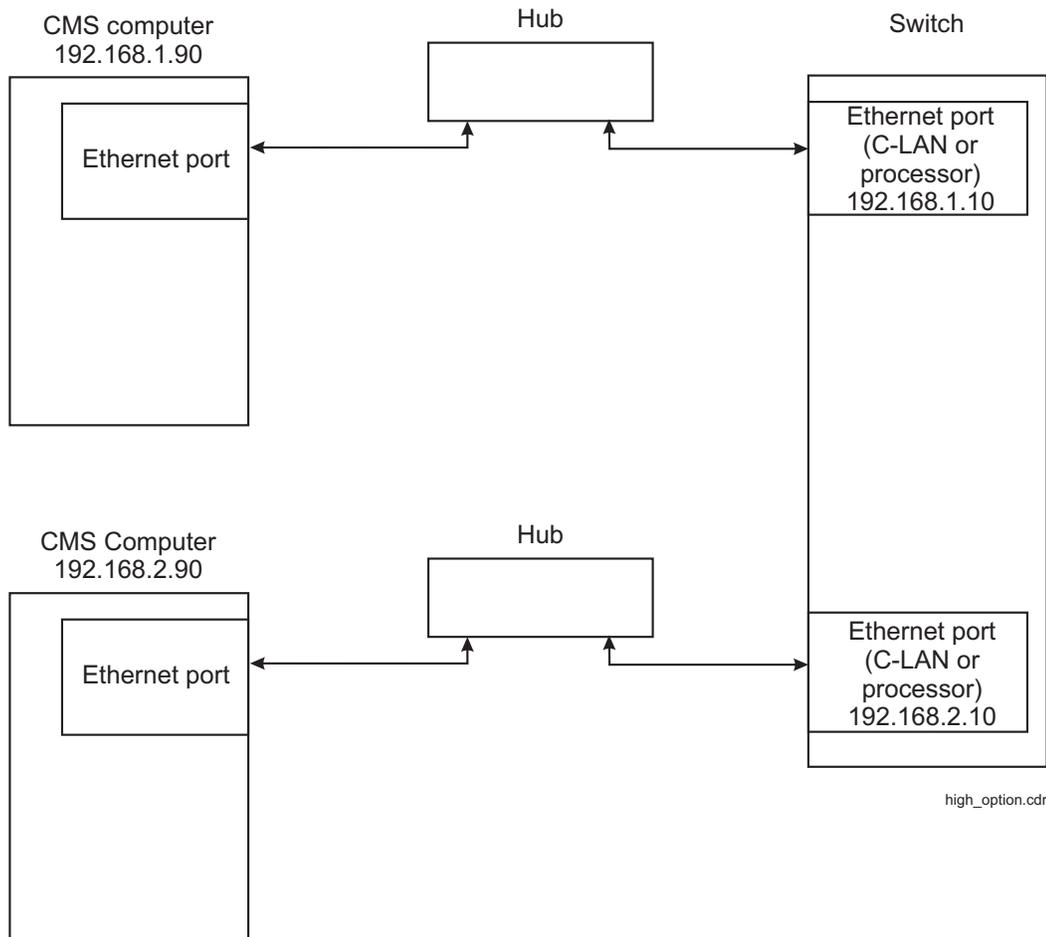
Public network

In a public network where the customer is connected to the Internet, the default IP addressing cannot be used. You must administer IP addressing based on the customer requirements. For switch-to-CMS traffic, this setup is the least desirable way to set up a switch link because of potential message loss on a network that has too much traffic.

open_net.cdr
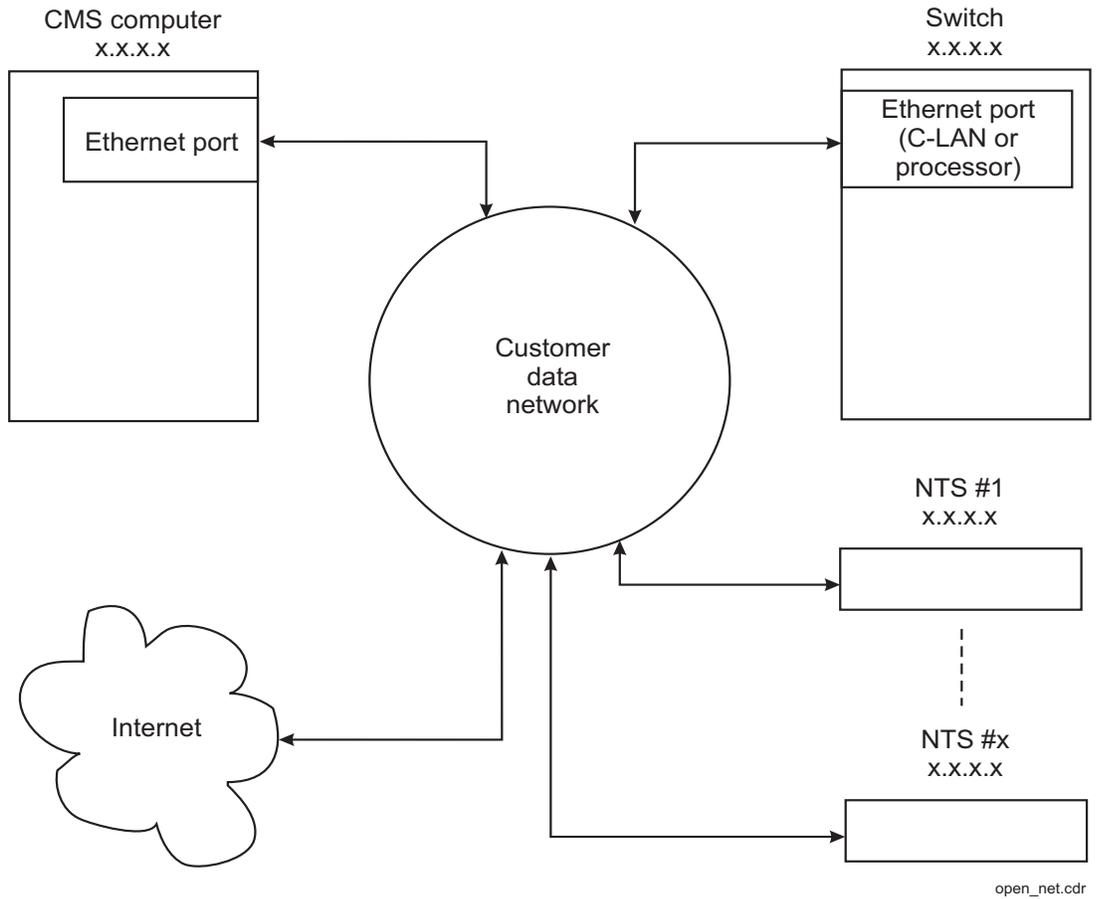
Connecting with a LAN hub or router

The LAN hub or router connection is the recommended method to connect the switch to the CMS computer. The hub or router can be used to connect to more than one switch (multiple ACDs), and to connect to NTS units.

This section includes the following topics:

- Distance limits on page 40
- Parts list on page 40
- Cabling Diagram - LAN via hub or router on page 41
- Cabling procedure on page 42

Distance limits

The distance limit for a single hub or router LAN connection is 328 feet (100 meters) from the switch to the hub or router, and another 328 feet (100 meters) from the hub or router to the CMS computer. If the distance between the switch and the CMS computer is more than 328 feet (100 meters), you can daisy-chain up to four separate hubs or routers.

Parts list

Quantity	Description
1	Ethernet port on the switch (TN799 C-LAN or processor ethernet port)
1	IP Media Processor adapter for 100 Mbps (848525887), or 259A adapter for 10 Mbps (102631413), or Category 5 cross-connect hardware and connecting block
2	RJ45 UTP Category 5 modular cord 107748063 (5 feet, 1.5 meters) 107748105 (10 feet, 3 meters) 107748188 (15 feet, 4.5 meters) 107742322 (25 feet, 7.6 meters) 107742330 (50 feet, 15.2 meters) 107748238 (100 feet, 30.5 meters) 107748246 (200 feet, 61 meters) 107748253 (300 feet, 91 meters)
1	LAN hub or router
1	Ethernet port on the CMS computer

Cabling Diagram - LAN via hub or router

IP Media Processor adapter (100 Mbps) or
259A adapter (10 Mbps)

Switch
(R7 or later)

RJ45 Cat 5
modular cord

CMS
computer
(R3V6 or later)

TN799
C-LAN
Port

OR

Cat 5
connecting
block

Ethernet
port

Cat 5
cross-
connect
field

Cat 5
25-pair
cable

Cat 5
wire

Hub or
router

RJ45 Cat 5
modular cord

RJ45 Cat 5
modular cord

Processor
ethernet
port

OR

AC
power

RJ45 Cat 5
modular cord

328 ft
(100 m)

328 ft
(100 m)

lan_ded.cdr
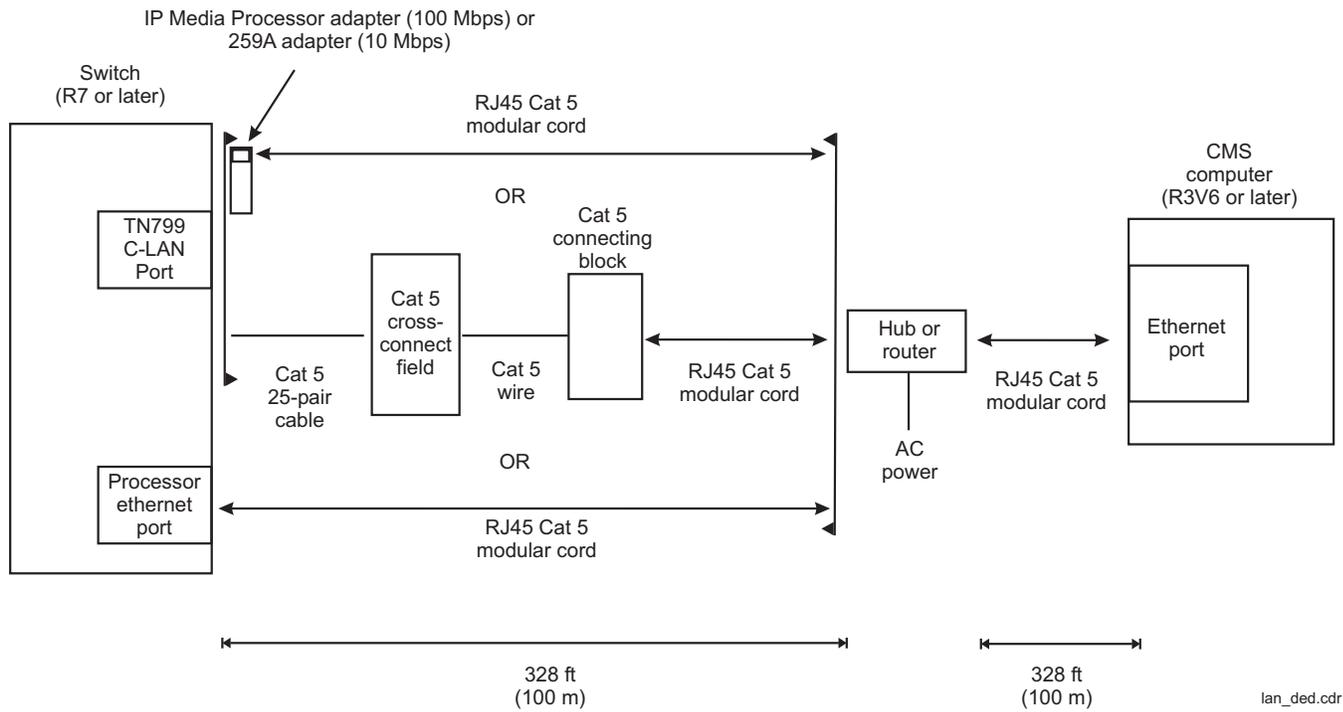
Cabling procedure

To connect the switch to a CMS computer using a LAN hub:

1. Do one of the following depending on your hardware configuration:

   - Attach an adapter (IP Media Processor or 259A) to the backplane connector of the TN799 C-LAN circuit pack. Attach one end of an RJ45 Category 5 modular cord to the adapter.

   - Connect the ethernet port of a TN799 C-LAN circuit pack to a Category 5 connecting block using Category 5 cross-connect wiring. Attach one end of an RJ45 Category 5 modular cord to the connecting block.

   - Attach one end of an RJ45 Category 5 modular cord to the processor ethernet port on the switch. On the Avaya IP600, DEFINITY One, and S8100 Media Server, the processor ethernet port is found on the processor interface cable assembly of the TN2314 processor circuit pack.

   - Attach one end of an RJ45 Category 5 modular cord to either the EXT1 or EXT2 ethernet port on a G700 Media Gateway. A G700 Media Gateway can be controlled by either an S8300 Media Server or an S87xx Media Server.

2. Connect the other end of the modular cord to a port on the LAN hub or router.

3. Connect another RJ45 Category 5 modular cord to a different port on the LAN hub or router.

4. Connect the other end of the modular cord to an ethernet port on the CMS computer.

5. Connect and apply power to the LAN hub or router.

Connecting over a customer LAN

Using a customer network is another method to connect a switch to the CMS computer. This method is not recommended except in special cases. The LAN hub or router method should be used for most installations.

This section includes the following topics:

- Distance limits on page 43
- Parts list on page 43
- Cabling diagram - customer LAN on page 44
- Cabling procedure on page 44

Distance limits

The distance limit using a customer network must be locally engineered.

Parts list

Quantity	Description
1	Ethernet port on the switch (TN799 C-LAN or processor ethernet port)
1	IP Media Processor adapter for 100 Mbps (848525887), or 259A adapter for 10 Mbps (102631413), or Category 5 cross-connect hardware and connecting block
1	RJ45 UTP Category 5 modular cord 107748063 (5 feet, 1.5 meters) 107748105 (10 feet, 3 meters) 107748188 (15 feet, 4.5 meters) 107742322 (25 feet, 7.6 meters) 107742330 (50 feet, 15.2 meters) 107748238 (100 feet, 30.5 meters) 107748246 (200 feet, 61 meters) 107748253 (300 feet, 91 meters)
1	Ethernet port on the CMS computer

Cabling diagram - customer LAN

IP Media Processor adapter (100 Mbps) or
259A adapter (10 Mbps)

Switch
(R7 or later)

RJ45 Cat 5
modular cord

CMS
computer
(R3V6 or later)

TN799
C-LAN
Port

OR

Cat 5
connecting
block

Cat 5
cross-
connect
field

Customer network
(locally engineered)

Ethernet
port

Cat 5
25-pair
cable

Cat 5
wire

RJ45 Cat 5
modular cord

Processor
ethernet
port

OR

RJ45 Cat 5
modular cord

Distance limit locally engineered

Lan_custnet.cdr
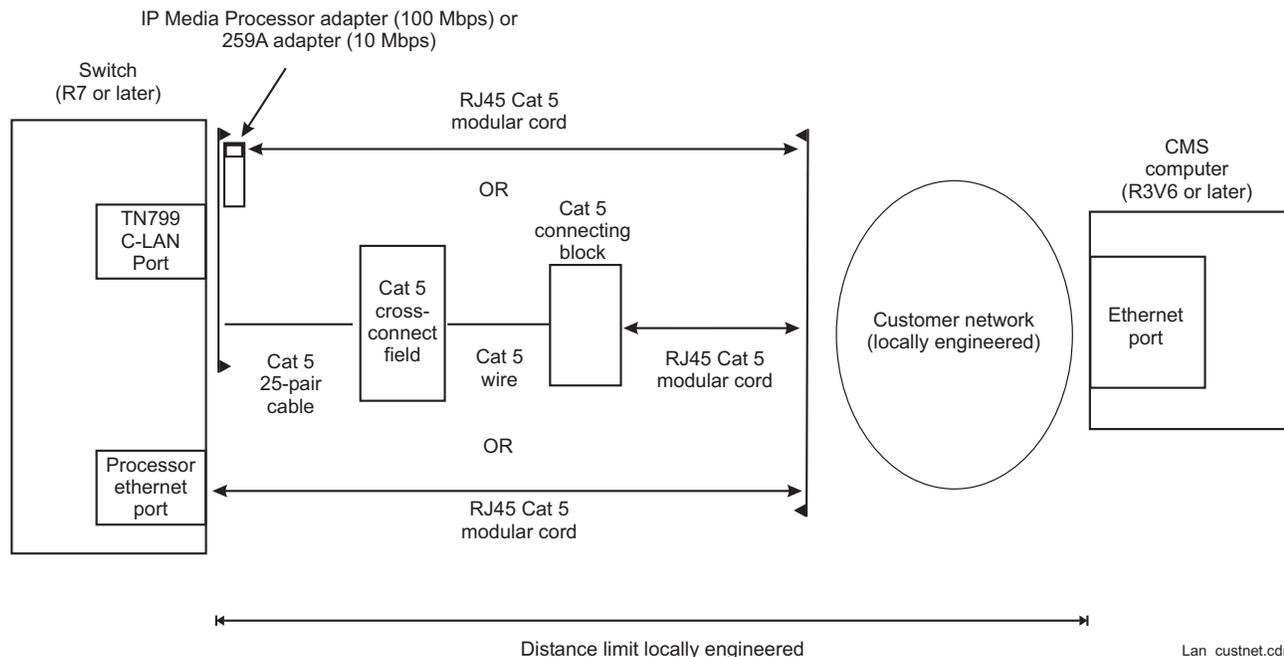
Cabling procedure

To connect the switch to a CMS computer using a customer LAN:

1. Do one of the following depending on your hardware configuration:

   - Attach an adapter (IP Media Processor or 259A) to the backplane connector of the TN799 C-LAN circuit pack. Attach one end of an RJ45 Category 5 modular cord to the adapter.

   - Connect the ethernet port of a TN799 C-LAN circuit pack to a Category 5 connecting block using Category 5 cross-connect wiring. Attach one end of an RJ45 Category 5 modular cord to the connecting block.

   - Attach one end of an RJ45 Category 5 modular cord to the processor ethernet port on the switch. On the Avaya IP600, DEFINITY One, and S8100 Media Server, the processor ethernet port is found on the processor interface cable assembly of the TN2314 processor circuit pack.

   - Attach one end of an RJ45 Category 5 modular cord to either the EXT1 or EXT2 ethernet port on a G700 Media Gateway. A G700 Media Gateway can be controlled by either an S8300 Media Server or an S87xx Media Server.

2. Connect the other end of the modular cord to a port on the customer data network.

3. Connect from the customer data network to an ethernet port the CMS computer.

Administering a TCP/IP switch link

This section provides the procedures to administer TCP/IP over a LAN.

This section includes the following topics:

Overview

The CMS application can collect and process Automatic Call Distribution (ACD) data from an Avaya switch. However, before CMS can collect and process the ACD data, a special hardware interface on the switch must be properly administered. Each switch can use a number of different interfaces to communicate to a CMS computer.

For additional information about switch administration, refer to the appropriate switch administration documents.

This section includes the following topics:

Local vs remote connections

The switch and the CMS computer can be connected in local and remote arrangements. For clarification, these arrangements are defined as follows:

● Local - The connections between the switch and the CMS computer use facilities local to the switch, such as a direct connection over a LAN.

● Remote - The connections between the switch and the CMS computer use WAN.

Multiple ACDs (switches)

One CMS computer can collect data from up to eight different switches. From the CMS computer point of view, each switch represents one ACD. Each switch requires a link to the CMS computer.

High availability option

The High Availability option provides dual links between the switch and two separate CMS computers. If the customer has purchased the High Availability option, you must connect a link from one C-LAN circuit pack to one CMS computer, and a second link from a different C-LAN circuit pack to another CMS computer. The High Availability option is not allowed using X.25 links.

Note:

For the S8300 Media Server, you cannot have dedicated links to each CMS computer; if you want true duplication, you must use a different solution.

In addition to having the correct CMS R3V8 or later load, the switch must be optioned with software version of V8 or later, Call Center Release of 8.1 or later, and Adjunct CMS Release of R3V8 or later. See Common switch administration on page 50 for more information.

Planning for TCP/IP switch links

When setting up a switch link using TCP/IP over a LAN, planning information must be gathered before you begin. In particular, you must take into account if the LAN connection includes both a connection to CMS, Intuity AUDIX with integrated messaging, and Avaya Operational Analyst (OA). Some of the information needed includes:

● How is the connection being made from the CMS computer to the switch?

- Private LAN, no connectivity to customer LAN (uses private LAN addresses).

  ● Preferred method, most robust and reliable, no dependency on customer's network

  ● A dedicated LAN port on the CMS computer provides the switch link

  ● The primary LAN port (the built-in ethernet port) is used for other connectivity (printers, terminals, Avaya CMS Supervisor, Intuity integrated messaging, and Avaya OA) using a different subnet from the switch link

  ● If desired, a second ethernet port can be used to provide additional isolation for the CMS link

  ● A dedicated LAN hub to connect the links.

- Customer LAN with private segment.

  ● Uses a network switch or router to provide a private network or network segment

  ● Minimal dependency on customer's network

  ● A dedicated LAN port on the CMS computer provides the switch link

  ● The primary LAN port (the built-in ethernet port) is used for other connectivity (printers, terminals, Avaya CMS Supervisor, Intuity integrated messaging, and Avaya OA) using a different subnet from the switch link

  ● Customer must provide equipment and administer network for private segment

  ● Customer LAN administrator must be present during setup.

- Direct connect to Customer LAN, without private segment.

  ● Least preferred method

  ● Complete dependency on performance and reliability of customer's LAN

  ● Allows remote location of endpoints when customer LAN connectivity is convenient

  ● Customer LAN administrator must be present during setup.

- If the customer LAN is used, the following information is needed from the customer:

  - Customer network physical connectivity:

    - Location of network access point (hub, router, and so on)

    - Distance between the ethernet port on the switch and the network access point (328 ft, 100 m maximum)

    - Wiring to access point, existing or new, Category 5 minimum required.

  - Customer network administration:

    - IP address of switch ethernet ports, CMS computer, Intuity, and gateways

    - Node names of switch ethernet ports, CMS computer, Intuity, and gateways

    - Subnet masks for all LAN segments containing switch ethernet ports or adjuncts

    - Gateway IP address for all LAN segments containing switch ethernet ports, adjuncts, or routers

    - Are all endpoints (switch ethernet ports and adjuncts) on the same local LAN segment?

    - Network routes.

    Network administration information needs to be mapped into specific administration fields.

- Sanity check of information obtained from customer:

  - If switch and adjuncts are on different LAN subnets (recommended), gateway IP addresses are different

  - If switch and adjuncts (CMS or Intuity) are on the same LAN subnet (not recommended):

    - Gateway IP address (if present) and subnet mask information is valid

    - All IP addresses contain the same subnet address

Without the above information, the technician may not be able to complete the installation. Installations that require the technicians to return because information was not available incur additional charges.

CMS link administration

In addition to the switch administration presented in this section, you must also set up the switch link on the CMS computer using the `swsetup` option of the `cmssvc` command. This procedure is documented in your CMS software installation document.

To set up the switch link:

1. Using the `cmssvc` command, turn off CMS.

2. Using the `cmssvc` command, access the `swsetup` option. When you access this option, you are queried for the following information:

   ● Switch name

   ● Switch model (release)

   ● Is Vectoring enabled on the switch (if authorized)?

   ● Is Expert Agent Selection (EAS) enabled on the switch (if authorized)?

   ● Does the Central Office have disconnect supervision?

   ● Local and remote port

     The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for the link. For example, if you use processor channel 10, set the local and remote port to 10.

   ● Transport method used to connect to the switch (X.25 or TCP/IP). For TCP/IP, the IP address or hostname, and TCP port (the default is 5001).

If the CMS computer has two ethernet ports, it is possible that the system might attempt to route packets from one interface to another. To prevent this, edit the `/etc/rc2.d/S98cms_ndd` file and add the following line to the end of the file:

```
ndd -set /dev/ip ip_forwarding 0
```

If the file already has this line, quit out of the file and make no changes.

Common switch administration

This section contains administration that must be done for all switches before you administer the switch to CMS computer link. The following administration must be done:

- Determining switch/CMS compatibility on page 51
- Verifying the software version on page 52
- Verifying the call center release on page 53
- Setting the adjunct CMS release on page 54

Determining switch/CMS compatibility

The following table reflects the recommended settings for the G3 Version, Call Center Release, Adjunct CMS Release, and CMS Setup switch type based on the software release of the switch. You can set the G3 Version, Call Center Release, or Adjunct CMS Release to an earlier version, but you will not have access to all of the features of the recommended release.

Switch software release	Switch administration			CMS administration
	G3 Version	**Call Center Release**	**Adjunct CMS Release**	**CMS setup switch model**
DEFINITY R5, R6.1, R6.2, or R6.3 as bugfix[1]	V5	NA	R3V5 or R3V6	Definity-G3V5
DEFINITY R6.3 with new features[2]	V6	NA	R3V6	Definity-R6
DEFINITY R7.1	V7	NA	R3V6	Definity-R6/R7
DEFINITY R8.x[3]	V8	8.1 or later	R3V8	Definity-R8
DEFINITY R9.1, R9.2[4]	V9	9.1 or later	R3V9	Definity-R9/10
Avaya Call Processing R9.5, R10.x	V10	9.1 or later	R3V9	Definity-R9/10
Communication Manager 1.x	V11	11.1 or later	R3V11	MultiVantage-R11
Communication Manager 2.x	V12	12.0 or later	R12[5]	Communication Mgr R2
Communication Manager 3.x	V13	3.0 or later[6]	R13	Communication Mgr R3

1. Bugfix load does not include Avaya Business Advocate or Avaya Virtual Routing.

2. Includes Business Advocate and Virtual Routing.

3. R8 is a bugfix load for R7.

4. R9 is not a bugfix load.

5. Beginning the CMS R12, the release numbering scheme dropped the "3V" designation. For example, instead of CMS R3V12, it is now CMS R12.

6. Beginning with Communication Manager 3.0, the Call Center release numbering has been realigned to match the same release numbering scheme.

Verifying the software version

Use the System Parameters Customer Options form to verify the software version. If the software version is not correct, you must either log on as `init` and change the version (pre-R10) or apply a new license file that has the correct version (R10 and later).

```
display system-parameters customer-options              Page   1 of  11
                          OPTIONAL FEATURES

    G3 Version: VXX                         RFA System ID (SID): 1
      Location: 1                           RFA Module ID (MID): 1
      Platform: 6

                                                          USED
                            Platform Maximum Ports: 10000 2756
                                  Maximum Stations: 450   22
                           Maximum XMOBILE Stations: 100   5
                  Maximum Off-PBX Telephones - EC500: 5     0
                  Maximum Off-PBX Telephones -   OPS: 0     0
                  Maximum Off-PBX Telephones - SCCAN: 0     0




          (NOTE: You must logoff & login to effect the permission changes.)
```

Field	Definition
G3 Version	Enter the appropriate software release of the switch. If you set this field to an earlier release number, you will not have access to the latest features. The G3 Version must be set to **v8** or later to use the High Availability option.

Verifying the call center release

Use the first Call Center Optional Features page of the System Parameters Customer Options form to set the Call Center Release. This field is found on R8 or later. If the release number is not correct, you must either log on as `init` and change the release number (pre-R10) or apply a new license file to the switch (R10 and later).

```
display system-parameters customer-options                    Page   6 of  11
                      CALL CENTER OPTIONAL FEATURES


                        Call Center Release: X.X

                             ACD? y                        Reason Codes? y
                    BCMS (Basic)? y                Service Level Maximizer? n
          BCMS/VuStats Service Level? y            Service Observing (Basic)? y
 BSR Local Treatment for IP & ISDN? n      Service Observing (Remote/By FAC)? y
                 Business Advocate? y              Service Observing (VDNs)? y
                   Call Work Codes? y                          Timed ACW? y
       DTMF Feedback Signals For VRU? n               Vectoring (Basic)? y
                  Dynamic Advocate? n            Vectoring (Prompting)? y
         Expert Agent Selection (EAS)? y       Vectoring (G3V4 Enhanced)? y
                          EAS-PHD? y            Vectoring (3.0 Enhanced)? n
                 Forced ACD Calls? n      Vectoring (ANI/II-Digits Routing)? y
                                          Vectoring (G3V4 Advanced Routing)? y
           Lookahead Interflow (LAI)? y                Vectoring (CINFO)? y
 Multiple Call Handling (On Request)? n    Vectoring (Best Service Routing)? y
    Multiple Call Handling (Forced)? n            Vectoring (Holidays)? y
  PASTE (Display PBX Data on Phone)? y           Vectoring (Variables)? y
          (NOTE: You must logoff & login to effect the permission changes.)
```

Field	Definition
Call Center Release	Enter `pre-8.1`, or `8.1` or later depending on the set of Call Center features you want to use. If you set this field to something other than your current Call Center load, you will not have access to the latest Call Center features. The Call Center Release must be set to `8.1` or later to use the High Availability option. **Note:** Beginning with Communication Manager 3.0, the Call Center release numbering has been realigned to match the same release numbering scheme.

Setting the adjunct CMS release

Use the Call Center page of the System Parameters Features form to set the Adjunct CMS Release. Depending on the switch software release, this field can be found on different pages.

```
change system-parameters features                              Page  12 of  15
                       FEATURE-RELATED SYSTEM PARAMETERS

  AGENT AND CALL SELECTION
                           MIA Across Splits or Skills? y
                            ACW Agents Considered Idle? y
                            Call Selection Measurement: predicted-wait-time
   Service Level Supervisor Call Selection Override? y
                                  Auto Reserve Agents: none
ASAI
          Copy ASAI UUI During Conference/Transfer? n
      Call Classification After Answer Supervision? n
                                Send UCID to ASAI? n
CALL MANAGEMENT SYSTEM
                            Adjunct CMS Release: RXX

                            BCMS/VuStats LoginIDs? y
                 BCMS/VuStats Measurement Interval: half-hour
          BCMS/VuStats Abandon Call Timer (seconds): 2
                    Validate BCMS/VuStats Login IDs? n
                            Clear VuStats Shift Data: on-login
                 Remove Inactive BCMS/VuStats Agents? n
```

Field	Definition
Adjunct CMS Release	Enter the software release of the CMS computer. If you set this field to an earlier release number, you will not have access to the latest CMS features. The Adjunct CMS Release must be set to `R3V6` or later to use the TCP/IP LAN switch link. The Adjunct CMS Release must be set to `R3V8` or later to use the High Availability option. **Note:** Beginning the CMS R12, the release numbering scheme dropped the "3V" designation. For example, instead of CMS R3V12, it is now CMS R12.

Administering a TCP/IP connection

The administration for a TCP/IP connection over a LAN is different if you are using a C-LAN circuit pack or if you are using a processor ethernet port as described in Ethernet ports on the switch on page 26.

This section includes the following topics:

- Administering a C-LAN connection on page 55
- Administering a processor ethernet port connection on page 68

Administering a C-LAN connection

Use the procedures in this section to administer a TCP/IP connection to a C-LAN circuit pack. This section contains examples of the administration forms with detailed explanations for the required fields. Use the forms in the order shown.

Form	Purpose
`change system-parameter maintenance` (G3csi, DEFINITY Server CSI, DEFINITY One, and S8100 Media Server only)	Adding a second packet interface
`change node-names` (R7 and R8) or `change node-names ip` (R9 and later)	Adding node names and IP addresses
`change ip-interfaces` (R8 and later)	Adding a C-LAN IP interface
`add data-module`	Adding an ethernet data module
`change communication-interface processor-channels`	Adding the processor interface channels
`add ip-route`	Adding IP routes (if needed)

Note:

If the customer has purchased the High Availability option, you must administer a link from one ethernet port on the switch to one CMS computer, and a second link from a different ethernet port on the switch to another CMS computer.

This section includes the following topics:

Adding a second packet interface

Use the Maintenance-Related System Parameters form to add a second packet interface. This is only required on G3csi, DEFINITY Server CSI, DEFINITY One, or S8100 Media Server.

```
change system-parameter maintenance                          Page 2 of 3
MAINTENANCE-RELATED SYSTEM PARAMETERS


MINIMUM MAINTENANCE THRESHOLDS ( Before Notification )
         TTRs: 4          CPTRs: 1          Call Classifier Ports: 0
         MMIs: 0           VCs: 0


TERMINATING TRUNK TRANSMISSION TEST ( Extension )
   Test Type 100:             Test Type 102:             Test Type 105:


ISDN MAINTENANCE
   ISDN-PRI Test Call Extension: 30999     ISDN-BRI Service SPID:


DS1 MAINTENANCE
   DS0 Loop-Around Test Call Extension:


SPE OPTIONAL BOARDS
                   Packet Intf1? y     Packet Intf2? y
   Bus Bridge: 01A03   Inter-Board Link Timeslots  Pt0: 6  Pt1: 1  Pt2: 1
```

Field	Definition
Packet Intf2	Enter **y** to add a second packet interface.
Bus Bridge	Enter the equipment location of the C-LAN circuit pack that does the bus bridge functionality when the packet bus is activated. This must be administered for the C-LAN to work.

Field	Definition
Inter-Board Link Timeslots - The total number of timeslots allocated cannot greater than 11.	
Inter-Board Link Timeslot Pt0	Enter the number of timeslots (1-9) used by this port. Port 0 carries the bulk of messaging traffic between the switch and the CMS. The default of `6` should be adequate, but can be increased if needed to improve traffic flow.
Inter-Board Link Timeslot Pt1	Enter the number of timeslots (1-3) used by this port. Port 1 is a low traffic port and should always be set to `1`.
Inter-Board Link Timeslot Pt2	Enter the number of timeslots (1-3) used by this port. Port 2 is a low traffic port and should always be set to `1`.

Adding node names and IP addresses

Use the Node Names form to assign the name and IP address of the CMS computer and any switches that are networked with the CMS computer. With the High Availability option, you will assign two switch node names and two CMS computer node names.

The Node Names form is different between R7 and R8 software, and R9 and later software.

Node Names Form (R7 and R8) - For R7 and R8, use Pages 2 through 6 of the Node Names form.

Note:
Page 1 of the Node Names form is reserved for Intuity administration.

```
change node-names                                               Page 2 of 6

                          NODE NAMES

     Name            IP Address      Name           IP Address
3net              192.168.3  .0                      .    .    .
cmshost           192.168.1  .90                     .    .    .
cmshost2          192.168.3  .90                     .    .    .
default           0   .0   .0   .0                   .    .    .
gateway           192.168.1  .211                    .    .    .
gateway2          192.168.4  .211                    .    .    .
switchhost        192.168.1  .10                     .    .    .
switchhost2       192.168.4  .10                     .    .    .
```

Node names form (R9 and later) - Use the following Node Names form for R9 and later.

```
change node-names ip                                        Page   1 of   1
                            IP NODE NAMES
   Name               IP Address           Name           IP Address
3net                 192.168.3  .0                          .   .   .
cmshost              192.168.1  .90                         .   .   .
cmshost2             192.168.3  .90                         .   .   .
default              0  .0  .0  .0                          .   .   .
gateway              192.168.1  .211                        .   .   .
gateway2             192.168.4  .211                        .   .   .
switchhost           192.168.1  .10                         .   .   .
switchhost2          192.168.4  .10                         .   .   .
                       .   .   .                            .   .   .
                       .   .   .                            .   .   .
                       .   .   .                            .   .   .
                       .   .   .                            .   .   .
                       .   .   .                            .   .   .
                       .   .   .                            .   .   .
                       .   .   .                            .   .   .
                       .   .   .                            .   .   .
( 8  of  8 administered node-names were displayed )
Use 'list node-names' command to see all the administered node-names
Use 'change node-names ip xxx' to change a node-name 'xxx' or add a node-name
```

Field	Definition
Name	Enter the host name of the CMS computer, any switches that are networked with the CMS computer, and any gateway hosts used in the network. The node names can be entered in any order. The names are displayed in alphabetical order the next time the form is displayed. The default node name entry is display-only and is not used for this application. For consistency, use the CMS computer host name as defined during the CMS Setup procedure. See your CMS software installation document for more information. These names are also used in the IP interfaces, data module, IP routing, and other forms. If you change the node name in this form, it is automatically updated on the other forms. **Note:** Do not use special characters in the node name. Special characters are not allowed in the **/etc/hosts** file on the CMS computer.
IP Address	Enter the IP address of the CMS computer, the switches, and any required gateways. ⚠ **CAUTION:** Plan out the network before you assign any IP addresses. Any future changes that require a change to IP addresses will cause a service disruption.

Adding a C-LAN IP interface (R8 through R10)

Use the IP Interfaces form to assign a C-LAN circuit pack as an IP interface. With the High Availability option, you will assign two separate C-LAN IP interfaces. This form is only found with R8 through R10. Several of the fields on this form were previously on the Data Module form in R7.

⚠ CAUTION:

If the IP interface is already administered, do not change the administration. Changing the administration could cause failure with IP telephones and other adjunct links.

```
change ip-interfaces                              Page    1 of   6   SPE B

                              IP INTERFACES

 Network regions are interconnected? n
Enable                                                              Net
Eth Pt Type    Slot  Code Sfx Node Name        Subnet Mask    Gateway Address Rgn
   y    C-LAN  01A03 TN799  B switchhost        255.255.255.0   192.168.1 .254 1
   y    C-LAN  01C02 TN799  B switchhost2       255.255.255.0   192.168.4 .254 1
   n                                            255.255.255.0       .   .   .
   n                                            255.255.255.0       .   .   .
   n                                            255.255.255.0       .   .   .
   n                                            255.255.255.0       .   .   .
   n                                            255.255.255.0       .   .   .
```

Field	Definition
Network regions are interconnected (R8 only)	Enter **n**. This application is not used for C-LAN.
Enabled	Enter **y** to enable the C-LAN IP interface. After initial administration, you must disable the interface before you make any changes.
Type	Enter **C-LAN**.
Slot	Enter the equipment location of the C-LAN circuit pack.
Code/Sfx	This is a display-only field that shows the designation number of the circuit pack installed in the specified slot.
Node Name	Enter the switch node name assigned on the Node Names form. In this example, enter **switchhost**. The same node name cannot be assigned to two different IP interfaces.
Subnet Mask	Identifies which portion of an IP address is a network address and which is a host identifier. Use the default entry, or check with the LAN administrator on site if connecting through the customer LAN.

Field	Definition
Gateway Address	Enter the address of a network node that will serve as the default gateway for the IP interface. If the application goes to points off the subnet, the gateway address of the router is required. If the switch and CMS computer are on the same subnet, a gateway is not required. If using ethernet only, and a gateway address is administered, no IP routes are required.
Net Rgn	For a C-LAN IP interface, use `1`.

Setting the C-LAN speed and duplex (R8 through R10)

By default, the TN799C and earlier C-LAN circuit packs operate at 10 Mbps, half duplex, and cannot be changed.

By default, the TN799DP and later C-LAN circuit packs auto-negotiate both speed and duplex. The `change ethernet-options` command can be used to set the TN799DP for auto-negotiate or to set the speed and duplex manually.

> **Note:**
> Before changing the ethernet options for a TN799DP circuit pack, you must first disable the ethernet port using the `change ip-interfaces` command.

```
change ethernet-options                                   Page   1 of   1   SPE B

                            ETHERNET OPTIONS

Enable
Eth Pt Type    Slot    Code    Sfx     Auto      Speed      Duplex
   y    C-LAN   03C11   TN799   D        y
   y    C-LAN   02C20   TN799   D        y
   y    C-LAN   02B13   TN799   C        n       10Mbps     Half
   y    C-LAN   04C13   TN799   D        y
   y    C-LAN   02D19   TN799   C        n       10Mbps     Half
   n    C-LAN   01C11   TN799   D        y
```

Field	Definition
Enabled	Displays the current status of the ethernet port. You must disable the ethernet port using `change ip-interfaces` before you make any changes here.
Type	Displays the type of IP interface.
Slot	Displays the equipment location of the C-LAN circuit pack.
Code/Sfx	Displays the designation number of the circuit pack installed in the specified slot.
Auto	Enter `y` for auto-negotiation or `n` for manual speed and duplex settings.

Field	Definition
Speed	Enter either `10Mbps` or `100Mbps`.
Duplex	Enter either `full` or `half`.

Adding a C-LAN IP interface (Communication Manager 1.1 and later)

Use the IP Interfaces form to assign a C-LAN circuit pack as an IP interface. With the High Availability option, you will assign two separate C-LAN IP interfaces. This form is only found with Communication Manager 1.1 and later.

⚠ CAUTION:

If the IP interface is already administered, do not change the administration. Changing the administration could cause failure with IP telephones and other adjunct links.

```
change ip-interface XXyXX                                      Page   1 of   1

                              IP INTERFACES


                 Type: C-LAN                       ETHERNET OPTIONS
                 Slot: XXyXX                              Auto? n
          Code/Suffix: TN799  D                          Speed: 10Mbps
            Node Name: clan-iptarts1                      Duplex: Half
           IP Address: 10 .100.100.99
          Subnet Mask: 255.0  .0  .0
      Gateway Address: 10 .100.100.254
  Enable Ethernet Port? y
        Network Region: 10
                 VLAN: n

Number of CLAN Sockets Before Warning: 400
```

Field	Definition
Enabled	Enter `y` to enable the C-LAN IP interface. After initial administration, you must disable the interface before you make any changes.
Type	Enter `C-LAN`.
Slot	Enter the equipment location of the C-LAN circuit pack.
Code/Sfx	This is a display-only field that shows the designation number of the circuit pack installed in the specified slot.

Field	Definition
Node Name	Enter the switch node name assigned on the Node Names form. In this example, enter `switchhost`. The same node name cannot be assigned to two different IP interfaces.
Subnet Mask	Identifies which portion of an IP address is a network address and which is a host identifier. Use the default entry, or check with the LAN administrator on site if connecting through the customer LAN.
Gateway Address	Enter the address of a network node that will serve as the default gateway for the IP interface. If the application goes to points off the subnet, the gateway address of the router is required. If the switch and CMS computer are on the same subnet, a gateway is not required. If using ethernet only, and a gateway address is administered, no IP routes are required.
Net Rgn	For a C-LAN IP interface, use `1`.
VLAN	Enter `y` if this is on a virtual LAN or `n` for a standard LAN.
Number of CLAN Sockets Before Warning	Enter the number of CLAN sockets available before the system issues a warning.
Auto	Enter `y` for auto-negotiation or `n` for manual speed and duplex settings.
Speed	Enter either `10Mbps` or `100Mbps`.
Duplex	Enter either `full` or `half`.

Adding an ethernet data module

Use the Data Module form to assign the Ethernet port of the C-LAN circuit pack.

Ethernet data module (R7) - This version of the form applies only to R7.

```
add data-module 2000                                         Page 1 of 1
                         DATA MODULE

   Data Extension: 2000              Name: ethernet data module      BCC: 2
             Type: ethernet
             Port: 01A0317
             Link: 8
      Enable Link? y

       Node Name: switchhost
     Subnet Mask: 255.255.255.0
Broadcast Address: 192.168.1  .255

Automatic Subnet Routing? y
```

Field	Definition
Data Extension	Enter an unassigned extension number.
Type	Enter **ethernet** in this field.
Port	Enter the equipment location of the C-LAN circuit pack (TN799). For the ethernet link, always use circuit 17 (for example, **01A0317**).
Link	Enter a TCP/IP link number (1-25 for csi/si, 1-33 for r). This entry is also used on the Processor Channel form.
Enable Link	Enter **y**.
Name	Enter a name for the data module. This name will display when you list the assigned data modules.
BCC	A display-only field.
Node Name	Enter the switch node name assigned on Page 2 of the Node Names form.
Subnet Mask	Use the default entry, or check with the LAN administrator on site if connecting through the customer LAN.

Field	Definition
Broadcast Address	Though other options are available, a safe assignment is to use the network address followed by 255. For example, `192.168.2.255`.
Automatic Subnet Routing	The recommended setting for this field is `y`. If you are on a private network, such as a dedicated link between the switch and the CMS computer, and they are both on the same subnet, enter `y`. This means that an IP route is not required. If the switch is connecting to the CMS computer over the customer network or over a public network, or if they are on different subnets, enter `n`. This means that an IP route is required. **Note:** When upgrading to R8, this field is no longer used, and Subnet Routing is always enabled.

Ethernet data module (R8 and later) - This version of the form applies to R8 and later. With the High Availability option, you will assign two ethernet data modules.

```
add data-module 2000                                    Page   1 of   1
                             DATA MODULE

  Data Extension: 2000              Name: ethernet data module
            Type: ethernet
            Port: 01A0317
            Link: 8




Network uses 1's for Broadcast Address? y
```

Field	Definition
Data Extension	Enter an unassigned extension number.
Type	Enter `ethernet`.
Port	Enter the equipment location of the C-LAN circuit pack (TN799). For the ethernet link, always use circuit 17 (for example, `01A0317`).
Link	Enter a TCP/IP link number (1-25 for csi/si, 1-33 for r). This entry is also used on the Processor Channel form.

Field	Definition
Name	Enter a name for the data module. This name will display when you list the assigned data modules.
Network uses 1's for Broadcast Address	This sets the host portion of the IP address to 0s or 1s. The default is yes (all 1s). Use the default if the private network contains only Avaya switches and adjuncts. Enter n only if the network includes non-Avaya switches that use the 0s method of forming broadcast addresses.

Adding the processor interface channels

Use the Processor Channel form to assign the processor channel attributes. With the High Availability option, you will assign two separate processor channels.

```
change communication-interface processor-channels           Page  1 of  X
                     PROCESSOR CHANNEL ASSIGNMENT
Proc              Gtwy      Interface         Destination     Session     Mach
Chan Enable  Appl.  To  Mode Link/Chan      Node      Port  Local/Remote  ID
  1:   y     mis         s    8   5001  cmshost          0     1     1
  2:   y     mis         s    9   5001  cmshost2         0     2     2
  3:   n                                                 0
  4:   n                                                 0
  5:   n                                                 0
  6:   n                                                 0
  7:   n                                                 0
  8:   n                                                 0
  9:   n                                                 0
 10:   n                                                 0
 11:   n                                                 0
 12:   n                                                 0
 13:   n                                                 0
 14:   n                                                 0
 15:   n                                                 0
 16:   n                                                 0
```

Field	Definition
Proc Chan	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 1 on G3r or DEFINITY Server R, and channel 10 on G3csi, DEFINITY Server CSI, G3si, or DEFINITY Server SI.
Enable	Enter **y**.
Appl	Enter **mis**.
Gtwy To	Leave blank for the local CMS-to-switch link.
Mode	Enter **s** for server.

Field	Definition
Interface Link	Enter the TCP/IP link number used on the ethernet data module form.
Interface Chan	Enter the TCP channel number (5000-64500). The default for CMS is 5001 and is defined during CMS setup. See your CMS software installation document for more information.
Destination Node	Enter the node name of the CMS computer as assigned on the Node Names form. In these examples, cmshost is used.
Destination Port	Use the default of 0.
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the local and remote port to 10.
Mach ID	Not used for CMS.

Adding IP routing

Use the IP Routing form to set up the IP routes from the switch to the CMS computer. This is required when:

- The switch and the CMS computer are on different subnets, or
- When a Gateway Address is not administered for the C-LAN IP interface.

The following example shows an IP route. This route shows how you get from a gateway (for example, a router) to a network.

```
add ip-route 1                                            Page   1 of   1
                            IP ROUTING

     Route Number: 1
 Destination Node: 3net
     Network Bits: 24   Subnet Mask: 255.255.0  .0
          Gateway: gateway2
            Board: 01C02
           Metric: 0
       Route Type: Network
```

Field	Definition
Route Number	If you are going through a router, you must set up IP route 1 from the switch to the router and set up IP route 2 from the switch to the CMS computer. The example above shows a simple IP route.
Destination Node	This field represents the node name of the destination for this route. You would typically enter the node name for the CMS computer or a router, depending on your configuration.
Network Bits (R1.1 and later)	Enter a value from 0-30.
Subnet Mask (R1.1 and later)	Enter a subnet mask.
Gateway	Enter the node name of the gateway by which the destination node is reached for this route. This is either the local C-LAN port of the first intermediate node between the C-LAN port and the final destination. For example, if there were one or more routers between the C-LAN port and the final destination node (the CMS computer), the gateway would be the node name of the first router.
C-LAN Board	Enter the equipment location of the C-LAN circuit pack that provides this route. It is possible to have more than one C-LAN circuit pack, but most configurations will only have one C-LAN.
Metric	Specifies the complexity of this IP route. Enter `0` if there are no intermediate nodes between the C-LAN port and the ethernet port on the CMS computer. A metric value of `1` is used only on a switch that has more than one C-LAN circuit pack installed. See *Administration for Network Connectivity* for more information about using this field.
Route Type (R8 only)	Specifies whether the route is host or network (default). Use a Host route to get to a specific IP address. Use a Network route to get to a subnet.

Administering a processor ethernet port connection

Use the procedures in this section to administer a TCP/IP connection over a LAN when connected to a processor ethernet port.

This section contains examples of the administration forms with detailed explanations for the required fields. Use the forms in the order shown.

Form	Purpose
`display system-parameters customer-options`	Display the Processor Ethernet port
`display ip-interfaces`	Display the processor ethernet port IP address
`change node-names ip`	Adding node names and IP addresses for the CMS computer and gateways
`change communication-interface processor-channels`	Adding the processor interface channels

Note:

If the customer has purchased the High Availability option, you must administer a link from one ethernet port on the switch to one CMS computer, and a second link from a different ethernet port on the switch to another CMS computer. For the S8300 Media Server, you cannot have dedicated links to each CMS computer; if you want true duplication, you must use a different solution.

This section includes the following topics:

- Verifying the Processor Ethernet port on page 69
- Displaying the processor IP interface (R10) on page 70
- Displaying the processor ethernet port (Communication Manager 1.1 and later) on page 71
- Adding node names and IP addresses on page 72
- Adding the processor interface channels on page 74

Verifying the Processor Ethernet port

Use the System Parameters Customer Options form to verify that the processor ethernet port is enabled. If the processor ethernet port is not enabled, you must apply a new license file to the switch.

```
display system-parameters customer-options                    Page   5 of  11
                            OPTIONAL FEATURES


                 Multinational Locations? n           Station and Trunk MSP? n
 Multiple Level Precedence & Preemption? n       Station as Virtual Extension? n
                     Multiple Locations? n
                                               System Management Data Transfer? n
             Personal Station Access (PSA)? n              Tenant Partitioning? n
                        Posted Messages? y        Terminal Trans. Init. (TTI)? n
                        PNC Duplication? n                Time of Day Routing? n
                    Port Network Support? n              Uniform Dialing Plan? y
                                               Usage Allocation Enhancements? y
                Processor and System MSP? n       TN2501 VAL Maximum Capacity? y
                      Private Networking? y
                      Processor Ethernet? y                 Wideband Switching? n
                                                                     Wireless? n
                          Remote Office? n
            Restrict Call Forward Off Net? y
                   Secondary Data Module? y



          (NOTE: You must logoff & login to effect the permission changes.)
```

Field	Definition
Processor Ethernet	Verify that the processor ethernet port is enabled.

Displaying the processor IP interface (R10)

Use the IP Interfaces form to display the IP address to the processor ethernet port. Use this form to verify that the IP interface has been administered.

⚠ CAUTION:

In most cases, the IP interface is already administered. Do not change the administration. Changing the administration could cause failure with IP telephones and other adjunct links.

```
display ip-interfaces                                  Page   1 of   6   SPE B

                             IP INTERFACES

Enable                                                                     Net
Eth Pt Type    Slot  Code Sfx Node Name       Subnet Mask     Gateway Address Rgn
  y    procr                  192.168.2.1     255.255.0  .0   192.168.1  .254 1
  y    procr                  192.168.2.2     255.255.0  .0   192.168.4  .254 1
  n                                           255.255.255.0      .    .    .
  n                                           255.255.255.0      .    .    .
  n                                           255.255.255.0      .    .    .
  n                                           255.255.255.0      .    .    .
  n                                           255.255.255.0      .    .    .
```

Displaying the processor ethernet port (Communication Manager 1.1 and later)

Use the IP Interfaces form to display the IP address to the processor ethernet port. Use this form to verify that the IP interface has been administered. This form is used with Communication Manager 1.1 and later.

> ⚠ **CAUTION:**
>
> In most cases, the IP interface is already administered. Do not change the administration. Changing the administration could cause failure with IP telephones and other adjunct links.

```
display ip-interface procr

IP INTERFACES


                  Type: PROCR


             Node Name: procr
            IP Address: 192.9  .22 .245
           Subnet Mask: 255.255.255.0

   Enable Ethernet Port? y
         Network Region: 1
```

Adding node names and IP addresses

Use the Node Names form to assign the name and IP address of the CMS computer and any gateways that are networked with the CMS computer. With the High Availability option, you will assign two CMS computer node names.

```
change node-names ip                                         Page   1 of   1
                            IP NODE NAMES
   Name              IP Address            Name           IP Address
3net               192.168.3  .0                        .    .    .
cmshost            192.168.1  .90                        .    .    .
cmshost2           192.168.3  .90                        .    .    .
default            0  .0  .0  .0                         .    .    .
gateway            192.168.1  .211                       .    .    .
gateway2           192.168.4  .211                       .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
                     .    .    .                         .    .    .
( 8  of  8 administered node-names were displayed )
Use 'list node-names' command to see all the administered node-names
Use 'change node-names ip xxx' to change a node-name 'xxx' or add a node-name
```

Field	Definition
Name	Enter the host name of the CMS computer and any gateway hosts used in the network. The processor ethernet port can be displayed on this form, but cannot be changed. The node names can be entered in any order. The names are displayed in alphabetical order the next time the form is displayed. The `default` node name entry is display-only and is not used for this application. For consistency, use the CMS computer host name as defined during the CMS Setup procedure. See your CMS software installation document for more information. These names are also used in the IP interfaces, data module, IP routing, and other forms. If you change the node name in this form, it is automatically updated on the other forms. **Note:** Do not use special characters in the node name. Special characters are not allowed in the **`/etc/hosts`** file on the CMS computer.
IP Address	Enter the IP address of the CMS computer and any required gateways. ⚠ **CAUTION:** Plan out the network before you assign any IP addresses. Any future changes that require a change to IP addresses will cause a service disruption.

Adding the processor interface channels

Use the Processor Channel form to assign the processor channel attributes. With the High Availability option, you will assign two separate processor channels.

```
change communication-interface processor-channels          Page  1 of  X
                    PROCESSOR CHANNEL ASSIGNMENT
Proc              Gtwy     Interface        Destination      Session      Mach
Chan Enable  Appl.  To  Mode Link/Chan      Node      Port Local/Remote   ID
  1:    y    mis         s    p   5001  cmshost          0      1    1
  2:    n                                                 0
  3:    n                                                 0
  4:    n                                                 0
  5:    n                                                 0
  6:    n                                                 0
  7:    n                                                 0
  8:    n                                                 0
  9:    n                                                 0
 10:    n                                                 0
 11:    n                                                 0
 12:    n                                                 0
 13:    n                                                 0
 14:    n                                                 0
 15:    n                                                 0
 16:    n                                                 0
```

Field	Definition
Proc Chan	Select a processor channel for this link.
Enable	Enter `y`.
Appl	Enter `mis`.
Gtwy To	Leave blank for the local CMS-to-switch link.
Mode	Enter `s` for server.
Interface Link	Enter `p` for the processor ethernet port.
Interface Chan	Enter the TCP channel number (5000-64500). The default for CMS is 5001 and is defined during CMS setup. See your CMS software installation document for more information.
Destination Node	Enter the node name of the CMS computer as assigned on the Node Names form. In these examples, `cmshost` is used.
Destination Port	Use the default of `0`.

Field	Definition
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the local and remote port to 10.
Mach ID	Not used for CMS.

■ ■ ■ ■ ■ ■

Troubleshooting TCP/IP switch connections

TCP/IP link troubleshooting can be done at the switch and at the CMS computer. This section describes tests you can run from either system.

The information in this section includes:

Switch administration

Switch tests

Using the system administration terminal on the switch, you can use the following commands to test the TCP/IP link:

ping ip-address *X.X.X.X* **board** *CCs* **[packet-length** *YYYY* **repeat** *ZZZ***]**

(where *X.X.X.X* is the IP address of the CMS computer, *CCs* is the equipment location of the C-LAN circuit pack, *YYYY* is the size of the test packet, and *ZZZ* is the number of times the test will be repeated)

The packet length and repeat options are available with R8 or later. This command sends a test message to the specified IP address to request a remote echo. The results will be either pass or fail, and will show how long the test took to complete. The packet length defaults to 64 bytes, with a maximum of 1500 bytes.

ping node-name *XXX* **board** *CCs* **[packet-length** *YYYY* **repeat** *ZZZ***]**

(where *XXX* is the node name of the CMS computer, *CCs* is the equipment location of the C-LAN circuit pack, *YYYY* is the size of the test packet, and *ZZZ* is the number of times the test will be repeated)

The packet length and repeat options are available with R8 or later. This command sends a test message to the specified node name to request a remote echo. The results will be either pass or fail, and will show how long the test took to complete. The packet length defaults to 64 bytes, with a maximum of 1500 bytes.

netstat ip-route

This command displays the destination IP address, gateway IP address, C-LAN circuit pack used for the route, and the interface for the route.

status processor-channels *X*

(where *X* is the processor channel used for the TCP/IP link)

This command displays the current status of the processor channel used for the TCP/IP link, and the last time and reason that the channel went down.

status link *X*

(where *X* is the TCP/IP link number)

This command displays the status for the TCP/IP link. Page 1 of the test shows whether the link is connected and is in service. Page 3 of the test shows whether the link is up or down. If the link is not up, there is a problem in translations or connectivity.

`status data-module XXXX`

(where *XXXX* is the extension number of the ethernet data module)

This command displays the status for the ethernet data module. This shows which port is connected and if the port is in service.

`status sys-link CCsc`

(where *CCsc* is the cabinet, carrier, slot, and circuit of the system link in question)

This command displays the status data for a specific system link. Each system link can be listed using the `list sys-link` command. The status includes the type and operational state of the link, the associated processor channel (if any), active alarms and path status, and a list of all hardware components that make up the link path.

`status packet`

This command displays the packet interface status.

`trace-route [ip-address X.X.X.X] [node-name nodename] board CCs`

(where *X.X.X.X* is the IP address of the CMS computer, *nodename* is the node name of the CMS computer, and *CCs* is the cabinet, carrier, and slot number of the C-LAN circuit pack)

This command works for R8 or later using the TN799B C-LAN circuit pack. This command displays the hops traversed from source to destination, along with the IP addresses of the hop points and final destination, and the observed round-trip delay from the source to each hop point. If no reply is received from a hop point, the IP address is blank.

`list measurements clan ethernet CCsc`

(where *CCsc* is the cabinet, carrier, slot, and circuit number of the ethernet port on the C-LAN circuit pack)

This command works for R8 or later. This command displays Cyclic Redundancy Check and collision counts for the past 24 hours in 15-minute intervals. N/A is displayed if the data cannot be retrieved for any interval.

Additional references

See the switch maintenance documents for more details on these test commands.

CMS computer tests

Using the system console on the CMS computer, you can use the following commands to test the TCP/IP link. More information about the UNIX commands can be found by printing out the manual pages (`man command`).

`netstat`

This command displays general network status information.

`ping X.X.X.X`

(where `X.X.X.X` is the IP address of the switch)

This command sends a test message to the specified IP address to request a remote echo. The results will be either alive or no answer.

`ping XXX`

(where `XXX` is the node name of the switch)

This command sends a test message to the specified node name to request a remote echo. The results will be alive, no answer, or unknown host.

`traceroute X.X.X.X`

(where `X.X.X.X` is the IP address of the switch)

This command traces the route that an IP packet follows from the CMS computer to the switch. There are more options to the command other than the IP address. Check the manual page for `traceroute` for more options.

`snoop`

This command allows you to capture and inspect network packets.

`spray hostname`

(where `hostname` is the name of the switch)

This command sends a stream of packets to a selected host, and reports how many were received and the transfer rate.

Maintenance > Connection Status (from CMS Main Menu)

This CMS command displays status information for the switch links.

`/usr/sbin/ndd /dev/tcp tcp_smallest_anon_port tcp_largest_anon_port`

This command allows you to display the possible range of *talk* ports randomly assigned by the CMS when communicating with the switch. These ports are called ephemeral ports.

You should also check the `/etc/hosts` and `/etc/defaultrouter` files to verify that the IP addresses and host names are accurate.

■ ■ ■ ■ ■ ■

Appendix A: Converting links from X.25 to TCP/IP

This appendix describes the procedures required to convert an X.25 link to a TCP/IP link.

This section includes the following topics:

Prerequisites

Check for the following prerequisites:

- The switch software must be R7 or later.
- Determine the IP addresses for the switch and the CMS computer before you begin the conversion.
- A C-LAN circuit pack must be installed in the switch.

Related administration

Check for the following related administration:

- A subnet mask for the CMS ethernet port may be required.
- A router or gateway IP address may be required.

Required documents

In addition to the procedures presented in this document, you will also need the following documents:

- CMS software installation, maintenance, and troubleshooting

  The exact title and document number differs for each CMS load. Use the document that matches the customer system.

- Sun hardware installation, maintenance, and troubleshooting documents

  The exact title and document number differs for each CMS computer platform. Use the document that matches the computer.

Replacing the X.25 links

To replace the X.25 links, you must do the procedures in this section, including:

- Disconnecting the X.25 hardware on page 82
- Administering the switch links on page 83
- Connecting the TCP/IP hardware on page 84
- Administering the CMS computer on page 85

Disconnecting the X.25 hardware

Do the following to disconnect the X.25 link hardware that is being replaced by TCP/IP. See Connecting a TCP/IP switch link on page 21 for diagrams that show typical X.25 link hardware.

To disconnect the X.25 hardware:

1. Disconnect the X.25 cabling that is connected to the serial ports or to the HSI cards on the CMS computer.

2. At the switch, disconnect the X.25 cabling that connects to the Processor Interface, the Packet Gateway, or to a digital port (DCP or DS1).

3. Leave the X.25 hardware intact on the switch and the CMS computer in case you have to reconnect the link.

Administering the switch links

To change from X.25 to TCP/IP, you must remove the X.25 administration and add the TCP/IP administration. This section only highlights what changes need to occur. For detailed information, see the TCP/IP procedures documented in Administering a TCP/IP switch link on page 45.

This section includes the following topics:

Removing the X.25 administration

Remove the X.25 administration using the following forms:

Form	Purpose
`change administered-connection` (G3r or DEFINITY Server R only)	Remove the administered connection between the packet gateway data module and the CMS computer data module
`change communication-interface processor-channels`	Remove the processor channel
`change data-module`	Remove the packet gateway X.25 data module

Adding the TCP/IP administration

Add the TCP/IP administration using the following forms:

Form	Purpose
`change system-parameter maintenance` (G3csi, DEFINITY Server CSI, DEFINITY One, and S8100 Media Server only)	Adding a second packet interface
`change node-names` (R7 and R8) or `change node-names ip` (R9 and later)	Adding node names and IP addresses
`change ip-interfaces` (R8 and later)	Adding a C-LAN IP interface
`add data-module`	Adding an ethernet data module
`change communication-interface processor-channels`	Adding the processor interface channels
`add ip-route`	Adding IP routes (if needed)

Connecting the TCP/IP hardware

Follow the instructions in , to connect the TCP/IP LAN switch link hardware.

Administering the CMS computer

At the CMS computer, the switch setup must be changed to use the TCP/IP link.

To change the switch link:

1. Using the `cmssvc` command, turn off CMS.

2. Using the `cmssvc` command, access the `swsetup` option. When you access this option, you are queried for the following information:

   - Switch name

   - Switch model (release)

   - Is Vectoring enabled on the switch (if authorized)?

   - Is Expert Agent Selection (EAS) enabled on the switch (if authorized)?

   - Does the Central Office have disconnect supervision?

   - Local and remote port

   - The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the remote and local port to 10.

   - Transport method used to connect to the switch (TCP/IP). When using TCP/IP, enter the IP address and the TCP port (the default TCP port is 5001).

3. Edit the `/etc/hosts` file to add the switch host name and IP address.

4. If the CMS computer has two ethernet ports, it is possible that the system might attempt to route packets from one interface to another. To prevent this, edit the `/etc/rc2.d/S98cms_ndd` file and add the following line to the end of the file:

   `ndd -set /dev/ip ip_forwarding 0`

   If the file already has this line, quit out of the file and make no changes.

■ ■ ■ ■ ■ ■

Appendix B: Connecting an X.25 switch link

This section explains how to connect the CMS computer to the switch using X.25 (allowed only for upgrades through CMS R3V11, not new installations).

Note:

Some CMS and switch loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

This section includes the following topics:

Overview

The connection between the CMS computer and a switch allows the CMS software on the computer to receive, store, and format the Automatic Call Distribution (ACD) information it receives from one or more switches.

A switch technician should be on-site to make the connection from the CMS computer to the switch and, if necessary, to administer the switch for the ACD feature and CMS. The CMS software will not communicate with the switch if the ACD feature, CMS, or the switch hardware is not properly administered. See Appendix C: Administering an X.25 switch link on page 125 for more information.

This section includes the following topics:

Local vs remote connections

This section shows both local and remote connections between the switch and the CMS computer. For clarification, these connections are defined as follows:

- Local - The connections between the switch and the CMS computer use facilities local to the switch, such as a direct connection through an Isolating Data Interface (IDI) or a switched connection over 7400D data modules using digital ports.

    Note:
    The 7400D data module is now in limited availability/inactive (LAI) status. There will be no new sales of 7400D data modules, but existing units can still be used for switch connectivity.

- Remote - The connections between the switch and the CMS computer use central office (CO) facilities such as analog or DS1 lines. Cabling diagrams for remote connections are given in this section, but administration must be done by the Avaya switch design engineers.

Multiple ACDs (switches)

One CMS computer can collect data from up to eight different switches. From the CMS computer point of view, each switch represents one ACD. Depending on the release of the switch and the release of the CMS computer, you can have all switches connected via TCP/IP, all switches connected via X.25 protocol, or some combination of the two protocols. In any event, the physical connectivity as shown in this section still applies when connecting one switch or eight switches. Each switch requires a link to the CMS computer.

CMS computer connections to the switch

Regardless of the switch type, the CMS computer connects to an ACD (a switch) using the following methods:

- Connecting one or more ACDs using an HSI card (X.25) on page 89 (all platforms)
- Connecting a single ACD using serial port A or B (X.25) on page 94 (Ultra 5 and SPARCserver only)

Connecting one or more ACDs using an HSI card (X.25)

This section describes how to connect one or more ACDs with an HSI card using the X.25 protocol.

Note:

Some CMS loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

This section includes the following topics:

- Overview on page 89
- Cabling to an HSI/S card on page 90
- Cabling to an HSI/P card on page 92

Overview

An HSI card and associated cabling is used to connect one or more ACDs to a CMS computer using X.25. At the CMS computer end, either a DB-25 M/M Gender Changer or a DB-25 Direct-Connect link adapter is required depending upon the switch interface device to be used. See the cabling diagrams for each switch type in this section. The required HSI cabling is different depending on the CMS computer.

⚠ WARNING:

For multiple ACDs, the Black Box converter must be used when connecting the system to the switch. Bypassing the Black Box and connecting the HSI card port directly to the switch will cause electrical damage to the CMS computer and switch components. Verify that the CMS computer, HSI cables, and Black Box converter are connected properly. See Checking the RS-232 to RS-422 interface converter on page 194 for more information about the Black Box converters.

Cabling to an HSI/S card

On CMS computers that have HSI/S cards, HSI Cables, Patch Panels, and Black Box converters are used for connections to one or more ACDs.

Parts list

Obtain the following parts:

Quantity	Description
1 or 2	HSI/S card For connections to more than four ACDs, you must have two HSI cards.
1 or 2	HSI patch panel cable (Sun P/N 530-1685-02 Rev 52) For connections to more than four ACDs, you must have two HSI patch panel cables.
1 or 2	HSI patch panel (Sun P/N 540-2191-01 Rev 51) For connections to more than four ACDs, you must have two HSI patch panels.
1 per ACD	RS-449 straight-through cable (P/N EDN 37J-0010-MM) (407086818)
1 per ACD	Black Box converter Model No. 1C456A-R4 (120V) (407076330) Model No. 1C456AE-R3 (240V) (407220128)

Cabling diagram

Make the following connections:

CMS
computer

HSI/S
Card 2

HSI Cable
P/N 530-1695-02 Rev 52

3
2
1
0

Cabling to ACD8
Cabling to ACD7
Cabling to ACD6
Cabling to ACD5

Patch Panel
P/N 540-2191-01 Rev 51

Black Box Converter
(RS-422 to RS-232)
407076330 (120V)
407220128 (240V)

RS-449 Cable
407086818
P/N EDN 37J-0010-MM

HSI Cable
P/N 530-1695-02 Rev 52

HSI/S
Card 1

3
2
1
0

Cabling to ACD4
Cabling to ACD3
Cabling to ACD2
Cabling to ACD1

Patch Panel
P/N 540-2191-01 Rev 51

hsi_port.cdr
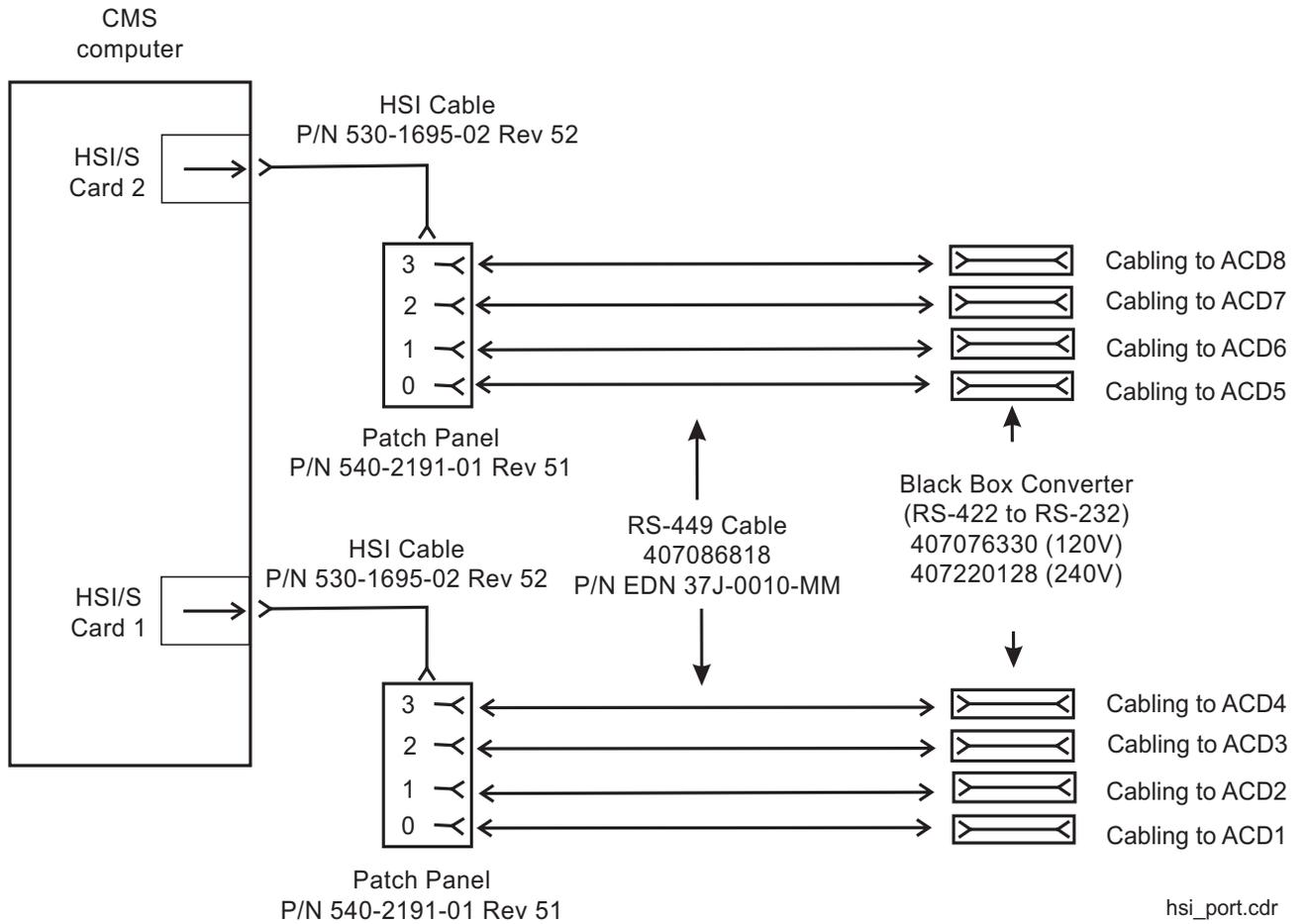
Cabling to an HSI/P card

On CMS computers that have HSI/P cards, HSI quad cables and Black Box converters are used for connections to one or more ACDs.

Parts list

Obtain the following parts:

Quantity	Description
1 or 2	HSI/P card For connections to more than four ACDs, you must have two HSI cards.
1 or 2	HSI quad cable (P/N 530-2492-01 Rev 50) For connections to more than four ACDs, you must have two HSI quad cables.
1 per ACD	RS-449 straight-through cable (P/N EDN 37J-0010-MM) 407086818
1 per ACD	Black Box converter Model No. 1C456A-R4 (120V) (407076330) Model No. 1C456AE-R3 (240V) (407220128)

Cabling diagram

Make the following connections:

CMS computer

HSI/P Card 2

Port 3
Port 2
Port 1
Port 0

Cabling to ACD8
Cabling to ACD7
Cabling to ACD6
Cabling to ACD5

HSI Quad Cable
P/N 530-2492-01 Rev 50

RS-449 Cable
407086818
P/N EDN 37J-0010-MM

Black Box Converter
(RS-422 to RS-232)
407076330 (120V)
407220128 (240V)

HSI/P Card 1

Port 3
Port 2
Port 1
Port 0

Cabling to ACD4
Cabling to ACD3
Cabling to ACD2
Cabling to ACD1
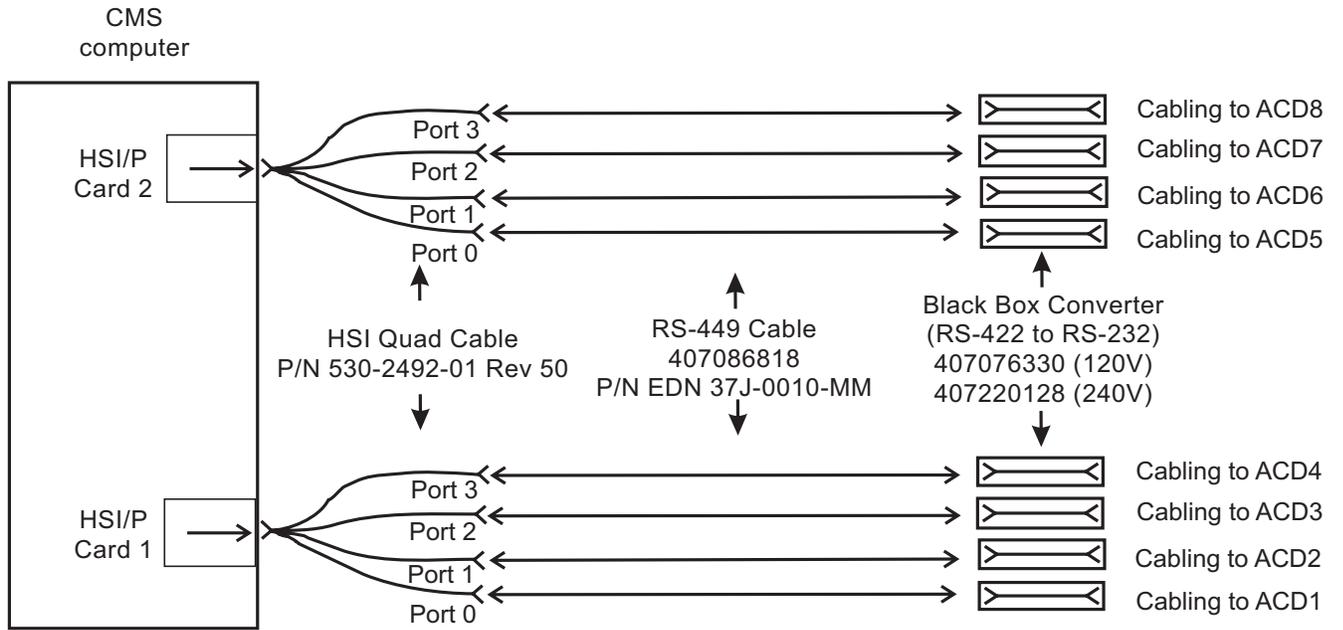
hisp_port.cdr

Connecting a single ACD using serial port A or B (X.25)

The serial port on an Ultra 5 or a SPARCserver can be used for single ACD configurations using X.25 as shown in the following figure. At the CMS computer end, either a DB-25 M/M Gender Changer or a DB-25 Direct-Connect link adapter is required depending upon the switch interface device to be used. See the cabling diagrams for each switch type in this section.
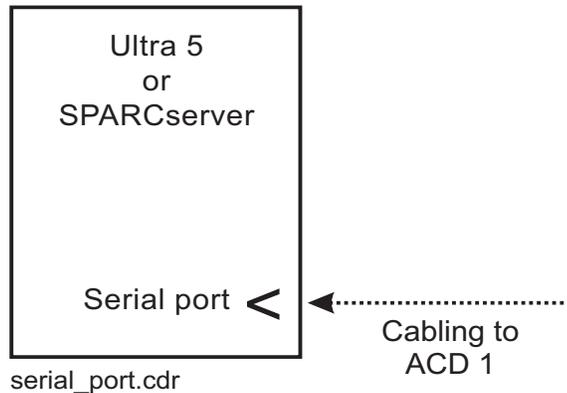
serial_port.cdr

Note:

> Some CMS loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

The serial port used for the single-ACD connection depends on the CMS computer platform:

CMS computer	Serial port for switch connections
Ultra 5	Port A
SPARCserver 5/10/20	Port B

Note:

> The serial ports on only the Ultra 5 and SPARCserver computers can be used for a single ACD link using X.25. For information on connecting multiple X.25 links, see Cabling to an HSI/S card on page 90 or Cabling to an HSI/P card on page 92.

Switch connections with X.25 using an IDI

This section describes how to connect a CMS computer to a switch with X.25 using an Isolating Data Interface (IDI). The switch connections described in this section include:

- Generic 3si or DEFINITY Server SI on page 95
- G3r or DEFINITY Server R on page 99

> **Note:**
> Some CMS loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

Generic 3si or DEFINITY Server SI

This section describes how to connect a switch port on the CMS computer to the EIA connector of a Processor Interface on the G3si or DEFINITY Server SI using an IDI.

This section includes the following topics:

- Restrictions on page 95
- Distance limits on page 96
- Parts list on page 96
- Cabling diagram - local using EIA port with IDI on page 97
- Cabling procedure on page 98

Restrictions

An IDI connection cannot be used when:

- the switch is more than 210 feet (64 meters) from the CMS computer,
- the switch has a duplicated common control,
- the switch is DC-powered, or
- link 1 of the TN765 Processor Interface is already being used by another application (for example, voice mail).

If any of these conditions exist, you must use data modules for the switch-to-CMS connection. See Switch connections with X.25 using data modules on page 102.

Distance limits

With this method, the maximum allowable distance between the CMS computer and the G3si is 210 feet (64 meters). If your required distance is more than 210 feet (64 meters), see Switch connections with X.25 using data modules on page 102.

Parts list

Obtain the following parts:

Quantity	Description
1	Link #1 port on the TN765 Processor Interface
1	H600-362 (RS232C to RS-449) cable Group 1 - 10 feet (3 meters) Group 2 - 25 feet (7.6 meters) Group 3 - 50 feet (15.2 meters) Group 4 - 100 feet (30.5 meters) Group 5 - 200 feet (61 meters)
1	Isolating Data Interface (IDI) unit The 105D (108367376) can operate at a maximum of 19200 bps.
1	ED-1E434-11, Group 175 (RS-232C to RS-449) cable
1	DB25 M/M Direct Connect Link adapter (407122068)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

Cabling diagram - local using EIA port with IDI

Make the following connections:

Black Box
Converter
407076330 (120V)
407220128 (240V)

CMS
Computer

Generic 3si

105D IDI

Direct Connect
Link Adapter
407122068

HSI
Cabling

HSI
Card

PI/EIA
TN765
Link 1

RS-232

Switch
J1

Adjunct
J2

RS-232

OR

H600-362
Group 1, 2, 3, 4, or 5

RS-449

RS-449

ED-1E434-11
Group 175

Serial
Port

200 ft max (61 m)

3 ft (1 m)

idi_g3si.cdr
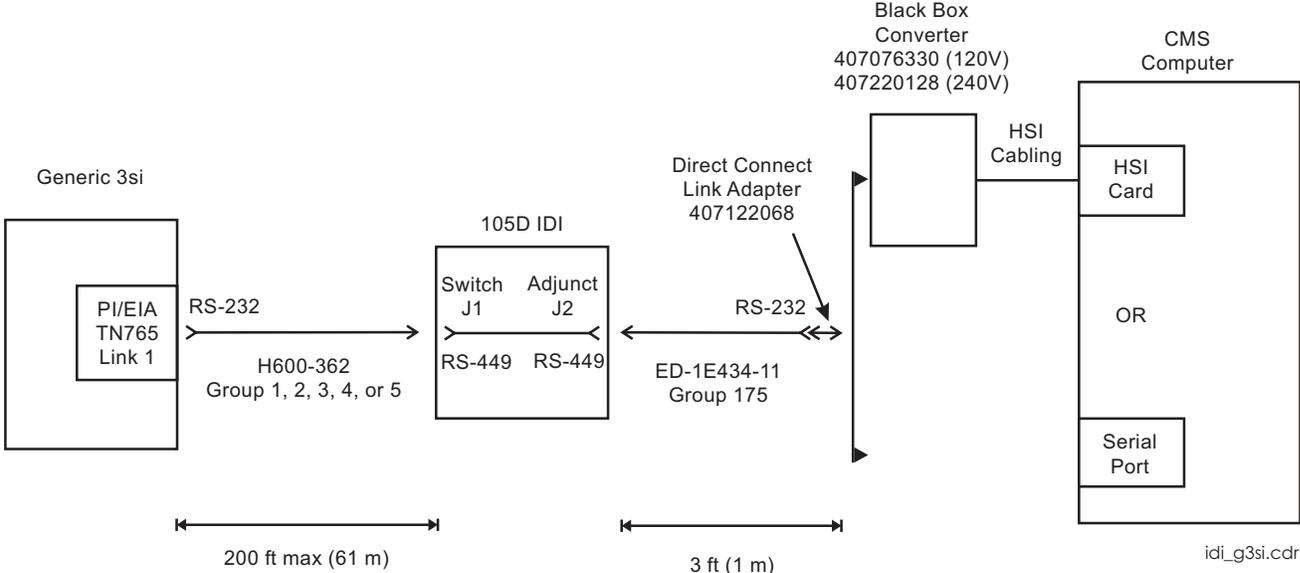
Cabling procedure

To connect the switch to a CMS computer using an IDI:

1. Connect the female end of the ED-H600-362 cable to Link 1 (EIA connector) of the Processor Interface.

2. Connect the male end of the ED-H600-362 cable to the J1 (Switch/In) connector on the IDI.

J 1
SWITCH - A

105D
ISOLATING
DATA
INTERFACE
UNIT

ADJUNCT - B
J 4

SWITCH - B
J 3

DIRECT CONNECT

O N
1 2 3 4 5 6 7 8

MUX / MODEM

ADJUNCT - A
J 2

h1df105d LJK 010699

3. Connect the male end of the ED-1E434-11, Group 175 cable to the J2 (Adjunct/Out) connector on the IDI.

4. If the IDI has DIP switches, make sure the switches are set for "Direct Connect."

5. Connect the female end of the ED-1E434-11, Group 175 cable to the direct-connect link adapter.

6. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

G3r or DEFINITY Server R

This section describes how to connect a switch port on the CMS computer to the Packet Gateway board on the G3r or DEFINITY Server R using an IDI. This interface can be used with either a single ACD configuration or a multiple ACD configuration.

This section includes the following topics:

Distance limits

With this method, the maximum allowable distance between the CMS computer and the switch is 210 feet (64 meters).

Parts list

Obtain the following parts:

Quantity	Description
1	TN577 PGATE circuit pack port
1	H600-347, Group 1 quad cable (provided as part of the TN577)
1	H600-210 (RS232C to RS-449) cable Group 1 - 10 feet (3 meters) Group 2 - 25 feet (7.6 meters) Group 3 - 50 feet (15.2 meters) Group 4 - 100 feet (30.5 meters) Group 5 - 200 feet (61 meters)
1	IDI unit The 105D (108367376) can operate at a maximum of 19200 bps.
1	H600-210, Group 1 (RS-232C to RS-449) cable

Quantity	Description
1	DB25 M/M Direct Connect Link adapter (407122068)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

Cabling diagram - local using PGATE with IDI

Make the following connections:
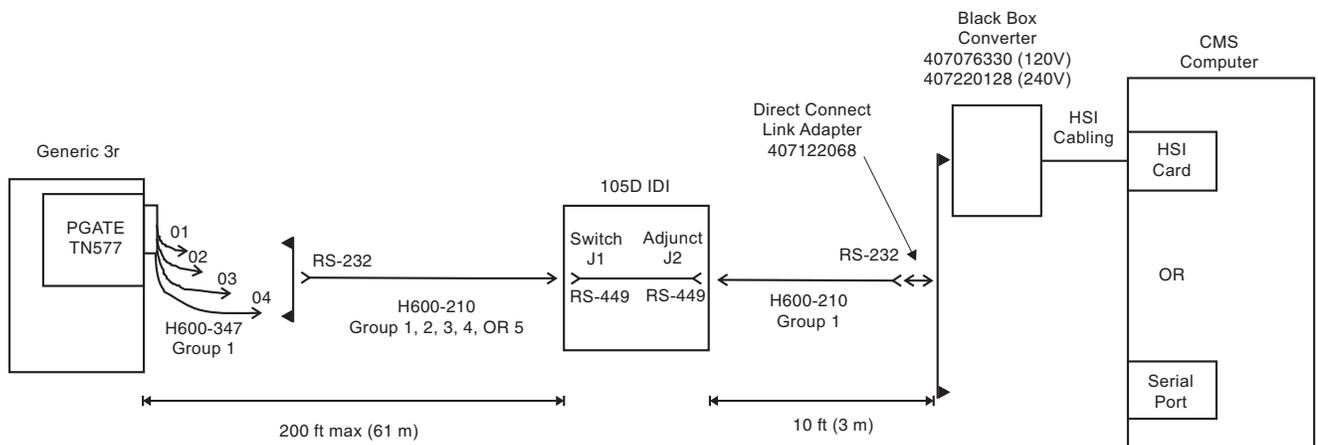
idi_g3r.cdr

Cabling procedure

To connect the switch to a CMS computer using an IDI:

1. Verify that the H600-347, Group 1 cable is connected to the amphenol connector of the Packet Gateway circuit pack.
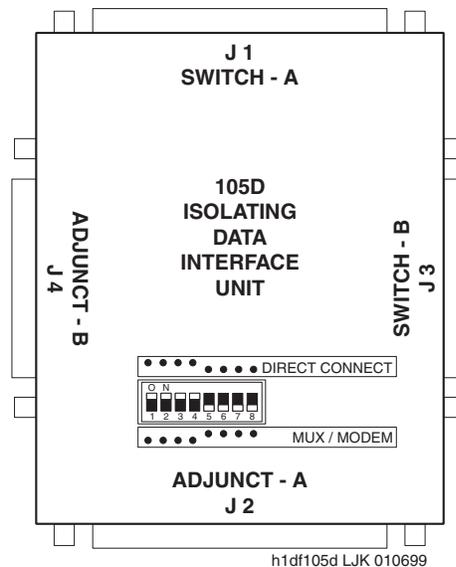
2. Connect one of the four H600-347, Group 1 cable RS232 connectors to the female end of the H600-210, Group 1 cable. Record the number of the RS232 connector used.

3. Connect the male end of the H600-210, Group 1, 2, 3, 4, or 5 cable to the J1 (Switch/In) connector on the IDI.

```
                    J 1
                  SWITCH - A


                    105D
                  ISOLATING
ADJUNCT - B         DATA         SWITCH - B
   J 4           INTERFACE          J 3
                    UNIT


                   •••• ••• DIRECT CONNECT
              O N
              1 2 3 4 5 6 7 8
                   ••• •••• MUX / MODEM

                  ADJUNCT - A
                     J 2
```

h1df105d LJK 010699

4. Connect the male end of the H600-210, Group 1 cable to the J2 (Adjunct/Out) connector on the IDI.

5. If the IDI has DIP switches, make sure the switches are set for "Direct Connect."

6. Connect the female end of the H600-210, Group 1 cable to the direct-connect link adapter.

7. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

   For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

Switch connections with X.25 using data modules

This section describes how to connect a CMS computer to a switch with X.25 using data modules. The switch connections described in this section include:

- G3si or DEFINITY Server SI on page 102
- G3r or DEFINITY Server R on page 105

> **Note:**
> Some CMS loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

G3si or DEFINITY Server SI

This section describes how to connect a switch port on the CMS computer to the Processor Interface circuit pack on the G3si or DEFINITY Server SI using a 7400D Data Module.

This section includes the following topics:

- Distance limits on page 102
- Parts list on page 103
- Cabling diagram - local with 7400D on page 103
- Cabling procedure on page 104

Distance limits

With this method, the maximum allowable distance between the CMS computer and the 7400D Data Module is 50 feet (15.2 meters). The maximum allowable distance between the 7400D and the switch is 5000 feet (1524 meters) with 24-gauge wire and 4000 feet (1219 meters) with 26-gauge wire.

Parts list

Obtain the following parts:

Quantity	Description
1	TN754 4-wire digital port on the switch
1	103A connecting block (105164818)
1	D8W modular cord or equivalent (UTP Category 3) 103786786 (7 feet, 2.1 meters) 103786802 (14 feet, 4.2 meters) 103786828 (25 feet, 7.6 meters)
1	7400D with a stand-alone housing
1	ED-1E434-11, Group 309 (RS-232C) cable
1	DB25 M/M Gender Changer (406783613)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

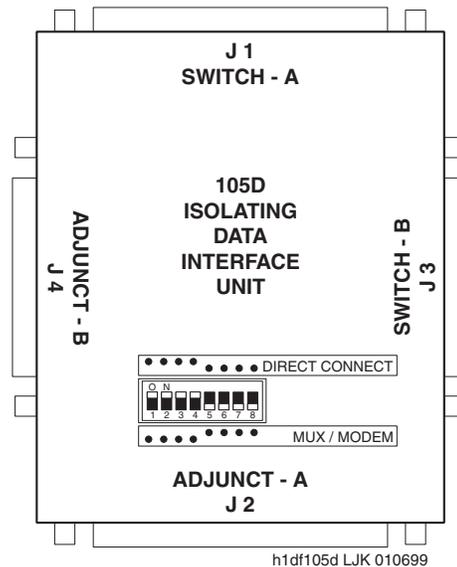## Cabling diagram - local with 7400D

Make the following connections:
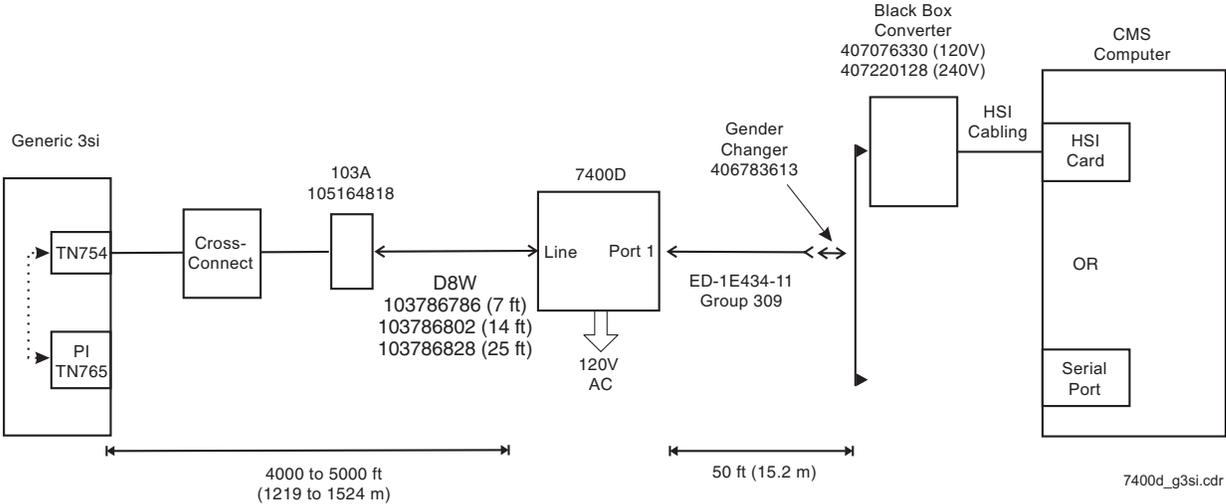
Cabling procedure

To connect the switch to a CMS computer using a data module:

1. Run a cable from the cross-connect to a TN754 4-wire digital port on the switch.

2. Cross-connect the TN754 4-wire digital port to a 103A connecting block.

3. Connect one end of a D8W modular cord to the 103A connecting block.

4. Connect the other end of the D8W modular cord to the LINE jack of the 7400D.

5. Plug the power supply cord into the connector labeled "POWER" on the 7400D.

6. Connect the AC Power Converter to the 7400D and to an AC power outlet.

   The default options for the 7400D are acceptable for CMS. Refer to the *7400D Data Module Users Guide* for information on options and setting options.

7. Connect the male end of the ED-1E434-11, Group 309 (RS-232) cable to the 7400D data module.

8. Connect the female end of the ED-1E434-11, Group 309 (RS-232) cable to the gender changer.

9. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

   For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

G3r or DEFINITY Server R

This section describes how to connect the CMS computer to the G3r or DEFINITY Server R using 7400D Data Modules. This interface can be used for either a single ACD configuration or a multiple ACD configuration.

This section includes the following topics:

Distance limits

With this method, the maximum allowable distance between the CMS computer and the 7400D is 50 feet (15.2 meters). The maximum allowable distance between the 7400D and the switch is 5000 feet (1524 meters) with 24-gauge wire and 4000 feet (1219 meters) with 26-gauge wire.

Parts list

Obtain the following parts:

Quantity	Description
1	TN577 PGATE circuit pack port
1	H600-347, Group 1 quad cable (provided as part of the TN577)
2	M25A RS232 cable 102269628 (25 feet, 7.6 meters) 102269636 (50 feet, 15.2 meters)
2	7400D with stand-alone housing
2	D8W modular cord or equivalent (UTP Category 3) 103786786 (7 feet, 2.1 meters) 103786802 (14 feet, 4.2 meters) 103786828 (25 feet, 7.6 meters)
2	103A connecting block (105164818)
1	Cross-connect hardware
2	TN754 4-wire digital port on the switch

Quantity	Description
1	DB25 M/M Gender Changer (406783613)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

Cabling diagram - local with 7400D

Make the following connections:

Cabling procedure

To connect the switch to a CMS computer using a data module:

1. Verify that the H600-347, Group 1 cable is connected to the amphenol connector of the Packet Gateway circuit pack (TN577).

2. Connect one of the four H600-347, Group 1 cable RS232 connectors to the female end of the M25A cable. Record the number of the RS232 connector used.

3. Connect the male end of the M25A cable to the connector labeled "PORT 1" on the 7400D.

4. Plug the power supply cord into the connector labeled "POWER" on the 7400D.

5. Plug the power supply cord into an AC power outlet.

   When connecting the CMS to the switch, set the speed of the 7400D to 9600. The remaining default options are acceptable for CMS. See the *7400D Data Module Users Guide* for information on options and setting options.

6. Connect one end of a D8W modular cord into the LINE jack on the 7400D.

7. Connect the other end of the D8W cord to a 103A connecting block.

8. Connect the 103A connecting block through the cross-connect to a TN754 4-wire digital port on the switch.

9. Connect another 103A connecting block through the cross-connect to a another TN754 4-wire digital port on the switch.

10. Connect one end of a D8W modular cord to the 103A connecting block.

11. Connect the other end of the D8W modular cord into the LINE jack on the 7400D.

12. Plug the power supply cord into the connector labeled "POWER" on the 7400D.

13. Plug the power supply cord into an AC power outlet.

    When connecting the CMS to the switch, set the speed of the 7400D to 9600. The remaining default options are acceptable for CMS. See the *7400D Data Module Users Guide* for information on options and setting options.

14. Connect the male end of the M25A cable to port 1 (RS-232) on the 7400D.

15. Connect the female end of the M25A cable to the gender changer.

16. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

    For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

Switch connections with X.25 remotely

This section describes how to connect a CMS computer to a switch with X.25 remotely. The switch connections described in this section include:

● G3si or DEFINITY Server SI on page 108

● G3r or DEFINITY Server R on page 118

> **Note:**
> Some CMS loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

G3si or DEFINITY Server SI

There are several ways you can remotely connect a CMS computer to G3si or DEFINITY Server SI:

● Analog connection directly to the processor interface on page 108

● Analog connection to a digital line linked to the processor interface on page 111

● DS1 connection linked to the processor interface on page 115

Analog connection directly to the processor interface

This section describes how to connect a switch port on the CMS computer remotely through analog facilities on the public network to the EIA connector of the PI circuit pack (TN765).

Restrictions - This connection cannot be used when:

● the switch has a duplicated common control,

● the switch is DC-powered, or

● link 1 of the TN765 Processor Interface is already being used by another application (for example, voice mail).

If any of these conditions exist, you must use a different method for remote connections. See the Analog connection to a digital line linked to the processor interface on page 111 section.

Distance Limits - There is a limit of 50 feet (15.2 meters) between the PI and the modem or DSU, and the CMS computer and the modem or DSU.

Parts list - Obtain the following parts:

Quantity	Description
1	Link #1 port on the TN765 Processor Interface
2	M25A RS232 cable 102269628 (25 feet, 7.6 meters) 102269636 (50 feet, 15.2 meters)
2	Model 3810 analog modem (107560500), or Model 3510 analog DSU (107560542), or Model 3550 digital DSU (107560963), or Model 3610 digital DSU (contact Design Center)
2	D8W modular cord or equivalent (UTP Category 3) 103786786 (7 feet, 2.1 meters) 103786802 (14 feet, 4.2 meters) 103786828 (25 feet, 7.6 meters)
2	103A connecting block (105164818)
	Cross-connect hardware
1	DB25 M/M Gender Changer (406783613)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

Cabling diagram - remote via private line using EIA port - Make the following connections:

50 ft max (15.2 m)

25 ft max (7.6 m)

Generic 3si

Modem or DSU

103A
105164818

PI/EIA
TN765
Link 1

M25A
102269628 (25 ft)
102269636 (50 ft)

Data   Line

D8W
103786786 (7 ft)
103786802 (14 ft)
103286828 (25 ft)

Central
Office

CMS
Computer

Black Box
Converter
407076330 (120V)
407220128 (240V)

HSI
Cabling

HSI
Card

OR

Serial
Port

Gender Changer
406783613

Modem or DSU

103A
105164818

M25A
102269628 (25 ft)
102269636 (50 ft)

Data   Line

D8W
103786786 (7 ft)
103786802 (14 ft)
103286828 (25 ft)

50 ft max (15.2 m)

25 ft max (7.6 m)

rem_idi_g3si.cdr

Cabling procedure - To connect from the switch to a port at the central office:

1. Connect the female end of the M25A cable to Link 1 (EIA connector) of the Processor Interface.

2. Connect the male end of the M25A cable to the Data port on the modem or DSU.

3. Connect one end of a D8W modular cord to the Line port on the modem or DSU.

4. Connect the other end of the D8W modular cord to a 103A connecting block.

5. Cross-connect the 103A connecting block to an analog port of the central office switch.

To connect from the CMS computer to a port at the central office:

1. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

   For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

2. Connect the female end of the M25A cable to the gender changer.

3. Connect the male end of the M25A cable to the Data port on the modem or DSU.

4. Connect one end of a D8W modular cord to the Line port on the modem or DSU.

5. Connect the other end of the D8W modular cord to a 103A connecting block.

6. Cross-connect the 103A connecting block to an analog port of the central office switch.

Analog connection to a digital line linked to the processor interface

This section describes how to connect a switch port on the CMS computer remotely through analog facilities on the public network, to a digital port (TN754) on a switch, which is internally linked to the PI.

Distance limits - There is a limit of 50 feet (15.2 meters) between the modular trunk data module (MTDM) and the modem or DSU, and the CMS computer and the modem or DSU.

Parts list - Obtain the following parts:

Quantity	Description
1	M25A RS232 cable 102269628 (25 feet, 7.6 meters) 102269636 (50 feet, 15.2 meters)
1	M25B RS232 cable 102968643 (25 feet, 7.6 meters) 103905543 (50 feet, 15.2 meters)
1	TN754 4-wire digital port on the switch
1	Modular Trunk Data Module
2	Model 3810 analog modem (107560500), or Model 3510 analog DSU (107560542), or Model 3550 digital DSU (107560963), or Model 3610 digital DSU (contact Design Center)

Connecting an X.25 switch link

Quantity	Description
3	D8W modular cord or equivalent (UTP Category 3) 103786786 (7 feet, 2.1 meters) 103786802 (14 feet, 4.2 meters) 103786828 (25 feet, 7.6 meters)
3	103A connecting block (105164818)
	Cross-connect hardware
1	DB25 M/M Gender Changer (406783613)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

Cabling diagram - remote via private line using modems - Make the following connections:

4000 to 5000 ft
(1219 to 1524 m)

50 ft max (15.2 m)

25 ft max (7.6 m)

Generic 3si

TN754

PI
TN765

Cross-Connect

103A
105164818

MTDM

Line

Port 1
(DTE)

D8W
103786786 (7 ft)
103786802 (14 ft)
103286828 (25 ft)

120V
AC

Modem or DSU

Data
(DTE)

Line

M25B
102968643 (25 ft)
103905543 (50 ft)

120V
AC

103A
105164818

D8W
103786786 (7 ft)
103786802 (14 ft)
103286828 (25 ft)

Central
Office

CMS
Computer

Black Box
Converter
407076330 (120V)
407220128 (240V)

HSI
Card

HSI
Cabling

OR

Serial
Port

Gender Changer
406783613

Modem or DSU

Data

Line

M25A
102269628 (25 ft)
102269636 (50 ft)

120V
AC

103A
105164818

D8W
103786786 (7 ft)
103786802 (14 ft)
103286828 (25 ft)

50 ft max (15.2 m)

25 ft max (7.6 m)

rem_dcp_g3si.cdr

Cabling procedure - To connect from the switch to a port at the central office:

1. Run a cable from the cross-connect to a TN754 4-wire digital port on the switch.

2. Cross-connect the TN754 4-wire digital port to a 103A connecting block.

3. Connect one end of a D8W modular cord to the 103A connecting block.

4. Connect the other end of the D8W modular cord to the LINE jack of the MTDM.

5. Plug the power supply cord into the connector labeled "POWER" on the MTDM.

6. Connect the AC Power Converter to the MTDM and to an AC power outlet.

   You do not have to set options for the MTDM, since the default options for the MTDM are acceptable for CMS. Refer to the *MTDM Data Module Users Guide* for information on setting options.

7. Connect the male end of the M25B cable to the MTDM.

   Note:
   > If a 7400D is being used instead of an MTDM, you must use a null modem cable between the 7400D and the modem/DSU. This null modem must be locally-provided.

8. Connect the other end of the M25B cable to the Data port on the modem or DSU.

9. Connect one end of a D8W modular cord to the Line port on the modem or DSU.

10. Connect the other end of the D8W modular cord to a 103A connecting block.

11. Cross-connect the 103A connecting block to an analog port of the central office switch.

To connect from the CMS computer to a port at the central office:

1. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

   For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

2. Connect the female end of the M25A cable to the gender changer.

3. Connect the male end of the M25A cable to the Data port on the modem or DSU.

4. Connect one end of a D8W modular cord to the Line port on the modem or DSU.

5. Connect the other end of the D8W modular cord to a 103A connecting block.

6. Cross-connect the 103A connecting block to an analog port of the central office switch.

DS1 connection linked to the processor interface

This section describes how to connect a switch port on the CMS computer remotely through DS1 facilities on the public network, to a DS1 circuit on the switch, which is internally linked to the PI.

Distance limits - The maximum allowable distance between the CMS computer and the 7400D Data Module is 50 feet (15.2 meters). The maximum allowable distance between the 7400D and the is 5000 feet (1524 meters) with 24-gauge wire and 4000 feet (1219 meters) with 26-gauge wire.

Parts list - Obtain the following parts:

Quantity	Description
1	DS1 circuit on *each* switch
	Cross-connect hardware
	Central office DS1 facilities
1	TN754 4-wire digital port on the switch
1	103A connecting block (105164818)
1	D8W modular cord or equivalent (UTP Category 3) 103786786 (7 feet, 2.1 meters) 103786802 (14 feet, 4.2 meters) 103786828 (25 feet, 7.6 meters)
1	7400D with a stand-alone housing
1	M25A RS232 cable 102269628 (25 feet, 7.6 meters) 102269636 (50 feet, 15.2 meters)
1	DB25 M/M Gender Changer (406783613)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

Cabling diagram - remote using UDP extension or trunk group over DS1 - Make the following connections:
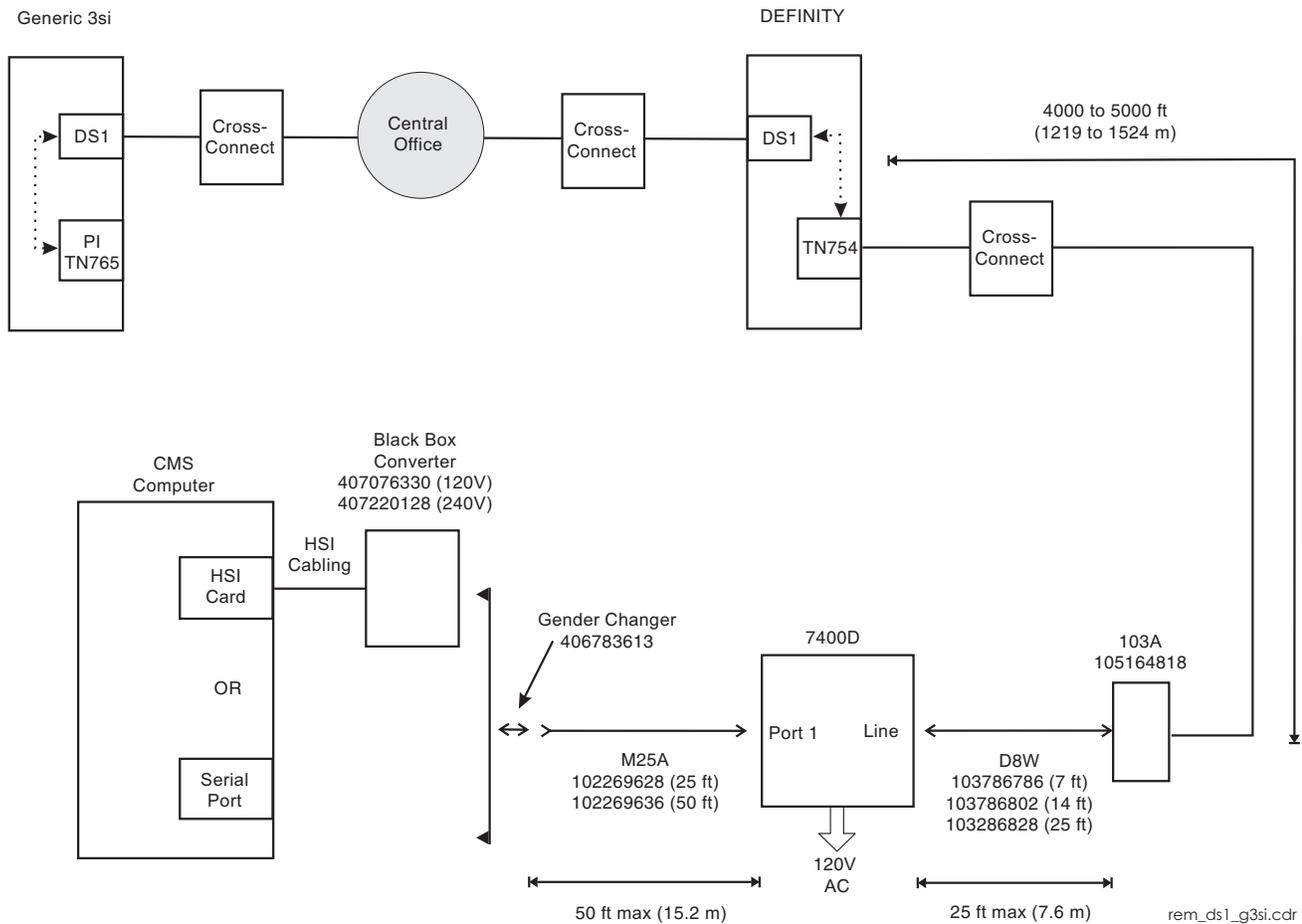
Cabling procedure - To connect the switch to a CMS computer using a UDP extension or trunk group over DS1:

1. Connect a DS1 circuit on the distant switch through CO facilities to a DS1 circuit on the local switch.

2. Run a cable from the cross-connect to a TN754 4-wire digital port on the local switch.

3. Cross-connect the TN754 4-wire digital port to a 103A connecting block.

4. Connect one end of a D8W modular cord to the 103A connecting block.

5. Connect the other end of the D8W modular cord to the LINE jack of the 7400D.

6. Plug the power supply cord into the connector labeled "POWER" on the 7400D.

7. Connect the AC Power Converter to the 7400D and to an AC power outlet.

   You do not have to set options for the 7400D, since the default options for the 7400D are acceptable for CMS. Refer to the *7400D Data Module Users Guide* for information on setting options.

8. Connect the male end of the M25A cable to Port 1 on the 7400D.

9. Connect the female end of the M25A cable to the gender changer.

10. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

    For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

G3r or DEFINITY Server R

There are two ways you can remotely connect a CMS computer to G3r or DEFINITY Server R:

- Analog connection directly to the packet gateway on page 118
- DS1 connection linked to the packet gateway on page 121)

Analog connection directly to the packet gateway

This section describes how to connect a switch port on the CMS computer remotely through analog facilities on the public network to the packet gateway circuit pack (TN577).

Distance limits - There is a limit of 50 feet (15.2 meters) between the Packet Gateway (TN577) and the modem or DSU, and the CMS computer and the modem or DSU.

Parts list - Obtain the following parts:

Quantity	Description
1	TN577 PGATE circuit pack port
1	H600-347, Group 1 quad cable (provided as part of the TN577)
2	M25A RS232 cable 102269628 (25 feet, 7.6 meters) 102269636 (50 feet, 15.2 meters)
2	Model 3810 analog modem (107560500), or Model 3510 analog DSU (107560542), or Model 3550 digital DSU (107560963), or Model 3610 digital DSU (contact Design Center)
2	D8W modular cord or equivalent (UTP Category 3) 103786786 (7 feet, 2.1 meters) 103786802 (14 feet, 4.2 meters) 103786828 (25 feet, 7.6 meters)
2	103A connecting block (105164818)
	Cross-connect hardware

Quantity	Description
1	DB25 M/M Gender Changer (406783613)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

Cabling diagram - remote via private line using PGATE - Make the following connections:
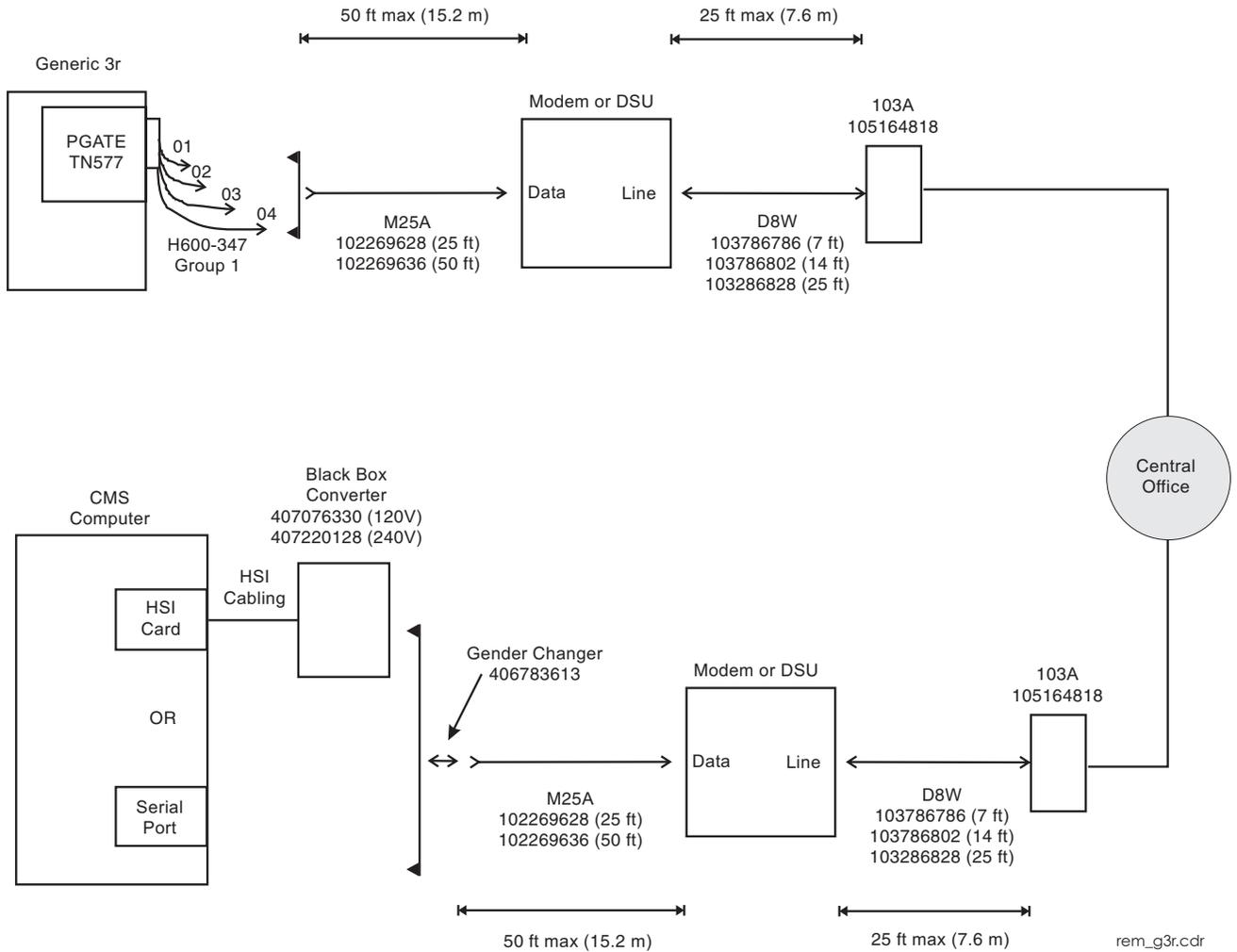
Cabling procedure - To connect from the switch to a port at the central office:

1. Verify that the H600-347, Group 1 cable is connected to the amphenol connector of the Packet Gateway circuit pack.

2. Connect one of the four H600-347, Group 1 cable RS232 connectors to the female end of the M25A cable. Record the number of the RS232 connector used.

3. Connect the male end of the M25A cable to the Data port on the modem or DSU.

4. Connect one end of a D8W modular cord to the Line port on the modem or DSU.

5. Connect the other end of the D8W modular cord to a 103A connecting block.

6. Cross-connect the 103A connecting block to an analog port of the central office switch.

To connect from the CMS computer to a port at the central office:

1. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

   For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

2. Connect the female end of the M25A cable to the gender changer.

3. Connect the male end of the M25A cable to the Data port on the modem or DSU.

4. Connect one end of a D8W modular cord to the Line port on the modem or DSU.

5. Connect the other end of the D8W modular cord to a 103A connecting block.

6. Cross-connect the 103A connecting block to an analog port of the central office switch.

DS1 connection linked to the packet gateway

This section describes how to connect a switch port on the CMS computer remotely through DS1 facilities on the public network, to a DS1 circuit on the switch (which is internally linked to a digital line), and is connected to the packet gateway (TN577).

Distance limits - The maximum allowable distance between the CMS computer or the packet gateway and the 7400D Data Module is 50 feet (15.2 meters). The maximum allowable distance between the 7400D and the switch is 5000 feet (1524 meters) with 24-gauge wire and 4000 feet (1219 meters) with 26-gauge wire.

Parts list - Obtain the following parts:

Quantity	Description
1	TN577 PGATE circuit pack port
1	H600-347, Group 1 quad cable (provided as part of the TN577)
2	M25A RS232 cable 102269628 (25 feet, 7.6 meters) 102269636 (50 feet, 15.2 meters)
2	7400D with stand-alone housing
2	D8W modular cord or equivalent (UTP Category 3) 103786786 (7 feet, 2.1 meters) 103786802 (14 feet, 4.2 meters) 103786828 (25 feet, 7.6 meters)
2	103A connecting block (105164818)
1	Cross-connect hardware
1	DS1 circuit on *each* switch
	Central office DS1 facilities
1	TN754 4-wire digital port on *each* switch
1	DB25 M/M Gender Changer (406783613)
1	Serial port on the CMS computer or HSI port with associated cabling and parts (see Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92)

Connecting an X.25 switch link

Cabling diagram - remote via private line using 7400D - Make the following connections:

50 ft max (15.2 m)

Generic 3r

PGATE TN577
01
02
03
04
H600-347 Group 1

7400D
Port 1   Line
M25A
102269628 (25 ft)
102269636 (50 ft)

103A
105164818

D8W
103786786 (7 ft)
103786802 (14 ft)
103786828 (25 ft)

120V AC

TN754

Cross-Connect

4000 to 5000 ft
(1219 to 1524 m)

DEFINITY

DS1

Cross-Connect

Central Office

Cross-Connect

DS1

CMS Computer

HSI Card

OR

Serial Port

Black Box Converter
407076330 (120V)
407220128 (240V)

HSI Cabling

Gender Changer
406783613

7400D
Port 1   Line

M25A
102269628 (25 ft)
102269636 (50 ft)

120V AC

103A
105164818

D8W
103786786 (7 ft)
103786802 (14 ft)
103286828 (25 ft)

Cross-Connect

TN754

50 ft max (15.2 m)

25 ft max (7.6 m)

4000 to 5000 ft
(1219 to 1524 m)

rem_ds1_g3r.cdr

Cabling procedure - To connect the switch to a CMS computer using a DS1 connection:

1. Verify that the H600-347, Group 1 cable is connected to the amphenol connector of the Packet Gateway circuit pack (TN577).

2. Connect one of the four H600-347, Group 1 cable RS232 connectors to the female end of the M25A cable. Record the number of the RS232 connector used.

3. Connect the male end of the M25A cable to the connector labeled "PORT 1" on the 7400D.

4. Plug the power supply cord into the connector labeled "POWER" on the 7400D.

5. Plug the power supply cord into an AC power outlet.

   You do not have to set options for the 7400D, since the default options for the 7400D are acceptable for CMS. Refer to the *7400D Data Module Users Guide* for information on setting options.

6. Connect one end of a D8W modular cord into the LINE jack on the 7400D.

7. Connect the other end of the D8W cord to a 103A connecting block.

8. Connect the 103A connecting block through the cross-connect to a TN754 4-wire digital port on the switch.

9. Connect a DS1 circuit on the distant switch through CO facilities to a DS1 circuit on the local switch.

10. Run a cable from the cross-connect to a TN754 4-wire digital port on the local switch.

11. Cross-connect the TN754 4-wire digital port to a 103A connecting block.

12. Connect one end of a D8W modular cord to the 103A connecting block.

13. Connect the other end of the D8W modular cord to the LINE jack of the 7400D.

14. Plug the power supply cord into the connector labeled "POWER" on the 7400D.

15. Connect the AC Power Converter to the 7400D and to an AC power outlet.

    You do not have to set options for the 7400D, since the default options for the 7400D are acceptable for CMS. Refer to the *7400D Data Module Users Guide* for information on setting options.

16. Connect the male end of the M25A cable to Port 1 on the 7400D.

17. Connect the female end of the M25A cable to the gender changer.

18. If an HSI card is installed (multiple ACD configuration), connect the direct-connect link adapter to the DTE (RS-232) output port on the Black Box converter. See Cabling to an HSI/S card on page 90 and Cabling to an HSI/P card on page 92 for more information.

    For a single ACD configuration (no HSI card), connect the direct-connect link adapter to the correct serial port on the CMS computer. See Connecting a single ACD using serial port A or B (X.25) on page 94 for more information.

Connecting an X.25 switch link

■   ■   ■   ■   ■   ■

Appendix C: Administering an X.25 switch link

This section provides the procedures to administer an X.25 link (allowed only for upgrades through CMS R3V11, not new installations).

Note:
> Some CMS and switch loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

This section includes the following topics:

- Overview on page 125
- CMS link administration on page 127
- Common switch administration on page 128
- Administering an IDI connection on page 133
- Administering a data module connection on page 150

Overview

The CMS application can collect and process Automatic Call Distribution (ACD) data from an Avaya switch. However, before CMS can collect and process the ACD data, a special hardware interface on the switch must be properly administered. Each switch can use a number of different interfaces to communicate to a CMS computer.

For additional information about switch administration, refer to the appropriate switch administration documents.

This section includes the following topics:

- Local vs remote connections on page 126
- Multiple ACDs (switches) on page 126

Local vs remote connections

This section shows both local and remote connections between the switch and the CMS computer. For clarification, these connections are defined as follows:

- Local - The connections between the switch and the CMS computer use facilities local to the switch, such as a direct connection through an Isolating Data Interface (IDI) or a switched connection over 7400D data modules using digital ports.

  Note:
  > The 7400D data module is now in limited availability/inactive (LAI) status. There will be no new sales of 7400D data modules, but existing units can still be used for switch connectivity.

- Remote - The connections between the switch and the CMS computer use central office (CO) facilities such as analog or DS1 lines. Cabling diagrams for remote connections are given in this section, but administration must be done by the Avaya switch design engineers.

Multiple ACDs (switches)

One CMS computer can collect data from up to eight different switches. From the CMS computer point of view, each switch represents one ACD. Depending on the release of the switch and the release of the CMS computer, you can have all switches connected via TCP/IP, all switches connected via X.25 protocol, or some combination of the two protocols. In any event, the physical connectivity as shown in this section still applies when connecting one switch or eight switches. Each switch requires a link to the CMS computer.

CMS link administration

In addition to the switch administration presented in this section, you must also set up the switch link on the CMS computer using the `swsetup` option of the `cmssvc` command. This procedure is documented in your CMS software installation document.

To set up the switch link:

1. Using the `cmssvc` command, turn off CMS.

2. Using the `cmssvc` command, access the `swsetup` option. When you access this option, you are queried for the following information:

   - Switch name

   - Switch model (release)

   - Is Vectoring enabled on the switch (if authorized)?

   - Is Expert Agent Selection (EAS) enabled on the switch (if authorized)?

   - Does the Central Office have disconnect supervision?

   - Local and remote port

     The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for the link. For example, if you use processor channel 10, set the local and remote port to 10.

   - Transport method used to connect to the switch (X.25 or TCP/IP). For X.25, the device used for x.25 connectivity (serial port A or B, or HSI link 0-7)

If the CMS computer has two ethernet ports, it is possible that the system might attempt to route packets from one interface to another. To prevent this, edit the `/etc/rc2.d/S98cms_ndd` file and add the following line to the end of the file:

```
ndd -set /dev/ip ip_forwarding 0
```

If the file already has this line, quit out of the file and make no changes.

Common switch administration

This section contains administration that must be done for all switches before you administer the switch to CMS computer link. The following administration must be done:

- [Determining switch/CMS compatibility](#) on page 129
- [Verifying the software version](#) on page 130
- [Verifying the call center release](#) on page 131
- [Setting the adjunct CMS release](#) on page 132

Determining switch/CMS compatibility

The following table reflects the recommended settings for the G3 Version, Call Center Release, Adjunct CMS Release, and CMS Setup switch type based on the software release of the switch. You can set the G3 Version, Call Center Release, or Adjunct CMS Release to an earlier version, but you will not have access to all of the features of the recommended release.

Switch software release	Switch administration			CMS administration
	G3 Version	**Call Center Release**	**Adjunct CMS Release**	**CMS setup switch model**
R5, R6.1, R6.2, or R6.3 as bugfix[1]	V5	NA	R3V5 or R3V6	Definity-G3V5
R6.3 with new features[2]	V6	NA	R3V6	Definity-R6
R7.1	V7	NA	R3V6	Definity-R6/R7
R8.x[3]	V8	8.1 or later	R3V8	Definity-R8
R9.1, R9.2[4]	V9	9.1 or later	R3V9	Definity-R9/10
R9.5, R10.x	V10	9.1 or later	R3V9	Definity-R9/10
Communication Manager 1.x	V11	11.1 or later	R3V11	MultiVantage-R11

1. Bugfix load does not include Avaya Business Advocate or Avaya Virtual Routing.

2. Includes Business Advocate and Virtual Routing.

3. R8 is a bugfix load for R7.

4. R9 is not a bugfix load.

Verifying the software version

Use the System Parameters Customer Options form to verify the software version. If the software version is not correct, you must either log on as `init` and change the version (pre-R10) or apply a new license file that has the correct version (R10 and later).

```
display system-parameters customer-options                    Page   1 of   X
OPTIONAL FEATURES
                                                            Used
    G3 Version: VXX                      Maximum Ports: 2800  1473
      Location: 1          Maximum XMOBILE Stations: 0      0
      Platform: 2


IP PORT CAPACITIES
                         Maximum Administered IP Trunks: 400    120
           Maximum Concurrently Registered IP Stations: 300    2
              Maximum Administered Remote Office Trunks: 0      0
Maximum Concurrently Registered Remote Office Stations: 0      0
              Maximum Concurrently Registered IP eCons: 0      0




   Maximum Number of DS1 Boards with Echo Cancellation: 0      0
                                   Maximum VAL Boards: 1      0



         (NOTE: You must logoff & login to effect the permission changes.)
```

Field	Definition
G3 Version	Enter the appropriate software release of the switch. If you set this field to an earlier release number, you will not have access to the latest features. The G3 Version must be set to `v8` or later to use the High Availability option.

Verifying the call center release

Use the first Call Center Optional Features page of the System Parameters Customer Options form to set the Call Center Release. This field is found on R8 or later. If the release number is not correct, you must either log on as `init` and change the release number (pre-R10) or apply a new license file to the switch (R10 and later).

```
display system-parameters customer-options                Page   X of   Y
                      CALL CENTER OPTIONAL FEATURES


                        Call Center Release: XX.X


                         ACD? y      PASTE (Display PBX Data on Phone)? y
                 BCMS (Basic)? y                           Reason Codes? y

        BCMS/VuStats Service Level? y            Service Observing (Basic)? y
              Business Advocate? n     Service Observing (Remote/By FAC)? y
               Call Work Codes? y              Service Observing (VDNs)? y
      DTMF Feedback Signals For VRU? y                        Timed ACW? y
               Dynamic Advocate? n                     Vectoring (Basic)? y
      Expert Agent Selection (EAS)? y               Vectoring (Prompting)? y
                      EAS-PHD? y            Vectoring (G3V4 Enhanced)? y
              Forced ACD Calls? n     Vectoring (ANI/II-Digits Routing)? y
           Least Occupied Agent? n     Vectoring (G3V4 Advanced Routing)? y
        Lookahead Interflow (LAI)? y                    Vectoring (CINFO)? y
Multiple Call Handling (On Request)? y     Vectoring (Best Service Routing)? y
      Multiple Call Handling (Forced)? y              Vectoring (Holidays)? n


        (NOTE: You must logoff & login to effect the permission changes.)
```

Field	Definition
Call Center Release	Enter `pre-8.1`, or `8.1` or later depending on the set of Call Center features you want to use. If you set this field to something other than your current Call Center load, you will not have access to the latest Call Center features. The Call Center Release must be set to `8.1` or later to use the High Availability option.

Setting the adjunct CMS release

Use the Call Center page of the System Parameters Features form to set the Adjunct CMS Release. Depending on the switch software release, this field can be found on different pages.

```
change system-parameters features                        Page  11 of  12   SPE B
                      FEATURE-RELATED SYSTEM PARAMETERS

  AGENT AND CALL SELECTION
                        MIA Across Splits or Skills? y
                         ACW Agents Considered Idle? y
                         Call Selection Measurement: current-wait-time
   Service Level Supervisor Call Selection Override? y
                              Auto Reserve Agents: none


  REASON CODES
                          Aux Work Reason Code Type: none
                           Logout Reason Code Type: none
  CALL MANAGEMENT SYSTEM

                              Adjunct CMS Release: RXVXX

                             BCMS/VuStats LoginIDs? y
                 BCMS/VuStats Measurement Interval: half-hour
        BCMS/VuStats Abandon Call Timer (seconds): 2
                  Validate BCMS/VuStats Login IDs? n
                           Clear VuStats Shift Data: on-login
              Remove Inactive BCMS/VuStats Agents? n
```

Field	Definition
Adjunct CMS Release	Enter the software release of the CMS computer. If you set this field to an earlier release number, you will not have access to the latest CMS features. The Adjunct CMS Release must be set to `R3V6` or later to use the TCP/IP LAN switch link. The Adjunct CMS Release must be set to `R3V8` or later to use the High Availability option.

Administering an IDI connection

Use the procedures in this section to administer an IDI connection for the following switch types:

- G3si or DEFINITY Server SI on page 133
- G3r or DEFINITY Server R on page 141

> **Note:**
> Some CMS loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

G3si or DEFINITY Server SI

The processor interface on the G3si or DEFINITY Server SI has eight interface links (01 to 08) available on a multi-carrier cabinet system and four interface links (01 to 04) available on a single-carrier cabinet system. One of these interface links must be assigned to a CMS computer.

The administration for an IDI connection differs for R6 and earlier, and R7 and later. Use the section that matches your software release.

This section includes the following topics:

- Restrictions on page 133
- IDI connections, R6 and earlier on page 134
- IDI connections, R7 and later on page 137

Restrictions

An IDI connection cannot be used if the switch is duplicated or if the switch is DC-powered. You must use data modules for the switch-to-CMS connection.

IDI connections, R6 and earlier

This section contains examples of the R6 and earlier administration forms used for IDI connections. Use the forms in the order shown.

Form	Purpose
`add data-module`	Adding processor interface data module
`change communication-interface processor-channels`	Adding the processor interface channel
`change communication-interface links`	Enabling the interface link

Adding the processor interface data module - Use the Data Module form to administer the internal data module used by the Processor Interface.

```
add data-module 2005                                    Page   1  of  1
                             DATA MODULE

  Data Extension: 2005                   Name: cms link data module
            Type: procr-infc             COS: 1     Maintenance Extension:
Physical Channel: 01                     COR: 1
             ITC: restricted              TN:


ABBREVIATED DIALING
  List1:


SPECIAL DIALING OPTION:



ASSIGNED MEMBERS (Station with a data extension button for this data module)

        Ext     Name
      1:
```

Field	Definition
Data Extension	The extension of the data module on the processor.
Name	Enter a name for the data module. Do not use special characters in the name field.
Type	Enter `procr-infc`.
COS	Enter the COS value.
Maintenance Extension	Enter an extension per local procedures.

Field	Definition
Physical Channel	Enter the interface link being used for this connection. The value `01` equals link 1.
COR	Enter the COR value.

Adding the processor interface channel - Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned to a CMS computer.

```
change communication-interface processor-channels         Page   1  of  4
             PROCESSOR CHANNEL ASSIGNMENT

Proc                 Interface              Remote
Chan    Appl.    Link  Chan  Priority  Proc Chan       Machine-ID
  1:
  2:
  3:
  4:
  5:
  6:
  7:
  8:
  9:
 10:    mis        1    1        h           1
```

Field	Definition
Processor Channel	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 10.
Appl	Enter `mis` for the call center application.
Interface Link	Enter the same physical channel number used from the Data Module form.
Interface Chan	Enter `1`.
Priority	Enter `h` for high priority.
Remote Proc Chan	Enter `1`.
Machine-ID	Leave blank.

Enabling the interface link - Use the Interface Links form to enable the processor interface link.

```
change communication-interface links
                         INTERFACE LINKS

  Link    Enable   Est    PI               Destination   DTE/
                   Conn   Ext    Prot      Digits   Brd  DCE   Identification
   1:       y       y     2005   BX25      eia            DTE     cms link
   2:
   3:
   4:
   5:
   6:
   7:
   8:

Link 1 [eia] - Connected to : DCE   Clocking : internal
```

Field	Definition
Link	Use the link number that corresponds to the Interface Link selected on the Processor Channel form.
Enable	Enter `y` to enable the link.
Est Conn	Enter `y` to establish the connection.
PI Ext	This displays the Processor Interface extension as defined in the Data Module form.
Prot	Enter `BX25` for the X.25 protocol.
Destination Digits	Enter `eia` for a direct connection using the IDI.
Destination Brd	Leave blank.
DTE/DCE	Enter `DTE`.
Identification	Enter an identifying name for this link.
Connected to	Enter `DCE`.
Clocking	Enter `internal`.

IDI connections, R7 and later

This section contains examples of the R7 and later administration forms used for IDI connections. Use the forms in the order shown.

Form	Purpose
add data-module	Adding processor interface data module and communications interface link attributes
change communication-interface processor-channels	Adding the processor interface channel
change data-module	Enabling the data link after adding the processor interface channel

Adding the processor interface data module and interface link - Use the Data Module form to administer the internal data module used by the Processor Interface and the communications interface link attributes.

```
add data-module 2005                                      Page   1  of  1
                             DATA MODULE

  Data Extension: 2005            Name:
            Type: procr-intf      COS: 1    Maintenance Extension: 2010
Physical Channel: 01              COR: 1        Destination Number: eia
             ITC: restricted       TN: 1     Establish Connection? y
            Link: 1          DTE/DCE: dte   Connected Data Module:
                         Enable Link? n
ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:



ASSIGNED MEMBER ( Station with a data extension button for this data module )

        Ext     Name (first 26 characters)
     1:
```

Field	Definition
Data Extension	The extension of the data module on the processor.
Type	Enter **procr-infc**.
Physical Channel	Enter the interface link being used for this connection. The value **01** equals link 1.

Field	Definition
Link	Enter the interface link being used for this connection. This must match the `Physical Channel` field value.
Name	Enter a name for the data module. Do not use special characters in the name field.
COS	Enter the COS value.
COR	Enter the COR value.
DTE/DCE	Enter `DTE`.
Enable Link	Enter `n` to disable the link. The link must be enabled after you have added the processor interface channel.
Maintenance Extension	Enter an extension per local procedures.
Destination Number	Enter `eia` for a direct connection using the IDI.
Establish Connection	Enter `y` to establish the connection.
Connected Data Module	Leave blank.
Connected to	Enter `DCE`.
Clocking	Enter `internal`.

Adding the processor interface channel - Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned to a CMS computer.

```
change communication-interface processor-channels              Page 1 of X
                         PROCESSOR CHANNEL ASSIGNMENT

Proc                    Gtwy    Interface     Destination        Session      Mach
Chan Enable  Appl.   To Mode Link/Chan      Node      Port    Local/Remote    ID
  1:
  2:
  3:
  4:
  5:
  6:
  7:
  8:
  9:
 10:  y     mis                 1    1                  0        1      1
```

Field	Definition
Processor Channel	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 10.
Appl	Enter **mis** for the Call Center application.
Interface Link	Enter the same Physical Channel number used from the Data Module form.
Interface Chan	Enter **1**.
Destination Port	Enter **0**.
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the remote and local port to 10.
Mach ID	Leave blank.

Enabling the processor interface link - Use the Data Module form to enable the processor interface link after you have added the processor interface channel.

```
change data-module 2005                                      Page   1  of  1
                            DATA MODULE

  Data Extension: 2005              Name:
            Type: procr-intf       COS: 1      Maintenance Extension: 2010
Physical Channel: 01               COR: 1          Destination Number: eia
             ITC: restricted        TN: 1       Establish Connection? y
            Link: 1            DTE/DCE: dte    Connected Data Module:
                          Enable Link? n
ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:



ASSIGNED MEMBER ( Station with a data extension button for this data module )

        Ext      Name (first 26 characters)
      1:
```

Field	Definition
Enable Link	Enter **y** to enable the link.

G3r or DEFINITY Server R

The Packet Gateway (TN577) board on the G3r or DEFINITY Server R has four interface links (01 to 04). One of these interface links must be assigned to a CMS computer.

The administration for an IDI connection differs for R6 and earlier, and R7 and later. Use the section that matches your software release.

This section includes the following topics:

- Restrictions on page 141
- IDI connections, R6 and earlier on page 141
- IDI connections, R7 and later on page 146

Restrictions

Though some IDI models operate at faster speeds, the recommended speed is 9600 bps.

IDI connections, R6 and earlier

This section contains examples of the R6 and earlier administration forms used for IDI connections. Use the forms in the order shown.

Form	Purpose
`add pgate`	Adding the Packet Gateway circuit pack (TN577)
`add data-module`	Adding the packet gateway X.25 data module
`change communication-interface processor-channels`	Adding the processor interface channel
`change communication-interface links`	Enabling the interface link

Adding the packet gateway circuit pack - Use the Packet Gateway Board form to add a packet gateway circuit pack (TN577). If the system already has a packet gateway circuit pack with an available port, this administration is not required.

```
add pgate 01C03                                        Page   1  of  1
                          PACKET GATEWAY BOARD


      Board Location: 01C03                          Name: cms link
         Application: X.25
  External cable type: rs232
   Port configuration: 1) rs232 2)rs232 3)rs232 4)rs232
```

Field	Definition
Board Location	Enter the equipment location of the Packet Gateway circuit pack (TN577).
Application	Enter **x.25**.
External cable type	Enter **rs232**.
Name	Enter an identifying name for this circuit pack.

Adding the packet gateway X.25 data module - Use the Data Module form to administer the internal X.25 data module used by the Packet Gateway circuit pack.

```
add data-module 2005                                   Page   1  of  2

DATA MODULE

  Data Extension: 2005            Name: cms link data module
          Type: x.25                     Remote Loop-Around Test? n
          Port: 01C0101        COR: 1
     Baud Rate: 9600             TN: 1
 Endpoint Type: adjunct     DTE/DCE: dte          Error Logging? n

   Permanent Virtual Circuit? y      Highest PVC Logical Channel: 64
    Switched Virtual Circuit? n
```

Field	Definition
Data Extension	The extension of the data module on the packet gateway.
Type	Enter **x.25**.
Port	Enter the equipment location of the packet gateway port used for the CMS connection.
Baud Rate	Enter **9600**.

Field	Definition
Name	Enter a name for the data module. Do not use special characters in the name field.
COR	Enter the COR value.
DTE/DCE	Enter **dte**.
Error Logging	Enter **y**.

```
add data-module 2005                                      Page   2  of  2
                              DATA MODULE

LAYER 2 PARAMETERS
              Number of Outstanding Frames (w): 7
                     Retry Attempt Counter (N2): 5
                                 Frame Size (N1): 135
       Retransmission (T1) Timer (1/10 seconds): 10
              Idle (T4) Timer (1/10 seconds): 30
LAYER 3 PARAMETERS
        Number of Outstanding Packets: 7
        Restart (T20) Timer (seconds): 8
          Reset (T22) Timer (seconds): 10
```

Field	Definition
Number of Outstanding Frames (w)	Enter **7**.
Retry Attempt Counter (N2)	Enter **5**.
Number of Outstanding Packets	Enter **7**.

Adding the processor channel - Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned to a CMS computer.

```
change communication-interface processor-channels        Page   1  of  8
              PROCESSOR CHANNEL ASSIGNMENT

Proc                      Interface    Local   Remote  Adjunct
Chan    Application    Link   Chan    Port    Port    Name      Machine-ID
 1:        mis          1      1       1       1
 2:
 3:
 4:
 5:
 6:
 7:
```

Field	Definition
Processor Channel	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 1.
Application	Enter `mis` for the call center application.
Interface Link	Enter the link number used on the Interface Links form.
Interface Chan	Enter `1`.
Local Port/Remote Port	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the remote and local port to 10.
Adjunct Name	Leave blank.
Machine-ID	Leave blank.

Enabling the interface link - Use the following form to enable the processor interface link.

```
change communication-interface links
                          INTERFACE LINKS
                X.25      Destination  Establish    Connected
Link  Enabled  Extension    Number     Connection  Data Module  Identification
  1:     y        2005      external                              cms link
  2:
  3:
  4:
  5:
  6:
  7:
  8:
  9:
 10:
 11:
 12:
 13:
 14:
 15:
 16:
```

Field	Definition
Link	Use the link number that corresponds to the Interface Link selected on the Processor Channel form.
Enabled	Enter `y` to enable the link.
X.25 Extension	Enter the extension number of the Packet Gateway data module port.
Destination Number	Enter `external`.
Identification	Enter an identifying name for this link.

IDI connections, R7 and later

This section contains examples of the R7 and later administration forms used for IDI connections. Use the forms in the order shown.

Form	Purpose
`add pgate`	Adding the Packet Gateway circuit pack (TN577)
`add data-module`	Adding the packet gateway X.25 data module and communication interface link attributes
`change communication-interface processor-channels`	Adding the processor interface channel
`change data-module`	Enabling the interface link after adding the processor channel

Adding the packet gateway circuit pack - Use the Packet Gateway Board form to add a packet gateway circuit pack (TN577). If the system already has a packet gateway circuit pack with an available port, this administration is not required.

```
add pgate 01C03                                      Page   1  of  1
                         PACKET GATEWAY BOARD

      Board Location: 01C03                        Name: cms link
         Application: X.25
 External cable type: rs232
  Port configuration: 1) rs232 2)rs232 3)rs232 4)rs232
```

Field	Definition
Board Location	Enter the equipment location of the Packet Gateway circuit pack (TN577).
Application	Enter **x.25**.
External cable type	Enter **rs232**.
Name	An identifying name for this circuit pack.

Adding the packet gateway X.25 data module and interface link - Use the Data
Module form to administer the internal X.25 data module used by the Packet Gateway
circuit pack, and the communication interface link attributes.

```
add data-module 2005                                          Page   1 of   2
                          DATA MODULE

 Data Extension: 2005               Name: map40-comlink
           Type: x.25                       Remote Loop-Around Test? n
           Port: 01C0301           COR: 1        Destination Number: external
      Baud Rate: 9600               TN: 1      Establish Connection? n
  Endpoint Type: adjunct       DTE/DCE: dte   Connected Data Module:
           Link: 1        Enable Link? n              Error Logging? y


    Permanent Virtual Circuit? y      Highest PVC Logical Channel: 64
      Switched Virtual Circuit? n
```

Field	Definition
Data Extension	The extension of the data module on the packet gateway.
Type	Enter **x.25**.
Port	Enter the equipment location of the packet gateway port used for the CMS connection.
Baud Rate	Enter **9600**.
Link	Enter the link number that corresponds to the Interface Link selected on the Processor Channel form.
Name	Enter a name for the data module. Do not use special characters in the name field.
COR	Use the COR value.
DTE/DCE	Enter **dte**.
Enable Link	Enter **n** to disable the link. The link must be enabled after you have added the processor channel.
Destination Number	Enter **external**.
Error Logging	Enter **y**.

```
add data-module 2005                                    Page   2  of  2
                            DATA MODULE


LAYER 2 PARAMETERS
            Number of Outstanding Frames (w): 7
                  Retry Attempt Counter (N2): 5
                             Frame Size (N1): 135
      Retransmission (T1) Timer (1/10 seconds): 10
            Idle (T4) Timer (1/10 seconds): 30
LAYER 3 PARAMETERS
       Number of Outstanding Packets: 7
       Restart (T20) Timer (seconds): 8
         Reset (T22) Timer (seconds): 10
```

Field	Definition
Number of Outstanding Frames (w)	Enter **7**.
Retry Attempt Counter (N2)	Enter **5**.
Number of Outstanding Packets	Enter **7**.

Adding the processor channel - Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned to a CMS computer.

```
change communication-interface processor-channels        Page 1 of X
                    PROCESSOR CHANNEL ASSIGNMENT

Proc              Gtwy    Interface      Destination        Session     Mach
Chan Enable  Appl. To Mode Link/Chan      Node     Port   Local/Remote   ID
  1:   y      mis            1    1                          1     1
  2:
  3:
  4:
```

Field	Definition
Processor Channel	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 1.
Enable	Enter **y** to enable the channel.
Appl	Enter **mis** for the call center application.
Interface Link	Enter the link number used on the X.25 Data Module form.
Interface Chan	Enter **1**.

Field	Definition
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the remote and local port to 10.
Mach ID	Leave blank.

Enabling the interface link - Use the Data Module form to enable the interface link after you have added the processor channel.

```
add data-module 2005                                       Page   1 of   2
                            DATA MODULE

 Data Extension: 2005              Name: map40-comlink
          Type: x.25                     Remote Loop-Around Test? n
          Port: 01C0301        COR: 1        Destination Number: external
     Baud Rate: 9600            TN: 1     Establish Connection? n
 Endpoint Type: adjunct     DTE/DCE: dte   Connected Data Module:
          Link: 1        Enable Link? y              Error Logging? y


   Permanent Virtual Circuit? y      Highest PVC Logical Channel: 64
    Switched Virtual Circuit? n
```

Field	Definition
Enable Link	Enter **y** to enable the link.

Administering a data module connection

Use the procedures in this section to administer a data module connection to the following switch types:

- G3si or DEFINITY Server SI on page 150
- G3r or DEFINITY Server R on page 160

> **Note:**
> Some CMS loads do not support the X.25 protocol. Contact the National Customer Care Center or consult with your product distributor or representative to verify if the X.25 protocol is supported on your system.

G3si or DEFINITY Server SI

When the distance from the switch to the CMS computer exceeds 200 feet, you must use a data module to interface from the Processor Interface on the switch to the CMS computer. The processor interface on the G3si or DEFINITY Server SI has eight interface links (01 to 08) available on a multi-carrier cabinet system and four interface links (01 to 04) available on a single-carrier cabinet system. One of these interface links must be assigned to a CMS computer.

The administration for a data module connection differs for R6 and earlier, and R7 and later. Use the section that matches your software release.

This section includes the following topics:

- Data module connections, R6 and earlier on page 151
- Data module connections, R7 and later on page 155

Data module connections, R6 and earlier

This section contains examples of the administration forms used for data module connections. Use the forms in the order shown.

Administration Form	Purpose
`add data-module`	Adding the processor interface data module and the CMS computer data module
`change communication-interface processor-channels`	Adding the processor interface channel
`change communication-interface links`	Enabling the interface link

Adding the processor interface data module - Use the Data Module form to administer the internal data module used by the Processor Interface.

```
add data-module 2005                                      Page   1  of  1
                              DATA MODULE

  Data Extension: 2005                    Name: cms link data module
            Type: procr-infc             COS: 1     Maintenance Extension:
Physical Channel: 01                      COR: 1
             ITC: restricted              TN:


ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:



ASSIGNED MEMBERS (Station with a data extension button for this data module)

        Ext     Name
       1:
```

Field	Definition
Data Extension	The extension of the data module on the processor.
Name	Enter a name for the data module. Do not use special characters in the name field.
Type	Enter `procr-infc`.
COS	Enter the COS value.

Field	Definition
Maintenance Extension	Enter an extension per local procedures.
Physical Channel	Enter the interface link being used for this connection. The value `01` equals link 1.
COR	Enter the COR value.

Adding the CMS computer data module - Use the Data Module form to administer the data module that connects to the CMS computer.

```
add data-module 2009                                   Page   1  of  1
                             DATA MODULE

  Data Extension: 2009              Name: cms comp data mod      BCC: 2
           Type: pdm               COS: 1    Remote Loop-Around Test? n
           Port: 01B0102           COR: 1      Secondary data module? n
            ITC: restricted         TN: 1               Connected to: dte

ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:


ASSIGNED MEMBERS (Station with a data extension button for this data module)

         Ext     Name
       1:
```

Field	Definition
Data Extension	The extension of the data module connected to the CMS computer.
Name	Enter a name for the data module. Do not use special characters in the name field.
Type	Enter `pdm`.
COS	Enter the COS value.
Port	Enter the port number of the digital interface circuit pack.
COR	Enter the COR value.
Connected to	Enter `dte`.

Adding the processor interface channel - Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned to a CMS computer.

```
change communication-interface processor-channels        Page   1  of  4
                 PROCESSOR CHANNEL ASSIGNMENT

Proc                   Interface              Remote
Chan    Appl.     Link  Chan  Priority  Proc Chan       Machine-ID
 1:
 2:
 3:
 4:
 5:
 6:
 7:
 8:
 9:
10:    mis        1    1        h           1
```

Field	Definition
Processor Channel	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 10.
Appl	Enter `mis` for the call center application.
Interface Link	Enter the same physical channel number used from the Data Module form.
Interface Chan	Enter `1`.
Priority	Enter `h` for high priority.
Remote Proc Chan	Enter `1`.
Machine-ID	Leave blank.

Enabling the interface link - Use the Interface Links form to enable the processor interface link.

```
change communication-interface links
                         INTERFACE LINKS

  Link    Enable   Est    PI                Destination    DTE/
                   Conn   Ext    Prot       Digits   Brd   DCE    Identification
   1:       y       y     2005   BX25       2009           DTE       cms link
   2:
   3:
   4:
   5:
   6:
   7:
   8:
```

Field	Definition
Link	Use the link number that corresponds to the Interface Link selected on the Processor Channel form.
Enable	Enter `y` to enable the link.
Est Conn	Enter `y` to establish the connection.
PI Ext	Enter the Processor Interface extension as defined in the Data Module form.
Prot	Enter `BX25` for the X.25 protocol.
Destination Digits	Enter the extension number of the data module connected to the CMS computer.
Destination Brd	Leave blank.
DTE/DCE	Enter `DTE`.
Identification	Enter an identifying name for this link.

Data module connections, R7 and later

This section contains examples of the R7 and later administration forms used for data module connections. Use the forms in the order shown.

Administration Form	Purpose
`add data-module`	Adding the processor interface data module and communications interface link attributes, and the CMS computer data module
`change communication-interface processor-channels`	Adding the processor interface channel
`change data-module`	Enabling the data link after adding the processor interface channel

Adding the processor interface data module and interface link - Use the Data Module form to administer the internal data module used by the Processor Interface and the communications interface link attributes.

```
add data-module 2005                                      Page   1 of   1
                            DATA MODULE

  Data Extension: 2005             Name: cms link data module
            Type: procr-intf      COS: 1     Maintenance Extension:
Physical Channel: 01              COR: 1         Destination Number: 2009
             ITC: restricted       TN: 1      Establish Connection? y
            Link: 1           DTE/DCE: dte    Connected Data Module:
                        Enable Link? n
ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:



ASSIGNED MEMBER ( Station with a data extension button for this data module )

        Ext      Name (first 26 characters)
      1:
```

Field	Definition
Data Extension	The extension of the data module on the processor.
Type	Enter `procr-infc`.

Field	Definition
Physical Channel	Enter the interface link being used for this connection. The value `01` equals link 1.
Link	Enter the interface link being used for this connection. This must match the `Physical Channel` field value.
Name	Enter a name for the data module. Do not use special characters in the name field.
COS	Enter the COS value.
COR	Enter the COR value.
DTE/DCE	Enter `DTE`.
Enable Link	Enter `n` to disable the link. The link must be enabled after you have added the processor interface channel.
Maintenance Extension	Enter an extension per local procedures.
Destination Number	Enter the extension number of the CMS computer data module.
Establish Connection	Enter `y` to establish the connection.

Adding the CMS computer data module - Use the Data Module form to administer the data module that connects to the CMS computer.

```
add data-module 2009                                      Page   1  of  1
                              DATA MODULE

 Data Extension: 2009                  Name: cms comp data mod      BCC: 2
            Type: pdm                   COS: 1    Remote Loop-Around Test? n
            Port: 01B0102               COR: 1       Secondary data module? n
             ITC: restricted             TN: 1                 Connected to: dte

ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:


ASSIGNED MEMBERS (Station with a data extension button for this data module)

        Ext     Name
       1:
```

Field	Definition
Data Extension	The extension of the data module connected to the CMS computer.
Type	Enter **pdm**.
Port	Enter the port number of the digital interface circuit pack.
Name	Enter a name for the data module. Do not use special characters in the name field.
COS	Enter the COS value.
COR	Enter the COR value.
Connected to	Enter **dte**.

Adding the processor interface channel - Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned to a CMS computer.

```
change communication-interface processor-channels              Page 1 of X
                      PROCESSOR CHANNEL ASSIGNMENT

Proc                  Gtwy     Interface      Destination        Session      Mach
Chan Enable  Appl.  To Mode Link/Chan       Node      Port    Local/Remote   ID
  1:
  2:
  3:
  4:
  5:
  6:
  7:
  8:
  9:
 10:  y      mis             1     1                    0          1      1
```

Field	Definition
Processor Channel	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 10.
Appl	Enter **mis** for the call center application.
Interface Link	Enter the same physical channel number used from the Data Module form.
Interface Chan	Enter **1**.
Destination Port	Enter **0**.
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the remote and local port to 10.
Mach ID	Leave blank.

Enabling the processor interface link - Use the Data Module form to enable the processor interface link after you have added the processor interface channel.

```
change data-module 2005                                  Page   1  of  1
                              DATA MODULE

  Data Extension: 2005                  Name: cms link data module
           Type: procr-infc            COS: 1     Maintenance Extension:
Physical Channel: 01                   COR: 1         Destination Number: 2009
            ITC: restricted             TN:         Establish Connection? y
           Link: 1                  DTE/DCE: DTE    Connected Data Module:
                              Enable Link? y


ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:


ASSIGNED MEMBERS (Station with a data extension button for this data module)

         Ext     Name
        1:
```

Field	Definition
Enable Link	Enter **y** to enable the link.

G3r or DEFINITY Server R

When the distance from the switch to the CMS computer exceeds 200 feet, you must use a data module to interface from the switch to the CMS computer. The Packet Gateway (TN577) board on the switch has four interface links (01 to 04). One of these interface links must be assigned to a CMS computer.

The administration for a data module connection differs for R6 and earlier, and R7 and later. Use the section that matches your software release.

This section includes the following topics:

- Data module connections, R6 and earlier on page 160
- Data module connections, R7 and later on page 168

Data module connections, R6 and earlier

This section contains examples of the R6 and earlier administration forms used for data module connections. Use the forms in the order shown.

Form	Purpose
`add pgate`	Adding the Packet Gateway circuit pack (TN577)
`add data-module`	Adding the packet gateway X.25 data module, the packet gateway EIA data module, and the CMS computer data module
`change communication-interface processor-channels`	Adding the processor interface channel
`change communication-interface links`	Enabling the interface link
`add administered-connection`	Setting up an administered connection between the packet gateway data module and the CMS computer data module

Adding the packet gateway circuit pack - Use the Packet Gateway Board form to add a packet gateway circuit pack (TN577). If the system already has an available packet gateway circuit pack, this administration is not required.

```
add pgate 01C03                                       Page   1  of  1
                          PACKET GATEWAY BOARD

       Board Location: 01C03                        Name: cms link
          Application: X.25
   External cable type: rs232
    Port configuration: 1) rs232 2)rs232 3)rs232 4)rs232
```

Field	Definition
Board Location	Enter the equipment location of the Packet Gateway circuit pack (TN577).
Application	Enter **x.25**.
External cable type	Enter **rs232**.
Name	An identifying name for this circuit pack.

Adding the packet gateway X.25 data module - Use the Data Module form to administer the internal data module used by the packet gateway port.

```
add data-module 2005                                   Page   1  of  2
                          DATA MODULE

Data Extension: 2005                   Name: cms link data module
        Type: x.25                           Remote Loop-Around Test? n
        Port: 01C0301            COR: 1
   Baud Rate: 9600                TN: 1
 Endpoint Type: adjunct       DTE/DTC: dte           Error Logging? y




   Permanent Virtual Circuit? y          Highest PVC Logical Channel: 64
    Switched Virtual Circuit? n
```

Field	Definition
Data Extension	The extension of the data module on the packet gateway.
Name	Enter a name for the data module. Do not use special characters in the name field.
Type	Enter **x.25**.

Field	Definition
Port	Enter the equipment location of the packet gateway port used for the CMS connection.
COR	Enter the COR value.
Baud Rate	Enter **9600**.
DTE/DCE	Enter **dte**.
Error Logging	Enter **y**.

```
add data-module 2005                                        Page   2  of  2
                                DATA MODULE

LAYER 2 PARAMETERS
            Number of Outstanding Frames (w): 7
                  Retry Attempt Counter (N2): 5
                             Frame Size (N1): 135
      Retransmission (T1) Timer (1/10 seconds): 10
               Idle (T4) Timer (1/10 seconds): 30
LAYER 3 PARAMETERS
      Number of Outstanding Packets: 7
      Restart (T20) Timer (seconds): 8
        Reset (T22) Timer (seconds): 10
```

Field	Definition
Number of Outstanding Frames (w)	Enter **7**.
Retry Attempt Counter (N2)	Enter **5**.
Number of Outstanding Packets	Enter **7**.

Adding the packet gateway EIA data module - Use the Data Module form to administer the data module used by the packet gateway port to connect to the CMS computer.

```
add data-module 2007                                      Page   1  of  1
                            DATA MODULE

  Data Extension: 2007                Name: eia data module        BCC: 2
            Type: pdm                 COS: 1    Remote Loop-Around Test? n
            Port: 01B0104             COR: 1       Secondary data module? n
             ITC: restricted          TN: 1                Connected to: dte

ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:


ASSIGNED MEMBERS (Station with a data extension button for this data module)

         Ext     Name
       1:
```

Field	Definition
Data Extension	The extension of the data module connected to the packet gateway EIA port.
Name	Enter a name for the data module. Do not use special characters in the name field.
Type	Enter **pdm**.
COS	Enter the COS value.
Port	Enter the port number of the digital interface circuit pack.
COR	Enter the COR value.
Connected to	Enter **dte**.

Adding the CMS computer data module - Use the Data Module form to administer the data module used by the CMS computer.

```
add data-module 2009                                      Page   1  of  1
                              DATA MODULE

  Data Extension: 2009                  Name: cms comp data mod      BCC: 2
            Type: pdm                    COS: 1    Remote Loop-Around Test? n
            Port: 01B0102                COR: 1      Secondary data module? n
             ITC: restricted             TN: 1               Connected to: dte


ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:


ASSIGNED MEMBERS (Station with a data extension button for this data module)

         Ext     Name
        1:
```

Field	Definition
Data Extension	The extension of the data module connected to the CMS computer.
Name	Enter a name for the data module. Do not use special characters in the name field.
Type	Enter `pdm`.
COS	Enter the COS value.
Port	Enter the port number of the digital interface circuit pack.
COR	Enter the COR value.

Adding the processor channel - Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned to a CMS computer.

```
change communication-interface processor-channels        Page  1  of  8
              PROCESSOR CHANNEL ASSIGNMENT

Proc                         Interface    Local   Remote  Adjunct
Chan    Application     Link   Chan    Port    Port    Name        Machine-ID
 1:        mis           1      1       1       1
 2:
 3:
 4:
 5:
 6:
 7:
```

Field	Definition
Processor Channel	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 1.
Application	Enter **mis** for the call center application.
Interface Link	Enter the link number used on the Interface Links form.
Interface Chan	Enter **1**.
Local Port/ Remote Port	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the remote and local port to 10.
Adjunct Name	Leave blank.
Machine-ID	Leave blank.

Enabling the interface link - Use the Interface Links form to enable the processor interface link.

```
change communication-interface links
                           INTERFACE LINKS
                  X.25      Destination  Establish   Connected
Link   Enabled  Extension     Number    Connection  Data Module  Identification
  1:      y        2005      external                                cms link
  2:
  3:
  4:
  5:
  6:
  7:
  8:
  9:
 10:
 11:
 12:
 13:
 14:
 15:
 16:
```

Field	Definition
Link	Use the link number that corresponds to the Interface Link selected on the Processor Channel form.
Enabled	Enter **y** to enable the link.
X.25 Extension	Enter the extension number of the Packet Gateway data module port.
Destination Number	Enter **external**.
Identification	Enter an identifying name for this link.

Setting up an administered connection - Use the Administered Connections form to set up the permanent connection between the packet gateway EIA data module and the CMS computer data module.

```
add administered-connection 1                           Page  1  of  1
                          ADMINISTERED CONNECTION

              Connection Number: 1                              Enable? y
                     Originator: 2007
                    Destination: 2009
                           Name:

AUTHORIZED TIME OF DAY
                    Continuous? y




MISENTRYANEOUS PARAMETERS
                     Alarm Type: warning              Alarm Threshold: 5
                                                       Retry Interval: 2
                       Priority: 5                   Auto Restoration? y
```

Field	Definition
Connection Number	Enter the connection number.
Enable	Enter `y` to enable the administered connection.
Originator	Enter the extension number of the Packet Gateway EIA data module.
Destination	Enter the extension number of the CMS computer data module.
Continuous	Enter `y` so that the administered connection is active at all times.

Data module connections, R7 and later

This section contains examples of the R7 and later administration forms used for data module connections. Use the forms in the order shown.

Form	Purpose
`add pgate`	Adding the Packet Gateway circuit pack (TN577)
`add data-module`	Adding the packet gateway X.25 data module and communication interface link attributes, the packet gateway EIA data module, and the CMS computer data module
`change communication-interface processor-channels`	Adding the processor channel
`add administered-connection`	Setting up an administered connection between the packet gateway data module and the CMS computer data module
`change data-module`	Enabling the interface link after adding the processor channel

Adding the packet gateway circuit pack - Use the Packet Gateway Board form to add a packet gateway circuit pack (TN577). If the system already has an available packet gateway circuit pack, this administration is not required.

```
add pgate 01C03                                          Page   1  of  1
                           PACKET GATEWAY BOARD


       Board Location: 01C03                        Name: cms link
          Application: X.25
  External cable type: rs232
   Port configuration: 1) rs232 2)rs232 3)rs232 4)rs232
```

Field	Definition
Board Location	Enter the equipment location of the Packet Gateway circuit pack (TN577).
Application	Enter `x.25`.
External cable type	Enter `rs232`.
Name	An identifying name for this circuit pack.

Adding the packet gateway X.25 data module and interface link - Use the Data
Module form to administer the internal X.25 data module used by the Packet Gateway
circuit pack, and the communication interface link attributes.

```
add data-module 2005                                          Page   1 of   2
                            DATA MODULE

 Data Extension: 2005               Name: map40-comlink
           Type: x.25                       Remote Loop-Around Test? n
           Port: 01C0301           COR: 1        Destination Number: external
      Baud Rate: 9600               TN: 1      Establish Connection? n
  Endpoint Type: adjunct      DTE/DCE: dte   Connected Data Module:
           Link: 1        Enable Link? n              Error Logging? y


    Permanent Virtual Circuit? y      Highest PVC Logical Channel: 64
      Switched Virtual Circuit? n
```

Field	Definition
Data Extension	The extension of the data module on the packet gateway.
Type	Enter **x.25**.
Port	Enter the equipment location of the packet gateway port used for the CMS connection.
Baud Rate	Enter **9600**.
Link	Enter the link number that corresponds to the Interface Link selected on the Processor Channel form.
Name	Enter a name for the data module. Do not use special characters in the name field.
COR	Use the COR value.
DTE/DCE	Enter **dte**.
Enable Link	Enter **n** to disable the link. The link must be enabled after you have added the processor channel.
Destination Number	Enter **external**.
Error Logging	Enter **y**.

```
add data-module 2005                                    Page   2  of  2
                              DATA MODULE

LAYER 2 PARAMETERS
              Number of Outstanding Frames (w): 7
                     Retry Attempt Counter (N2): 5
                               Frame Size (N1): 135
       Retransmission (T1) Timer (1/10 seconds): 10
               Idle (T4) Timer (1/10 seconds): 30
LAYER 3 PARAMETERS
         Number of Outstanding Packets: 7
         Restart (T20) Timer (seconds): 8
           Reset (T22) Timer (seconds): 10
```

Field	Definition
Number of Outstanding Frames (w)	Enter **7**.
Retry Attempt Counter (N2)	Enter **5**.
Number of Outstanding Packets	Enter **7**.

Adding the packet gateway EIA data module - Use the Data Module form to administer the data module used by the packet gateway port to connect to the CMS computer.

```
add data-module 2007                                      Page   1 of   1
                             DATA MODULE

  Data Extension: 2007          Name:                              BCC: 2
           Type: pdm            COS: 1      Remote Loop-Around Test? n
           Port: 01B0104        COR: 1         Secondary data module? n
            ITC: restricted      TN: 1                 Connected To: dte


ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:



ASSIGNED MEMBER ( Station with a data extension button for this data module )

         Ext     Name (first 26 characters)
       1:
```

Field	Definition
Data Extension	The extension of the data module connected to the packet gateway EIA port.
Type	Enter **pdm**.
Port	Enter the port number of the digital interface circuit pack.
Name	Enter a name for the data module. Do not use special characters in the name field.
COS	Enter the COS value.
COR	Enter the COR value.

Adding the CMS computer data module - Use the Data Module form to administer the data module used by the CMS computer.

```
add data-module 2009                                          Page   1 of   1
                              DATA MODULE

  Data Extension: 2009              Name:                              BCC: 2
            Type: pdm              COS: 1        Remote Loop-Around Test? n
            Port: 01B0102          COR: 1          Secondary data module? n
             ITC: restricted        TN: 1                   Connected To: dte



ABBREVIATED DIALING
  List1:

SPECIAL DIALING OPTION:



ASSIGNED MEMBER ( Station with a data extension button for this data module )

        Ext      Name (first 26 characters)
      1:
```

Field	Definition
Data Extension	The extension of the data module connected to the CMS computer.
Type	Enter **pdm**.
Port	Enter the port number of the digital interface circuit pack.
Name	Enter a name for the data module. Do not use special characters in the name field.
COS	Enter the COS value.
COR	Enter the COR value.

Adding the processor channel - Use the Processor Channel form to assign one of the 64 local processor channels from the processor link to one of the 64 interface channels assigned to one interface link (1 to 4). Only one interface link is assigned to a CMS computer.

```
change communication-interface processor-channels              Page 1 of X
                       PROCESSOR CHANNEL ASSIGNMENT

Proc                  Gtwy    Interface      Destination        Session     Mach
Chan Enable  Appl.  To Mode Link/Chan      Node      Port    Local/Remote   ID
  1:    y     mis                1    1                          1     1
  2:
  3:
  4:
```

Field	Definition
Processor Channel	Select a processor channel for this link. The standard CMS provisioning procedure is to use channel 1.
Enable	Enter **y** to enable the channel.
Appl	Enter **mis** for the call center application.
Interface Link	Enter the link number used on the X.25 Data Module form.
Interface Chan	Enter **1**.
Session Local/ Session Remote	The local and remote port assignments must be symmetrical between the switch and the CMS. The standard CMS provisioning procedure is to set the local and remote port assignments equal to the switch processor channel used for this link. For example, if you use processor channel 10, set the remote and local port to 10.
Mach ID	Leave blank.

Enabling the interface link - Use the Data Module form to enable the interface link after you have added the processor channel.

```
change data-module 2005                                      Page   1 of   2
                           DATA MODULE

  Data Extension: 2005              Name: map40-comlink
           Type: x.25                      Remote Loop-Around Test? n
           Port: 01C0301            COR: 1        Destination Number: external
      Baud Rate: 9600               TN: 1       Establish Connection? n
  Endpoint Type: adjunct        DTE/DCE: dte   Connected Data Module:
           Link: 1          Enable Link? y                Error Logging? y



    Permanent Virtual Circuit? y      Highest PVC Logical Channel: 64
     Switched Virtual Circuit? n
```

Field	Definition
Enable Link	Enter **y** to enable the link.

Setting Up an administered connection - Use the Administered Connections form to set up the permanent connection between the packet gateway EIA data module and the CMS computer data module.

```
add administered-connection 1                              Page   1 of   1
                         ADMINISTERED CONNECTION

    Connection Number: 1                              Enable? y
          Originator: 2007
         Destination: 2009
                Name: cms link

AUTHORIZED TIME OF DAY

          Continuous? y




MISCELLANEOUS PARAMETERS

            Alarm Type: warning              Alarm Threshold: 5
                                              Retry Interval: 2
              Priority: 5                    Auto Restoration? n
```

Field	Definition
Connection Number	Enter the connection number.
Enable	Enter **y** to enable the administered connection.
Originator	Enter the extension number of the Packet Gateway EIA data module.
Destination	Enter the extension number of the CMS computer data module.
Name	Enter a name for the administered connection.
Continuous	Enter **y** so that the administered connection is active at all times.

■ ■ ■ ■ ■ ■

Appendix D: Troubleshooting an X.25 switch connection

This section provides procedures for troubleshooting X.25 switch connections.

This section includes the following topics:

Troubleshooting HSI cards

This section includes the following topics:

Testing an HSI card

Each HSI card provides a break-out for four separate 37-pin RS-449 connections. A CMS computer supports up to eight physical switches connected to two HSI cards (ports 0-7).

To test an individual port on an HSI card for problems:

1. Log in as root.

2. Stop the X.25 daemons with the following command:

   /etc/init.d/x25.control stop

3. Remove the cable from the port to be tested and attach the loopback plug that was shipped with the HSI card.

4. Run the following two loopback tests:

   ● Internal loopback test

- Loopback test using the loopback plug.

  These tests send approximately 100 packets each. No transmission errors should be reported.

5. To run an internal loopback test on a computer that has an HSI/P card, enter the following command:

   /opt/SUNWconn/bin/hihp_loop -t 1 hih0

   To run an internal loopback test on a computer that has an HSI/S card, enter the following command:

   /opt/SUNWconn/bin/hsi_loop -t 1 hih0

   The system displays a message similar to the following:

   ```
   hih0: [Using /dev/hiho0]
   hih0: speed=9600, loopback=yes, nrzi=no, txc=baud, rxc=rxc
      .
      .
      .
   Port CRC errors Aborts Overruns Underruns   In <-Drops-> Out
   hih0:    0     0     0     0     0     0
   #
   ```

6. To run a loopback test using the loopback plug on a computer that has an HSI/P card, enter the following command:

   /opt/SUNWconn/bin/hihp_loop -t 2 hih0

   To run a loopback test using the loopback plug on a computer that has an HSI/S card, enter the following command:

   /opt/SUNWconn/bin/hsi_loop -t 2 hih0

   The system displays a message similar to the following:

   ```
   hih0: [Using /dev/hiho0]
   hih0: speed=9600, loopback=yes, nrzi=no, txc=baud, rxc=rxc
      .
      .
      .
   Port CRC errors Aborts Overruns Underruns   In <-Drops-> Out
   hih0:    0     0     0     0     0     0
   #
   ```

7. If the loopback tests fail, you should suspect HSI hardware problems. Prior to replacing the HSI card:

   a. Verify that the loopback plug is in the correct HSI port.

   b. Check the cabling to the HSI break-out module.

8. Remove the loopback plug.

9. Reconnect the link.

10. Restart X.25 after completing this test (see).

If you determine that the HSI card is defective and must be replaced, see the instructions in the hardware installation, maintenance, and troubleshooting document for your CMS computer.

Removing and reinstalling the HSI software and patches

Sometimes when a new HSI card is installed or an existing HSI card is moved to a new location, the system will fail to recognize the new or relocated card. This can happen after adding a second HSI card to support additional ACDs. You can tell if the card is not recognized when the `show-devs` command (run from the open boot prompt) does not show the HSI card and when `/var/adm/messages` fails to recognize the card upon boot up even after booting with `boot -r`. If this happens, try running the following command:

    /cms/toolsbin/lnSBusdev

If this does not cause the HSI card to be recognized, you must do the following:

● Back out the HSI patch

● Remove the HSI software

● Reinstall the HSI software

● Reinstall all of the Solaris patches, which includes the HSI patch.

> ⚠ **CAUTION:**
> These procedures should only be done if you are going to reinstall the patch and the software. The system will not operate correctly without the HSI software and patch installed.

This procedure is different for computers that have HSI/P and HSI/S cards.

This section includes the following topics:

●

●

Computers with HSI/P cards

Note that the procedures in this section may differ slightly depending on the CMS release and different models of the hardware. See your CMS software installation, maintenance, and troubleshooting document for more information.

Backing out (removing) the HSI/P patch

To back out or remove the current HSI/P patch (or patches):

1. Display the list of HSI patches by entering the following command:

   `showrev -p │ grep hsi`

   The system displays the patches associated with the HSI/P package. Some recent HSI/P patches are 106295-01 and 106922.04. If there are no HSI/P patches installed, continue with Removing the HSI/P software on page 180.

2. Go to the patch directory at **`/var/sadm/patch/xxxxxx-xx`** and read the **`README.xxxxxx-xx`** file. Use the actual patch number displayed in Step 1.

3. Verify that you are logged in as root.

4. Back out the current patches by entering the following command (using the actual patch number):

   `/var/sadm/patch/xxxxxx-xx/backoutpatch xxxxxx-xx`

Removing the HSI/P software

To remove the HSI/P software:

1. Enter:

   `pkgrm SUNWhsip`

   The system displays a message similar to the following:

   ```
   The following package is currently installed:
      SUNWhsip        HSI/P Driver/Utilities for PCI Bus
                      (sparc) 1.0

   Do you want to remove this package?
   ```

2. Enter: **`y`**

   The system displays the following message:

   ```
   ## Removing installed package instance <SUNWhsip>

   This package contains scripts which will be executed with
   super-user permission during the process of removing this
   package.

   Do you want to continue with the removal of this package [y,n,?,q]
   ```

3. Enter: **y**

The system displays the following message:

```
## Verifying package dependencies.
## Processing package information.
    .
    .
    .
## Updating system information.
Removal of <SUNWhsip> was successful.
```

Reinstalling the HSI/P software

To reinstall the HSI/P software:

1. Load the SunHSI/P Adapter CD-ROM into the CD-ROM drive.

2. After about 15 seconds, enter **mount** to verify the name of the CD-ROM. The program responds with a list of devices and file systems currently mounted. The last line should display the installed CD-ROM as shown below:

```
     .
     .
     .
/cdrom/sunhsip_1_0 on /vol/dev/dsk/c0t2d0/sunhsip_1_0 read only on
Fri Jun  5 14:11:42 1998
```

3. Enter:

/usr/sbin/pkgadd -d /cdrom/cdrom0/Product SUNWhsip

The system displays the following message:

```
Processing package instance <SUNWhsip> from </cdrom/sunhsip_1_0/Product>

HSI/P Driver/Utilities for PCI Bus
(sparc) 1.0
SunHSI/P 1.0
   .
   .
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <SUNWhsip> [y,n,?] y
```

4. Enter: `y`

   The system displays the following message:

```
Installing HSI/P Driver/Utilities for PCI Bus as <SUNWhsip>

## Installing part 1 of 1.
/opt/SUNWconn/hsip/drv/HSIP
   .
   .

## Executing postinstall script.

Adding entries to /etc/devlink.tab
   .
   .
   .
Installation of <SUNWhsip> was successful.
#
```

5. Enter:

   eject cdrom

6. Remove the CD-ROM from the disk tray, place the CD-ROM back in its case, and close the CD-ROM tray.

Reinstalling the HSI/P patch

To reinstall the HSI/P patch, you must reinstall all of the *Solaris* patches. This should not take as long as when the patches were first installed, because the system recognizes when a patch is already installed and skips that patch.

To reinstall the patches:

1. Load the "Avaya CMS" CD-ROM into the CD-ROM drive.

2. After about 15 seconds, enter **mount** to verify the name of the CD-ROM. The program responds with a list of devices and file systems currently mounted. The last line should display the installed CD-ROM as shown below:

```
  ...
  ...
/cdrom/cms on /vol/dev/dsk/c0t2d0/cms read only on
Mon Jan 19 12:36:55 1998
```

3. Enter:

/usr/sbin/pkgadd -d /cdrom/cdrom0 spatches

The system displays the following message:

```
Processing package instance <spatches> from </cdrom/cms>

CMS Supplied Solaris Patches
(sparc) 1.0

## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <spatches> [y,n,?]
```

4. Enter: **y**

The system displays the following message:

```
Installing CMS Supplied Solaris Patches as <spatches>

## Installing part 1 of 1.
101130-12 is not needed
Spooling 103461-18
Spooling 103566-24
. . .
. . .
Installation of <spatches> was successful.
#
```

5. Enter:

/tmp/patches/install_patches | tee -a /var/sadm/spatch.log

The system displays the following message:

```
Checking installed packages and patches...
Generating list of files to be patched...
Verifying sufficient filesystem capacity (exhaustive method)...
Installing patch packages...

Patch number 103461-18 has been successfully installed.
See /var/sadm/patch/103461-18/log for details

Patch packages installed:
  SUNWmfrun
   .
   .
```

The program generates various lists of files to be patched. This can take from 30 minutes to several hours to process, depending on the number of patches and the CMS computer. When it finishes, the program displays the system prompt.

6. Reboot the system by entering the following:

/usr/sbin/shutdown -y -i6 -g0

7. Log in as root. The Sun Solaris patches have been successfully installed and the system kernel has been rebuilt.

Computers with HSI/S cards

Note that the procedures in this section may differ slightly depending on the CMS release and different models of the hardware. See your CMS software installation, maintenance, and troubleshooting document for more information.

Backing out (removing) the HSI/S patch

To back out or remove the current HSI/S patches:

1. Display the list of HSI patches by entering the following command:

showrev -p | grep hsi

The system displays the patches associated with the HSI/S package. One recent HSI/S patch is 101130-12. If there are no HSI/S patches installed, continue with

2. Go to the patch directory at **/var/sadm/patch/xxxxxx-xx** and read the **README.xxxxxx-xx** file. Use the actual patch number displayed in Step 1.

3. Verify that you are logged in as root.

4. Back out the current patches by entering the following command (using the actual patch number):

/var/sadm/patch/*xxxxxx-xx*/backoutpatch *xxxxxx-xx*

Removing the HSI/S software

To remove the HSI/S software:

1. Enter:

pkgrm SUNWhsis

The system displays a message similar to the following:

```
The following package is currently installed:
   SUNWhsis        HSI/S Driver/Utilities 2.0 v1.6
                   (sparc) 2.0

Do you want to remove this package?
```

2. Enter: **y**

The system displays the following message:

```
## Removing installed package instance <SUNWhsis>

This package contains scripts which will be executed with
super-user permission during the process of removing this
package.

Do you want to continue with the removal of this package [y,n,?,q]
```

3. Enter: **y**

The system displays the following message:

```
## Verifying package dependencies.
## Processing package information.
   .
   .
## Updating system information.
Removal of <SUNWhsis> was successful.
```

Reinstalling the HSI/S software

To reinstall the HSI/S software:

1. Load the SunLink HSI/S CD-ROM into the CD-ROM drive.

2. After about 15 seconds, enter `mount` to verify the name of the CD-ROM. The program responds with a list of devices and file systems currently mounted. The last line should display the installed CD-ROM as shown below:

```
     .
     .
     .
/cdrom/unnamed_cdrom on /vol/dev/dsk/c0t2d0/unnamed_cdrom read only
on Wed Jan 21 11:08:05 1998
```

3. Enter:

   `/usr/sbin/pkgadd -d /cdrom/cdrom0 SUNWhsis`

   The system displays the following message:

```
Processing package instance <SUNWhsis> from </cdrom/unnamed_cdrom>

HSI/S Driver/Utilities 2.0 v1.6
(sparc) 2.0
    Copyright 1993 Sun Microsystems, Inc. All Rights Reserved.
      . . .
      . . .
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with
super-user permission during the process of installing this package.

Do you want to continue with the installation of <SUNWhsis> [y,n,?]
```

4. Enter: **`y`**

   The system displays the following message:

```
Installing HSI/S Driver/Utilities 2.0 v1.6 as <SUNWhsis>
## Installing part 1 of 1.
/opt/SUNWconn/hsis/drv/HSI
    .
    .
NOTE: HSI driver will be loaded when it is referenced

Installation of <SUNWhsis> was successful.
#
```

5. Enter:

```
eject cdrom
```

6. Remove the CD-ROM from the disk tray and place the CD-ROM back in its case.

Reinstalling the HSI/S patch

To reinstall the HSI/S patches, you must reinstall all of the Solaris patches. This should not take as long as when the patches were first installed, because the system recognizes when a patch is already installed and skips that patch.

To reinstall the patches:

1. Load the "Avaya CMS" CD-ROM into the CD-ROM drive.

2. After about 15 seconds, enter **mount** to verify the name of the CD-ROM. The program responds with a list of devices and file systems currently mounted. The last line should display the installed CD-ROM as shown below:

```
  ...
  ...
/cdrom/cms on /vol/dev/dsk/c0t2d0/cms read only on
Mon Jan 19 12:36:55 1998
```

3. Begin the installation by entering the following:

```
/usr/sbin/pkgadd -d /cdrom/cdrom0 spatches
```

The system displays the following message:

```
Processing package instance <spatches> from </cdrom/cms>

CMS Supplied Solaris Patches
(sparc) 1.0

## Processing package information.
## Processing system information.
## Verifying disk space requirements.
## Checking for conflicts with packages already installed.
## Checking for setuid/setgid programs.

This package contains scripts which will be executed with super-user
permission during the process of installing this package.

Do you want to continue with the installation of <spatches> [y,n,?]
```

4. Enter: **y**

   The system displays the following message:

   ```
   Installing CMS Supplied Solaris Patches as <spatches>

   ## Installing part 1 of 1.
   101130-12 is not needed
   Spooling 103461-18
   Spooling 103566-24
   . . .
   . . .
   Installation of <spatches> was successful.
   #
   ```

5. Enter:

   /tmp/patches/install_patches | tee -a /var/sadm/spatch.log

   The system displays the following message:

   ```
   Checking installed packages and patches...
   Generating list of files to be patched...
   Verifying sufficient filesystem capacity (exhaustive method)...
   Installing patch packages...

   Patch number 103461-18 has been successfully installed.
   See /var/sadm/patch/103461-18/log for details

   Patch packages installed:
     SUNWmfrun
       .
       .
   ```

   The program generates various lists of files to be patched. This can take from 30 minutes to several hours to process, depending on the number of patches and the CMS computer. When it finishes, the program displays the system prompt.

6. Reboot the system by entering the following:

   /usr/sbin/shutdown -y -i6 -g0

7. Log in as root. The Sun Solaris patches have been successfully installed and the system kernel has been rebuilt.

Troubleshooting an X.25 link

This section describes procedures used to troubleshoot an X.25 link problem. The information in this section includes the following:

- Checking the processor gateway circuit pack vintage on page 189
- Checking the status of LAPB on page 190
- Monitoring LAPB and X.25 protocol on page 191
- Stopping and starting individual links on page 191
- Stopping and starting X.25 on page 193
- Checking the RS-232 to RS-422 interface converter on page 194
- Checking switch administration on page 197
- Checking cabling on page 197

Checking the processor gateway circuit pack vintage

On G3r or DEFINITY Server R, check the vintage of the TN577 PGATE circuit pack. If the vintage is not V16 or later, replace the circuit pack.

Checking the status of LAPB

The first item to check for troubleshooting link problems is the status of LAPB for the link in question.

To check if LAPB (layer 2 of the X.25 Protocol) is up:

1. Examine the `/var/adm/messages` files or the system console for the last message about the link. The system displays one of the following messages:

   Message 1: `LAPB Up on link x`

   Diagnosis: LAPB is up for the link indicated.

   Message 2: `LAPB Down on link x`

   Diagnosis: LAPB is down for the link/port indicated.

   Message 3: `hihx: xmit hung`

   Diagnosis: LAPB is down for the link/port indicated.

2. If LAPB is not up, answer the following questions:

   - Has X.25 been started without errors?

   - Is the switch administration correct?

   - Is the cabling correct?

   - Is the Interface Converter operating correctly?

   - Is the HSI card operational?

3. If LAPB is up, answer the following questions:

   - Has data collection been turned on?

   - Is the switch administration correct?

   - Does the error log contain any link-related messages?

   - Does the `spi.err` file contain messages about mismatched administration?

Monitoring LAPB and X.25 protocol

To monitor LAPB and the X.25 protocol:

1. To monitor the LAPB (level 2) or the X.25 (level 3) protocol for any given link, enter the following command:

   `/opt/SUNWconn/x25/bin/x25trace`

   In many situations this command can be used in place of a line monitor.

2. To monitor the LAPB protocol for link 0, enter the following command:

   `/opt/SUNWconn/x25/bin/x25trace -i /dev/lapb -l 0 lapb`

3. To monitor the X.25 protocol for link 0, enter the following command:

   `/opt/SUNWconn/x25/bin/x25trace -i /dev/x25 -l 0 lapb`

If the link will not come up:

- Examine the `/usr/elog/elog` file for messages.
- Verify that CMS data collection is on, and examine the `spi.err` file for messages.
- Examine link and MIS status on the switch.

Stopping and starting individual links

The `linkstop` command is used to "stop" a link. The link will not respond to any LAPB messages until the link is restarted with the `linkreset` or the `linkstart` command. To stop a link enter the following command:

   `/opt/SUNWconn/x25/bin/linkstop <linkid>`

where the `<linkid>` is defined as follows:

Link ID Number	Definition
4	Serial Port A (single ACD application only)
5	Serial Port B (single ACD application only)
10	HSI card 1, port 0
11	HSI card 1, port 1
12	HSI card 1, port 2
13	HSI card 1, port 3

Link ID Number	Definition
14	HSI card 2, port 0
15	HSI card 2, port 1
16	HSI card 2, port 2
17	HSI card 2, port 3

The `linkstart` command is used to "start" a link that has been stopped with the `linkstop` command. To start a link enter the following command:

`/opt/SUNWconn/x25/bin/linkstart <linkid>`

The `linkreset` command is used to "reset" a link. It may also be used to "start" a link that has been stopped with the `linkstop` command. To reset a link enter the following command:

`/opt/SUNWconn/x25/bin/linkreset <linkid>`

Note:

All links are reset when X.25 is started.

The most common use of these commands would be to reset an X.25 link while troubleshooting a problem. For example, to reset port 2 on the second HSI card, enter the following command:

`/opt/SUNWconn/x25/bin/linkreset 16`

Or enter the following commands:

`/opt/SUNWconn/x25/bin/linkstop 16`

`/opt/SUNWconn/x25/bin/linkstart 16`

Note:

X.25 must have been started prior to entering these commands.

Stopping and starting X.25

When you stop and start X.25, you are stopping and starting all links on the machine.

To stop and start X.25:

1. To check the status of the network daemons, enter:

   /etc/init.d/x25.control status

   The system displays the following message:

   ```
   The network is up
   #
   ```

2. To stop the network daemons, enter:

   /etc/init.d/x25.control stop

3. To start the network daemons, enter:

   /etc/init.d/x25.control start

   The system displays the following message:

   ```
   Starting the X.25 software - please wait
   X.25 has found a valid license
   The network has been brought up.
   #
   ```

4. If other messages are displayed, the network did not start successfully. For example:

   ```
   x25netd: failed to open driver "/dev/hih0" (Bad file      number[9])
   #
   ```

   Note:

   > You will see the above message if you tried to restart the network too quickly after stopping it. When you see this message, wait a minute before starting X.25.

5. If X.25 cannot start due to license problems, the system displays the following message:

   ```
   The X.25 software is being stopped - please wait.
   The network programs are being killed - please wait
   The network has been stopped.
   #
   ```

6. Check the license manager. The license manager (lmgrd) is started when the CMS computer is booted. To check if the license manager is running, enter the following command:

    `ps -ef | grep lmgrd`

7. If the license manager is not running, enter the following script command:

    `/etc/rc2.d/S85lmgrd`

8. Examine any messages in the `/tmp/license_log` file.

Checking the RS-232 to RS-422 interface converter

The purpose of the RS-232 to RS-422 converter is to convert the RS-422 electrical/RS-449 physical interface on the HSI card to the RS-232 interface supported in existing switch connections. Each switch link that is connected to the HSI card uses one converter.

Note:

The Interface Converter is only used with the HSI card and not on the serial ports.

This section includes the following topics:

- Checking LEDs on page 195
- Checking the correct DTE/DCE settings on page 195
- Circuit board diagram on page 196
- Changing the shunt locations on page 196

Checking LEDs

The Interface Converter has six LEDs (light indicators) on the front panel of the black box that help troubleshoot link problems. Three LEDs (DSR, CTS, and DATA) are located on the left side of the monitor. These LEDs are the CMS computer HSI portion of the connection. Three LEDs (DSR,CTS, and DATA) are located on the right side of the monitor. These LEDs are the switch portion of the connection.

When the X.25 daemons are started, the LEDs on the left side are lit.

> **Note:**
> It is normal for the DSR LED on the right (switch) side of the converter to be out or to be very dim when IDI-based connections are being used.

If the LEDs on the left side are not lit, check the following items:

- DCE/DTE DIP-shunt settings inside the converter
- Status of the SunLink X.25 daemons
- Cabling between the interface converter and the CMS computer.

When the X.25 daemons are started and the link is administered and enabled on the switch, the LEDs on the right side of the interface converter are lit. If the LEDs on the right side are not lit, check the following items:

- Switch administration for the link
- Cabling between the interface converter and the switch.

Checking the correct DTE/DCE settings

The Black Box converter used for HSI link connectivity comes preset from the factory with the correct settings. This section shows how to reset the converter to the default factory settings.

The following table shows where the Dual In-Line Package (DIP) shunts should be located.

Move DIP shunts	
From	**To**
XW1A	XW1B
XW2A	XW2B
XW3A	XW3B
XW4B	XW4A
XW5B	XW5A

Circuit board diagram

The following is a diagram of the circuit board.
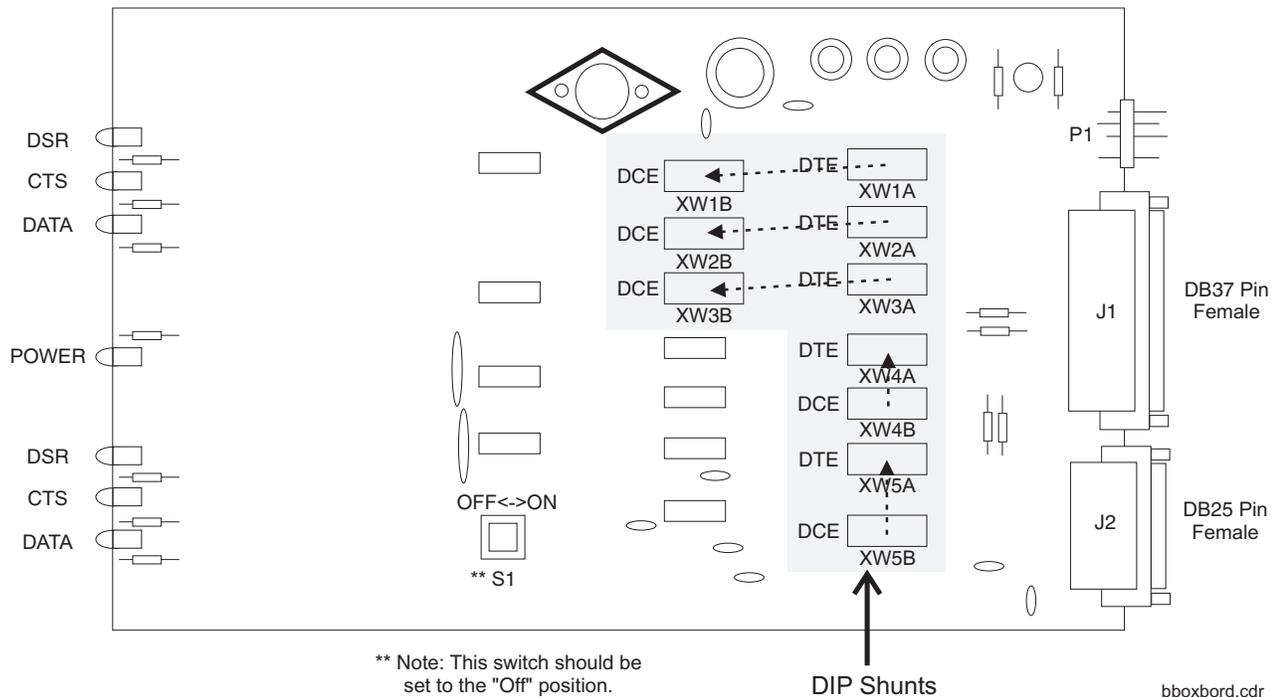
Changing the shunt locations

To change the shunt locations:

1. Disconnect all power and cables from the Black Box converter.

2. Open the interface converter.

3. Compare the current settings with the table and diagram.

> ⚠ **WARNING:**
>
> Be very careful when moving the DIP shunts. The DIP-shunt pins are fragile and could easily bend or break.

4. If a setting are not correct, carefully slide the tip of a common screwdriver between the DIP-shunt jumper and the DIP-shunt socket.

5. Gently pry/wiggle the DIP-shunt jumper free from the socket.

6. Move the DIP-shunt jumper to the appropriate socket (see the table or diagram).

7. Carefully align the pins, and gently press the DIP-shunt jumper into place.

8. Reassemble and reconnect the converter.

For additional information, see the booklet that comes with the converter.

Checking switch administration

To verify that the switch link administration is correct, see Administering a TCP/IP switch link on page 45. You should also check the following:

- Packet gateway data module administration on page 197
- Serial port administration on page 197

Packet gateway data module administration

Make sure the following required G3r or DEFINITY Server R administration is in effect. Set the `Number of Outstanding Frames(w)` field on the Packet Gateway data module to **7**.

> **Note:**
> If the window size for your system is not `7`, the link will reset.

Serial port administration

If you are using a serial port on your system for the switch link (port A or port B), verify that there is no login administration on that port.

Enter the following command to list any login administration on serial port A:

```
pmadm -l | grep /dev/term/a
```

Enter the following command to list any login administration on serial port B:

```
pmadm -l | grep /dev/term/b
```

If the `pmadm -l` command shows the login administration on the serial port use the `pmadm -r` command to remove the login administration. Remove *only* the login administration for the serial port used for the switch link.

Checking cabling

If the link is not operating reliably and does not operate for speeds above 9600 baud, do the following:

- Check that the link adapter is placed correctly between the Interface Converter and the IDI.
- If using a serial port, the link adapter must be between the serial port and the IDI.

Troubleshooting an X.25 switch connection

Glossary

Automatic Call Distribution (ACD)	A switch feature. ACD is software that channels high-volume incoming call traffic to agent groups (splits or skills). Also an agent state where the extension is engaged in an ACD call (with the agent either talking to the caller or the call waiting on hold).
CMS	Call Management System (CMS). A software product used by business customers that have an Avaya telecommunications switch and receive a large volume of telephone calls that are processed through the Automatic Call Distribution (ACD) feature of the switch.
High Speed Serial Interface (HSI)	The HSI controller card is a 4-port serial communications card. Each of the four ports is used for a single physical X.25 link. It is an add-on package that is needed by CMS for multiple ACDs.
Split	A group of extensions that receive special-purpose calls in an efficient, cost-effective manner. Normally, calls to a split arrive over one or a few trunk groups.
Switch	A private switch system providing voice-only or voice and data communications services (including access to public and private networks) for a group of terminals within a customer premises.
TSC	Technical Service Center. The Avaya organization that provides technical support for Avaya products.
Transmission Control Protocol/Internet Protocol (TCP/IP)	A communications protocol that provides interworking between dissimilar systems. It is the de facto standard for UNIX systems.

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