Cisco ATUC-4DMT-ISDN Line Card Installation and Configuration

Product Number: ATUC-1-4DMT-I(=)

Introduction

This publication contains instructions that describe how to install and configure Cisco ATUC-4DMT-ISDN line cards. This high-density line card supports discrete multitone (DMT) over Integrated Services Digital Network (ISDN) protocols that employ 2B1Q- or 4B3T-based encoding.

You can only use this line card in Cisco 6260 digital subscriber line access multiplexers (DSLAMs) that contain the NI-2 network interface processor module running Cisco IOS software. You can deploy the line cards described in this document in either of two ways:

- A direct connect configuration—Telco equipment routes DMT signals only between customer modems and the line cards (see the "Line Card Direct Connect Deployment" section on page 11).

- A splitter configuration—Telco equipment includes DMT/ISDN splitters to separate or combine ISDN and DMT signals at the central office (CO) and at the customer site (see the "Line Card Splitter Deployment" section on page 13).

Contents

This document includes the following sections:

Line Card Description

You can only use ATUC-4DMT-ISDN line cards in ISDN service in Cisco 6260 DLSAM chassis.

- In a direct connect configuration—DMT signals are routed directly between the line cards and the customer modems.
- In a splitter connected DMT/ISDN configuration—Telco equipment separates DMT signals from or combines them with ISDN signals if the customer premises equipment (CPE) includes ISDN telephone service.

The ATUC-4DMT-ISDN line card

- Handles DMT signals only in both direct connect and splitterless deployments
- Requires that its DMT modem ports be connected directly to a CO facility main distribution frame (MDF) when used in splitterless CPE installations
- Requires that its DMT modem ports be connected to an ADC Telecommunications, Inc. central office high-density 240-port chassis (DMT/ISDN) signal splitter or other Cisco qualified DMT/ISDN signal splitter when used in CPE ISDN installations
- Contains four modems: two on the motherboard and two on an attached daughter board
- Only operates with an NI-2 network interface processor module running Cisco IOS software in a Cisco 6260 DSLAM chassis

In CPE installations with ISDN service on the same wire pair, you must use a DMT/ISDN signal splitter to separate and isolate ISDN and DMT signal frequency bands. The line card contains filters that reject the ISDN spectrum (or signal) during operation.

Safety

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Warning **Means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.**

Waarschuwing **Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen. Voor vertalingen van de waarschuwingen die in deze publicatie verschijnen, kunt u het document Regulatory Compliance and Safety Information (Informatie over naleving van veiligheids- en andere voorschriften) raadplegen dat bij dit toestel is ingesloten.**

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Attention **Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions d'avertissements figurant dans cette publication, consultez le document Regulatory Compliance and Safety Information (Conformité aux règlements et consignes de sécurité) qui accompagne cet appareil.**

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Avvertenza **Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti. La traduzione delle avvertenze riportate in questa pubblicazione si trova nel documento Regulatory Compliance and Safety Information (Conformità alle norme e informazioni sulla sicurezza) che accompagna questo dispositivo.**

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Guidelines for Wiring Outside the Central Office

Use the following guidelines when working with equipment that is connected to telephone wiring or to other network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which can occur when electronic line cards or components are improperly handled, results in complete or intermittent failures. Port adapters and processor line cards consist of printed circuit boards that are fixed in metal carriers. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the board from ESD, use a preventive antistatic strap during handling.

Observe the following guidelines to prevent equipment ESD damage:

- Always use an ESD wrist or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unfinished chassis surface.
- When installing a component, use any available ejector levers or captive installation screws to properly seat the bus connectors in the backplane or midplane. These devices prevent accidental removal, provide proper grounding for the system, and help to ensure that bus connectors are properly seated.
- When removing a component, use any available ejector levers or captive installation screws to release the bus connectors from the backplane or midplane.
- Handle carriers by available handles or edges only; avoid touching the printed circuit boards or connectors.
- Place a removed component board-side-up on an antistatic surface or in a static-shielding container. If you plan to return the component to the factory, immediately place it in a static-shielding container.
- Avoid contact between the printed circuit boards and clothing. The wrist strap protects components from ESD voltages on the body only; ESD voltages on clothing can still cause damage.

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Caution   Never attempt to remove the printed circuit board from the metal carrier. For safety, periodically check the resistance value of the antistatic strap. The measurement should be between 1 and 10 megohms.

Installation Prerequisites

This section describes software requirements and lists the parts and tools that you need to install an ATUC-4DMT-ISDN line card in a Cisco 6260 DLSAM chassis.

Software Requirements

Table 1 lists the Cisco IOS release you should use to configure and manage line cards in Cisco 6260 DSLAMs.

Table 1   Line Card Software Requirements

Hardware Platform	Recommended Minimum Cisco IOS Release
Cisco 6260 NI-2 DSLAM	Cisco IOS Release 12.1(3)DA or later

Parts and Tools

You do not need special parts or tools to install a line card. However, you should use ESD-preventive equipment or the disposable grounding wrist strap included with the line card you receive. You also need a small standard screwdriver to rotate the line card locking tabs.

Installing and Removing Line Cards

To install any line card in a Cisco 6260 DSLAM chassis, follow the procedures in the "Line Card Installation" section on page 5. To remove a line card, follow the procedures in the "Line Card Removal" section on page 8.

✎

Note   You do not need to disconnect power before you insert or remove a line card from a Cisco 6260 NI-2 DSLAM chassis.

Line Card Installation

You can install up to 30 ATUC-4DMT-ISDN line cards in the following Cisco 6260 DSLAM slots

- Slots 1 to 9—Upper shelf
- Slots 12 to 17—Upper shelf
- Slots 18 to 32—Lower shelf
- Slot 10—Reserved for a full-length NI-2 network interface module

- Slot 11 and any other empty Cisco 6260 NI-2 DSLAM slot—Must contain a blank faceplate (refer to the *Cisco 6260 Hardware Installation and Troubleshooting Guide* for details)

To install a line card in a Cisco 6260 chassis slot, perform the following steps:

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Caution   Static voltages as low as 30 volts can cause latent damage to circuitry. Be sure to observe all standard antistatic procedures (for example, wear a grounding strap).

✎
Note   If an unexpected result occurs when you perform the following procedure refer to the *Cisco 6260 Hardware Installation and Troubleshooting Guide*.

Step	Procedure
Step 1	Hold the line card vertically, with its faceplate toward you and its connector fingers facing the DSLAM line card slot.
Step 2	Align the upper and lower edges of the line card with the upper and lower guides in the DSLAM line card slot.
Step 3	Slide the line card into its DSLAM slot (Figure 1) by applying gentle pressure with both hands at the top and bottom of its faceplate until its finger contacts enter the backplane connector.
Step 4	Rotate the faceplate locking tab on the line card to its unlocked position (see Figure 2) and engage the locking lever at the upper front rail of the DSLAM chassis (see Figure 1).
Step 5	Press the locking lever down; this action inserts the line card finger contacts into the backplane connector.
Step 6	Rotate the line card locking tab with a small screwdriver. When you insert the line card, the green Status LED on the faceplate should light (firmware on the line card runs an internal test to ensure proper line card operation). If the Status LED does not light, replace the line card.
Step 7	Install a blank faceplate to cover each empty slot in the Cisco 6260 DSLAM. Secure the faceplate to the DSLAM chassis by rotating its locking tab to the locked position (see Figure 2).

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Warning   **Blank faceplates and cover panels serve three important functions: 1) they prevent exposure to hazardous voltages and currents inside the chassis; 2) they constrain electromagnetic interference (EMI) that may otherwise disrupt other equipment; and 3) they direct the flow of cooling air through the chassis. Do not operate the system unless all line cards, blank faceplates, front covers, and rear covers are in place.**
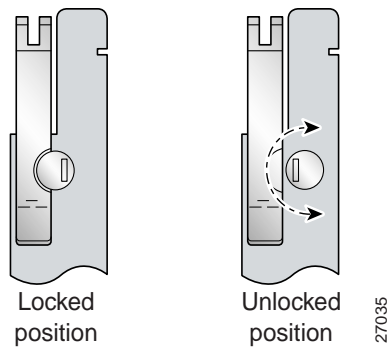
Figure 1   Cisco 6260 DSLAM—Line Card Insertion
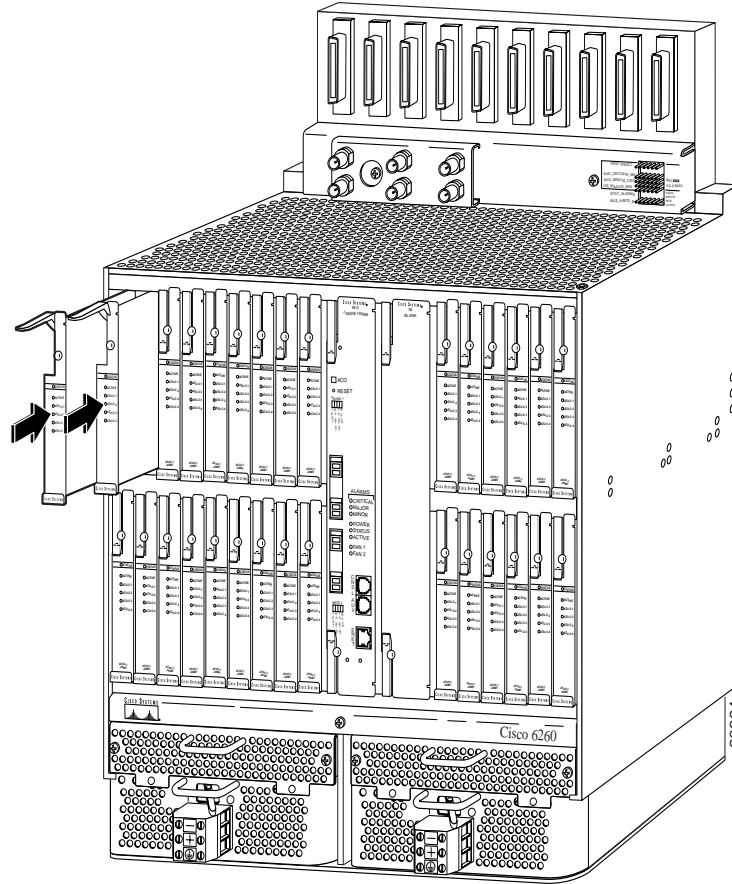
> ✎
> **Note**   The *Cisco 6260 Hardware Installation and Troubleshooting Guide* describes the Cisco 6260
>   DSLAM-slot modem tip and ring mapping to backplane connectors.

Figure 2   Typical Line Card Locking Tab

Locked
position

Unlocked
position

Line Card Removal

This section describes how to remove a line card. You do not need to disconnect power before you remove a line card from its slot in a Cisco 6260 DSLAM chassis. The following procedure describes how to remove a line card.

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Caution　Static voltages as low as 30 volts can cause latent damage to circuitry. Be sure to observe all standard antistatic procedures (for example, wear a grounding strap).

Step	Procedure
Step 1	Rotate the line card locking tab to its unlocked position (see Figure 2).
Step 2	Grasp the line card extraction lever (see Figure 1). Pull up the locking lever to disengage the line card contact fingers from the backplane connector.
Step 3	Slide the line card out of the chassis.
Step 4	Place the line card on an antistatic surface. For extended storage, insert the line card into a static-shielding bag or into a box lined with static-shielding material.
Step 5	If you do not replace the removed line card with another line card, install a blank faceplate (refer to "Line Card Installation" section on page 5).

Line Card Faceplate Description

In addition to its locking mechanism (Figure 3), the faceplate contains two LEDs that show you line card activity and status, and four other LEDs that show the activity of each modem during operation.

Figure 3   Faceplate—ATUC-4DMT-ISDN Line Card
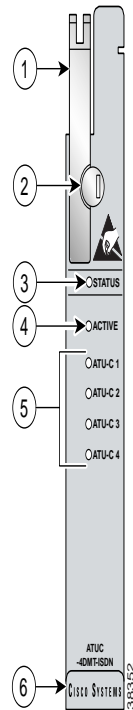
Line Card LED Indicators

The Status and Active light-emitting diode (LED) indicators on the line card faceplate indicate line card activity during operation. The faceplate also includes four modem-status LED indicators, one for each modem in the line card. Table 2 describes LEDs on the ATUC-4DMT-ISDN line card.

Table 2   Line Card LEDs

LED	Color and State	Indication
Status	Solid green	No internal faults, line card is communicating with the NI-2 processor card.
	Blinking slow green	No internal faults, line card is establishing connection with the NI-2 processor.
	Off	This line card has not booted or is operating improperly. (During reboot, this line card might be off for 2 to 3 seconds.)
	Blinking slow red	An internal fault has occurred or the line card cannot boot.

Table 2   Line Card LEDs (continued)

Active	Solid green	Running application code, no digital signal processor (DSP) microcode is downloading.
	Blinking fast green	Running application code and DSP microcode is downloading. ✎ **Note** Never interrupt a microcode download.
ATU-C 1 through ATU-C 4 modem ports	Solid green	The port is active and trained with its CPE device.
	Blinking green	The port is training with its CPE device.
	Off	The port is shut down or no CPE device detected.

Line Card Operation

After the line card detects the CPE and completes the initialization sequence, it configures itself for one of the following types of operation

- Upstream data rates—32 to 864 kbps in increments of 32 kbps

- Downstream data rates—32 to 8032 kbps in increments of 32 kbps

- Symmetrical data rate—Matches upstream and downstream rates

- Attained modem rate—The line card must obtain and report the actual acquired modem rate if the desired rate cannot be achieved or if the line card adaptively selects the rate

Cisco NI-2 Network Interface Processor Module Functions

After a reset, the NI-2 network interface processor executes boot Flash EPROM routines. Boot flash code also contains the serial management bus (SMB) boot loader. The NI-2 network interface processor module sends each line card its run-time image over the SMB and loads the main executable code into SRAM. After the main-code image loads and runs, the line card loads its serial data bus (SDB) Utopia field programmable gate array (FPGA) and initializes all modems.

ATM Virtual Circuit Support

Each line card supports up to 256 virtual channel identifiers (VCIs) and virtual path identifiers (VPIs) per port. Each line card also enables use of default VPI/VCI mapping or provisioning of VPI/VCI mapping by means of Cisco IOS configuration commands.

Configuring Software for a Line Card

For Cisco IOS software configuration information and support, refer to the *Configuration Guide for Cisco 6000 Family DSLAMs with NI-2* and to the *Command Reference for Cisco 6000 Family DSLAMs with NI-2* in the Cisco IOS software configuration documentation set that corresponds with the software release installed on your Cisco 6260 NI-2 DSLAM hardware.

Line Card Direct Connect Deployment

Figure 4 shows the physical DMT data and installed interface relationships among devices in a typical ATUC-4DMT-ISDN direct connect line card deployment in a Cisco 6260 DSLAM.

Figure 4   Typical ATUC-4DMT-ISDN Direct-Connect Line Card Deployment
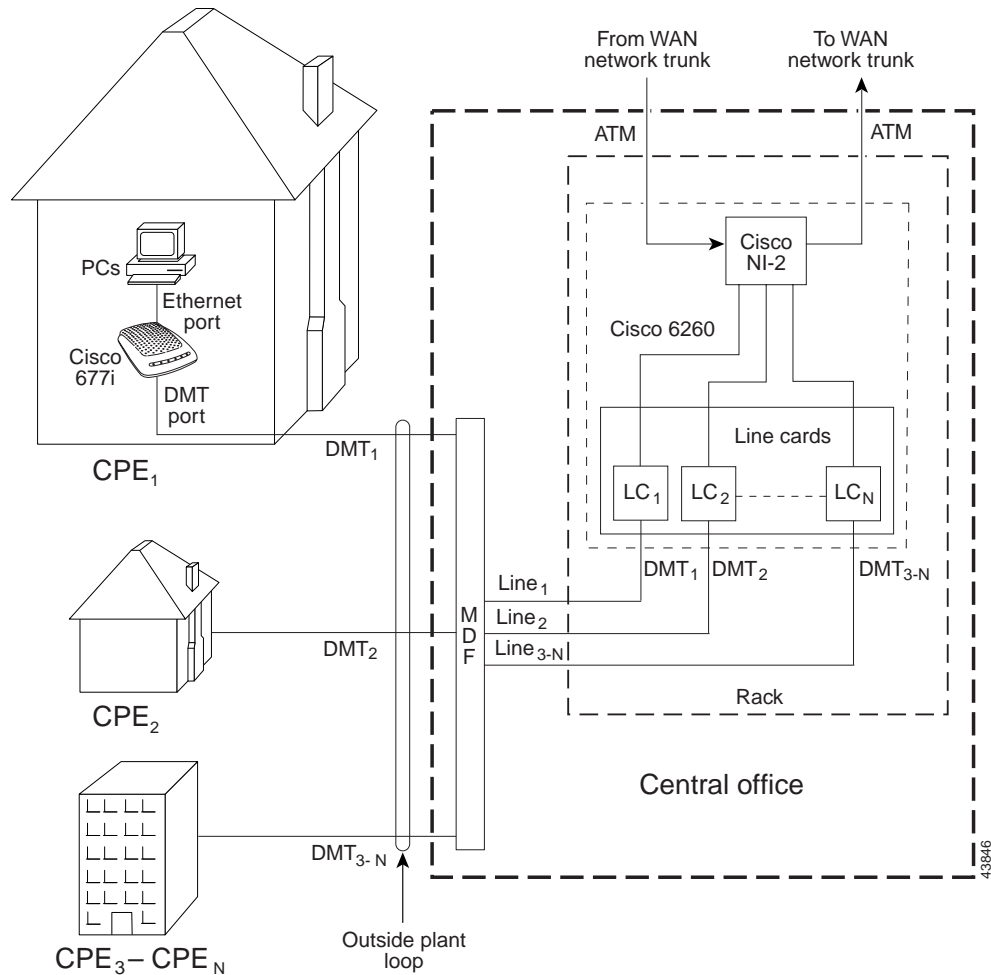
In direct connect deployments, Cisco ATUC-4DMT-ISDN line cards are a principal component of the Cisco 6260 DSLAM normally located in a CO facility rack. You install from 1 to N (where N has any value up to 30) line cards in a single Cisco 6260 DSLAM.

The network configuration consists of the following two principal hardware groups

- Customer premises equipment (CPE)
- CO facility equipment

CPE Hardware Group

The CPE hardware group (see Figure 4) consists of customer and telco equipment. Customer PC equipment connected to a customer Ethernet LAN receives and transmits Ethernet data only. The Cisco 677i modem is telco equipment that interfaces with an Ethernet line and converts Ethernet data to DMT signals. Customers must use a telco-provided Cisco 677i modem to produce DMT signals for proper ATUC-4DMT-ISDN line card operation.

This section describes how the component configuration illustrated in Figure 4 relates to proper line card operation.

Cisco 677i Modem

At a customer site, you must use the Cisco 677i modem to provide the Ethernet LAN interface (see Figure 4) at the downstream end of the line. The 677i modem provides the interface between a customer Ethernet and a line card. Specifically, the customer Cisco 677i modem provides the network ATUC-R DMT signaling function, which

- Has an Ethernet port that interfaces physically with an Ethernet LAN
- Converts line card downstream DMT signaling to its Ethernet data equivalent for transfer to the customer Ethernet LAN
- Has a DMT port that interfaces physically with the outside plant loop
- Converts upstream Ethernet data to an equivalent DMT signal for transfer to the line cards through the telco CO facility MDF

CO Facility Hardware Group

The CO facility hardware group (see Figure 4) consists of

- The telco MDF
- Cisco equipment housed in a telco rack containing one or more Cisco 6260 DSLAMs with line cards LC_1, and LC_2 through LC_N (where N can have any value between 3 and 30)

The CO facility equipment routes signals DMT_1, DMT_2, and DMT_3 through DMT_N between the CPE 677i modems and the MDF.

In the:

- Upstream direction—Line cards convert DMT signals to ATM formatted cells for application to the NI-2 interface processor modules
- Downstream direction—Line cards convert ATM cells to DMT signals for application to the MDF and customer modems

Cisco equipment using these line cards includes

- One or more Cisco 6260 DSLAMs in telco racks
- Up to 30 line cards in each Cisco 6260 DSLAM
- An NI-2 network interface processor module in each 6260 DSLAM

Main Distribution Frame

The MDF (see Figure 4) is telco equipment that distributes customer DMT signals from a
Cisco 677i modem to its corresponding internal modem on a line card through suitable
MDF to Cisco 6260 DSLAM cabling. Cisco product offerings include prefabricated Champion cable
assemblies in various lengths for connection of customer lines between a CO facility MDF and the line
card connectors on Cisco 6260 DSLAM backplanes. You make these cable connections at Cisco 6260
backplane receptacles. Refer to the *Cisco 6260 Hardware Installation and Troubleshooting Guide* for
cabling instructions.

Line Cards

In Figure 4, Cisco ATUC-4DMT-ISDN line cards LC_1 and LC_2 through LC_N convert upstream
DMT signals to AMT cells and downstream AMT cells to DMT signals. The Cisco NI-2 interface
processor module controls each line card, which

- Connects up to four line pairs that transport DMT signals between the line card modems and the
  NI-2 module through the MDF

- Converts DMT signals, routed from the customer modems, to WAN trunk ATM cells

- Converts WAN trunk ATM cells, routed from the NI-2 module, to modem DMT signals

A full complement of line cards in a single Cisco 6260 DSLAM can handle network communications
from and to as many as 120 customers.

You can install up to four Cisco 6260 DSLAMs, populated with ATUC-4DMT-ISDN line cards in a
direct connect configuration, in a standard NEBS compliant 7-foot CO facility rack.

Cisco NI-2 Network Interface Processor Module

The Cisco NI-2 network interface processor module (see Figure 4) in the Cisco 6260 DSLAM and the
Cisco IOS software running on the Cisco NI-2 control how ATM cells are processed when transported
between the line cards and the WAN network trunk.

The NI-2 processor module

- Collects ATM cells from the WAN network trunk intended for customers connected to the line card
  modems through the Cisco 6260 DSLAM and the telco MDF

- Distributes WAN network trunk ATM cells through the Cisco 6260 DSLAM line cards as
  DMT signals among addressed customers connected to the line card modems

The *Cisco NI-2 Card Installation and Configuration for the Cisco 6260* document describes the
NI-2 network interface processor module.

Line Card Splitter Deployment

Figure 5 shows the DMT/ISDN data and system interface relationships among devices in a typical
ATUC-4DMT-ISDN line card deployment using DMT/ISDN splitters.

Figure 5   Line Card Splitter Deployment—ISDN and Data DMT/ISDN Network
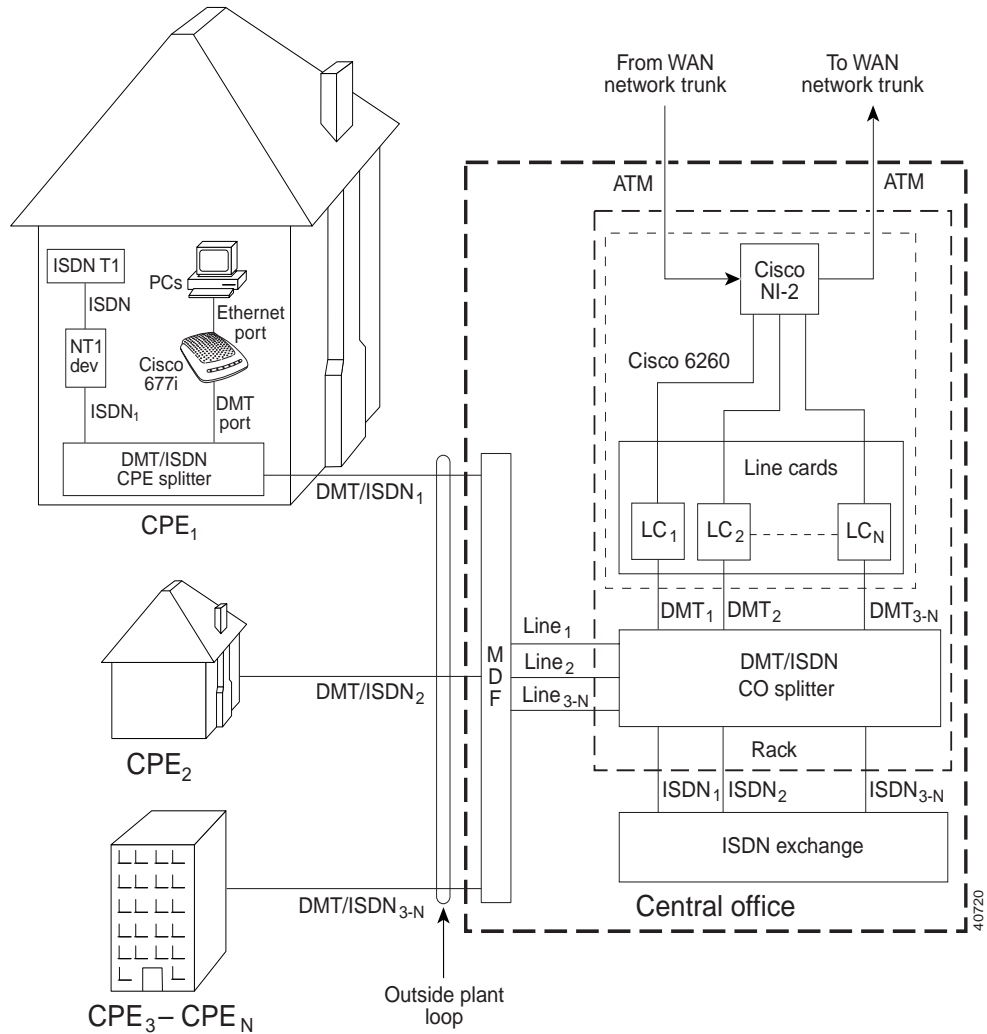
In DMT/ISDN line card deployments, you use CPE and CO splitters to separate the two signals.

DMT/ISDN splitters permit both telephone voice and data signals to be transported as data from and to the CPE. You can install as many as 30 ATUC-4DMT-ISDN line cards in a single splitter-configured Cisco 6260 DSLAM.

The network configuration consists of the two following principal hardware groups:

• The CPE facility

• The CO facility

CPE Hardware Group

The CPE hardware group (see Figure 5) consists of customer and telco equipment that transmits and receives both ISDN and DMT signals and PC equipment that transmits and receives Ethernet data. A typical CPE hardware group (for example, CPE_1) consists of

- ISDN terminal equipment
- A network NT1 device
- A Cisco 677i modem
- A DMT/ISDN splitter

The following sections describe the components that make up a typical splitter-configured CPE hardware group.

ISDN Terminal Equipment

ISDN terminal equipment

- Provides ISDN services such as telephony and data terminal applications
- Provides upstream and downstream ISDN signaling functions

NT1 Device

The NT1 device (see Figure 5) includes two ports that typically provide an interface to the customer ISDN terminal equipment and the CPE DMT/ISDN splitter. The NTI device passes properly formatted 2B1Q or 4B3T signals (see Table 3) to the splitter.

Cisco 677i Modem

In this deployment, the Cisco 677i modem (seeFigure 5) also provides the Ethernet primary interface. The Cisco 677i modem transmits and receives DMT signals or Ethernet data passed between the local DMT/ISDN CPE splitter and the customer LAN. Specifically, the Cisco 677i modem provides the required ATUC-R function, which

- Converts line card downstream DMT signaling to its Ethernet data equivalent for transfer to the customer Ethernet LAN
- Converts upstream Ethernet data to an equivalent DMT signal for transfer to the line cards through the CPE DMT/ISDN splitter

The DMT port interfaces physically with the CPE DMT/ISDN splitter. The modem ports must be used to transport data traffic over an ADSL access network.

CPE DMT/ISDN Splitter

The CPE DMT/ISDN splitter (Figure 5) electrically couples the ISDN signal from the NT1 device and the DMT signal from the modem onto the pair carrying the DMT/IDSN traffic between the CPE facility and the MDF at the CO facility. The CPE splitter provides a filtering function that

- Separates ISDN and DMT signals from the composite downstream signal
- Feeds the downstream ISDN signal to the local NT1 device

- Feeds the line card downstream DMT signal to the Cisco 677i modem for conversion to equivalent Ethernet data for application to the customer LAN

- Combines upstream ISDN and DMT signals from the subscriber modem into a DMT/ISDN data stream for application to the CO facility DMT/ISDN splitter through the MDF

CO Facility Hardware Group

The CO facility hardware group consists of Cisco and telco equipment that processes both ISDN and DMT signals (see Figure 5). The CO facility Cisco equipment transfers DMT signals between local DSL subscribers and the wide area network (WAN) trunk interface through the MDF, the DMT/ISDN CO splitter, and the line cards. Cisco equipment includes

- One or more Cisco 6260 DSLAMs

- Up to 30 line cards in each DSLAM

- An NI-2 network interface processor module in each Cisco 6260 DSLAM

Other equipment at the CO facility associated with DMT/ISDN signal processing includes

- The MDF

- One or more CO facility DMT/ISDN splitters

- A PSTN ISDN exchange switch

This section describes the relationship between the line cards and the components in the CO facility hardware group illustrated in Figure 5.

Main Distribution Frame

The MDF distributes DMT/ISDN signals (see Figure 5)

- From subscriber CPE splitters to the CO facility DMT/ISDN splitter

- From the CO facility DMT/ISDN splitter to the subscriber CPE DMT/ISDN splitter

DMT/ISDN CO Splitter

The telco facility DMT/ISDN CO splitter (see Figure 5):

- Separates combined line signals $DMT/ISDN_1$ and $DMT/ISDN_2$ through $DMT/ISDN_N$ for distribution to the line cards and to the PSTN ISDN exchange, respectively

- Electrically combines line card signal DMT_1 with ISDN exchange signal $ISDN_1$ and signals DMT_2 through DMT_N with signals $ISDN_2$ through $ISDN_N$ for distribution on the same line pair to the DMT/ISDN CPE splitter through the MDF

Line Cards

ATUC-4DMT-ISDN line cards function as described in the "Line Cards" section on page 13. In Figure 5, Cisco line cards LC_1 and LC_2 through LC_N convert upstream DMT signals to AMT cells and downstream AMT cells to DMT signals.

Because a CO DMT/ISDN splitter is required with each 6260 DSLAM, you can only install two Cisco 6260 DSLAMs, populated with ATUC-4DMT-ISDN line cards, in a splitter-configured standard NEBS compliant 7-foot CO facility rack.

Cisco NI-2 Network Interface Processor Module

The "Cisco NI-2 Network Interface Processor Module" section on page 13 briefly describes the Cisco NI-2 network interface processor module (see Figure 4 and Figure 5).

Acronyms and Terms

Table 3 defines the following terms that are used in this guide.

Table 3   Acronyms and Term Definitions

Acronym/Term	Definition
2B1Q	An ISDN line coding technique used in the USA and Europe
4B3T	An ISDN line coding technique used in Germany
AAL5	ATM adaption Layer 5
ADSL	Asymmetric digital subscriber line
ANSI	American National Standards Institute
ATM	Asynchronous Transfer Mode
ATUC or ATU-C	Central office ADSL transceiver unit
CCO	Cisco Connection Online
CO	Central office
CPE	Customer premises equipment
DMT	Discrete multi-tone
DSB	Data serial bus
DSP	Digital signal processor
DSLAM	Digital subscriber line access multiplexer
DSL	Digital subscriber line
EMI	Electromagnetic interference
EPROM	Erasable programmable read-only memory
ESD	Electrostatic discharge
FAQ	Frequently asked questions
FCC	Federal Communications Commission
FPGA	Field programmable gate array
FTP	File Transfer Protocol
G.dmt	Standard that defines ADSL over splitter-coupled interfaces.
GFR	Guaranteed frame rate
GND	Ground
HEC	Header error control
I/O	Input/output

Table 3   Acronyms and Term Definitions (continued)

Acronym/Term	Definition
ISDN	Integrated Services Digital Network
ITU	International Telecommunications Union
LED	Light emitting diode
MIB	Management Information Base
NI-2	Network interface module type 2
NT1	ISDN network terminal type 1
PEM	Power entry module
PSTN	Public switched telephone network
SDB	Serial data bus
SMB	Serial management bus
SRAM	Serial random-access memory
TAC	Cisco technical assistance center
VCI	Virtual channel identifier
VPI	Virtual path identifier
VIS	Visible

More Information

Your Cisco 6260 NI-2 DSLAM and Cisco IOS software running on an NI-2 module installed in Cisco 6260 NI-2 DSLAMs have extensive features and functionality, which are documented in the following resources:

- For Cisco IOS software configuration information and support, refer to the *Configuration Guide for Cisco 6000 Family DSLAMs with NI-2* and the *Command Reference for Cisco 6000 Family DSLAMs with NI-2* in the Cisco IOS software configuration documentation set that corresponds with the software release installed on your Cisco 6260 NI-2 DSLAM hardware.

- You can access Cisco IOS software configuration and hardware installation and maintenance documentation on the World Wide Web at http://www.cisco.com, http://www-china.cisco.com, or http://www-europe.cisco.com.

- For hardware installation and maintenance information about Cisco 6260 NI-2 DSLAMs, refer to the *Cisco 6260 Hardware Installation and Troubleshooting User Guide*.

- For hardware installation and maintenance information about the Cisco 6260 NI-2 DSLAM module, refer to the *NI-2 Line Card Installation and Configuration for the Cisco 6260* document.

- For hardware installation information about the Cisco 6260 NI-2 DSLAM system I/O card, refer to *Cisco 6260 Hardware Installation and Troubleshooting User Guide.*

- To view Cisco documentation or obtain general information about the documentation, see the "Cisco Connection Online" section on page 19 or the "Documentation CD-ROM" section on page 20, or call Customer Service at 800 553-6387 or 408 526-7208. Customer Service hours are 5:00 a.m. to 6:00 p.m. Pacific time, Monday through Friday (excluding company holidays). You can also send e-mail to cs-rep@cisco.com, or refer to the Cisco Information Packet that shipped with your line card.

Related Documentation

Refer to the following documents for more information about the operation and components of the Cisco 6100 series DSLAMs:

- *NI-2 Card Installation and Configuration for the Cisco 6260*
- *ATUC-4DMT-ISDN Card Installation and Configuration for the Cisco 6260*
- *Cisco 6260 PEM and Fan Tray Installation and Replacement*
- *Cisco 6100 Series DSLAM Release Notes for Cisco IOS Release 12.0(5)DA*
- *Cisco DSL Manager User Guide*
- *Cisco DSL Manager Concepts Manual*
- *Cisco DSL Manager Management Tool Kit*
- *Cisco DSL Manager Quick Start Guide*

FCC Class B Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case users will be required to correct the interference at their own expense.

You can determine whether your equipment is causing interference by turning it off. If the interference stops, it was probably caused by the Cisco equipment or one of its peripheral devices. If the equipment causes interference to radio or television reception, try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the equipment to one side or the other of the television or radio.
- Move the equipment farther away from the television or radio.
- Plug the equipment into an outlet that is on a different circuit from the television or radio. (That is, make certain the equipment and the television or radio are on circuits controlled by different circuit breakers or fuses.)

Note The ATUC-4DMT-ISDN line card is designed to meet these requirements. Modifications to this product that are not authorized by Cisco Systems, Inc., may void various approvals and negate your authority to operate this product.

Cisco Connection Online

Cisco Connection Online (CCO) is the Cisco Systems primary real-time support channel. Maintenance customers and partners may self-register at CCO to obtain additional information and services.

Available 24 hours a day, 7 days a week, CCO provides a wealth of standard and value-added services to Cisco customers and business partners. CCO services include product information, product documentation, software updates, release notes, technical tips, the Bug Navigator, configuration notes, brochures, descriptions of service offerings, and download access to public and authorized files.

CCO serves a wide variety of users through two interfaces that are updated and enhanced simultaneously: a character-based version and a multimedia version that resides on the World Wide Web (WWW). The character-based CCO supports Zmodem, Kermit, Xmodem, FTP, and Internet e-mail, and it is excellent for quick access to information over lower bandwidths. The WWW version of CCO provides richly formatted documents with photographs, figures, graphics, and video, as well as hyperlinks to related information.

You can access CCO in the following ways:

- WWW: http://www.cisco.com
- WWW: http://www-europe.cisco.com
- WWW: http://www-china.cisco.com
- Telnet: cco.cisco.com
- Modem: From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and connection rates up to 28.8 kbps.

For a copy of CCO Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.

If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact the Cisco Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or tac@cisco.com. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or cs-rep@cisco.com.

Documentation CD-ROM

Cisco documentation and additional literature are available in a CD-ROM package, which ships with your product. The Documentation CD-ROM, a member of the Cisco Connection Family, is updated monthly. Therefore, it might be more current than printed documentation. To order additional copies of the Documentation CD-ROM, contact your local sales representative or call customer service. The CD-ROM package is available as a single package or through an annual subscription.

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