

Dual-Port DMT-2 ATU-C Module FRU Installation and Replacement Notes

Product Number: ATUC-2-DMT2-DIR-1=

This document provides information about installing and replacing the Cisco 6100 Series system dual-port Discrete Multi-Tone-Issue 2 (DMT-2) asymmetric digital subscriber line (ADSL) Transmission Unit – central office (ATU-C) module. The dual-port DMT-2 ATU-C module is a field-replaceable unit (FRU).

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Dual-Port DMT-2 ATU-C Module Overview

The Cisco 6100 Series system dual-port DMT-2 ATU-C module is a dual T1.413 Issue 2 compliant DMT version of the current dual-port CAP ATU-C module. The module resides in the Cisco 6100 Series 6100/6130 chassis and is designed for use in one of the following configurations:



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- Direct Connect with a POTS splitter—Provisions one modem directly and is physically connected to one specific subscriber line through the POTS splitter.
- Direct Connect without a POTS splitter—Provisions one modem directly and is physically connected to one specific subscriber line through the main distribution frame (MDF) connections.

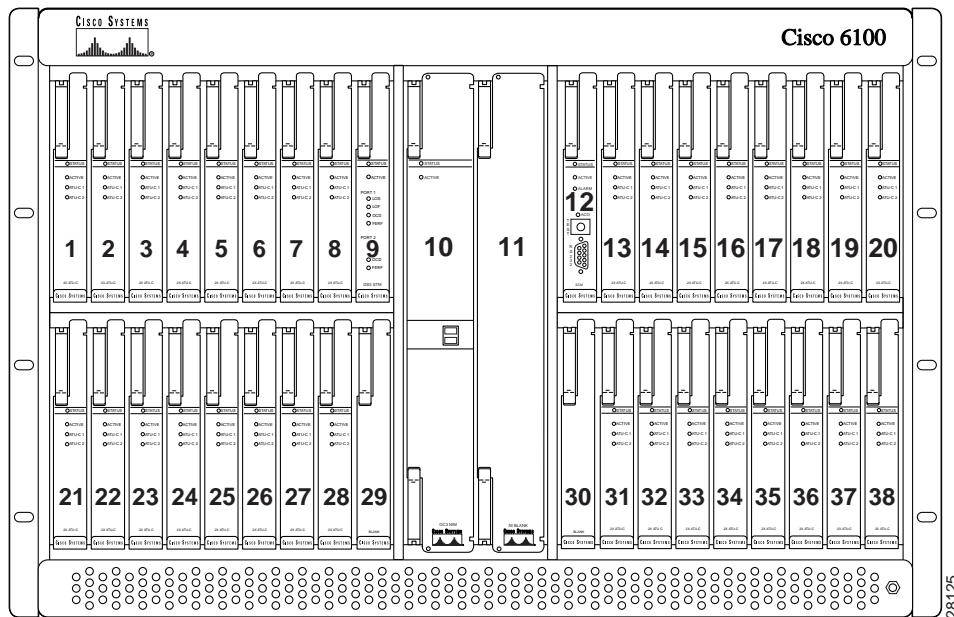
The dual-port DMT-2 ATU-C module:

- Contains two ADSL modem connections.
- Converts ADSL modulation from the line into digital data streams to and from the network interface module.
- Negotiates the line rate with the customer premises equipment (CPE) when it trains and bases the rate on line quality and distance.

If provisioned, the dual-port DMT-2 ATU-C module rate adapts to the maximum bit rate negotiable on the line. The maximum bit rate settings are provisioned in the ViewRunner management software.

The Cisco 6100/6130 chassis can include up to 32 dual-port DMT-2 ATU-C modules for a total of 64 ADSL modems. The modules can be installed in Cisco 6100/6130 chassis slots 1 through 8, 13 through 28, and 31 through 38, as shown in Figure 1.

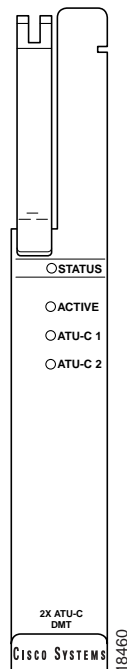
Figure 1 Dual-Port DMT-2 ATU-C Module Slots in the Cisco 6100/6130 chassis



Caution

Do not mix CAP ATU-C, DMT-2 ATU-C, and STU-C modules in the same Cisco 6100/6130 chassis. Mixing modules can cause unpredictable system behavior.

Figure 2 shows a close-up of the dual-port DMT-2 ATU-C module faceplate.

*(DRAFT LABEL) ALPHA DRAFT - CISCO CONFIDENTIAL***Figure 2** *Dual-Port DMT-2 ATU-C Module Faceplate***Note**

Several cabling options are available for a Direct Connect configuration. Refer to the *Cisco 6100 Series Direct Connect Installation Guide* for detailed information on system cables and port mapping tables.

Module Interfaces

The Cisco 6100 Series system Release 2.4.0 supports the dual-port DMT-2 ATU-C module installed in a Cisco 6130 chassis. Release 2.4.1 adds support for the DMT-2 ATU-C module installed in a Cisco 6100 chassis. The module is not compatible with any releases prior to Release 2.4.0.

**Caution**

Use all DMT modules in both the Cisco 6100/6130 chassis and POTS splitter. Mixing DMT and CAP modules can cause unpredictable system behavior.

Module LEDs

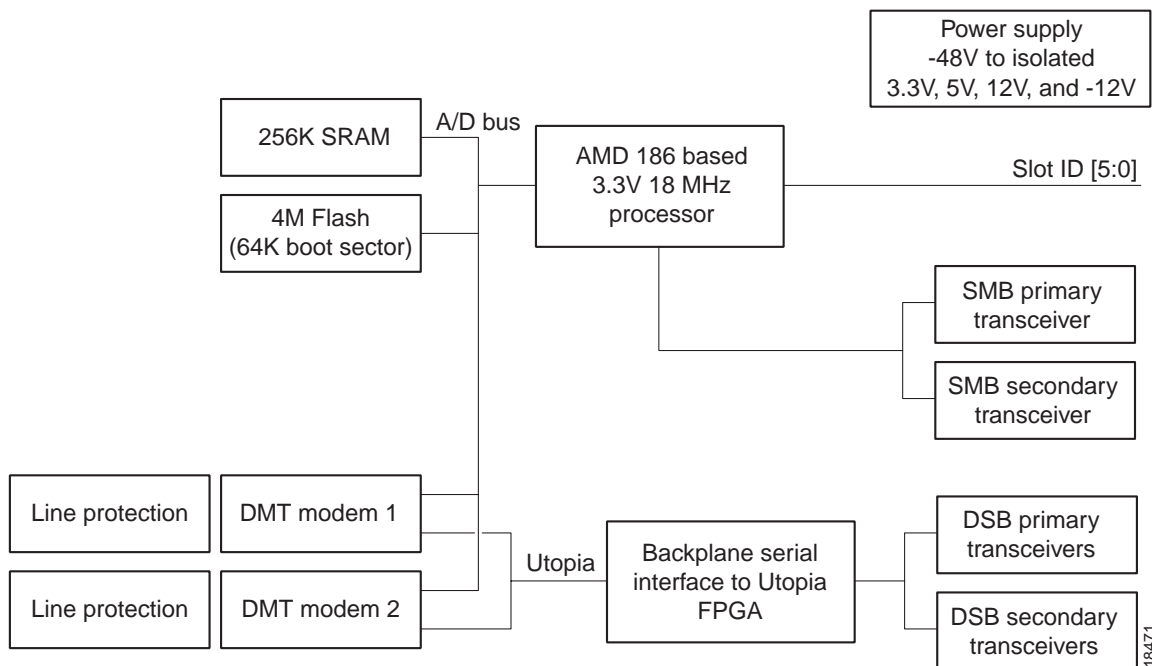
Table 1 describes the dual-port DMT-2 ATU-C module LED functions.

*(DRAFT LABEL) ALPHA DRAFT - CISCO CONFIDENTIAL***Table 1** *Dual-port DMT-2 ATU-C Module LED Functions*

LED	State	Function
STATUS	Green slow blinking	The self-test is in progress.
	Green fast blinking	The image download is in progress.
	Green solid	The status is OK.
	Red	The self-test or module has failed.
	Off	The ATU-C module has a power failure.
ACTIVE	Green solid	The module is activated.
	Off	The module is not in service.
ATU-C 1	Green solid	Modem 1 is trained.
	Green blinking	Training is in progress for modem 1.
	Off	Modem 1 is idle.
ATU-C 2	Green solid	Modem 2 is trained.
	Green blinking	Training is in progress for modem 2.
	Off	Modem 2 is idle.

Module Block Diagram

Figure 3 is a block diagram of the dual-port DMT-2 ATU-C module.

Figure 3 *Dual-Port DMT-2 ATU-C Module Block Diagram*

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Installation Prerequisites

This section describes software requirements, and lists parts and tools used to install the dual-port DMT-2 ATU-C module.

Software Requirements

The following software is required to provision and manage the dual-port DMT-2 ATU-C module:

Table 2 Dual-Port DMT-2 ATU-C Module Software Requirements

Software	Required Minimum Cisco Release
Cisco 6100 Series system node software	Release 2.4.0
ViewRunner for Windows	Release 2.4.0
ViewRunner for HP OpenView	Release 2.4.0

Part and Tool Requirements

To install or replace the dual-port DMT-2 ATU-C module, you need the following parts and tools:

- Dual-port DMT-2 ATU-C module.
- Each time you handle Cisco Digital Subscriber Line Access Multiplexer (DSLAM) equipment, including the chassis, modules, and cards, you must use ESD protection equipment.



Note

The Cisco 6100 Series system has no internal user-serviceable parts. However, you can add or remove a dual-port DMT-2 ATU-C module without removing power from the system (hot-swapping).

General Safety Precautions and Maintenance Guidelines

This section describes the following:

- General Safety Precautions
- Hot-Swapping Modules
- Module Installation and Replacement Suggestions

General Safety Precautions

Before working on the equipment, be aware of the hazards involved with the electrical circuitry and standard safety practices to prevent accidents. Adhere to the following cautions and warnings for safe and hazard-free installation.

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Note

To see translations of the warnings that appear in this publication, refer to the *Regulatory Compliance and Safety Information for the Cisco 6100 Series System* document.



Caution

Proper ESD protection is required whenever you handle Cisco DSLAM equipment. Installation and maintenance personnel should be properly grounded using ground straps to eliminate the risk of ESD damage to the equipment. Modules are subject to ESD damage whenever they are removed from the chassis.



Caution

Installing the modules in the chassis with the power leads reversed can damage the modules.



Caution

If the modules are installed when you apply power to the system, you could damage the modules and the chassis.



Warning

Use copper conductors only.



Warning

A readily accessible two-poled disconnect device must be incorporated in the fixed wiring.



Warning

Never install telephone wiring during an electrical storm.



Warning

Do not reach into a vacant slot or chassis while you install or removing a module or a fan. Exposed circuitry could constitute an energy hazard.



Warning











Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.

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-  Warning The ISDN connection is regarded as a source of voltage that should be inaccessible to user contact. Do not attempt to tamper with or open any public telephone operator (PTO)-provided equipment or connection hardware. Any hardwired connection (other than by a nonremovable, connect-one-time-only plug) must be made only by PTO staff or suitably trained engineers.
-  Warning The power supply circuitry for the Cisco DSLAM equipment can constitute an energy hazard. Before you install or replace the equipment, remove all jewelry (including rings, necklaces, and watches). Metal objects can come into contact with exposed power supply wiring or circuitry inside the DSLAM equipment. This could cause the metal objects to heat up and cause serious burns or weld the metal object to the equipment.
-  Warning Do not work on the system or connect or disconnect cables during periods of lightning activity.
-  Warning Use caution when installing or modifying telephone lines.
-  Warning Metal objects heat up when connected to power and ground, and can cause serious burns.
-  Warning Secure all power cabling when installing this unit to avoid disturbing field-wiring connections.
-  Warning Ultimate disposal of this product should be handled according to all national laws and regulations.
-  Warning This unit is intended for installation in restricted access areas. A restricted access area is where access can only be gained by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location
-  Warning The safety cover is an integral part of the product. Do not operate the unit without the safety cover installed. Operating the unit without the cover in place will invalidate the safety approvals and pose a risk of fire and electrical hazards
-  Warning Connect the unit only to DC power source that complies with the Safety Extra-Low Voltage (SELV) requirements in IEC 60950 based safety standards.

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- 
Warning This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations.
- 
Warning Care must be given to connecting units to the supply circuit so that wiring is not overloaded.
- 
Warning Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- 
Warning Do not use a telephone to report a gas leak in the vicinity of the leak.
- 
Warning Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
- 
Warning Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- 
Warning This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.
- 
Warning Do not use this product near water; for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.

Hot-Swapping Modules

The dual-port DMT-2 ATU-C module supports hot swapping. Hot swapping allows you to remove, replace, and rearrange the modules without disconnecting the system power. When the system detects that a module is added or removed, it automatically runs diagnostic and discovery routines, acknowledges the presence or absence of the module.

If you remove and replace a:

- DMT-2 ATU-C module with a DMT-2 ATU-C module—The newly installed module receives the same provisioning as the original module. The system resumes operation without any operator intervention.

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- CAP ATU-C or an STU-C module with a DMT-2 ATU-C module—You must delete the original module in ViewRunner before you remove it from the Cisco 6100/6130 chassis. If you do not delete the module before you install the DMT-2 ATU-C module, an alarm generates in the ViewRunner software.

After you remove the module and install the DMT-2 ATU-C module, the system identifies it as present but unprovisioned.

If an unprovisioned module is installed for the first time, the system identifies it as present but unprovisioned. Instructions for provisioning the module are found in the

- *ViewRunner for Windows Provisioning and Operation Guide*, if you are using ViewRunner for Windows as your management software
- *ViewRunner for HP OpenView Provisioning and Operation Guide*, if you are using ViewRunner for HP OpenView as your management software

Module Installation and Replacement Suggestions

The following are examples of recommended module installation and replacement practices:

- Do not force the module into its slot. This action can damage the pins on the backplane if they are not aligned properly with the module.
- When you install the module in the slot, ensure that the module is straight and not at an angle. This action can damage the module.
- Fully depress the ejector tabs to ensure that the module connector mates with the backplane correctly. Firmly seat the module in the slot.

Any module that is only partially connected to the backplane can disrupt system operation.

Removing and Installing a Dual-Port DMT-2 ATU-C Module

The following sections describe how to remove and replace or install a dual-port DMT-2 ATU-C module.

Removing a DMT-2 ATU-C Module



Caution

Proper ESD protection is required whenever you handle Cisco DSLAM equipment. Installation and maintenance personnel should be properly grounded using ground straps to eliminate the risk of ESD damage to the equipment. Modules are subject to ESD damage whenever they are removed from the chassis.

Use the following steps to remove the a module from the Cisco 6100/6130 chassis:

-
- Step 1** Open the front door on the Cisco 6100/6130 chassis.
 - Step 2** Lift up the ejector tab.
 - Step 3** Carefully slide the module out of the Cisco 6100/6130 chassis.

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Either replace the module that you remove, or insert a filler faceplate in the empty slot. See the “Installing or Replacing a DMT-2 ATU-C Module” section on page 10 for DMT-2 ATU-C module installation instructions. For filler faceplate installation instructions, refer to the *Cisco 6100 Series Direct Connect Installation Guide*.



Note

Although filler faceplates are not required for system operation, you must install them in all open slots of each chassis to achieve NEBS and thermal compliance. For more information on NEBS requirements, refer to the *Regulatory Compliance and Safety Information for the Cisco 6100 Series System* document.

Installing or Replacing a DMT-2 ATU-C Module

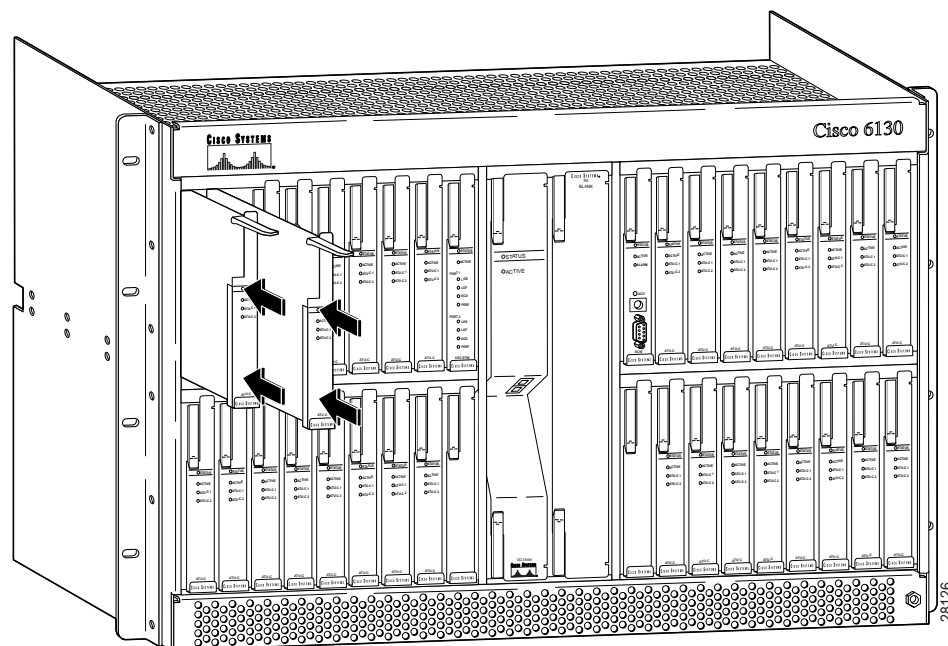


Caution

Proper ESD protection is required whenever you handle Cisco DSLAM equipment. Installation and maintenance personnel should be properly grounded using ground straps to eliminate the risk of ESD damage to the equipment. Modules are subject to ESD damage whenever they are removed from the chassis.

To install the dual-port DMT-2 ATU-C module in the Cisco 6100/6130 chassis, complete the following steps:

- Step 1** Vertically align the module edge with the module guides at the top and bottom of the Cisco 6100/6130 chassis slot.
- Step 2** Lift up on the ejector tab.
- Step 3** As you lift up the ejector tab and gently apply pressure to the bottom of the faceplate, push the module into the slot (see Figure 4).

*(DRAFT LABEL) ALPHA DRAFT - CISCO CONFIDENTIAL***Figure 4** *Dual-Port DMT-2 ATU-C Module Installation*

- Step 4** Push on the faceplate of each module to fully seat the module.
- Step 5** After the module is fully seated in the slot, press down on the ejector tab to secure the module.
- Step 6** After the brief self-test, verify that the Status LED is solid green. If the Status LED is not green after the self-test, refer to the *Cisco 6100 Series User Guide* for troubleshooting procedures.
- Step 7** If you are installing the module for the first time, provision it using the ViewRunner management software. For provisioning procedures, refer to the *ViewRunner for Windows Provisioning and Operation Guide* or *ViewRunner for HP OpenView Provisioning and Operation Guide*.

Traffic Handling

The dual-port DMT-2 ATU-C module supports the following data rates:

- Downstream—Maximum data rates of up to 8.032 Mbps
- Upstream—Maximum data rates of up to 864 kbps

Downstream refers to data coming from the network interface module and to the subscriber lines. *Upstream* refers to data coming from the subscriber lines to the network interface module.

System Controller Module Microprocessor

When the module is reset, the system controller (SC) module microprocessor executes boot flash. The boot flash code also contains a boot loader for the serial management bus (SMB). If the current image in the dual-port DMT-2 ATU-C module's flash is not the latest image available, the SC module sends the DMT-2 ATU-C module's run-time image over the SMB. The image is loaded and run from Flash.

Standards and Certifications

Table 3 lists dual-port DMT-2 ATU-C module standards and certifications.

Table 3 *Standards and Certifications*

Category	Description
International Telecommunication Union	G.992.1 Annex A
ANSI	T1.413 Issue 2
NEBS Level 3	Bellcore GR-63-CORE, GR-1089-CORE
EMI	FCC Part 15, Class A
Safety	UL 1950, 3rd Edition

Related Documentation

The following sections list the central office (CO) and customer premises equipment (CPE) publications that relate to the Cisco DSL product family.

CO Publications

A complete list of all released Cisco 6100 Series system with NI-1 related documentation is available on the World Wide Web at

http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/c6100/index.htm.

The following ViewRunner management software is used to provision and manage the Cisco 6100 Series system with NI-1. A complete list of all released ViewRunner documentation is available on the Word Wide Web.

- ViewRunner for Windows
http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/vrmgtsw/vr4w/index.htm
- ViewRunner for HP OpenView
http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/vrmgtsw/vr4ov/index.htm

CPE Publications

The Cisco CPE, also known as the Cisco 600 Series, is part of the Cisco end-to-end DSL product family. CPE comprises modems and routers at the customer site primarily used by home office and corporate LAN personnel. Most CPE uses the Cisco Broadband Operating System (CBOS) as its operating system. CBOS provides a comprehensive command set and web interface that allow you to configure your Cisco CPE modem or router.

A complete list of all released Cisco 600 Series documentation is available on the World Wide Web at http://www.cisco.com/univercd/cc/td/doc/product/dsl_prod/c600s/index.htm.

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- 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's Frequently Asked Questions (FAQ), contact cco-help@cisco.com. For additional information, contact cco-team@cisco.com.



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