



Cisco uBR10012 Universal Broadband Router DTCC Card

Revision History

Date	Revision	Change Summary
November 2009	OL-15406-03	Added information about the Serialized DTCC Field Programmable Gate Array (FPGA) Autoupgrade feature.
January 2009	OL-15406-02	Updated support for DTCC card in Cisco IOS Release 12.2(33)SCB.
July 2008	OL-15406-01	Updated information on Cisco IOS version supported on DTCC card.
March 2008	OL-15406-01	Updated LED tables.
December 2007	OL-15406-01	Initial release.

Purpose

The purpose of this document is to provide installation, removal, and troubleshooting information for the DOCSIS Timing, Communication and Control (DTCC) installed in the Cisco uBR10012 universal broadband router.

Audience

This document is intended for use by a field service engineer who is familiar with Cisco products and headend cable installation procedures.



Warning

Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
Statement 1030.



Scope

This document includes procedures for installing and removing the Cisco DTCC card that comes with the Cisco uBR10012 universal broadband router. This document also includes technical specifications and troubleshooting information.

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Prerequisites

- The DTCC card is supported beginning in Cisco IOS Release 12.3(23)BC and later. For information on Cisco IOS hardware and software release support and restrictions, refer to [Release Notes for the Cisco uBR10012 Universal Broadband Router for Cisco IOS Release 12.3BC](#).
- The DTCC card is supported in Cisco IOS Release 12.2(33)SCB and later. For more information on Cisco IOS hardware and software release support and restrictions, refer to [Cisco uBR10012 Router Release Notes for Cisco IOS Release 12.2\(33\)SCB](#)
- In Cisco IOS Release 12.2(33)SCB and later releases, you must ensure that two DTCC cards are installed and configured on the Cisco uBR10012 router before installing the line cards or the shared port adaptor (SPA). Installing and configuring only a single DTCC card on a Cisco uBR10012 router is not supported in Cisco IOS Release 12.2(33)SCB and later.
- The DTCC card requires PRE2 or versions later than PRE2.

Restrictions

The DTCC card is not supported in Cisco IOS Release 12.2(33)SCA and SCA-based releases.

Feature Overview

On the Cisco uBR10012 universal broadband router, the DTCC card acts as a secondary processor that performs the following functions:

- In the default DTI mode, a 10.24 MHz clock and 32-bit DOCSIS timestamp are generated by the DTI Server, propagated to DTI client using DTI protocol, and distributed by DTI client to each cable interface line card.
- Allows software to independently power off any or all cable interface line cards.
- Drives the LCD panel used to display system configuration and status information.
- Monitors the supply power usage of the chassis.
- Two RJ-45 cables with the DTI server, which, in turn, can generate the clock using its own oscillator or external timing reference inputs such as GPS or network clock.

Two DTCC cards are installed and configured as active (primary) and backup (redundant). If the DTCC card in the first slot is working at system power-up, it automatically becomes the active card and the DTCC card in the second slot becomes the backup card. The DTCC cards monitor each other's priority information, so that if the active card fails, the active card role is transferred to the redundant backup card without loss of data.

**Note**

In Cisco IOS Release 12.2(33)SCB and later releases, you must ensure that two DTCC cards are installed and configured in the Cisco uBR10012 router to properly time the system components and to distribute clocking correctly.

**Note**

When the **cable clock dti** command or its **no** form is used to configure the DTI clock reference mode, the DTCC card on the Cisco uBR10012 router restart and the cable modems may re-initialize or re-register.

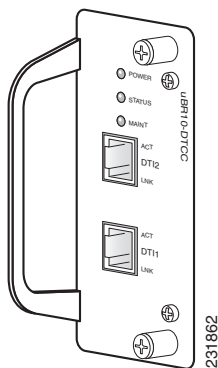
**Note**

In Cisco IOS Release 12.2(33)SCB and later releases, upgrading the DTCC card electronic programmable logical devices (EPLD) version, which is already at 0xEF, fails.

Each DTCC card contains two RJ-45 connectors labeled Primary and Secondary, on the front panel. See [Figure 1 on page 4](#). These connectors are for a primary and secondary (redundant) Stratum 3 external clock reference source that is traceable to a Stratum 1 clock source. The external reference source allows the Cisco uBR10012 router's reference clock to be synchronized to the Stratum 1 clock source, providing a free-running DOCSIS-quality clock reference and time stamp to the cable interface line cards.

If present, the primary DTI link is used. If it is lost, the secondary DTI link (if present) on the active DTCC card is used. If the active DTCC card stops functioning, control is transferred to the backup DTCC card, which then uses its primary and secondary clock reference sources. If neither card has a valid clock reference source, In DTI mode, all M-CMTS elements should have common timing source. The internal clock of DTI client cannot be used to provide DOCSIS clock and timestamp. High availability strategies (active/backup card, active/backup ports) should be used to prevent loss of common timing source.

Figure 1 Cisco DTCC Front Panel



The front panel on the DTCC card has seven LEDs. They are labeled POWER, STATUS, MAINTENANCE, PRESENT, and ACTIVE. The second set of PRESENT and ACTIVE LEDs are associated with the primary and secondary external clock reference inputs.

Table 1 describes the LEDs on the DTCC card.

Table 1 DTCC Card LEDs and Their Functions

LED Label	Color	State	Meaning
POWER	Green	On	Indicates that power is supplied to the DTCC card.
		Off	Power is off.
STATUS- bi-color	Yellow	On	Indicates that the CPU is in the bootup process, self-test, or downloading code.
	Green	On	Indicates that the CPU has successfully completed the boot, self-test, and code download process, and that the DTCC card is the active card.
	Green	Blinking	Indicates that the CPU has successfully completed the boot, self-test, and code download process, and that the DTCC card is the backup card.
MAINTENANCE	Off	—	Normally off. Indicates that no maintenance action is required.
	Yellow	On	Indicates a required maintenance operation and that the DTCC card can be hot-swapped.
LINK (DTI1)	Yellow	On	Indicates that DTI port 1 is operating in fast mode and the port is active.
	Yellow	Blinking	Indicates that DTI port 1 is operating in fast mode and the port is standby.
	Yellow	Off	Indicates that DTI port 1 is not in the fast mode.
ACTIVE (DTI1)	Green	On	Indicates that DTI port 1 is operating in normal or bridging mode and the port is active.
	Green	Blinking	Indicates that the DTI port 1 is operating in normal or bridging mode and the port is standby.
	Green	Off	Indicates that DTI port 1 is not in normal or bridging mode.
LINK (DTI2)	Yellow	On	Indicates that DTI port 2 is operating in fast mode.
	Yellow	Blinking	Indicates that DTI port 2 is operating in fast mode and the port is standby.

Table 1 DTCC Card LEDs and Their Functions (continued)

LED Label	Color	State	Meaning
	Yellow	Off	Indicates that DTI port 2 is not in the fast mode.
ACTIVE (DTI2)	Green	On	Indicates that DTI port 2 is operating in normal or bridging mode and the port is active.
	Green	Blinking	Indicates that the DTI port 2 is operating in normal or bridging mode and the port is standby.
	Green	Off	Indicates that DTI port 2 is not in normal or bridging mode.

Part Numbers and Technical Specifications

Table 2 lists the specifications for the DTCC card:

Table 2 DTCC Card Specifications

Description	Specifications
Product order number	<ul style="list-style-type: none"> UBR10-DTCC=
Chassis dimensions	<ul style="list-style-type: none"> Height: 4.73 in. (12.0142 cm) Width: 1.548 in. (3.93192 cm) Depth: 10 in. (25.4 cm)
Weight	1.5 lb. (.68 kg)
Power consumption	12 Watts (40.94 BTU ¹ per hour)
MTBF	431,348 hours
Temperature range	<ul style="list-style-type: none"> Operating: 41 to 104° F (5 to 40° C) Storage: -40 to 158° F (-40 to 70° C)
Relative humidity	<ul style="list-style-type: none"> Operating: 5 to 85% Storage: 5 to 95%
Operating altitude	-197 to 13,123 ft. (-60 to 4000 m)

1. British thermal units per hour

Upgrading the FPGA Image on DTCC Cards

The following two types of Field-Programmable Gate Array (FPGA) image upgrades are supported in Cisco IOS Release 12.2(33) SCC and later:

- Serialized DTCC FPGA autoupgrade—Supported only if two DTCC cards are installed on the Cisco uBR10012 router.
- Manual DTCC FPGA upgrade—Supported only if a single DTCC card is installed on the Cisco uBR10012 router. For more information about the manual upgrade, see [“Upgrading the FPGA Image Manually on a DTCC Card” section on page 7.](#)



Note

The DTCC card must have the FPGA version 0xEF or later for proper function of the Cisco UBR-MC20X20V cable interface line card. The FPGA autoupgrade or manual upgrade is required, if the FPGA image on the DTCC card is earlier to the FPGA version 0xEF.

Serialized DTCC FPGA Autoupgrade

The Serialized DTCC FPGA Autoupgrade feature enables automatic upgrade of the FPGA image stored in the on-board electrically erasable programmable read-only memory (EEPROM). This feature is supported in the following Cisco IOS Releases:

- Cisco IOS Release 12.2(33)SCB5 and later
- Cisco IOS Release 12.2(33)SCC and later

The Serialized DTCC FPGA Autoupgrade feature ensures that the FPGA image upgrade happens sequentially on the two DTCC cards installed on the Cisco uBR10012 router. The autoupgrade occurs only on the standby DTCC card. This is to ensure that the Cisco uBR10012 router functions using the active card in the event of an upgrade failure. The approximate autoupgrade time for each DTCC card is two minutes.

The autoupgrade occurs on the standby DTCC card after the Cisco uBR10012 router boots up. If the autoupgrade is successful on the standby card, the autoupgrade process triggers a DTCC card switchover to set the upgraded card as active. Once the upgraded card becomes active, the autoupgrade resumes on the second card, which moves to the standby state.



Note

If the first sequential autoupgrade fails on the standby card, the autoupgrade does not happen on the second DTCC card that was active at the time of the first sequential autoupgrade. Do not reset or unplug the DTCC card during the autoupgrade. The DTCC card might become unusable if you reset or unplug the card during the autoupgrade.

The autoupgrade occurs only if the following conditions are met:

- Two DTCC cards are available on the Cisco uBR10012 router.
- The first sequential autoupgrade on the standby card is successful.

The autoupgrade does not occur if:

- The first sequential autoupgrade fails on the standby card.
- Only one DTCC card is available on the Cisco uBR10012 router.

Prerequisites for Serialized DTCC FPGA Autoupgrade

Table 3 lists the hardware and software prerequisites for the Serialized DTCC FPGA Autoupgrade feature.

Table 3 Prerequisites for Serialized DTCC FPGA Autoupgrade

Board Hardware Revision	FPGA Version	IOS Release
0xA0 or higher	0xEF or higher	Cisco IOS Release 12.2(33)SCB5 and Cisco IOS Release 12.2(33)SCC

**Note**

A warning message is displayed when a DTCC card with an old firmware version (0xEE and earlier) becomes the active card. The warning message indicates that the active DTCC card does not have the latest firmware, and this may impact system behavior in the selected clock mode. If the card is in DTI mode, a warning message is not displayed.

Upgrading the FPGA Image Manually on a DTCC Card

In Cisco IOS Release 12.2(33) SCC and later, you can manually upgrade the FPGA image only if a single DTCC card is installed on the Cisco uBR10012 router.

**Caution**

The manual upgrade must be implemented on the Cisco uBR10012 router *only* in a lab environment as it could result in a service outage if implemented in a production cable network.

**Note**

If the manual upgrade fails or is interrupted, the DTCC card may become unusable. Do not reset or unplug the DTCC card during the manual upgrade. We recommend that you take precaution against extended downtime if the FPGA upgrade fails unexpectedly by having a standby DTCC card installed on the Cisco uBR10012 router.

To upgrade the FPGA image manually, complete the following steps:

SUMMARY STEPS

1. **enable**
2. **cable clock upgrade *slot/subslot***

DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><code>enable</code></p> <p>Example: Router> enable</p>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> Enter your password if prompted.
Step 2	<p><code>cable clock upgrade slot/subslot</code></p> <p>Example: Router# cable clock upgrade 1/1</p>	<p>Enters global configuration mode and starts the manual upgrade.</p> <ul style="list-style-type: none"> <i>slot</i>—Chassis slot number for the DTCC card. The valid slot is 1. <i>subslot</i>—Secondary slot number for the DTCC card. Valid subslots are 1 or 2. <p>Note You will have to enter y (yes) when the system prompts you to continue the upgrade.</p>

Verifying the FPGA Upgrade

To verify the FPGA autoupgrade or manual upgrade on the Cisco uBR10012 router, use the **show controllers clock-reference** command in privileged EXEC mode.

The following is a sample output of the **show controllers clock-reference** command on the Cisco uBR10012 router with two DTCC cards (autoupgrade):

```
Router# show controllers clock-reference

Controllers for Card in Slot: 1
Interrupt Status Reg           : 0x40
Interrupt Mask Reg             : 0xF85F
UCPC Bus Control Status Reg    : 0x4053
Push Button Status Reg         : 0x0
Line Card Presence Status Reg  : 0xC2
LC Power off Control Reg       : 0x0
PEM0 Voltage Monitor High Time Reg : 0x3F
PEM0 Voltage Monitor Total Time Reg : 0x7F
PEM0 Current Monitor High Time Reg : 0x25
PEM0 Current Monitor Total Time Reg : 0xE3
PEM1 Voltage Monitor High Time Reg : 0x0
PEM1 Voltage Monitor Total Time Reg : 0x0
PEM1 Current Monitor High Time Reg : 0x0
PEM1 Current Monitor Total Time Reg : 0x0
Main EPLD version Reg          : 0xEF
Mode selection Reg             : 0x0
LCD Control Reg RS0            : 0x66
LCD Control Reg RS1            : 0x20
General Purpose Control Reg 0   : 0x0
General Purpose Control Reg 1   : 0x0
General Purpose Control Reg 2   : 0x40
LC Power off Status Reg        : 0x0
Push Button Input Reg          : 0xFF
LC Presence Input Reg          : 0x3D
Controllers for Card in Slot: 2
Interrupt Status Reg           : 0x40
Interrupt Mask Reg             : 0xF85F
UCPC Bus Control Status Reg    : 0x4035
Push Button Status Reg         : 0x0
```



```

Line Card Presence Status Reg      : 0xC2
LC Power off Control Reg          : 0x0
PEM0 Voltage Monitor High Time Reg : 0x3F
PEM0 Voltage Monitor Total Time Reg : 0x24
PEM0 Current Monitor High Time Reg  : 0x0
PEM0 Current Monitor Total Time Reg : 0x0
PEM1 Voltage Monitor High Time Reg  : 0x3F
PEM1 Voltage Monitor Total Time Reg  : 0x24
PEM1 Current Monitor High Time Reg   : 0x0
PEM1 Current Monitor Total Time Reg  : 0x0
Main EPLD version Reg             : 0xEA
Mode selection Reg                 : 0x0
LCD Control Reg RS0                : 0xC8
LCD Control Reg RS1                : 0xC8
General Purpose Control Reg 0      : 0x0
General Purpose Control Reg 1      : 0x0
General Purpose Control Reg 2      : 0x40
LC Power off Status Reg            : 0x0
Push Button Input Reg              : 0xFF
LC Presence Input Reg              : 0x3D
Power Entry Module 0 Power         : 686w
Power Entry Module 0 Voltage       : 49v

```

Verifying the Board Hardware Revision

The board hardware revision refers to the hardware revision of the DTCC card. To verify the board hardware revision, use the **show diag** command in privileged EXEC mode.

The following is a sample output of the **show diag** command on the Cisco uBR10012 router:

```

Router# show diag 1/1

Slot/Subslot 1/1:
2cable-dtcc card, 0 ports
Card is half slot size
Card is analyzed
Card detected 16:44:01 ago
Card uptime 0 days, 16 hours, 46 minutes, 3 seconds
Card idle time 0 days, 8 hours, 52 minutes, 16 seconds
Voltage status: 3.3V Nominal 2.5V Nominal 1.8V Nominal 1.2V Nominal
EEPROM contents, slot 1/1:
Controller Type      : 1456
Hardware Revision   : 2.0
Top Assy. Part Number : 800-29390-01
Top Assy. Revision  : A0
Product Identifier (PID) : UBR10-DTCC
Version Identifier (VID) : V01
CLEI Code            : IPUCAL1BAA
Deviation Number     : 0
Fab Version          : 02
PCB Serial Number    : CAT1219E1HK
RMA Test History     : 00
RMA Number           : 0-0-0-0
RMA History          : 00
LCMON version, slot 1/1

```

Safety Warnings

Warning Definition



Warning

IMPORTANT SAFETY INSTRUCTIONS

This warning symbol 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. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

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 de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza IMPORTANTI ISTRUZIONI SULLA SICUREZZA

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel VIKTIGE SIKKERHETSINSTRUKSJONER

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! INSTRUCCIONES IMPORTANTES DE SEGURIDAD

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! VIKTIGA SÄKERHETSANVISNINGAR

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR**Figyelem****FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmeztető jel veszélyre utal. Sérülésveszélyt rejtő helyzetben van. Mielőtt bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplő figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**Предупреждение****ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ**警告****重要的安全性说明**

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告**安全上の重要な注意事項**

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

Electrical Equipment Guidelines

Follow these basic guidelines when working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before moving a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) damage, which occurs when electronic cards or components are improperly handled, can result in complete or intermittent failures. The AC-input power shelf and its AC power modules contain a printed circuit card that is fixed in a metal carrier. Electromagnetic interference (EMI) shielding and connectors are integral components of the carrier. Although the metal carrier helps to protect the cards from ESD, use an anti-static strap each time you handle the modules.

Following are guidelines for preventing ESD damage:

- Always use an ESD-preventive wrist or ankle strap and ensure that it makes good skin contact. Before removing a card from the chassis, connect the equipment end of the strap to a bare metal, unpainted surface on the chassis or rack-mount.
- Handle components by the carrier edges only; avoid touching the card components or any connector pins.
- When removing a module, place it on an anti-static surface or in a static-shielding bag. If the module will be returned to the factory, immediately place it in a static-shielding bag.
- Avoid contact between the modules and clothing. The wrist strap protects the card from ESD voltages on the body only; ESD voltages on clothing can still cause damage.



Caution

For safety, periodically check the resistance value of the anti-static strap. The measurement should be between 1 and 10 megohms.

Removing and Replacing the Cisco DTCC Card

To install a new DTCC card or to replace an existing card, use the procedures that follow.



Tip

With two DTCC cards installed for redundant operation, one of the cards can be removed and replaced without interrupting system operations.

Equipment

To remove and replace an individual Cisco LCD module, you need the following:

- Replacement DTCC card, product order number UBR10-DTCC=.
- ESD-preventive wrist strap.

Unpack the DTCC Card

To unpack the DTCC card, complete the following steps:

-
- Step 1** Make sure that you are properly grounded with an ESD-preventive ground strap.
 - Step 2** Open the shipping box and remove the DTCC card.
 - Step 3** Place the DTCC card on an anti-static surface.
-

Remove the DTCC Card

-
- Step 1** Make sure that you are properly grounded.
 - Step 2** Clear enough interface and power cables to allow sufficient space to work.
 - Step 3** If installing a new DTCC card, remove the blank slot cover and discard it; then, proceed to [Step 1](#). Otherwise, disconnect the DTI connection cables from the DTCC card being replaced.



Note The backup DTCC card should be present in order to maintain proper synchronization of the line cards.

- Step 4** Unscrew the top and bottom captive screws on the DTCC card ([Figure 2 on page 15](#)).
- Step 5** Pull the DTCC card out of the slot and place it on an anti-static surface or in an anti-static bag.

Figure 2 DTCC Card Captive Screws

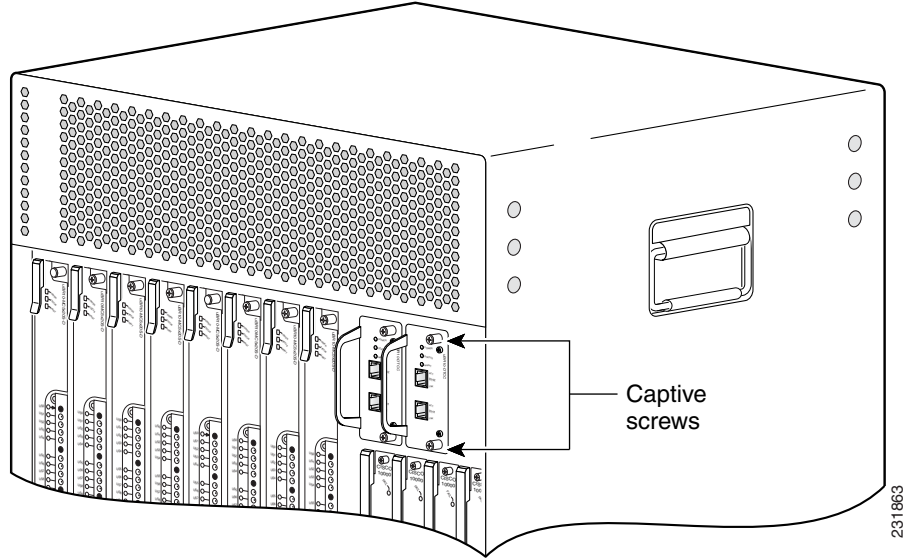
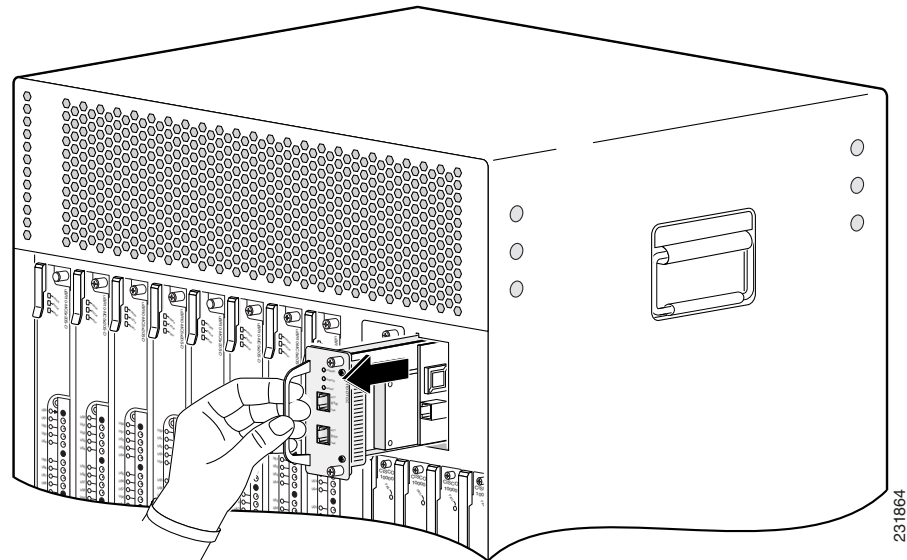


Figure 3 Removing the DTCC Card



Step 6 If you are installing a replacement card, proceed to the next step. Otherwise, install a blank cover over the slot and screw down its captive screws to conclude this procedure.

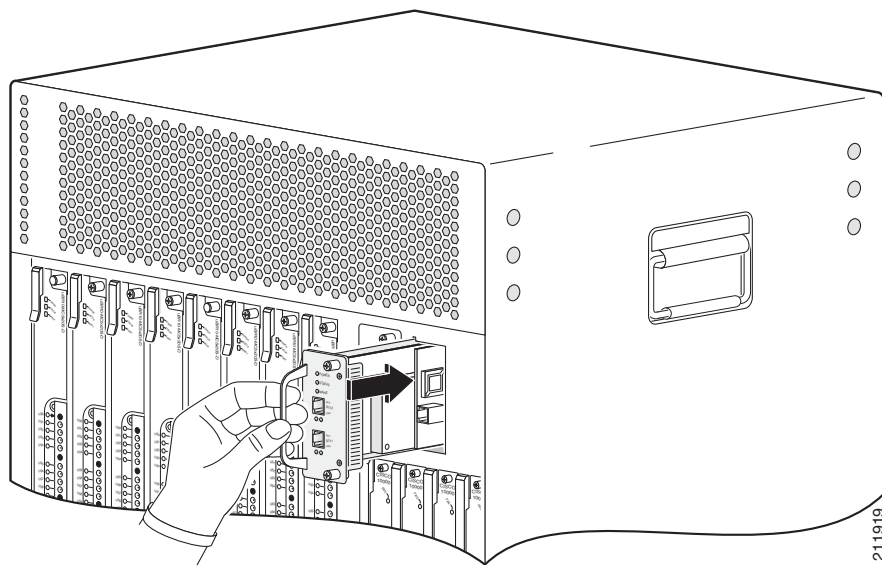


Note For proper cooling and airflow, a cover must always be installed in a blank DTCC card slot. The product order number for the blank DTCC card cover is UBR10-DTCC-COVER=.

Replace the DTCC Card

- Step 1** Pick up the replacement DTCC card, and position it in front of the card slot.
- Step 2** Carefully align the upper and lower edges of the line card with the upper and lower guides in the chassis, and slide the line card into the slot, so that it firmly seats in the backplane connectors ([Figure 4](#)).

Figure 4 Inserting the DTCC Card



- Step 3** Secure the line card in the chassis by tightening the top and bottom captive screws ([Figure 2 on page 15](#)).



Caution

Always tighten the captive screws on each DTCC card. These screws prevent accidental removal and provide proper grounding for electromagnetic interference (EMI) shielding.

- Step 4** When fully inserted, the DTCC card cycles through its power-on self-test. If the STATUS LED remains yellow or remains off, the card is not working properly. See the [“Troubleshooting the Cisco DTCC Card” section on page 17](#).
- Step 5** Connect DTI ports to DTI Server. The port can be connected either to the Root Server, or subtending Slave Server, in the way that all ports have common Root Server.
- Step 6** Configure the DTCC card, if necessary.

Refer to [“Formatting Flash Memory Cards and Disks”](#) section in the *Cisco uBR10012 Universal Broadband Router Hardware Installation Guide* or the *Cisco uBR10012 Universal Broadband Router Software Configuration Guide*, see the [“Troubleshooting the Cisco DTCC Card” section on page 17](#).



Note

It is not necessary to configure the DTCC card if you are installing a replacement card in the identical slot. The system automatically downloads the necessary configuration information from the performance routing engine (PRE).

Troubleshooting the Cisco DTCC Card

Check the following if a problem appears on one of the PRE modules:

- If both PREs are operating correctly, check the POWER LEDs on each DTCC card. Are the POWER LEDs on each DTCC card on (green)?
 - If no, remove the DTCC card and reinsert it, making sure that it firmly connects to the backplane and that both captive screws are tightly connected.
 - If yes, proceed to the next step.
- Is the STATUS LED on the primary DTCC card on (green) to indicate that it is the primary card?

Is the STATUS LED on the secondary DTCC card flashing (green) to indicate that it is the redundant card?

- If no, check that the version of Cisco IOS you have loaded on the router supports the DTCC card.
- Is the Green DTI Status LED on the active port of primary card on, to indicate that DTI connection is valid?
- Check that the version of Cisco IOS supports the DTCC card.
- In Cisco IOS Release 12.2(33)SCB and later releases, check if two DTCC cards are installed and configured in the Cisco uBR10012 router.

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, which also lists all new and revised Cisco technical documentation, at:

<http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html>

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS version 2.0.

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