



Cisco UBR-MC20X20V Cable Interface Line Card Quick Start Guide

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Overview

The Cisco UBR-MC20X20V cable interface line card transmits and receives radio frequency (RF) signals between the subscriber and the headend.

The Cisco UBR-MC20X20V line cards have five downstream (DS) ports and twenty upstream (US) ports. The line card supports five cable MAC domains (cable interfaces), and the 20 DS and 20 US channels are dynamically associated with any of these five MAC domains. The card has twenty US spigots and five DS spigots. Each of the US spigots supports either two-frequency stacked US channels across ten ports or a single US channel across twenty ports. Each of the DS spigots supports four-frequency stacked channels across five ports.

[Figure 1](#) shows the Cisco UBR-MC20X20V line card faceplate with *Configured as UBR-MC20X20V-20D* bar code label printed on it to indicate that the software license installed on the card supports 20 DS channels. The product ID (PID) of this card is *UBR-MC20X20V-20D*.



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Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

Figure 1 Cisco UBR-MC20X20V-20D Cable Line Card

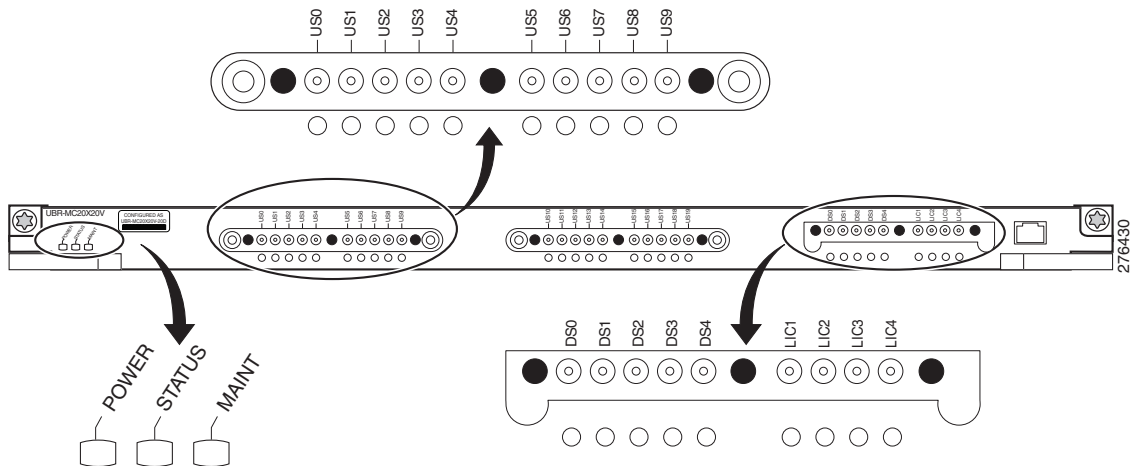


Figure 2 shows the Cisco UBR-MC20X20V line card faceplate with *Configured as UBR-MC20X20V-5D* bar code label printed on it to indicate that the software license installed on the card supports five DS channels. The PID of this card is *UBR-MC20X20V-5D*.

Figure 2 Cisco UBR-MC20X20V-5D Cable Line Card

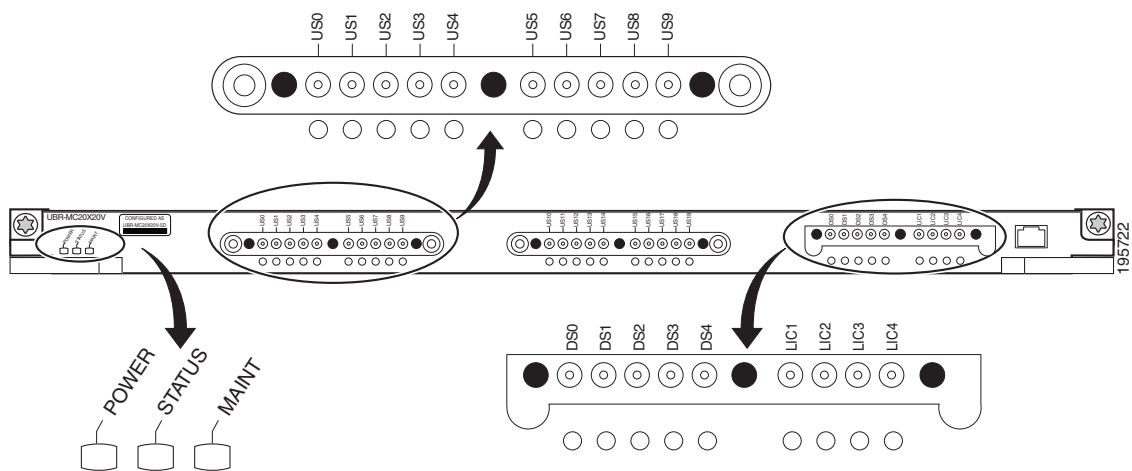
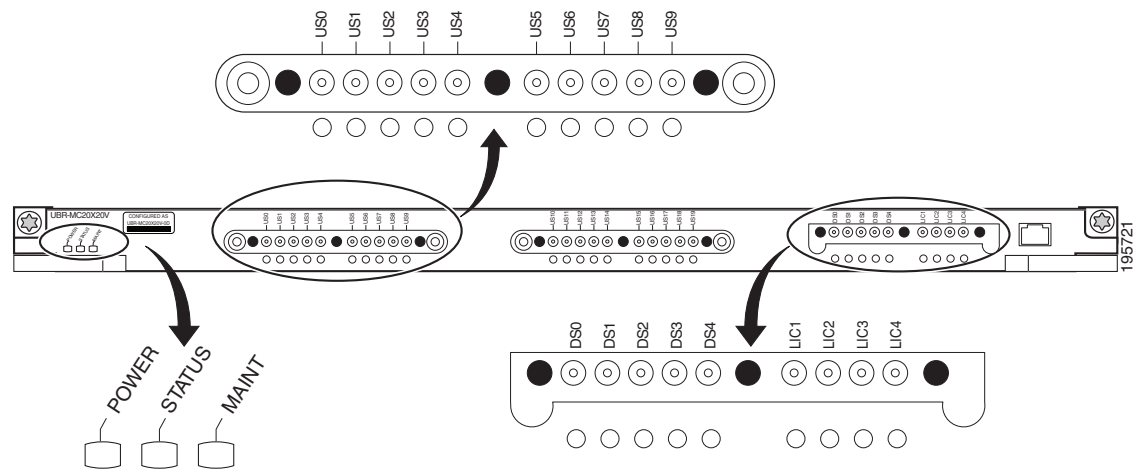


Figure 3 shows the Cisco UBR-MC20X20V line card faceplate with *Configured as UBR-MC20X20V-0D* bar code label printed on it to indicate that the software license installed on the card does not support DS channels. The PID of this card is *UBR-MC20X20V-0D*.

Figure 3 Cisco UBR-MC20X20V-0D Cable Line Card



Four LEDs on the line card faceplate indicate the license status. For Software Licensing information, refer to *Cisco UBR-MC20X20V Cable Interface Line Card Hardware Installation Guide*.


Note

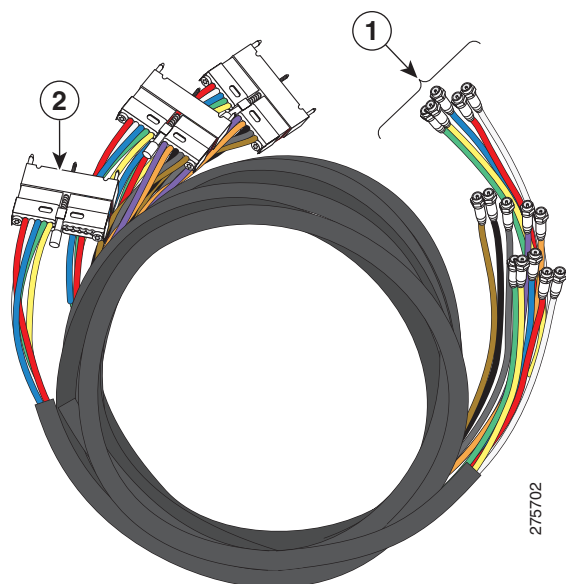
You must ensure that two DOCSIS Timing, Communication and Control (DTCC) cards are configured on the Cisco uBR10012 router before installing the Cisco UBR-MC20X20V cable interface line card.

Quad-Shield Coaxial Cable Bundles for Cisco UBR-MC20X20V Cable Interface Line Card

Quad-shield coaxial cable bundles for the Cisco UBR-MC20X20V cable interface line card can be purchased from Cisco, with the Universal Cable Holders (UCH) already connected to the coaxial cable bundles. Alternatively, custom-length quad-shield coaxial cable bundles can be purchased from third party vendors, with the UCH either connected to the cable bundles or provided as separate components.

Figure 4 shows the cable bundle for Cisco UBR-MC20X20V cable interface line card to hybrid fiber-coaxial (HFC) plant that has twenty five F connectors attached to one end and three UCH2 units attached to the other end. This cable is 9.84 feet (3 m) long and the part number is CAB-RFSW520QTIMF2.

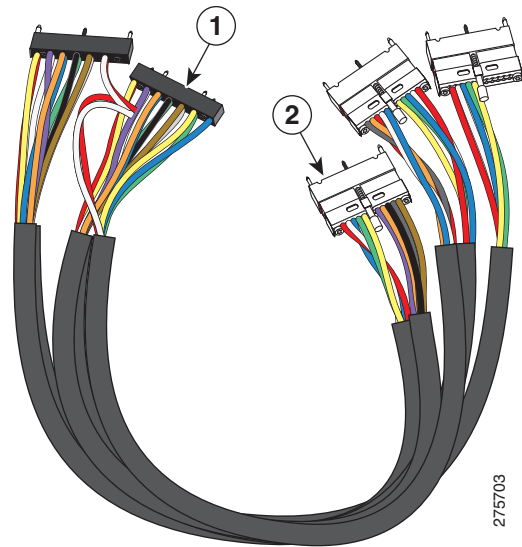
Figure 4 Cable Bundle with UCH2 Units and F Connectors



1	F Connectors	2	UCH2
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Figure 5 shows the cable bundle for Cisco UBR-MC20X20V cable interface line card to RF switch that has three UCH2 units attached to one end and two RF switch header blocks attached to the other end. This cable is 3.2 feet (1 m) long and the part number is CAB-RFSW520QTIMM2.

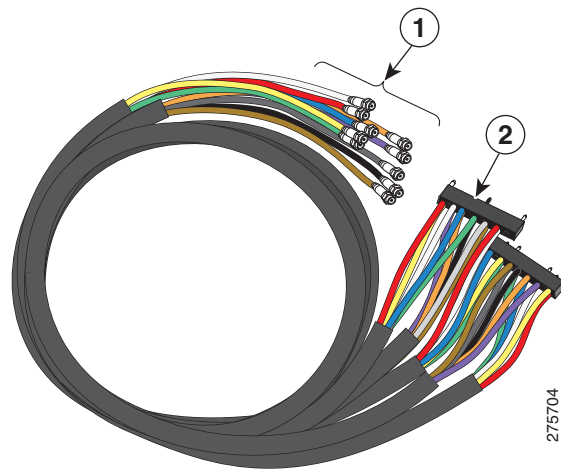
Figure 5 Cable Bundle with UCH2 Units and RF Switch Header Blocks



1	RF Switch Header Blocks	2	UCH2
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Figure 6 shows the cable bundle for RF switch to HFC plant that has two RF switch header blocks attached to one end and twenty five F connectors attached to the other end. This cable is 9.84 feet (3 m) long and the part number is CAB-RFSW520QTPMF2.

Figure 6 Cable Bundle with RF Switch Header Blocks and F Connectors



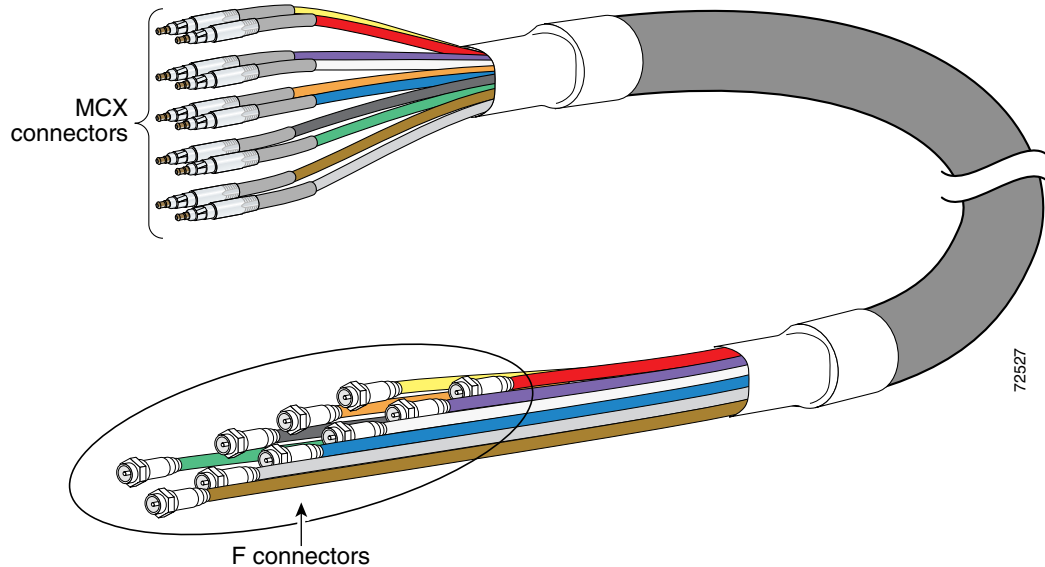
1	F Connectors	2	RF Switch Header Blocks
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Note

Customers purchasing custom-length quad-shield coaxial cable bundles from third party vendors can purchase spare Universal Cable Holders and spare RF switch header blocks from Cisco. Please refer to [Table 4](#) for the applicable Cisco part numbers.

If you are cabling the card to the Cisco uBR 3X10 RF Switch, you must have MCX connectors at either end of the cable.

Figure 7 10-Bundle Dual-Shielded Cable with MCX Connectors



Safety Guidelines

Following are safety guidelines that you should follow when working with any equipment that connects to electrical power.

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. Make sure that the chassis and/or rack has a grounding cable installed. (For more information, see the [Cisco uBR10012 Universal Broadband Router Hardware Installation Guide](#).)
- 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 megaohms.

Installing the Cisco UBR-MC20X20V Cable Interface Line Card

To install a Cisco UBR-MC20X20V line card, complete the following steps:



Caution

Make sure that you are grounded using an ESD-preventive wrist or ankle strap.

Step 1 Remove the protective sticker covering the DS ports of the line card.

Step 2 Verify that the ejector levers are open.



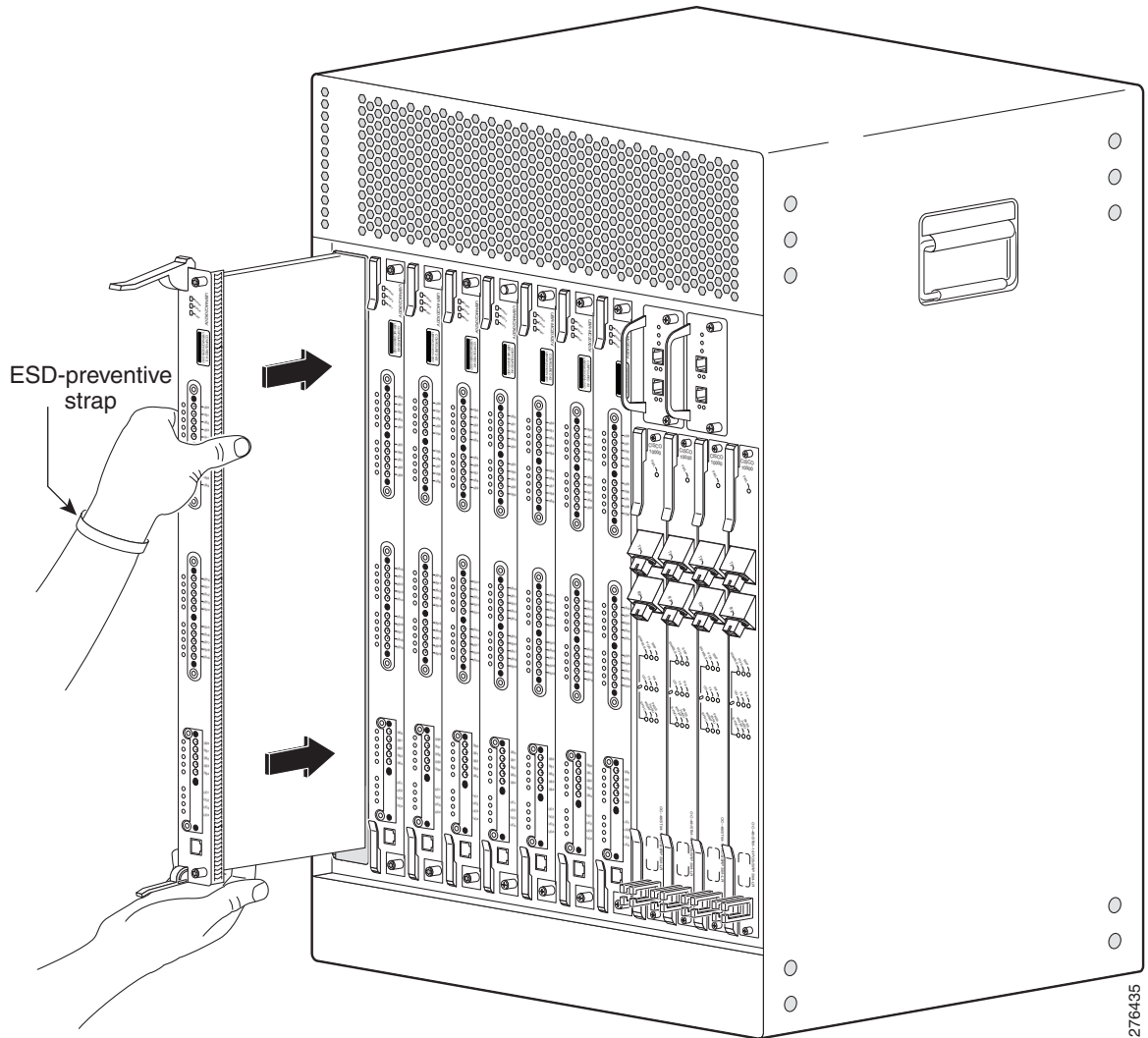
Caution

This Cisco UBR-MC20X20V line card weighs 16 lbs. Use both hands when handling the card. Do not drop the card or otherwise damage the carrier rails. Bent or damaged rails can damage the card guides and prevent line card installation. When installing cards for the first time, or when all the card's captive screws are loose, insert cards first in slot 5/1 and work towards slot 8/0 to prevent uneven gasket pressure.

Step 3 Grasp the faceplate with one hand and place your other hand under the card.

Step 4 Align the upper and lower edges of the card with the upper and lower guides in the chassis.

Figure 8 Installing the Card



Step 5 Slide the card into the slot until you can feel it seat in the backplane connectors.

Step 6 Close both ejector levers to secure the card in the chassis. Engage and begin tightening the captive screws first by hand. Then, use either a T-10 Torx (included in the line card accessory kit) or a common flathead screwdriver to tighten the captive screws between 5 to 7 in-lbs.


Caution

Only tighten the captive screws to a maximum of 7 in-lbs.


Tip

Make sure that the captive screws are secure for proper electromagnetic interference (EMI) shielding.

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Cabling the Cisco UBR-MC20X20V Cable Interface Line Card

The Cisco UBR-MC20X20V cable interface line card uses 75-ohm precision video coax cables and 75-ohm MCX connectors to connect to the CMTS.

The following procedures are for the customized RF cables and for the maintenance of the Cisco preconfigured cable bundles.

- [Installing the Cables](#)
- [Installing the UCH2](#)

Installing the Cables



Caution

The UCH2 must be used for all Cisco UBR-MC20X20V line card cable connections. Failure to use the UCH2 may cause permanent damage to the line card connectors and result in low or no RF output.



Caution

Do not attempt to remove or install cables in the UCH2, when the UCH2 is attached to the faceplate.

Step 1

Loosen the top screws and slide open the lock bar. (If the UCH2 is already installed in the line card, use a screwdriver to slide open the bar.)

Step 2

Remove the ESD cap from a cable, and insert it into the hole in the UCH2. See [Figure 9](#).



Caution

When using quad-shielded cables, make sure there is no heat-shrink wrap on the ends by the MCX connectors.

Cisco cables are color-coded for easy reference and installation. The cable color corresponds to a specific port on the card. The tables include a column for users to define ports and color definitions.

[Table 1](#) lists the cable ports and associated cable color applicable when using MC20X20V dual-shielded cables or quad-shielded cabling.



Note

Precision miniature video coaxial cables come in various colors, and you can use any cable color combination. However, when you are connecting the Cisco UBR-MC20X20V cable interface card to the Cisco RF switch, we recommend that you install the cables in the UCH2 as listed in [Table 1](#) (see [Figure 9](#)).

Table 1 MC20X20V Dual/Quad Shielded Cable Ports and Cable Colors

Universal Cable Holder (1)			Universal Cable Holder (2)			Universal Cable Holder (3)		
Line Card Port	Cable Color	RF Switch User Defined	Line Card Port	Cable Color	RF Switch User Defined	Line Card Port	Cable Color	RF Switch User Defined
US ¹ 0	Red		US10	Gray		DS ² 0	Red	
US1	White		US11	Brown		DS1	White	
US2	Blue		US12	Red		DS2	Blue	
US3	Green		US13	White		DS3	Green	
US4	Yellow		US14	Blue		DS4	Yellow	
US5	Violet		US15	Green		—	—	
US6	Orange		US16	Yellow		—	—	
US7	Black		US17	Violet		—	—	
US8	Gray		US18	Orange		—	—	
US9	Brown		US19	Black		—	—	

1. US = upstream
2. DS = downstream

Table 2 Legacy 5-Color MC20X20V Quad-Shielded Cable Ports and Cable Colors

Universal Cable Holder (1)			Universal Cable Holder (2)			Universal Cable Holder (3)		
Line Card Port	Cable Color	RF Switch User Defined	Line Card Port	Cable Color	RF Switch User Defined	Line Card Port	Cable Color	RF Switch User Defined
US ¹ 0	Red		US10	Red		DS ² 0	Red	
US1	White		US11	White		DS1	White	
US2	Blue		US12	Blue		DS2	Blue	
US3	Green		US13	Green		DS3	Green	
US4	Yellow		US14	Yellow		DS4	Yellow	
US5	Red		US15	Red		—	—	
US6	White		US16	White		—	—	
US7	Blue		US17	Blue		—	—	
US8	Green		US18	Green		—	—	
US9	Yellow		US19	Yellow		—	—	

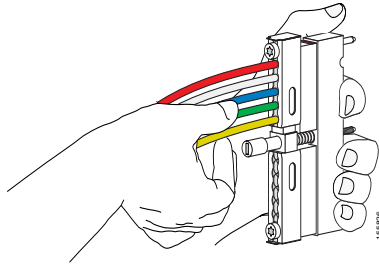
1. US = upstream
2. DS = downstream

Step 3 Insert the cable completely into the UCH2. (The cables will fit loosely in the holes until the lock bar is closed in [Step 5](#).)



Caution Do not kink the cables.

Figure 9 *Inserting a Cable in the UCH2*



- Step 4** Repeat this procedure for all of the cables.
- Step 5** Ensure the cables are fully inserted in the UCH2 and slide the lock bar closed completely. (The lock bar will not close if cables are not fully inserted or properly aligned.)
- Step 6** Using the T-10 TORX driver tool tighten the screws on the lock bar (maximum torque—10 in-lbs).

Installing the UCH2

After the cables are installed in the UCH2, perform the following steps to prevent ESD damage to the line card.



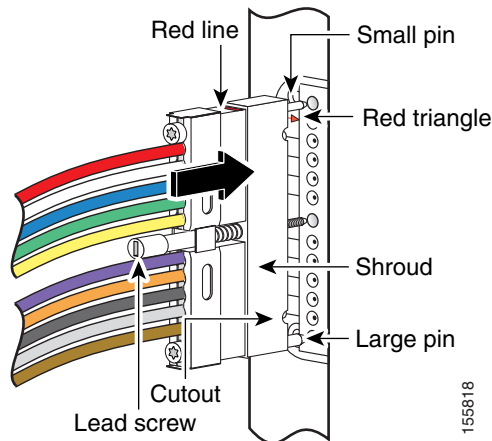
Note Before proceeding, remove the protective sticker covering the line card DS ports.



Caution Make sure that you are grounded using an ESD-preventive wrist or ankle strap.

- Step 1** Attach a jumper cable to the ground point on the chassis.
- Step 2** Briefly touch the center of each cable connector with the jumper cable to remove any built-up ESD potential.
- Step 3** Position the UCH2 so the red line is on the same side as the red triangle on the faceplate.

Figure 10 Installing the UCH2



- Step 4** Align the end pins with the pin holes in the faceplate of the line card, and guide the UCH2 onto the faceplate.
- Step 5** Hold the cables and UCH2 in place while finger tightening the leadscrew. Do not bend the cables at right angles.
- Step 6** Use the flathead screwdriver to tighten the leadscrew 10 in-lbs, (maximum torque 15 in.-lbs).



Caution Torquing the leadscrew to more than 20 in-lbs can cause the leadscrew to fail.

The UCH2 is fully engaged when the semi-circles on the shroud show metal and the red and black lines are completely covered. See [Figure 10](#).

Removing the Cisco UBR-MC20X20V Cable Interface Line Card

Shut down the card interface before removing the card from the chassis. Refer to “Shutting Down and Restarting the Interface” in the *Cisco uBR10012 Software Configuration Guide*.

If the maintenance LED is on, you can remove the card without affecting system operations.

This section describes how to remove the Cisco UBR-MC20X20V cable interface line card from the chassis.

- [Removing the UCH2](#)
- [Removing the Cables](#)
- [Removing the Card](#)

Removing the UCH2

The following instructions describe the disconnection process for the customized uBR cables and the maintenance of the Cisco preconfigured cable bundles.



Caution Make sure that you are grounded using an ESD-preventive wrist or ankle strap.

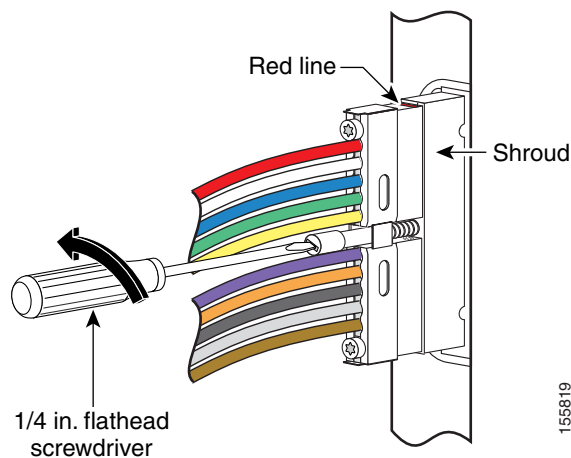
Step 1 Loosen the leadscrew (counterclockwise) on the UCH2 until it is completely disengaged from the faceplate.

Step 2 Pull the UCH2 straight away from the faceplate using the leadscrew.



Caution Do not use the cables to pull the UCH2 from the faceplate.

Figure 11 Removing the UCH2



Removing the Cables

Step 1 Use the T-10 TORX driver tool to loosen the lock bar on the side you want to remove cables.

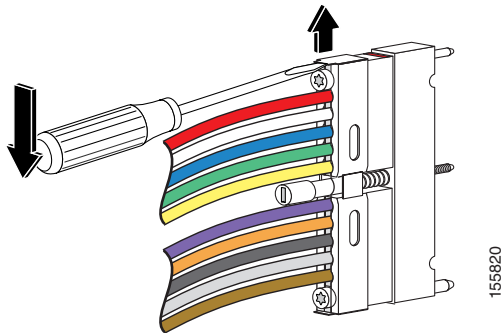
Step 2 Slide the lock bar open by hand, or with a flathead screwdriver if the bar is stuck or hard to access. See [Figure 12](#). (Make sure the lock bar is completely open or the cables will not release.)



Caution Be careful not to bend the cables.

Step 3 Carefully pull the cable out of the hole.

Figure 12 Sliding Open the Lock Bar



Removing the Card

-
- Step 1** Using a T-10 TORX driver tool or flathead screwdriver, unscrew the top and bottom captive screws on the card.
 - Step 2** Simultaneously pivot both ejector levers away from each other to disengage the card from the backplane.
 - Step 3** Slide the card out of the slot and place it on an antistatic surface with the component side facing up.



Tip

Always install a blank cover in an empty slot to ensure proper cooling and airflow.

Troubleshooting

Check the following:

1. Verify that the LEDs light and go through the power on self test (POST) when the card is inserted in the chassis.
2. Verify that the captive screws and ejector levers are secure.
3. Verify that the POWER LED is on (green). If the LED is off (not green):
 - a. Verify that there is power to the system.
 - b. Verify that the card is configured for the system.

Table 3 LED Descriptions

LEDs	Description
POWER	
Green	Power on
Off	Power off
STATUS	
Green	Booted, passed diagnostics
Blinking green	Protect mode if redundant card
Yellow	In bootup mode

Table 3 LED Descriptions (continued)

LEDs	Description
MAINT Off Yellow	No action required Okay to remove the card
US0–US19 Green Off	Configured, able to pass traffic Not enabled
DS0–DS4 Green Off	At least one frequency on the quad-stacked downstream is able to pass traffic Not enabled
LIC1 to LIC4 Green	Each LIC LED indicates 5 downstream (DS) channels. For example, if LIC1–LIC2 LEDs are green, it indicates 10 DS channels. If LIC1–LIC4 LEDs are green, it indicates 20 DS channels.
Off Blinking green	Line card supports 0 DS channels. Invalid or no license.

- If the card is cabled, check to see that the cables are securely attached and in the correct location.
- Contact Cisco TAC for further information and help at the following URL:

<http://www.cisco.com/tac>

Technical Specifications

Table 4 Part Numbers

Description	Part Num/Specification
<ol style="list-style-type: none"> Cisco UBR-MC20X20V line card Blank card slot covers 	<ol style="list-style-type: none"> UBR-MC20X20V-20D=, UBR-MC20X20V-5D=, UBR-MC20X20V-0D= UBR10-MC-COVER=
Cable kit (3m MCX to F cables)¹	
Dual-shielded	<ul style="list-style-type: none"> CAB-RFSW520TPMF=, Cisco Systems, Inc.
Quad-shielded	<ul style="list-style-type: none"> CAB-RFSW520QTPMF=, Cisco Systems, Inc.
Universal Cable Holder (UCH)	
<ol style="list-style-type: none"> UCH2 Universal Cable Holder for MCX connectors, qty 3 pcs 	<ol style="list-style-type: none"> CAB-520-UCH2, Cisco Systems CAB-520-MULT-UCH2

Table 4 Part Numbers

Description	Part Num/Specification
<ol style="list-style-type: none"> 1. Cable bundle for RF card to HFC plant: 3 UCH2 units attached to one end and 25 F connectors attached to the other end, 9.84 feet (3 m) long. 2. Cable bundle for RF card to RF switch: 3 UCH2 units attached to one end and 2 RF switch header blocks attached to the other end, 3.2 feet (1 m) long. 3. Cable bundle for RF switch to HFC plant: 2 RF switch header blocks attached to one end and 25 F connectors attached to the other end, 9.84 feet (3 m) long. 	<ol style="list-style-type: none"> 1. CAB-RFSW520QTIMF2= 2. CAB-RFSW520QTIMM2= 3. CAB-RFSW520QTPMF2=
RF switch header blocks for MCX connectors, qty 4 pcs	CAB-RFSW-MULT-HB

1. In Europe only, the Cisco UBR-MC20X20V line card must use quad-shielded cables. In all other regions, the Cisco UBR-MC20X20V line card can use dual-shielded or quad-shielded cables.

Table 5 Specifications

Ports	Specification
Cisco UBR-MC20X20V line card frequency range—55–999 MHz	
US ports frequency range—5–65 MHz	
DS ports frequency range—55–999 MHz	
Modulation	
Upstream (US0–US19)	QPSK 8-, 16-, 32-, 64-QAM
Downstream (DS0–DS4)	64-QAM, 256-QAM
RF output power range—See RF Output Power Range .	
Power consumption	
MC20X20V	250 W (853 BTU/hr)
Weight	16 lb (7.26 kg)

RF Output Power Range

All the channels within a controller must have the same RF power value. When the rf power value is changed on any one channel, the same value is applied to all the channels within the controller.

The recommended RF power range depends on the mode of the upconverter. The mode of the upconverter is decided by the highest numbered channel that is enabled. [Table 6](#) lists the mode and the corresponding RF power range.

Table 6 RF Output Power Range

Upconverter Mode	Channel Setting	Recommended RF Power Range
Single	Any one channel is enabled (channel 0, 1, 2 or 3)	60.0 to 52.0 dBmV
Dual	Any two adjacent channels are enabled (channels 0–1, 1–2, or 2–3)	56.0 to 48.0 dBmV
Triple	Any three adjacent channels are enabled (channels 0–2, or 1–3)	54.0 to 46.0 dBmV
Quad	All four channels are enabled (channels 0, 1, 2, and 3)	52.0 to 44.0 dBmV

Related Documentation

For safety information, refer to:

[Regulatory Compliance and Safety Information for the Cisco uBR10012 Universal Broadband Router](#)

For additional hardware installation and software configuration information, go to:

http://www.cisco.com/en/US/products/hw/cable/ps2209/tsd_products_support_series_home.html

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>

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