Doc. No. 78-0689-02

Installing and Configuring the Hardware Type 1.1 CSC-MCI Card

Product Numbers: CSC-1E=, CSC-1S=, CSC-1T=, CSC-2S=, CSC-2T=, CSC-1E1S=, CSC-1E1T=, CSC-1E2S=, CSC-1E2T=, CSC-1E1S1T=, CSC-1E1T1S=, CSC-2E=, CSC-2E1S=, CSC-2E1T=, CSC-2E2S=, CSC-2E2T=, CSC-2E1S1T=, and CSC-2E1T1S=

Description of Part

The Multiport Communications Interface (MCI) card, hardware type 1.1 (or Revision 3), provides up to two Ethernet ports and one 50-pin connector that supports up to two synchronous serial ports by means of a split 50-pin cable and ribbon connector. The CSC-MCI card also supports the CSC-MC nonvolatile random access memory (NVRAM) card for storing configurations, and the CSC-MC+ Flash memory and NVRAM card. These NVRAM cards attach to the CSC-MCI card by way of a special 50-pin NVRAM connector located just behind the Ethernet connectors. (See Figure 1.)

No special configuration changes are necessary on the CSC-MCI card when using a NVRAM card, and such use does not affect the performance of the card.

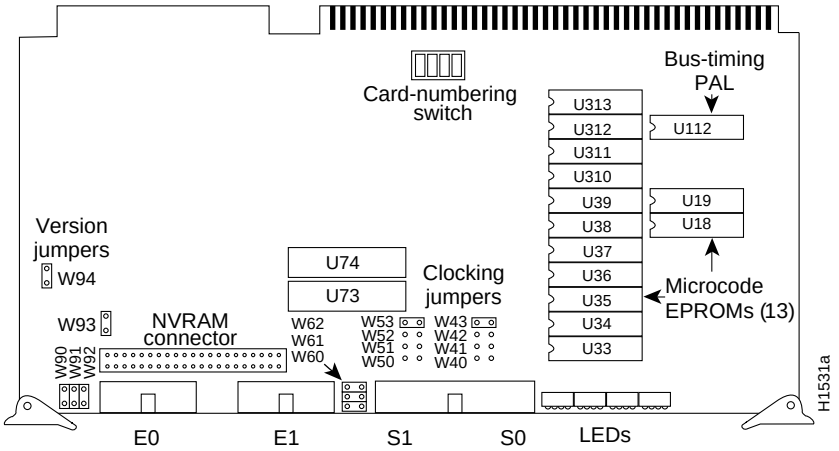

Figure 1 CSC-MCI Card Hardware Type 1.1—Component-Side View

The Ethernet ports support Ethernet Versions 1 and 2 and IEEE 802.3. The serial ports can be ordered with software support for low-speed (up to 64-megabytes [MB]) or high-speed (down to 4-kilobytes [kB]) data rates.

After installation you can obtain information about your CSC-MCI card using the EXEC command **show controller mci**. The output displays the hardware type and microcode version, along with information about the configuration of each port on the card.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) is a discharge of stored static electricity that can damage equipment and impair electrical circuitry. It occurs when electronic components are improperly handled and can result in complete or intermittent failures.

Following are guidelines for preventing ESD damage:

- Before you open a chassis, ensure that power to the unit is turned off, but that the power cord is connected to the wall receptacle. Having the power cord connected will ensure a ground path for any ESD voltages.
- Always use an ESD wrist strap or ankle strap and ensure that it makes good skin contact.
- Connect the equipment end of the strap to an unpainted surface of the chassis frame or another proper grounding point or surface. We recommend that you attach it to the inside bottom of the chassis, or to the rear panel (inside or outside), without making contact with any connectors or appliques.
- Avoid contact between equipment and clothing. The wrist strap only protects the equipment from ESD voltages on the body; ESD voltages on clothing can still cause damage.
- Handle printed circuit cards and appliques by the edges only; avoid touching the components, traces, or any connector pins.
- Place a removed card component-side-up on an antistatic surface or in a static shielding bag. If the component will be returned to the factory, immediately place it in a static shielding bag.
- Do not remove the wrist strap until the installation is complete.

Caution For safety, periodically check the resistance value of the antistatic strap. The measurement should be within the range of 1 and 10 Mohms.

Chassis Restrictions

Table 1 and Table 2 list the number of CSC-MCI cards that can be used per chassis.

Table 1 Number of CSC-MCI Interfaces per Chassis

Chassis	No. of Controllers
AGS+	7
AGS	4
MGS	2
CGS	1
CPT	1[1]

1. For the CPT chassis, *only* one Ethernet interface can be used.

Note The CSC-R Token Ring interface card (which is obsolete, but still supported) consumes as much power as the CSC-MCI card. Therefore, if you are using both the CSC-MCI and CSC-R cards in any chassis, the total number of controllers must not exceed the number indicated in Table 2.

Table 2 Number of CSC-R Interfaces per Chassis

Chassis	No. of Controllers
AGS+	3
AGS	4
MGS	1

Interface Combinations

CSC-MCI cards can combine up to two high-speed serial ports (designated with *T*) or up to two low-speed serial ports (designated with *S*), and up to two Ethernet ports (designated with *E*). These interface combinations are referenced in the *Cisco Systems Product Catalogue* by designations such as *CSC-1E1T*. Table 3 lists these CSC-MCI card combinations.

Table 3 CSC-MCI Card Interface Combinations

CSC-MCI Card	Interface Combinations
CSC-1E	1 Ethernet
CSC-2E	2 Ethernet
CSC-1S	1 low-speed synchronous serial
CSC-1T	1 high-speed synchronous serial
CSC-2S	2 low-speed synchronous serial
CSC-2T	2 high-speed synchronous serial
CSC-1E1S	1 Ethernet, 1 low-speed synchronous serial port
CSC-1E1T	1 Ethernet, 1 high-speed synchronous serial port
CSC-1E2S	1 Ethernet, 2 low-speed synchronous serial ports
CSC-1E2T	1 Ethernet, 2 high-speed synchronous serial ports
CSC-2E1S	2 Ethernet, 1 low-speed synchronous serial port
CSC-2E1T	2 Ethernet, 1 high-speed synchronous serial port
CSC-2E2S	2 Ethernet, 2 low-speed synchronous serial ports
CSC-2E2T	2 Ethernet, 2 high-speed synchronous serial ports
CSC-1E1S1T	1 Ethernet, 1 low- and 1 high-speed synchronous serial port
CSC-2E1S1T	2 Ethernet, 1 low- and 1 high-speed synchronous serial port
CSC-1E1T1S	1 Ethernet, 1 low- and 1 high-speed synchronous serial port
CSC-2E1T1S	2 Ethernet, 1 low- and 1 high-speed synchronous serial port

Configuring the CSC-MCI Cards

The following sections discuss the various configuration changes you can make to the CSC-MCI cards. Card numbers are assigned by setting a dual inline package (DIP) switch (S1). For the CSC-MCI card, the card-numbering switch (S1) is located toward the back of the card. (See Figure 1.)

CSC-CSC-MCI Card Numbering

Table 4 and Table 5 show the switch (S1) settings for card numbering the CSC-MCI card in the MGS and A-type chassis, respectively. Because only one interface card slot is available in the C chassis, card number 0 is used. The card numbers within the set of CSC-MCI cards installed in the chassis must be unique. These card numbers must also be unique among the other cards installed.

Table 4 Switch (S1) Settings for Card Numbering in the MGS Chassis

Card No.[1]	S1-1	S1-2	S1-3	S1-4
0	Off	Off	Off	Off
1	Off	Off	Off	On
2	Off	Off	On	Off

1. The maximum number of card numbers applies only to the MGS chassis.

Table 5 Switch (S1) Settings for Card Numbering in the A-Type Chassis

Card No.	S1-1	S1-2	S1-3	S1-4
0[1]	Off	Off	Off	Off
1	Off	Off	Off	On
2	Off	Off	On	Off
3	Off	Off	On	On
4	Off	On	Off	Off
5	Off	On	Off	On
6	Off	On	On	Off
7	Off	On	On	On

1. Use only if no ciscoBus controller card is installed. The ciscoBus controller card is card number 0 by default.

CSC-MCI Mode and Clocking Options

Jumpers W51 and W41 control the serial ports 0 and 1 in data communications equipment (DCE) mode. In addition to changing these jumpers for DCE operation, you must also configure the clock rate on the serial interface of the interface card using the **clockrate** *speed* interface subcommand (where *speed* is the bit rate of the interface in bits per second [bps]). The applique must be DCE (or configured as DCE) to generate the clock signals.

Following is sample output of the **clockrate** *speed* command:

```
Router# configure terminal
Enter configuration commands, one per line.
Edit with DELETE, CRTL/W, and CRTL/U;end with CTRL/Z
interface serial 0
clockrate 64000
^Z
Router# write memory
[ok]
Router#
```

The **no clockrate** command removes the clock rate if DTE mode is desired. Refer to the appropriate configuration and reference publication for more information on these commands. Following are the acceptable clockrate speed settings appearing as they are entered with the **clockrate** *speed* command:

1200, 2400, 4800, 9600, 19200, 38400, 56000, 64000, 72000, 125000, 148000, 500000, 800000, 1000000, 1300000, 2000000, and 4000000

The fastest speeds might not work if your cable is too long. Speeds faster than 148 kilobits per second (kbps) are not recommended for RS-232 or RS-232 SDLC signaling. It is recommended that you use the RS-232 and RS-232 SDLC appliques only at speeds up to 64 kbps; for speeds above this, use RS-449, HD V.35, and X.21.

Most data terminal equipment (DTE) interfaces require a Normal External Transmit Clock signal. All DCE interfaces require an Internal Transmit Clock (noninverted) signal. The CSC-MCI card clocking options are controlled by jumper areas W40 through W53. Occasionally, delays occur between the Serial Clock Transmit External (SCTE) clock and the transmitted data that may push the data transition out to the point where using an inverted clock is appropriate (jumpers W42 and W52); however, an inverted clock is not recommended.

Typical delays indicate that the inverted clock may be appropriate above 1.3 megabits per second (Mbps), depending upon the DTE clock-to-data skews and setup required, and allowing some margin for temperature, cable, and other variables. Some DCE devices will not accept SCTE, so Serial Clock Transmit (SCT) must be used. Inverting the clock may be the only way to compensate for the cable length and circuit delays in the DTE and DCE.

Table 6 lists the jumper settings for the CSC-MCI clock options. The last two columns of the table (DTE and DCE) indicate the setting that should be used with either a DTE or DCE applique. Unless specifically noted, all products are shipped with the factory default setting to work with the DTE applique, which requires external clocking; the channel service unit/digital service unit (CSU/DSU) provides the clocking for the circuit.

Table 6 Jumper Settings for Clock Options

Jumper Pair	Signal Description	Interface	DTE	DCE
W53	Normal External Transmit Clock	Serial 0	X[1]	–
W52	Inverted External Transmit Clock	Serial 0	x	–
W51	Normal Internal Transmit Clock	Serial 0	–	X
W50	Inverted Internal Transmit Clock	Serial 0	–	x
W43	Normal External Transmit Clock	Serial 1	X[1]	–
W42	Inverted External Transmit Clock	Serial 1	x	–
W41	Normal Internal Transmit Clock	Serial 1	–	X
W40	Inverted Internal Transmit Clock	Serial 1	–	x

1. X = Recommended setting. x = Available, but not recommended.

CSC-MCI Card Grounding Options

The CSC-MCI card provides up to two Ethernet ports and uses grounding options to accommodate the differences between the Ethernet Version 1 and IEEE 802.3 electrical specifications. Ethernet Version 1 permits certain signals to float, whereas IEEE 802.3 requires the signals to be grounded. Table 7 lists the CSC-MCI grounding options. Inserting a jumper grounds the signal and removing a jumper allows the signal to float. The factory default is to ground all signal pairs, which is compatible with both Ethernet and IEEE 802.3 requirements.

Table 7 Jumper Settings for Grounding Options

Jumper Pair	Signal Description	Interface
W90	Receive Pair Shield	First Ethernet
W91	Transmit Pair Shield	First Ethernet
W92	Power Pair Shield	First Ethernet
W60	Power Pair Shield	Second Ethernet
W61	Transmit Pair Shield	Second Ethernet
W62	Receive Pair Shield	Second Ethernet

On the CSC-MCI card, jumpers W94 and W93 are 3-pin jumpers that select between Ethernet and IEEE 802.3 electrical levels. Jumper W94 controls the first Ethernet port, and jumper W93 controls the second Ethernet port. The factory default is to select IEEE 802.3 (Ethernet Version 2). Using the card orientation shown in Figure 1, on page 1, place a jumper on the lower pair of pins to select Ethernet Version 1.

Opening the Chassis

To access the cards or the rest of the chassis components, you must access the chassis interior by removing the front panel or top cover. The following procedures include instructions for both. Following are the procedures for your chassis model.

Tools Required

The following tools are required for accessing the chassis interior:

- Flat-blade screwdriver: Small and medium sized
- Phillips screwdriver: No. 1 and No. 2
- ESD-preventive wrist strap

A-Type Chassis Access Procedure

Following is the procedure for accessing the A-type chassis interior.

Warning Before accessing the chassis interior, turn OFF power to the chassis and unplug the power cord because hazardous voltages may exist in or near the power supply. Use extreme caution when working near the power supply.

Step 1 Turn OFF power to the chassis and unplug it from AC power.

Step 2 If the chassis is rack mounted, disconnect all external cables from the chassis rear panel. Note where these cables were connected, for reinstallation.

Step 3 Remove the chassis from the rack and transfer it to a desktop or work table.

Step 4 If you will need to handle any electronic components (cards, and so forth), attach appropriate ESD protection and attach the AC power cord, but to prevent a shock hazard, make certain the chassis power is OFF.

Step 5 To access cards in the card cage, loosen the two thumbscrews and remove the front panel from the chassis. (See Figure 2.) If you wish to access cards in the card cage only, skip the next step.

Step 6 To access other system components, locate and remove the seven No. 1 Phillips screws securing the top cover. (See Figure 2.) Set the top cover and screws aside.

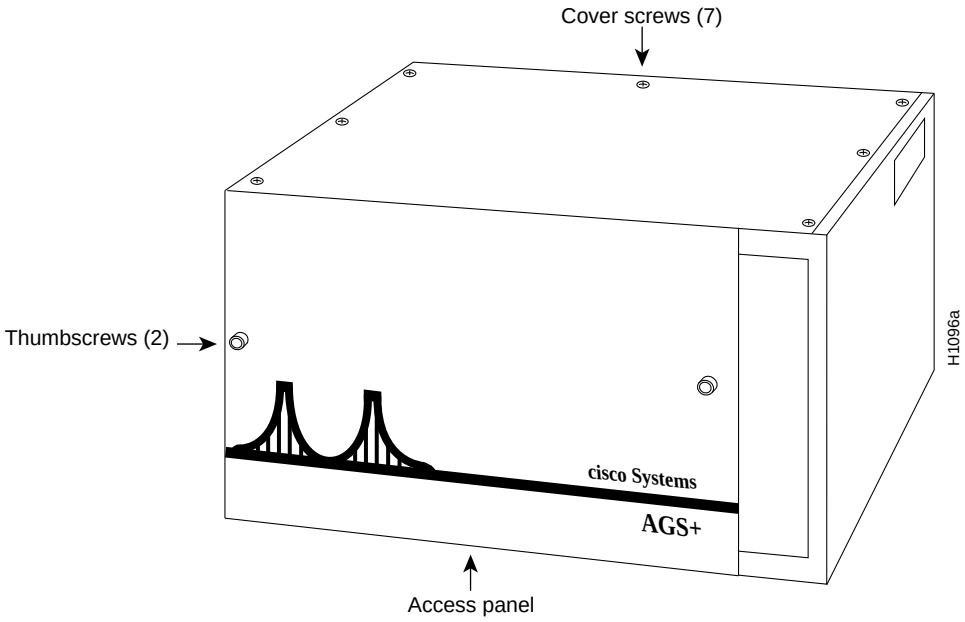

Figure 2 Chassis Front and Top Panels

Note To reassemble the chassis, reverse all steps.

MGS Chassis Access Procedure

Following is the procedure for accessing the MGS chassis interior.

Warning Before accessing the chassis interior, turn OFF power to the chassis and unplug the power cord because hazardous voltages may exist in or near the power supply. Use extreme caution when working near the power supply.

Step 1 Turn OFF power to the chassis and unplug it from AC power.

Step 2 If the chassis is rack mounted, disconnect all external cables from the chassis rear panel. Note where these cables were connected, for reinstallation.

Step 3 Remove the chassis from the rack and transfer it to a desktop or work table.

Step 4 If you need to handle any electronic components (cards and so forth) attach appropriate ESD protection and attach the AC power cord, but to prevent a shock hazard, make certain the chassis power is OFF.

Step 5 To access the cards in the card cage, locate the three flat-blade screws that secure the card cage access panel. (See Figure 3.) These screws are located on the top of the MGS chassis access panel.

Step 6 Using the flat-blade screwdriver, turn each of these screws 1/4 to 1/2 turn counterclockwise until the screw pops up.

Step 7 Using the No. 2 Phillips screwdriver, loosen the three screws at the bottom edge of the card cage cover. (Do not remove these screws completely.) Carefully remove the card cage cover and set it aside.

Step 8 To access the other chassis components, use the No. 1 Phillips screwdriver to remove the 14 screws that secure the top cover of the MGS chassis. (See Figure 3.) Set the top cover aside.

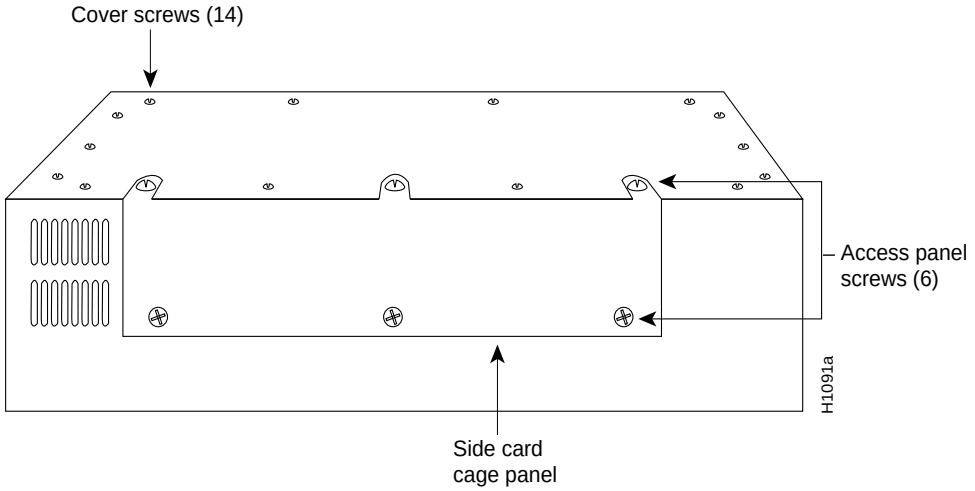

Figure 3 Screw Locations on the MGS Chassis Exterior—Side View

Note To reassemble the chassis, reverse all steps.

C Chassis Access Procedure

Following is the procedure for accessing the C chassis interior.

Warning Before accessing the chassis interior, turn OFF power to the chassis and unplug the power cord because hazardous voltages may exist in or near the power supply. Use extreme caution when working near the power supply.

Step 1 Turn OFF power to the chassis and unplug it from AC power.

Step 2 If you need to handle any electronic components (cards and so forth) attach appropriate ESD protection and attach the AC power cord, but to prevent a shock hazard, make certain the chassis power is OFF.

Step 3 Use the No. 2 Phillips screwdriver to remove the ten screws that secure the cover of the C chassis. There are two screws on each side and six screws on the bottom of the chassis. (See Figure 4.)

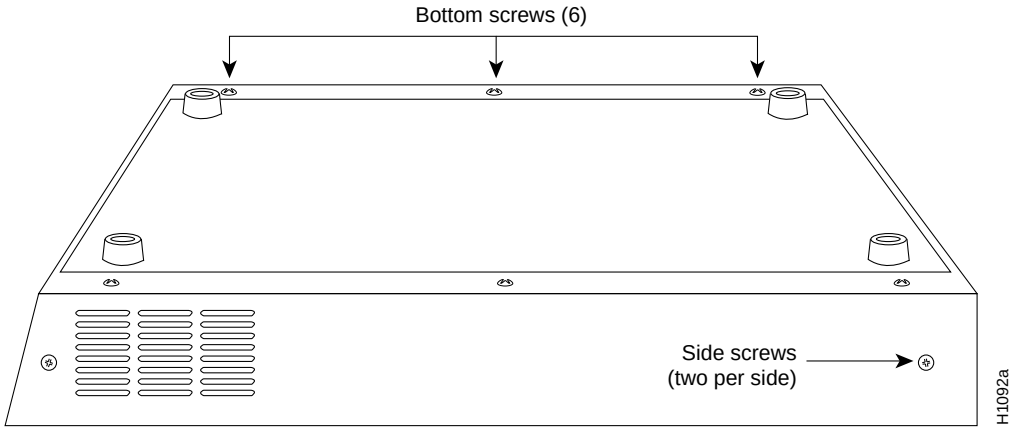

Figure 4 Screw Locations on the C Chassis Exterior—Side View

Step 4 Position the chassis so that the back (the side with the ports) is on your left; the front of the chassis (with the LED) is on your right; and the chassis top is facing up. (This is completely opposite of the chassis position shown in Figure 4.)

Step 5 Pull the front of the cover to the right (while securing the back of the chassis with your left hand) until the power supply and card cage are completely exposed. Because the fit is snug, pull slowly and carefully, and do not remove the cover.

Caution Several cables are located close to the interior of the C chassis cover. Avoid damage to these cables by ensuring that they do not impede the cover as you remove it.

Note To reassemble the chassis, reverse all steps.

Installing the CSC-MCI Card

Following is the procedure for installing the CSC-MCI card in a chassis as follows:

Step 1 Turn OFF the power to the chassis, but to channel ESD voltages to ground, do not disconnect the power cable.

Step 2 Remove the card access panel (A-type and M chassis) or the top cover (C chassis) according to the procedures in the section “Opening the Chassis.”

Step 3 Select jumper settings. Refer to Figure 1 for a view of the jumper areas and the card-numbering dual inline package (DIP) switch (S1).

- Set jumper areas W53 through W40 to select the appropriate serial clocking options. Refer to Table 6 for the settings.
- Select grounding options with jumper areas W90 through W62. Table 7 lists the grounding options. Inserting a jumper grounds a signal, and removing a jumper allows the signal to float.

Step 4 Select card numbers. Switch S1 determines the unit number of the CSC-MCI card. Card numbers are shown in Table 4 and Table 5.

Step 5 Insert the CSC-MCI card in an appropriate slot in the chassis card cage.

Step 6 Attach all internal ribbon cables.

- Connect a 50-pin ribbon cable to the serial connector on each CSC-MCI card you installed.
- Connect each half of the opposite end of this serial cable to the 25-pin connector on the appropriate serial applique card (RS-232, and so forth).

  When making this connection with older appliques from other vendors (for example SCO-232), you must locate pin 1 for each port and match it correctly to pin 1 on the applique.

The CSC-MCI interface card also offers two 15-pin Ethernet connectors:

- Internally, connect a cable to the 15-pin Ethernet port on the CSC-MCI card.
- Externally, attach an Ethernet transceiver cable from the 15-pin connector to a transceiver or MAU.

Warning If the serial and Ethernet connectors are not installed correctly, they can cause damage to the interface card and/or the network.

Step 7 Turn ON the power for an installation check.

Step 8 Check LEDs, which are listed in Table 8 and shown in Figure 5.

Step 9 When the system checks out, replace the card access panel or the top cover.

CSC-MCI Card LED Indicators

The CSC-MCI card contains a bank of 16 LEDs. (Four are currently used.) Table 8 lists the LEDs that are used and the serial and Ethernet port each LED represents. LED 0 is at the left end of each block of four LEDs (as you view the front edge of the card in the system card cage—shown in Figure 5). At startup, all LEDs flash and then only those LEDs that indicate active interfaces will stay on. A problem is indicated if all LEDs remain on after the system boots, or if the LED of a specific interface does *not* stay on after the system boots.

Note For the CPT and ASM-CS chassis, the *Ethernet 1* LED will never light because these chassis can have a maximum of *only* one (Ethernet) interface (*Ethernet 0*).

Table 8 CSC-MCI Card LED Indicators

LED	Interface Port
0	Ethernet 0
4	Serial 0
8	Ethernet 1
12	Serial 1

When the indicated LED is on, Carrier Detect (CD) is present on that serial interface, and the interface is enabled. In Ethernet systems, this means that the interface is attached to the Multibus correctly, but is not an indication of complete functionality.

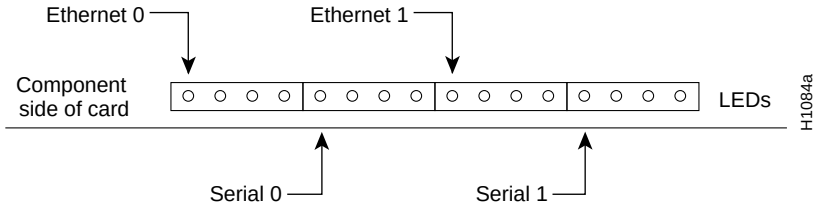

Figure 5 CSC-MCI Card LED Indicators—Partial Front-Edge View

Note For technical assistance, contact a service representative or the Cisco Technical Assistance Center (TAC) at 800 553-2447, 415 903-7209, or `tac@cisco.com`. For upgrade or product information, contact the Customer Response Center at 800 553-6387, 415 903-7208, or `cs-rep@cisco.com`.

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