APPENDIX B

Reading LED Indicators

Most system cards and appliques have light-emitting diode (LED) indicators that show, for example, the state of a port on an interface card or the mode (DTE or DCE) of a serial applique. These LEDs also can be used to troubleshoot and isolate a problem with the chassis and its components.

Typically, you will know a problem exists before you examine the LEDs, but should a problem require more investigation, the LEDs can help identify the problem.

The following card LEDs are included in this appendix:

- CSC-1R (MGS only) and CSC-2R (MGS and CGS only)
- CSC/3 and CSC/4
- CSC-MCI and CSC-SCI
- CSC-MC+
- CSC-MT (MGS only)
- CSC-R16M (MGS only)

The following applique LEDs are included in this appendix:

- Ethernet 10BaseT
- HD V.35 dual mode (DCE or DTE)
- RS-232 DCE and DTE
- RS-232 Synchronous Data Link Control (SDLC) dual mode (DCE or DTE)
- RS-449 DCE and DTE
- X.21 dual mode (DCE or DTE)

Card LED Indicators

The following sections discuss reading and interpreting the LED indicators on processor and interface cards.

CSC-1R and CSC-2R Token Ring Cards: LED Indicators

Along the front edge of the CSC-1R (and CSC-2R) card are ten status LEDs: nine red and one green. The order of the LEDs is left to right when looking at the front edge of the card. (See Figure B-1.) Although only the CSC-1R is shown, both the CSC-1R and CSC-2R have the same LED configuration. The CPT cannot use Token Ring interfaces. The CGS can use only the CSC-2R.

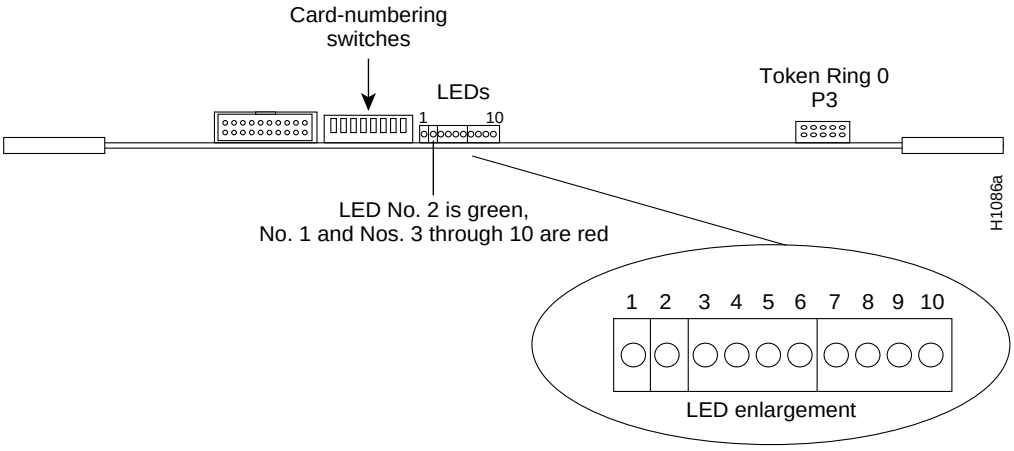

Figure B-1 CSC-1R and CSC-2R LED Indicators—Front-Edge View

The red LED on the far left end of the bank of LEDs is the Power-On LED (No. 1). The next LED is the green Processor LED (No. 2). The remaining eight LEDs (3 through 10) are all red. At system boot, these eight LEDs will change state to indicate that the card is being initialized. The seven initialization states of LEDs 3 through 10 are shown in Table B-1.

In the first initialization state, all eight status LEDs (3 through 10) are on. During the next four states, LEDs 7 through 10 will be on, while LEDs 6 through 3 consecutively will turn on then off. States 6 and 7 will indicate a successful initialization.

The first seven LED states display consecutively at system boot. If a problem occurs during this initialization, the state that the LEDs were in when the problem occurred will flash on and off.

When the port inserts into the ring, LEDs 3 through 10 will flash a series of patterns too fast to see. Following this, LEDs 3 through 10 will strobe back and forth to indicate correct operation. The speed of this strobing is in inverse proportion to the volume of data traffic; the heavier the traffic, the slower the strobing, and so forth. Either way, the strobing of these LEDs is the key indicator for the proper operation of the CSC-1R and CSC-2R Token Ring cards.

Table B-1 CSC-1R and CSC-2R Status LED States at System Boot

	LEDs[1]							
State	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	O	O	O	O	O	O	O	O
2	•	•	•	O	O	O	O	O
3	•	•	O	•	O	O	O	O
4	•	O	•	•	O	O	O	O
5	O	•	•	•	O	O	O	O
6	•	O	O	•	•	O	O	•
7	O	•	•	•	•	O	•	O

1. O = LED on. • = LED off.

CSC/3 and CSC/4 Processor Cards: LED Indicators

To the right of the configuration register, on the front edge of the processor card, are three LEDs. On the CSC/3, the left and center LEDs are red (see Figure B-2), while on the CSC/4, they are yellow (see Figure B-3). The third LED (far right) on each card is green. The LED on the left is a software-programmable status light; it lights (momentarily) during initialization, flashes to indicate an error, and remains off under normal operation. The middle LED is the processor halt light; it lights when the processor halts for any reason. This LED can flash at power-up, but should not remain lit; a problem is indicated when it does. The green LED on the right is a software-programmable run light that lights when the system is running properly.

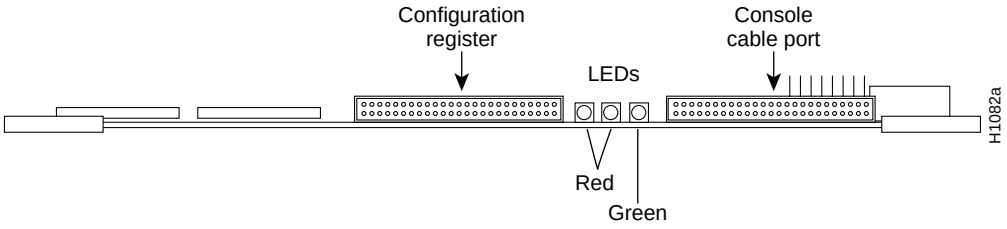

Figure B-2 CSC/3 LED Indicators—Front-Edge View

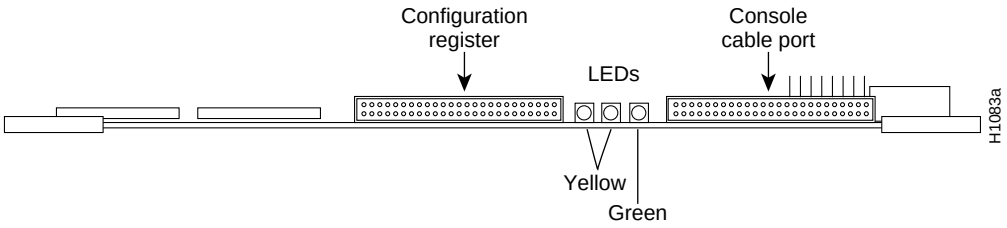

Figure B-3 CSC/4 LED Indicators—Front-Edge View

CSC-MCI and CSC-SCI Cards: LED Indicators

The CSC-MCI and CSC-SCI cards contain a bank of 16 LEDs. (Four are currently used.) Table B-2 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 B-4 and Figure B-5). At startup, all LEDs flash and then only those LEDs that indicate active interfaces will stay lit. A problem is indicated if all LEDs remain lit after the system boots, or if the LED of a specific interface does *not* stay lit after the system boots.

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

Table B-2 CSC-MCI and SCI LED Indicators

LED	MCI Port	SCI Port
0	Ethernet 0	Serial 0
4	Serial 0	Serial 1
8	Ethernet 1	Serial 2
12	Serial 1	Serial 3

When the indicated LED is lit, 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.

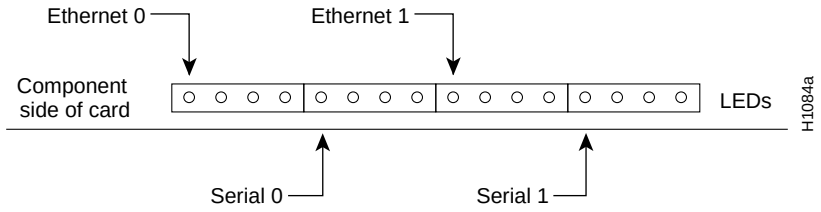

Figure B-4 CSC-MCI LED Indicators—Partial Front-Edge View

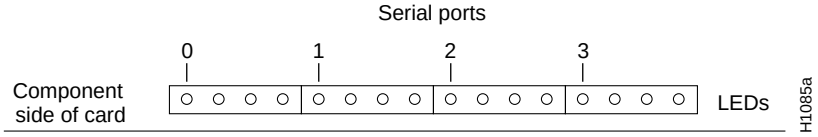

Figure B-5 CSC-SCI LED Indicators—Partial Front-Edge View

CSC-MC+ Flash Memory Card: LED Indicators

The CSC-MC+ has two LEDs on the front edge of the card. (See Figure B-6 and note the *chassis front* orientation of the illustration.) When viewed with the card installed in the card cage, the green LED is on the left. The green LED is the power indicator and should be lit when power is on. The yellow LED is lit during Flash copy operations and will be off at all other times. When the write-protect jumper is removed, Flash memory cannot be overwritten or erased.

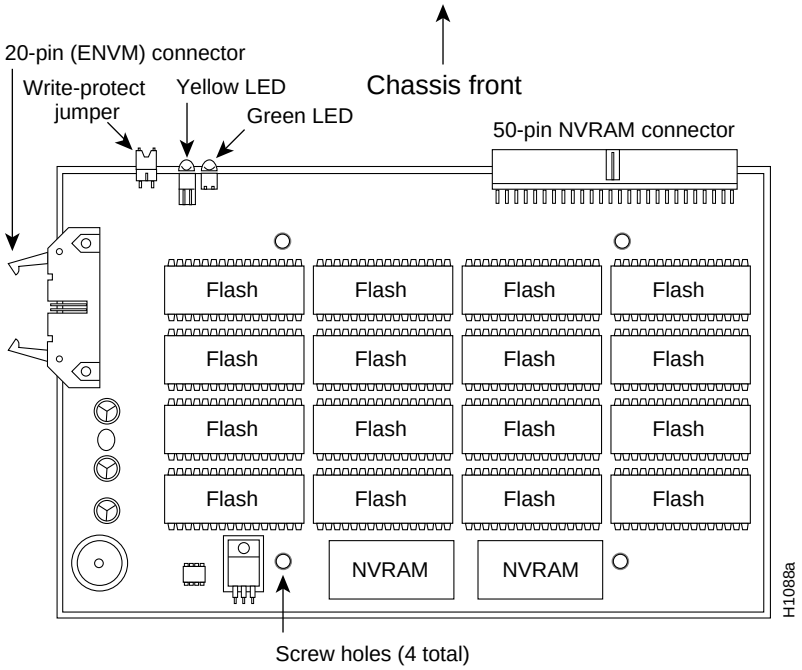

Figure B-6 CSC-MC+ LED Indicators—Component-Side View

CSC-MT Memory Card: LED Indicators

The CSC-MT card has one green and three red LEDs (from left to right, when viewing the front edge of the card). (See Figure B-7.) The red LEDs each indicate battery status. If one of the three onboard batteries fails, its corresponding red LED lights up. The green LED on the left indicates that power is on to the card and is normally on when the system is powered up.

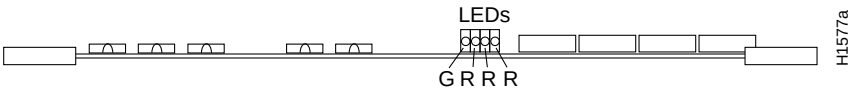

Figure B-7 CSC-MT LED Indicators—Front-Edge View

CSC-R16M Token Ring Card: LED Indicators

The CSC-R16M Token Ring card, which can be used in the MGS chassis only, has 14 LED indicators located on the front edge of the card. (See Figure B-8.) During normal operation, after the card has initialized and the port is connected to the ring, LEDs F through M will strobe back and forth to indicate proper operation. The descriptions of the CSC-R16M LED functions are listed in Table B-3.

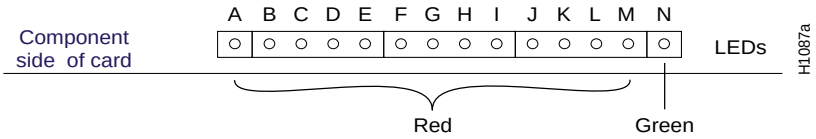

Figure B-8 CSC-R16M LED Indicators—Partial Front-Edge View

Table B-3 CSC-R16M LED Indicators

LED	Function
A	Processor halted (normally off)
B	–12V fused
C	+12V fused
D	+ 5V fused
E	+ 5V (power)
F–M	Activity lights[1]
N	Run light (green)

1. LEDs F through M will strobe back and forth to indicate proper operation.

Applique LED Indicators

Checking applique LEDs requires access to the chassis rear panel, which may require removing the system from a rack or closet. In the following serial applique LED tables, the symbols <— and —> indicate signal direction with respect to DCE and DTE devices. For example, “DCE <— DTE” means *signal direction is from DTE to DCE*.

The following LED indicators are included in this section:

- Ethernet 10BaseT
- HD V.35 dual mode (DCE or DTE)
- Other synchronous serial
  - — RS-232 DCE and DTE
  - — RS-232 SDLC dual mode (DCE or DTE)
  - — RS-449 DCE and DTE
- X.21 dual mode (DCE or DTE)

Ethernet 10BaseT Applique: LED Indicators

The Ethernet 10BaseT applique has the following green LED indicators. (See Figure B-9.)

- LINK—Lights when a good link on the receive data (RD) pair has been established.
- RCV—Lights to indicate that a packet has been received from the network.
- XMT—Lights to indicate that a packet has been sent from the unit.

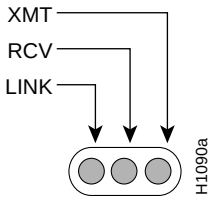

Figure B-9 10BaseT Applique LED Indicators

At power up, the LINK LED lights up and remains lit if it is connected to a 10BaseT link that is powered up. This LED indicates that a good link has been established. If it does not light, check the opposite end of the link to ensure that it is powered up and that the cable is securely installed. If the LED still does not light, switch the transmit and receive pair at one end of the link and restart the system. When a good link is established, the RCV LED will flash or remain lit to indicate packet traffic on the link. The XMT LED will light when the unit transmits data over the link.

If the opposite end of the link is connected to a hub, the hub will perform a *crossover* function, which means that the transmitter from the unit goes to the receiver of the hub, and the transmitter from the hub goes to the receiver of the unit. This configuration is correct; however, if the unit connects to an external media attachment unit (MAU), then the crossover function must be performed in the attaching wires. Otherwise, the two transmit wires are connected to each other, as are the two receive wires.

HD V.35 Dual-Mode Applique: LED Indicators

Table B-4 lists the 14 LEDs that indicate the status of the HD V.35 synchronous serial applique. LEDs are listed as viewed from left to right on the applique. (See Figure B-10.) Use the green LEDs toward the end of the row for orientation. The LEDs on the HD V.35 applique are located beneath the connector.

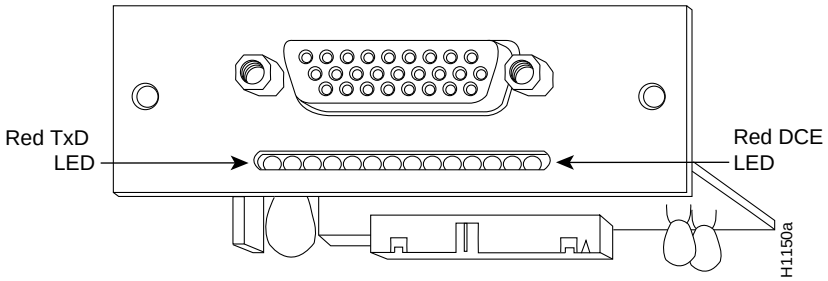

Figure B-10HD V.35 Applique LED Indicators

Table B-4 HD V.35 Applique LED Indicators

LED Number	Color	Mnemonic DTE (DCE)	Function	Direction DCE DTE
1	Red	TxD (RxD)	Transmit Data (Receive Clock)	<— (—>)
2	Red	SCTE (SCR)	Serial Clock Transmit External (Serial Clock Receive)	<— (—>)
3	Red	RxD(TxD)	–	—> (<—)
4	Red	SCR (SCTE)	–	—> (<—)
5	Red	DTR	Data Terminal Ready	—>
6	Red	RTS	Clear To Send	—>
7	Red	RTS	Request To Send	<—
8	Red	DCD	Data Carrier Detect	<—
9	Red	LT	Software Loopback	<—
10	Green	+5V	+5V present	On if OK
11	Green	+12V	+12V present	On if OK
12	Green	–12V	–12V present	On if OK
13	Green	OK	Applique test OK	On if OK
14	Red	DCE	Mode selection	On for DCE

Other Synchronous Serial Appliques: LED Indicators

On the RS-232, RS-232 Synchronous Data Link Control (SDLC), and RS-449 appliques, the LEDs are located beneath the connectors. These synchronous serial appliques have the lamp pattern shown in Table B-5, except the RS-232 SDLC applique which has two additional LEDs. Use the green LEDs toward the end of the row for orientation. LEDs in Table B-5 are listed as viewed left to right on the applique. The signal mnemonics and directions are listed in Table B-6.

Table B-5 RS-232 SDLC Dual-Mode, RS-232 DTE and DCE, and RS-449 DTE and DCE Applique LED Indicators

LED Number	Color	RS-232 SDLC—DTE (DCE)	RS-232 DTE	RS-232 DCE	RS-449 DTE	RS-449 DCE
1	Red	TxD (RxD)	RxD	RxD	RxD	RxD
2	Red	RxC	RxC	RxC	RxC	SCT/SCR
3	Red	RxD	TxD	RxD	TxD	RxD
4	Red	TxC	TxC	TxC	TxC	RxC
5	Red	DCD	DTR	DCD	DTR	DCD
6	Red	CTS	RTS	CTS	RTS	CTS
7	Red	RTS (CTS)	CTS	CTS	CTS	CTS
8	Red	DTR (DCD)	DCD	DCD	DCD	RLSD
9	Red	LT	LT	LT	LTST	LT
10	Green	+5V OK	+5V OK	+5V OK	+5V OK	+5V OK
11	Green	+12V OK	+12V OK	+12V OK	+12V OK	+12V OK
12	Green	–12V OK	–12V OK	–12V OK	–12V OK	–12V OK
13	Green	Applique OK	Applique OK	Applique OK	Applique OK	Applique OK
14	Red	NRZI/NRZ (on for NRZI)	–	–	–	–
15[1]	Red	DCE/DTE (on for DTE)	–	–	–	–

1. LEDs 14 and 15 refer to the RS-232 SDLC dual-mode applique only. Numbers are not listed on the applique, but are used here for convenience.

Table B-6 Signal Mnemonics and Directions

Mnemonic	Description	Direction
CTS	Clear To Send	DCE to DTE
DCD	Data Carrier Detect	DCE to DTE
DTR	Data Terminal Ready	DTE to DCE
LT (LTST)	Loopback Test	DTE to DCE
RTS	Request To Send	DTE to DCE
RxC	Receive Clock	DCE to DTE
RxD	Receive Data	DCE to DTE
SCT/SCR	Source Clock Transmit/Source Clock Receive	DCE to DTE
TxC	Transmit Clock	DCE to DTE
TxD	Transmit Data	DTE to DCE

X.21 Dual-Mode Applique: LED Indicators

On the X.21 serial applique, the 14 LED indicators, which are positioned as shown in Figure B-11, indicate the status of the interface. Use the green LEDs toward the end of the row for orientation. The LEDs are located beneath the connector. The LEDs are listed in Table B-7 as viewed from left to right when facing the front of the applique.

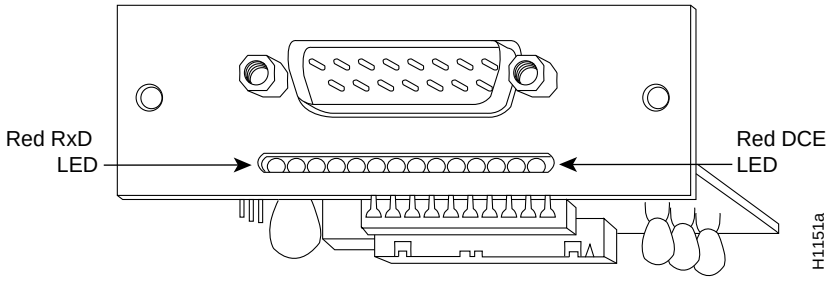

Figure B-11X.21 Applique LED Indicators

Table B-7 X.21 Applique LED Indicators

LED Number	Color	Mnemonic DTE	Mnemonic DCE	Function	Direction DCE DTE
1	Red	RxD	TxD	Receive Data	—>
2	Red	RxC	–	Receive Clock	—>
3	Red	TxD	RxD	Transmit Data	<—
4	Red	DCE CLK	DCE CLK	Internal Clock	—>
5	Red	BDSR	BDSR	Data Set Ready B	—>
6	Red	RTS/CONTROL	CTS/INDICATE	Request To Send	<—
7	Red	CTS/INDICATE	RTS/CONTROL	Clear To Send	—>
8	Red	BDCD/BCTS	BDCD/BCTS	Data Carrier Detect /Clear To Send	—>
9	Red	–	LOOP[1]	Loopback	<—
10	Green	+5V	+5V	+5V present	On if OK
11	Green	+12V	+12V	+12V present	On if OK
12	Green	–12V	–12V	–12V present	On if OK
13	Green	OK	OK	Applique test OK	On if OK
14	Red	DCE	DCE	DCE Mode	On for DCE

1. Loopback is available in DCE mode only.