CISCO SYSTEMS

# *Microcode Release Note*

This release note describes the latest microcode upgrades for the AGS+, A, M, and C modular chassis interface cards, and for the ciscoBus interface and controller cards associated with the AGS+ chassis.

*Microcode* is card-specific firmware that resides on erasable programmable read-only memory (EPROM) devices on most interface and controller cards. As new software and hardware features are introduced, the microcode for affected cards is updated in order to implement new features, operate with new software, or fix bugs found in earlier versions. The latest version of the microcode is not always required. You need to install new microcode only when it is required for a card to be compatible with a new software upgrade, if it enables new features or functions you want to implement, or if it fixes bugs that are causing problems with your current system.

This release note specifies both the recommended and required microcode versions for operation with all currently supported software releases. It is also a historical summary of the microcode versions released for each interface and controller card. Instructions for replacing microcode are not part of this document; card- and version-specific replacement procedures are included with each microcode upgrade kit.

Before Software Release 9.1, microcode information was included in the *Router Software Release Notes* publication. This *Microcode Release Note* publication provides only microcode-specific information. It will be updated as required for microcode updates independent of software releases. The section "Obtaining Additional Information" on page 41 provides instructions for obtaining the latest revision of this release note and a list of related documents, together with instructions for obtaining them.

This release note contains the following sections:

# New Microcode Versions

New microcode is available with the Software Release 9.1 (or later) and Software Release 9.21 (or later) for several of the modular router cards. Table 1 outlines the new microcode versions available and distinguishes between maintenance (bug fix) releases, which do not require Software Release 9.1, 9.21, or Internetwork Operating System (IOS) Release 10.0 or later, and new feature releases, which require Software Release 9.1, 9.21, or IOS Release 10.0 or later, for the new features. Subsequent sections describe the features, software prerequisites, modifications, and caveats for each microcode version.

*Table 1*   New Microcode Releases Available with Software Release 9.1, 9.21, or IOS Release 10.0 or Later

| Microcode Version | Replaces | New Features or Bug Fixes | 9.1 SW Required | 9.21 SW Required | IOS 10.0 or Later SW Required |
|---|---|---|---|---|---|
| C2MEC 10.3[1] | MEC 10.2 | Bug fixes | Yes[1] | No | No |
| C2FCI 10.2[1] | C2FCI 10.1 | Bug fixes | Yes | No | No |
| C2FCIT 10.3[1] | C2FCIT 10.2 | Bug fixes | Yes | No | No |
| FCI 2.2 | FCI 2.1 | Bug fixes | Yes | No | No |
| C2HSCI 10.1 | C2HSCI 10.0 | Bug fixes | Yes | No | No |
| SCI 5.1 | SCI 5.0 | Bug fixes | 9.1(7) at least | No | No |
| MCI 1.11 (1.11A) | MCI 1.10 (1.10A) | Bug fixes | No | No | No |
| C2CTR 10.2[2] | C2CTR 10.1 | Bug fixes | Yes | No | No |
| CCTL 3.0 | CCTL 2.0 | Bug fixes | No | No | No |
| CCTL2 11.2 | CCTL2 11.1 | Bug fixes | No[3] | Yes[6] | No |
| ENVM 2.2 | ENVM 2.1 | Bug fixes | No | No | No |
| SBEMON 3.4[4] (CSC-R16M) | SBEMON 3.2 | Bug fixes | 9.1(2) at least[5] | No | No |

| Microcode Version | Replaces | New Features or Bug Fixes | 9.1 SW Required | 9.21 SW Required | IOS 10.0 or Later SW Required |
|---|---|---|---|---|---|
| SCI 1.4 (1.4A) | SCI 1.3 | Bug fixes | No | No | No |
| STRMON 1.5 (CSC-1R/2R) | STRMON 1.4 | Bug fixes | 9.1(2) at least[6] | No | No |
| STRMON 1.6 (CSC-1R/2R) | STRMON 1.5 | Bug fixes | 9.1(2) at least[6] | No | No |

[1]Software Release 9.1 or later is required for MEC Microcode Version 10.3.
[2]These cards only operate with a ciscoBus2 controller card (CSC-CCTL2).
[3]Microcode Version 11.2 is backward compatible with Software Release 9.1 or later, but Software Release 9.21 or later is required for full functionality of the 9.21-related features in Microcode Version 11.2.
[4]Microcode Version 3.3 for the CSC-R16M card did not ship. The SBEMON microcode went from Version 3.2 directly to Version 3.4.
[5]If 9.1(2) is not used, 8.3(6) and 9.0(4) are the minimum versions required; however, Software Release 9.1(10) is recommended.
[6]If 9.1(2) is not used, 9.0(4) is the minimum version required; however, Software Release 9.1(10) is recommended.

## Microcode Interoperability Summary

Table 2 summarizes the compatibility of current, recommended microcode versions for software releases earlier than IOS Release 10.0: Software Releases 8.3, 9.0, 9.1, and 9.21.

Table 3 summarizes the recommended microcode versions for IOS Release 10.0 or later. New microcode versions are tested for backward compatibility.

Table 4 lists the minimum required microcode versions for software releases earlier than IOS Release 10.0 or later: Software Releases 8.3, 9.0, 9.1, and 9.21.

Table 5 lists the minimum required microcode versions for IOS Release 10.0 or later.

*Note:* Some cards can operate with an earlier microcode version, although some features might not be available. Using the recommended version ensures that you will obtain maximum performance and reliability. Refer to these version numbers when ordering upgrades.

*Table 2*    Recommended Microcode for Pre-IOS Release 10.0 Interoperability

| Card Name | 8.3(1–4) | 8.3(6) | 9.0(2) | 9.0(4) | 9.1 w/ CCTL | 9.1 w/ CCTL2 | 9.21 w/ CCTL | 9.21 w/ CCTL2 |
|---|---|---|---|---|---|---|---|---|
| CSC-1R/2R | – | – | 1.1 | 1.6[1] | 1.6[1] | 1.6[1] | 1.6 | 1.6 |
| CSC-C2CTR | – | – | – | – | – | 10.2 | – | 10.2 |
| CSC-C2FCI | – | – | – | – | – | 10.2 | – | 10.2 |
| CSC-C2FCIT | – | – | – | – | – | 10.3 | – | 10.3 |
| CSC-C2HSCI | – | – | – | – | – | 10.1 | – | 10.1 |
| CSC-C2MEC (5.1) | – | – | – | – | – | 10.3 | – | 10.3 |
| CSC-CCTL | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | – | 3.0 | – |
| CSC-CCTL2 | – | – | – | – | – | 10.0 | – | 11.2 |
| CSC-ENVM | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |

| Card Name | 8.3(1–4) | 8.3(6) | 9.0(2) | 9.0(4) | 9.1 w/ CCTL | 9.1 w/ CCTL2 | 9.21 w/ CCTL | 9.21 w/ CCTL2 |
|---|---|---|---|---|---|---|---|---|
| CSC-FCI | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | – | 2.2 | – |
| CSC-HSCI | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | – | 1.1 | – |
| CSC-MCI | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 | 1.11 |
| CSC-MEC (5.0) | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | – | 1.7 | – |
| CSC-MEC (5.1) | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | – | 2.4 | – |
| CSC-R | 2.2 | 2.2 | 2.2 | 2.2 | – | – | – | – |
| CSC-R16M | 3.1 | 3.4[2] | 3.1 | 3.4[2] | 3.4[2] | 3.4[2] | 3.4 | 3.4 |
| CSC-SCI | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 |
| CSC-SCI (HDX)[3] | – | – | – | – | 5.1[4] | 5.1[4] | 5.1 | 5.1 |

[1]Microcode Version STRMON 1.5 requires Software Releases 9.0(4) or 9.1(2) at a minimum; however, Software Release 9.1(10) is recommended.

[2]Microcode Version SBEMON 3.4 requires Software Releases 8.3(6), 9.0(4), or 9.1(2) at a minimum; however, Software Release 9.1(10) is recommended.

[3]HDX = half duplex.

[4]Microcode Version 5.1 on the 3-port CSC-SCI card requires that the system is running Software Release 9.1(7) or later.

*Table 3*    Recommended Microcode for IOS Release 10.0 or Later Interoperability

| Card Name | IOS 10.0 or Later w/ CCTL | IOS 10.0 or Later w/ CCTL2 |
|---|---|---|
| CSC-1R/2R | 1.6 | 1.6 |
| CSC-C2CTR | – | 10.2 |
| CSC-C2FCI | – | 10.2 |
| CSC-C2FCIT | – | 10.3 |
| CSC-C2HSCI | – | 10.1 |
| CSC-C2MEC (5.1) | – | 10.3 |
| CSC-CCTL | 3.0 | – |
| CSC-CCTL2 | – | 11.2 |
| CSC-ENVM | 2.2 | 2.2 |
| CSC-FCI | 2.2 | – |
| CSC-HSCI | 1.1 | – |
| CSC-MCI | 1.11 | 1.11 |
| CSC-MEC (5.0) | 1.7 | – |
| CSC-MEC (5.1) | 2.4 | – |
| CSC-R | – | – |
| CSC-R16M | 3.4 | 3.4 |
| CSC-SCI | 1.4 | 1.4 |
| CSC-SCI (HDX)[1] | 5.1 | 5.1 |

[1]HDX = half duplex.

*Table 4*   Minimum (Required) Microcode for Pre-IOS Release 10.0 Interoperability

| Card Name | 8.3/9.0 w/o AS[1] | 8.3/9.0 w/ AS[1] | 9.1 w/ CCTL | 9.1 w/ CCTL2 | 9.21 w/ CCTL | 9.21 w/ CCTL2 |
|---|---|---|---|---|---|---|
| CSC-1R/2R | 1.2[2] | 1.2[2] | 1.2[2] | 1.2[2] | 1.2 | 1.2 |
| CSC-C2CTR[3] | – | – | – | 10.0 | – | 10.0 |
| CSC-C2FCI | – | – | – | 10.0 | – | 10.0 |
| CSC-C2FCIT | – | – | – | 10.0 | – | 10.0 |
| CSC-C2HSCI | – | – | – | 10.0 | – | 10.0 |
| CSC-C2MEC (5.1) | – | – | – | 10.0 | – | 10.0 |
| CSC-CCTL | 1.0 | 2.0 | 2.0 | – | 3.0 | |
| CSC-CCTL2 | – | – | – | 10.0 | – | 11.0 |
| CSC-ENVM | 1.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |
| CSC-FCI | 128.45 | 1.0 | 2.0 | – | 2.0 | – |
| CSC-HSCI | 1.0 | 1.0 | 1.0 | – | 1.0 | – |
| CSC-MCI | 1.9 | 1.9 | 1.9 | 1.9 | 1.10 | 1.10 |
| CSC-MEC (5.0)[4] | 1.6 | 1.7 | 1.7 | – | 1.7 | – |
| CSC-MEC (5.1) | 2.1 | 2.2 | 2.2 | – | 2.2 | – |
| CSC-R | 2.2 | 2.2 | – | – | – | – |
| CSC-R16M | 3.2[5] | 3.2[5] | 3.2[5] | 3.2[5] | 3.2 | 3.2 |
| CSC-SCI | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 |
| CSC-SCI (HDX) | – | – | 5.0[6] | 5.0[6] | 5.0 | 5.0 |

[1]Autonomous switching (AS) applies only to CSC-CCTL, CSC-FCI, and CSC-MEC cards.
[2]Microcode Version STRMON 1.2 requires either 9.0(4) or 9.1(2) at a minimum; however, Software Release 9.1(10) is recommended.
[3]In all cases, the C2 designator refers specifically to interoperability with the CSC-CCTL2 card and Microcode Version 10.0 or later.
[4]Users of the MEC 5.0 card who wish to upgrade to a CCTL2 card must first upgrade to MEC rev. 5.1 cards.
[5]Microcode Version SBEMON 3.2 requires either 8.3(6), 9.0(4), or 9.1 (2) at a minimum. Software Release 9.1(10) is recommended.
[6]Microcode Version 5.0 on the 3-port CSC-SCI card requires that the system is running Software Release 9.1(7) or later.

*Table 5*   Minimum (Required) Microcode for IOS Release 10.0 or Later Interoperability

| Card Name | IOS 10.0 or Later w/ CCTL | IOS 10.0 or Later w/ CCTL2 |
|---|---|---|
| CSC-1R/2R | 1.2 | 1.2 |
| CSC-C2CTR[1] | – | 10.0 |
| CSC-C2FCI | – | 10.0 |
| CSC-C2FCIT | – | 10.0 |
| CSC-C2HSCI | – | 10.0 |
| CSC-C2MEC (5.1) | – | 10.0 |
| CSC-CCTL | 3.0 | |
| CSC-CCTL2 | – | 11.0 |
| CSC-ENVM | 2.2 | 2.2 |
| CSC-FCI | 2.0 | – |
| CSC-HSCI | 1.0 | – |
| CSC-MCI | 1.10 | 1.10 |

| Card Name | IOS 10.0 or Later w/ CCTL | IOS 10.0 or Later w/ CCTL2 |
|---|---|---|
| CSC-MEC (5.0)[2] | 1.7 | – |
| CSC-MEC (5.1) | 2.2 | – |
| CSC-R | – | – |
| CSC-R16M | 3.2 | 3.2 |
| CSC-SCI | 1.4 | 1.4 |
| CSC-SCI (HDX) | 5.0 | 5.0 |

[1]In all cases, the C2 designator refers specifically to interoperability with the CSC-CCTL2 card and Microcode Version 10.0 or later.

[2]Users of the MEC 5.0 card who wish to upgrade to a CCTL2 card must first upgrade to MEC rev. 5.1 cards.

## *Microcode Revision History*

The sections that follow describe the microcode revision history for each card.

*Note:* Unless otherwise stated, the system software prerequisites (earliest level required) are the same as listed in Table 2 through Table 5 in the previous section, "Microcode Interoperability Summary."

## *MCI Microcode Revisions*

This section describes the various revisions of microcode for the multiport communications interface card (CSC-MCI).

*Note:* Because the CSC-MC (NVRAM) and CSC-MC+ (NVRAM/Flash) cards can be connected to CSC-MCI cards and to the CSC-1R/2R cards, a CSC-MCI card is not required for connection to a CSC-MC or a CSC-MC+ card *if* a CSC-1R or CSC-2R card is present. In software releases earlier than Maintenance Release 9.1(10), the format of the configuration file data stored on the CSC-MC and MC+ cards connected to CSC-1R/2R cards is different than the format when they are connected to CSC-MCI cards. If you are running software earlier than Maintenance Release 9.1(10), *and* you move a CSC-MC or MC+ card NVRAM cable from a CSC-MCI card to a CSC-1R/2R card (or vice versa), you must erase and rewrite the contents of the memory on the CSC-MC or CSC-MC+ card. System images stored in Flash are unaffected by moving the NVRAM cable. This caveat does not apply to system images stored on Flash cards and is fixed in Maintenance Release 9.1(10) and later.

## MCI Microcode Version 1.4

MCI Microcode Version 1.4 was the first officially released version of MCI microcode. It was released in the summer of 1988.

### Caveats

■ Ethernet might hang with keepalives turned on in high-collision environments.

■ Serial line reports DCD transitions when the interface is disabled. This causes the excessive error rate shutdown feature to fail when DCD flapping occurs.

■ AppleTalk fast routing is not supported.

## MCI Microcode Version 1.5

Released in March 1989, MCI Microcode Version 1.5 requires replacement of all 13 registered EPROMs.

### Modifications

■ Supports the nonvolatile memory cards (CSC-MC and CSC-MT).

■ Ethernets no longer hang with keepalives turned on in high-collision environments.

■ Serial DCD transition interrupts no longer occur when the interface is disabled.

■ Supports additional protocols for use with fast switching. The protocol-specific fast-switching support is specified in the "Features" section of the appropriate system software release note.

### Caveats

■ Serial interface reports CRC errors as encapsulation failure.

■ An Ethernet interface, under certain traffic patterns, can receive an errored frame as often as once in 3000 to 4000 frames.

## MCI Microcode Version 1.6

Released in July 1990, this version requires replacement of only three of the registered EPROMs if MCI Microcode Version 1.5 is currently installed. For more information on the upgrade procedure, refer to the publication *Upgrading MCI Cards to Version 1.6* (Document Number 78-0722).

### Modifications

Serial interface reports of CRC errors as encapsulation failure has been corrected.

*Caveats*

■ Serial performance with X.25 at rates of 2 Mbps or higher can be impacted by very short (2- to 6-byte) packets.

■ In extremely rare cases, packets received on Ethernet can have the last byte or word corrupted due to extended dribble bit errors from certain other vendors' equipment.

*System Software Prerequisites*

Requires Software Release 8.1(14) or later.

## MCI Microcode Version 1.7

Released in July 1990, this version requires replacement of three of the registered EPROMs.

*Modifications*

■ In MCI Microcode Version 1.5, an Ethernet interface, under certain traffic patterns, could receive an errored frame as good once in 3000 to 4000 frames. This has been corrected.

■ Supports additional protocols for use with fast switching. The protocol-specific fast- switching support is specified in the "Features" section of the appropriate system software release note.

■ Ethernet enhanced to completely receive frames that have framing or dribble bit errors.
The SEEQ Ethernet controller used on the MCI reports framing or dribble errors with certain other vendors' Ethernet interfaces. This behavior has been most prevalent in 10BaseT environments or where Ethernet hub or concentrator equipment is used.

With MCI Microcode Version 1.7 in combination with Software Release 8.1(19) or later, if only framing errors are reported, frames that have framing or dribble bit errors will be received as good.

■ In combination with the newer revision (R68561AP) of the Rockwell MPCC integrated circuit, MCI Microcode Version 1.7 now supports sending zero in the first byte. This capability is required for SMDS and Frame Relay.

*Caveats*

■ An Ethernet interface could experience repeated resets in an environment of late collisions in fiber or broadband Ethernets, and, if keepalives are turned off, the interface could appear to hang.

■ Serial performance with X.25 at rates of 2 Mbps or higher can be impacted by very short (2- to 6-byte) packets.

■ In extremely rare cases, packets received on Ethernet can have the last byte or word corrupted due to extended dribble bit errors from certain other vendors' equipment.

*System Software Prerequisites*

Requires Software Release 8.1(19) or later.

## MCI Microcode Version 1.8

Released in January 1991, this version only requires replacement of only three of the registered EPROMs if MCI Microcode Version 1.7 is currently installed. For more information on the microcode upgrade procedure from Version 1.5 to Version 1.8, refer to Document Number 78-0728-xx.

*Modifications*

Previously, an Ethernet interface could experience repeated resets in an environment of late collisions in fiber or broadband Ethernets, and, if keepalives were turned off, it could appear to hang. This condition has been corrected.

*Caveats*

■ Serial performance with X.25 at rates of 2 Mbps or higher can be impacted by very short (2- to 6-byte) packets.

■ In extremely rare cases, packets received on Ethernet can have the last byte or word corrupted due to extended dribble bit errors from certain other vendors' equipment.

*System Software Prerequisites*

Requires Software Release 8.1(25) or later.

## MCI Microcode Version 1.9

Introduced with Software Release 9.0 in April 1992, this version requires replacement of all 13 registered EPROMs. For more information on the upgrade procedure from older versions of MCI microcode to Version 1.9, refer to Document Number 78-0728-xx.

### Caveats

■   Wiggling V.35 cable on a serial port will cause a system crash.

■   802.3 length is   1500 (not <1500).

### Modifications

■   Improved serial performance with X.25 at rates of 2 Mbps or higher.

■   Previously, in extremely rare cases, packets received on Ethernet could have the last byte or word corrupted due to extended dribble bit errors from certain other vendors' equipment. This has been corrected.

### System Software Prerequisites

Requires Software Release 8.1(25) or later.

## MCI Microcode Version 1.10

MCI Microcode Version 1.10, introduced on November 8, 1993, requires replacement of all 13 registered EPROMs. In general, if you are upgrading from Version 1.5, you will need the MC-MCI-V1.10 kit, and you will need to use all 16 components in the kit. If you are upgrading from Version 1.7 (or later), you will need the MC-MCI-V1.10A kit. For more information on the upgrade procedure from older versions of MCI microcode to Version 1.10, refer to Document Number 78-0728-xx.

### Caveats

■   A DEC system on the Ethernet link might experience DECnet, DAP, and CRC errors.

■   At loads greater than 30%, performance might drop due to retransmissions.

■   Novell ISO packets received on the MCI Ethernet interface are not fast switched.

### Modifications

■   MCI Microcode Version 1.10 fixes the caveats in Version 1.9.

■   Added Banyan VINES and Novell classifications to support future implementation of fast switching of those protocols.

### System Software Prerequisites

Requires Software Release 8.1(25) or later.

## MCI Microcode Version 1.11

MCI Microcode Version 1.11, introduced in March 1994, requires replacement of all 13 registered EPROMs. In general, if you are upgrading from Version 1.5, you will need the MC-MCI-V1.11 kit, and you will need to use all 16 components in the kit. If you are upgrading from Version 1.7 (or later), you will need the MC-MCI-V1.11A kit. For more information on the upgrade procedure from older versions of MCI microcode to Version 1.11, refer to Document Number 78-0728-xx.

### Modifications

■   Fixes the caveats in Microcode Version 1.10.

■   Corrects a data corruption error and provides for proper setup and hold times for the SEEQ 80C03 Ethernet controller.

### System Software Prerequisites

Requires Software Release 8.1(25) or later.

# SCI Microcode Revisions

This section describes the microcode revisions to the serial-port communications interface card (CSC-SCI).

## SCI Microcode Version 1.0

Version 1.0 was the first officially released version of SCI microcode. It was released in January 1989.

### Caveats

■   Serial interface reports CRC errors as encapsulation failures. This problem is identical to the serial line bug in MCI Version 1.5.

■   Serial performance with X.25 at rates of 2 Mbps or higher can be impacted by very short (2- to 6-byte) packets.

## SCI Microcode Version 1.1

Released simultaneously with MCI Version 1.6, this version requires the replacement of only two of the registered EPROMs if SCI Microcode Version 1.0 is installed. For more information on the upgrade procedure from Version 1.0 to Version 1.1, refer to the publication *Upgrading SCI Microcode Version 1.0 to 1.1* (Document Number 78-0733-xx).

### Modifications

Serial interface reports of CRC errors as encapsulation failures has been corrected.

*Caveats*

Serial performance with X.25 at rates of 2 Mbps or higher can be impacted by very short (2- to 6-byte) packets.

## SCI Microcode Version 1.2

Introduced with Software Release 8.3(1), SCI Microcode Version 1.2 requires replacement of all 12 registered EPROMs. For more information on the upgrade procedure from Version 1.0 to Version 1.2, refer to the publication *Upgrading SCI Microcode Version 1.0 to Version 1.2* (Document Number 78-0864-xx). For more information on the upgrade procedure from Version 1.1 to Version 1.2, refer to the publication *Upgrading SCI Microcode Version 1.1 to Version 1.2* (Document Number 78-0863-xx).

### Modifications

- In combination with the newer revision (R68561AP) of the Rockwell MPCC integrated circuit, SCI Microcode Version 1.2 now supports sending a zero in the first byte. This capability is required for SMDS and Frame Relay.

- SCI Version 1.2 supports additional protocols for use with fast switching. The protocol-specific fast-switching support is documented in the "New Features" section of the appropriate system software release note.

- For environments with heavy line noise, error handling has been improved.

- Previously, serial performance with X.25 at rates of 2 Mbps or above could be impacted by very short (2- to 6-byte) packets. This condition has been corrected.

## SCI Microcode Version 1.3

Released with Software Release 9.0 in April 1992, this version contains only manufacturability modifications (that is, no additional capabilities are provided over SCI 1.2). For information on the upgrade procedure from Version 1.0 to Version 1.3, refer to the publication *Upgrading SCI Cards from Microcode Version 1.0 to 1.3* (Document Number 78-0864-xx). For information on the upgrade procedure from Version 1.1 to Version 1.3, refer to the publication *Upgrading SCI Cards from Microcode Version 1.1 to 1.3* (Document Number 78-0863-xx).

### Modifications

Manufacturing-related modifications only—no changes in functionality.

### Caveats

Repeatedly moving a V.35 cable connector while it is plugged into an active router can create bursts of line disconnections, resulting in a multibus timeout and a system crash.

## SCI Microcode Version 1.4

SCI Microcode Version 1.4 was released in December 1993. For information on the upgrade procedure from Version 1.0, 1.1, 1.2, or 1.3 to Version 1.4, refer to the publication *Upgrading Serial-Port Communications Interface (SCI) Cards from Microcode Version 1.0, 1.1, 1.2 or 1.3 to Version 1.4* (Document Number 78-0863-xx).

### Modifications

Fixes a system crash caused by a multibus timeout that occurs when an SCI interface V.35 cable connector is repeatedly moved while still plugged into the router chassis; this creates bursts of line disconnections.

## SCI Microcode Version 5.0

Microcode Version 5.0 was released with Software Release 9.1(7) in September of 1993, and requires that the system is running Software Release 9.1(7) or later. For information on the upgrade procedures for Microcode Version 5.0, refer to the publication *Upgrading the Serial-Port Communications Interface (SCI) Card to Microcode Version 5.0* (Document Number 78-1201-xx).

### Caveats

In data communications equipment (DCE) mode, the SCI card generates an inaccurate clock at speeds greater than 64 kilobits per second (kbps). This affects only the CSC-3T SCI cards running Version 5.0.

### Modifications

Microcode Version 5.0 allows for half-duplex (HDX) operation on the serial communications interface (SCI) card when connected to the Synchronous Data Link Control (SDLC) RS-232 applique. Microcode Version 5.0 should *only* be used if you require half-duplex functionality. With Microcode Version 5.0 installed, only three of the four serial ports on the SCI card are operational. Microcode Version 5.0 can also be used for normal High-Level Data Link Control (HDLC) and SDLC full-duplex (FDX) operation.

## SCI Microcode Version 5.1

Microcode Version 5.1, released in April of 1994, requires that the system is running Software Release 9.1(11) or later. For information on the upgrade procedures for Microcode Version 5.1, refer to the publication *Upgrading the Serial-Port Communications Interface (SCI) Card to Microcode Version 5.1* (Document Number 78-1201-xx).

### Modifications

Microcode Version 5.1 running on the CSC-3S SCI card fixes the caveat from the previous version.

# CSC-R16 Microcode Revisions

This section describes the microcode revisions to the CSC-R16 Token Ring interface card.

## CSC-R16 Microcode Version 2.0

Version 2.0 was the first officially released version of CSC-R16/SBEMON microcode. It was released in June 1991.

### Caveats

If cabling problems exist, the router prints the following error message and does not attempt to restart the interface:

```
%TR-3-WIREFAULT: Unit 1, wire fault: check the lobe cable MAU
connection
```

This error occurs to prevent route flapping in the various network layer protocols. This behavior is new as of Software Release 8.2(6).  An explicit **clear interface** command will cause the router to attempt to restart the interface.

### System Software Prerequisites

Requires Software Release 8.2(4) or later.

## CSC-R16M Microcode Version 3.0

This version of CSC-R16M microcode requires replacement of the two SBEMON EPROMs on the CSC-R16M card. For more information on the upgrade procedure from Version 2.0 to Version 3.0, refer to the publication *Upgrading the CSC-R16 Token Ring Interface Card to the CSC-R16M and Upgrading Microcode on the CSC-R16M* (Document Number 78-0848-xx).

### Modifications

Incorporates Madge microcode for significantly improved performance.

### Caveats

- Continued extreme load conditions can result in faulty error counts due to priority lockout of the SBEMON microcode. Sustaining such loads for many seconds increases the potential for ring reset by the interface.

- Source routing of IP across a router may not work.

- The router may appear twice in a traceroute.

- Users running both Novell and source-route bridging may experience the dropping of frames that are both explicitly addressed to the router and match the source-routing criteria.

*System Software Prerequisites*

Requires Software Release 2(4) or later.

## CSC-R16M Microcode Version 3.1

This version of CSC-R16M microcode requires the replacement of the two EPROMs on the CSC-R16 card. For more information on the upgrade procedure from Version 3.0 to Version 3.1, refer to the publication *Upgrading the CSC-R16 Token Ring Interface Card to the CSC-R16M and Upgrading Microcode on the CSC-R16M* (Document Number 78-0848-xx).

*Caveats*

Resetting the board during high ring traffic can cause the CSC-R16M to die resulting in any or all of the following error messages from the system:

```
%TR-3-RESETFAIL: Unit ... reset failed, error code ...
%TR-3-OPENFAIL:  Unit ... reset failed, error code ...
```

With the previous two error messages, the LEDs display a solid unchanging pattern.

```
%TR-3-PANICTYPE: UNIT ... TMS380 adaptor check error
```

With the previous error message, the LEDs continue cycling.

*Modifications*

■   Supports setting "early token release." This is a new feature.

■   Source routing of IP across the router has been made fully operational.

■   The router will no longer appear twice in a traceroute.

■   In a router running both Novell and source-route bridging, frames both explicitly addressed to the router and matching the source-routing criteria are no longer dropped.

*System Software Prerequisites*

Requires Software Release 2(4) or later; however, you must use Software Release 9.1(1) or later in order to take advantage of the modifications listed previously.

## CSC-R16M Microcode Version 3.2

This version of CSC-R16M microcode replaces Microcode Version 3.1 and requires the replacement of the two EPROMs on the CSC-R16M card. For more information on the upgrade procedure from Version 3.1 to Version 3.1, refer to the publication *Upgrading the CSC-R16 Token Ring Interface Card to the CSC-R16M and Upgrading Microcode on the CSC-R16M* (Document Number 78-0848-xx).

*Modifications*

■   Fixes the CSC-R16M reset problem.

■   The changes to the microcode *must* correspond with a change to the system software, otherwise the system software will lose synchronization with the CSC-R16M microcode and the router will crash with a multibus timeout error.

*Caveats*

The system can crash under heavy load or while the card is initializing.

*System Software Prerequisites*

Software Releases 8.3(6), 9.0(4), and 9.1(2) are required for operation with Microcode Version 3.2 on the CSC-R16M card.

## CSC-R16M Microcode Version 3.4

This version of CSC-R16M microcode replaces Microcode Version 3.2 and requires the replacement of the two EPROMs on the CSC-R16M card. For more information on the upgrade procedure from Version 3.2 to Version 3.4, refer to the publication *Upgrading the CSC-R16 Token Ring Interface Card to the CSC-R16M and Upgrading Microcode on the CSC-R16M* (Document Number 78-0848-xx).

*Modifications*

■   Fixes the system-crash problem that can occur under heavy loads or during initialization of the card.

■   The Fastmac microcode was updated to Version 4.3.

*System Software Prerequisites*

Software Releases 8.3(6), 9.0(4), and 9.1(2) are the minimum requirements for operation with Microcode Version 3.4 on the CSC-R16M card.

# CSC-1R/2R Microcode Revisions

This section describes the microcode revisions to the CSC-1R/2R dual 16-Mbps Token Ring interface cards. Both cards use the same microcode.

## CSC-1R/2R Microcode Version 1.0

Introduced with Software Release 9.0 in April 1992, this is the first officially released version of CSC-1R/2R (STRMON) microcode.

*System Software Prerequisites*

Microcode Version 1.0 interoperates with Software Release 9.0 and later.

> *Note:* Because the CSC-MC (NVRAM) and CSC-MC+ (NVRAM/Flash) cards can be connected to CSC-MCI cards and to the CSC-1R/2R cards, a CSC-MCI card is not required for connection to a CSC-MC or a CSC-MC+ card *if* a CSC-1R or CSC-2R card is present. In software releases earlier than Maintenance Release 9.1(10), the format of the configuration file data stored on the CSC-MC and MC+ cards connected to CSC-1R/2R cards is different than the format when they are connected to CSC-MCI cards. If you are running software earlier than Maintenance Release 9.1(10), *and* you move a CSC-MC or MC+ card NVRAM cable from a CSC-MCI card to a CSC-1R/2R card (or vice versa), you must erase and rewrite the contents of the memory on the CSC-MC or CSC-MC+ card. System images stored in Flash are unaffected by moving the NVRAM cable. This caveat does not apply to system images stored on Flash cards and is fixed in Maintenance Release 9.1(10) and later.

*Caveats*

- Source routing of IP across a router may not work.

- The router may appear twice in a traceroute.

- Users running both Novell and source-route bridging may experience the dropping of frames that are both explicitly addressed to the router and match the source-routing criteria.

*System Software Prerequisites*

Interoperates with Software Release 9.0 and later.

## CSC-1R/2R Microcode Version 1.1

Introduced with Software Release 9.1, this version of microcode requires the replacement of the STRMON EPROM on the card. For more information on the upgrade procedure from Version 1.0 to Version 1.1, refer to the publication *Upgrading the Microcode EPROM on the CSC-1R and CSC-2R Token Ring Interface Card*s (Doc. No. 78-1050-xx).

*Caveats*

Resetting the board during high ring traffic can cause the CSC-1R or 2R to die resulting in any or all of the following error messages from the system:

```
%TR-3-RESETFAIL: Unit ... reset failed, error code ...
%TR-3-OPENFAIL:  Unit ... reset failed, error code ...
```

LEDs display a solid unchanging pattern.

```
%TR-3-PANICTYPE: UNIT ... TMS380 adaptor check error
```

LEDs are still cycling.

*Modifications*

■   Support for setting "early token release" was added. This is a new feature.

■   Source routing of IP across the router has been made fully operational.

■   The router will no longer appear twice in a traceroute.

■   In a router running both Novell and source-route bridging, frames both explicitly addressed to the router and matching the source-routing criteria are no longer dropped.

■   The ability to support fast switching was added.

*System Software Prerequisites*

Requires Software Release 9.0 or later; however, Release 9.1 or later is required in order to take advantage of the preceding modifications.

## *CSC-1R/2R Microcode Version 1.2*

This version of CSC-1R/2R microcode requires the replacement of the STRMON EPROM on the CSC-1R and CSC-2R cards. For more information on the upgrade procedure from Version 1.1 to Version 1.2, refer to the publication *Upgrading the Microcode EPROM on the CSC-1R and CSC-2R Token Ring Interface Card*s (Doc. No. 78-1050-xx).

*Caveats*

■   On the 1R card, the interface may fail intermittently.

■    Initialization of the card may fail.

■    The "token error" counter may increment faster than it should.

■    The system can crash under heavy load or while the board is initializing.

*Modifications*

■   Fixes the CSC-1R and CSC-2R reset problem.

■   The changes to the microcode *must* correspond with a change to the system software, otherwise the system software will lose synchronization with the CSC-1R/2R microcode and the router will crash with a multibus timeout error.

*System Software Prerequisites*

Software Releases 9.0(4) and 9.1(2) are required for operation with Microcode Version 1.2 on the CSC-1R/2R card.

## CSC-1R/2R Microcode Version 1.4

This version of CSC-1R/2R microcode requires the replacement of the STRMON EPROM on the CSC-1R and CSC-2R cards. For more information on the upgrade procedure from Version 1.2 to Version 1.4, refer to the publication *Upgrading the Microcode EPROM on the CSC-1R and CSC-2R Token Ring Interface Card*s (Document Number 78-1050-xx).

### Caveats

■ When there are a high number of throttles caused by heavy traffic, the card may hang.

### Modifications

■ Fixes the intermittent failure problem in the CSC-1R card.

■ Fixes the initialization failure problem.

■ Fixes the "token error" counter problem.

■ Fixes the system-crash problem that can occur under heavy loads or during initialization of the card.

■ The Fastmac microcode was updated to Version 4.36.

### System Software Prerequisites

Software Releases 9.0(4) and 9.1(2) are required for operation with Microcode Version 1.4 on the CSC-1R or CSC-2R cards.

## CSC-1R/2R Microcode Version 1.5

This version of CSC-1R/2R microcode requires the replacement of the STRMON EPROM on the CSC-1R and CSC-2R cards. For more information on the upgrade procedure from Version 1.2 to Version 1.5, refer to the publication *Upgrading the Microcode EPROM on the CSC-1R and CSC-2R Token Ring Interface Card*s (Document Number 78-1050-03).

### Caveats

■ If the CSC-MC+ card is connected through the CSC-1R/2R card and there is Token Ring traffic, booting from Flash may fail. This has been fixed in Microcode Version 1.6.

### Modifications

■ Fixes potential hang condition in high-traffic environments.

*System Software Prerequisites*

Software Releases 9.0(4) and 9.1(2) are required for operation with Microcode Version 1.5 on the CSC-1R or CSC-2R cards.

## CSC-1R/2R Microcode Version 1.6

This version of CSC-1R/2R microcode requires the replacement of the STRMON EPROM on the CSC-1R and CSC-2R cards. For more information on the upgrade procedure from Version 1.2 to Version 1.6, refer to the publication *Upgrading the Microcode EPROM on the CSC-1R/2R Token Ring Interface Card*s (Document Number 78-1050-04).

*Modifications*

■   Fixes potential failure of boot from Flash if a CSC-MC+ card is connected through the CSC-1R/2R card and there is Token Ring traffic.

*System Software Prerequisites*

Software Releases 9.0(4) and 9.1(2) are required for operation with Microcode Version 1.6 on the CSC-1R or CSC-2R cards.

# Environmental Monitor Microcode Revisions

This section describes the microcode revisions to the environmental monitor card (CSC-ENVM).

## ENVM Microcode Version 1.1

Version 1.1 was the first officially released version of ENVM (ECMON) microcode.

## ENVM Microcode Version 2.0

Introduced with Software Release 9.0 in April 1992, ECMON Version 2.0 provides additional accuracy and functionality to the ENVM card. For information on the upgrade procedure from Version 1.1 to Version 2.0, refer to the publication *Installing and Configuring the Environmental Monitor Card* (Document Number 78-0899-xx).

*Modifications*

■   Provides access to environmental parameters via SNMP queries.

■   Provides a log of previous shutdown history upon subsequent boot.

For more information on the new features provided with microcode Version 2.0, see "Managing and Monitoring the System" in the *Router Products Configuration and Reference* publication.

## ENVM Microcode Version 2.1

This version contains manufacturing-related enhancements and no new features or fixes.

### Caveats

The following caveat applies only to systems that have the CSC-MC+ Flash card connected to the CSC-ENVM card:

During the erase procedure associated with the **copy tftp flash** command, some Flash memory locations might not be completely erased, but the system will continue with the erase (and write) procedure as if these locations were erased. At the end of the write procedure, when the verification checksum is calculated, these partially-erased memory locations will affect the checksum and cause the following error message:

```
Flash verification checksum error.
Expected xxxx, got yyyy on length zzzzz.
(where xxxx and yyyy are hexadecimal values for the correct and incorrect
checksums, respectively, and zzzzz is the hexadecimal value for the file
size)
```

### Modifications

Gives improved accuracy in voltage, temperature, and airflow sensing, and in warning messages and shutdowns.

### System Software Prerequisites

Requires Software Release 9.0 or later for SNMP query features.

## ENVM Microcode Version 2.2

This version contains new fixes, but no new features. For information on the upgrade procedure from Version 2.1 to Version 2.2, refer to the publication *Installing and Configuring the Environmental Monitor Card in the AGS+ Chassis* (Document Number 78-0899-xx).

### Modifications

Fixes the Flash verification checksum error that occasionally occurred after the erase/write procedure associated with the **copy flash tftp** command.

### System Software Prerequisites

Requires Software Version 9.0 or later for access to the Flash feature.

# ciscoBus Controller Microcode Revisions

This section describes the microcode revisions to the Cisco proprietary first-generation ciscoBus controller card (CSC-CCTL).

## ciscoBus Microcode Version 1.0

Version 1.0 of ciscoBus microcode was the first officially released version of ciscoBus microcode.

## ciscoBus Microcode Version 2.0

Version 2.0 of CiscoBus microcode was introduced with Software Release 8.3(1) to support IP autonomous switching and the new High-Speed Serial Interface (HSSI) interface. Version 2.0 requires replacement of all nine registered EPROMs. For more information on the upgrade procedure from Version 1.0 to Version 2.0, refer to the publication *Upgrading the cBus Controller Card Microcode Version 1.0 to Version 2.0* (Document Number 78-0856-xx.

### Caveats

Incoming Ethernet 802.3 packets are not classified correctly. This can result in dropped packets.

### Modifications

■ Support for IP autonomous switching has been added.

■ Support for the high-speed controller interface card (CSC-HSCI) has been added.

### System Software and Microcode Prerequisites

■ Requires Software Release 8.3(1) or later for autonomous switching or CSC-HSCI support.

■ Refer to Table 1 through Table 5 (on pages 2 through 6) for information on the microcode levels required for other cards used in conjunction with the CSC-CCTL card.

## ciscoBus Microcode Version 3.0

Version 3.0 requires replacement of all nine registered EPROMs. For more information on the upgrade procedure from Version 1.0 or 2.0 to Version 3.0, refer to the publication *Upgrading the CSC-CCTL Cards from Microcode Version 1.0 or 2.0 to Version 3.0* (Document Number 78-1192-xx).

### Modifications

■ Microcode Version 3.0 fixes the caveat from Version 2.0.

- Requires Software Release 8.3(1) or later for autonomous switching or CSC-HSCI support.

- Refer to Table 1 through Table 5 (on pages 2 through 6) for information on the microcode levels required for other cards used in conjunction with the CSC-CCTL card.

# *ciscoBus2 Controller Microcode Revisions*

This section describes the microcode revisions to the Cisco proprietary ciscoBus2 controller card (CSC-CCTL2).

## *ciscoBus2 Microcode Version 10.0*

Version 10.0 of ciscoBus2 microcode was the first officially released version of ciscoBus2 microcode.

*System Software and Microcode Prerequisites*

- Requires Software Release 9.1(1) or later.

- Refer to Table 1 through Table 5 (on pages 2 through 5) for information on the microcode levels required for other cards used in conjunction with the CSC-CCTL2 card.

## *ciscoBus2 Microcode Version 11.0*

Version 11.0 of ciscoBus2 microcode was first released in January of 1994 with Software Release 9.21. Microcode Version 11.0 provides the following new features: IPX autonomous switching, autonomous transparent bridging, and autonomous or fast switching of PPP and Frame Relay over IP.

*Caveats*

- MAC encapsulation of autonomous switched IPX packets corrupt the Ethernet source address. This prevents downstream bridges from correctly learning the router's MAC address.

- The packet length of autonomous switched IPX packets to Token Ring is computed incorrectly when the packet includes RIF in a multi-ring environment.

- The router sometimes corrupts packet length when it switches Ethernet 802.3 SNAP encapsulated IP datagrams.

- Requires Software Release 9.21 or later for full functionality of new features, but is backward compatible with Software Release 9.1 or later (if these features are not required).

- Refer to Table 1 through Table 5 (on pages 2 through 5) for information on the microcode levels required for other cards used in conjunction with the CSC-CCTL2 card.

## *ciscoBus2 Microcode Version 11.1*

Version 11.1 of ciscoBus2 microcode was first released in March of 1995. Microcode Version 11.1 adds cached rewrite length to the IPX protocol length for outbound Token Ring and FDDI.

### *Caveats*

- With autonomous bridging enabled, MEC cards can experience an intermittent hang.

- IP packets can be truncated, causing UDP (tftp) packet corruption.

- IPX ARPA encapsulation errors can occur with IPX autonomous switching enabled.

### *System Software and Microcode Prerequisites*

- Requires Software Release 9.21 or later for full functionality of new features, but is backward compatible with Software Release 9.1 or later (if these features are not required).

- Refer to Table 1 through Table 5 (on pages 2 through 5) for information on the microcode levels required for other cards used in conjunction with the CSC-CCTL2 card.

### *Modifications*

- Microcode Version 11.1 fixes the caveats from Version 11.0.

## *ciscoBus2 Microcode Version 11.2*

Version 11.2 of ciscoBus2 microcode was first released in March 1996 and fixes the caveats in Version 11.1

### *System Software and Microcode Prerequisites*

- Requires Software Release 9.21 or later for full functionality of new features, but is backward compatible with Software Release 9.1 or later (if these features are not required).

- Refer to Table 1 through Table 5 (on pages 2 through 5) for information on the microcode levels required for other cards used in conjunction with the CSC-CCTL2 card.

### Modifications

- Microcode Version 11.2 fixes the caveats from Version 11.1.

## FCI Microcode Revisions

This section describes the microcode revisions to the Fiber Distributed Data Interface (FDDI) controller card (CSC-FCI).

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*Note:* With the release of the ciscoBus2 controller card (CSC-CCTL2), the microcode for the CSC-FCI must match that of the ciscoBus controller. In order to use the ciscoBus2 controller (CSC-CCTL2), FCI Microcode Version 10.x is required. To use the older ciscoBus controller (CSC-CCTL), FCI Microcode Version 2.0 or a previous version are required. When using FCI Microcode Version 1.0 or later, the CCTL microcode must be version 2.0 or later.

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The revision numbering scheme for the FCI microcode has been amended to conform with the numbering scheme for other microcode versions. Thus, FCI Microcode Version 128.43 was the first release, followed by Versions 128.45, 1.0, 2.0, and 10.0 (for the CSC-C2FCI).

### FCI Microcode Version 128.43

FCI Microcode Version 128.43 was the first officially released version of FDDI microcode. It was released in May 1990.

### Caveats

Routers can hang in high-traffic environments where the FDDI ring is extremely unstable (continual transitions). Typical problems include the following:

- The router locks up, and a power cycle is the only way to correct the problem.

- Performance degrades over time.

- High instances of output hangs and ciscoBus controller card restarts occur.

- Symptoms may include the following error message (release-version-dependent traceback information needs to be examined):

```
May 21 15:24:23 145.1.89.254 19: %SYS-2-GETBUF: Bad getbuffer,
bytes= 16654
-Process="Virtual Exec", level=4, pid= 41 -Traceback=5014 4510E 66BE
9E380
9B408 A07B8 A1 028 A0100
```

Performance can degrade significantly due to excessive processor utilization if a MIC connector is pulled from one of the PHY ports. (Both PHY ports erroneously contend to be active.) The problem can be remedied with the **cmt disconnect phy** {**A** | **B**} command when the problem is observed.

## FCI Microcode Version 128.45

Released in June 1991, this version requires replacement of all eight EPROMs.

### Modifications

Fixes potential hang condition in high-traffic environments.

### Caveats

Performance can degrade significantly due to excessive processor usage if a MIC connector is pulled from one of the PHY ports. (Both PHY ports erroneously contend to be active.) The problem can be remedied with the **cmt disconnect phy** {**A** | **B**} command when the problem is observed.

### System Software Prerequisites

Requires Software Release 8.2(4) or later.

## FCI Microcode Version 1.0

Released in October 1991, FDDI Microcode Version 1.0 requires replacement of all eight registered EPROMs. For more information refer to the publication *Upgrading FDDI Controller Interface (FCI) Cards from Microcode Version 128.43/128.45 to Version 1.0* (Document Number 78-0857-xx).

### Modifications

- Fixes the excessive processor utilization problem when a MIC connector is pulled from one of the PHY ports.

- Performance is improved in excessively "bursty" environments (such as environments with frequent NFS timeouts).

- Support has been added to interoperate with most single-mode and multimode converters.

### Caveats

With Software Releases 8.3 or 9.0, under heavy loads, a transmit logic error can cause the FDDI interface to hang and produce the following error message:

```
Interface fddi 0 output hung, restarting cbus 0 controller - mci_output()
```

- For information on the microcode levels required for other cards used in conjunction with the CSC-FCI card, refer to Table 1 through Table 5 (on pages 2 through 6). The microcode for the CSC-CCTL card must be Version 2.0 or greater.

- FDDI Microcode Version 1.0 requires Software Release 8.2(4) or later to support the three modifications listed previously.

## FCI Microcode Version 2.0

FCI Microcode Version 2.0 requires replacement of all eight registered EPROMs. For more information on the upgrade procedure from a previous version to Version 2.0, refer to the publication *Upgrading CSC-FCI Cards to Microcode Version 2.0 or 10.0* (Document Number 78-0857-xx).

### Modifications

- Fixes potential output hangs under heavy loads.

- This version implements interface-based CMT performance enhancements.

### Caveats

Dual homing standby link incorrectly goes active.

### System Software and Microcode Prerequisites

- For information on the microcode levels required for other cards used in conjunction with the CSC-FCI, refer to Table 1 through Table 5. The microcode for CSC-CCTL must be Version 2.0 or greater.

- FDDI Microcode Version 2.0 requires Software Release 9.1(1) or later to take advantage of the improved CMT performance

## FCI Microcode Version 2.1

FCI Microcode Version 2.1 requires replacement of all eight registered EPROMs. For more information on the upgrade procedure from a previous version to Version 2.1, refer to the publication *Upgrading CSC-FCI Cards to Microcode Version 2.1 or 10.1* (Document Number 78-0857-xx).

### Modifications

Fixes the dual homing standby link problem (incorrectly going active).

### Caveats

Dual homing standby link used short link confidence test (LCT).

- For information on the microcode levels required for other cards used in conjunction with the CSC-FCI, refer to Table 1 through Table 5 (on pages 2 through 5). The microcode for the CSC-CCTL card must be Version 2.0 or greater.

- FCI Microcode Version 2.1 requires Software Release 9.1(1) or later to take advantage of the improved CMT performance

## *FCI Microcode Version 2.2*

FCI Microcode Version 2.2 requires replacement of all eight registered EPROMs. For more information on the upgrade procedure from a previous version to Version 2.2, refer to the publication *Upgrading CSC-FCI Cards to Microcode Version 2.2 or 10.2* (Document Number 78-0857-xx).

### *Modifications*

- Dual-homing standby link uses extended link confidence test (LCT).

- Includes a performance improvement to eliminate packet drops in some cases.

### *System Software and Microcode Prerequisites*

- For information on the microcode levels required for other cards used in conjunction with the CSC-FCI, refer to Table 1 through Table 5 (on pages 2 through 5). The microcode for the CSC-CCTL card must be Version 2.0 or greater.

- FCI Microcode Version 2.2 requires Software Release 9.1(1) or later to take advantage of the improved CMT performance

## *C2FCI Microcode Version 10.0 for the CSC-C2FCI Card*

The designator *C2* refers to cards used in conjunction with the new CSC-CCTL2 ciscoBus2 controller card. C2FCI Microcode Version 10.0 requires replacement of all eight registered EPROMs. For more information on the upgrade procedure from a previous version to Version 10.0, refer to the publication *Upgrading CSC-FCI Cards to Microcode Version 2.1 or 10.1* (Document Number 78-0857-xx).

### *Caveats*

Dual homing standby link incorrectly goes active.

### *Modifications*

Support for the new ciscoBus2 controller has been added.

### *System Software and Microcode Prerequisites*

- For information on the microcode levels required for other cards used with the CSC-C2FCI card, refer to Table 1 through Table 5 (on pages 2 through 5).

- C2FCI Microcode Version 10.0 requires Software Release 9.1(1) or later and the ciscoBus2 controller.

## *C2FCI Microcode Version 10.1 for the CSC-C2FCI Card*

C2FCI Microcode Version 10.1 requires replacement of all eight registered EPROMs. For more information on the upgrade procedure from a previous version to Version 10.1, refer to the publication *Upgrading CSC-FCI Cards to Microcode Version 2.1 or 10.1* (Document Number 78-0857-xx).

### *Caveats*

Dual homing standby link used short link confidence test (LCT).

### *Modifications*

Fixes the dual homing standby link problem (incorrectly going active).

### *System Software and Microcode Prerequisites*

- For information on the microcode levels required for other cards used in conjunction with the CSC-C2FCI card, refer to Table 1 through Table 5 (on pages 2 through 5).
- C2FCI Microcode Version 10.1 requires Software Release 9.1(1) or later and the ciscoBus2 controller card.

## *C2FCI Microcode Version 10.2 for the CSC-C2FCI Card*

C2FCI Microcode Version 10.2 requires replacement of all eight registered EPROMs. For more information on the upgrade procedure from a previous version to Version 10.2, refer to the publication *Upgrading CSC-FCI Cards to Microcode Version 2.2 or 10.2* (Document Number 78-0857-xx).

### *Modifications*

- Dual-homing standby link uses extended link confidence test (LCT).
- Includes a performance improvement to eliminate packet drops in some cases.

### *System Software and Microcode Prerequisites*

- For information on the microcode levels required for other cards used in conjunction with the CSC-C2FCI card, refer to Table 1 through Table 5 (on pages 2 through 5).
- C2FCI Microcode Version 10.2 requires Software Release 9.1(1) or later and the ciscoBus2 controller card.

# CSC-C2FCIT Microcode Revisions

This section describes the microcode revisions to the Fiber Distributed Data Interface (FDDI) controller card (CSC-C2FCIT).

## C2FCIT Microcode Version 10.0 for the CSC-C2FCIT Card

This was the first officially released version of microcode for the CSC-C2FCIT card. C2FCIT Microcode Version 10.0 requires replacement of one EPROM. For more information on the upgrade procedure from a previous version to Version 10.0, refer to the publication *Installing the CSC-C2FCIT Fiber Distributed Data Interface Card and Applique* (Document Number 78-0946-xx).

### Modifications

Support for the new ciscoBus2 controller card has been added.

### Caveats

■  On the CSC-C2FCIT card running Microcode Version 10.0, the system may display the following error message on power up:

```
bad rxeof vec
```

■  On the CSC-C2FCIT card running Microcode Version 10.0, a dual-homing standby link may go active incorrectly.

■  When configured for translational bridging, the FDDI receive interface may drop packets.

### System Software and Microcode Prerequisites

■  For information on the microcode levels required for other cards used in conjunction with the CSC-C2FCIT, refer to Table 1 through Table 5 (on pages 2 through 5).

■  C2FCIT Microcode Version 10.0 requires Software Release 9.1(1) or later and the ciscoBus2 controller card.

## C2FCIT Microcode Version 10.1

C2FCIT Microcode Version 10.1 requires replacement of two components on the C2FCIT card: a microcode EPROM at socket U32, and a serial programmable read only memory (PROM) at socket U34. Both components are included in the Version 10.1 microcode upgrade kit. Microcode Version 10.1 has fixed the caveats for Microcode Version 10.0 on the CSC-C2FCIT card. For more information on the upgrade procedure from a previous version to Version 10.1 on the CSC-C2FCIT card, refer to the publication *Installing the CSC-C2FCIT Fiber Distributed Data Interface Card and Applique* (Document Number 78-0946-xx).

*Caveats*

- FCIT transmitter will sometimes stop.

- Dual homing standby link confidence test (LCT) is too short.

- LEM count is running during PCM.

- PHY-A gets trace when it is in WRAP-B.

*System Software and Microcode Prerequisites*

- For information on the microcode levels required for other cards used in conjunction with the CSC-FCIT card, refer to Table 1 through Table 5 (on pages 2 through 5).

- C2FCIT Microcode Version 10.1 requires Software Release 9.1(1) or later and the ciscoBus2 controller card.

## C2FCIT Microcode Version 10.2

C2FCIT Microcode Version 10.2, introduced on November 8, 1993, requires replacement of the microcode EPROM at socket U32. For more information on the upgrade procedure from a previous version to Version 10.2 on the CSC-C2FCIT card, refer to the publication *Installing the CSC-C2FCIT Fiber Distributed Data Interface Card and Applique* (Document Number 78-0946-zx).

*Caveats*

The FDDI ring may experience erroneous transitions and traces.

*Modifications*

C2FCIT Microcode Version 10.2 fixes the caveats in C2FCIT Microcode Version 10.1.

*System Software and Microcode Prerequisites*

- For information on the microcode levels required for other cards used in conjunction with the CSC-FCIT card, refer to Table 1 through Table 5 (on pages 2 through 5).

- C2FCIT Microcode Version 10.2 requires Software Release 9.1(1) or later and the ciscoBus2 controller card.

## C2FCIT Microcode Version 10.3

C2FCIT Microcode Version 10.3, introduced in April 1994, requires replacement of the microcode EPROM at socket U32 and the serial PROM at U34. For more information on the upgrade procedure from a previous version to Version 10.3 on the CSC-C2FCIT card, refer to the publication *Installing the CSC-C2FCIT Fiber Distributed Data Interface Card and Applique* (Document Number 78-0946-xx).

*Modifications*

C2FCIT Microcode Version 10.3 fixes the caveats in C2FCIT Microcode Version 10.2. The code was modified to increase stability.

*System Software and Microcode Prerequisites*

■  For information on the microcode levels required for other cards used in conjunction with the CSC-FCIT card, refer to Table 1 through Table 5 (on pages 2 through 5).

■  C2FCIT Microcode Version 10.3 requires Software Release 9.1(1) or later and the ciscoBus2 controller card.

# CSC-MEC Microcode Revisions

This section describes the microcode revisions to the multiport Ethernet controller interface card (CSC-MEC).

The proper version of microcode for use with an MEC card depends on the hardware revision of the card. To determine revision levels and microcode versions in use on a given system, use the **show controller cbus** command or examine the label on the card edge. Table 4 lists the limitations that apply.

*Table 6*    MEC Hardware/Microcode Prerequisites

| Controller Type | Revision Level | Compatible Microcode Versions |
|---|---|---|
| 5.0 | A[1] (1.0) | 1.1, 1.4 |
| 5.0 | C, D (1.0) | 1.6, 1.7[2] |
| 5.1 | E, F (3.0) | 2.1, 2.2, 2.3, 2.4, 10.0, 10.1, 10.2, 10.3 |

[1]MEC Controller Type 5.0 Revision A is not compatible with the new MEC microcode. Users with this revision must upgrade before installing a ciscoBus2 controller card (CSC-CCTL2).

[2]Version 1.7 is provided for users with cards of earlier revisions who would like to use autonomous switching.

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*Note:*   With the release of the ciscoBus2 controller card (CSC-CCTL2), the microcode for the CSC-MEC must be installed to match the microcode on the ciscoBus controller card. In order to use the CSC-CCTL2, MEC Microcode Version 10.x is required on the hardware Version 5.1 CSC-C2MEC card. To use the older ciscoBus controller card (CSC-CCTL), MEC Microcode Version 2.4 or a previous version is required.

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## MEC Microcode Version 1.1

MEC Microcode Version 1.1 was the first officially released version of MEC microcode.

Under heavy traffic loads, the ciscoBus controller card memory can be corrupted, resulting in a gradual decrease in performance. In extreme cases, an interface can hang.

## MEC Microcode Version 1.4

Version 1.4 requires replacement of three registered EPROMs if MEC Microcode Version 1.1 is currently installed. Refer to Table 6 on page 32 for hardware revision prerequisites associated with this version of microcode.

### Modifications

MEC Microcode Version 1.4 fixes the caveat in MEC Version 1.1.

## MEC Microcode Version 1.6

MEC Microcode Version 1.6 was released in February 1991. This version requires the replacement of all 11 registered EPROMs. For hardware revision prerequisites associated with this version of microcode, refer to Table 6 on page 32.

### Modifications

MEC Microcode Version 1.6 supports the hardware upgrade from Hardware Version 5.0 Revision A to Hardware Version 5.0 Revision C.

### Caveats

MEC Microcode Version 1.6 does not properly support packets that start on odd-byte boundaries. This problem affects AppleTalk fast switching with some other vendors' software.

## MEC Microcode Version 1.7

Introduced with Software Release 8.3(1) in October 1991, this version requires replacement of all 11 registered EPROMs. For more information on the upgrade procedure from Version 1.6 to Version 1.7, refer to the publication *Upgrading MEC Microcode Version 1.6/2.1 to Version 1.7/2.2* (Document Number 78-0858-xx). For hardware revision prerequisites associated with this version of microcode, refer to Table 6 (on page 32).

### Modifications

■   Support has been added for autonomous switching.

■   As a performance improvement for AppleTalk fast switching with Software Release 8.3(1), support has been added for handling packets that start on odd-byte boundaries.

MEC Microcode Version 1.7 does not properly support packets that start on odd-byte boundaries when used with software releases earlier than 8.2(6). This problem affects AppleTalk fast switching with some other vendors' software.

## MEC Microcode Version 2.1

MEC Microcode Version 2.1 was released in February 1991 with the CSC-MEC Hardware Version 5.1 card. For hardware revision prerequisites associated with Microcode Version 2.1, refer to Tables 2 and 3 (on pages 3 and 4, respectively).

### Modifications

MEC Microcode Version 2.1 supports the hardware upgrade from Hardware Version 5.0 to Hardware Version 5.1.

### Caveats

- MEC Microcode Version 2.1 does not properly support packets that start on odd-byte boundaries. This problem affects AppleTalk fast switching with some other vendors' software.

- In extremely high-collision environments, the transmitter may hang. In rare instances, if the output interface queues are full (due to continued extreme collision rates), the interface may not recover, even when issuing a **clear interface** command. This condition requires a system reset.

## MEC Microcode Version 2.2

Introduced with Software Release 8.3(1) in October 1991, MEC Microcode Version 2.2 requires replacement of all 11 registered EPROMs. For more information on the upgrade procedure from Version 2.1 to Version 2.2, refer to the publication *Upgrading MEC Microcode Version 1.6/2.1 to Version 1.7/2.2* (Document Number 78-0858-xx). Refer to Tables 2 and 3 (on pages 3 and 4, respectively) for hardware revision prerequisites associated with this version of microcode.

### Modifications

- Support has been added for autonomous switching.

- As a performance improvement for AppleTalk fast switching with Software Release 8.3(1), support has been added for handling packets that start on odd-byte boundaries.

### Caveats

- The MEC Microcode Version 2.2 does not properly support packets that start on odd-byte boundaries when used with software releases earlier than 8.2(6). This problem affects AppleTalk fast switching with some other vendors' software.

- In extremely high-collision environments the transmitter may hang. In rare instances, if the output interface queues are full (due to continued extreme collision rates), the interface may not recover, even when issuing a **clear interface** command. This condition requires a system reset.

## MEC Microcode Version 2.3

Introduced with Software Release 9.0 in April 1992, MEC Microcode Version 2.3 requires replacement of all 11 registered EPROMs. For more information on the upgrade procedure from Version 2.1 to Version 2.3 and from Version 2.2 to Version 2.3, refer to *Upgrading MEC Cards from Microcode Version 2.2 to 2.3* (Document Number 78-0934-xx). Refer to Tables 2 and 3 (on pages 3 and 4, respectively) for hardware revision prerequisites associated with this version of microcode.

### Modifications

Fixes transmitter hang problems that could occur in high-collision environments.

### Caveats

- The MEC Microcode Version 2.3 does not properly support packets starting on odd-byte boundaries when used with system software releases earlier than Release 8.2(6). This problem affects AppleTalk fast switching with some other vendors' software.

- Under very heavy loads, the MEC will repeat the first portions (12 to 16 bytes) of the packets it sends.

## MEC Microcode Version 2.4

Introduced with Software Release 9.1, MEC Microcode Version 2.4 requires the replacement of all 11 registered EPROMs. For more information on the upgrade procedure from Version 2.3 to Version 2.4, refer to the publication *Upgrading CSC-MEC Cards to Microcode Version 2.4 or 10.0* (Document Number 78-0934-xx). Refer to Tables 2 and 3 (on pages 3 and 4, respectively) for hardware revision prerequisites associated with this version of microcode.

### Modifications

- Fixes the problem of repeating the first portions of packets it sends.

- Version 2.4 improves the ability to detect and filter out errors received in noisy environments. This is especially important in environments such as DECnet and Novell, where there is no IP checksum verification, because it is possible for noise on the physical link to cause data errors.

## C2MEC Microcode Version 10.0

C2MEC Microcode Version 10.0 requires replacement of all 11 registered EPROMs. For more information on the upgrade procedure from a previous version to Version 10.0, refer to the publication *Upgrading CSC-MEC Cards to Microcode Version 2.4 or 10.0* (Document Number 78-0934-xx).

### Modifications

- Support for the new ciscoBus2 controller card has been added.

- Fixes the repeated sending of packet portions observed in MEC 2.3.

### System Software and Microcode Prerequisites

- For information on the microcode levels required for other cards used in conjunction with the CSC-MEC, refer to Tables 2 through 5 (on pages 3 through 5). MEC Microcode Version 10.0 requires Software Release 9.1(1) or later and the ciscoBus2 controller card (CSC-CCTL2).

## C2MEC Microcode Version 10.1

C2MEC Microcode Version 10.1 requires replacement of all 11 registered EPROMs. For more information on the upgrade procedure from a previous version to Version 10.1, refer to the publication *Upgrading CSC-MEC 5.1 Cards to Microcode Version 2.4 or 10.1* (Document Number 78-0934-xx).

### Caveats

- A DEC system on the Ethernet link might experience DECnet, DAP, and CRC errors.

- At loads greater than 30 percent, performance might drop due to retransmissions.

### Modifications

Fixes known caveats from the previous release including the following:

If a transmitter delay is configured for both port 0 and 5, the actual transmitter delay used may not match the value configured.

### System Software and Microcode Prerequisites

- For information on the microcode levels required for other cards used in conjunction with the CSC-MEC, refer to Tables 2 through Table 5 (on pages 3 through 5).

- MEC Microcode Version 10.1 requires Software Release 9.1(1) or later and the ciscoBus2 controller card (CSC-CCTL2).

## C2MEC Microcode Version 10.2

C2MEC Microcode Version 10.2 requires replacement of all 11 registered EPROMs. For more information on the upgrade procedure from a previous version to Version 10.2, refer to the publication *Upgrading CSC-MEC 5.1 Cards to Microcode Version 2.4 or 10.2* (Document Number 78-0934-xx).

### Caveats

■ If an Ethernet segment is shorted while traffic is being processed, the interface might not recover even when the segment is restored.

■ Microcode Version 10.2 might not work with MEC card Revision J0 or lower. (Part Numbers 73-0638-xx [MEC, 6E], 73-0733-xx [MEC, 4E], and 73-0736-xx [MEC, 2E])

Revision K0 (and above) MEC cards will work with Version 10.2 and later.

### Modifications

■ Fixes known caveats from Microcode Version 10.1.

■ Corrects a data corruption error and provides for proper setup and hold times for the SEEQ 80C03 Ethernet controller.

### System Software and Microcode Prerequisites

■ For information on the microcode levels required for other cards used in conjunction with the CSC-MEC, refer to Tables 2 through Table 5 (on pages 3 through 5).

■ MEC Microcode Version 10.2 requires Software Release 9.1(1) or later and the ciscoBus2 controller card (CSC-CCTL2).

## C2MEC Microcode Version 10.3

C2MEC Microcode Version 10.3 requires replacement of all 11 registered EPROMs. For more information on the upgrade procedure from a previous version to Version 10.3, refer to the publication *Upgrading CSC-MEC 5.1 Cards to Microcode Version 2.4 or 10.3* (Document Number 78-0934-xx).

### Modifications

Fixes all known caveats from Microcode Version 10.2.

### System Software and Microcode Prerequisites

■ For information on the microcode levels required for other cards used in conjunction with the CSC-MEC, refer to Tables 2 through 5 (on pages 3 through 5).

■ MEC Microcode Version 10.3 requires Software Release 9.1(1) or later and the ciscoBus2 controller card (CSC-CCTL2).

# CSC-HSCI Microcode Revisions

This section describes the microcode revisions to the High-Speed Serial Interface (HSSI) card (CSC-HSCI), which supports both the HSSI specification and UltraNet interfaces.

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*Note:*  With the release of the ciscoBus2 controller card (CSC-CCTL2), the microcode for the CSC-HSCI card must be installed to match that of the ciscoBus controller card. HSCI Microcode Version 10.x is required for use with the ciscoBus2 controller card (CSC-CCTL2). HSCI Microcode Version 1.0 is required for use with the older ciscoBus controller card(CSC-CCTL).

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## HSCI Microcode Version 1.0

HSCI Microcode Version 1.0 is the first officially released version of HSCI microcode.

### System Software and Microcode Prerequisites

■   HSCI Microcode Version 1.0 requires Software Release 8.3(1) or later.

■   Refer to Table 1 through Table 5 (on pages 2 through 5) for information on the microcode levels required for other cards used in conjunction with the HSCI.

## HSCI Microcode Version 1.1

HSCI Microcode Version 1.1 requires the replacement of all 15 registered EPROMs. For more information on the upgrade procedure from Version 1.0, refer to the publication *Upgrading CSC-HSCI Cards to Microcode Version 1.1 or 10.0* (Document Number 78-1001).

### Modifications

■   Fixes Ultra native mode giants problem allowing the user to set the MTU size of the UltraNet interface to any size between 64 and 4500. Previously some common sizes such as 1500 were not correct. When the MTU was set to 1500, a 1500-byte packet would be interpreted as a giant and discarded.

■   Fixes heavy traffic problem. Heavy traffic on UltraNet or HSSI could cause buffer losses. This would result in many dropped packets, becoming worse over time.

■   Forces HSSI applique to reset if there is a hardware error. Previously, multiple 256-byte packets may have caused the HSSI interface to pause indefinitely or for a few seconds depending on the serial protocol. Now the microcode recognizes that the interface is paused and resets the interface. This may result in a few dropped packets, but it will not hang the interface. The **show interface hssi** command displays the error as an "applique" error.

- HSCI Microcode Version 1.1 requires Software Release 8.3(1) or later.

- Refer to Table 2 through Table 5 (on pages 3 through 5) for information on the microcode levels required for other cards used in conjunction with the HSCI.

## *C2HSCI Microcode Version 10.0*

Introduced with Software Release 9.1 to support the ciscoBus2 controller card (CSC-CCTL2), C2HSCI Microcode Version 10.0 requires the replacement of all 15 registered EPROMs. For more information on the upgrade procedure from Version 1.0, refer to the publication *Upgrading CSC-HSCI Cards to Microcode Version 1.1 or 10.0* (Document Number 78-1001).

### *Caveats*
Transmitter delay did not work.

### *Modifications*
This version adds support for the ciscoBus2 card.

### *System Software and Microcode Prerequisites*
- C2HSCI Microcode Version 10.0 requires Software Release 9.1(1) or later.

- Refer to Table 2 through Table 5 (on pages 2 through 5) for information on the microcode levels required for other cards used in conjunction with the CSC-HSCI card.

## *C2HSCI Microcode Version 10.1*

Introduced May 1994, C2HSCI Microcode Version 10.1 requires the replacement of all 15 registered EPROMs. For more information on the upgrade procedure from Version 1.0, refer to the publication *Upgrading CSC-HSCI Cards to Microcode Version 1.1 or 10.1* (Document Number 78-1001).

### *Modifications*
The caveat from the previous release is fixed in C2HSCI Microcode Version 10.1.

### *System Software and Microcode Prerequisites*
- C2HSCI Microcode Version 10.1 requires Software Release 9.1(1) or later.

- Refer to Table 2 through Table 5 (on pages 2 through 5) for information on the microcode levels required for other cards used in conjunction with the CSC-HSCI card.

# CSC-C2CTR Card Microcode Revisions

This section describes microcode revisions to the ciscoBus Token Ring interface card (CSC-C2CTR).

## C2CTR Microcode Version 10.0

Introduced with Software Release 9.1 to support the ciscoBus2 card, C2CTR Microcode Version 10.0 was the first officially released version for the C2CTR card.

### Caveats

- Under an extremely heavy load, the performance of the card can significantly degrade.
- The C2CTR card may hang when an interface is cleared.

## C2CTR Microcode Version 10.1

C2CTR Microcode Version 10.1 requires the replacement of one EPROM. For more information on the upgrade procedure for Version 10.0 to Version 10.1, refer to the publication *cBus Token Ring Card and Applique Installation and Upgrade Instructions* (Document Number 78-0875-xx).

### Modifications

- Fixes the performance degradation problem (under heavy loads).
- Fixes the problem of hanging the card when an interface is cleared.

### System Software and Microcode Prerequisites

- C2CTR Microcode Version 10.1 requires Software Release 9.1 or later.
- Refer to Table 2 through Table 5 (on pages 3 through 5) for information on the microcode levels required for other cards used in conjunction with the CSC-C2CTR card.

## C2CTR Microcode Version 10.2

C2CTR Microcode Version 10.2 requires the replacement of one EPROM. For more information on the upgrade procedure for Version 10.1 to Version 10.2, refer to the publication *ciscoBus Token Ring Card and Applique Installation and Upgrade Instructions*
(Document Number 78-0875-xx).

### Modifications

- Fixes the known caveats from the previous release, in addition to the following:

— Under heavy loads on multiple interfaces, an interface may stop transmitting and receiving packets and the card may stop functioning.

— The interface may incorrectly report that the ring is beaconing.

— Occasionally, an interface may fail to insert into the ring because it incorrectly assumes the ring is beaconing.

— During Token Ring Lobe Test, an Adapter Check error (0008 0003 0A5E 4F11) may occur.

*System Software and Microcode Prerequisites*

■ C2CTR Microcode Version 10.2 requires Software Release 9.1 or later.

■ Refer to Table 2 through Table 5 (on pages 3 through 5) for information on the microcode levels required for other cards used in conjunction with the CSC-C2CTR card.

# Obtaining Additional Information

Following are methods for obtaining microcode-related information.

# Microcode Installation Instructions

Each microcode upgrade kit comprises a set of one or more microcode EPROMs (and in some cases additional replacement components) and the installation instructions. Table 7 lists the upgrade kits currently available and the titles of the installation instructions. The document number is an ordering number and is provided for verification. When you receive a publication, check the document number in the upper right or left corner of the first page to ensure that you have the correct publication.

*Table 7*    Installation Instructions for Microcode Upgrade Kits

| Kit Part Number | Title | Document No. |
|---|---|---|
| MC-1R/2R-V1.6=[1] | *Upgrading the Microcode EPROM on the 1R/2R Token Ring Interface Cards* | 78-1050-04 |
| MC-C2CTR-V10.2= | *cBus Token Ring Card and Applique Installation and Upgrade Instructions* | 78-0875-04 |
| MC-C2FCIT-V10.3= | *Installing and Upgrading the CSC-C2FCIT FDDI Card and Applique* | 78-0946-07 |
| MC-CCTL-V3.0= | *Upgrading CSC-CCTL Cards from Microcode Version 1.0 or 2.0 to 3.0* | 78-1192-01 |
| MC-CCTL2-V11.2= | *Installing and Upgrading the CSC-CCTL2 ciscoBus II Controller Card* | 78-0877-05 |
| MC-ENVM-V2.2= | *Installing and Configuring the CSC-ENVM in the AGS+ Chassis* | 78-0899-03 |
| MC-FCI-V2.2= | *Upgrading CSC-FCI Cards to Microcode Version 2.2 or 10.2* | 78-0857-03 |
| MC-FCI-V10.2= | *Upgrading CSC-FCI Cards to Microcode Version 2.2 or 10.2* | 78-0857-03 |
| MC-HSCI-V1.1= | *Upgrading CSC-HSCI Cards to Microcode Version 1.1 or 10.1* | 78-1001-02 |
| MC-HSCI-V10.1= | *Upgrading CSC-HSCI Cards to Microcode Version 1.1 or 10.1* | 78-1001-02 |
| MC-MCI3-V1.11= MC-MCI3-V1.11A= | *Upgrading MCI Cards from Microcode Versions 1.5, 1.7, 1.8, 1.9 and 1.9A to Microcode Versions 1.10 and 1.10A* | 78-0728-05 |
| MC-MEC5.0C-V1.7= | *Upgrading the CSC-MEC from Microcode Version 1.6/2.1 to 1.7/2.2* | 78-0858-01 |
| MC-MEC5.0C-V2.2= | *Upgrading the CSC-MEC from Microcode Version 1.6/2.1 to 1.7/2.2* | 78-0858-01 |

| Kit Part Number | Title | Document No. |
|---|---|---|
| MC-MEC5.1-V2.4= | *Upgrading CSC-MEC5.1 Cards to Microcode Version 2.4 or 10.3* | 78-0934-05 |
| MC-MEC5.1-V10.3= | *Upgrading CSC-MEC5.1 Cards to Microcode Version 2.4 or 10.3* | 78-0934-05 |
| MC-R16M-V3.4= | *Upgrading the CSC-R16 Token Ring Interface Card to the CSC-R16M and Upgrading Microcode on the CSC-R16M Card* | 78-0848-03 |
| MC-SCI-V1.4=<br>MC-SCI-V1.4A= | *Upgrading Serial-Port Communications Interface (SCI) Cards from Microcode Version 1.0, 1.1, 1.2, and 1.3 to Versions 1.4 and 1.4A* | 78-0863-03 |
| MC-SCI-V5.1= | *Upgrading the Serial-Port Communications Interface (SCI) Card to Microcode Version 5.1* | 78-1201-02 |
| MC-SCI-V5.1A= | *Upgrading the Serial-Port Communications Interface (SCI) Card to Microcode Version 5.1* | 78-1201-02 |

[1]The equal sign (=) indicates that this kit is available as a spare part.

# *Cisco Information Online*

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- WWW: `http://www.cisco.com`.

- Telnet: `cio.cisco.com`.

- Modem:  From North America, 408 526-8070; from Europe, 33 1 64 46 40 82. Use the following terminal settings: VT100 emulation; databits: 8; parity: none; stop bits: 1; and baud rates up to 14.4 kbps.

For a copy of CIO's Frequently Asked Questions (FAQ), contact `cio-help@cisco.com`. For additional information, contact `cio-team@cisco.com`.

> ***Note:*** If you are a network administrator and need personal technical assistance with a Cisco product that is under warranty or covered by a maintenance contract, contact Cisco's Technical Assistance Center (TAC) at 800 553-2447, 408 526-7209, or `tac@cisco.com`. To obtain general information about Cisco Systems, Cisco products, or upgrades, contact 800 553-6387, 408 526-7208, or `cs-rep@cisco.com`.