SYSTEM RECOVERY

This is the 235-105-250, **5ESS®** *Switch System Recovery*. The procedures in this information product are used in the software and hardware recovery of the *5ESS* switch by telephone company personnel who respond to critical *5ESS* switch system or unit faults that result in call processing downtime.

In accordance with the *5ESS* Switch Software Support Policy, the 5E14 software release is rated Discontinued Availability as of September 1, 2004. The information supporting 5E14 and earlier software releases has been removed from this document. If you support offices that use a software release before 5E15 and you need that information, keep the earlier copy of the CD-ROM.

Sections 5.2, 5.3 and 5.4.1 were updated for Feature 99-5E-8850–MSGS-MSGS CM3 Ethernet Connectivity.

Replace the appropriate pages with the new pages, and keep the Update Instructions pages for future reference. Two Comment Forms per volume are included with this update so you can provide feedback to the document developer if desired.

Division	Pages	Issue Number	Division	Pages	Issue Number
UPDATE	1	16.16	3.3.5	1	16.01
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Alcatel·Lucent

5ESS® Switch System Recovery

5E15 and Later Software Releases

235-105-250
Issue 16.16
February 2008

Notice

Every effort was made to ensure that the information in this information product was complete and accurate at the time of publication. However, information is subject to change.

This information product describes certain hardware, software, features, and capabilities of Alcatel-Lucent products. This information product is for information purposes; therefore, caution is advised that this information product may differ from any configuration currently installed.

This *5ESS*® switch document may contain references to the *5ESS*® switch, the *5ESS*®-2000 switch, and the *5ESS*® *AnyMedia*® Switch. The official name of the product has been changed back to the *5ESS*® switch. The documentation will not be totally reissued to change these references. Instead, the changes will be made over time, as technical changes to the document are required. In the interim, assume that any reference to the *5ESS*®-2000 switch or the *5ESS*® *AnyMedia*® Switch is also applicable to the *5ESS*® switch. It should be noted that this name change may not have been carried forward into software-influenced items such as input and output messages, master control center screens, and recent change/verify screens.

Conformance Statements

Interference Information: Part 15 of FCC Rules - Refer to the *5ESS*® Switch Product Specification information product.

Trademarks

5ESS is a registered trademark of Alcatel-Lucent in the United States and other countries.
AnyMedia is a registered trademark of Alcatel-Lucent in the United States and other countries.
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Limited Warranty

Warranty information applicable to the *5ESS*® switch may be obtained from the Alcatel-Lucent Account Management organization. Customer-modified hardware and/or software is not covered by this warranty.

Ordering Information

This information product is distributed by Alcatel-Lucent in Indianapolis, Indiana.

The order number for this information product is 235-105-250. To order, call:

1-888-582-3688 or fax to 1-800-566-9568 (from inside the continental United States)

1-317-377-8618 or fax to 1-317-377-8616 (from outside the continental United States).

Support Information

Information Product Support: To report errors or ask nontechnical questions about this or other information products produced by Alcatel-Lucent, contact Alcatel-Lucent by using one of the following methods:

Use the comment form at http://www.lucent-info.com/comments/

Send e-mail to comments@alcatel-lucent.com

Please include with your comments the title, ordering number, issue number, and issue date of the information product, your complete mailing address, and your telephone number.

Technical Support Telephone Numbers: For technical assistance, call Technical Support Services (TSS) at:

1-866-582-3688 (from inside the continental United States)

1-630-224-4672 (from outside the continental United States).

Technical Support Services is staffed 24 hours a day, 7 days a week.

Acknowledgment

Developed by Alcatel-Lucent.

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1. INTRODUCTION

1.1 PURPOSE

This is the 235-105-250, **5ESS®** *Switch System Recovery*. The procedures in this information product are used in the software and hardware recovery of the *5ESS* switch by telephone company personnel who respond to critical *5ESS* switch system or unit faults that result in call processing downtime.

Caution: Some local recovery efforts may be attempted before contacting Alcatel-Lucent support. However, as soon as possible, escalate all service outage problems to Alcatel-Lucent support. Call Customer Technical Support at 1-866-582-3688 (866LUCENT8) or 1-630-224-4672. Table 1-1 lists the recommended maximum escalation intervals for various service-affecting conditions.

Figure 1-1 is a recovery checklist. During a recovery effort, fill out this checklist and refer to it.

Table 1-1 — Service Outage Escalation Guidelines

OUTAGE CONDITION	MAXIMUM ESCALATION INTERVAL
Power Outage	10 min.
AM Initialization Fault	10 min.
CNI Initialization Fault	10 min.
CM Duplex Failure	10 min.
SM Initialization Fault	10 min.
SM Isolation	10 min.
RSM Isolation	10 min.
DNU Duplex Failure Outage	10 min.
OIU PG Duplex Failure Outage	10 min.
Other SM Peripheral Duplex Failure	30 min.

This information product covers the 5E15-5E16.2 software releases. As the *5ESS* switch continues to evolve, this information product will be reissued or updated to cover future software releases.

RECOVERY CHECKLIST:

1. Who is on the bridge?

_____

2. Site Information:

Office Name: _____

Site Phone #: _____

3. What is the nature of the outage? Briefly describe what is not working:

_____

_____

4. What time did the incident start? _____

5. What types of calls are affected?

Line calls: **# of lines:** _____

Trunk calls (CCS/PSU/MF): **# of trunks:** _____

911/Police/Fire/Hospital: _____

6. What portion of calls of a given type are affected?

All, 50%, intermittent, … _____

7. What processors are affected? (Include types, if appropriate.)

AM (3B20, 3B21, Sun): _____

CNI (IRN2, SSI): _____

CM/CMP (CM2, CM3, SF, DF): _____

SM (SMP12/20/23, RSM/ORM, SM2000): _____

_____

8. What has been done so far in attempting to resolve the problem?

Initializations/pumps/boots (AM, CM, CNI, SM): _____

System inhibits active (HW/SW checks): _____

9. What led up to the incident?

SU application or RCV activity: _____

Growth/Conversion activity: _____

Loss of Power: _____

Other: _____

10. How old are the backup tapes? _____

Recommend tape reload within two hours!

Figure 1-1 — Recovery Checklist

1.2 GENERAL

1.2.1 REASONS FOR UPDATE

This is an update of the Alcatel-Lucent information product 235-105-250, System Recovery. This document is being updated from previous issue 16.15G July 2007 to new issue 16.16H, February 2008. Modifications have been made due to new or updated features, or for technical issues.

1.2.2 USER FEEDBACK

We are constantly striving to improve the quality and usability of this information product. Please use one of the following options to provide us with your feedback. And with your feedback, please include the Title, Ordering Number, Issue Number, and Issue Date of the information product, your complete mailing address, and your telephone number.

You can send email to **comments@lucent.com**.

You can use the on-line comment form at **http://www.lucent-info.com/comments**.

You can call the Lucent Learning Organization with your feedback. The telephone number is **1-888-LUCENT8** (1-888-582-3688). This number is staffed Monday – Friday from 7:00 AM to 4:00 PM Central time.

1.2.3 SUPPORTED SOFTWARE RELEASES

In accordance with the *5ESS* Switch Software Support Policy, the 5E14 software release is rated Discontinued Availability as of September 1, 2004. The information supporting 5E14 and earlier software releases has been removed from this document. If you support offices that use a software release before 5E15 and you need that information, keep the earlier copy of the CD-ROM.

1.2.4 TERMINOLOGY

1.2.4.1 Lucent Electronic Delivery

The Lucent Electronic Delivery system is replacing the Software Change Administration and Notification System (SCANS) as the system used to download software changes to Alcatel-Lucent products. During the transition, both systems will be supported. When products no longer require SCANS, Alcatel-Lucent will notify any customers still using SCANS of the plans for completing the migration to Lucent Electronic Delivery. The 235-200-145, **5ESS** *Switch* **OneLink Manager**™ *Administrative Services Module User's Guide*, describes the Lucent Electronic Delivery System. Documentation currently referencing SCANS will be changed over time, as other technical changes are required.

1.2.4.2 COMMUNICATION MODULE NAME CHANGE

The term Communication Module (CM) was changed to the Global Messaging Server (GMS), representing the new portfolio name of this particular module. The current names of the specific types of the GMS (the CM2 and CM3) were not changed. Where the CM name was used in a generic way in this information product, the name is changed to GMS. Where the specific version of GMS (CM2 or CM3) is being described or mentioned, the name will not be changed. However, the GMS name may be added to the description in certain places as a reminder of the change, and that the particular version is a part of the overall portfolio. The following list provides some examples of how you may see these names used together:

- Global Messaging Server (formerly Communication Module)

- GMS (formerly CM)
- Global Messaging Server-CM2
- GMS-CM2
- Global Messaging Server-CM3
- GMS-CM3.

These name changes will be made over time as other technical changes are required. Also, these changes may not be reflected in all software interfaces (input and output messages, master control center screens, and recent change and verify screens). Where the information product references these areas, the names are used as they are within the software interface.

1.2.4.3 *5ESS*-2000 SWITCH NAME CHANGE

This *5ESS* switch document may contain references to the *5ESS* switch, the *5ESS*-2000 switch, and the *5ESS AnyMedia*® Switch. The official name of the product has been changed back to the *5ESS* switch. The documentation will not be totally reissued to change these references. Instead, the changes will be made over time, as technical changes to the document are required. In the interim, any reference to the *5ESS*-2000 switch or the *5ESS AnyMedia* Switch is also applicable to the *5ESS* switch. This name change may not have been carried forward into software-influenced items such as input and output messages, master control center screens, and recent change and verify screens.

1.3 ORGANIZATION

This information product contains the following sections:

- ***SECTION 1 – INTRODUCTION:*** This section contains an introduction to this information product and an overall description and strategy for system recovery.
- ***SECTION 2 – DISK INDEPENDENT OPERATION (DIOP), DEAD-START, AND TAPE LOAD:*** This section provides the description and the procedures for recovering the system when DIOP is the problem, or when all attempts at disk recovery fail.
- ***SECTION 3 – POWER:*** This section contains the description and the procedures for recovering the system after a power loss or power interruption.
- ***SECTION 4 – ADMINISTRATIVE MODULE (AM):*** This section contains the descriptions and the procedures for recovering the AM when the fault has been caused by the AM.
- ***SECTION 5 – COMMUNICATION MODULE (CM):*** This section contains the descriptions and the procedures for recovering the CM when the fault has been caused by the CM.
- ***SECTION 6 – SWITCHING MODULE/SM-2000 AND REMOTES:*** This section contains the descriptions and the procedures for recovering the SM/SM-2000 and Remotes when the fault has been caused by the SM/SM-2000 and Remotes.
- ***SECTION 7 – COMMON NETWORK INTERFACE RING:*** This procedure is used in the recovery of the *5ESS* switch when the AM has been taken down by the Common Network Interface (CNI). When the CNI ring needs to be repaired and the AM is sane, craft personnel must reference 235-200-115, **5ESS** *Switch CNI Common Channel Signaling*, for the appropriate recovery steps.

- ***SECTION 8 – MISCELLANEOUS PROCEDURES:*** This section contains miscellaneous descriptions and procedures relating to system recovery.
- ***SECTION 9 – SYSTEM RECOVERY DESCRIPTION:*** This section provides a description of the software and hardware recovery capabilities of the *5ESS* switch. Both automatic and manual recovery capabilities are covered.
- ***GLOSSARY:*** The glossary section provides brief definitions of acronyms and abbreviations used in this information product.
- For the paper version of the document, an Index is provided.

1.4 USER COMMENTS

We are constantly striving to improve the quality and usability of this information product. Please use one of the following options to provide us with your comments:

- You may use the on-line comment form at **http://www.lucent-info.com/comments**
- You may email your comments to **comments@alcatel-lucent.com**

Please include with your comments the title, ordering number, issue number, and issue date of the information product, your complete mailing address, and your telephone number.

If you have questions or comments about the distribution of our information products, see Section 1.5, Distribution.

1.5 DISTRIBUTION

For distribution comments or questions, contact your local Alcatel-Lucent Account Representative.

A documentation coordinator has authorization from Alcatel-Lucent to purchase our information products at discounted prices. To find out whether your company has this authorization through a documentation coordinator, call **1-888-582-3688**.

Customers who are not represented by a documentation coordinator and employees of Alcatel-Lucent should order *5ESS* switch information products directly from Alcatel-Lucent.

To order, call the following telephone number:

- **1-888-582-3688** or fax to **1-800-566-9568**; from inside the continental United States
- **1-317-377-8618** or fax to **1-317-377-8616**; from outside the continental United States.

1.6 TECHNICAL ASSISTANCE

For technical assistance, call Technical Support Services (TSS) at:

- **1-866-582-3688**; from inside the continental United States
- **1-630-224-4672**; from outside the continental United States.

Technical Support Services is staffed 24 hours a day, 7 days a week.

1.7 MAINTENANCE OF VENDOR EQUIPMENT

The 235-XXX-XXX information products do not provide maintenance procedures for the repair of equipment manufactured by vendors other than Alcatel-Lucent (for example, tape drives, disk drives, etc.). To identify the appropriate maintenance

information product for other vendor equipment, see 235-001-001, *Documentation Description and Ordering Guide*.

1.8 REFERENCES

The information products that support *5ESS* switch system recovery are as follows:

- 235-600-400, *Audits Manual*: This information product provides the information to interpret the *5ESS* switch application operating system audit messages.
- 235-600-500, *Asserts Manual*: This information product provides the information to interpret Defensive Check Failure (DCF) output messages.
- 235-600-601, *Processor Recovery Messages*: This information product provides the information to interpret the *5ESS* switch processor recovery messages (PRMs).
- 235-105-220, *Corrective Maintenance Procedures*: This information product provides a series of "task-oriented" procedures for analyzing and clearing *5ESS* switch hardware and/or software problems. It contains information on diagnostic failures, non-diagnosable (operational) errors, postmortem dumps, as well as information on responding to asserts and audit reports.

See 235-001-001, *Documentation Description and Ordering Guide*, for other *5ESS* switch information products.

The Compact Digital Exchange (CDX), the Very Compact Digital Exchange (VCDX), and the Distinctive Remote Module (DRM) are switching systems based on the *5ESS* switch. This information product is a standard *5ESS* switch document that is also applicable to the CDX, VCDX, and DRM switching systems. Information applicable only to CDX, VCDX, or DRM may be found in the following information products:

- 235-120-010, *Compact Digital Exchange (CDX) Reference Guide*
- 235-120-020, *Compact Digital Exchange (CDX) User's Guide*
- 235-120-120, *Very Compact Digital Exchange (VCDX) User's Guide*
- 235-200-150, *Distinctive Remote Module (DRM) User's Guide.*

5. COMMUNICATION MODULE

These procedures are used to recover the CM when the fault is caused by a CM unit.

5.1 CLEAR AM/CM ISOLATION

OVERVIEW

This procedure is used to clear a manual administrative module/communication module (AM/CM) isolation. The AM/CM isolation is useful when recovering from an AM software or hardware problem. Once the AM problems have been resolved, resynchronize the AM and CM to resume normal operation of the system.

The AM and CM can usually be resynchronized without an initialization. However, if a CM duplex failure is detected during AM/CM resynchronization, a manual AM initialization must be requested. The CM will then be initialized, if necessary, to restore essential functionality.

PROCEDURE

1. At the master control center (MCC) video terminal, is the **EMERGENCY ACTION PAGE** displayed?

   If **YES**, go to Step 3.

   If **NO**, continue with the next step.

2. At the MCC video terminal, depress the **EA DISP** key to display the **EMERGENCY ACTION PAGE**.

   Response: The **EMERGENCY ACTION PAGE** is displayed.

3. Enter command **42** on the command input line to enable application parameter entry.

   Response: **PARAMETER** indicator is displayed.

4. Enter application parameter **t** (the letter 't') on the command input line to clear AM/CM isolation.

   Reference: Section 4.7.2.

5. Enter command **50** on the command input line to perform an AM/CM resynchronization without an AM initialization.

   Response: **OK**

6. At the receive-only printer (ROP), look for a processor recovery message (PRM) with the following format:

   PRM_a EE00 0225 xxxx xxxx xx xx xx

   This PRM indicates that CM hardware resynchronization completed successfully. It may take several minutes for this PRM to be printed.

7. Was the PRM shown in Step 6 printed?

   If **YES**, go to Step 10.

   If **NO**, continue with the next step.

8. Is AM/CM isolation still in effect?

   If **YES**, continue with the next step.

   If **NO**, go to Step 10.

Note: This condition would be indicated by one or more of the following:

a. **REPT CM ISOLATED FROM AM** output message printed on the ROP.

b. **REPT CM RE-SYNCHRONIZATION WITH THE AM ABORTED** output message printed on the ROP.

c. **CM ISOL** indicator backlighted on MCC Page **115**.

9. Enter command **54** on the command input line to invoke an AM initialization with AM/CM resynchronization (D4,S7,H2,C4). If necessary, the CM is initialized to restore essential functionality.

   Reference: Procedure 4.7.

10. Determine whether call processing is available.

    Reference: Procedure 8.1.

11. Has call processing been restored?

    If **YES**, continue with the next step.

    If **NO**, contact the next higher level of support ***immediately***.

12. Monitor call processing, and do not go any further than this step unless call processing has been lost again, or unless directed by the next higher level of support.

    Reference: Procedure 8.2.

13. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5.2 ANALYZE AND CONTROL THE REPAIR OF CM DUPLEX HARDWARE FAILURE

OVERVIEW

This procedure is used when an essential Communication Module (CM) unit duplex-fails and results in the Administrative Module (AM) rolling in initializations.

Caution: Use this procedure only if the AM procedures (in Section 4) have determined that the CM is preventing the AM from recovering and if every attempt to stabilize the CM has failed.

Note: This procedure is associated with a service outage. Before starting this procedure, contact the Electronic Switching Action Center (ESAC), or equivalent, and Lucent Technologies support. Call Customer Technical Support at 1-866-582-3688 (866LUCENT8) or 1-630-224-4672.

This procedure is only intended to recover CM units that are crucial to maintaining call processing. The CM units that are considered essential for call processing include the Message Switch Control Unit (MSCU), Communication Module Processor (CMP), Foundation Peripheral Controller (FPC), and Office Network Timing Complex (ONTC). At least one of each of these units must be in service.

In addition, the AM must be able to communicate with at least one switching module (SM) or switching module-2000 (SM-2000). This requires at least one active module message processor (MMP) or, if equipped, one active quad-link packet switch (QLPS) and one active QLPS gateway processor (QGP). At least one dual link interface (DLI) or primary network link interface (NLI) and, for CM3 in 5E16.2 and later, one primary time multiplexed switch fabric pair (TMSFP) are also required. A total failure of all units of one of these types can only cause the AM to initialize if it results in a loss of communication to all SM/SM-2000s. Other CM units, such as the pump peripheral controller (PPC), and secondary NLIs and TMSFPs are not viewed as essential for call processing.

ONTC duplex failures are normally caused by failure of ONTCCOM (ONTC common) units, rather than DLI, NLI, QLPS, or TMS fabric problems. Therefore, the fastest way to find and repair critical ONTC faults is usually to run the ONTCCOM (rather than ONTC) diagnostic. For CM2 offices, the ONTCCOM includes the dual message interface (DMI), network clock (NC), and TMS. For CM3 offices, prior to 5E16.2, it includes the message link interface (MLI), NC, and TMS. For CM3 offices, in 5E16.2 and later, the TMS controller remains a part of the ONTCCOM but the TMS fabrics are associated with separately configurable and diagnosable TMSFP units.

For CM3 offices, once the fuse is inserted at the MFFU, the packs can be removed/inserted hot. There is no SN516 for CM3.

All CM3 hardware is APR-compliant. Once an APR-compliant CM pack is inserted and/or power is supplied, it is usually necessary to perform a manual action (a restore or CM initialization) to bring the affected unit(s) into service. However, system software can bring such units into service automatically in order to maintain essential functionality if critical faults occur.

For CM3, all MSGS sub-units (MSCU, FPC, CMP, MMP, QGP, PPC, and MSGS ENETWK) are displayed on MCC page 1240 (for side 0) and 1250 (for side 1).

Note: The ENETWK indicator is only displayed if the network is equipped.

Caution 1: This procedure initializes the AM into "MIN MODE" where all the call processing functions are turned off. This means all central call processing is blocked. DO NOT use this procedure until all conventional recovery methods have been exhausted; this includes inhibiting CM hardware [42-f-50 poke on emergency action interface (EAI)] and software checks (36 poke of EAI) (AM Procedures 4.2 and 4.3). If this procedure is needed, work expeditiously to resolve the problem; then refer to Step 23 of this procedure to exit min-mode.

Caution 2: If the failure Processor Recovery Messages (PRMs) do NOT indicate that an essential CM unit is preventing the AM from recovering, DO NOT use this procedure. If the failure PRM implicates the CM, determine if there is a power problem by inspecting the CM cabinets and the Power Control Fuse Distribution (PCFD) cabinet that powers the CM. Check to see if CM cabinet unit power converters have shut down or if there are PCFD or CM cabinet fuse alarms. Use Procedures 3.6 and 3.8 to correct any identified power problem.

Once in min-mode, maintenance personnel are required to gather the information on the unit(s) that are preventing the AM from recovering.

PROCEDURE

1. Observe the information provided in the following Note:

   Note: This procedure is associated with a service outage. Before starting this procedure, contact the Electronic Switching Action Center (ESAC), or equivalent, and Lucent Technologies support. Call Customer Technical Support at 1-866-582-3688 (866LUCENT8) or 1-630-224-4672.

2. On the emergency action interface (EAI), perform AM Full Initialization (D4,S7,H4,C4) to enter AM minimum-mode using **poke 42-m-54**.

   Note: After the AM completes its initialization into min-mode, the MCC page (111/112) for the AM unit status is displayed.

3. Determine the operational state of MSCU 0 and MSCU 1 by displaying the **1240** and **1250** MCC pages.

4. Is the operational state of either MSCU 0 or MSCU 1 **ACT**?

   If **YES**, continue with the next step.

   If **NO**, repair MSCU 0 using Procedure 5.3. If MSCU 0 cannot be recovered, attempt the repair of MSCU 1. If neither MSCU can be recovered, ***seek technical assistance*** according to local procedure.

5. For CM2, determine the operational state of FPC 0 and FPC 1 by displaying the **1241** and **1251** MCC pages.

   For CM3, determine the operational state of FPC 0 and FPC 1 by displaying the **1240** and **1250** MCC pages.

6. Is the operational status of either FPC 0 or FPC 1 **ACT**?

   If **YES**, continue with the next step.

   If **NO**, repair an FPC, which is the child of an ACT MSCU, using Procedure 5.3. If the FPC cannot be recovered, attempt the repair of the mate FPC. **NOTE:** if only one MSCU is active and the FPC on the active MSCU side cannot be

recovered, repair the second MSCU by using Procedure 5.3. If neither FPC can be recovered, ***seek technical assistance*** according to local procedure.

7. For CM2, determine the operational state of CMP 0-0 and CMP 1-0 by displaying the **1241** and **1251** MCC pages.

   For CM3, determine the operational state of CMP 0-0 and CMP 1-0 by displaying the **1240** and **1250** MCC pages.

8. Is the operational status of either CMP 0-0 or CMP 1-0 **ACT**?

   If **YES**, continue with the next step.

   If **NO**, repair a CMP, which is the child of an ACT MSCU, using Procedure 5.3.

   If the CMP cannot be recovered, attempt the repair of the mate CMP. **NOTE:** if only one MSCU is active and the CMP on the active MSCU side cannot be recovered, repair the second MSCU by using Procedure 5.3. If neither CMP can be recovered, ***seek technical assistance*** according to local procedure.

9. Determine the operational state of ONTCCOM 0 and ONTCCOM 1 by displaying the **1209** MCC page.

10. Is the operational state of either ONTCCOM 0 or ONTCCOM 1 **ACT** or **DGR**?

    If **YES**, continue with the next step.

    If **NO**, repair ONTCCOM 0 failure using Procedure 5.3. If ONTCCOM 0 cannot be recovered, attempt the repair of ONTCCOM 1. If neither ONTCCOM can be recovered, ***seek technical assistance*** according to local procedure.

11. For CM3 in 5E16.2 and later, determine the operational state of TMSFP 0-0 and TMSFP 1-0 by displaying the **1212** MCC page.

    For CM2 or prior to 5E16.2, go to Step 13.

12. Is the operational state of either TMSFP 0-0 or TMSFP 1-0 **ACT** or **DGR**?

    If **YES**, continue with the next step.
    If **NO**, repair TMSFP 0-0 failure using Procedure 5.3. If TMSFP 0-0 cannot be recovered, attempt the repair of TMSFP 1-0. If neither *primary* TMSFP 0-0 or 1-0 can be recovered, ***seek technical assistance*** according to local procedure.

13. For CM2, determine the operational state of the MMPs on MSGS side 0 and MSGS side 1 by displaying the **1242, 1243, 1252** and **1253** MCC pages.

    For CM3, determine the operational state of the MMPs on MSGS side 0 and MSGS side 1 by displaying the **1240** and **1250** MCC pages.

    Note: The goal of this step is to determine if any MMPs are active. As soon as one MMP is found with an operational status of active, this step of this procedure is complete.

14. For CM2, is the operational state of any MMP 0-X or MMP 1-X (where X = 0-47) **ACT**?

    For CM3, is the operational state of any MMP 0-X or MMP 1-X (where X = 0 or 1) **ACT**?

    If **YES**, continue with the next step.

    If **NO**, repair a MMP, which is the child of an ACT MSCU, using Procedure 5.3.

If the MMP is not recovered, sequentially attempt the repair of each remaining MMP, until one is successfully recovered. **NOTE:** if only one MSCU is active and the MMPs on this side cannot be recovered, repair the second MSCU by using Procedure 5.3.

If all attempts to recover MMPs have been unsuccessful ***and*** there are no QGPs equipped in the office, ***seek technical assistance*** according to local procedure. If QGPs are equipped, continue with the next step.

15. Determine the operational state of the QGPs on MSGS side 0 and MSGS side 1 by displaying the **1380** and **1381** MCC pages.

    Note: The goal of this step is to determine if any QGPs are active. As soon as one QGP is found with an operational status of active, this step of this procedure is complete.

16. Is the operational state of QGP 0-0 or QGP 1-0 for CM2/CM3 (or QGP 0-1 or QGP 1-1 for CM2, if equipped) **ACT**?

    If **YES**, continue with the next step.

    If **NO**, repair a QGP, which is the child of an ACT MSCU, using Procedure 5.3.

    If the QGP is not recovered, sequentially attempt the repair of each remaining QGP, until one is successfully recovered. **NOTE:** if only one MSCU is active and the QGPs on this side cannot be recovered, repair the second MSCU by using Procedure 5.3.

    If all attempts to recover QGPs have been unsuccessful, ***seek technical assistance*** according to local procedure.

17. Determine the operational state of the QLPSs on ONTC side 0 and ONTC side 1 by displaying the **1380** and **1381** MCC pages.

18. For CM2, does QGP 0-1 appear on the 1381 MCC page (indicating a four QGP configuration)?

    If **YES**, go to Step 20.

    If **NO**, continue with the next step.

    For CM3, continue with the next step.

19. Is the operational state of QLPS 0-0, QLPS 1-0, QLPS 0-1, or QLPS 1-1 **ACT**?

    If **YES**, go to Step 21.
    If **NO**, repair a QLPS, which is the child of an in-service ONTCCOM (CM2 and CM3 prior to 5E16.2) or TMSFP (CM3 in 5E16.2 and later), using Procedure 5.3.

    If the QLPS cannot be recovered, sequentially attempt the repair of each remaining QLPS until one is successfully recovered. If only one ONTCCOM and/or primary TMSFP (CM3, 5E16.2 and later) is in-service, and the QLPSs on that ONTC side cannot be recovered, repair the out-of-service ONTCCOM and/or primary TMSFP by using Procedure 5.3.

    If all attempts to recover QLPSs have been unsuccessful, ***seek technical assistance*** according to local procedure.

    If a QLPS is recovered successfully, go to Step 21.

20. Is the operational state of either/both QLPS 0-X or QLPS 1-X **and** either QGP 0-X or QGP 1-X **ACT** for either QLPS network (that is, X = **0** or **1**)?

    If **YES**, continue with the next step.

    If **NO**, and if QGP 0-X or QGP 1-X is ACT, repair QLPS Y-X, which is the child of an in-service ONTCCOM Y, using Procedure 5.3.

    If this QLPS is not recovered, attempt the repair of the QLPS in network X on the mate ONTCCOM. **NOTE:** if only one ONTCCOM is in-service and the QLPSs on this ONTC side cannot be recovered, repair the second ONTCCOM by using Procedure 5.3, ***before*** seeking technical assistance.

    If attempts to recover both QLPSs in network X have been unsuccessful, ***seek technical assistance*** according to local procedure.

    Note: If the only attempted repairs were associated with **one** QLPS network **X** (either 0 or 1), repeat Steps 16 and 20 for the other QLPS network, ***before*** seeking technical assistance.

21. Enter the **alw:hdwchk,cm** command to clear CM hardware check inhibits.

    Note: CM hardware check inhibits are cleared while still in min-mode to ensure that critical hardware faults (that could result in duplex failure once min-mode is exited) are not being masked.

22. Re-check the operational state of all critical CM units using Steps 3–20 of this procedure, and resolve any critical failures. Then, continue with the next step.

23. At the EAI, restore call processing by exiting minimum mode, perform an AM Full Initialization (D4, S7, H4, C4) using **poke 42-n-54**, and then gather information about this problem.

24. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5.3 REPAIR FAILURES IN A CM UNIT

OVERVIEW

This procedure is used to diagnose and restore a CM unit to an operational state. This procedure can be used to repair any of the following units: MSCU, FPC, CMP, QGP, MMP, PPC, ONTCCOM, DLI/NLI, QLPS, CLNK, or TMSFP (CM3, 5E22.1 and later). In CM3 office (**5E22.1 and later**), the ENETWK cannot be diagnosed individually, only as part of the MSGS diagnostic.

For CM3, the FPC is no longer a helper unit of the ONTCCOM, and the ONTCCOM and FPC are no longer helper units for the QLPS. In CM2 offices, input commands can be used to diagnose the NC and TMS components of the ONTCCOM, as well as the ONTCCOM as a whole. In CM3 offices, the NC and TMS cannot be diagnosed individually, only as part of the ONTCCOM diagnostic. ***For 5E16.2 and later***, all CM3 TMS functionality except for the TMS controller is tested as part of the TMSFP diagnostic. Both CM2 and CM3 support separate diagnostics for the QLPS, NLI, and DLI sub-units of the ONTC.

The following tables provide information for CM3.

CM3 for 5E16.1 and Earlier

Board Replaced	Relevant Diagnostics
TMSF	ONTCCOM QLPS NLI/DLI (for those NLIs/DLIs associated with the board that was replaced)
TMSX	ONTCCOM NLI/DLI (for those NLIs/DLIs associated with the board that was replaced)

CM3 for 5E16.2 and Later

Board Replaced	Relevant Diagnostics
TMSF	TMSFP (for which a board was replaced) QLPS (if TMSF associated with TMSFP 0) NLI/DLI (for those NLIs/DLIs associated with the board that was replaced)
TMSX	TMSFP (for which a board was replaced) NLI/DLI (for those NLIs/DLIs associated with the board that was replaced)

Basically, this procedure performs a diagnostic test on the desired unit (the specific unit to be repaired must be identified ***before*** entering this procedure); and, if the diagnostic passes, the unit is restored to an operational state. When the diagnostic finds a fault, a trouble locating procedure (TLP) output message is printed. This information is used to replace the suspected faulty boards. After replacing the board(s), the diagnostic is executed again. This process is repeated until one of the following happens:

- The unit is returned to service and the procedure is completed.
- Despite pack replacement/repair procedure, the unit cannot be recovered. In this case, ***seek technical assistance*** according to local procedure.

Two methods have been provided to recover the desired unit. Both are software release inclusive and table driven.

1. The **first method** uses a single command to conditionally restore the unit. When the unit is conditionally restored, a diagnosis is performed automatically on the unit. If the diagnostic finds a fault, a TLP output message is printed and the unit is not restored. A restoration of the desired unit is performed after the unit passes the diagnostic.

   This method is usually the faster of the two, due to limited manual intervention. However, the second method has some additional flexibility for QLPS or ONTCCOM diagnostics; an OOS FPC can be used as a "helper unit," or diagnostics can be limited to the NC or TMS, rather than to the entire ONTCCOM.

   Note: For CM3, the ONTCCOM and QLPS diagnostics do not require helper units; and separate commands to diagnose the NC/TMS components of the ONTCCOM are not supported.

2. The **second method** uses two commands to diagnose and then restore the unit unconditionally. The manual diagnostic produces a TLP output message if a hardware fault is found, or a completed response with an all tests pass (ATP) or conditionally all tests pass (CATP). When the unit passes diagnostics, use a second command to restore the unit unconditionally. This method is provided to be consistent with the document in previous software releases.

Internal to this procedure, it is often necessary to remove/replace circuit packs to affect repair, and the following general cautions/guidelines apply.

Caution 1: For CM2, to avoid damage to the equipment when removing and replacing a circuit pack, power down the community, in which the pack to be replaced resides, using the power control switch on the control and display pack (for example, SN516) for the affected unit. Some diagnostics execute "interface tests," and it is possible that the suspect pack does NOT belong to the unit being diagnosed.

For CM2, note that before powering down a service group/community, you must manually remove all units on that power supply. While some units such as CMPs or DLIs have their own power supply, other units share power supplies. For example, the FPC and the PPC share a power supply, as do up to four MMPs or two QGPs. Another example, the replacement of a minor fabric board in the TMS or a QLPS requires that the entire parent ONTCCOM be removed from service first. The easiest way to ensure all the right units are removed from service is to toggle the RST/ROS switch on the corresponding control and display pack to the ROS (request OOS) position.

For CM3, replacing the MSGS board or ONTC-related boards (NCC, TMSF, TMSX, NCOSC, or the optical data transceiver paddleboards) does NOT require a power-down and power-up of the associated shelf or cabinet. Each board powers up automatically when it is re-inserted. Once the fuse is inserted at the MFFU, the packs can be removed/inserted hot. There is no SN516 for CM3.

All CM3 hardware is APR-compliant. Once an APR-compliant CM pack is inserted and/or power is supplied, it is usually necessary to perform a manual action (a restore or CM initialization) to bring the affected unit(s) into service. However, system software can bring such units into service automatically in order to maintain essential functionality if critical faults occur.

The use of unconditional removals or manual override power downs is NOT recommended (unless the office is in AM/CM min mode operation), because call processing may be detrimentally affected. The failure of conditional removals usually indicates that mate hardware must be repaired first.

Caution 2: The SM-2000 NLI is an exception to the previous caution. The NLI paddleboards, which connect to the rear of the backplane, are constructed to withstand removal/replacement, while power remains on. However, repair of an even NLI on an EXM-2000 requires that corresponding odd NLI be removed from service before the pack is replaced (due to timing coupling at the TRCU).

PROCEDURE

1. This procedure provides two ways to diagnose and restore the desired unit. Both methods perform the same operation, but one performs the action with one input command and the other with two. Decide which method is used.

   Note: The single-step version is faster than the two-step method. It is generally recommended that the single-step version be used for repairing the desired units. However, there are exceptions where the **two-command** format is preferable or necessary, as follows:

   - For CM2, if an ONTCCOM or QLPS is being repaired ***and*** one FPC is thought to be fault-free, but is OOS, the two-command format allows the use of the OOS FPC as a "helper unit."
   - For CM2, if a QLPS is being repaired ***and*** its parent ONTCCOM is thought to be fault-free, but is OOS/UNAV-FRC, the two-command format allows the use of the OOS/UNAV ONTCCOM as a "helper unit." Do not attempt to restore the QLPS until repair is complete in this case (skip Step 8).
   - If repair of an UNAV-FRC MSCU or ONTCCOM is required, use the two-command format to diagnose/repair the unit, but do not attempt to restore the unit (skip Step 8).
   - For CM2, to isolate certain NC reference problems, it may be necessary to diagnose only the NC (rather than the more lengthy diagnostics associated with the entire ONTCCOM); the same limitation can occur for TMSLNK repair, where only the TMS diagnostic need be executed. In both of these cases, the two-command format allows execution of only the required ONTCCOM diagnostic phases and saves time.

   If the **two-command** format is used, go to Step 5.
   Else, continue with the next step.

2. At the master control center (MCC) video terminal, restore the desired unit conditionally. This can be done by entering either the input message or the display page poke for the desired unit as indicated in Table 5.3-1 for CM2 or Table 5.3-3 for CM3.

Note: In some cases, diagnostics may have been executed before entering this procedure, and a current TLP containing faulty suspect packs may already be available. In this case, go directly to the next step, or it may be preferable to reexecute the restoration to confirm that the suspect packs in the TLP have not changed (time may be the deciding factor).

For CM2, if the unit to be restored is an ONTCCOM or QLPS, the restore may be stopped because a "helper FPC" is not available; the OOS FPC must be repaired first. If the unit to be restored is a QLPS, the parent ONTCCOM must also be removed as a "helper unit." This request could be denied for a variety of reasons, all implicitly referring to problems with other hardware that must be resolved first. Typical hardware implicated are an OOS/DGR mate ONTCCOM, OOS QLPSs on the mate ONTCCOM, OOS QGPs, or CLNKs/MMPs.

Finally, as part of a conditional restoration, diagnostics are performed on the indicated unit. If the diagnostic returns all tests pass (ATP) or conditional all tests pass (CATP), the unit is restored to an operational state. If a fault is found, however, the diagnostic output message may include a **SUSPECTED FAULTY EQUIPMENT TLP** list.

If the restoration is successful, the following message forms are printed:

- **DGN UNIT COMPLETED ATP/CATP**
- **RST UNIT COMPLETED ATP/CATP**.

If the diagnostic finds a fault, the following message forms are printed:

- **DGN UNIT SUSPECTED FAULTY EQUIPMENT LAST RECORD**
- **RST UNIT STOPPED** [reason].

3. Was the unit successfully restored?

   The following four conditions determine the next actions to be performed:

   a. If **YES**, the unit was restored to an operational state: **STOP!** This procedure has been completed. Return to the procedure that pointed to this procedure (Procedure 5.2 or 5.4).

   b. If **NO**, the unit was not restored, and the diagnostic printed a **SUSPECTED FAULTY EQUIPMENT** list (see the following note): Replace the first listed circuit pack not previously replaced, and return to the previous step to conditionally restore the unit again.

   c. If **NO**, the unit was not restored, but no **SUSPECTED FAULTY EQUIPMENT** list was printed: Continue with the next step.

   d. If **NO**, the unit was not restored, and all the circuit packs have been tried for the desired unit: Continue with the next step.

   Note: If a note number appears in the last column on the **SUSPECTED FAULTY EQUIPMENT** list, obtain the text for the note before replacing the pack to see what precautions or additional procedures are recommended. Obtain the text for the note by entering the **op:tlpnote=n** command, where **n** is the note number.

   Also, diagnostics associated with some units may execute **interface tests**. This may cause the TLP listing to include suspect packs that are ***not*** owned by the unit being diagnosed. Some examples include a DLI/NLI diagnostic implicating a

TMS pack (when TMSLNK phases are executed), or a QLPS diagnostic implicating a QGP (when QGL phases are executed). When this happens, it is important that conditional restores scheduled in Step 2 are performed on ***both*** the **original** unit, and also the **parent** of the suspect/replaced circuit pack.

Also, after diagnostics have been executed on the same unit twice and fail, check the TLP to determine if any changes have occurred. When the list of suspected faulty boards changes, replace the first listed circuit pack on the latest list even if it has been changed previously. Then, return to Step 2 to conditionally restore the unit again.

4. Inspect the backplane for wiring open/short circuits, bent pins, loose optical transceivers/NLI packs, loose/broken electrical/optical cables, or other physical defects.

   - If such defects are found ***and*** can be repaired, return to Step 2 after completing those repairs.
   - If no backplane faults can be found, or repair cannot be made, ***seek technical assistance*** according to local procedure.

5. At the MCC video terminal, diagnose the desired unit. This can be done by entering either the input message or the display page poke for the desired unit as indicated in Table 5.3-2 for CM2 or Table 5.3-4 for CM3.

   Note: In some cases, diagnostics may have been executed before entering this procedure, and a current TLP containing faulty suspect packs may already be available. In this case, go directly to the next step, or it may be preferable to reexecute the restoration to confirm that the suspect packs in the TLP have not changed (time may be the deciding factor).

   For CM2, if the unit to be diagnosed is an ONTCCOM, MI, NC, TMS, or QLPS, the diagnostic may be stopped because a STBY "helper FPC" is not available. Either the OOS FPC must be repaired first, or, if the OOS FPC and its parent MSCU hardware is thought to be fault-free, an option **helper=x** (where **x** is the MSGS side associated with the OOS FPC) attempts to use that FPC as a "helper." If the unit to be diagnosed is a QLPS, the parent ONTCCOM must also be removed as a "helper unit." This request could be denied for a variety of reasons, all implicitly referring to problems with other hardware that must be resolved first. Typical hardware implicated are an OOS/DGR mate ONTCCOM, OOS QLPSs on the mate ONTCCOM, OOS QGPs, or CLNKs/MMPs.

   Finally, after diagnostics are completed, an output message is printed. If no hardware fault was found, message form "A" is printed; if a hardware fault was found, message form "B" is printed.

   A. **DGN UNIT COMPLETED ATP/CATP**

   B. **DGN UNIT SUSPECTED FAULTY EQUIPMENT LAST RECORD**.

6. Does diagnostic response end with ATP or CATP? The following three conditions determine the next actions to be performed:

   a. If **YES**, the diagnostic passed and form "A" was printed: Go to Step 8.

b. If **NO**, a hardware fault was found by the diagnostic and form "B" was printed (see the following note): Replace the first listed circuit pack not previously replaced, and return to the previous step to diagnose the unit again.

c. If **NO**, a hardware fault was found by the diagnostic and form "B" was printed, but all the boards have been replaced previously: Continue with the next step.

Note: If a note number appears in the last column on the **SUSPECTED FAULTY EQUIPMENT** list, obtain the text for the note before replacing the pack to see what precautions or additional procedures are recommended. Obtain the text for the note by entering the **op:tlpnote=n** command, where **n** is the note number.

Also, diagnostics associated with some units may execute **interface tests**. This may cause a TLP listing to include suspect packs, that are ***not*** owned by the unit being diagnosed. Some examples include a DLI/NLI diagnostic implicating a TMS pack (when TMSLNK phases are executed), or a QLPS diagnostic implicating a QGP (when QGL phases are executed). When this happens, it is important that diagnostics/unconditional restores scheduled in Steps 5 and 8 are performed on ***both*** the **original** unit ***and*** the **parent** of the suspected/replaced circuit pack.

After diagnostics have been executed on the same unit twice and failed, check the TLP to determine if any changes have occurred. When the list of suspected faulty boards changes, replace the first listed circuit pack on the latest list even if it has been changed previously. Then, return to the previous step to diagnose the unit again.

7. Inspect the backplane for wiring open/short circuits, bent pins, loose optical transceivers/NLI packs, loose/broken electrical/optical cables, or other physical defects.

   - If such defects are found ***and*** can be repaired, return to Step 5 after completing those repairs.
   - If no backplane faults can be found or repair cannot be made, ***seek technical assistance*** according to local procedure.

8. At the MCC video terminal, restore unconditionally the desired unit. This can be done by entering either the input message or the display page poke, with the UCL option, for the desired unit as indicated in Table 5.3-2 for CM2 or Table 5.3-4 for CM3.

   Note: As part of an unconditional restore, diagnostics are omitted on the indicated unit.

   See Step 1 concerning the diagnostics of QLPSs under an OOS/UNAV ONTCCOM, or the diagnostic of an UNAV-FRC MSCU or ONTCCOM. In these cases, DO NOT attempt the unconditional restore.

   If the restoration is successful, the following message form is printed:

   RST UNIT COMPLETED

   If the restoration fails, the following message form is printed:

   RST UNIT STOPPED [reason]

9. Did the unit restore?

   - If **YES**, the unit was restored to an operational state: **STOP!** This procedure has been completed. Return to the procedure that pointed to this procedure (Procedure 5.2 or 5.4).
   - If **NO**, the unit was not restored: ***seek technical assistance*** according to local procedure.

   Note: It is possible to re-initialize the entire CM without re-initializing the AM. This feature is termed "AM/CM Decoupling for CM-Only Init" and is available as a secured feature. For the procedure to perform the CM-only initialization, refer to 235-105-220, *Corrective Maintenance Manual*.

Table 5.3-1 — Input Messages or Command Pokes for Diagnosing and Restoring (In One Step) CM2 Units for Each Software Release

INPUT MESSAGE	CORRESPONDING MCC DISPLAY PAGE	POKE COMMAND	SOFTWARE RELEASE
RST:MSGS=0;	1240	300	ALL
RST:MSGS=1;	1250	301	
RST:MSCU=0;	1240	310	ALL
RST:MSCU=1;	1250	311	
RST:FPC=0;	1241	340	ALL
RST:FPC=1;	1251	341	
RST:PPC=0;	1241	350	ALL
RST:PPC=1;	1251	351	
RST:CMP=0-XX;	1241	3XX	ALL
XX = CMP number	CMP range 00-00		
RST:CMP=1-XX;	1251	3XX	
XX = CMP number	CMP range 00-00		
RST:QGP=0-Y;	1241	370Y	ALL
Y=QGP number	QGP range 0-1		
RST:QGP=1-Y;	1251	371Y	
Y=QGP number	QGP range 0-1		
RST:MMP=0-XX;	1242	3XX	ALL
XX = MMP number	MMP range 00-23		
RST:MMP=0-XX;	1243	3XX	
XX = MMP number	MMP range 24-47		
RST:MMP=1-XX;	1252	3XX	
XX = MMP number	MMP range 00-23		
RST:MMP=1-XX;	1253	3XX	
XX = MMP number	MMP range 24-47		
RST:ONTCCOM=0;	1209	310	ALL
RST:ONTCCOM=1;	1209	311	
RST:QLPS=0-Y;	1209	320Y	ALL
Y=QLPS number	QLPS range 0-1		
RST:QLPS=1-Y;	1209	321Y	
Y=QLPS number	QLPS range 0-1		
RST:DLI=X-0;	1200,X	300	ALL
X=SM number	SM range 1-192		
RST:DLI=X-1;	1200,X	301	
X=SM number	SM range 1-192		
RST:NLI=X-YY-0;	1200,X	30YY	ALL
X=SM number	SM range 1-192		
YY=NLI number	NLI range 00-23		
RST:NLI=X-YY-1;	1200,X	31YY	
X=SM number	SM range 1-192		
YY=NLI number	NLI range 00-23		

Table 5.3-2 — Input Messages or Command Pokes for Diagnosing and Restoring (CM2) (In Two Steps)

INPUT MESSAGES	CORRESPONDING MCC DISPLAY PAGE	POKE COMMAND	SOFTWARE RELEASE
DGN:MSGS=0,RAW,TLP;	1240	530	ALL
RST:MSGS=0,UCL;	1240	300,UCL	
DGN:MSGS=1,RAW,TLP;	1250	531	
RST:MSGS=1,UCL;	1250	301,UCL	
DGN:MSCU=0,RAW,TLP;	1240	560	ALL
RST:MSCU=0,UCL;	1240	310,UCL	
DGN:MSCU=1,RAW,TLP;	1250	561	
RST:MSCU=1,UCL;	1250	311,UCL	
DGN:FPC=0,RAW,TLP;	1241	540	ALL
RST:FPC=0,UCL;	1241	340,UCL	
DGN:FPC=1,RAW,TLP;	1251	541	
RST:FPC=1,UCL;	1251	341,UCL	
DGN:PPC=0,RAW,TLP;	1241	550	ALL
RST:PPC=0,UCL;	1241	350,UCL	
DGN:PPC=1,RAW,TLP;	1251	551	
RST:PPC=1,UCL;	1251	351,UCL	
DGN:CMP=0-XX,RAW,TLP;	1241	5XX	ALL
RST:CMP=0-XX,UCL;	1241	3XX,UCL	
XX = CMP number	CMP range 00-00		
DGN:CMP=1-XX,RAW,TLP;	1251	5XX	
RST:CMP=1-XX,UCL;	1251	3XX,UCL	
XX = CMP number	CMP range 00-00		
DGN:QGP=0-Y,RAW,TLP;	1241	570Y	ALL
RST:QGP=0-Y,UCL;	1241	370Y,UCL	
Y=QGP number	QGP range 0-1		
DGN:QGP=1-Y,RAW,TLP;	1251	571Y	
RST:QGP=1-Y,UCL;	1251	371Y,UCL	
Y=QGP number	QGP range 0-1		
DGN:MMP=0-XX,RAW,TLP;	1242	5XX	ALL
RST:MMP=0-XX,UCL;	1242	3XX,UCL	
XX = MMP number	MMP range 00-23		
DGN:MMP=0-XX,RAW,TLP;	1243	5XX	
RST:MMP=0-XX,UCL;	1243	3XX,UCL	
XX = MMP number	MMP range 24-47		
DGN:MMP=1-XX,RAW,TLP;	1252	5XX	
RST:MMP=1-XX,UCL;	1252	3XX,UCL	
XX = MMP number	MMP range 00-23		
DGN:MMP=1-XX,RAW,TLP;	1253	5XX	
RST:MMP=1-XX,UCL;	1253	3XX,UCL	
XX = MMP number	MMP range 24-47		
DGN:ONTCCOM=0,RAW,TLP;	1209	510	ALL
RST:ONTCCOM=0,UCL;	1209	310,UCL	

Table 5.3-2 — Input Messages or Command Pokes for Diagnosing and Restoring (CM2) (In Two Steps) (Contd)

INPUT MESSAGES	CORRESPONDING MCC DISPLAY PAGE	POKE COMMAND	SOFTWARE RELEASE
DGN:ONTCCOM=1,RAW,TLP;	1209	511	
RST:ONTCCOM=1,UCL;	1209	311,UCL	
DGN:NC=0,RAW,TLP;	1210	520	ALL
RST:ONTCCOM=0,UCL;	1210	300,UCL	
DGN:NC=1,RAW,TLP;	1210	521	
RST:ONTCCOM=1,UCL;	1210	301,UCL	
DGN:TMS=0,RAW,TLP;	1220	510	ALL
RST:ONTCCOM=0,UCL;	1220	300,UCL	
DGN:TMS=1,RAW,TLP;	1220	511	
RST:ONTCCOM=1,UCL;	1220	301,UCL	
DGN:DLI=X-0,RAW,TLP;	1200,X	500	ALL
RST:DLI=X-0,UCL;	1200,X	300,UCL	
X = SM number	SM range 1-192		
DGN:DLI=X-1,RAW,TLP;	1200,X	501	
RST:DLI=X-1,UCL;	1200,X	301,UCL	
X = SM number	SM range 1-192		
DGN:NLI=X-YY-0,RAW,TLP; RST:NLI=X-YY-0,UCL; X=SM number YY=NLI number	1200,X SM range 1-192 NLI range 0-23	50YY 30YY,UCL	ALL
DGN:NLI=X-YY-1,RAW,TLP; RST:NLI=X-YY-1,UCL; X=SM number YY=NLI number	1200,X SM range 1-192 NLI range 0-23	51YY 31YY,UCL	

Table 5.3-3 — Input Messages or Command Pokes for Diagnosing and Restoring (In One Step) CM3 Units for Each Software Release

INPUT MESSAGE	CORRESPONDING MCC DISPLAY PAGE	POKE COMMAND	SOFTWARE RELEASE
RST:MSGS=0;[a]	1240	300	ALL
RST:MSGS=1;[a]	1250	301	
RST:ONTCCOM=0;	1209	310	Prior to 5E16.2
RST:ONTCCOM=1;	1209	311	
ONTCCOM diagnostic covers NCC, NCOSC, TMSF, and TMSX boards.			
RST:ONTCCOM=0;	1209	310	5E16.2 and
RST:ONTCCOM=1;	1209	311	Later
ONTCCOM diagnostic covers NCC and NCOSC boards.			
RST:QLPS=0-Y;	1209	320Y	Prior to
Y=QLPS number	QLPS range 0-1		5E16.2
RST:QLPS=1-Y;	1209	321Y	
Y=QLPS number	QLPS range 0-1		
RST:QLPS=0-Y;	1214	300Y	5E16.2 and
Y=QLPS number	QLPS range 0-1		Later
RST:QLPS=1-Y;	1214	301Y	
Y=QLPS number	QLPS range 0-1		
RST:DLI=X-0;	1200,X	300	ALL
X=SM number	SM range 1-192		
RST:DLI=X-1;	1200,X	301	
X=SM number	SM range 1-192		
RST:NLI=X-YY-0;	1200,X	30YY	ALL
X=SM number	SM range 1-192		
YY=NLI number	NLI range 00-23		
RST:NLI=X-YY-1;	1200,X	31YY	
X=SM number	SM range 1-192		
YY=NLI number	NLI range 00-23		
RST:ONTC=0;	1209	300	ALL
RST:ONTC=1;	1209	301	
[RST:ONTC includes ONTCCOM, TMSFP (5E16.2 and Later), NLI/DLI, and QLPS]			
RST:TMSFP=0-Y; Y=TMSFP number	1212 (TMSFP range 0-3)	300Y	5E16.2 and
RST:TMSFP=1-Y; Y=TMSFP number	1212 (TMSFP range 0-3)	301Y	Later

Note(s):

a. MSGS sub-units (MSCU, FPC, CMP, MMP, QGP, PPC) are normally tested by MSGS diagnostic and do not have their own individual diagnostics; their diagnostic tests are only run as part of MSGS diagnostic. An FPC/CMP/MMP/QGP/PPC conditional restore performs operational tests before restoring the unit to service. To diagnose/restore an OOS MSCU, use MSGS conditional restore command.

Table 5.3-4 — Input Messages or Command Pokes for Diagnosing and Restoring (In Two Steps) for CM3

INPUT MESSAGE	CORRESPONDING MCC DISPLAY PAGE	POKE COMMAND	SOFTWARE RELEASE
DGN:MSGS=0,RAW,TLP;[a]	1240	500	ALL
RST:MSGS=0,UCL;	1240	300,UCL	
DGN:MSGS=1,RAW,TLP;[a]	1250	501	
RST:MSGS=1,UCL;	1250	301,UCL	
DGN:ONTCCOM=0,RAW,TLP;	1209	510	Prior to
RST:ONTCCOM=0,UCL;	1209	310,UCL	5E16.2
DGN:ONTCCOM=1,RAW,TLP;	1209	511	
RST:ONTCCOM=1,UCL;	1209	311,UCL	
ONTCCOM diagnostic covers NCC, NCOSC, TMSF, and TMSX boards.			
DGN:ONTCCOM=0,RAW,TLP;	1209	510	5E16.2
RST:ONTCCOM=0,UCL;	1209	310,UCL	and Later
DGN:ONTCCOM=1,RAW,TLP;	1209	511	
RST:ONTCCOM=1,UCL;	1209	311,UCL	
ONTCCOM diagnostic covers NCC and NCOSC boards.			
DGN:QLPS=0-Y,RAW,TLP;	1209	520Y	Prior to
RST:QLPS=0-Y,UCL;	1209	320Y, UCL	5E16.2
Y=QLPSNW (0 or 1)			
DGN:QLPS=1-Y,RAW,TLP;	1209	521Y	
RST:QLPS=1-Y,UCL; Y=QLPSNW (0 or 1)	1209	321Y, UCL	
DGN:QLPS=0-Y,RAW,TLP;	1214	500Y	5E16.2
RST:QLPS=0-Y,UCL ; Y=QLPSNW (0 or 1)	1214	300Y, UCL	and Later
DGN:QLPS=1-Y,RAW,TLP	1214	501Y	
RST:QLPS=1-Y,UCL; Y=QLPSNW (0 or 1)	1214	301Y, UCL	
RST:ONTC=0;	1209	300	ALL
RST:ONTC=1;	1209	301	
[RST:ONTC includes ONTCCOM, TMSFP (5E16.2 and Later), NLI/DLI, and QLPS.][b]			
DGN:DLI=X-0,RAW,TLP;	1200,X	500	ALL
RST:DLI=X-0,UCL;	1200,X	300,UCL	
X = SM number	SM range 1-192		
DGN:DLI=X-1,RAW,TLP;	1200,X	501	
RST:DLI=X-1,UCL;	1200,X	301,UCL	
X = SM number	SM range 1-192		
DGN:TMSFP=0-Y,RAW,TLP; RST:TMSFP=0-Y,UCL; Y=TMSFP number	1212 (TMSFP range 0-3)	510Y 310Y,UCL	5E16.2 and Later
DGN:TMSFP=1-Y,RAW,TLP; RST:TMSFP=1-Y,UCL; Y=TMSFP number	1212 (TMSFP range 0-3)	511Y 311Y,UCL	

See note(s) at end of table.

Table 5.3-4 — Input Messages or Command Pokes for Diagnosing and Restoring (In Two Steps) for CM3 (Contd)

INPUT MESSAGE	CORRESPONDING MCC DISPLAY PAGE	POKE COMMAND	SOFTWARE RELEASE
DGN:NLI=X-YY-0,RAW,TLP; RST:NLI=X-YY-0,UCL; X=SM number YY=NLI number	1200,X SM range 1-192 NLI range 0-23	50YY 30YY,UCL	ALL
DGN:NLI=X-YY-1,RAW,TLP; RST:NLI=X-YY-1,UCL; X=SM number YY=NLI number	1200,X SM range 1-192 NLI range 0-23	51YY 31YY,UCL	

Note(s):

a. MSGS sub-units (MSCU, FPC, CMP, MMP, QGP, PPC, ENETWK) are normally tested by the MSGS diagnostic and do not have their own individual diagnostics; their diagnostic tests are only run as part of the MSGS diagnostic. An FPC/CMP/MMP/QGP/PPC conditional restore performs operational tests before restoring the unit to service. To diagnose/restore an OOS MSCU, use the MSGS diagnostic and unconditional restore commands.

b. There is no two-step sequence to diagnose and unconditionally restore the entire ONTC. The conditional RST:ONTC command causes the ONTCCOM, TMSFPs (5E16.2 and later), NLIs/DLIs, and QLPSs to be diagnosed and those that pass diagnostics are restored to service.

5.4 ANALYZE/RESOLVE CM HARDWARE PROBLEMS

OVERVIEW

This procedure is used to analyze and resolve Communication Module (CM) hardware problems. The following CM units are covered in the procedure: MSCU, FPC, CMP, PPC, MMP, ONTCCOM, NC reference/oscillator, TMSLNK, DLI/NLI, QGP, QLPS, CLNK, and TMSFP. If a unit or complex on the CM status display page (MCC poke 115) is shown as off-normal (backlighted), go to the procedure specified in the following list.

- Procedure 5.4.1 — Message Switch Analysis
- Procedure 5.4.2 — Office Network Timing Complex Common Analysis
- Procedure 5.4.3 — Network Clock Analysis
- Procedure 5.4.4 — Time-Multiplexed Switch/Dual Link Interface Analysis
- Procedure 5.4.5 — TMS Links/Network Link Interface Analysis (This procedure is normally started from Procedure 5.4.4.)
- Procedure 5.4.6 — Communication Link Analysis
- Procedure 5.4.7 — Quad-Link Packet Switch Gateway Processor Analysis (This procedure is normally started from Procedure 5.4.1.)
- Procedure 5.4.8 — Quad-Link Packet Switch Analysis
- Procedure 5.4.9 — Time-Multiplexed Switch Fabric Pair Analysis.

PROCEDURE

1. If a unit or complex on the CM status display page **(MCC poke 115)** is shown as off-normal (backlighted), go to the procedure specified in the following list.

   If any **MSGS Box 1240-1243, 1250-53** is backlighted, then go to Procedure 5.4.1.

   Note: 1241-1243 and 1251-1253 are CM2-only.

   If **ONTC Box 1209** is backlighted, then go to Procedure 5.4.2.

   If **NC Box 1210** is backlighted, then go to Procedure 5.4.3.

   If any **TMS Box 1221-1228, 1231-1238** is backlighted (CM2 or CM3 prior to 5E16.2 only), then go to Procedure 5.4.4.

   If **CLNKS Box 1260** is backlighted, then go to Procedure 5.4.6.

   If **QLPS NETWK Box 1380** or **1381** or **QLPS Box 1214** (CM3 in 5E16.2 and later only) is backlighted, then go to Procedure 5.4.8.

   If **TMSFP box 1212** is backlighted (CM3 in 5E16.2 and later only), then go to Procedure 5.4.9.

2. **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

5.4.1 MESSAGE SWITCH ANALYSIS

PROCEDURE

1. Based on the off-normal (backlighted) boxes on the 115 MCC page, bring up the MCC page specified by the off-normal indicator and transition to the step indicated in the following list (if several of the following designated boxes are backlighted, take action in the order of the listing).

   For CM3 (for 5E22.1 and later), if FUSE ALARM is backlit and the **1240** and **1250** page ENETWK box is displayed with either **ETHERNET NETWORK X ISOLATED, ETHERNET NETWORK X OFFNORMAL** (where X is the Ethernet Network (0 or 1) or **ETHERNET NETWORK ISOLATED** (for both networks), use Procedures 3.5.4 and 3.6 to correct the power problem. If ENETWK off normal condition persists after completing the procedure, continue with Step 74.

   For CM2/CM3, if **Box 1240** or **1250** is off-normal, continue with the next step.
   For CM2, if **Box 1241** or **1251** is off-normal, go to Step 21.
   For CM2, if **Box 1242-3** or **1252-3** is off-normal, go to Step 55.

   Otherwise, return to Procedure 5.4 to reevaluate the status of other CM units.

2. Is the MSCU in an out-of-service (OOS) or unavailable (UNAV) state?

   If **YES**, then go to Step 6.

   If **NO**, then continue with the next step.

3. Are hardware checks inhibited on the MSCU?

   If **YES**, then continue with the next step.

   If **NO**, then go to Step 19 for CM2, or Step 21 for CM3.

4. Use MCC **poke 91x** or the **op:cfgstat:mscu=x** command (where x = MSGS side) to determine if hardware checks were manually or automatically inhibited.

   Note: The MSCU hardware checks are inhibited automatically (INH-AUTO) after an automatic AM/CM hardware initialization has escalated.

5. If it is determined that MSCU hardware checks can be allowed, use **poke 71x** or the **alw:hdwchk,mscu=x** command (where x = MSGS side), and then return to Step 2.

   If the decision is made to leave hardware checks inhibited, return to Procedure 5.4 to reevaluate status of other CM units.

6. Output the MSCU hardware state to the ROP using MCC **poke 91x** or the **op:cfgstat,mscu=x** command (where x = MSGS side).

   If state is OOS-MAN-RMV, then continue with Step 7.
   If state is OOS-AUTO-RMV, then go to Step 15.
   If state is OOS-MAN-DGN, then go to Step 11.
   If state is OOS-AUTO-DGN, then go to Step 11.
   If state is OOS-MAN-EX (*CM2-only*), then go to Step 11.
   If state is OOS-MAN-REX, then go to Step 11.
   If state is OOS-AUTO-REX, then go to Step 11.
   If state is OOS-MAN-TEMP (*CM2-only*), then go to Step 16.
   If state is OOS-MAN-FLT, then go to Step 9.
   If state is OOS-AUTO-FLT, then go to Step 9.
   If state is OOS-AUTO-TBLA, then go to Step 12.
   If state is OOS-AUTO-PWRALM, then go to Step 13.
   If state is UNAV-MAN-PWROFF, then go to Step 14.
   If state is UNAV-FRCD-RMV, then go to Step 18.

```
If state is UNAV-FRCD-PWROFF, then go to Step 14.
If state is UNAV-FRCD-DGN, then go to Step 11.
If state is UNAV-FRCD-EX (CM2-only), then go to Step 11.
If state is UNAV-FRCD-TEMP (CM2-only), then go to Step 16.
If state is UNAV-FRCD-FLT, then go to Step 17.
If state is UNAV-FRCD-PWRALM, then go to Step 13.
If state is any other, contact next level of technical support.
```

7. Restore the MSCU that was removed using MCC **poke 31x** or the **rst:mscu=x** command (where x = MSCU side) (for CM2) or restore MSGS using poke **30x** or **rst:msgs=x** (where x=msgs side) (0 or 1) for CM3.

8. Did the MSCU (for CM2) or MSGS (for CM3) restore successfully?

   If **YES**, then return to Step 1.
   If **NO**, then return to Step 6.

9. For CM2, the MSCU is faulty. For CM3, the MSGS is faulty. Find the most recently printed TLP list on the ROP, use Procedure 5.3 to repair the unit, and then continue with the next step.

10. Did Procedure 5.3 result in the successful restoral of the MSCU for CM2 or MSGS for CM3?

    If **YES**, then return to Step 1.
    If **NO**, then return to Procedure 5.4 to evaluate other CM units.

11. The MSCU for CM2 or MSGS for CM3 is currently being diagnosed or exercised (either manually or routinely). When diagnostics/routine exercise completes or an interactive manual exercise session is stopped, return to Step 1.

12. The MSCU is in a trouble analysis state (repeated fault recovery removals, but diagnostics pass). ***Seek technical assistance*** according to local procedure.

13. The MSCU has lost power independently. See power repair guidelines in Procedure 3.5.4. Once the problem is resolved, return to Step 1.

14. For CM2, the MSCU has been manually powered off. Power up the MSCU at the corresponding control and display pack, and then return to Step 6.

    For CM3, see MSGS power-up procedure in Procedure 3.5.4.

15. The MSCU has been automatically removed for the purpose of running diagnostics. Output the CM diagnostic queue to the ROP via the **op:dmq,cm** command.

    If the MSCU *is* in queue, wait for diagnostics to complete, then return to Step 1.

    If the MSCU is *not* in queue, then return to Step 7.

16. The MSCU is being used as a "helper unit" to execute diagnostic tests for other hardware. When the diagnostic testing is complete, the MSCU state changes. Once the diagnostic completes, return to Step 1.

17. For CM2, the MSCU is faulty. For CM3, the forced unavailable MSGS is faulty. Find the most recent printed TLP list on the ROP, use Procedure 5.3 to repair the unit (execute only diagnostics, and make no attempt to restore the unit). When the repair is complete, return to Step 1.

18. The MSCU has been forced unavailable. To clear the force, use the clear force **poke 402** or the **clr:frc,mscu** command, and then return to Step 6.

19. On MCC Page **1240** or **1250**, is the indicator for community 0-1 or 8-9 backlighted?

    If **YES**, then continue with the next step.

    If **NO**, then go to Step 53.

20. For CM2, go to MCC Display Page **1241** or **1251**.

    For CM3, go to MCC Display Page **1240** or **1250**.

21. For CM2 on MCC Display Page **1241** or **1251**, is the CMP in an OOS, UNAV, or INIT state?

    For CM3 on MCC Display Page **1240** or **1250** , is the CMP in an OOS, UNAV, or INIT state?

    If **YES**, then go to Step 25.

    If **NO**, then continue with the next step.

22. Are CMP hardware checks inhibited?

    If **YES**, then continue with the next step.

    If **NO**, then go to Step 36.

23. Use MCC **poke 9yy** on MCC Display Page 1241 or 1251 (for CM2) or **poke 960/961** on MCC Display Page 1240 or 1250 (for CM3) or the **op:cfgstat,cmp=x-yy** command (where x = MSGS side and yy = CMP number) to determine if hardware checks were manually or automatically inhibited.

    Note: The CMP hardware checks are inhibited automatically only after an automatic AM/CM hardware initialization or CMP duplex-fail recovery has escalated.

24. If it is determined that CMP hardware checks can be allowed, use **poke 7yy** on MCC Display Page 1241 or 1251 (for CM2) or **poke 760/761** on MCC Display Page 1240 or 1250 (for CM3) or the **alw:hdwchk,cmp=x-yy** command (for CM2/CM3) (where x = MSGS side and yy = CMP number), and then return to Step 21.

    If the decision is made to leave hardware checks inhibited, return to Procedure 5.4 to reevaluate status of other CM units.

25. Output the CMP hardware state to the ROP using MCC **poke 9yy** on MCC Display Page 1241 or 1251 (for CM2) or **poke 960/961** on MCC Display Page 1240 or 1250 (for CM3) or the **op:cfgstat,cmp=x-yy** command (where x = MSGS side and yy = CMP number).

    If state is OOS-MAN-RMV, then continue with Step 26.
    If state is OOS-DACT-RMV, then continue with Step 26.
    If state is OOS-AUTO-RMV, then go to Step 34.
    If state is OOS-MAN-DGN (*CM2-only*), then go to Step 30.
    If state is OOS-AUTO-DGN (*CM2-only*), then go to Step 30.
    If state is OOS-MAN-EX (*CM2-only*), then go to Step 30.
    If state is OOS-MAN-REX (*CM2-only*), then go to Step 30.
    If state is OOS-AUTO-REX (*CM2-only*), then go to Step 30.
    If state is OOS-MAN-FLT (*CM2-only*), then go to Step 28.
    If state is OOS-AUTO-FLT (*CM2-only*), then go to Step 28.
    If state is OOS-AUTO-PWRALM (*CM2-only*), then go to Step 32.
    If state is OOS-AUTO-TBLA, then go to Step 31.
    If state is OOS-MAN-FE, then go to Step 35.
    If state is OOS-AUTO-FE, then go to Step 35.

If state is **UNAV-MAN-PWROFF** (*CM2-only*), then go to Step 33.
If state is **INIT-NULL-NULL**, then see Note.
If state is **INIT-DACT-NULL**, then see Note.

Note: The INIT-NULL-NULL and INIT-DACT-NULL states are transient, used while the CMP is being initialized. Allow the recovery to complete, and return to Step 21.

26. Restore the CMP that was removed using MCC **poke 3yy** on MCC Display Page 1241 or 1251 (for CM2) or **poke 360** on MCC Display Page 1240 or 1250 (for CM3) or the **rst:cmp=x-yy** command (where x = MSGS side and yy = CMP number).

27. Did the CMP restore successfully?

    If **YES**, then return to Step 22.

    If **NO**, then return to Step 25.

28. The CMP is faulty. Find the most recent printed TLP list on the ROP, use Procedure 5.3 to repair the unit, and then continue with the next step.

29. Did Procedure 5.3 result in the successful restoral of the CMP?

    If **YES**, then return to Step 22.

    If **NO**, then return to Procedure 5.4 to evaluate other CM units.

30. The CMP is currently being diagnosed or exercised (either manually or routinely). When diagnostics/routine exercise completes or an interactive manual exercise session is stopped, return to Step 21.

31. The CMP is in a trouble analysis state (repeated fault recovery removals).

    For CM2, diagnostics have not been able to locate the trouble. ***Seek technical assistance*** according to local procedure.

    For CM3, attempt to conditionally restore the MSGS using the MCC **poke 30x** or the **rst:msgs= x** command (where x = MSGS side 0 or 1) to ensure that a diagnostic is run that might detect faulty hardware. If the attempt to conditionally remove the MSGS is denied, then you will either need to:

    - Resolve the issue that is causing the MSGS remove to be denied. A reason must be provided in response to the denied MSGS CDL RST command. Some reasons imply that manual action is required (for example, to repair/restore an OOS mate MSCU or sub-unit). In other cases, the reason for denial may be transient (for example, CLNKs are being re-mapped onto the mate MSCU).

      or

    - Attempt to conditionally restore the MSGS sub-unit using the MCC poke **360** (CMP) or **330/331** (FPC) or **350/351** (PPC) or **320/321** (QGP) or **34x** (MMP, where x = MMP number) or the appropriate MSGS sub-unit RST command. The MSGS sub-units are normally tested by the MSGS diagnostic and do not have their own individual diagnostics (that is, the diagnostic tests associated with them are only run as part of the MSGS diagnostic). However, operational tests are performed as part of an MSGS sub-unit conditional restore.

      If the initial problem was transient, an MSGS sub-unit restore may return the system to normal operation. If it was not, the problem may occur again. Thus, this option isn't preferred, but may help in cases where it isn't possible to

conditionally remove the MSGS. If a conditional restore of the MSGS sub-unit fails to bring it back into service, and the associated MSGS cannot be conditionally restored, then ***seek technical assistance*** according to local procedures.

Finally, if an MSGS diagnostic is run and ATP, and the MSGS sub-unit still ends up in an OOS state, then ***seek technical assistance*** according to local procedures.

32. The CMP has lost power independently. See power repair guidelines in Section 3.5.4. Once the problem is resolved, return to Step 21.

33. The CMP has been manually powered off. Power up the CMP community at the corresponding control and display pack, and then return to Step 25.

34. For CM2, the CMP has been automatically removed by fault recovery for the purpose of running diagnostics. Output the CM diagnostic queue to the ROP by using the **op:dmq,cm** command.

    If the CMP *is* in the queue, wait for diagnostics to complete, and then return to Step 21.

    If the CMP is *not* in the queue, then return to Step 26.

    For CM3, attempt to conditionally restore the MSGS using the MCC **poke 30x** or the **rst:msgs= x** command (where x = MSGS side 0 or 1) to ensure that a diagnostic is run that might detect faulty hardware. If the attempt to conditionally remove the MSGS is denied, then you will either need to:

    - Resolve the issue that is causing the MSGS remove to be denied. A reason must be provided in response to the denied MSGS CDL RST command. Some reasons imply that manual action is required (for example, to repair/restore an OOS mate MSCU or sub-unit). In other cases, the reason for denial may be transient (for example, CLNKs are being re-mapped onto the mate MSCU).

      or

    - Attempt to conditionally restore the MSGS sub-unit using the MCC poke **360** (CMP) or **330/331** (FPC) or **350/351** (PPC) or **320/321** (QGP) or **34x** (MMP, where x = MMP number) or the appropriate MSGS sub-unit RST command. The MSGS sub-units are normally tested by the MSGS diagnostic and do not have their own individual diagnostics (that is, the diagnostic tests associated with them are only run as part of the MSGS diagnostic). However, operational tests are performed as part of an MSGS sub-unit conditional restore.

      If the initial problem was transient, an MSGS sub-unit restore may return the system to normal operation. If it was not, the problem may occur again. Thus, this option isn't preferred, but may help in cases where it isn't possible to conditionally remove the MSGS. If a conditional restore of the MSGS sub-unit fails to bring it back into service, and the associated MSGS cannot be conditionally restored, then ***seek technical assistance*** according to local procedures.

      Finally, if an MSGS diagnostic is run and ATP, and the MSGS sub-unit still ends up in an OOS state, then ***seek technical assistance*** according to local procedures.

35. The CMP is in the OOS family of equipment (OOSF) state, indicating the CMP's parent MSCU is OOS or UNAV. Return to Step 1.

36. For CM2, on MCC Display Page 1241 or 1251 is the FPC (or PPC) in an OOS or UNAV state?

    For CM3, on MCC Display Page 1240 or 1250 is the FPC (or PPC) in an OOS state?

    If **YES**, then go to Step 40.

    If **NO**, then continue with the next step.

37. Are FPC (or PPC) hardware checks inhibited?

    If **YES**, then continue with the next step.

    If **NO**, then go to Step 52.

38. Use MCC **poke 94x** (or **poke 95x**) (for CM2 on MCC Display Page 1241 or 1251) or MCC **poke 930/931** or **poke 950/951** (for CM3 on MCC Display Page 1240 or 1250), or the **op:cfgstat,fpc=x** (or **op:cfgstat,ppc=x**) command (where x = MSGS side), to determine if hardware checks were manually or automatically inhibited.

    Note: The FPC/PPC hardware checks are inhibited automatically only after an automatic AM/CM hardware initialization has escalated.

39. If it is determined that FPC (or PPC) hardware checks can be allowed, then use **poke 74x** (or **poke 75x**) (for CM2) on MCC display Page 1241 or 1251 or MCC **poke 730/731** (or **poke 750/751**) for CM3 on MCC display Page 1240 or 1250, or the **alw:hdwchk,fpc=x** (or **alw:hdwchk,ppc=x**) command (where x = MSGS side), and return to Step 36.

    If the decision is made to leave hardware checks inhibited, return to Procedure 5.4 to reevaluate status of other CM units.

40. Output the FPC (or PPC) hardware state to the ROP using MCC **poke 94x** (or **95x**), (for CM2) on MCC Display Page 1241 or 1251 (or MCC **poke 930/931** or **poke 950/951**) for CM3 on MCC Display Page 1240 or 1250, or the **op:cfgstat,fpc=x** (or **op:cfgstat,ppc=x**) command (where x = MSGS side).

    If state is OOS-MAN-RMV, then continue with Step 41.
    If state is OOS-AUTO-RMV, then go to Step 49.
    If state is OOS-MAN-DGN (*CM2-only*), then go to Step 45.
    If state is OOS-AUTO-DGN (*CM2-only*), then go to Step 45.
    If state is OOS-MAN-EX (*CM2-only*), then go to Step 45.
    If state is OOS-MAN-REX (*CM2-only*), then go to Step 45.
    If state is OOS-AUTO-REX (*CM2-only*), then go to Step 45.
    If state is OOS-MAN-TEMP (*CM2-only*), then go to Step 51.
    If state is OOS-AUTO-TEMP (*CM2-only*), then go to Step 51.
    If state is OOS-MAN-FLT (*CM2-only*), then go to Step 43.
    If state is OOS-AUTO-FLT (*CM2-only*), then go to Step 43.
    If state is OOS-AUTO-PWRALM (*CM2-only*), then go to Step 47.
    If state is OOS-AUTO-TBLA, then go to Step 46.
    If state is OOS-MAN-FE, then go to Step 50.
    If state is OOS-AUTO-FE, then go to Step 50.
    If state is UNAV-MAN-PWROFF (*CM2-only*), then go to Step 48.

41. Restore the FPC (or PPC), that was removed, by using MCC **poke 34x** (or **poke 35x**) for CM2 on MCC Display Page 1241 or 1251 or MCC **poke 330/331** (or **poke 350/351**) for CM3 on MCC Display Page 1240 or 1250, or the **rst:fpc=x** (or **rst:ppc=x**) command (where x = MSGS side).

42. Did the FPC (or PPC) restore successfully?

    If **YES**, then return to Step 37.

    If **NO**, then return to Step 40.

43. The FPC or PPC is faulty. Find the most recent printed TLP list on the ROP, use Procedure 5.3 to repair the unit, and then continue with the next step.

44. Did Procedure 5.3 result in the successful restoral of the FPC or PPC?

    If **YES**, then return to Step 37.

    If **NO**, then return to Procedure 5.4 to evaluate the status of other CM units.

45. The FPC (or PPC) is currently being diagnosed or exercised (either manually or routinely). When diagnostics/routine exercise completes or an interactive manual exercise session is stopped, return to Step 36.

46. The FPC or PPC is in a trouble analysis state (repeated fault recovery removals).

    For CM2, diagnostics have not been able to locate the trouble. ***Seek technical assistance*** according to local procedure.

    For CM3, attempt to conditionally restore the MSGS using the MCC **poke 30x** or the **rst:msgs= x** command (where x = MSGS side 0 or 1) to ensure that a diagnostic is run that might detect faulty hardware. If the attempt to conditionally remove the MSGS is denied, then you will either need to:

    - Resolve the issue that is causing the MSGS remove to be denied. A reason must be provided in response to the denied MSGS CDL RST command. Some reasons imply that manual action is required (for example, to repair/restore an OOS mate MSCU or sub-unit). In other cases, the reason for denial may be transient (for example, CLNKs are being re-mapped onto the mate MSCU).

      or

    - Attempt to conditionally restore the MSGS sub-unit using the MCC poke **360** (CMP) or **330/331** (FPC) or **350/351** (PPC) or **320/321** (QGP) or **34x** (MMP, where x = MMP number) or the appropriate MSGS sub-unit RST command. The MSGS sub-units are normally tested by the MSGS diagnostic and do not have their own individual diagnostics (that is, the diagnostic tests associated with them are only run as part of the MSGS diagnostic). However, operational tests are performed as part of an MSGS sub-unit conditional restore.

      If the initial problem was transient, an MSGS sub-unit restore may return the system to normal operation. If it was not, the problem may occur again. Thus, this option isn't preferred, but may help in cases where it isn't possible to conditionally remove the MSGS. If a conditional restore of the MSGS sub-unit fails to bring it back into service, and the associated MSGS cannot be conditionally restored, then ***seek technical assistance*** according to local procedures.

      Finally, if an MSGS diagnostic is run and ATP, and the MSGS sub-unit still ends up in an OOS state, then ***seek technical assistance*** according to local procedures.

47. The combined FPC/PPC community has lost power independently. See power repair guidelines in Section 3.5.4. Once the problem is resolved, return to Step 36.

48. The combined FPC/PPC community has been manually powered off. Power up the FPC/PPC community at the corresponding control and display pack, and then return to Step 40.

49. For CM2, the FPC (or PPC) has been automatically removed by fault recovery for the purpose of running diagnostics. Output the diagnostic queue to the ROP via the **op:dmq,cm** command.

    If the FPC (or PPC) is *on* the queue, wait for the diagnostics to complete, and then return to Step 36.

    If the FPC (or PPC) is *not* on the queue, return to Step 41.

    For CM3, attempt to conditionally restore the MSGS using the MCC **poke 30x** or the **rst:msgs= x** command (where x = MSGS side 0 or 1) to ensure that a diagnostic is run that might detect faulty hardware. If the attempt to conditionally remove the MSGS is denied, then you will either need to:

    - Resolve the issue that is causing the MSGS remove to be denied. A reason must be provided in response to the denied MSGS CDL RST command. Some reasons imply that manual action is required (for example, to repair/restore an OOS mate MSCU or sub-unit). In other cases, the reason for denial may be transient (for example, CLNKs are being re-mapped onto the mate MSCU).

      or

    - Attempt to conditionally restore the MSGS sub-unit using the MCC poke **360** (CMP) or **330/331** (FPC) or **350/351** (PPC) or **320/321** (QGP) or **34x** (MMP, where x = MMP number) or the appropriate MSGS sub-unit RST command. The MSGS sub-units are normally tested by the MSGS diagnostic and do not have their own individual diagnostics (that is, the diagnostic tests associated with them are only run as part of the MSGS diagnostic). However, operational tests are performed as part of an MSGS sub-unit conditional restore.

      If the initial problem was transient, an MSGS sub-unit restore may return the system to normal operation. If it was not, the problem may occur again. Thus, this option isn't preferred, but may help in cases where it isn't possible to conditionally remove the MSGS. If a conditional restore of the MSGS sub-unit fails to bring it back into service, and the associated MSGS cannot be conditionally restored, then ***seek technical assistance*** according to local procedures.

      Finally, if an MSGS diagnostic is run and ATP, and the MSGS sub-unit still ends up in an OOS state, then ***seek technical assistance*** according to local procedures.

50. The FPC or PPC is in the OOS family of equipment (OOSF) state, which implies its parent MSCU is OOS or UNAV. Go to Step 1.

51. The FPC or PPC is being used as a "helper unit" to execute diagnostic tests for other hardware. When the diagnostic testing is complete, the FPC/PPC state will change. Once the diagnostic completes, return to Step 36.

52. For CM2, on MCC Display Page 1241 or 1251, are any QGPs OOS or UNAV, or are QGP interrupts inhibited?

    For CM3, on MCC Display Page 1240 or 1250, is the QGP in an OOS state?

    If **YES**, then go to Procedure 5.4.7.

    If **NO**, then continue with the next step for CM2, or go to Step 55 for CM3.

53. On MCC Display Page **1240** or **1250**, is the community 2-7 or 10-15 indicator backlighted?

    If **YES**, then continue with the next step.

    If **NO**, then go to Procedure 5.3.

54. Go to MSGS Community display page that is backlighted.

    MSGS 0 - Communities 2-7 - use MCC **poke 1242**.
    MSGS 0 - Communities 10-15 - use MCC **poke 1243**.
    MSGS 1 - Communities 2-7 - use MCC **poke 1252**.
    MSGS 1 - Communities 10-15 - use MCC **poke 1253**.

55. For CM2 on MCC Display Page 1242/1243 or MCC Display Page 1252/1253, are there any MMPs in an OOS or UNAV state?

    For CM3, on MCC Display Page 1240 or 1250, are there MMPs in an OOS state?

    If **YES**, then go to Step 59.

    If **NO**, then continue with the next step.

56. Are any MMP hardware checks inhibited?

    If **YES**, then continue with the next step.

    If **NO**, then go to Step 74.

57. Use MCC **poke 9yy** (for CM2 on MCC Display Page 1242/1243 or MCC Display Page 1252/1253) or **poke 94yy** (for CM3 on MCC display Page 1240 or 1250) or the **op:cfgstat,mmp=x-yy** command (where x = MSGS side and yy = MMP number) to determine if hardware checks were manually or automatically inhibited.

    Note: The MMP hardware checks are inhibited automatically only after an automatic AM/CM hardware initialization has escalated or during duplex/quadruplex fail recovery.

58. If it is determined that MMP hardware checks can be allowed, use **poke 7yy** (for CM2 on MCC Display Page 1242/1243 or MCC Display Page 1252/1253) or **poke 74yy** (for CM3 on MCC Display Page 1240 or 1250) or the **alw:hdwchk,mmp=x-yy** command (where x = MSGS side and y y= MMP number), and then return to Step 55.

    If the decision is made to leave hardware checks inhibited, return to Procedure 5.4 to reevaluate status of other CM units.

59. Output the MMP hardware state to the ROP using MCC **poke 9yy** (for CM2 on MCC Display Page 1242/1243 or MCC Display Page 1252/1253) or **poke 94yy** (for CM3 on MCC Display Page 1240 or 1250) or the **op:cfgstat,mmp=x-yy** command (where x = MSGS side and yy = MMP number).

```
If state is OOS-MAN-RMV, then continue with Step 60.
If state is OOS-AUTO-RMV, then go to Step 68.
If state is OOS-MAN-DGN (CM2-only), then go to Step 64.
If state is OOS-AUTO-DGN (CM2-only), then go to Step 64.
If state is OOS-MAN-EX (CM2-only), then go to Step 64.
If state is OOS-MAN-REX (CM2-only), then go to Step 64.
If state is OOS-AUTO-REX (CM2-only), then go to Step 64.
If state is OOS-MAN-FLT (CM2-only), then go to Step 62.
If state is OOS-AUTO-FLT (CM2-only), then go to Step 62.
If state is OOS-AUTO-PWRALM (CM2-only), then go to Step 66.
If state is OOS-AUTO-TBLA, then go to Step 65.
If state is OOS-UNEQ-NULL, then go to Step 69.
If state is OOS-GROW-XXX (CM2-only), then go to Step 70.
If state is OOS-MAN-FE, then go to Step 71.
If state is OOS-AUTO-FE, then go to Step 71.
If state is OOS-MAN-TEMP (CM2-only), then go to Step 72.
If state is OOS-AUTO-TEMP (CM2-only), then go to Step 72.
If state is OOS-MAN-MIP, then go to Step 73.
If state is OOS-AUTO-MIP, then go to Step 73.
If state is OOS-AUTO-DFRIP, then see note and go to Step 60.
If state is UNAV-MAN-PWROFF (CM2-only), then go to Step 67.
```

Note: The OOS-AUTO-DFRIP state only occurs when a group of MMPs serving the same SM cannot be restored (periodic restoral attempts will occur, but generally, escalation to an AM/CM initialization is avoided). Generally, hardware is faulty, but craft intervention is necessary to diagnose/repair the unit (a restore request results in a diagnostic failure and a stable OOS-MAN-FLT state, suitable for further analysis).

60. Restore the MMP that was removed using the MCC poke **3yy** (for CM2 on MCC Display Page 1242/1243 or MCC Display Page 1252/1253) or **poke 34yy** (for CM3 on MCC Display Page 1240 or 1250) or the **rst:mmp=x-yy** command (where x = MSGS side and yy = MMP number).

61. Did the MMP restore successfully?

    If **YES**, then go to Step 56.

    If **NO**, then go to Step 59.

62. The MMP is faulty. Find the most recent printed TLP list on the ROP, use Procedure 5.3 to repair the unit, and then continue with the next step.

63. Did Procedure 5.3 result in the successful restoral of the MMP?

    If **YES**, then return to Step 56.

    If **NO**, then return to Procedure 5.4 to evaluate other CM units.

64. The MMP is currently being diagnosed or exercised (either manually or routinely). When diagnostics/routine exercise completes or an interactive manual exercise session is stopped, return to Step 55.

65. The MMP is in a trouble analysis state (repeated fault recovery removals).

    For CM2, diagnostics have not been able to locate the trouble. ***Seek technical assistance*** according to local procedure.

    For CM3, attempt to conditionally restore the MSGS using the MCC **poke 30x** or the **rst:msgs= x** command (where x = MSGS side 0 or 1) to ensure that a diagnostic is run that might detect faulty hardware. If the attempt to

conditionally remove the MSGS is denied, then you will either need to:

- Resolve the issue that is causing the MSGS remove to be denied. A reason must be provided in response to the denied MSGS CDL RST command. Some reasons imply that manual action is required (for example, to repair/restore an OOS mate MSCU or sub-unit). In other cases, the reason for denial may be transient (for example, CLNKs are being re-mapped onto the mate MSCU).

  or

- Attempt to conditionally restore the MSGS sub-unit using the MCC poke **360** (CMP) or **330/331** (FPC) or **350/351** (PPC) or **320/321** (QGP) or **34x** (MMP, where x = MMP number) or the appropriate MSGS sub-unit RST command. The MSGS sub-units are normally tested by the MSGS diagnostic and do not have their own individual diagnostics (that is, the diagnostic tests associated with them are only run as part of the MSGS diagnostic). However, operational tests are performed as part of an MSGS sub-unit conditional restore.

  If the initial problem was transient, an MSGS sub-unit restore may return the system to normal operation. If it was not, the problem may occur again. Thus, this option isn't preferred, but may help in cases where it isn't possible to conditionally remove the MSGS. If a conditional restore of the MSGS sub-unit fails to bring it back into service, and the associated MSGS cannot be conditionally restored, then ***seek technical assistance*** according to local procedures.

  Finally, if an MSGS diagnostic is run and ATP, and the MSGS sub-unit still ends up in an OOS state, then ***seek technical assistance*** according to local procedures.

66. The MMP community has lost power independently. See power repair guidelines in Section 3.5.4. Once the problem is resolved, return to Step 55.

67. The MMP community has been manually powered off. Power up the MMP community at the corresponding control and display pack, and then return to Step 55.

68. For CM2, the MMP has been automatically removed by fault recovery for the purpose of executing diagnostics. Output the diagnostic queue to the ROP via the **op:dmq,cm** command.

    If the MMP is *on* the queue, wait for the diagnostics to complete, and then return to Step 55.

    If the MMP is *not* on the queue, then return to Step 60.

    For CM3, attempt to conditionally restore the MSGS using the MCC **poke 30x** or the **rst:msgs= x** command (where x = MSGS side 0 or 1) to ensure that a diagnostic is run that might detect faulty hardware. If the attempt to conditionally remove the MSGS is denied, then you will either need to:

    - Resolve the issue that is causing the MSGS remove to be denied. A reason must be provided in response to the denied MSGS CDL RST command. Some reasons imply that manual action is required (for example, to repair/restore an OOS mate MSCU or sub-unit). In other cases, the reason for denial may be transient (for example, CLNKs are being re-mapped onto the mate MSCU).

      or

- Attempt to conditionally restore the MSGS sub-unit using the MCC poke **360** (CMP) or **330/331** (FPC) or **350/351** (PPC) or **320/321** (QGP) or **34x** (MMP, where x = MMP number) or the appropriate MSGS sub-unit RST command. The MSGS sub-units are normally tested by the MSGS diagnostic and do not have their own individual diagnostics (that is, the diagnostic tests associated with them are only run as part of the MSGS diagnostic). However, operational tests are performed as part of an MSGS sub-unit conditional restore.

  If the initial problem was transient, an MSGS sub-unit restore may return the system to normal operation. If it was not, the problem may occur again. Thus, this option isn't preferred, but may help in cases where it isn't possible to conditionally remove the MSGS. If a conditional restore of the MSGS sub-unit fails to bring it back into service, and the associated MSGS cannot be conditionally restored, then ***seek technical assistance*** according to local procedures.

  Finally, if an MSGS diagnostic is run and ATP, and the MSGS sub-unit still ends up in an OOS state, then ***seek technical assistance*** according to local procedures.

69. The MMP is unequipped. No further action can be performed. Go to Step 53.

70. The MMP is in a growth state. See the MMP growth procedures (see 235-105-231, *Hardware Change Procedures–Growth* or 235-105-331, *Hardware Change Procedures–Degrowth*), and then return to Step 53.

71. The MMP is in the OOS family of equipment (OOSF) state, which indicates the parent MSCU is OOS or UNAV. Go to Step 1.

72. The MMP is being used as a "helper unit" to execute diagnostic tests for other hardware. When the diagnostic testing is complete, the MMP state will change. Once the diagnostic completes, return to Step 53.

73. The MMP is being pumped/restarted (maintenance in progress), which only takes several seconds to complete. After a short wait, return to Step 53.

74. For CM3 (5E22.1 and later) on MCC Pages 1240 and 1250 an off normal MSGS Ethernet state can be displayed as either **ETHERNET NETWORK X ISOLATED** or **ETHERNET NETWORK X OFFNORMAL** (where X is the Ethernet Network) (0 or 1) or **ETHERNET NETWORKS ISOLATED** (for both networks). Are there any off normal Ethernet states indicated?

    If **YES**, then go to Step 75.

    If **NO**, then the MSGS Recovery procedure is completed.

75. ***Warning: The MSGS Ethernet recovery procedure may result in the MSGS being placed in an OOS-MAN-RMV state unless all of the faulty hardware is replaced during the procedure. Before proceeding, ensure you have sufficient replacement hardware for MSGS Ethernet equipment on this MSGS side.***

    The MSGS Ethernet Network (ENETWK) sub-unit can only be diagnosed as part of the MSGS in CM3 offices. It can only be run if the mate MSGS is in-service. See the overview in Procedure 5.3 for additional background information about MSGS diagnostics. Continue with the next step

76. For CM3 on MCC Page 115, is either FUSE ALARM for SIDE 0 or SIDE 1 backlit?

    If **YES**, then continue with Procedures 3.5.4 and 3.6.

    If **NO**, then continue with the next step.

77. Check the mate MSCU/MSGS state to determine if the unit is ACT. For Page 1240, refer to page 1250. For Page 1250, refer to page 1240. Are both MSCUs ACT?

    If **YES**, then continue with the next step.

    If **NO**, then return to Step 2 to recover the mate MSGS unit(s).

78. Set and clear isolation on the ENETWK using **set:isol,enetwk=x** command (where x = ETHERNET network)) (0 or 1). Wait for the set:isol completion ROP report. Input **clr:isol,enetwk=x** command (where x = ETHERNET network)) (0 or 1) to clear ENETWORK isolation. Wait for the clr:isol completion ROP report before continuing.

79. Output the MSGS ENETWK hardware status to the ROP using **op:enetstat,entwk=x** command (where x = ETHERNET network) to determine the status of the MSCUs, the MSGS Ethernet pipes and the MSGS Ethernet links.

    The following list should be handled progressively in order from the first OOS state to the last in the list.

    If MSENLNK state is **OOS,FE**, then go to Step 81.

    If MSENPIPE state is **OOS,UNEQ**, then go to Step 82.

    If MSENPIPE state is **OOS,AUTO,FE**, then go to Step 82.

    If MSENPIPE state is **OOS,MAN,FE**, then go to Step 82.

    If MSENPIPE state is **OOS,MAN,RMV,ISOL**, then go to Step 82.

    If MSENLNK state is **OOS,UNEQ**, then go to Step 82.

    If MSENLNK state is **OOS,MAN,RMV,ISOL**, then go to Step 82.

    If MSENPIPE state is **OOS,AUTO,MIP**, then go to Step 80.

    If MSENPIPE state is **OOS,AUTO,RMV**, then go to Step 84.

    If MSENPIPE state is **OOS,AUTO,FLT**, then go to Step 84.

    If MSENLNK state is **OOS,MIP**, then go to Step 84.

    If MSENLNK state is **OOS, RMV**, then go to Step 84.

    If MSENLNK state is **OOS, FLT**, then go to Step 84.

    If MSENLNK or MSENPIPE in any other **OOS** or **INIT** state , then go to Step 82.

80. The MSENPIPE is undergoing an initialization. Wait for the initialization complete message on the ROP. When the restoral completes, return to Step 73.

81. The MSENLNK is OOS family equipment. This condition is only valid if the MSENPIPE is not ACT. Is the MSENPIPE state ACT?

    If **YES**, then continue to the next step.

    If **NO**, then continue to Step 83.

82. Execute the Ethernet network pipe and Ethernet network link audits using **aud:enpipe,env=smkp** and **aud:enlnk,env=smkp** to correct any data inconsistencies.

83. Output the MSGS ENETWK hardware status to the ROP using **op:enetstat,entwk=x** command (where x = ETHERNET network) to determine the status of the MSCUs, the MSGS Ethernet pipes and the MSGS Ethernet links. Are all of the MSENPIPEs and MSENLNKs ACT?

    If **YES**, then the recovery is complete.

    If **NO**, then continue to the next step.

84. The MSGS ENETWK hardware is faulty or has been removed. Remove and conditionally restore the MSGS, running diagnostics to determine the faulty hardware. Use either MCC poke 20x or the **rmv:msgs=x** command (where x = MSCU side) (0 or 1) to remove. Then conditionally restore the MSGS using poke 30x or **rst:msgs=x** (where x=msgs side) (0 or 1). Did the MSGS restore successfully?

    If **YES**, then continue to Step 86.

    If **NO**, then continue to the next step.

85. Did the MSGS diagnostics Phase 11 fail?

    If **YES**, then follow the **Repair Failures in a CM Unit** Procedure 5.3 using the TLPNOTE instructions for hardware replacement. Continue to the next step once the repair is complete.

    If **NO**, then continue with Step 2 to recover the MSGS.

86. Output the MSGS ENETWK hardware status to the ROP using **op:enetstat,entwk=x** command (where x = ETHERNET network)(0 or 1) to determine the status of the MSCUs, the Ethernet links and Ethernet pipes. Are all of MSENPIPEs and MSENLNKs ACT?

    If **YES**, then the recovery is complete.

    If **NO**, the associated ENETWK cannot be conditionally restored. ***Seek technical assistance*** according to local procedures.

5.4.2 OFFICE NETWORK TIMING COMPLEX COMMON (ONTCCOM) ANALYSIS

OVERVIEW

The following ONTC sub-units can be diagnosed separately: ONTCCOM, TMSFP (CM3 in 5E16.2 and later), QLPS, and NLI/DLI. For CM2 only, separate commands also exist to diagnose the MI, NC, and TMS components of the ONTCCOM. For CM2, the ONTCCOM diagnostic required the use of an FPC as a helper unit. No helper units are required for CM3. See the overview in Procedure 5.3 for additional background information about ONTC diagnostics.

PROCEDURE

1. Go to MCC Page **1209** to display the status of both ONTCCOMs.

2. Is an ONTCCOM in an OOS or UNAV state?

   If **YES**, then go to Step 7.

   If **NO**, then continue with the next step.

3. Are hardware checks inhibited on an ONTC?

   If **YES**, then go to Step 5.

   If **NO**, then continue with the next step.

4. For CM2 and CM3 prior to 5E16.2: are any QLPSs in an OOS state?

   Note: For CM3 in 5E16.2 and later, the QLPS indicators were moved from MCC page **1209** to MCC page **1214**.

   If **YES**, then go to Procedure 5.4.8.

   If **NO**, then return to Procedure 5.4 to evaluate other CM units.

5. Use MCC **poke 91x** or the **op:cfgstat,ontccom=x** command (where x = ONTC side) to determine if hardware checks were manually or automatically inhibited.

   Note: ONTC hardware checks are inhibited automatically only after an automatic AM/CM hardware initialization has escalated.

6. If it is determined that ONTC hardware checks can be allowed, use **poke 70x** or the **alw:hdwchk,ontc=x** command (where x = ONTC side), and then return to Step 2.

   If the decision is made to leave hardware checks inhibited, return to Procedure 5.4 to reevaluate status of other CM units.

7. Output the ONTCCOM hardware state to the ROP using MCC **poke 91x** or the **op:cfgstat,ontccom=x** command (where x = ONTC side).

   If state is OOS-MAN-RMV, then continue with Step 8.
   If state is OOS-AUTO-RMV, then go to Step 10.
   If state is OOS-AUTO-DGN, then go to Step 13.
   If state is OOS-MAN-DGN, then go to Step 13.
   If state is OOS-MAN-EX (*CM2-only*), then go to Step 13.
   If state is OOS-AUTO-REX, then go to Step 13.
   If state is OOS-MAN-REX, then go to Step 13.
   If state is OOS-MAN-TEMP (*CM2-only*), then go to Step 19.
   If state is OOS-AUTO-TEMP (*CM2-only*), then go to Step 19.
   If state is OOS-AUTO-FLT, then go to Step 11.
   If state is OOS-MAN-FLT, then go to Step 11.
   If state is OOS-AUTO-PWRALM, then go to Step 15.
   If state is OOS-AUTO-TBLA, then go to Step 14.

```
If state is OOS-AUTO-DFRIP, see the following Note.
If state is UNAV-MAN-PWROFF, then go to Step 16.
If state is UNAV-FRCD-RMV, then go to Step 17.
If state is UNAV-FRCD-DGN, then go to Step 13.
If state is UNAV-FRCD-EX (CM2-only), then go to Step 13.
If state is UNAV-FRCD-FLT, then go to Step 18.
If state is UNAV-FRCD-PWROFF, then go to Step 16.
If state is UNAV-FRCD-PWRALM, then go to Step 15.
```

Note: The OOS-AUTO-DFRIP state only occurs when both ONTCCOMs cannot be restored. If system software checks are allowed, take no action, as the failure of fault recovery to restore one of the ONTCCOMs will result in escalation to an AM/CM initialization. If software checks are inhibited, escalation to an initialization will not occur; the ONTCCOM should be restored in the next step.

8. Restore the ONTCCOM that was removed using MCC **poke 31x** or the **rst:ontccom=x** command (where x = ONTCCOM side).

9. Did the ONTCCOM restore to an active (ACT) or degraded (DGR) state?

   If **YES**, then return to Step 3.

   If **NO**, then return to Step 7.

   Note: For CM2, if an FPC is OOS/UNAV, it cannot be used as a "helper unit" for the ONTCCOM diagnostic. Return to Procedure 5.4.1 to repair the FPC before continuing.

10. The ONTCCOM has been automatically removed by fault recovery for the purpose of running diagnostics. Output the CM diagnostic queue to the ROP via the **op:dmq,cm** command.

    If the ONTCCOM is *on* the queue, wait for diagnostics to complete, and then return to Step 2.

    If the ONTCCOM is *not* on the queue, return to Step 8.

11. The ONTCCOM is faulty. Find the most recently printed TLP list on the ROP, use Procedure 5.3 to repair the unit, and then continue with the next step.

12. Did Procedure 5.3 result in the successful restoral of the ONTCCOM?

    If **YES**, then return to Step 3.

    If **NO**, then return to Procedure 5.4 to evaluate other CM units.

13. The ONTCCOM is currently being diagnosed or exercised (either manually or routinely). When diagnostics/routine exercise completes or an interactive manual exercise session is stopped, return to Step 2.

14. The ONTCCOM is in a trouble analysis state (repeated fault recovery removals, but diagnostics pass). ***Seek technical assistance*** according to local procedure.

15. The ONTCCOM or one of its shelf units has lost power independently. See power repair guidelines in Section 3. Once the problem is resolved, return to Step 2.

    For CM3, you will see a “power alarm” state if the fuse is pulled (or fails) and a “power off” state if the pack is pulled.

16. The ONTCCOM or one of its shelf units has been manually powered off. Power up the ONTCCOM or shelf unit as indicated in the power repair guidelines in Section 3. Once the problem is resolved, return to Step 2.

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