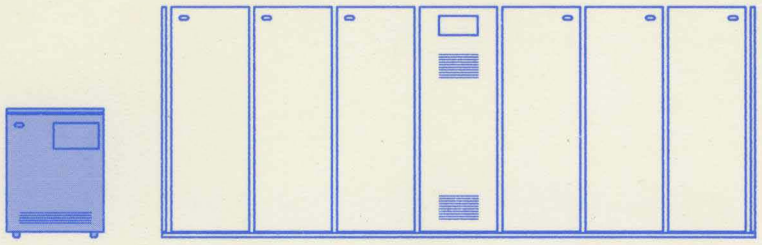
IBM

3745 Communication Controller

SY33-2070-2

Maintenance Information Procedures (MIP)
Part 2



3745

3745

3745

3745

IBM

IBM 3745 Communication Controller Models 130,150, and 170

SY33-2070-2

Maintenance Information Procedures (MIP) Part 2

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For Canada, Canadian Department of Communication Statement GX27-3883 applies.

Third Edition (September 1990)

This major revision obsoletes SY33-2070-1. Extensive changes have been made throughout this edition, and this manual should be read in its entirety.

Changes are made periodically to the information herein. Any such changes will be reported in subsequent revisions or Technical Newsletters. Before using this publication in connection with the operation of IBM systems, consult the *IBM System/370*, 30xx, 4300, and 9370 Processors Bibliography*, GC20-0001, for the editions that are applicable and current.

The drawings and specifications contained herein shall not be reproduced in whole or in part without written permission.

IBM has prepared this service manual for the use of IBM customer engineers in the installation, maintenance, or repair of the specific machines indicated. IBM makes no representations that it is suitable for any other purpose.

Publications are not stocked at the addresses given below. Requests for IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

A form for readers' comments is provided at the back of this publication. If the form has been removed, comments may be addressed to either of the following:

- International Business Machines Corporation, Department 6R1LG
  180 Kost Road, Mechanicsburg, PA 17055
- IBM France, Centre d'Etudes et Recherches
  Service 0762, 06610 La Gaude, France

© Copyright International Business Machines Corporation 1989 1990
All rights reserved

Note to US Government users - Documentation related to restricted rights - Use, duplication, or disclosure is subject to restrictions set forth in the GSA ADP Schedule Contract with IBM Corporation.

Special Notices

References in this publication to IBM products, programs, or services do not imply that IBM intends to make these available in all countries in which IBM operates.

Any references to an IBM licensed program or other IBM product in this publication is not intended to state or imply that only IBM's program or other product may be used. Any functionally equivalent program that does not infringe any of IBM's intellectual property rights may be used instead of the IBM product. Evaluation and verification of operation in conjunction with other products, except those expressly designated by IBM, is the user's responsibility.

IBM may have patents or pending patent applications covering subject matter in this document. The furnishing of this document does not give you any license to these patents. You can send license enquiries, in writing, to the IBM Director of Commercial Relations, IBM Corporation, Purchase, NY 10577.

The following terms, DENOTED BY AN ASTERISK (*), used in this publication, are trademarks of the IBM Corporation in the United States or other countries:

NetView
PS/2

The following terms, DENOTED BY AN DOUBLE ASTERISK (**), used in this publication, are trademarks of other companies as follows:

Tektronix

Contents

MAINTENANCE INFORMATION PROCEDURES. Part 1/2.

Chapter 1. START 1-1
General MIP Flow 1-1
START - How to Begin Troubleshooting 1-2
Control Panel Use 1-4
How to Perform Control Panel Operations 1-8
Selection Table 1-10
Using Reference Codes 1-18
Panel Codes 1-19
Using the MIP FRU Group Table 1-54

Chapter 2. Map for FRU Isolation 2-1
IOC Bus MAPs 2-2
MOSS MAPs 2-4
Line Adapter MAPs 2-10
Channel MAPs 2-13
Power MAPs 2-15

MAINTENANCE INFORMATION PROCEDURES. Part 2/2.

Chapter 3. How to Run 3745 Diagnostics 3-1
Diagnostic Description 3-2
How to Run MOSS Diagnostics 3-3
How to Loop MOSS Diagnostics 3-4
How to Run the Console Link Test 3-5
How to Run the Panel Test 3-6
How to Run Internal Function Tests 3-7
How to Run the LIC Wrap Test with IFTs 3-11
How to Run the LIC Wrap Test (WTT) 3-12
How to Run the Channel Wrap Test 3-16

Chapter 4. 3745 FRU Exchange 4-1
Exchange Procedures 4-1
FRU Physical Locations 4-4
FRU Exchange Procedures 4-32
Action to Take After a Diagnostic Run or an FRU Exchange 4-93
CE Leaving Procedure 4-97

Appendix A. Maintenance Aids A-1
Contacting Support A-1
Control Program Maintenance Aids A-3
MOSS Microcode Maintenance Aids A-5
Scanner Microcode Maintenance Aids A-7
Special Tools A-9
PKD (Portable Keypad Display) Maintenance Aids for LIC 5/6 . . . . . A-13

List of Abbreviations X-1

Glossary X-5

Figures

0-1. 3745 Label and Power Rating Plate Locations (Back) xvi
0-2. 3745 Label and Power Rating Plate Locations (Front) xvii
0-3. Safety Labels xix
1-1. Maintenance Functions Menu 1-3
1-2. Panel Layout 1-6
1-3. Reference Code Screen 1-18
1-4. TSS Service Screen 1-64
1-5. Select/Release Screen 1-64
1-6. Mode Control Screen 1-65
1-7. TSS/HPTSS Diagnostic Selection Screen 1-65
1-8. TRSS Services Screen 1-69
1-9. Select Screen 1-69
1-10. Connect/Disconnect Screen 1-70
1-11. TRSS Diagnostic Selection Screen 1-70
1-12. TSS/HPTSS Diagnostic Selection Screen 1-74
1-13. TSS Service Screen 1-76
1-14. Select/Release Screen 1-76
1-15. Mode Control Screen 1-77
1-16. LIC Type 1 and 4 Wrap Plug P/N 65X8927 1-77
1-17. LIC Type 3 Wrap Cable P/N 65X8928 1-77
1-18. LIC Type 5 and 6 Wrap Plug P/N 11F4815 1-78
1-19. LIC Types 1, 3 and 4 1-78
1-20. LIC Types 5 and 6 1-79
2-1. Console Outputs 2-9
2-2. EPO Location 01S 2-20
2-3. UEPO Switch 2-23
2-4. EPO Location 01S 2-27
3-1. Console Outputs 3-5
3-2. Maintenance Functions Menu 3-7
3-3. How to Select Diagnostics 3-8
3-4. How to Enter Options 3-9
3-5. Error Menu 3-10
3-6. LICs Type 1 and 4 Wrap Plug P/N 65X8927 3-14
3-7. LIC Type 3 Wrap Cable P/N 65X8928 3-14
3-8. LIC Types 1, 3 and 4 3-14
3-9. LICs Type 5 and 6 Wrap Plug P/N 11F4815 3-15
3-10. LIC Types 5 and 6 3-15
4-1. 3745 Frame (front) 4-4
4-2. 3745 Frame (back) 4-5
4-3. Card locations 4-6
4-4. 3745 Model 170 Basic Board without TPS and without HPTSS . . 4-7
4-5. 3745 Model 170 Basic Board with TPS and with HPTSS 4-8
4-6. 3745 Model 130 Basic Board with TPS 4-9
4-7. 3745 Model 150 Basic Board. 4-10
4-8. 3745 MOSS Board, Cards and Connectors 4-11
4-9. 3745 LIC Unit type 1 Board and Connectors (for LIC types 1,3 & 4 in models 150 & 170) 4-12
4-10. 3745 LIC Unit type 2 Board and Connectors (for LIC types 5 & 6 in models 150 & 170) 4-12

4-11. 3745 LIC Unit type 3 Board and Connectors (for LIC types 1,3 & 4 in model 150) 4-13
4-12. 3745 DMUX and SMUX Packaging 4-13
4-13. 3745 LIC Board 01M-A2 Packaging 4-14
4-14. 3745 LIC Board 01M-A1 Packaging 4-15
4-15. 3745 LIC Board 01L-A2 Packaging 4-16
4-16. 3745 LIC Board 01L-A2 Packaging (LICs type 5) 4-17
4-17. 3745 LIC Board 01L-A1 Packaging (LIC type 5) 4-17
4-18. 3745 LIC Board 01L-A2 Packaging (LICs type 6 low speed) 4-18
4-19. 3745 LIC Board 01L-A1 Packaging (LICs type 6 low speed) 4-18
4-20. 3745 LIC Board 01L-A2 Packaging (LICs type 6 high speed) . . . 4-19
4-21. 3745 LIC Board 01L-A1 Packaging (LICs type 6 high speed) . . . 4-19
4-22. 3745 LIC Board 01M-A2 Packaging 4-20
4-23. 3745 High-Speed Lines Tail Gate 4-21
4-24. 3745 High-Speed Line Locations 4-21
4-25. 3745 Token-Ring Tail Gate 4-22
4-26. 3745 Token-Ring Line Locations 4-22
4-27. 3745 Channel Tail Gate 4-23
4-28. 3745 Channel Tail Gate Details (for more details see YZ052 sheet 2) 4-23
4-29. 3745 Console Operator Tail Gate 4-24
4-30. 3745 EPO 4-24
4-31. 3745 Control Panel 4-25
4-32. 3745 Flexible Diskette Drive 4-26
4-33. 3745 Hard Disk Drive 4-26
4-34. 3745 Primary Power Box Components 4-27
4-35. 3745 Power Supply 1 Components 4-28
4-36. 3745 Power Supply 2 Components 4-29
4-37. 3745 Fan 1 Components 4-30
4-38. 3745 Fan 2 Components 4-30
4-39. CB1 Location. 4-32
4-40. Covers. 4-33
4-41. Shipping Springs. 4-33
4-42. Select Out Switches According to CADR Cards 4-34
4-43. Channel Tail Gate Location 4-34
4-44. Select Out Switch 4-34
4-45. Basic Board and CB1 Locations 4-35
4-46. Location of the LIC Boards 4-36
4-47. DMUX Cover 4-36
4-48. DMUX Location 4-37
4-49. DMUX 4-37
4-50. Location of the LIC Boards Type 2. 4-38
4-51. SMUX Cover. 4-38
4-52. SMUX Location. 4-39
4-53. SMUX Link and Cable. 4-39
4-54. Location of the LIC Boards 4-42
4-55. LIC 6 4-42
4-56. LIC Board Type 1 and 2 4-43
4-57. LIC Board Type 3 4-43
4-58. Panel, MOSS and CB1 Locations 4-44
4-59. MOSS Right Cover 4-44
4-60. Panel Cable Location on MOSS Board 4-45
4-61. Panel 4-45
4-62. Panel Location 4-46

4-63. Battery Location 4-46
4-64. Power Services Screen 4-47
4-65. Acknowledge Screen 4-47
4-66. Fan 1 and CB1 Locations 4-48
4-67. Fan 1 Air Flow Detector and Power Cables 4-48
4-68. Fan 2 and CB1 Locations 4-49
4-69. Fan 2 Air Flow Detector and Power Cables 4-49
4-70. FDD and CB1 Location 4-50
4-71. PS1 4-51
4-72. MOSS Covers 4-52
4-73. FDD Removal 4-52
4-74. FDD Connectors 4-53
4-75. HDD and CB1 Locations 4-54
4-76. HDD Removal 4-55
4-77. HDD connectors and jumpers (old model). 4-57
4-78. HDD connectors and jumpers (new model). 4-57
4-79. CB1 Location 4-58
4-80. Basic Board Grid 4-58
4-81. Terminator Card Locations 4-58
4-82. Power Supply 1 and CB1 Locations 4-60
4-83. Power Supply 1 Cover 4-60
4-84. Primary Power Box 4-61
4-85. Power Supply 1 4-61
4-86. Primary Power Box, Power Supply 2 and CB1 Locations 4-62
4-87. Cable Locations on Primary Power Box 4-63
4-88. PS2 in Primary Power Box 4-63
4-89. PS2 and Primary Power Box Assembly 4-64
4-90. Primary Power Box and CB1 Locations 4-66
4-91. EPO Location 4-66
4-92. Cables on Primary Power Box 4-67
4-93. Primary Power Box and PS2 Cover Removal 4-67
4-94. EPO Assembly 4-68
4-95. Basic Board, MOSS Board and CB1 Locations 4-70
4-96. Basic and MOSS Covers 4-71
4-97. Basic Board Grid 4-71
4-98. FDS and Multivoltage Cable Locations on PS1 4-71
4-99. FAN 2 Air Flow Detector and Power Connectors 4-72
4-100. MOSS to Basic Cable Locations 4-72
4-101. Basic Board Enclosure 4-72
4-102. Basic Board Cables 4-73
4-103. Basic Assembly 1 4-74
4-104. Basic Assembly 2 4-75
4-105. Y and Z rows 4-76
4-106. CB1 Location 4-78
4-107. LIC Board Type 1 Locations 4-78
4-108. DMUX Cover 4-79
4-109. LIC Locations 4-80
4-110. LIC Board Assembly 4-81
4-111. CB1 Location 4-82
4-112. SMUX Cover 4-82
4-113. LIC Board Type 2 Locations. 4-83
4-114. SMUX Link and Cable. 4-83
4-115. LIC Locations 4-84
4-116. LIC Board Assembly 4-84

4-117. MOSS Board and CB1 Locations 4-86
4-118. MOSS Board Covers 4-86
4-119. MOSS Board Cards and Cables 4-87
4-120. MOSS Board Enclosure 4-88
4-121. CB1 Location 4-90
4-122. Select Out Switch 4-90
4-123. Channel Tail Gate and Basic Board Grid 4-91
4-124. Channel Tail Gate, Cables and Basic Board. 4-91

Tables

0-1. Part Numbers xv
0-2. 3745 Power Supply CP/CB and Fuse Reference xvi
1-1. Panel Display Values 1-7
1-2. General Symptoms 1-12
1-3. General Symptoms 1-13
1-4. 3745 Console Symptoms 1-14
1-5. Control Panel Symptoms 1-15
1-6. Power Symptoms 1-17
1-7. Panel codes 1-19
1-8. 3745 FRU Table 1-55
1-9. 3745 Diagnostic Requirements 1-60
2-1. Wrap plug P/N 2-9
3-1. Wrap plug P/N 3-5
4-1. TIC Position and Ring address 4-6
4-2. Basic Board Configurations 4-7
4-3. Channel Interface 4-23
4-4. 3745 Power Supply Cross Reference 4-28
4-5. Voltage Test Points 4-51

SAFETY

General Safety

This product meets IBM safety standards.

For general service information, see:

- *IBM Products Safety Handbook*, GA33-0126.

Safety Notices

CAUTION

Hazardous voltages are still present in some areas of the 3745 when power is OFF

VORSICHT

Gefährliche Spannungen auch bei ausgeschaltetem Gerät vorhanden

ATTENTION

Presence de tensions dangereuses dans certaines parties du 3745 même lorsque l'unité est hors tension

ATTENZIONE

Tensioni pericolose sono ancora presente anche se l'unità 3745 è spenta

PRECAUCION

Con la corriente apagada todavia hay voltages peligrosos en algunas areas del 3745

CUIDADO

Voltagen ainda presente em algumas áreas da 3745 mesmo quando desligada

注 意

電源が切れていても、3745のある箇所には、

危険電圧 がかかっています。

Service Inspection Procedures

Introduction

The following procedures help the Service Personnel check whether the 3745 conforms to IBM safety criteria.

The 3745 areas and functions checked through these procedures are:

1. External covers.
2. Safety labels.
3. Safety covers and shields.
4. Grounding.
5. Circuit breaker and protector rating.
6. Input power voltage.
7. Power On indicator ON.
8. Emergency power OFF.

Hazardous voltages are still present in some areas of the 3745 when power is OFF.
Steps 1 through 6 must be performed with the **power OFF.**

- **CB1 tripped** (switched OFF) on the 3745,

  and

- **Customer's power supply switch OFF.** Do not remove the power cord in order to maintain the ground protection.

1. **External covers**

   Check that:

   - They are all present on the 3745.
   - They are locked with two kinds of lock: flat blade screw for IBM access area and hex head for customer access area (refer to the *3745 Parts Catalog*).
   - They can be fully opened.
   - Appropriate service clearance and access are provided around the frames with external covers opened.

     Leave all external covers opened to allow further safety inspection steps.

2. **Safety labels**

   Check that:

   - All the safety labels are at the places indicated by letters in "Safety Label Locations" on page xvi.
   - Each label is of the model corresponding to the letter as shown on "Safety Label Identifications" on page xviii.

3. **Safety covers and shields**

   Referring to FRU location (Chapter 4) check that:

   - All the safety covers are present and secured with screws.
   - All the voltage terminal boards (TBs) are protected by a plastic shield screwed on top of the TB.

4. **Grounding**

   Refer to YZ111 for grounding jumper/contact locations

   Check that:

   - **Electrical continuity is assured between the frame ground and the terminals indicated on the ground distribution diagrams.**

5. **Circuit breaker and protector rating**

   Refer to Table 0-2 on page xvi for CB and CP locations.

   Check that:

   - All CBs and CPs in the 3745 are rated at the indicated values in Table 0-2 on page xvi. If the rating is not indicated, check the part number against the *3745 Parts Catalog, S135-2012.*

6. **Input power voltage**

   The power rating plate indicates the voltage range available (200/220/240) and the frequency (50/60 Hz).

   The voltage label (label **J**) indicates the input voltage for which the 3745 is wired. This information must be in accordance with Switch 1 on PS2.

   Performing a power convertion Inspection.

   - A power convertion inspection must be performed on any 3745 Communication Controler that has been converted from 50Hz to 60Hz, or from 60Hz to 50Hz.
   - The following is used only for the primary power box. Refer to Figure 4-1 on page 4-4 for location.
   - Check against Table 0-1 for the correct part numbers for the specified 50Hz or 60Hz use. In case of discrepancy, contact your support structure.

Table 0-1. Part Numbers	
Frequencies	**Part Numbers**
50 Hz	P/N 03F4745
60 Hz	P/N 03F4569

   Refer to Figure 0-1 on page xvi for voltage label and power rating plate location , and to page YZ060 sheet 1 for the PS-2 box voltage adjustment by SW1.

   Check that:

   - The power rating plate and the voltage label are consistent with the frequency and the voltage measured at the customer's power supply. If not, inform your branch office.

Important Note:

Since the 3745 can be remotely powered On, all the following procedures must be performed with the power control function on the 3745 control panel set to **local mode.**

7. **Test of the emergency power Off**

   Ask the customer to connect the power cord to the customer's mains supply, put CB1 On, and power the 3745 On (power control function to Local on the control panel).

   Then operate the EMERGENCY switch to POWER OFF (**O**) and check that:

   - The 3745 is powered Off.
   - The diskette and disk drives are stopped.
   - All the fans are stopped.

   Relatch the EMERGENCY switch, then power the controller On.

8. **Power On Indicator**

   Once the controller is powered On, check that the Power On indicator on the 3745 control panel is lit.

3745 Power Supply CP/CB and Fuse Reference

Table 0-2. 3745 Power Supply CP/CB and Fuse Reference

Frame	CB/CP/F	Location	Rating	PS
Frame 1	CB1	01H-A1	10 A	ALL
	CP2	01H-A1	1,5 A	PS2
	CP3	01H-B1	2 A	FANs
	F1	01H-B1	0.2 A	PS2

Safety Label Locations

On the following figures, labels are designated by letters. A particular wording corresponds to each letter (see "Safety Label Identifications" on page xviii).

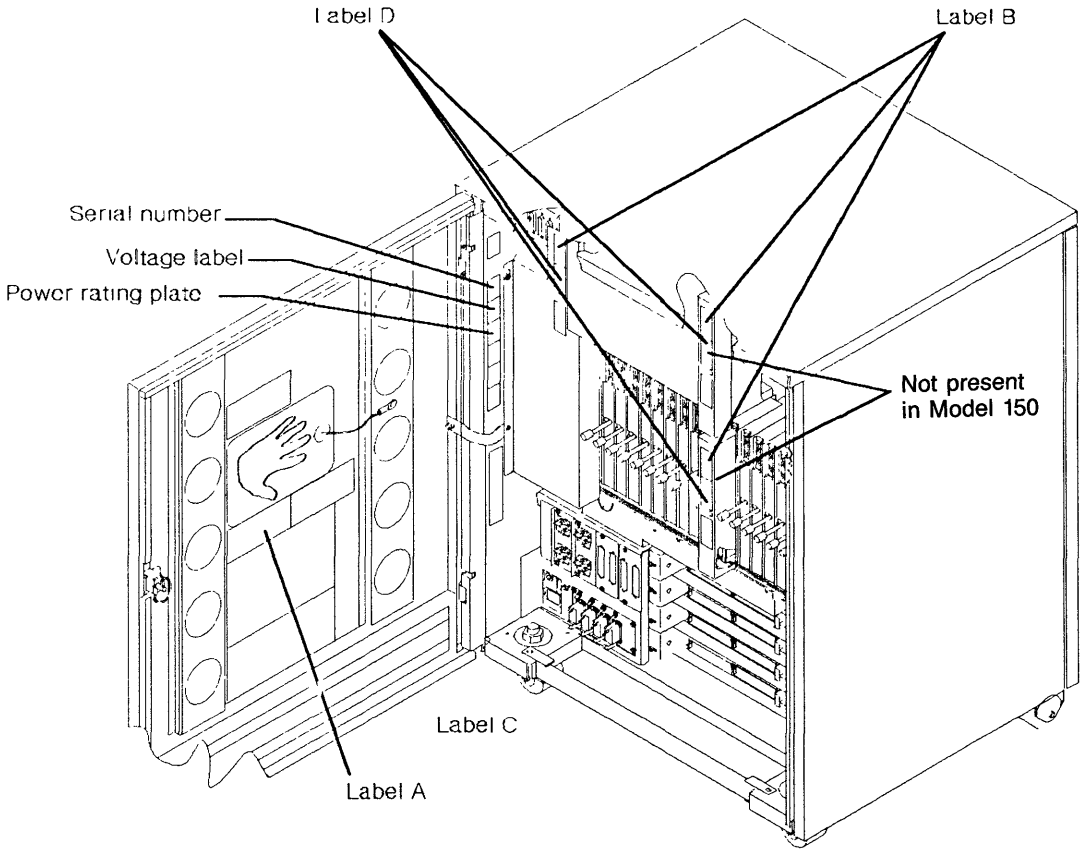


Figure 0-1. 3745 Label and Power Rating Plate Locations (Back)

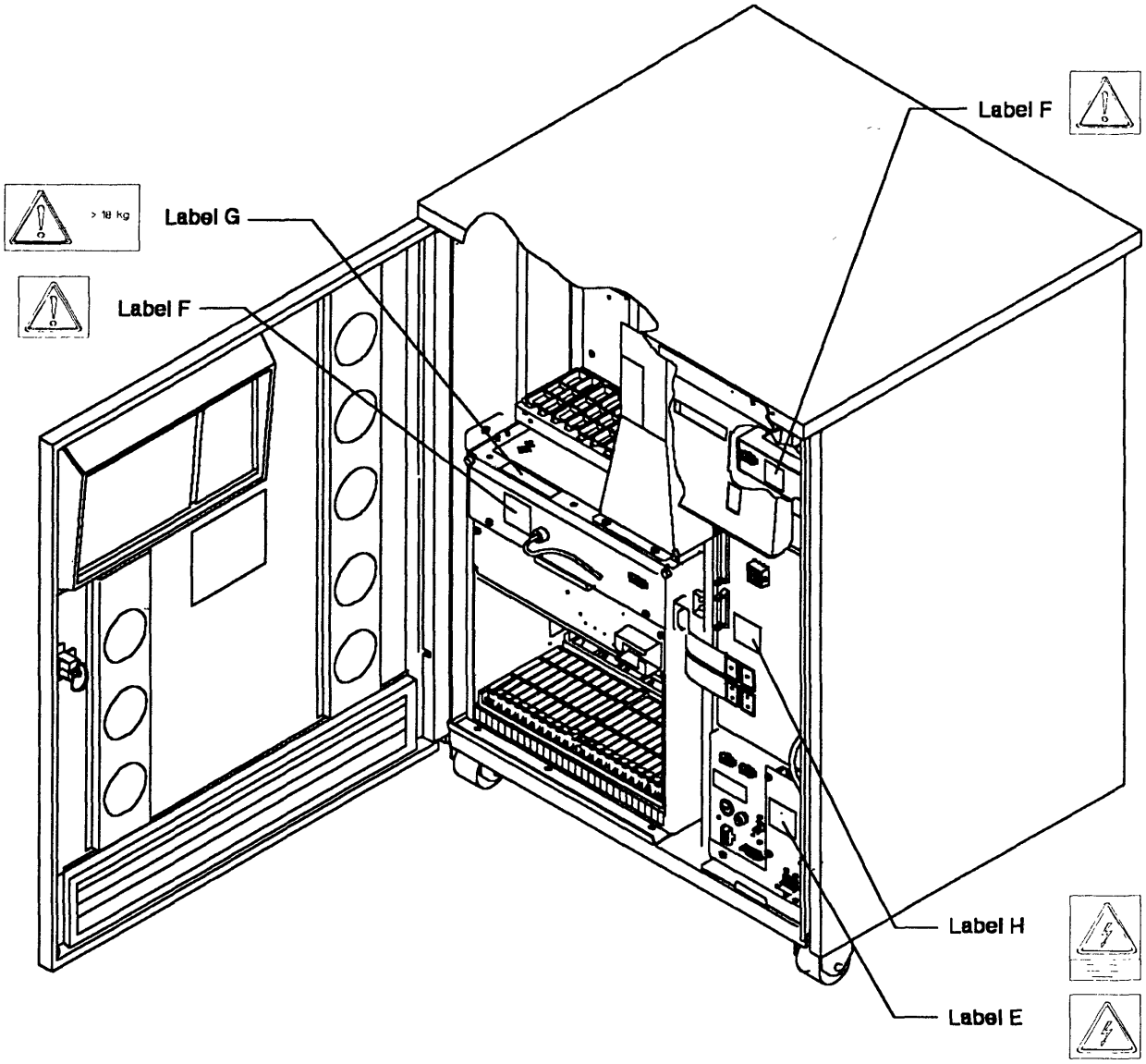
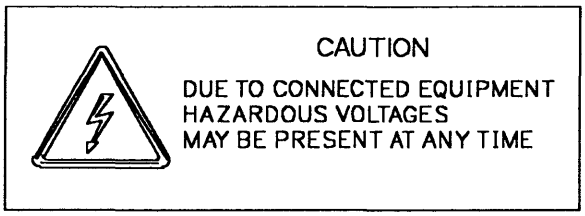


Figure 0-2. 3745 Label and Power Rating Plate Locations (Front)

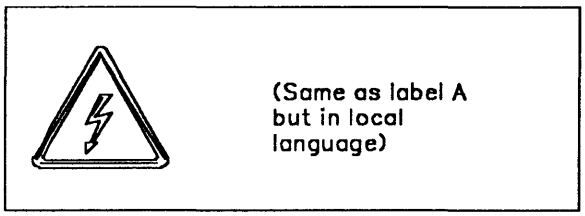
Safety Label Identifications

The safety labels shown in Figure 0-3 on page xix are in the English language. They are also available in other languages. See "Safety Label Part Numbers by Country" on page xx for ordering.

LABEL A

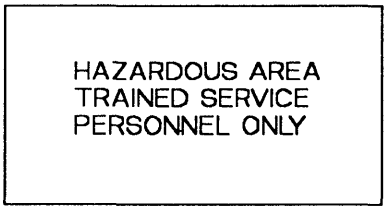


LABEL C

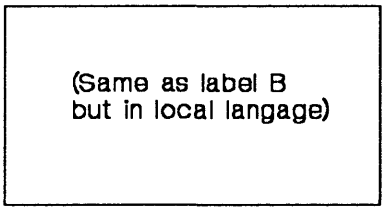


(When required)

LABEL B

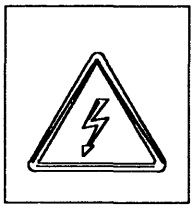


LABEL D



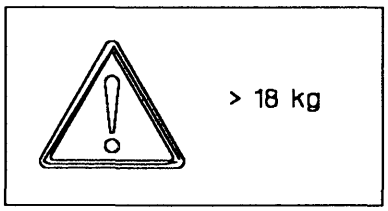
(When required)

LABEL E



LABEL F

LABEL G



LABEL H

Figure 0-3. Safety Labels

Safety Label Part Numbers by Country

The following table gives the label group part number according to the language(s) of the country in which the 3745 is installed.

LANGUAGE	PART NUMBER
Canadian French	03F4861
Danish	03F4869
Dutch	03F4872
English	03F4860
Finnish	03F4870
French	03F4862
French/Dutch	03F4871
German	03F4863
Italian	03F4864
Japanese	03F4867
Norwegian	03F4868
Portuguese	03F4865
Spanish	03F4866
Swedish	03F4873

Preface

About this manual

The MIP is a guide for fault isolation and repair of the 3745 Communication Controller. It is expected that the customer has used the *Problem Determination Guide, SA33-0145* prior to calling IBM for service and the MIP does not duplicate the tasks done by the *Problem Determination Guide, SA33-0145*.

The MIP gives the service representative information needed to:

- Analyze problems or symptoms reported by the system user.
- Restore normal 3745 operation.

Who should read this book

The person using this manual should be:

- Trained to service the 3745.
- Familiar with the configuration of the system to which the 3745 is connected.
- Familiar with the operation of the 3745, as described in *IBM 3745 Hardware Maintainance Reference, SY33-2066* and *IBM 3745 Communication Contoller Service Function, SY33-2069*, which are part of this Maintenance Library.

The intended audience for this manual are Product-Trained Customer Engineers (PT CE). The Product Support-Trained Customer Engineer (PST CE) is also expected to refer to the manual when he is required to perform the same tasks as the PT CE.

How this book is organized

This manual is organized as follows:

- Safety information is at the start of the manual followed by information about the maintenance library and related documents.
- From Chapter 1 through Chapter 4, this manual is designed so that the information is presented to the user in the same order as he will require it during the majority of service calls. The user is told where to go next for each path through this part of the manual.
- At the back of the manual are Appendix A, abbreviation list and glossary. This information is for reference purposes.

Summary of Amendments

Revision information for this manual will be inserted here.

3745 BIBLIOGRAPHY

Service Personnel Definitions

Definition	Uses
Product trained CE (PT CE): hardware CE also able to fix problems in the microcode Also called: CE1 1st Level CE CE Phase 1	RETAIN console 3745 control panel 3745 console MIP Service Functions Installation Guide Parts Catalog Basic Operations Guide Problem Determination Guide Connection and Integration Advanced Operations Guide Wiring Diagrams (YZ Pages)
Product support trained CE (PST CE): hardware CE also able to determine and fix problems in the microcode Also called: CE2 2nd Level CE CE Phase 2 Specialist Support	Same as PT CE, plus: Hardware Maintenance Reference Diagnostic Descriptions Principles of Operation
Hardware Central Service (HCS) May include: Dispatchers PT CEs PST CEs	All 3745 tools and books
Program service representative (PSR) Also called: Program support CE Software CE	Operating systems, access methods, and NCP/EP library

Customer Information

Supplied with the 3745
(Without binder)

Manual		Order Number
Title:	Products Safety Handbook	GA33-0126
Purpose:	Recalls elementary safety principles that must be observed when installing and connecting telecommunication products on a customer site.	
Audience:	(1) Customers (2) IBM CE.	

Volume A
(With binder SX11-8300)

Manual		Order Number
Title:	3745 Master Index	SA33-0142
Purpose:	Helps the user find information in the 3745 customer documentation.	
Audience:	(1) Telecommunication network specialist. (2) Network operator, System operator.	
Title:	3745 Connection and Integration Guide	SA33-0141
Purpose:	Explains how to install, replace, and remove the LICs, and how to plug and unplug cables for all attachments. Also explains how to integrate the 3745 into a telecommunication network.	
Audience:	(1) Telecommunication network specialist. (2) Network operator, IBM product trained CE.	
Title:	3745 Console Set-up Guide	SA33-0158
Purpose:	Explains how to install 3745 consoles.	
Audience:	(1) Telecommunication network specialist. (2) Network operator, System operator.	

Volume B
(With binder SX11-8301)

Manual		Order Number
Title:	3745 Advanced Operations Guide	SA33-0097
Purpose:	Describes all maintenance and operator subsystem functions.	
Audience:	(1) Telecommunication network specialist, system programmer. (2) IBM product trained CE.	

Volume C
(With binder SX11-8301)

Manual		Order Number
Title:	3745 Basic Operations Guide	SA33-0146
Purpose:	Provides the basic procedures needed for the daily operation of the 3745.	
Audience:	(1) Operator. (2) Network operator, installation coordinator, IBM product trained CE.	

Manual		Order Number
Title:	3745 Problem Determination Guide	SA33-0096
Purpose:	Provides problem determination procedures.	
Audience:	(1) Network operator, system operator. (2) IBM product trained CE.	

Other Customer Information

Manual		Order Number
Title:	3745 Introduction	GA33-0138
Purpose:	Provides introductory information. Describes highlights of the 3745.	
Audience:	(1) DP management, IBM marketing. (2) Operator, IBM system engineer and service personnel.	
Title:	3745 Configuration Program	GA33-0093
Purpose:	Can be run from an IBM PC, PC convertible, or any equipment of the IBM Personal System/2 to configurate the 3745.	
Audience:	(1) Network DP Manager, IBM marketing representative and system engineer. (2) Other customer users.	
Title:	3745 Preparing for Connection	GA33-0140
Purpose:	Provides plugging sheets and information to prepare the 3745 cable installation. Explains how to fill in the LIC5/6 configuration sheets.	
Audience:	(1) DP manager, facilities technician, IBM Marketing. (2) IBM system engineer and service personnel.	
Title:	System/360, System 370, 4300 Processors Input/Output Equipment IM-PP	GC22-7064
Purpose:	Gives reference information to plan the physical installation of the 3745.	
Audience:	(1) DP manager, facilities technician, IBM Marketing. (2) IBM system engineer and service personnel.	
Title:	3745 Original Equipment Manufacturer's Information	SA33-0099
Purpose:	Provides information for designing compatible interfaces that can be attached to the 3745.	
Audience:	(1) Original equipment manufacturers. (2) IBM developers.	
Title:	3745 Principles of Operation	SA33-0102
Purpose:	Gives an understanding of the 3745 instruction and command set.	
Audience:	(1) System programmer, IBM system engineer and program service representative. (2) System analyst, IBM marketing representative and service personnel.	

Service Information

Supplied with the 3745

Volumes 1-1 and 1-2
(With two binders SX11-8300)

Manual		Order Number
Title:	3745 Service Master Index (SMI)	SY33-2079
Purpose:	Helps the user find information in the 3745 models 130, 150, and 170 shipping group documentation.	
Audience:	(1) IBM product trained CE. (2) IBM product support trained CE.	
Title:	3745 Maintenance Information Procedures (MIP)	SY33-2070
Purpose:	From exits from the Problem Determination Guide, or from error information given by the machine, provides procedures for isolating and fixing the 3745 failures.	
Audience:	(1) IBM product trained CE. (2) IBM product support trained CE.	

Volume 2
(Without binder)

Manual		Order Number
Title:	3745 Service Functions	SY33-2069
Purpose:	Describes how the MOSS service functions are used from the 3745 console.	
Audience:	(1) IBM product trained CE. (2) IBM product support trained CE.	

Volume 3
(Without binder)

Manual		Order Number
Title:	3745 Hardware Maintenance Reference (HMR)	SY33-2066
Purpose:	Provides reference information to locate failures in the 3745 in complement to the Maintenance Information Procedures and the Microcode Maintenance Reference.	
Audience:	(1) IBM product support trained CE. (2) IBM Product Engineering.	

Volume 4
(With binder SX11-8300)

Manual		Order Number
Title:	3745 Installation Guide	SY33-2067
Purpose:	Provides instructions to install or relocate the 3745.	
Audience:	IBM product trained CE.	
Title:	3745 Parts Catalog	S135-2012
Purpose:	Provides reference information for ordering 3745 parts, assemblies, and subassemblies.	
Audience:	(1) IBM product trained CE. (2) IBM part distribution centers.	
Title:	3745 External Cable Reference	SY33-2075
Purpose:	Describes interface cables and wrap plugs used for connecting the 3745 to the console(s) and lines.	
Audience:	(1) IBM product support trained CE. (2) IBM Product Engineering.	

Volume 5
(With binder SX11-8301)

Manual		Order Number
Title:	3745 Wiring Diagram (YZ Pages)	Part Numbers (See Note)
Purpose:	Provides detailed schematic information on power wiring, board to board interconnections, locations, card population, jumpering, and interfaces.	
Audience:	(1) IBM product trained CE. (2) IBM product support trained CE and Product Engineering.	

Note: Manufacturing documents, cannot be ordered from the IBM distribution centers.

Volume 6
(Without binder)

Manual		Order Number
Title:	3745 Diagnostic Descriptions	SY33-2076
Purpose:	Describes the diagnostic programs and the purpose of each routine.	
Audience:	(1) IBM product support trained CE. (2) IBM Product Engineering.	

Other Service Information

Manual		Order Number
Title:	3745 Channel Adapter On-Line Tests	D99-3745A (See Note 1)
Purpose:	Describes the 3745 channel adapter OLTs and how to run them.	
Audience:	(1) IBM product trained CE. (2) IBM product support trained CE.	

Notes:

1. Shipped from Poughkeepsie with the S/370 channel adapter OLT tape. Cannot be ordered from the IBM distribution centers.

Related Signal Converter Products Information

The following publications relate to IBM signal converter products and are currently available:

- *7861 Description and Planning Guide*, GA33-0122.
- *7861 Setup, User's Guide, and Problem Determination*, SA33-0123.
- *7861 Maintenance Information and Parts Catalog*, SY33-2062.
- *7868 Guide to Operation*, GA33-0134.
- *5822-10 Guide to Operation*, GA33-0118.
- *5822-18 Guide to Operation*, GA33-0136.
- *5858 Guide to Operation*, GH11-3027.
- *5858 Maintenance Information and Parts Catalog*, SY12-8246.
- *Link Problem Determination Aid*, SY33-2064.
- *Power Supply and Telecommunication Connections*, GA33-0054.

Related NCP Service Information

NCP and EP Reference Summary and Data Areas (LY30-3196 for V4R3.1 only)

NCP and EP Reference Summary and Data Areas (LY30-5603 for V5 only)

These manuals are for system programmers and IBM program service representatives. They provide quick access to often-used diagnostic and debugging information about NCP and EP in PEP environment.

NCP, SSP, and EP Diagnosis Guide (LY30-5591)

This manual is designed to help customers and IBM program service representative isolate and define problem in NCP Version 3, NCP Version 4, NCP V4 Subset, NCP Version 5, and EP in the PEP environment using SSP Version 3. The primary purpose of the manual is to help the user interact with the IBM Support Center to resolve a problem. Procedures in these manuals describe how to:

- Determine whether the problem is in NCP
- Use relevant information to describe the problem
- Gather appropriate documentation about the problem
- Report the problem to the IBM Support Center

In addition, it includes detailed descriptions of how to use the programming tools available with NCP and SSP.

NCP and EP Reference (LY30-5569 for V4R3.1 only)

NCP and EP Reference (LY30-5605 for V5 only)

These manuals contain reference material describing the internal organization and function of the NCP and the EP in PEP environment. These manuals provide information for customization and diagnosis.

Chapter 3. How to Run 3745 Diagnostics

Diagnostic Description 3-2
3745 Diagnostics 3-2
Errors During Diagnostics 3-2
Diagnostics Monitoring 3-2
Checkout Diagnostics 3-2
How to Run MOSS Diagnostics 3-3
How to Loop MOSS Diagnostics 3-4
How to Run the Console Link Test 3-5
Local/Remote or Alternate/RSF Link Tests 3-5
How to Run the Panel Test 3-6
How to Run Internal Function Tests 3-7
How to Run the LIC Wrap Test with IFTs 3-11
How to Run the LIC Wrap Test (WTT) 3-12
How to Run the Channel Wrap Test 3-16

© Copyright IBM Corp. 1989 1990

Diagnostic Description

3745 Diagnostics

Two groups of diagnostics run on the 3745:

1. Automatic:

   IML/IPL checkout diagnostics including MOSS diagnostics.

2. Controlled:

   - Internal Function Tests (IFTs)
   - Wrap tests
   - OLTs.

Diagnostics are run during the installation procedure and when a fault is detected to isolate a field-replaceable unit that caused the failure. They are also executed after a repair is performed, to check that the hardware area is working correctly. They have to be run before and after an EC or MES has been installed in the area concerned.

Diagnostics may be run in offline mode when the 3745 is fully available or in concurrent mode. In concurrent mode, the diagnostic must be selected in the specific area and will run only in configured units. These units must be available at that time.

Errors During Diagnostics

When the MOSS diagnostic program detects a failure, a three-digit code is displayed on the control panel.

When the internal function tests detect an error, a reference code is posted on the 3745 console.

Diagnostics Monitoring

The controlled diagnostics are monitored by the diagnostic control monitor (DCM) and the command processor (CP).

The diagnostic control monitor is loaded when the diagnostic utility program is selected from the 3745 function menu.

It automatically restricts the diagnostic testing to the elements defined in the configuration data file (CDF) and disconnected from the NCP.

Checkout Diagnostics

The checkout diagnostics are designed to test the hardware of the CCU, IOC, Channel Adapter, CSP part of the line adapter, TIC and the PCC card.

For the CA, LA, and TIC, they are part of the microcode and located in the ROS of the adapter itself. They run automatically at power ON time before IML.

The cyclic PCC checkouts run when the machine is powered ON and are successful when the power control and service mode indicators are displayed.

For the CCU and IOC, the diagnostics are located on the disk and run during IPL.

For the CA, TSS, and HPTSS they are also automatically run when the internal function tests are started.

For the TIC, the Token-Ring wrap test is automatically run at each TIC Open command from the NCP. This TIC Internal Lobe Media tests the ring up to the local wiring concentrator (IBM 8228), or up to the point where it is unplugged before the 8228.

If an error is detected, the MOSS analyzes the problem and presents a control panel code or a reference code.

How to Run MOSS Diagnostics

These tests can be run without stopping the customer's application.

Error conditions will result in a control panel code being displayed. Actions for these codes are defined in "Panel Codes" on page 1-19.

or

Some errors will result in a reference code at IML completion. These types can also be recognized by the panel code displaying **F0D**. Refer to "Using Reference Codes" on page 1-18 for action.

Ensure MOSS is offline or alone (look at "MOSS Status Area" on the second line of the console screen) and that service mode (panel) is **0** or **1**.

From the 3745 console

1. On the 3745 console, call Menu 1 (See PF key line).
2. In Menu 1, type **IML** in the selection area for 'IML MOSS'.
3. After approximately 2 minutes the console will be re-initialized with the 'Channel Enable/Disable' screen which indicates that a successful run of MOSS diagnostics and the MOSS IML have been completed.
4. If the console has not been re-initialized, then an error was detected.

From the control panel

1. Set the function to MOSS IML:
   a. Press the 'Service' key until the number **0** or **1** is displayed in the service window. (No bypass of MOSS diagnostics.)
   b. Press the 'Validate' key.
   c. Press the 'Function' key until the number **1** is displayed in the function window.
   d. Press the 'Validate' key.
2. If after approximately 2 minutes the control panel displays code **F0F**, then MOSS diagnostics and a MOSS IML have been successfully completed. Code **F0E** can be displayed if the MOSS was previously 'alone', that is not in 'offline mode'.
3. If any other code is displayed, then an error was detected.

How to Loop MOSS Diagnostics

If an intermittent Moss problem is suspected, the 'loop MOSS diagnostics' facility can be used as follows:

Ensure that MOSS is offline or alone (look at "MOSS Status Area", on the second line of the console screen).

1. Set service mode to MAINT1:
   a. Press the 'Service' key until the number **1** is displayed in the service window.
   b. Press the 'Validate' key.
2. Set function to loop on MOSS diagnostics:
   a. Press the 'Function' key until the digit **A** is displayed in the function window.
   b. Press the 'Validate' key.
3. The MOSS diagnostics will run continuously unless an error is detected. Usually 5 to 10 minutes of error free operation are sufficient to determine whether the MOSS is working satisfactorily. If an error is detected, a panel code will be permanently displayed. Therefore, go to "Panel Codes" on page 1-19. Gentle vibration of the MOSS cables and cards while the test is running, will locate most loose connection problems.

   If no error is detected then:
4. Set function to MOSS IML:
   a. Press the 'Function' key until **1** is displayed in the function window.
   b. Press the 'Validate' key.
5. When the control panel displays **F0F** (or **F0E** if the MOSS was previously 'alone'), perform a MOSS online. Refer to "How to Put MOSS Online" on page 4-100.

How to Run the Console Link Test

This function tests the customer console ports with wrap plugs which may be installed at the end of the cable attached to either the local console, the remote console modem, or the RSF link modem. The wrap plugs can also be installed at the connectors for these cables in the 3745.

This test can be run without stopping the customer's application.

Local/Remote or Alternate/RSF Link Tests

1. Ensure that the customer is not using any of the 3745 consoles and also confirm the availability of MOSS.
2. Set the power control to local:
   a. Press the 'Power Control' key until **3** is displayed in the power control window.
   b. Press the 'Validate' key.
3. Set Service mode to MAINT1:
   a. Press the 'Service' key until the number **1** is displayed in the service window.
   b. Press the 'Validate' key.
4. Open the rear door of the 3745, remove the appropriate cable (if installed) from the output and connect the wrap plug. See Figure 3-1 and Table 3-1.
   Or,
   Remove the DCE interface cable from the console, or modem, or console switch and connect the wrap plug at the end of the cable.
   Important : The cable going to the alternate console must be tested on the 'Local' output with test option **8**.

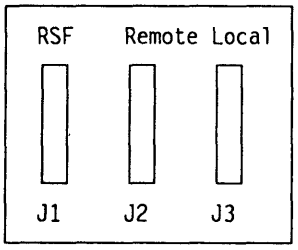


Figure 3-1. Console Outputs

Table 3-1. Wrap plug P/N

WRAP PLUG P/N	CONSOLE TYPE
6398697	31XX
2667737	3727
26F1801	7427
26F0320	PC*/PS2*

5. Set function to the link test required: either remote/alternate, RSF or local:
   a. Press the 'Function' key until **6**, **7** or **8** is displayed in the function window.
      - **6** (remote/alternate)
      - or **7** (RSF)
      - or **8** (Local).
   b. Press the 'Validate' key.
6. After a partial MOSS IML the following panel codes will be displayed:
   a. LOCAL.
      1B1: Start of test
      1B2: Successful completion of test
   b. REMOTE/ALTERNATE
      1B3: Start of test
      1B4: Successful completion of test
   c. RSF
      1B5: Start of test
      1B6: Successful completion of test

   If any other panel code is displayed, disconnect the wrap plug, go to "Panel Codes" on page 1-19 and follow the instructions.
7. Disconnect the wrap plug and reconnect the cable.
8. Set function to MOSS IML:
   a. Press the 'Function' key until **1** is displayed in the function window.
   b. Press the 'Validate' key.
9. When the control panel displays **F0F** (or **F0E** if the MOSS was previously 'alone'), perform a MOSS online. Refer to "How to Put MOSS Online" on page 4-100.
10. Console link test has completed with no error detected.

How to Run the Panel Test

This test can be run without stopping the customer's application.

This test is not a sequential test and can be cancelled any time, by pressing the 'Exit' key.

Notes:

1. Any inactivity during the panel test, of approximately 60 seconds will result in the test being automatically cancelled and the panel will return to operational mode.
2. During this test the control panel audible alarm will sound for each action.

'special character': Can be described as when every possible segment of the window is lit.

```
 - -
|\|/|
 - -
|/|\|
 - -
```

1. Set power to local:
   a. Press the 'Power Control' key until **3** is displayed in the power control window.
   b. Press the 'Validate' key.

      If the above action cannot be performed, go to step 11.
2. Set Service mode to MAINT1:
   a. Press the 'Service' key until the number **1** is displayed in the service window.
   b. Press the 'Validate' key.

      If the above action cannot be performed go to step 11.
3. Set 'Function' to panel test:
   a. Press the 'Function' key until **5** is displayed in the function window.
   b. Press the 'Validate' key.

      If the above action cannot be performed go to step 11.

   Observe the display: All 10 special character will be displayed.

   If the pattern is not identical for each figure, go to step 11.

   Note: If during the following steps the function window displays the digit **5** then the control panel has detected its own failure, continue at step **11**.
4. Press the 'Function' key.

   Observe the display: The 'Function' window 'special character' will be displayed. Repetitive action will scroll through the 'Code' window sequentially and wrap around.

   If this does not occur, go to step 12.
5. Press the 'Service' key.

   Observe the display: The 'Service' window 'special character' will be displayed. Repetitive action will scroll through the 'Power Control' window and wrap around.

   If this does not occur, go to step 12.
6. Press the 'Power Control' key.

   Observe the display: The 'Console in Use' window 'special character' will be displayed. Repetitive action will scroll through the 'All CA Disabled' 'MOSS Inop' and the 'MOSS Msg' windows sequentially and wrap around.

   If this does not occur, go to step 12.
7. Press the 'Power On Reset' key.

   Observe the display: The digit '8' will be displayed in the 'Function' window.

   If this does not occur, go to step 12.
8. Press the 'Power Off' key.

   Observe the display: The display will be completely blank.

   If this does not occur, go to step 12.
9. Press the 'Exit' key.

   Observe the display: The display will present the 'Power Control' and 'Service Mode' indicating that the test is complete, and the panel has returned to operational mode.

   If this does not occur, go to step 12.
10. **The control panel test has completed with no error detected, discard steps 11 and 12**
11. Exchange the FRU group **35**. Go to "Using the MIP FRU Group Table" on page 1-54.
12. Exchange the FRU group **10**. Go to "Using the MIP FRU Group Table" on page 1-54.

How to Run Internal Function Tests

How to Call Diagnostics

```
CUSTOMER ID:                          3745          SERIAL NUMBER:
CCU-A SELECTED PROCESS MOSS-OFFLINE     X71:020415
                                        X72:000085


------------------------------------------------------------ 01/12/87 04:29
                                MENU 3

      MISUSE OF MAINTENANCE FUNCTIONS MAY LEAD TO UNPREDICTABLE RESULTS

BER CORRELATION..: BRC      MODULE DISPLAY...: MDD     TSS SERVICES.....: TSS
CADS SERVICES....: CAS      MOSS STORE DSPLY.: MSD
CONCURRENT DIAGS.: CDG      OFFLINE DIAGS....: ODG
DUMP DISPLAY/DEL.: DDD      TRSS SERVICES....: TRS



                           ENTER OFF TO LOG OFF
===>

F1:END  F2:MENU2   F3:ALARM       F4:MENU1                      F6:RULES
```

Figure 3-2. Maintenance Functions Menu

On the 3745 console, from Menu 1 hit F5 to get the maintenance function Menu (Menu 3). See Figure 3-2.

On this menu two options are available to run diagnostics:

- **CDG** to run diagnostics in **concurrent diagnostics mode.**
  Selected diagnostics will run if the adapter is available (ask the customer to disconnect the related resources), and only the sections or routines allowed to run in concurrent mode will be called without interfering the 3745 operation.

  For channel diagnostics :

  1. If only 2 channel adapters **without TPS** are installed you **must** use ODG instead of CDG.
  2. If more than 2 channel adapters are installed two channel interfaces must be disabled:
     - CA5 **and** CA6 for tests on either channel 5 or 6.
     - CA7 **and** CA8 for tests on either channel 7 or 8.

  CDG must be used if CCU + NCP are running.

- **ODG** to run diagnostics in **offline mode** when the 3745 is fully available for maintenance.
  Selected diagnostics will run whatever the status of the adapter.
  For channel diagnostic, all the channel interfaces must be disabled.

  ODG must be used if conditions for concurrent maintenance mode are not met (no NCP or CCU running).

Type ODG or CDG after ===> and press SEND.

How to Select Diagnostics

```
CUSTOMER ID:                          3745            SERIAL NUMBER:
CCU-A SELECTED PROCESS MOSS-OFFLINE     X71:020415
                                        X72:000085



------------------------------------------------------------ 03/07/87 00:21
FUNCTION ON SCREEN: OFFLINE DIAGS
GROUP :ADP# :LINE :
1 ALL :     :     :
2 CCU : A- B:     :
3 IOCB: 1- 4:     :
4 CA  : 1-16:     :
5 TSS : 1-32: 0-31:
6 TRSS: 1- 6: 1- 2:
7 HTSS: 1- 8:     :
8 OLT : 1-16:     :                          DIAGNOSTICS INITIALIZATION
OPT=  Y IF MODIFY :

OPTION REQUIRED   :
                  : ENTER REQUEST ACCORDING TO THE DIAG MENU
                  : DIAG==>       ADP#==>     LINE==>     OPT==>
===>

F1:END  F2:MENU2  F3:ALARM
```

Figure 3-3. How to Select Diagnostics

After entering ODG or CDG on Menu 3, the diagnostic menu is displayed. See Figure 3-3.

Four input fields are available in this menu:

- **DIAG= = >** Diagnostic group (1-8), IFT, section, or routine you want to run.

  Example:

  2 (full set of CCU IFTs)
  K (section K of IOC diags.)
  AC01 (specific routine of CCU diags.)

- **ADP# = = >** adapter number
- **LINE= = >** line number for TSS, TRSS or HPTSS. You may obtain the line number from the 'LID' function (in Menu 1) by entering the line address.
- **OPT= = >** Y to display option menu

If the 'ALL' option is entered, diagnostics will be run on all adapters in the CDF and disconnected from the NCP.

Type your request in the input fields and press SEND.

If OPT= = = >Y is entered, the option menu is displayed. See Figure 3-4 on page 3-9. If not, the diagnostic is started and the diagnostic result is displayed on this frame.

.
.
.
.

Options Menu

```
CUSTOMER ID:                          3745            SERIAL NUMBER:
CCU-A SELECTED PROCESS MOSS-OFFLINE     X71:020415
                                        X72:000085



------------------------------------------------------------ 03/06/87 00:15
FUNCTION ON SCREEN: OFFLINE DIAGS
                  :
R RERUN REQUEST   :
A ABORT ROUTINE   :
C CANCEL REQUEST  :
G GO              :
M MODIFY OPTIONS: :
 S/LS/AL/ALS/B/DM :
 NW/W             : START 09:58:15
 C1/CNNN/C        : REQUEST: CCU                DIAGNOSTICS INITIALIZATION
 R1/RNNN          : OPTIONS: S   NW C1   R1    BR
 BR/NBR           :
                  : ENTER REQUEST ACCORDING TO THE DIAG MENU
                  : ==>M R2
===>

F1:END  F2:MENU2  F3:ALARM
```

Figure 3-4. How to Enter Options

When the OPT field is set to **Y** in the diagnostic menu, the options menu is displayed. See Figure 3-4.

The default options are automatically displayed.

OPTIONS:	**Meaning**
S	Stop on first error
LS	Loop on first error with stop
AL	Automatic loop on error
ALS	Automatic loop on error with new error stop
B	Bypass error stop
DM	Display multiple errors
NW	No wait before execution of each routine
W	Wait before execution of each routine
C1/CNNN/C	Cycle request option
R1/RNNN	Repeat routine option
BR/NBR	BER recording option

Enter or modify the option using the 'M' function followed by the option or options needed. (For example : **M C5 DM** will cause your request to cycle 5 times and display multiple errors.)

Only one option per line of the menu can be selected. If more than one option is entered, only the last one is accepted.

Press SEND

Restart the same procedure to enter the other options if needed.

Enter 'G'.

Press SEND.

The diagnostic is started and the diagnostic result is displayed on this frame.

If an error is detected, an error message is displayed. See Figure 3-5 on page 3-10.

Error Menu

```
CUSTOMER ID:                          3745          SERIAL NUMBER:
CCU-A SELECTED PROCESS MOSS-OFFLINE     X71:020415
                                        X72:000085



------------------------------------------------------------ 03/01/87 10:17
FUNCTION ON SCREEN: OFFLINE DIAGS
                  : ****************              FRU REMOVAL ==> POWER OFF
R RERUN REQUEST   : *RH B3032208 *
A ABORT ROUTINE   : *RAC 8050A0000 * ERR BIT  FFFFFF02
C CANCEL REQUEST  : * ERC AC010701 *                      ERROR COUNT 00001
GO                : ****************
M MODIFY OPTIONS: :
S/LS/AL/ALS/B/DM  :
NW/W              : START 10:13:46  STOP 10:18:02
C1/CNNN/C         : REQUEST: AC                 CCU DIAG  RUNNING
R1/RNNN           : OPTIONS: S   NW C1   R1    NER     ROUTINE AC01 ADP 0A
BR/NBR            :
                  : ENTER REQUEST ACCORDING TO THE DIAG MENU
                  : ==>
===>              ***ERROR FOUND***

F1:END  F2:MENU2  F3:ALARM
```

Figure 3-5. Error Menu

Note: The RH field contains the **reference code**.

How to Run the LIC Wrap Test with IFTs

1. Install the wrap plug as follows :

- ***For HPTSS***

  Install wrap plug P/N 58X9349 for V35 or P/N 58X9354 for X.21 on the tail gate connector.

- ***For LICs type 1 and 4***

  Install wrap plug P/N 65X8927 on the LIC connector. See Figure 3-6 and Figure 3-8 on page 3-14.

- ***For LIC type 3***

  Install wrap cable P/N 65X8928 between the 2 sockets. See Figure 3-7 and Figure 3-8 on page 3-14.

  Note: To fully test the port (all control leads) install the wrap cable and run the test, then reverse the wrap cable ends (between the DCE and direct attach connector) and then repeat the test.

- ***For LICs type 5 and 6***

  Unplug the line cable at the customer wall frame and install the appropriate wrap plug (see list hereafter) at the end of the cable or unplug the line cable from both ends and install the wrap plug P/N 11F4815 at the tail gate connector. (Line cable must be unplugged from wall frame for line loading reasons.) See Figure 3-9 and Figure 3-10 on page 3-15.

LIC-5/6 Wrap Plug P/N according to the country.

U.S / Canada	66X0807
Japan	6124644
Austria	6162946
France	6162955
Germany	6162950
Belgium	6162950
Luxemburg	6162950
Israel	66X1954
Hong Kong	65X8070
Italy	6162957
Switzerland	66X0748
U.K.	65X8069
Netherlands	6162948

2. Start the diagnostic as follows :

- ***For HPTSS***
  - Update the CDF to point that the lines to be tested have wrap plugs installed. Refer to *IBM 3745 Service Functions.*
  - Using "How to Run Internal Function Tests" on page 3-7 call the IFTs and enter the following :
    - Diagnostic group **7** in the DIAG= = > area.
    - Adapter number in the ADP# = = > area.
  - Press SEND.

- ***For LICs type 1, 3 and 4***

  Using "How to Run Internal Function Tests" on page 3-7, call the IFTs and enter the following :

  - Routine number **RC01** in the DIAG= = > area.
  - Adapter number in the ADP# = = > area.
  - Line number in the LINE= = > area. You may obtain the line number from the 'LID' function (in Menu 1) by entering the line address.

  Then press SEND.

- ***For LIC type 5, 6***

Using "How to Run Internal Function Tests" on page 3-7 call the IFTs and enter the following :

- Routine number **RH59** in the DIAG= = > area.
- Adapter number in the ADP# = = > area.
- Line number in the LINE= = > area. You may obtain the line number from the 'LID' function (in Menu 1) by entering the line address.

Then press SEND.

How to Run the LIC Wrap Test (WTT)

WARNING: MOSS must be online to start this procedure.

- Call Menu 1, type **WTT** and press SEND.
- Follow the instructions given by the following screens.

```
CUSTOMER ID:                          3745            SERIAL NUMBER:
CCU-A          PROCESS MOSS-ALONE       X71:0A0800
RESET     BYP-IOC-CHK STOP-CCU-CHK      X72:0BC800



------------------------------------------------------------- 03/01/87 01:22
FUNCTION ON SCREEN: WRAP TEST
             WRAP TEST INITIAL SELECTION

- SELECT ONE OPTION (1,2)  ==> (A)

    1 = AUTOMATIC WRAP TEST ON LIC

    2 = WRAP TEST AT ANY LEVEL


  THEN PRESS SEND
===>

F1:END  F2:MENU2  F3:ALARM              F6:QUIT
```

(A) Enter 1 or 2 here to select the wrap test option.

Option 1: Follow the instructions given by the following screen :

```
CUSTOMER ID:                          3745            SERIAL NUMBER:
CCU-A          PROCESS MOSS-ALONE       X71:0A0800
RESET     BYP-IOC-CHK STOP-CCU-CHK      X72:0BC800



------------------------------------------------------------- 03/01/87 01:22
FUNCTION ON SCREEN: WRAP TEST
             AUTOMATIC WRAP TEST ON LIC

- ENTER A LINE ADDRESS OF THE LIC     (0-159) ==> (B)


 WARNING: ALL LINES OF THE LIC MUST BE DISABLED/DEACTIVATED



===>

F1:END  F2:MENU2  F3:ALARM      F4:WRAP TEST INITIAL SELECTION
```

(B) Enter the line address here.

Option 2: Follow the instructions given by the following screen and select wrap level **4** (tailgate).

```
CUSTOMER ID:                          3745            SERIAL NUMBER:
CCU-A          PROCESS MOSS-ALONE       X71:0A0800
RESET     BYP-IOC-CHK STOP-CCU-CHK      X72:0BC800



------------------------------------------------------------- 03/01/87 01:22
FUNCTION ON SCREEN: WRAP TEST
             WRAP TEST INITIAL SELECTION

- ENTER LINE ADDRESS (TSS: 0-159 HPTSS: 1028-1031) ==> (B)

- ENTER WRAP TYPE (1 to 3)  ==>
    1 = DATA                          3 = DISPLAY LIC 5-6 DATA
    2 = CONTROL LEADS

- ENTER WRAP LEVEL (1 to 6) ==> (C)
    1 = LOCAL MODEM                   4 = TAILGATE
    2 = NTT CABLE (TSS ONLY)          5 = REMOTE MODEM  (HPTSS & DATA WRAP ONLY)
    3 = LIC (TSS & DATA WRAP ONLY)    6 = INTERNAL (HPTSS ONLY)

       LINE(S) TO BE TESTED MUST BE DISABLED/DEACTIVATED
===>

F1:END  F2:MENU2  F3:ALARM                F6:QUIT
```

(B) Enter the line address here.
(C) Enter **4** here to select the tailgate level.

- ***For HPTSS***

  Install wrap plug P/N 58X9349 for V35 or P/N 58X9354 for X21 on the tail gate connector.

- ***For LICs type 1 and 4***

  Install wrap plug P/N 65X8927 on the LIC connector. See Figure 3-6 and Figure 3-7 on page 3-14.

- ***For LIC type 3***

  Install wrap cable P/N 65X8928 between the 2 sockets. See Figure 3-7 and Figure 3-8 on page 3-14.

  Note: If you are working on a Line Adapter with 1 line at 256 kbps speed connected to and at least 1 other line, and if these lines are initialized at NCP activation, you are not allowed to run the WTT on these lines.

  To fully test the port (all control leads) install the wrap cable and run the test, then reverse the wrap cable ends (between the DCE and direct attach connector) and then repeat the test.

- ***For LICs type 5 and 6***

  Unplug the line cable at the customer wall frame and install the appropriate wrap plug (see list hereafter) at the end of the cable or unplug the line cable from both ends and install the wrap plug P/N 11F4815 at the LIC connector. (Line cable must be unplugged from wall frame for line loading.) See Figure 3-9 and Figure 3-10 on page 3-15.

LIC-5/6 Wrap Plug P/N according to the country.

U.S / Canada	66X0807
Japan	6124644
Austria	6162946
France	6162955
Germany	6162950
Belgium	6162950
Luxemburg	6162950
Israel	66X1954
Hong Kong	65X8070
Italy	6162957
Switzerland	66X0748
U.K.	65X8069
Netherlands	6162948

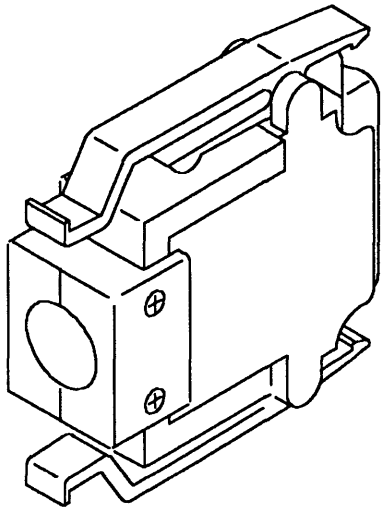


Figure 3-6. LICs Type 1 and 4 Wrap Plug P/N 65X8927

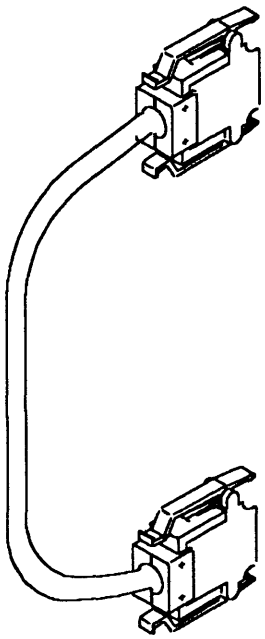
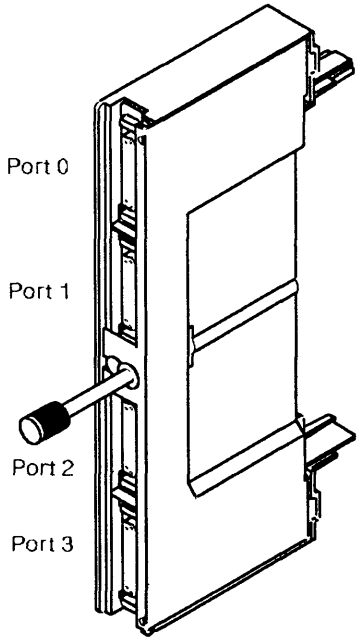
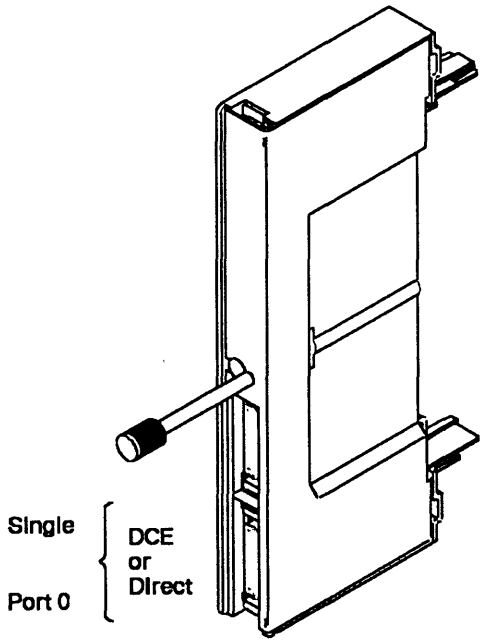


Figure 3-7. LIC Type 3 Wrap Cable P/N 65X8928



Type	KNOB Color
LIC1	Brown
LIC4A	Green
LIC4B	Green



Type	KNOB Color
LIC3	Blue

Figure 3-8. LIC Types 1, 3 and 4

Note: On LIC4B only the port 0 is used.

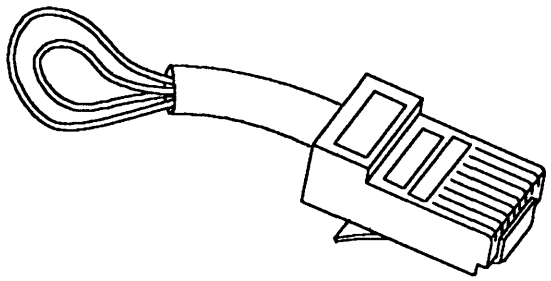
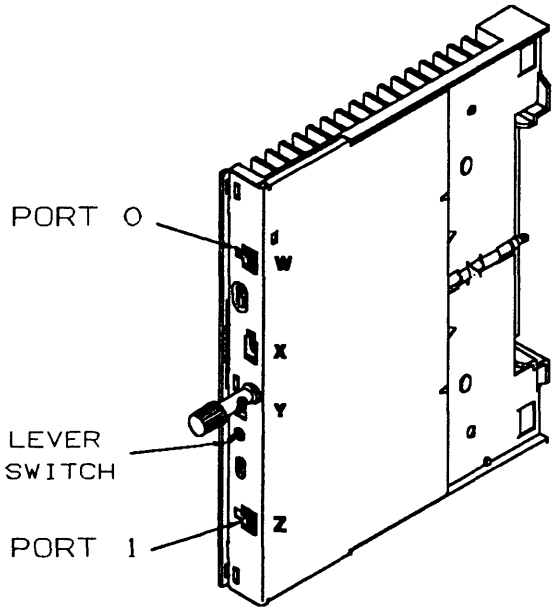
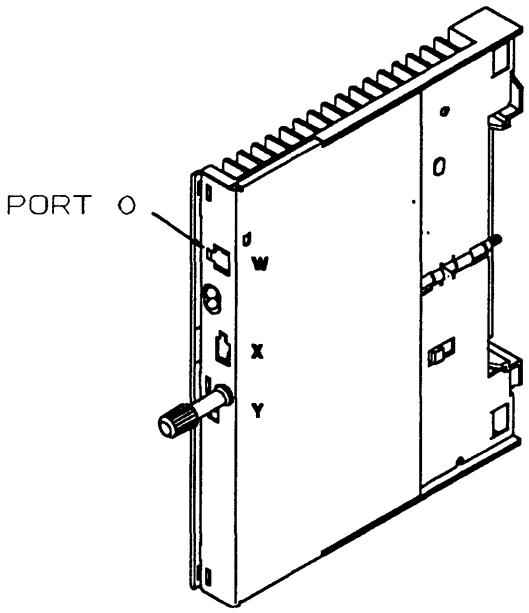


Figure 3-9. LICs Type 5 and 6 Wrap Plug P/N 11F4815



TYPE	KNOB COLOR
LIC5	BLACK



TYPE	KNOB COLOR
LIC6	BLACK

Figure 3-10. LIC Types 5 and 6

How to Run the Channel Wrap Test

1. **Ask the customer to disable the channel related to the channel adapter you want to test with Channel Wrap Test.**
2. Call option ODG or CDG from the maintenance function menu.
3. Enter the following :
   - Routine number **LO01** in the DIAG= = > area.
   - Channel adapter number in the ADP# = = > area.
4. Press SEND.
5. Two models of wrap plugs can be used for this test:

   BUS P/N 03F4301 and TAG P/N 03F4300 or
   BUS P/N 26F1755 and TAG P/N 26F1754

   You will be asked for the wrap tools P/N you are using.
6. Messages on the screen will prompt you for the required actions.
7. Refer to Figure 4-27, Figure 4-28 and to Table 4-3 on page 4-23 to remove the interface cables. When you are required by the diagnostic, remove the interface cables and install the wrap plugs.
   In order to allow the customer to use the channel during test time, you have to connect the cables together or to the terminators.
   Ensure that the 'Select Out Bypass' switch is in the 'NORMAL' position.

   According to the wrap plugs you are using, follow one of the two actions here after :

   - If you have the channel wrap plugs:

     P/N 03F4300 (for Tag)
     and P/N 03F4301 (for Bus)

     install them for interface A in the IN ROW (dark gray) and the CA terminators:

     P/N 2282676 (for Tag)
     and P/N 2282675 (for Bus)

     in the OUT ROW (light gray).
   - If you have the channel wrap plugs :

     P/N 26F1754 (for Tag)
     and P/N 26F1755 (for Bus)

     you have to make two installations, one after the other (when requested by messages on the screen) :

     1st step - Install the wrap plugs for interface A in the IN ROW (dark gray), and the CA terminators:

     P/N 2282676 (for Tag)
     and P/N 2282675 (for Bus)

     in the OUT ROW (light gray).

     2st step - Install the wrap plugs in the OUT ROW (light gray) and leave the IN ROW (dark gray) free. (CA terminators have not to be used).
8. You will be asked to install the wrap plugs on interface connectors B if the TPS feature is installed on this channel. In this case repeat the action as before for interface A.

Chapter 4. 3745 FRU Exchange

Use this chapter once you know what FRU to exchange. You should use all its sections, from front to back, to learn:

- Where the FRU is physically located
- How to exchange FRUs properly
- How to test the machine afterward
- What else to do before returning the machine to the customer.

Exchange Procedures

1. Some of the FRUs can be exchanged in concurrent maintenance. Thus, it is **VERY IMPORTANT** that these procedures be followed when replacing any FRU in the machine.
2. The control panel has voltage present even with the machine 'Power OFF'.
3. Be sure that the 3745 is 'power OFF' before replacing any FRUs, except for hot-pluggable FRUs (LIC,MUX) and the separeted power-controlled FRUs (FDD and HDD).
4. **Before starting FRU exchange, make sure the involved area has been disabled by the customer.**
5. The 3745 communication controller contains cards that are sensitive to electrostatic discharge (ESD). Use the ESD kit and store all cards in their protective packaging when you are not actually exchanging them.
6. Procedures for exchanging FRUs are listed on the next pages, use the list in alphabetical order leading to the correct page.
7. After FRU exchange, go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

Important. Do not disassemble or attempt to remove FRUs from the 3745 until you have read "Telecommunication Products Safety Handbook" GA33-0126.

VERY IMPORTANT

BEFORE ANY FRU EXCHANGE

BE SURE THAT THE REQUIRED AREA HAS BEEN DISABLED

IF NOT, GO TO START PAGE AND FOLLOW THE APPROPRIATE PROCEDURE

© Copyright IBM Corp. 1989 1990

List of FRUs

Basic BOARD	Use "Basic Board Exchange Procedure" on page 4-70.
LIC BOARD type 1 and 3	Use "LIC Board Type 1 and 3 Exchange Procedure" on page 4-78.
LIC BOARD type 2	Use "LIC Board Type 2 Exchange Procedure" on page 4-82.
MOSS BOARD	Use "MOSS Board Exchange Procedure" on page 4-86.
BPC	Use "Card Exchange Procedure" on page 4-32.
Battery	Use "Battery Exchange Procedure" on page 4-46.
CADR	Use "Card Exchange Procedure" on page 4-32.
CAL6	Use "Card Exchange Procedure" on page 4-32.
CAL7	Use "Card Exchange Procedure" on page 4-32.
Channel Tail Gate	Use "Channel Tail Gate Exchange Procedure" on page 4-90.
Control Panel	Use "Control Panel Exchange Procedure" on page 4-44.
CSC	Use "Card Exchange Procedure" on page 4-32.
CSP	Use "Card Exchange Procedure" on page 4-32.
DCREG	Use "DCREG Exchange Procedure" on page 4-35.
DFA	Use "Card Exchange Procedure" on page 4-32.
DMUX	Use "DMUX Exchange Procedure" on page 4-36.
EPO box	Use "EPO Exchange Procedure" on page 4-66.
FAN1	Use "Fan 1 Exchange Procedure" on page 4-48.
FAN2	Use "Fan 2 Exchange Procedure" on page 4-49.
FDD	Use "FDD Exchange Procedure" on page 4-50.
FESH	Use "Card Exchange Procedure" on page 4-32.
HDD	Use "HDD Exchange Procedure" on page 4-54.
LIC	Use "LIC Exchange Procedure" on page 4-42.
MCC	Use "Card Exchange Procedure" on page 4-32.
MPC	Use "Card Exchange Procedure" on page 4-32.
MSC	Use "Card Exchange Procedure" on page 4-32.
PCC	Use "Card Exchange Procedure" on page 4-32.
PPB	Use "PS2 and Primary Power Box Exchange Procedure" on page 4-62.
PS1	Use "PS1 Exchange Procedure" on page 4-60.
PS2	Use "PS2 and Primary Power Box Exchange Procedure" on page 4-62.
PUC	Use "Card Exchange Procedure" on page 4-32.

SCTL	Use "Card Exchange Procedure" on page 4-32.
SMUXA/B	Use "SMUXA/B Exchange Procedure" on page 4-38.
STO4	Use "Card Exchange Procedure" on page 4-32.
STO8	Use "Card Exchange Procedure" on page 4-32.
TERMD	Use "TERMD/TERMI Exchange Procedure" on page 4-58.
TERMI	Use "TERMD/TERMI Exchange Procedure" on page 4-58.
TIC2	Use "Card Exchange Procedure" on page 4-32.
TRM	Use "Card Exchange Procedure" on page 4-32.

FRU Physical Locations

3745 Frame

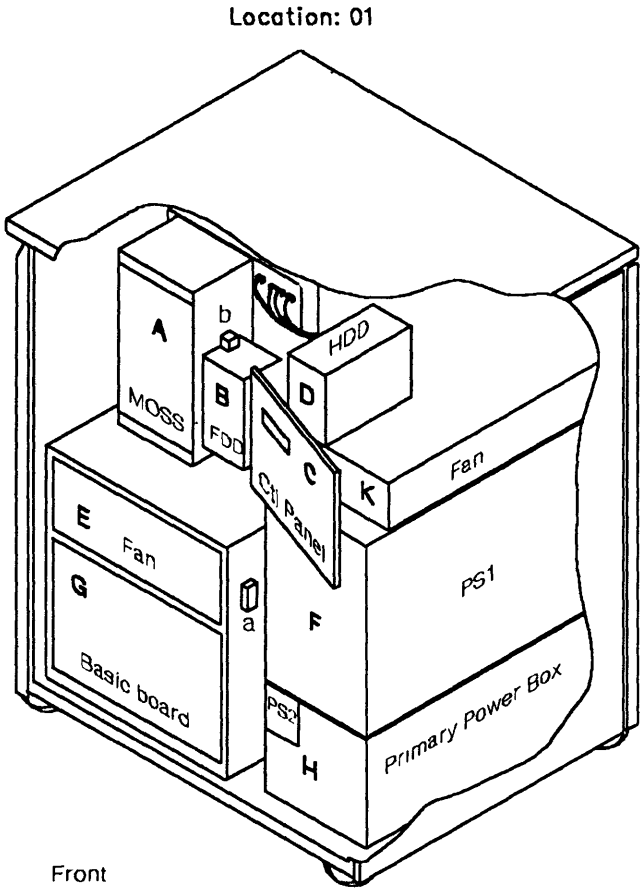


Figure 4-1. 3745 Frame (front)

A	MOSS board (**01A-X0** and **01A-Y0**)	**F**	PS1
B	FDD	**G**	Basic board (**01G-A1**)
C	Panel	**H**	Primary Power Box + PS2
D	HDD	**K**	FAN1 (for powers)
E	FAN2 (for logic)		

a	Basic board test points
b	MOSS board test points

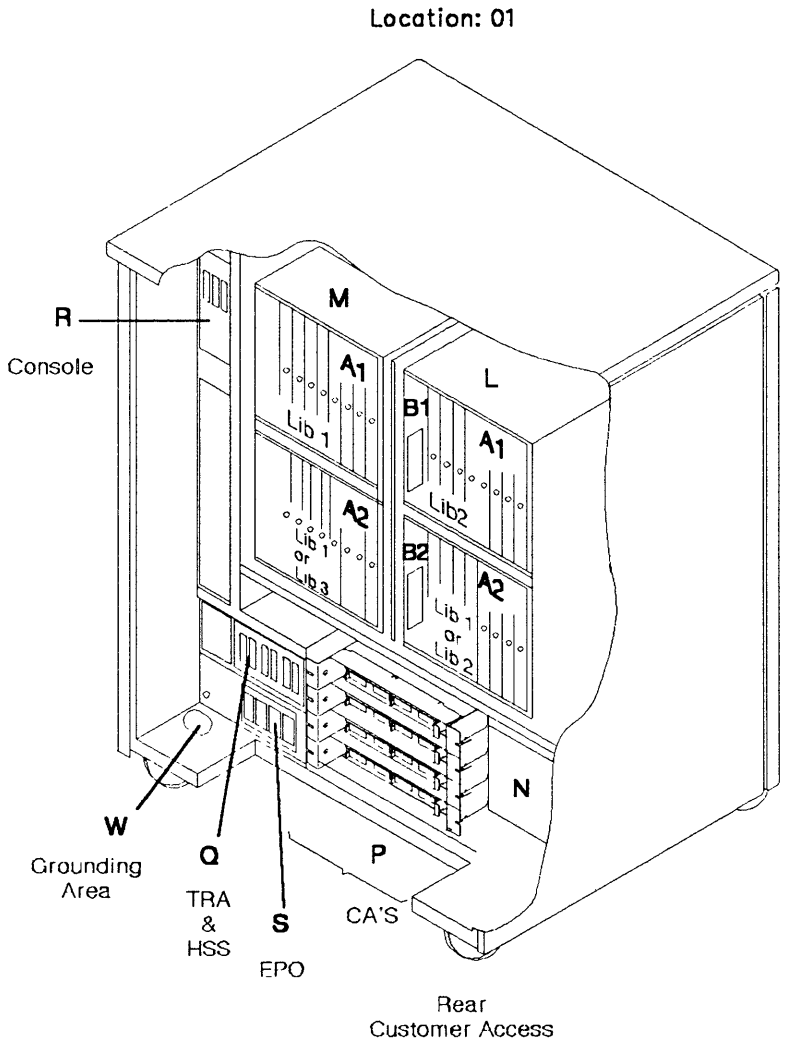


Figure 4-2. 3745 Frame (back)

01L-A1 LIC board type 2 (Lines 80-95)

01L-A2 LIC board type 2 (Lines 64-79)
or
LIC board type 1 (Lines 128-159)

01L-B1 Connectors

01L-B2 Connectors

01M-A1 LIC board type 1 (Lines 32-63)

01M-A2 LIC board type 1 (Lines 00-31)
or
LIC board type 3 (Lines 00-15)

N Rear board access (**01G-A1**)

P CA tail gate

Q TRA & HSS tail gate

R Console/RSF outputs

S EPO

W Grounding area

Basic Board, Cards, Connectors and Crossovers

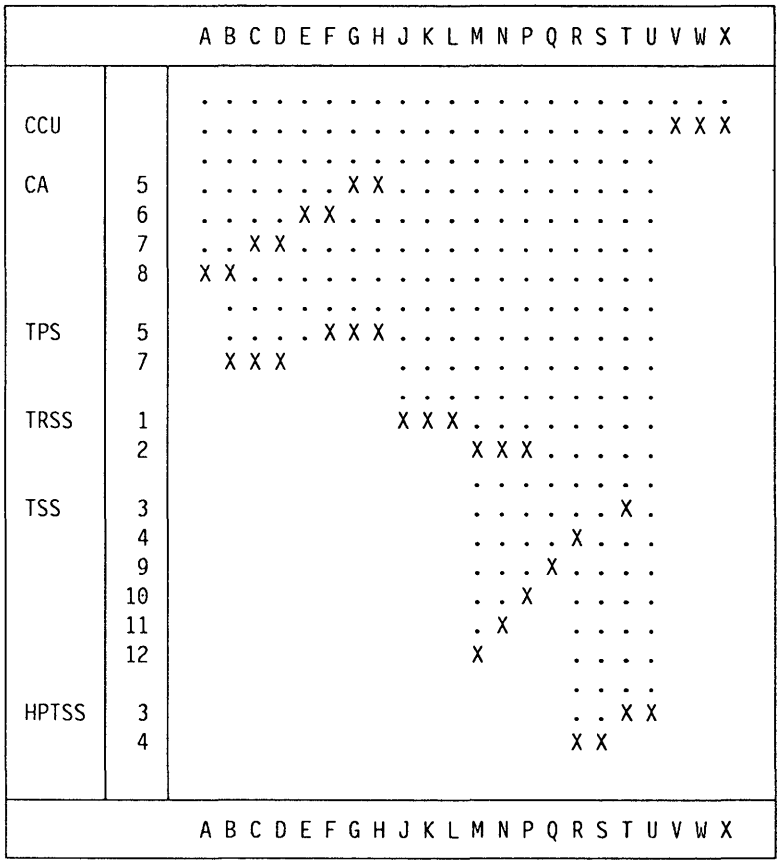


Figure 4-3. Card locations

Table 4-1. TIC Position and Ring address

TRM	TIC position	Ring address
TRM-1	TIC2-1	1088
	TIC2-2	1089
TRM-2	TIC2-3	1090
	TIC2-4	1091

Next figures give some configuration examples.

Table 4-2. Basic Board Configurations			
Model	**TPS**	**HPTSS**	**Figure available**
130	no	yes	
130	yes	yes	Figure 4-6 on page 4-9
150	no	yes	Figure 4-7 on page 4-10
170	no	no	Figure 4-4
170	no	yes	
170	yes	no	
170	yes	yes	Figure 4-5 on page 4-8

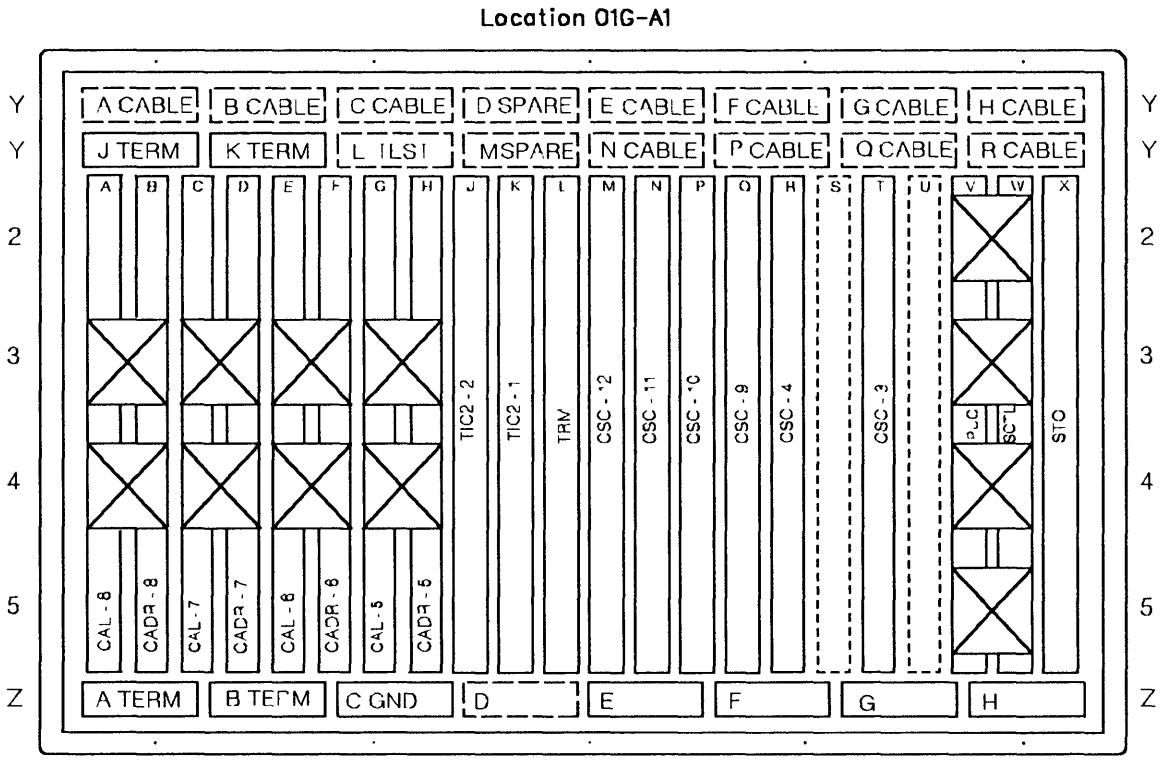


Figure 4-4. 3745 Model 170 Basic Board without TPS and without HPTSS

Note 1: STO may be STO4 (4MB) or STO8 (8MB).

Note 2: CAL may be CAL6 (for CADS feature) or CAL7 (for BCCA feature).

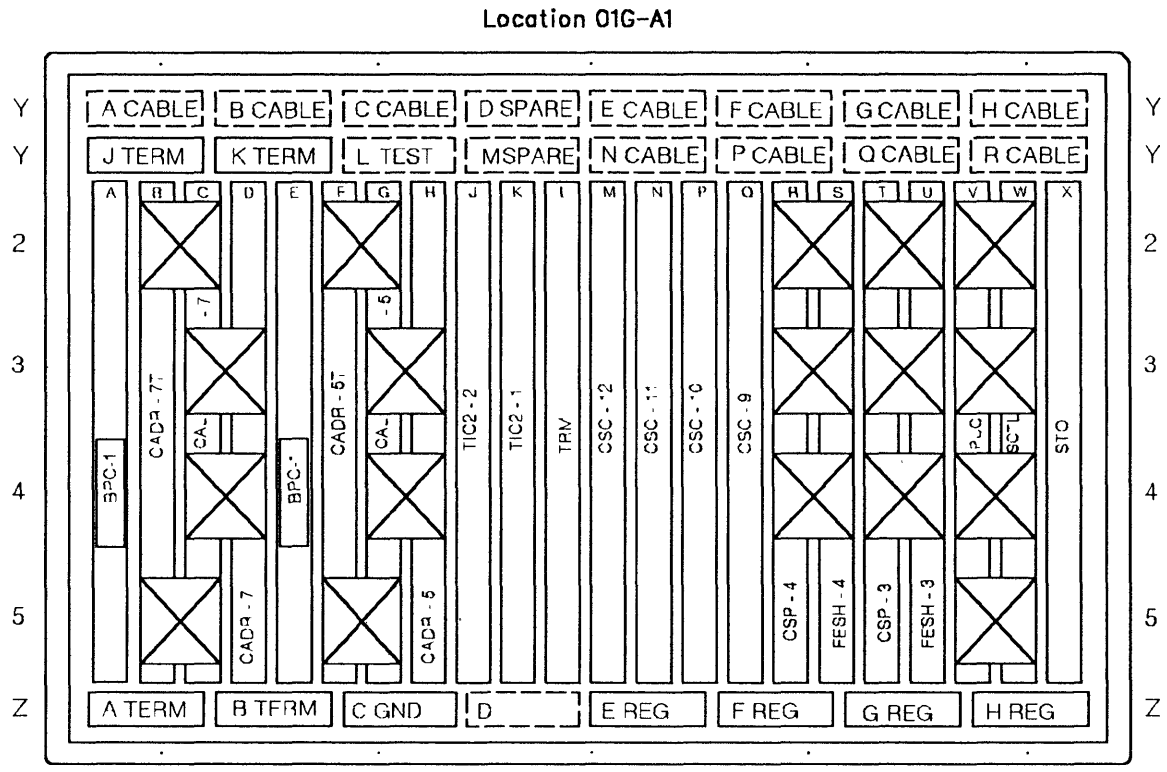


Figure 4-5. 3745 Model 170 Basic Board with TPS and with HPTSS

Note 1: When TPS-5 is installed a Bypass card 1 (BPC1) is needed in location E if CADR-7 is present.

Note 2: STO may be STO4 (4MB) or STO8 (8MB).

Note 3: CAL may be CAL6 (for CADS feature) or CAL7 (for BCCA feature).

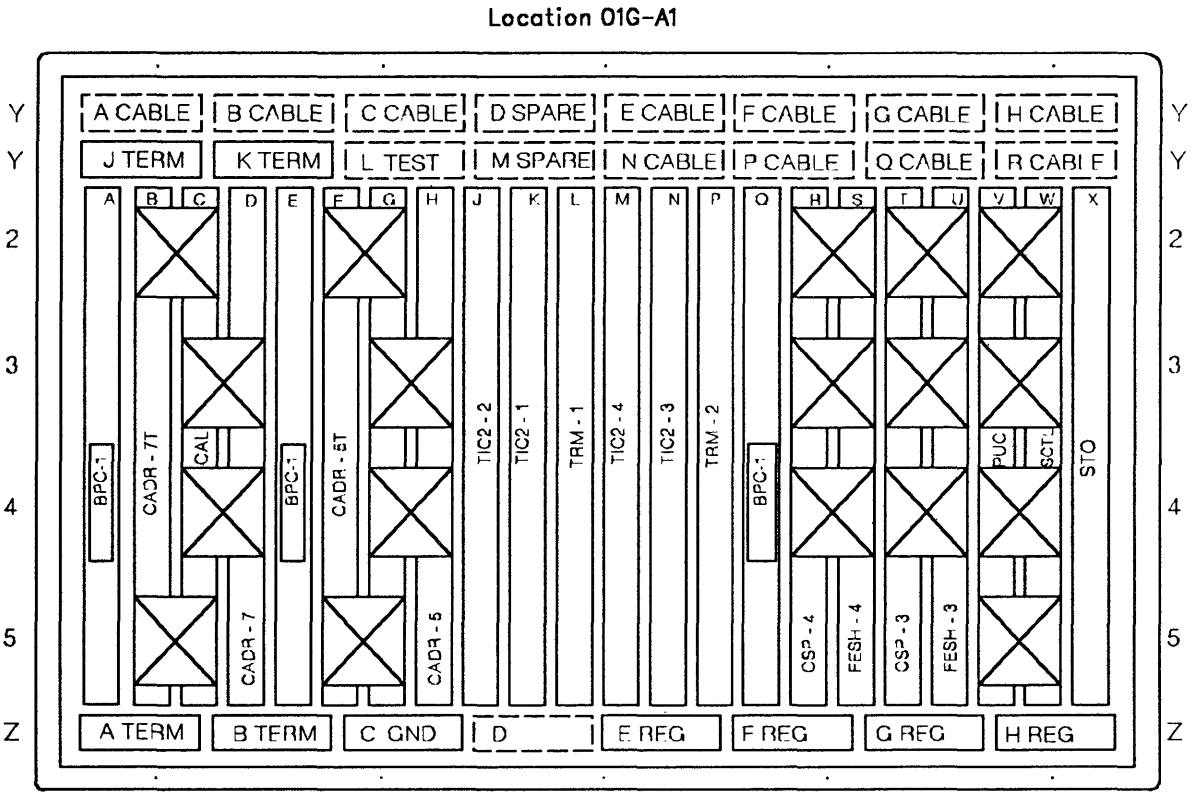


Figure 4-6. 3745 Model 130 Basic Board with TPS

Note 1: When TPS-5 is installed a Bypass card 1 (BPC1) is needed in location E if CADR-7 is present.

Note 2: STO may be STO4 (4MB) or STO8 (8MB).

Note 3: CAL may be CAL6 (for CADS feature) or CAL7 (for BCCA feature).

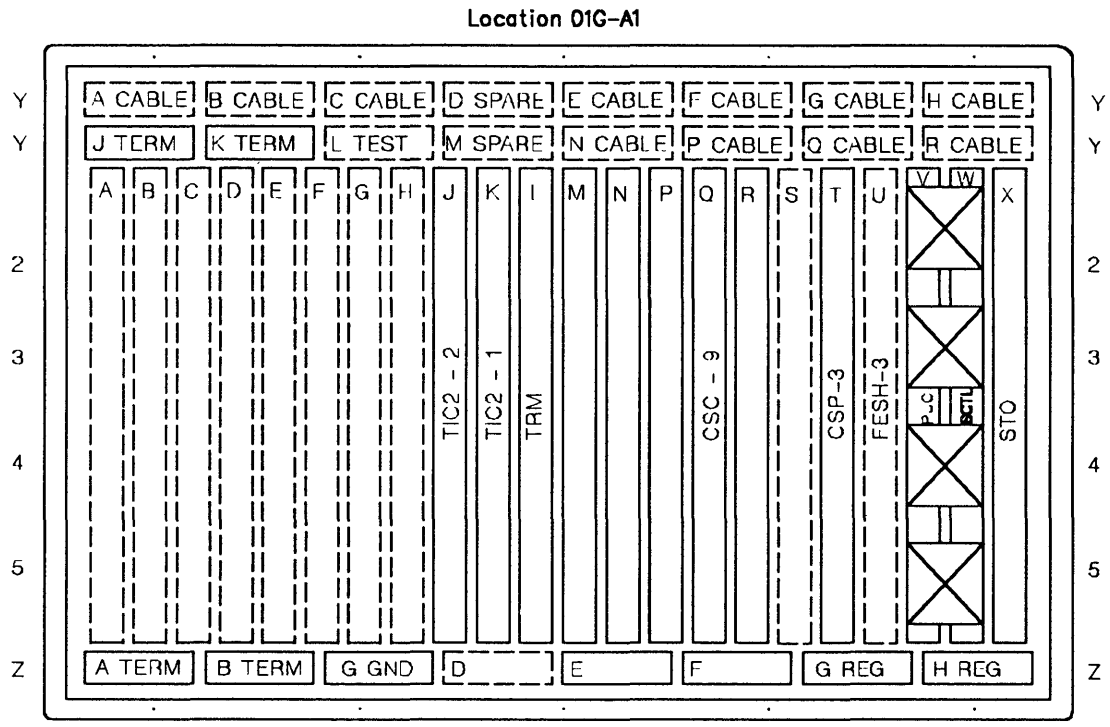


Figure 4-7. 3745 Model 150 Basic Board.

Note: STO may be STO4 (4MB) or STO8 (8MB).

MOSS Board, Cards and Connectors

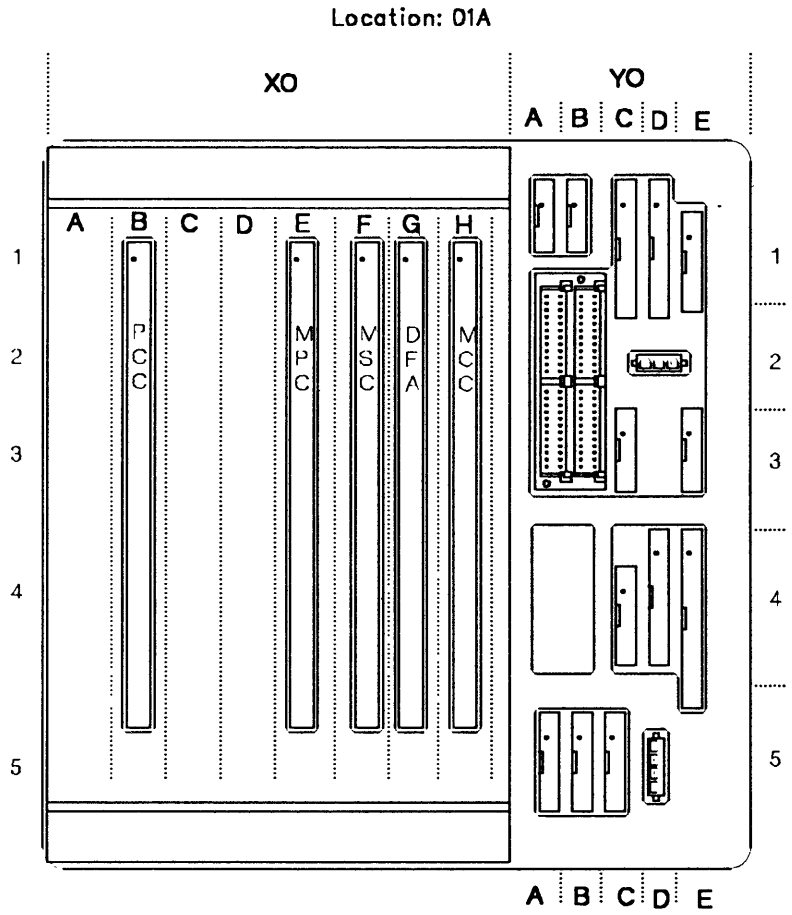


Figure 4-8. 3745 MOSS Board, Cards and Connectors

LIC Board type 1

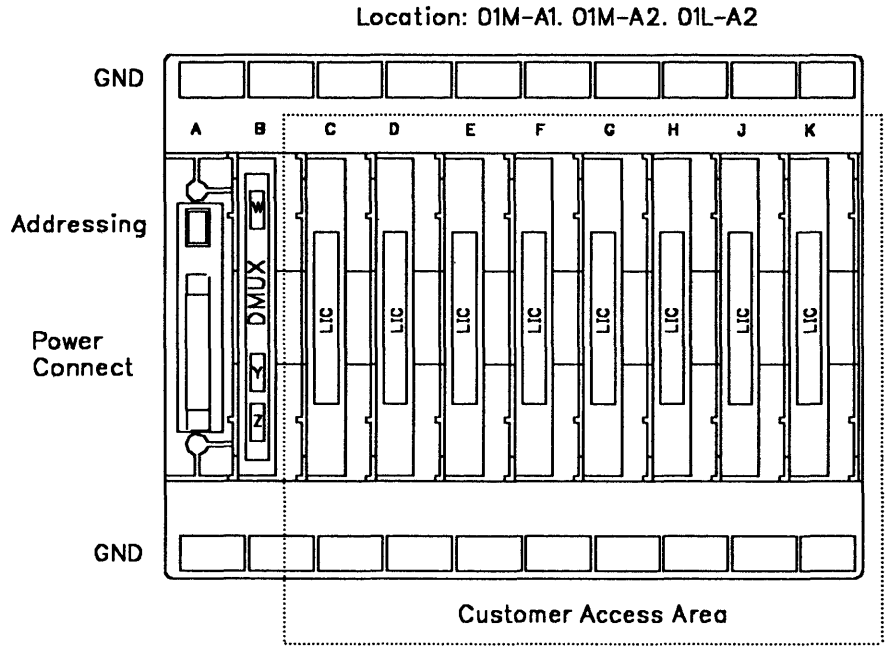


Figure 4-9. 3745 LIC Unit type 1 Board and Connectors (for LIC types 1,3 & 4 in models 150 & 170)

LIC Board type 2

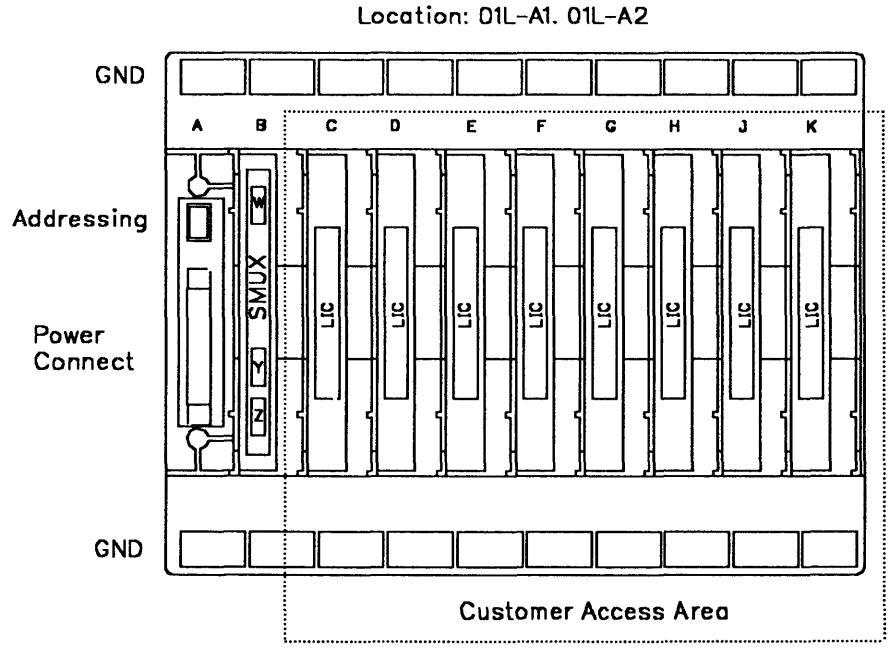


Figure 4-10. 3745 LIC Unit type 2 Board and Connectors (for LIC types 5 & 6 in models 150 & 170)

LIC Board type 3

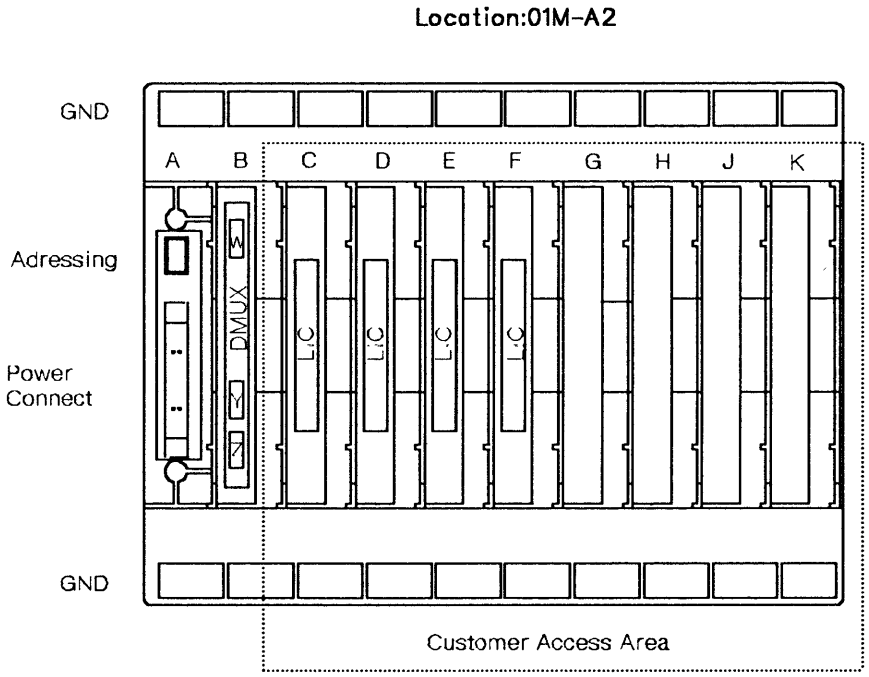


Figure 4-11. 3745 LIC Unit type 3 Board and Connectors (for LIC types 1,3 & 4 in model 150)

DMUX and SMUX Packaging

DMUX (Id)	DMUX location
1 or 2	01M-A2B
3 or 4	01M-A1B
9 or 10	01L-A2B

SMUX type	SMUX (Id)	SMUX location
SMUX-A	5	01L-A2B
SMUX-B	7	01L-A1B

Figure 4-12. 3745 DMUX and SMUX Packaging

LIC Board type 1 Packaging for LICs type 1 to 4

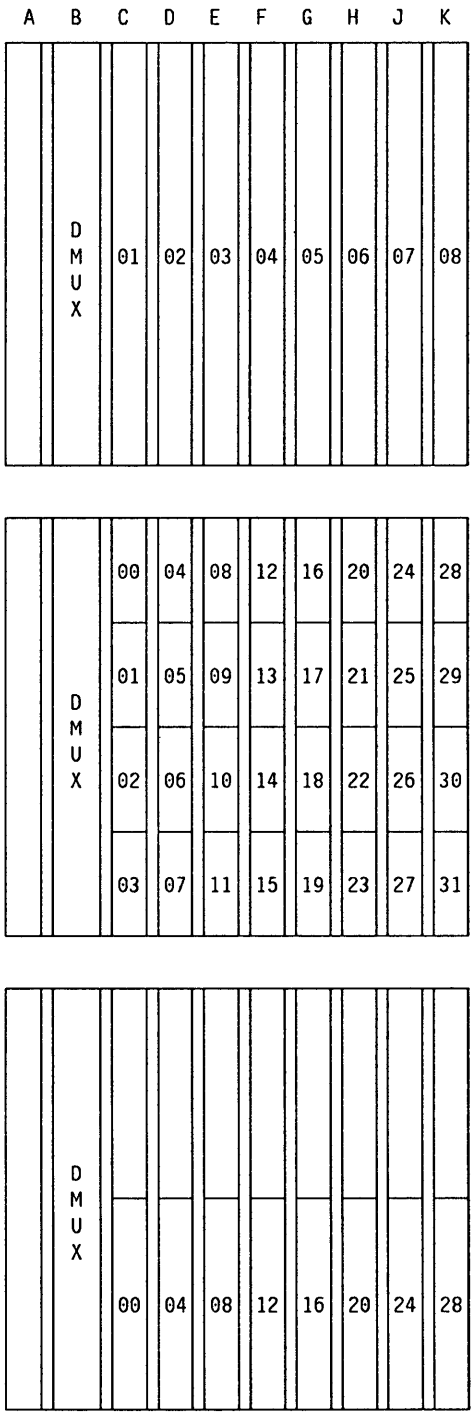


Figure 4-13. 3745 LIC Board 01M-A2 Packaging

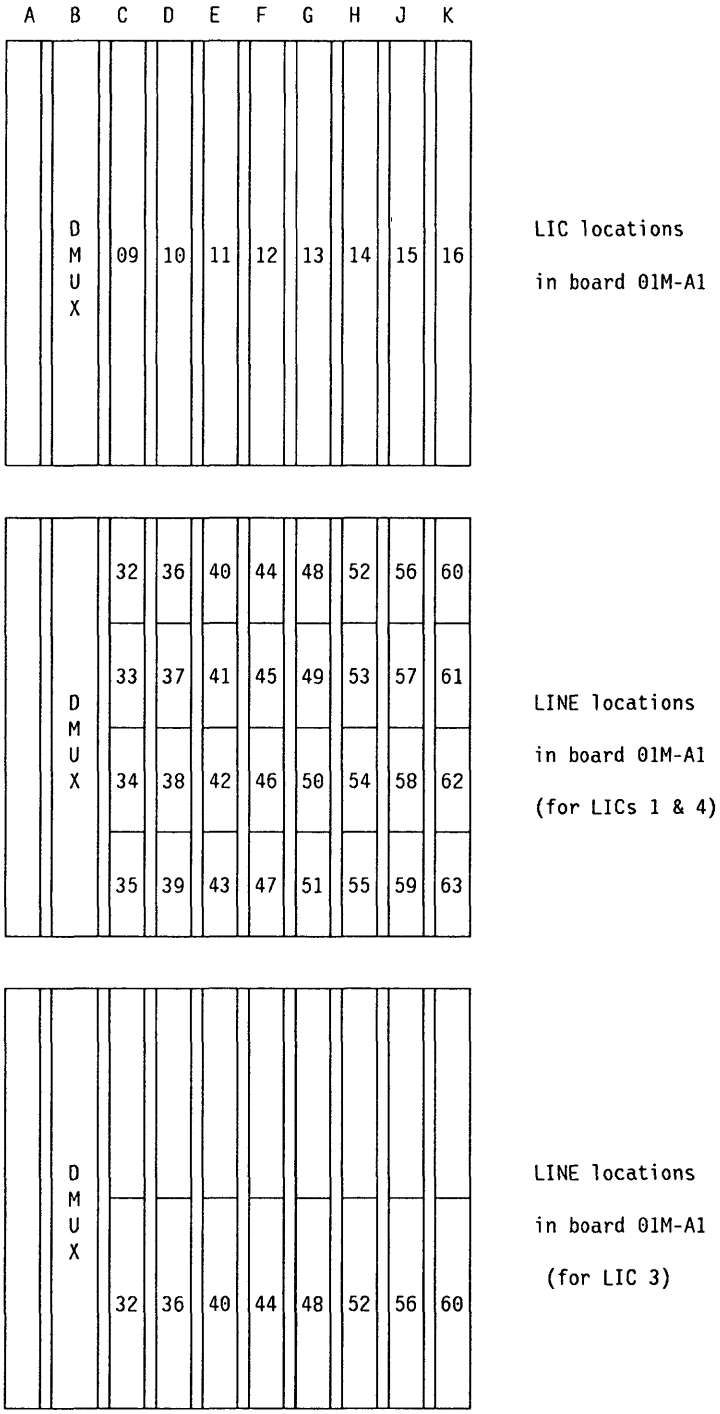


Figure 4-14. 3745 LIC Board 01M-A1 Packaging

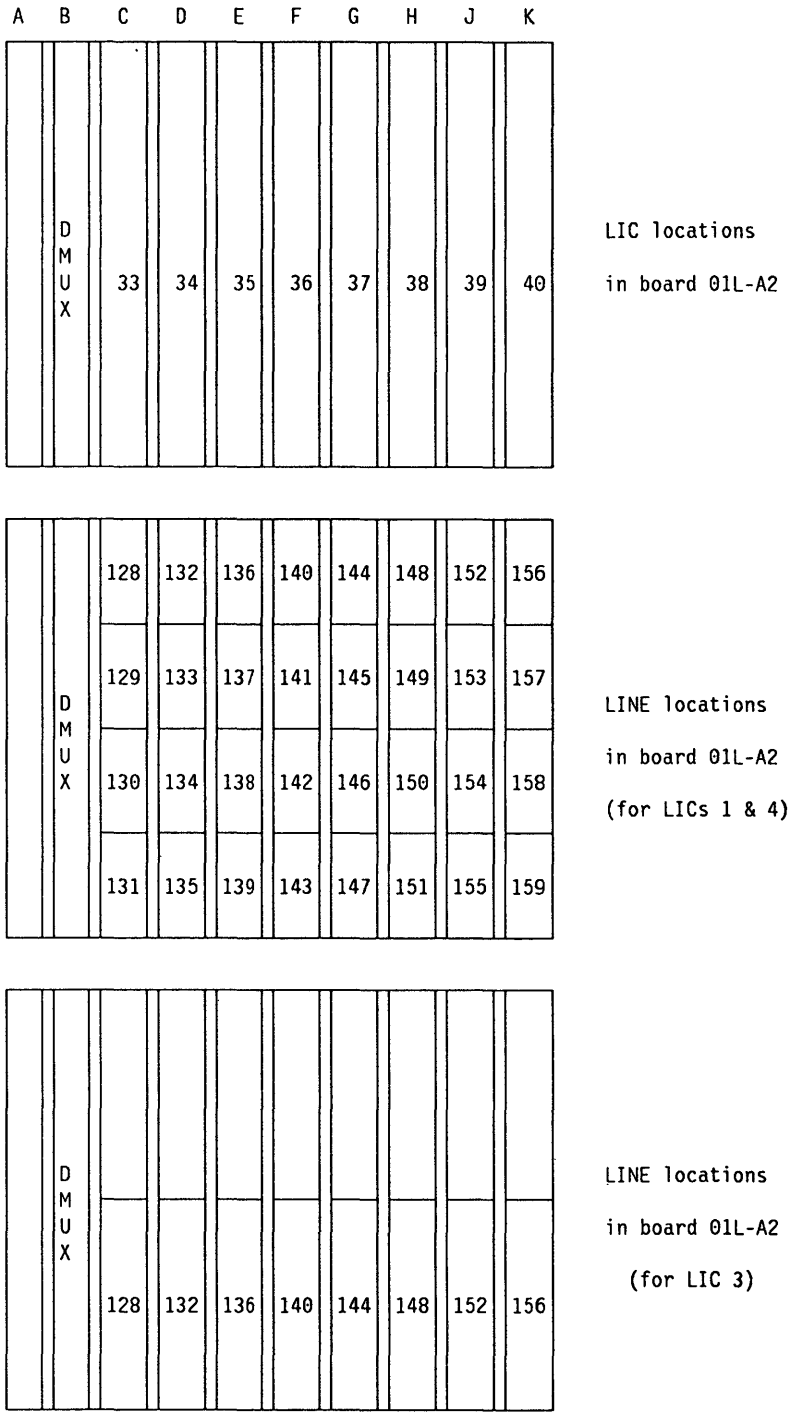
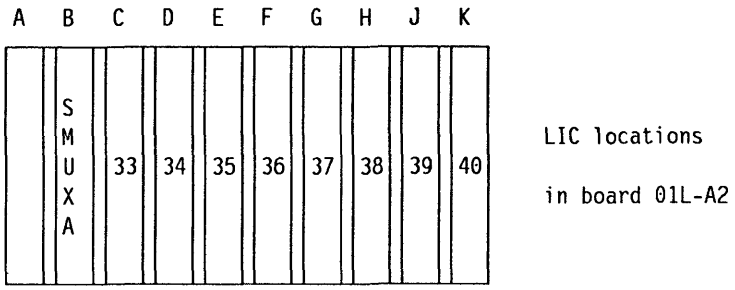


Figure 4-15. 3745 LIC Board 01L-A2 Packaging

LIC Board type 2 Packaging for LICs type 5



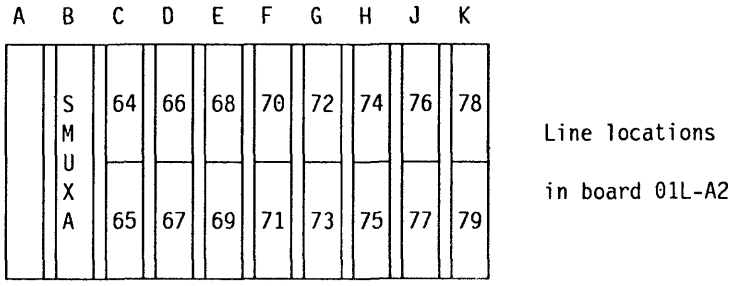
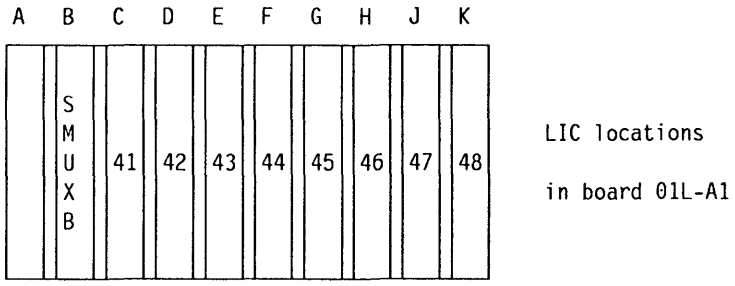


Figure 4-16. 3745 LIC Board 01L-A2 Packaging (LICs type 5)



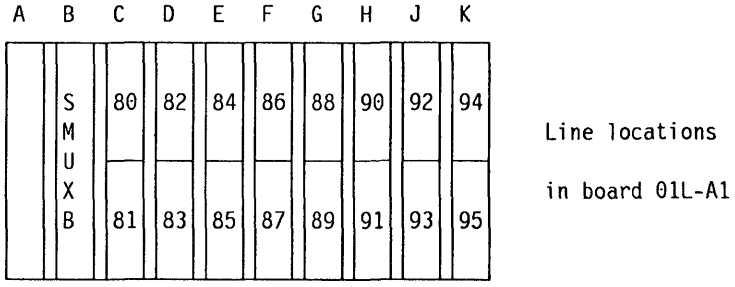


Figure 4-17. 3745 LIC Board 01L-A1 Packaging (LIC type 5)

LIC Board type 2 Packaging for LICs type 6 low speed

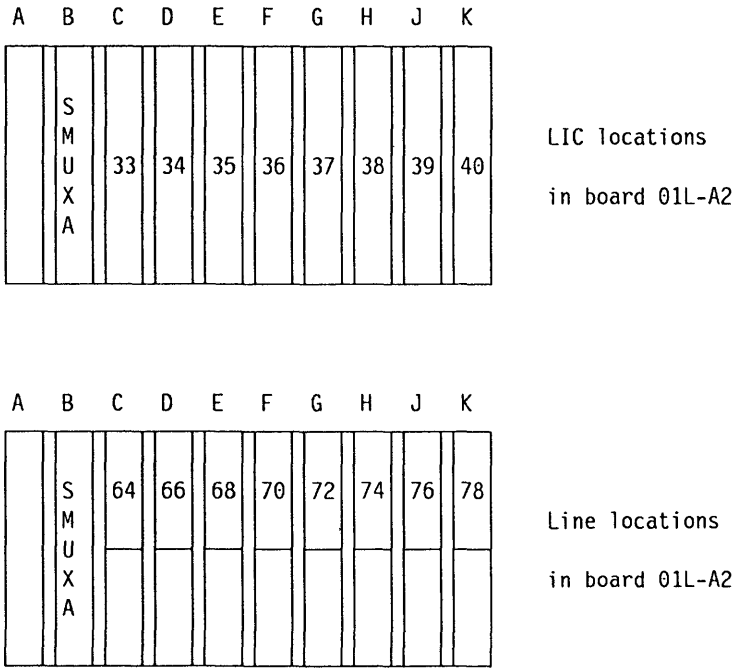


Figure 4-18. 3745 LIC Board 01L-A2 Packaging (LICs type 6 low speed)

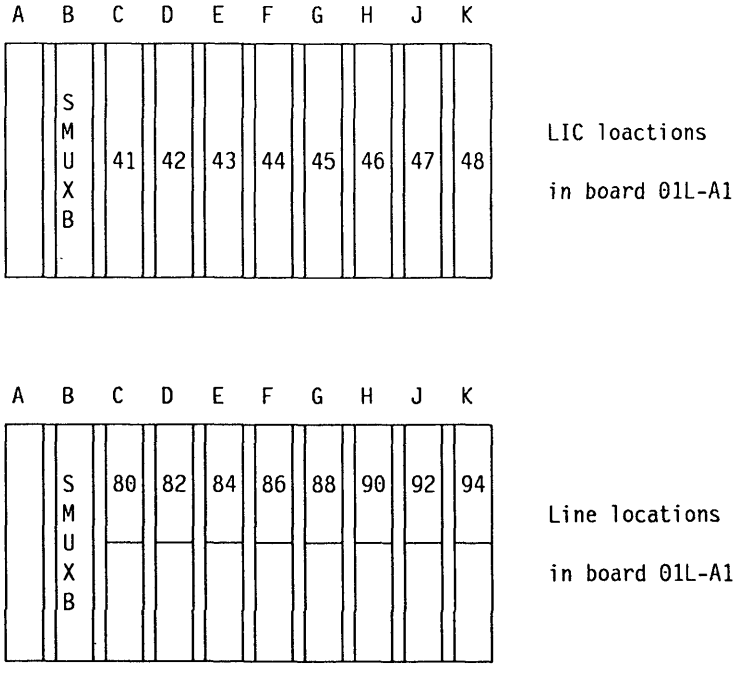
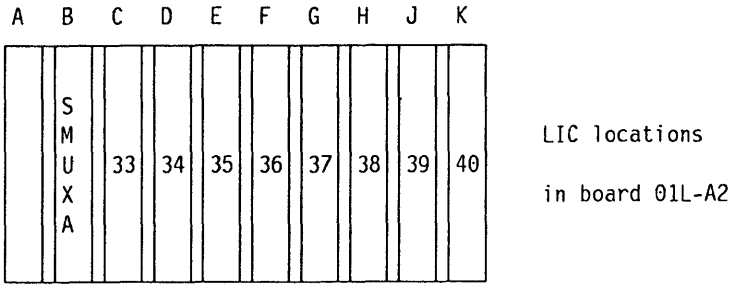


Figure 4-19. 3745 LIC Board 01L-A1 Packaging (LICs type 6 low speed)

LIC Board type 2 Packaging for LICs type 6 high speed



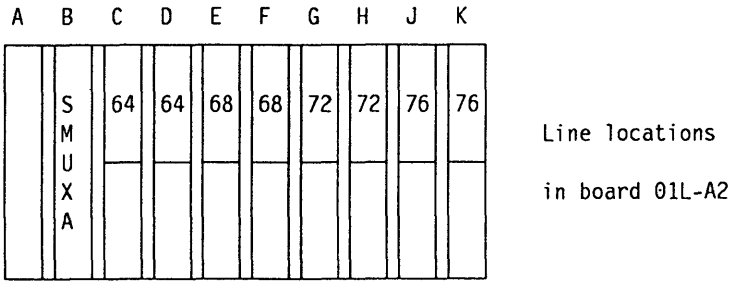
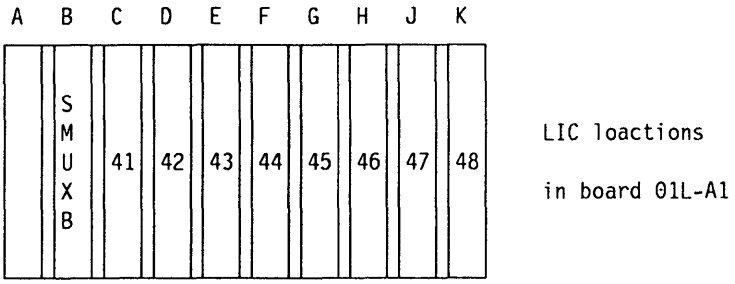


Figure 4-20. 3745 LIC Board 01L-A2 Packaging (LICs type 6 high speed)



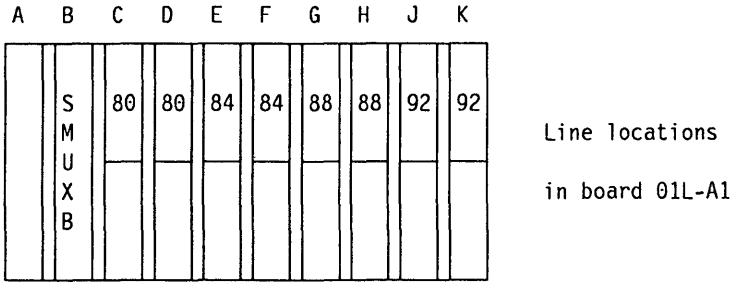


Figure 4-21. 3745 LIC Board 01L-A1 Packaging (LICs type 6 high speed)

LIC Board type 3 Packaging for LICs type 1 to 4

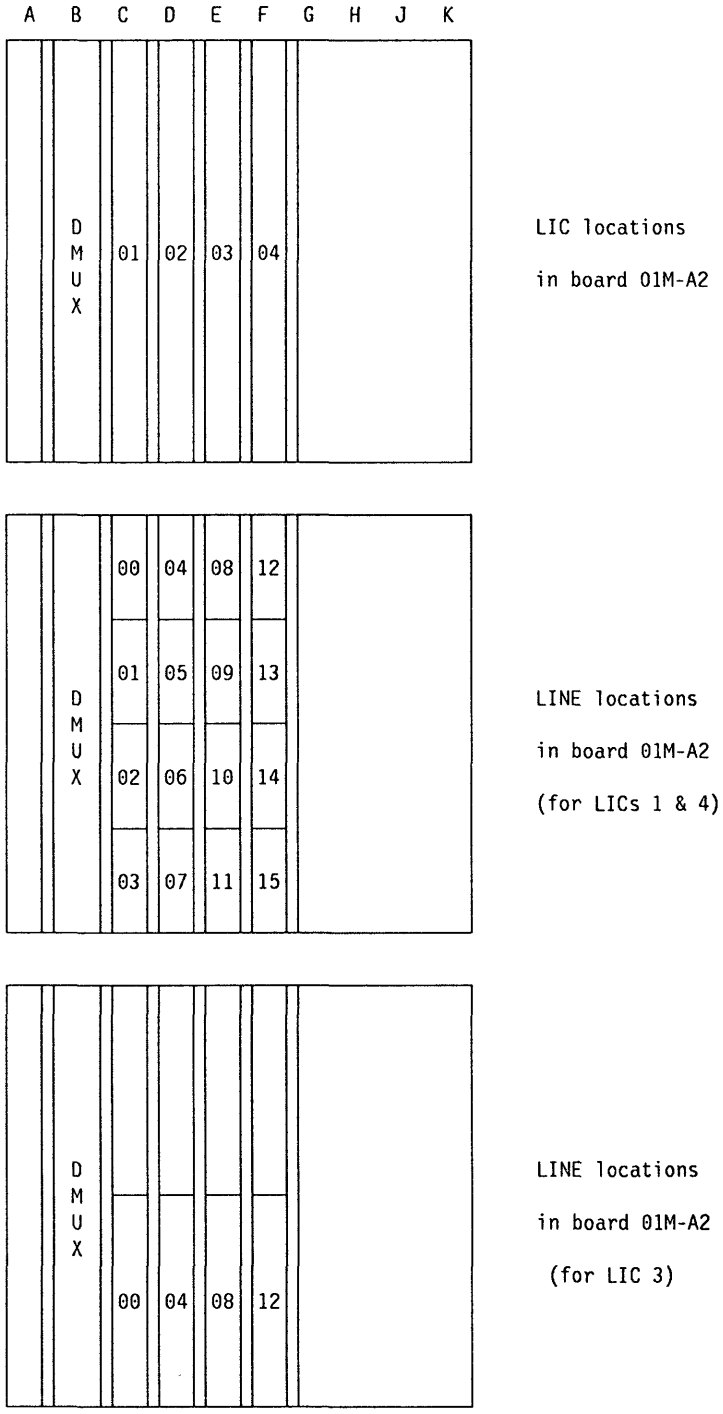


Figure 4-22. 3745 LIC Board 01M-A2 Packaging

High-Speed Lines Tail Gate

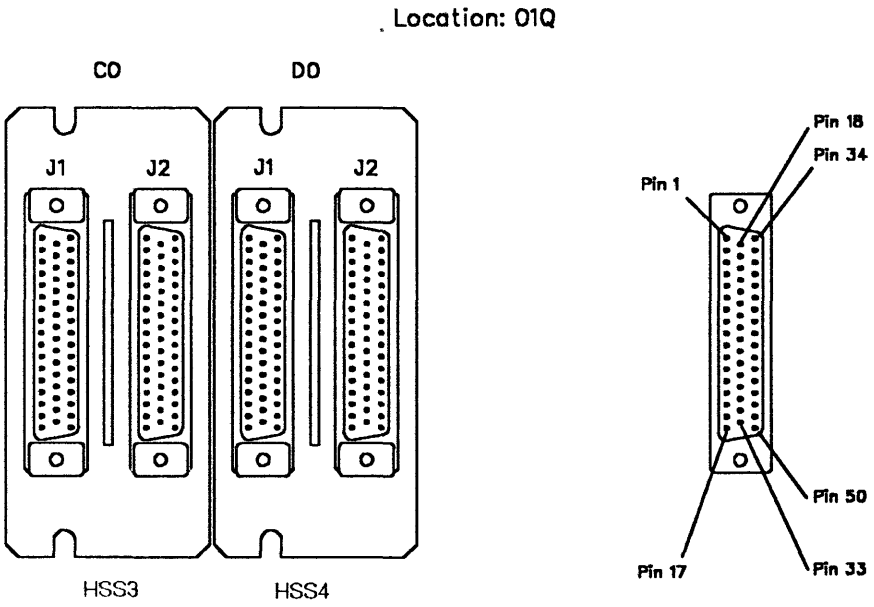


Figure 4-23. 3745 High-Speed Lines Tail Gate

Line	Location
1028	01Q-C0J2
1029	01Q-C0J1
1030	01Q-D0J2
1031	01Q-D0J1

Figure 4-24. 3745 High-Speed Line Locations

Token-Ring Tail Gate

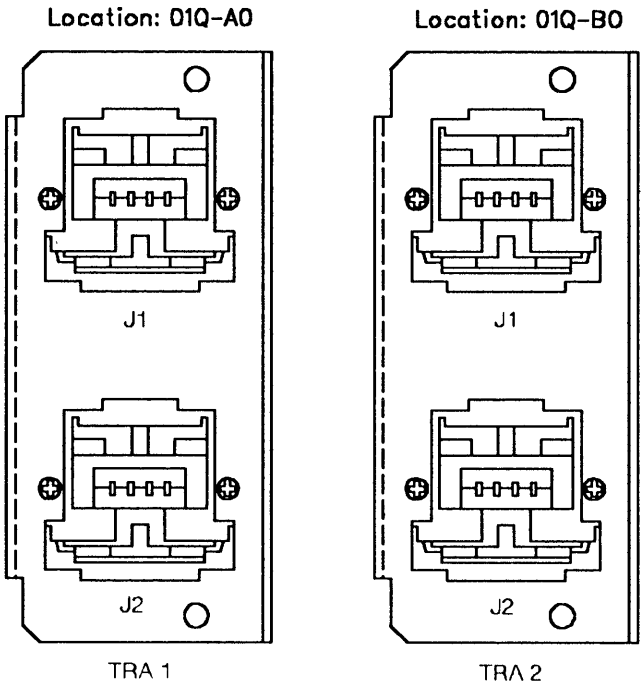


Figure 4-25. 3745 Token-Ring Tail Gate

Line	Location
1088	01Q-A0J1
1089	01Q-A0J2
1090	01Q-B0J1
1091	01Q-B0J2

Figure 4-26. 3745 Token-Ring Line Locations

Channel Tail Gate

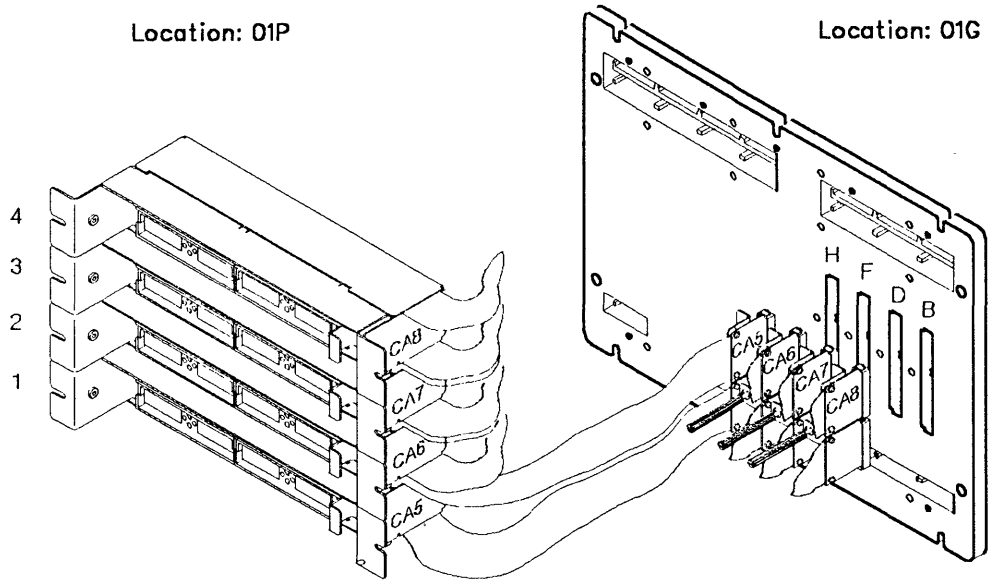


Figure 4-27. 3745 Channel Tail Gate

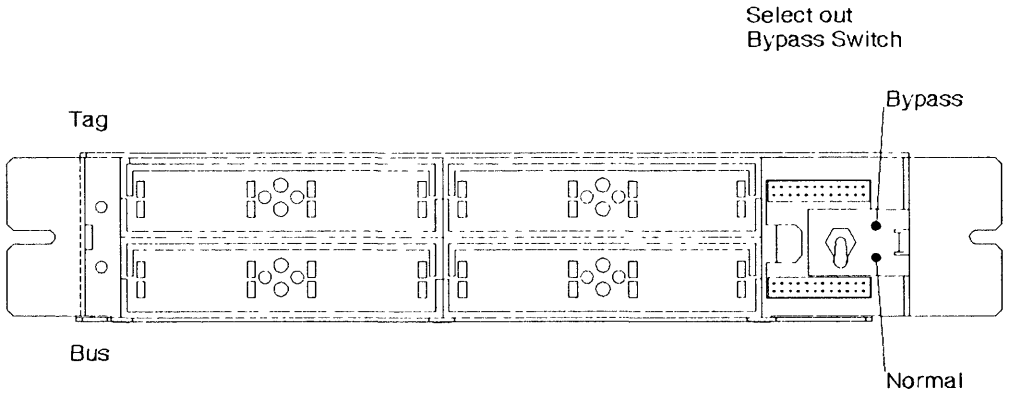


Figure 4-28. 3745 Channel Tail Gate Details (for more details see YZ052 sheet 2)

Table 4-3. Channel Interface. Channel interface A and Channel interface B (TPS) distribution chart.

Basic board rear position	Tail gate	CA# (Interface A - Interface B)
01G-H	01P-1	CA5-A
01G-F	01P-2	CA6-A or CA5-B
01G-D	01P-3	CA7-A
01G-B	01P-4	CA8-A or CA7-B

Console Operator Tail Gate

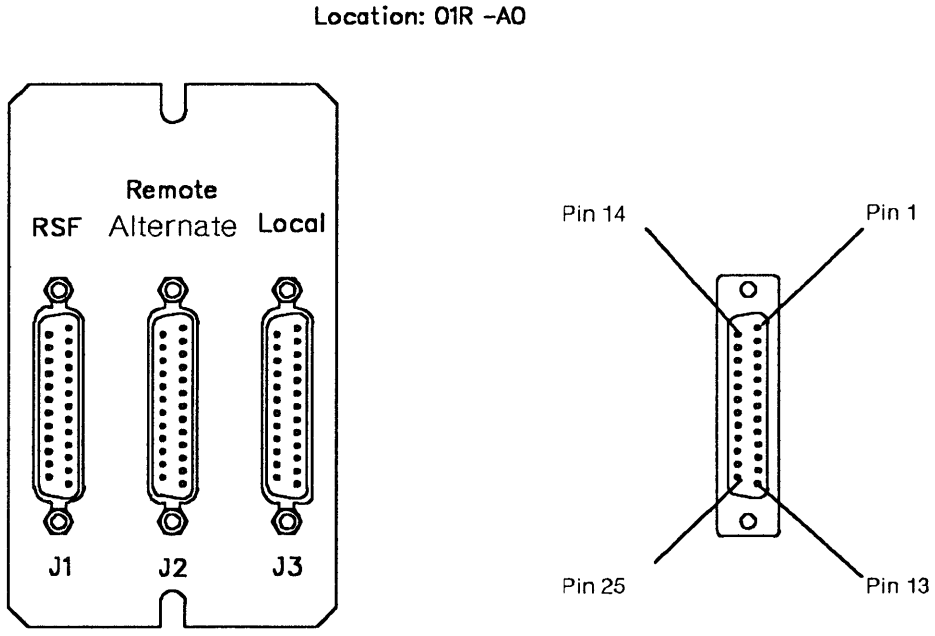


Figure 4-29. 3745 Console Operator Tail Gate

EPO Tail Gate

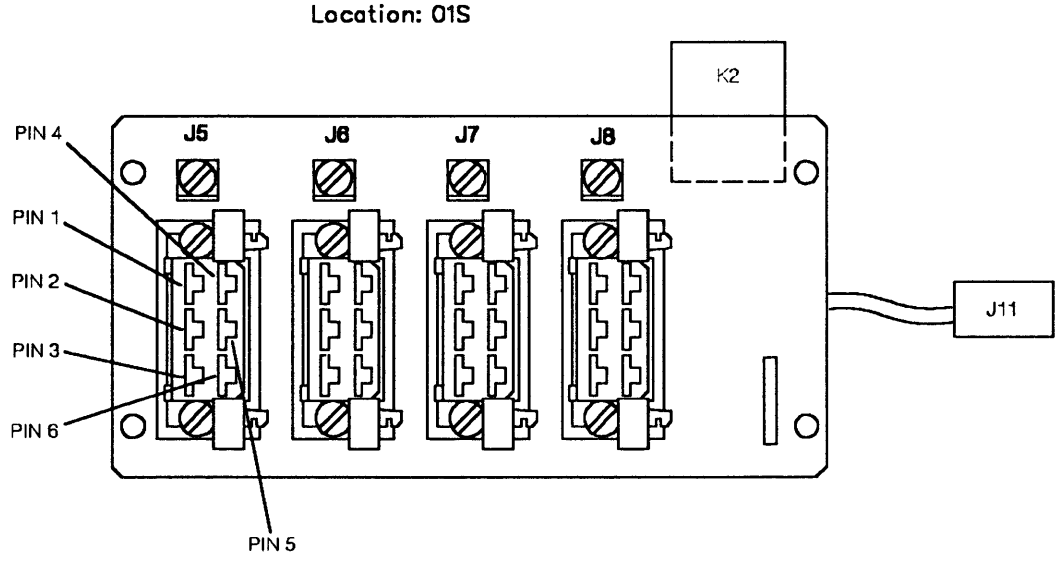
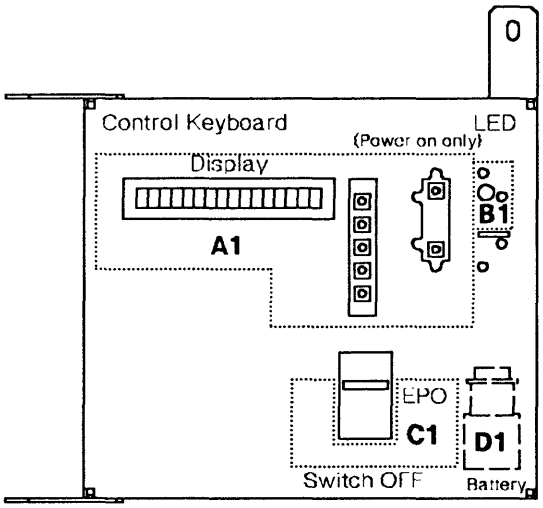


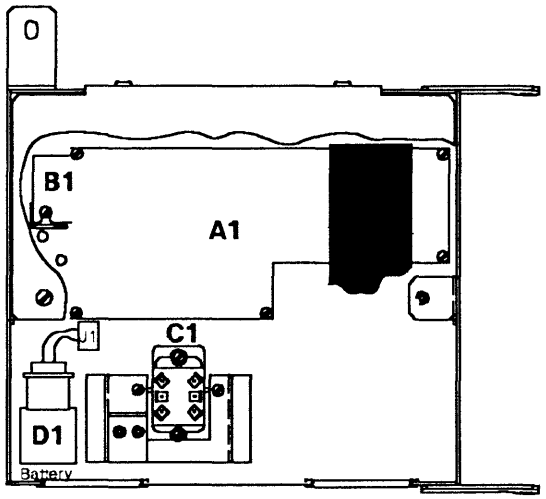
Figure 4-30. 3745 EPO

Control Panel

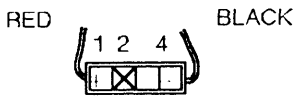
Location 01C



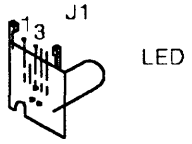
Front View



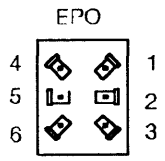
Rear View



Connector 01C D1J1



Detail B 01C-B1J1



Wiring Side

Detail C 01C-C1SW1

Figure 4-31. 3745 Control Panel

Flexible Diskette Drive

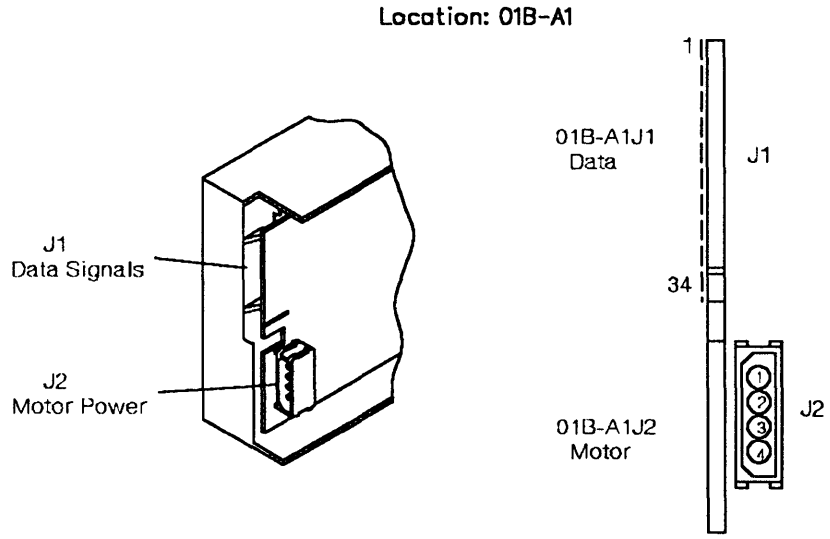


Figure 4-32. 3745 Flexible Diskette Drive

Hard Disk Drive

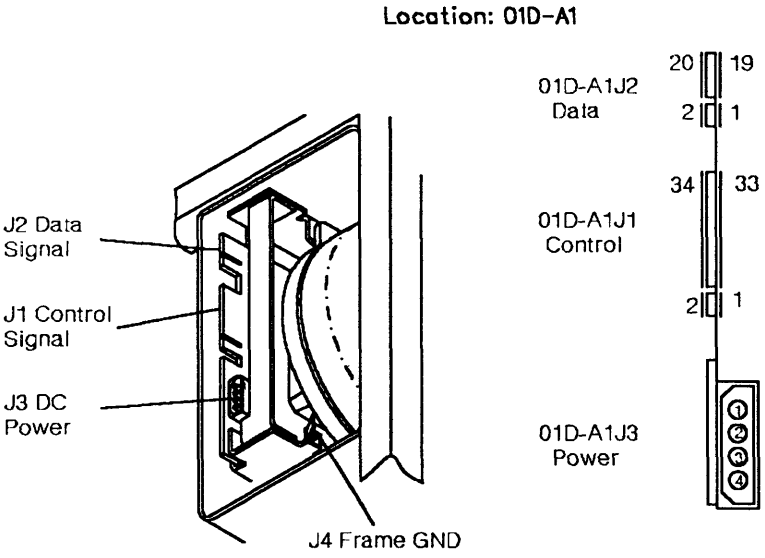


Figure 4-33. 3745 Hard Disk Drive

Primary Power Box

Location: 01H

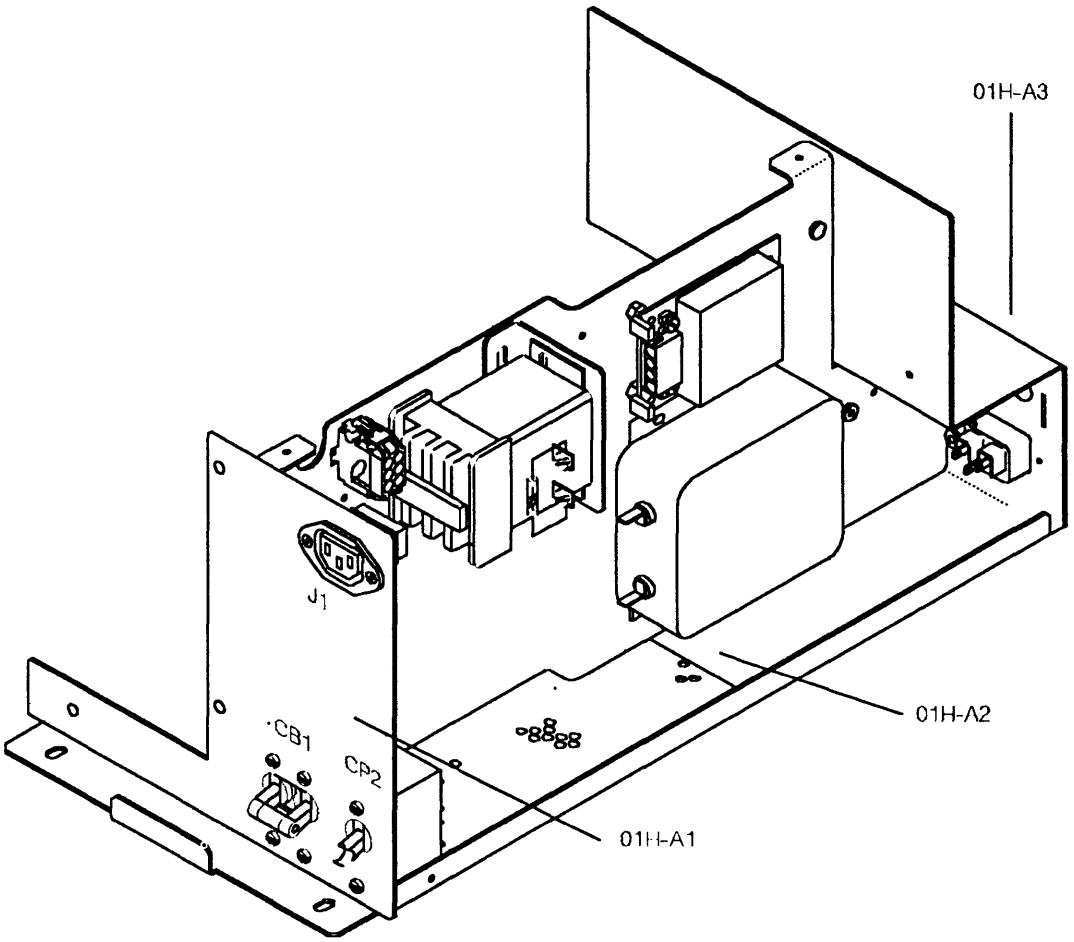


Figure 4-34. 3745 Primary Power Box Components

Power Supply 1

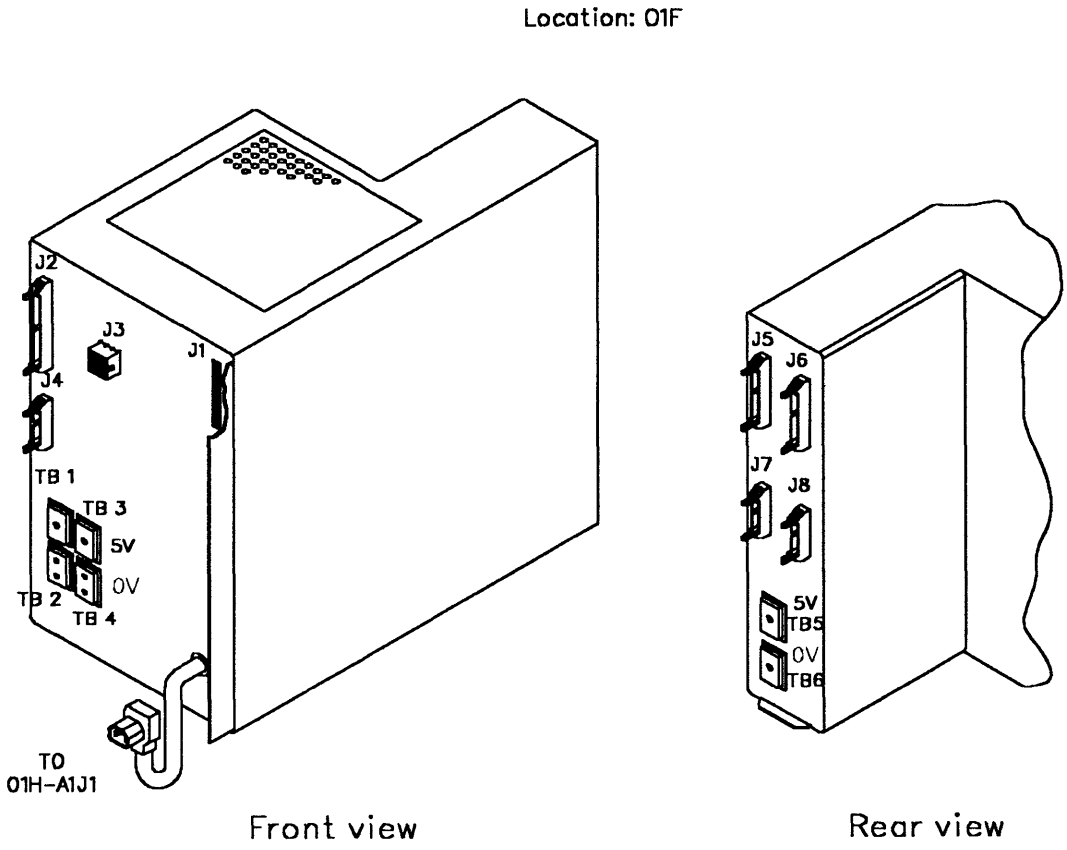


Figure 4-35. 3745 Power Supply 1 Components

3745 Power Supply Cross Reference

Table 4-4. 3745 Power Supply Cross Reference

Power Supply	Location	Area Supplied
PS1	01F	Basic board MOSS board FDD & HDD LIC board 01M-A1 LIC board 01M-A2 LIC board 01L-A1 LIC board 01L-A2
PS2	01H	FANs PCC Panel

Power Supply 2

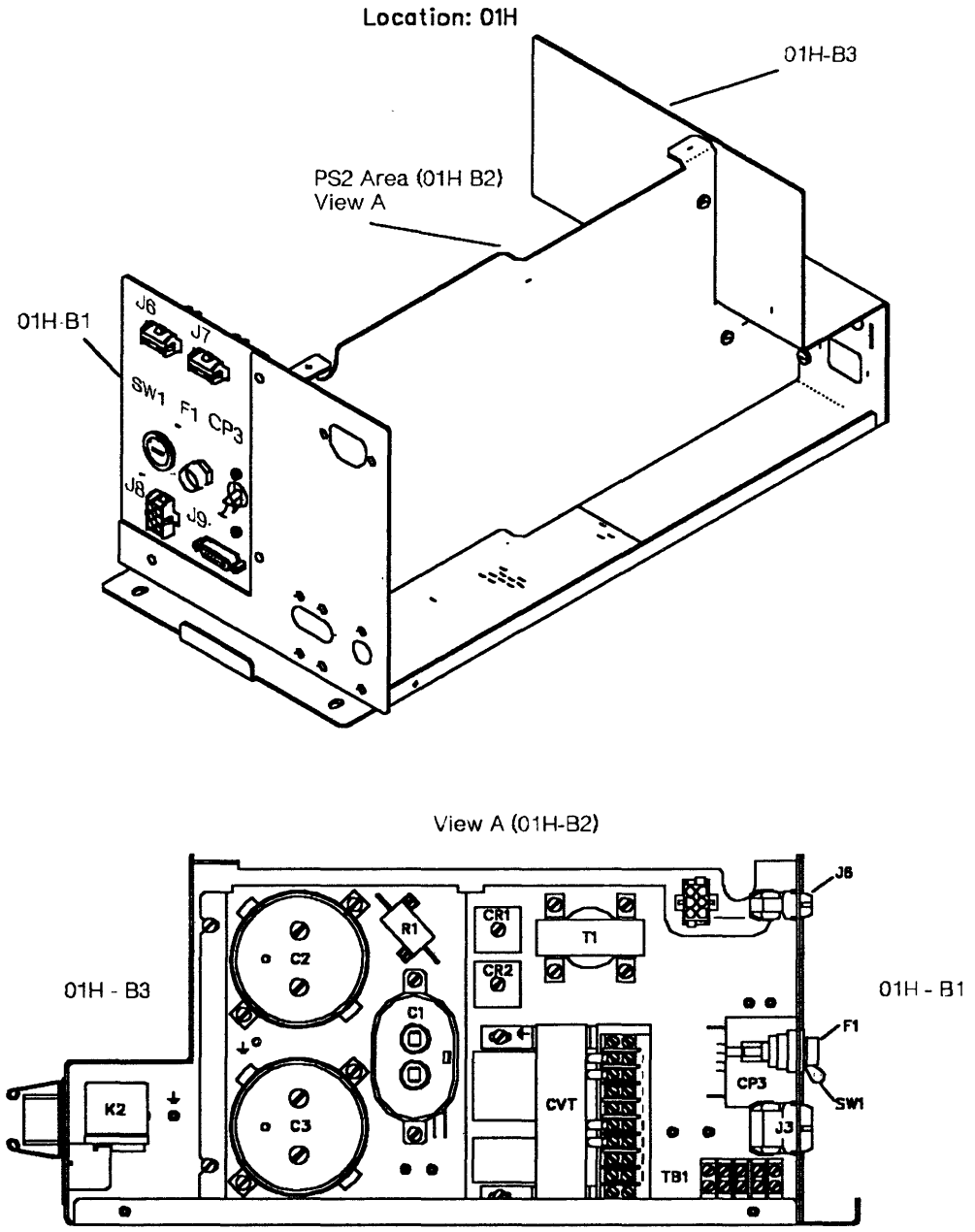


Figure 4-36. 3745 Power Supply 2 Components

Fan 1

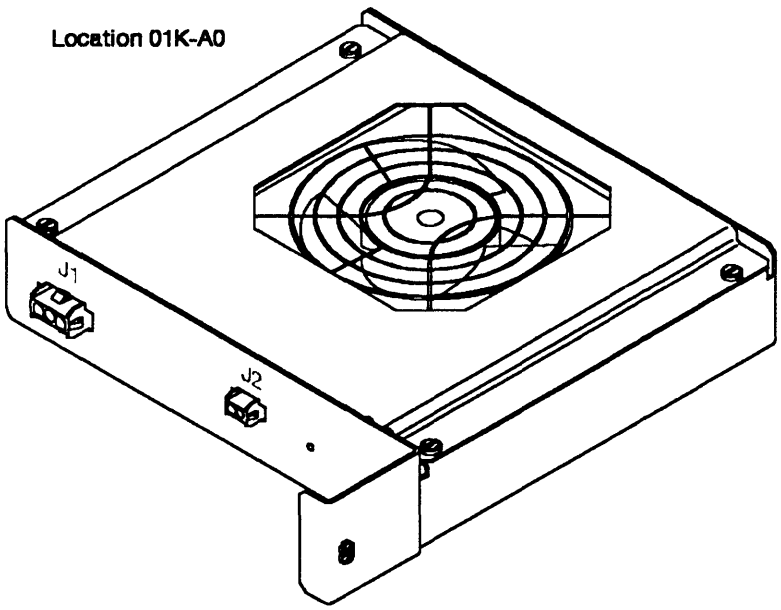


Figure 4-37. 3745 Fan 1 Components

Fan 2

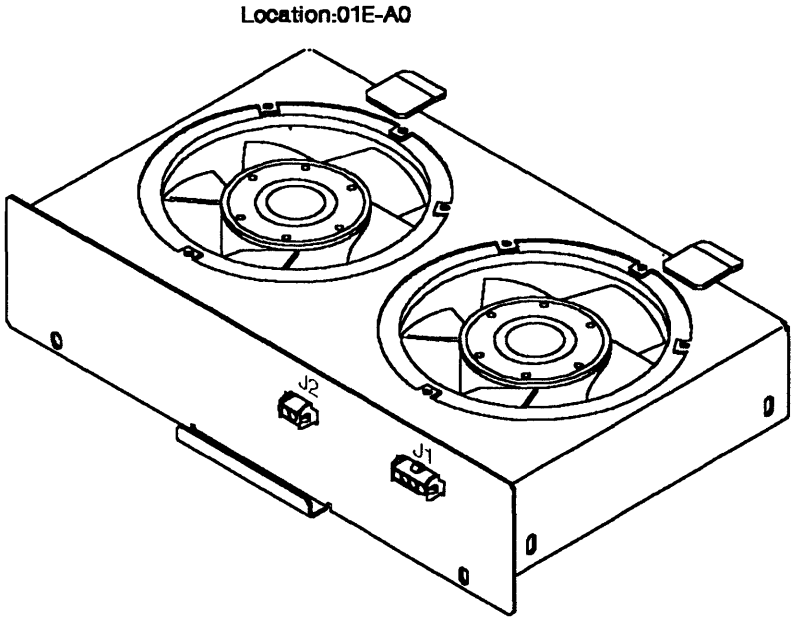


Figure 4-38. 3745 Fan 2 Components

FRU Exchange Procedures

Card Exchange Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door.
4. **Switch CB1 OFF.** Refer to Figure 4-39

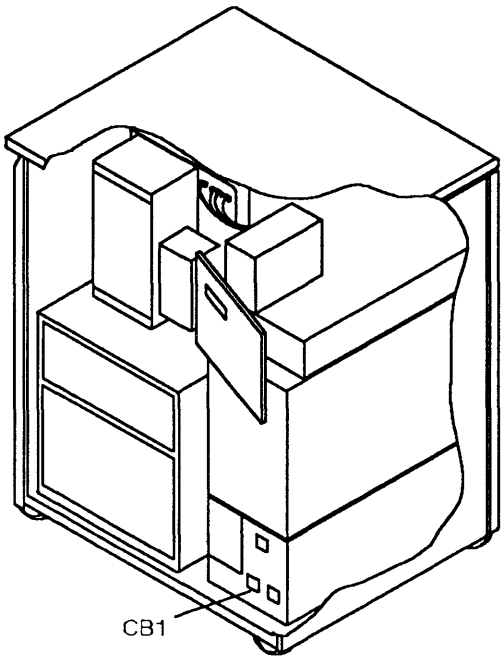


Figure 4-39. CB1 Location.

5. Look for physical location.
   a. For physical board location, refer to Figure 4-1 on page 4-4
   b. For physical card location:
      - On the Basic board refer to Figure 4-4 on page 4-7 or Figure 4-5 on page 4-8 or Figure 4-6 on page 4-9 or Figure 4-7 on page 4-10.
      - On the MOSS board refer to Figure 4-8 on page 4-11.
6. Take away the cover(s) of the board. Refer to Figure 4-40 on page 4-33. Cover **1** for the Basic board (loosen the 2 screws **2** and lift up the cover), covers **3** for the MOSS board (remove the 7 screws **4**).
7. **Warning: Use the ESD kit and procedures.**
8. If the card to be replaced is a CADR go to step 22 on page 4-34.
9. Remove the crossover connectors (if installed) from the card you have to exchange.
10. If the card to be exchanged is on the MOSS board, remove the "shipping springs" that secure the extractor levers by sqeezing them together. Refer to Figure 4-41 on page 4-33.
11. If the card to be exchanged is a CAL or a STO take care that the new card is identical with the previous one. (For STO there are 2 kinds of cards: STO4 for 4MB and STO8 for 8MB. For CAL there are 2 kinds of cards: CAL6 for CADS feature and CAL7 for BCCA feature.)
12. Exchange the card, re-install the crossover connectors (if installed) and re-install the "shipping springs" if you have exchanged a card on the MOSS board.
13. Replace the board cover(s).
14. Switch CB1 ON.
15. Close the front door.
16. If the replaced card is the PCC, go to step 19.
17. Power 3745 ON.
18. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

PCC replacement.

19. (from step 16). Power 3745 ON. Ignore the BERs that are logged, they are due to the 'time-of-day' clock not being set.
20. Set the 'time-of-day' clock. Refer to Service Function Chapter 12.
21. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

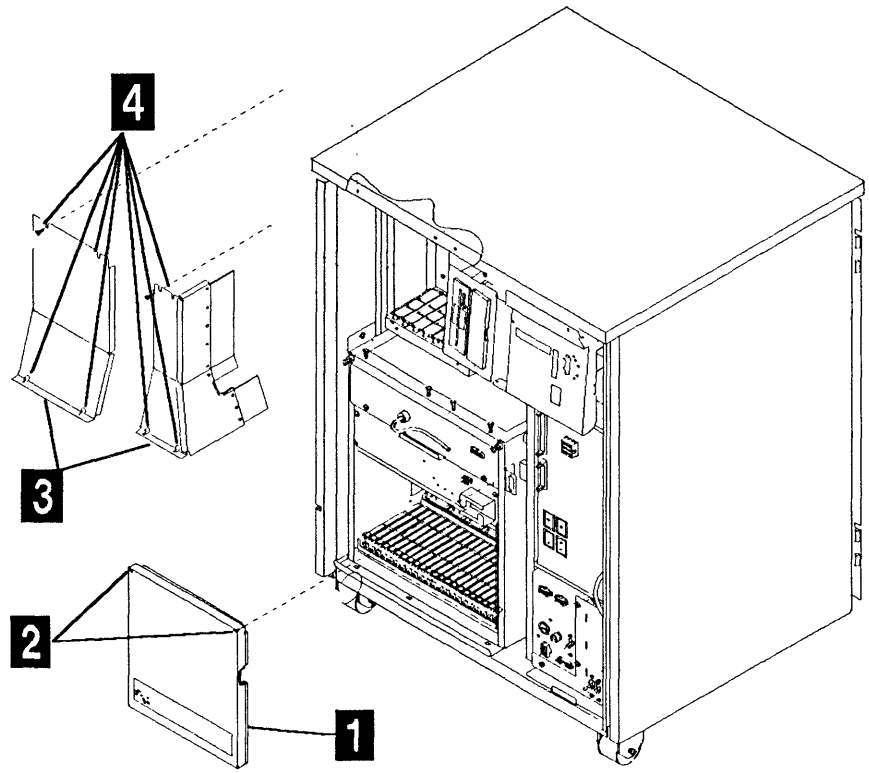


Figure 4-40. Covers.

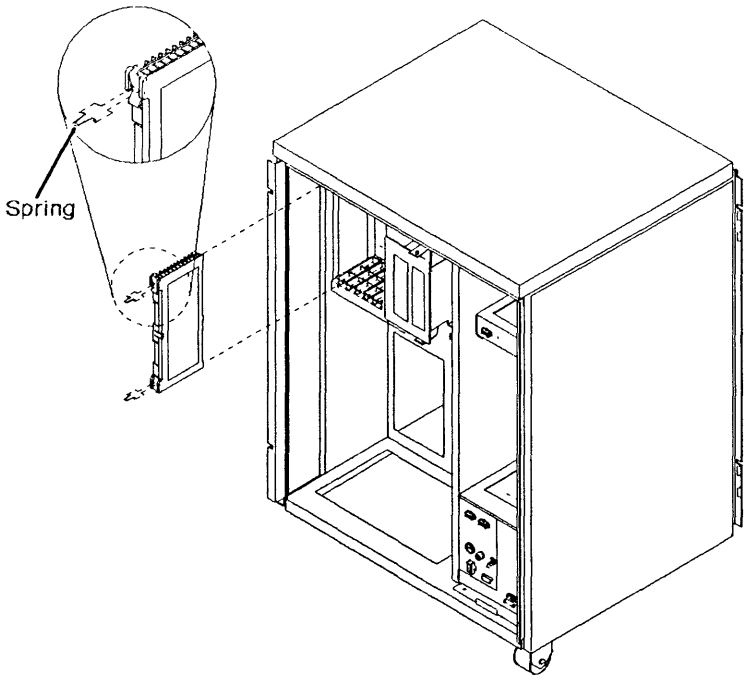


Figure 4-41. Shipping Springs.

CADR exchange.

22. (from step 8 on page 4-32). At the Channel Tail Gate set the Select Out Bypass switch to **bypass** (refer to Figure 4-27 on page 4-23 and to Figure 4-43 and to Figure 4-44) according to the CADR to be replaced (refer to Figure 4-42).
23. Remove the crossover connectors from the card you have to exchange.
24. Exchange the card and re-install the cross-over connectors.
25. Replace the board cover.
26. Set the Select Out Bypass switch to **normal**
27. Switch CB1 ON.
28. Close the front door.
29. Power 3745 ON.
30. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

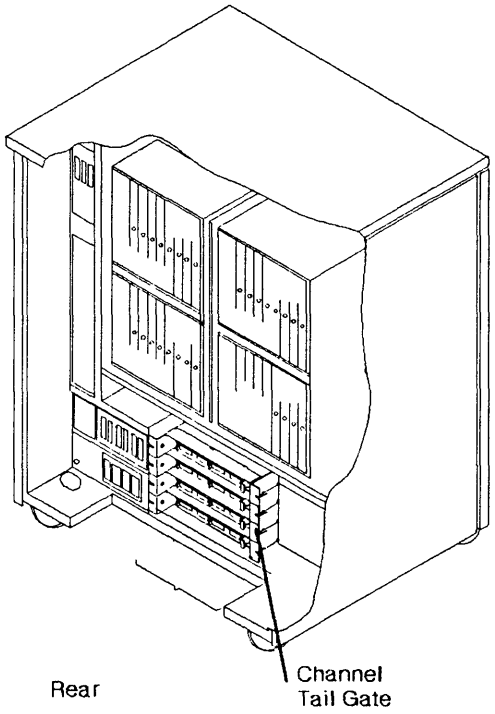


Figure 4-43. Channel Tail Gate Location

Select Out switch	CADR card
01P-4	01G-A1B
01P-3	01G-A1D
01P-2	01G-A1F
01P-1	01G-A1H

Figure 4-42. Select Out Switches According to CADR Cards

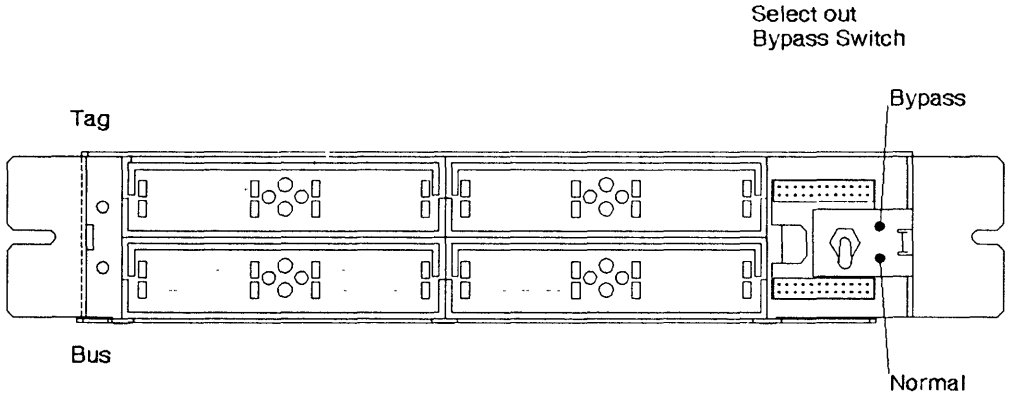


Figure 4-44. Select Out Switch

DCREG Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door.
4. **Switch CB1 OFF.** Refer to Figure 4-45.
5. Locate the Basic board. Refer to Figure 4-45.
6. Take away the Basic board cover (2 screws must be loosened ,then lift up the cover).
7. **Warning: Use the ESD kit and procedures.**
8. At the Channel Tail Gate set all the Select Out Bypass switches to **bypass** (refer to Figure 4-43 and to Figure 4-44 on page 4-34).
9. Remove all the cards.
10. Release the retainer at the bottom of the board (1 screw must be loosened).
11. Remove the DCREG card in position E-F or G-H of row Z. Refer to Figure 4-5 on page 4-8 or Figure 4-6 on page 4-9 or Figure 4-7 on page 4-10.

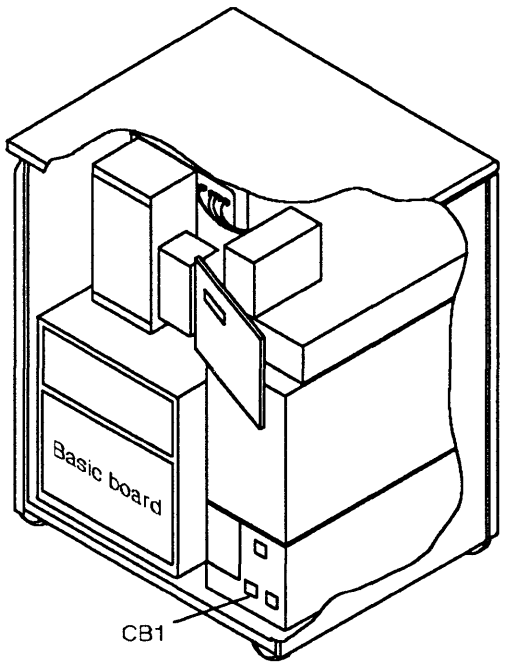


Figure 4-45. Basic Board and CB1 Locations

Installation Procedure

1. Install the new DCREG card.
2. Re-install the retainer.
3. Re-install the cards.
4. Replace the Basic board cover.
5. Set all the Select Out Bypass switches to **normal**
6. Switch CB1 ON.
7. Close the front door.
8. Power 3745 ON.
9. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

DMUX Exchange Procedure

Since the DMUX is hot-pluggable, there is no need to power OFF.

Removal Procedure

1. Open the rear door.
2. For board location refer to Figure 4-46.
3. Take away the related DMUX cover. Refer to Figure 4-47. Two screws must be removed 1. (Two kinds of DMUX cover exist, according to the board location.)
4. For DMUX location refer to Figure 4-48 on page 4-37. The thumb screw color of the DMUX is white.
5. Refer to Figure 4-49 on page 4-37, note the DMUX cable(s) location(s) then remove them.
6. Unfasten the thumb screw holding the DMUX cassette to the board.
7. Remove the DMUX cassette.

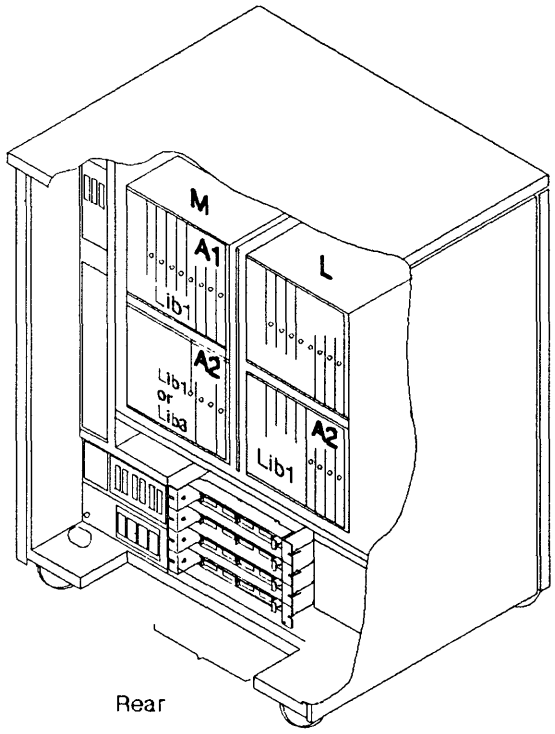


Figure 4-46. Location of the LIC Boards

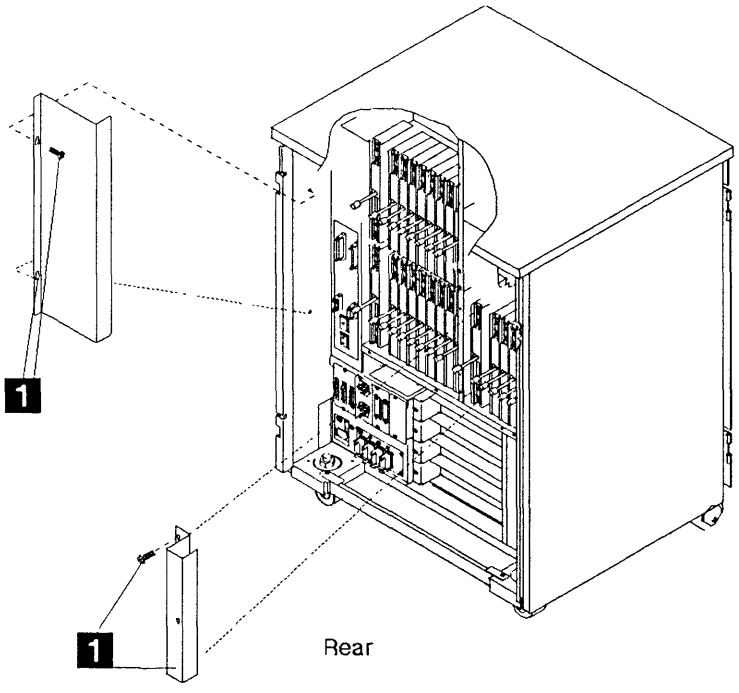


Figure 4-47. DMUX Cover

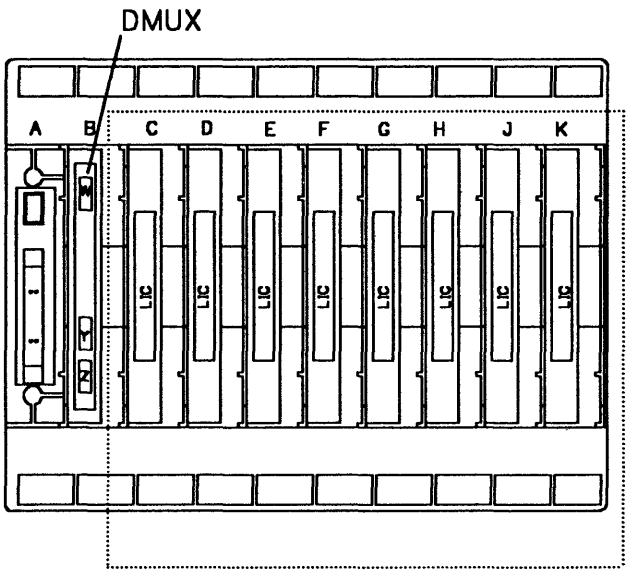


Figure 4-48. DMUX Location

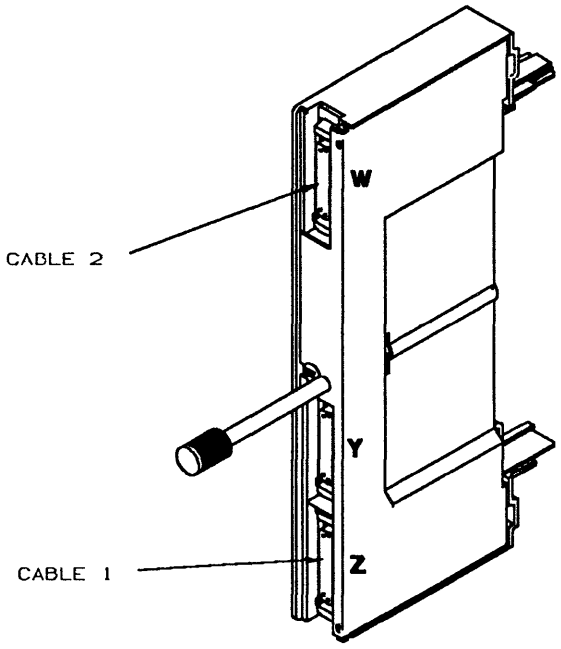


Figure 4-49. DMUX

Installation procedure

1. Install the new DMUX cassette.
2. Fasten the thumb screw holding the DMUX cassette to the board. Finger strengh is enough, do not use tools.
3. Replace the DMUX cable(s) in its(their) proper position(s).
4. Re-install the DMUX cover with the 2 screws. Refer to Figure 4-47 on page 4-36.
5. Close the rear door.
6. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

Note

If the change of the DMUX does not solve the problem, we suggest you to test the voltages levels **at DMUX test points**. If voltage levels are not correct, suspect the Power Supply 1.
For test point pin locations see page YZ738.
For voltage tolerances see HMR chapter 10, section Power Supply 1.

SMUXA/B Exchange Procedure

Removal procedure

Since the SMUX is hot-pluggable, there is no need to power OFF.

1. Open the rear door.
2. For board location refer to Figure 4-50.
3. Take away one of the SMUX covers. Refer to Figure 4-51 (2 screws must be removed **1**).

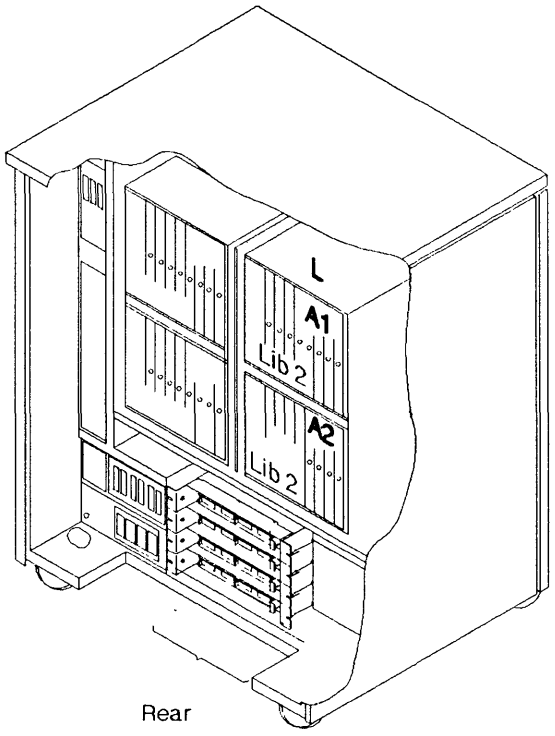


Figure 4-50. Location of the LIC Boards Type 2.

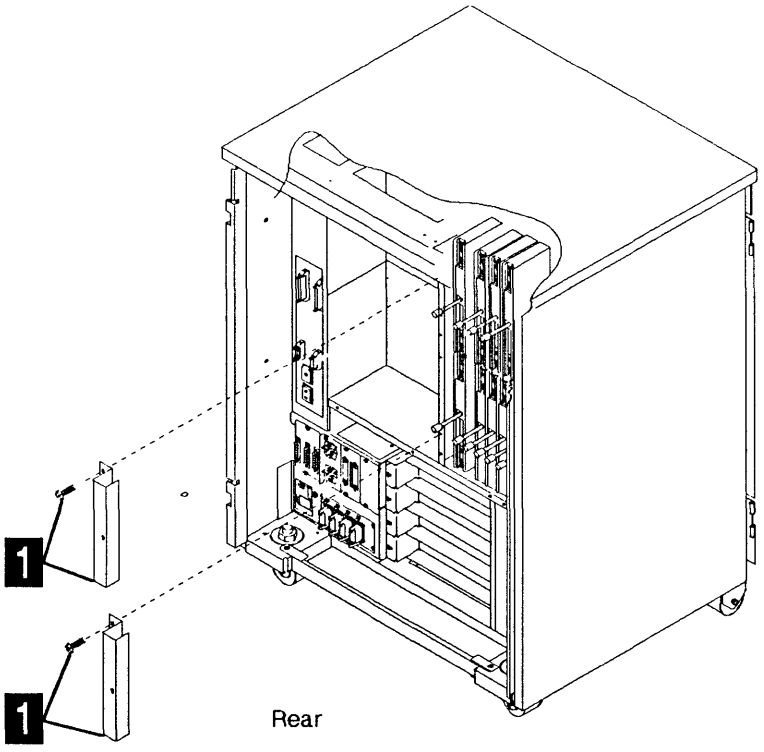


Figure 4-51. SMUX Cover.

4. For SMUX location refer to Figure 4-52

Refer to Figure 4-53 and do the following:

5. Remove the serial link cable (if installed) from the SMUX (this cable is absent on SMUXB when SMUXA and the flat cable **2** are present).
6. Remove the flat cable **2** (if installed) which connects the two SMUXs, if two LIC boards type 2 are present in the machine. (This cable may be absent in spite of the presence of the two boards)
7. Unfasten the thumb screw holding the SMUX cassette to the board.
8. Remove the SMUX cassette.

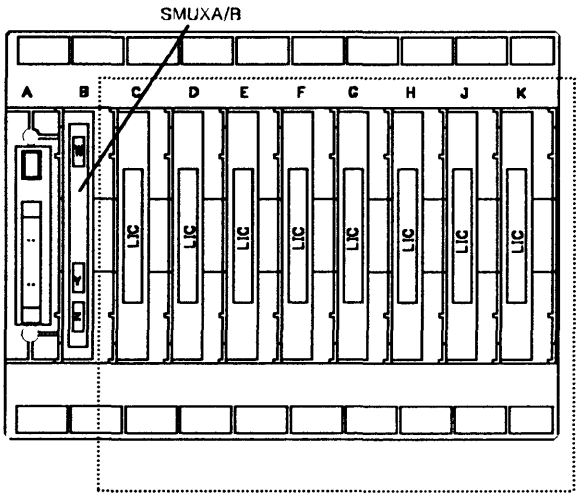


Figure 4-52. SMUX Location.

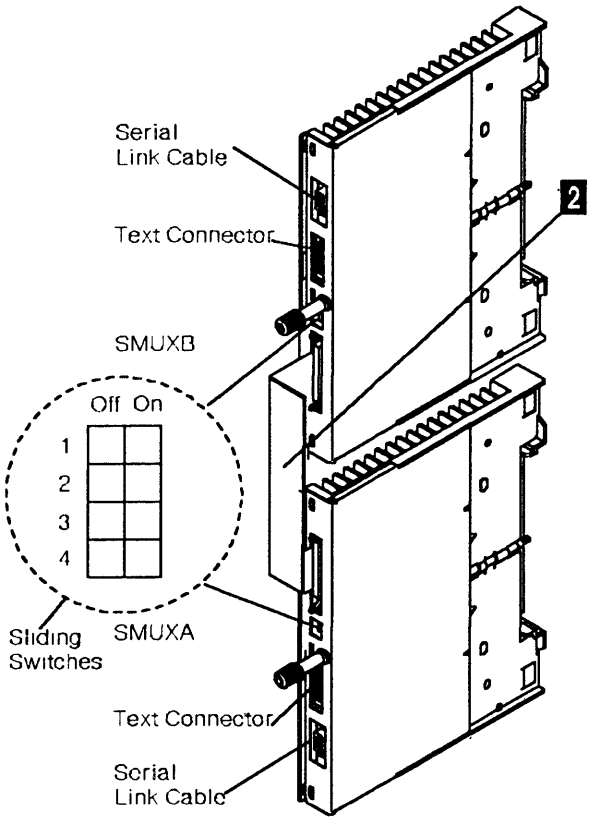
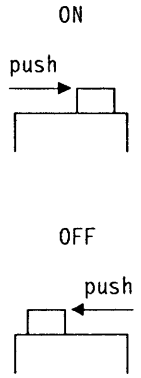


Figure 4-53. SMUX Link and Cable.

Installation Procedure

1. Install the new SMUX cassette.
2. Fasten the thumb screw holding the SMUX cassette to the board. Finger strength is enough, do not use tools.
3. Replace the SMUX cable(s).
4. Set the XMIT level according to the table below. Refer to Figure 4-53 on page 4-39 for the sliding switches.
5. Re-install the SMUX cover with the 2 screws. Refer to Figure 4-51 on page 4-38.
6. Close the rear door.
7. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

COUNTRY (leased lines)	XMIT LEVEL (in dBm)	SLIDING SWITCHES			
		1	2	3	4
Canada,Greece,US Ireland,other AP/APG countries	0				
	- 1	ON			
	- 2		ON		
	- 3	ON	ON		
	- 4			ON	
	- 5	ON		ON	
Chile,other E.M.E.A countries	- 6		ON	ON	
	- 7	ON	ON	ON	
	- 8				ON
Hong-Kong	- 9	ON			ON
Denmark,Finland Iceland,Italy,Sweden	-10		ON		ON
	-11	ON	ON		ON
	-12			ON	ON
Australia, UK	-13	ON		ON	ON
	-14		ON	ON	ON
France, Japan	-15	ON	ON	ON	ON



Note

If the change of the SMUX does not solve the problem, we suggest you to test the voltage levels **at the SMUX test points**. If the voltage levels are not correct, suspect the Power Supply 1.
For test point pin location see page YZ739.
For voltage tolerances see HMR chapter 10, section Power Supply 1.

LIC Exchange Procedure

Removal Pprocedure

Since the LIC is hot-pluggable, there is no need to power OFF.

1. For physical locations, refer to Figure 4-54, to Figure 4-56 and to Figure 4-57 on page 4-43.
2. Open the rear door.
3. Remove the line cable(s) from the PTT/Common carrier wall socket if you deal with LIC 5 or 6.
4. Remove the line cable(s) from the LIC. Note their positions.
5. If you deal with LIC 5 or 6, check if "LIC configuration" is available, if not use the PKD (Refer to 'Connection and Integration Guide', SA33-0141).
6. Unfasten the thumb screw holding the LIC cassette to the board.
7. Remove the LIC cassette.

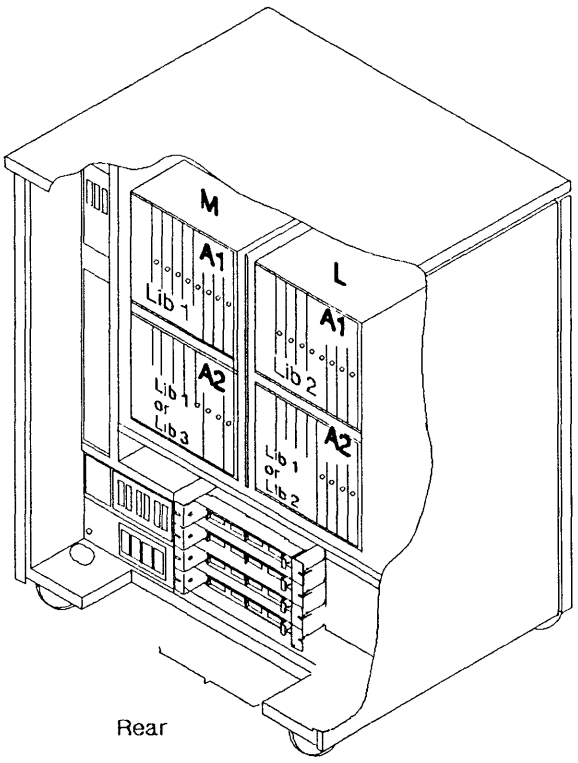


Figure 4-54. Location of the LIC Boards

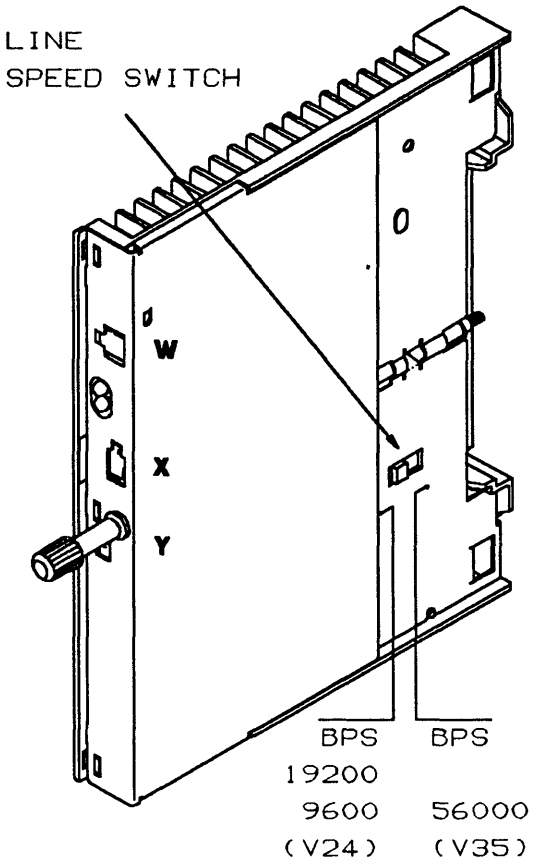


Figure 4-55. LIC 6

Installation Procedure

1. If you deal with a LIC type 6 (refer to Figure 4-55), note the position of the line speed switch, then set the line speed switch of the new LIC accordingly.
2. Install the new LIC cassette.
3. Fasten the thumb screw holding the LIC cassette to the board. Finger strength is enough, do not use tools.
4. If a LIC 5 or 6 has been installed, configuration must be done by PKD (Refer to 'Connection and Integration Guide', SA33-0141).
5. Replace the line cable(s) in their proper positions on the LIC.
6. Reconnect the line cable(s) to the PTT/Common carrier wall socket if you deal with LIC 5 or 6.
7. Close the rear door.

8. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

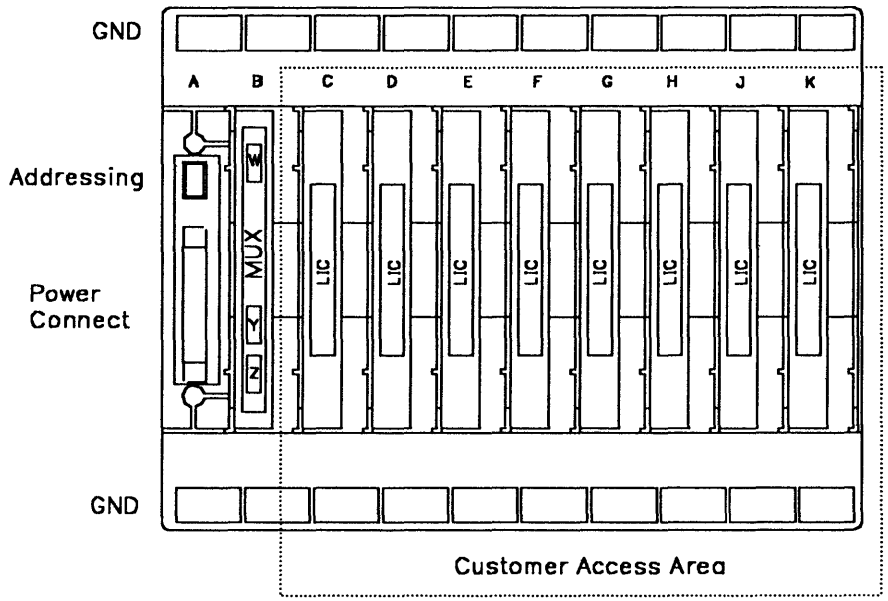


Figure 4-56. LIC Board Type 1 and 2

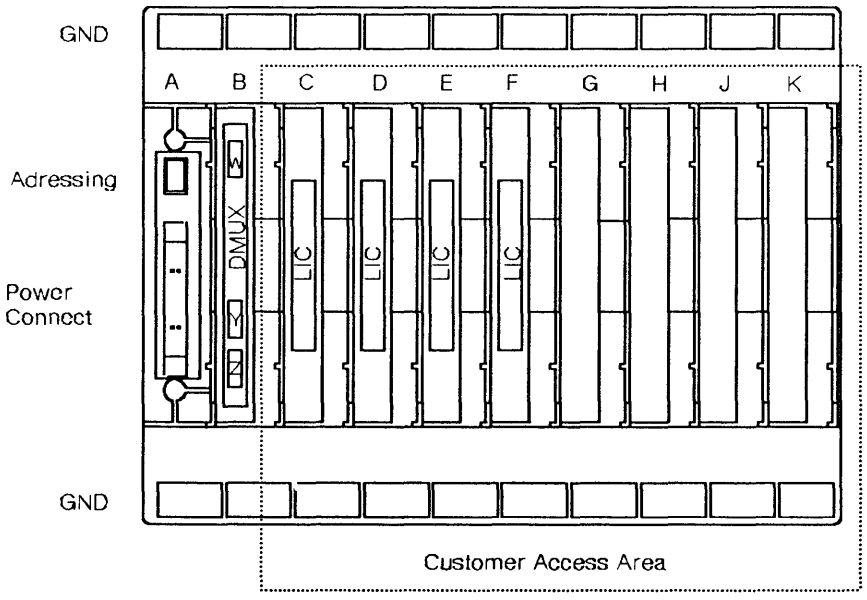


Figure 4-57. LIC Board Type 3

Control Panel Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door.
4. **Switch CB1 OFF.** Refer to Figure 4-58.
5. Locate the control panel and the MOSS. Refer to Figure 4-58.
6. Open the control panel door (1 screw must be removed).
7. Take away the MOSS right cover (3 screws must be removed **1**) Refer to Figure 4-59.
8. Refer to Figure 4-58 and to Figure 4-60 on page 4-45 then remove from the MOSS board the cable going to the control panel (Y0-D1).
9. Release the cable from its securing points.

Refer to Figure 4-61 on page 4-45 and do the following:

10. Take away the panel cover (3 screws must be removed **2**).
11. Remove the 5 screws holding the panel to the door **3** .
12. Withdraw the panel with the cable.

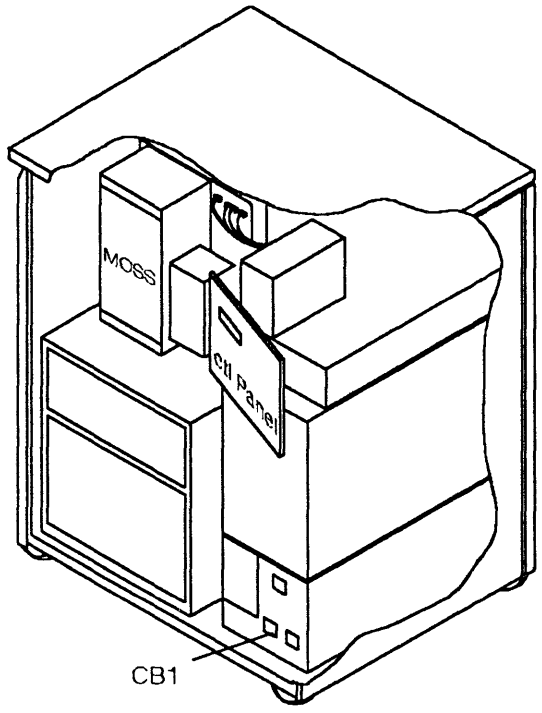


Figure 4-58. Panel, MOSS and CB1 Locations

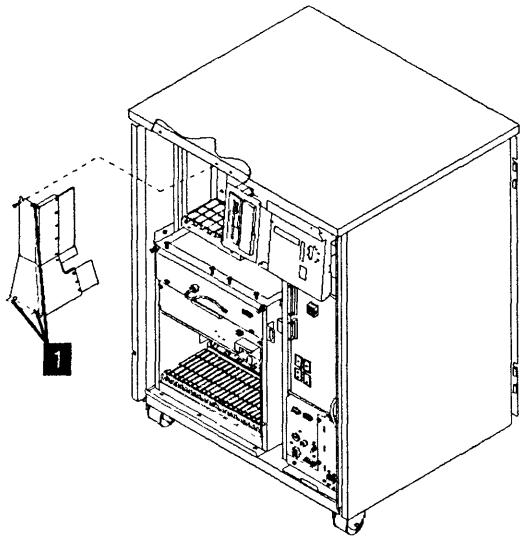


Figure 4-59. MOSS Right Cover

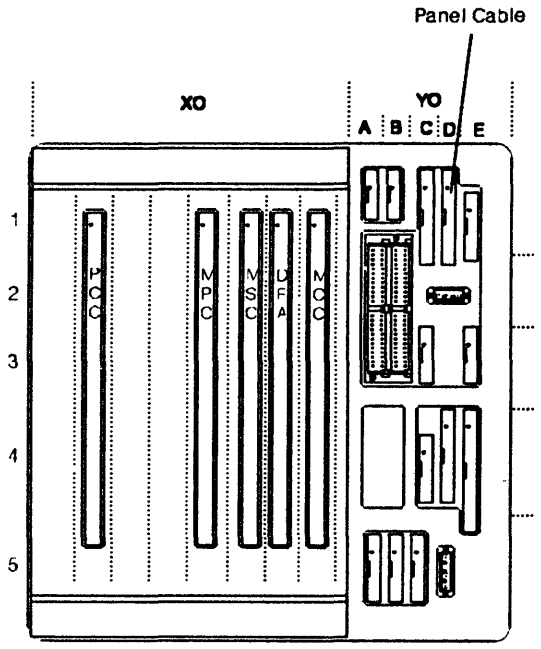


Figure 4-60. Panel Cable Location on MOSS Board

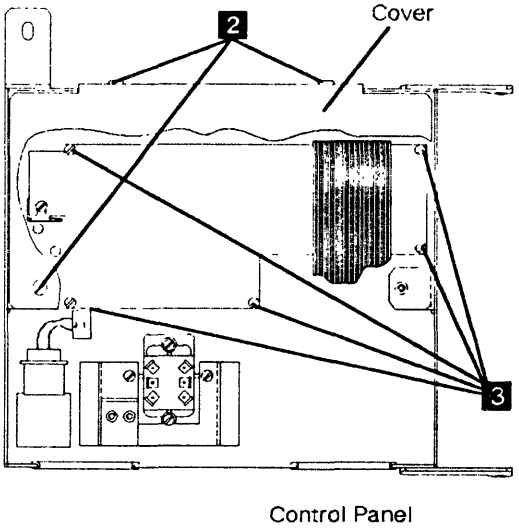


Figure 4-61. Panel

Installation Procedure

1. Install the new panel on the panel door and attach it with the 5 screws 3.
2. Re-install the panel cover with the 3 screws 2.
3. Re-install the cable in its path and reconnect it to the MOSS board.
4. Re-install the MOSS right cover with the 3 screws 1.
5. Close the control panel door with 1 screw.
6. Switch CB1 ON.
7. Close the front door.
8. Power 3745 ON.
9. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same Jiagnostic in ODG you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

Battery Exchange Procedure

It is the Service Personnel's responsibility to exchange the battery.

The 3745 will automatically send an alert to the operator console when there is a need to exchange the battery.

Removal Procedure

1. Locate the control panel. Refer to Figure 4-62.
2. Open the front door.
3. Open the control panel door (1 screw must be removed).
4. Locate the battery **1** Refer to Figure 4-63.
5. Remove the tie wrap on the battery and unplug the battery plug **2**.

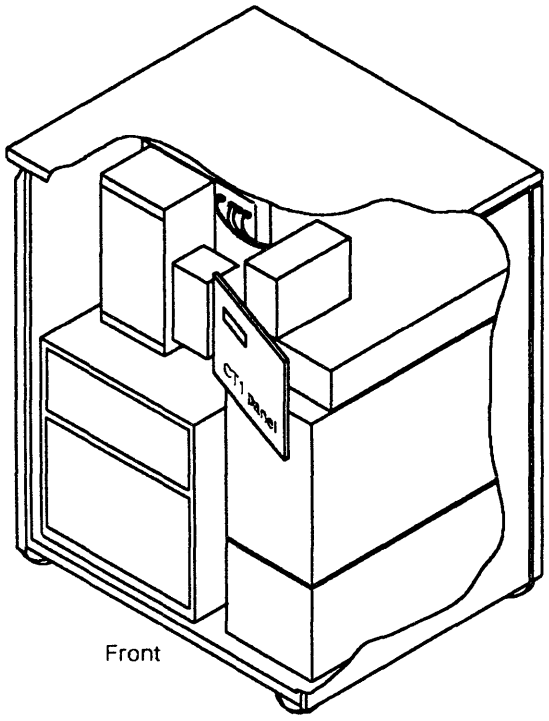


Figure 4-62. Panel Location

Installation Procedure

1. Insert the new battery and reconnect the plug.
2. Fasten the tie wrap on the battery.
3. Close the control panel door with the screw.
4. Close the front door.

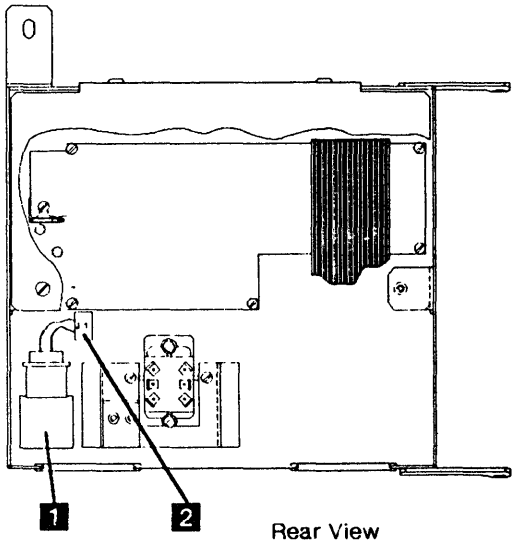


Figure 4-63. Battery Location

5. **Battery disposal must be performed according to the instruction on the battery case.**

Reporting

Now you have to update the battery exchange record as follows:

- Using the 3745 console, type **POS** on any displayed screen selection area for 'Power Services Screen'.
- Press SEND.
- You now have the 'Power Services Screen' displayed. Refer to Figure 4-64 on page 4-47. If you have a MOSS console function in process, hit the 'F1' key to terminate it.
- Type **2** in the selection area for 'Battery change acknowledge'.
- Press SEND.
- You get the 'Battery Change Screen'. Refer to Figure 4-65 on page 4-47.
- Type **Y** in the CONFIRM THAT THE BATTERY HAS BEEN CHANGED (Y/N) ===> field.
- Press SEND.

A successful command message will appear.

Go to "CE Leaving Procedure" on page 4-97 for time update.

```
CUSTOMER ID:                          3745            SERIAL NUMBER:
CCA-A          PROCESS MOSS-ALONE       X71:0A0800
RESET     BYP-IOC-CHK STOP-CCU-CHK      X71:0BC800



------------------------------------------------------------- 03/01/87 01:2
FUNCTION ON SCREEN: POWER SERVICES

- SELECT ONE OPTION, THEN PRESS ENTER  ==>



          1 = POWER DUMP
          2 = BATTERY CHANGE ACKNOWLEDGE




===>

F1:END  F2:MENU2  F3:ALARM              F6:QUIT
```

Figure 4-64. Power Services Screen

```
CUSTOMER ID:                          3745            SERIAL NUMBER:
CCU-A          PROCESS MOSS-ALONE       X71:0A0800
RUN       BYP-IOC-CHK STOP-CCU-CHK      X72:0BC800



------------------------------------------------------------- 03/01/87 01:2
FUNCTION ON SCREEN: POWER SERVICES









CONFIRM THAT THE BATTERY HAS BEEN CHANGED (Y/N) ==>



===>

F1:END  F2:MENU2  F3:ALARM              F6:QUIT
```

Figure 4-65. Acknowledge Screen

Fan 1 Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door.
4. **Switch CB1 OFF.** Refer to Figure 4-66.
5. Locate Fan 1. Refer to Figure 4-66.
6. At Fan 1, disconnect the air flow detector cable and the power cable. Refer to Figure 4-67.
7. Remove the screw **1** which maintains Fan 1 to the frame.
8. Slide Fan 1 assembly out.

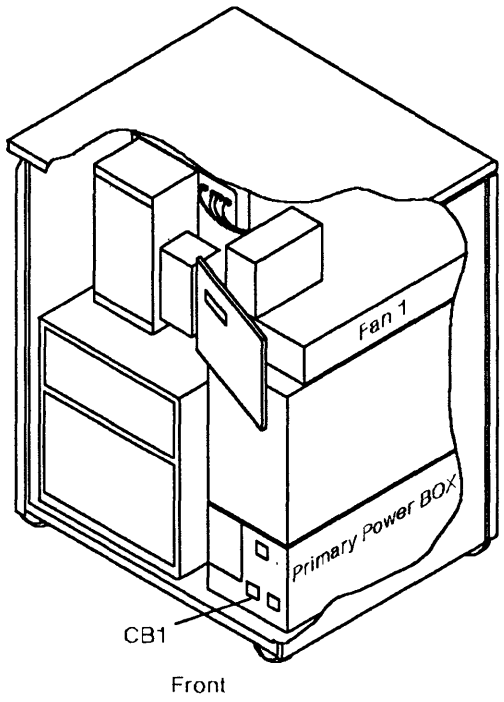


Figure 4-66. Fan 1 and CB1 Locations

Installation Procedure

1. Install the new Fan 1 in the frame and fasten it with the screw **1**.
2. Reconnect the air flow detector cable and the power cable to Fan 1.
3. Switch CB1 ON.
4. Close the front door.
5. Power 3745 On.
6. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

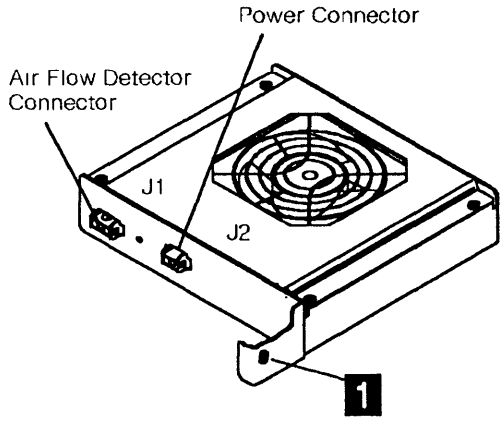


Figure 4-67. Fan 1 Air Flow Detector and Power Cables

Fan 2 Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door.
4. **Switch CB1 OFF.** Refer to Figure 4-68.
5. Locate Fan 2. Refer to Figure 4-68.
6. At Fan 2, disconnect the air flow detector cable and the power cable. Refer to Figure 4-69.
7. Remove the 2 screws 1 which maintain Fan 2 on the frame.
8. Slide Fan 2 assembly out.

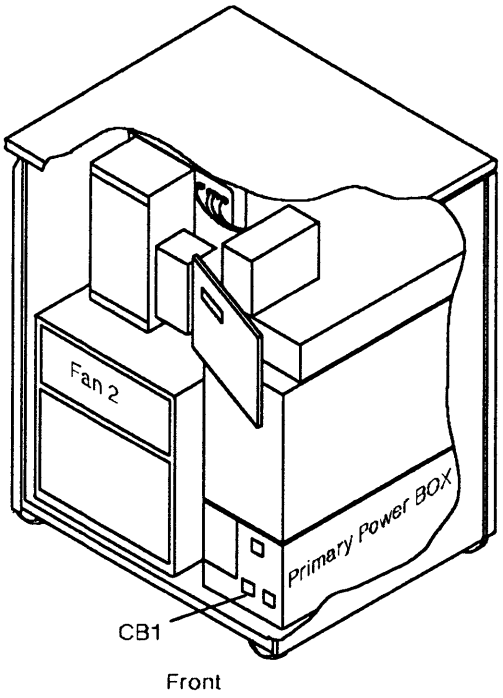


Figure 4-68. Fan 2 and CB1 Locations

Installation Procedure

1. Install the new Fan 2 in the frame and fasten it with the 2 screws 1.
2. Reconnect the air flow dtector cable and the power cable to Fan 2.
3. Switch CB1 ON.
4. Close the front door.
5. Power 3745 On.
6. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

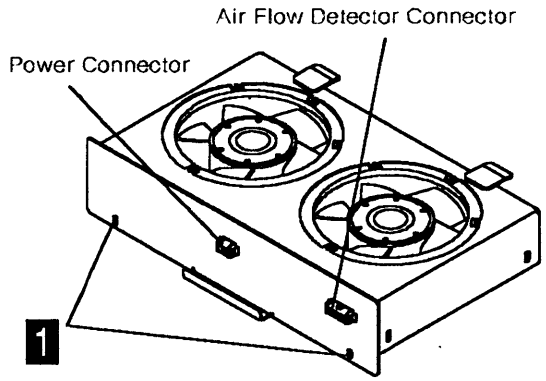


Figure 4-69. Fan 2 Air Flow Detector and Power Cables

FDD Exchange Procedure

Removal Procedure

For physical locations, refer to Figure 4-70.

IMPORTANT

The MOSS must have been loaded from the Disk. If you are not sure, execute a MOSS IML from Disk. Refer to "MOSS IML" on section "How to Perform Control Panel Operations" on page 1-8.

Check that the 'Power Control' display is set to local (*3*) on the control panel. If yes, go to step 3.

If not, proceed with step 1.

1. Press the 'Power Control' key until '*3*' (Local mode) is displayed in the power control window.
2. Press the 'Validate' key.
3. Press the 'Service' key until *1* (Maintenance 1) is displayed in the service window.

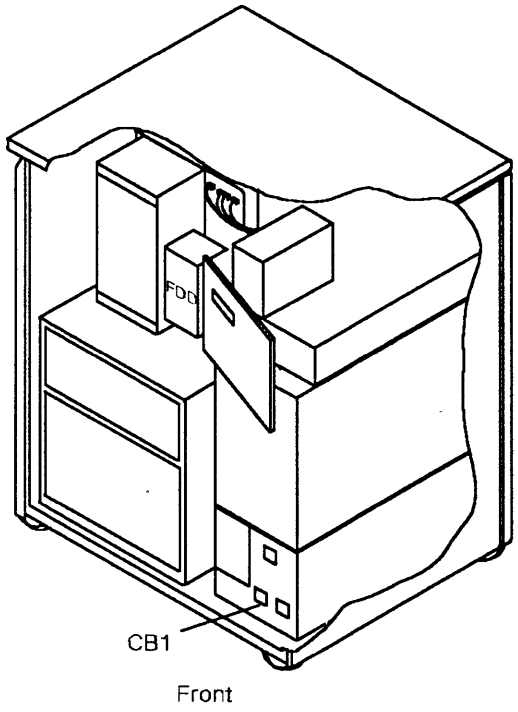


Figure 4-70. FDD and CB1 Location .

4. Press the 'Validate' key.
5. Disable the MOSS area as follows (if NCP is running in 3745):
   a. Call Menu 2 (See PF key line).
   b. In Menu 2 type **MOF** in the selection area for 'MOSS OFFLI NE'.
   c. Press SEND.
   d. "MOSS OFFLINE" is displayed.
6. Open the front door.
7. Before exchanging the FDD, check the voltages as follows:.

   Note: The voltages are not permanently applied on the FDD and, to have them available for measurement for approximately 15 minutes, a MOSS IML is required.

   a. Press the 'Function' key on the control panel until the 'MOSS IML' function (*1*) is displayed.

Table 4-5. Voltage Test Points				
Connector	**Pin**	**Voltage**	**Max**	**Min**
01B-A1J2 (FDD)	1	+12V	+13.00V	+11.00V
	2	GND		
	3	GND		
	4	+ 5V	+ 5.25V	+ 4.85V
PS1-J1 Voltage Test Points	2	+12V	+13.00V	+11.00V
	5	+ 5V	+ 5.25V	+ 4.85V
	12	GND		

b. Press the 'Validate' key.

c. Using Table 4-5, measure the voltages on the voltage test points of PS1, refer to Figure 4-71. If the voltages are incorrect, exchange PS1.

8. Remove power as follows:

a. Call menu 1 (See PF key line).

b. In menu 1 type **DIF** in the selection area for 'Disk Function'.

c. Press SEND.

d. You get the 'Disk Function Screen'.

e. Type **8** in selection area for 'Power OFF Disk/Diskette Driver'.

f. Press SEND.

g. If you get on the screen "DISK/DISKETTE DRIVES CONCURRENT MAINTENANCE ENTERED", then go to step 9 on page 4-52.

h. If you get on the screen "DISK/DISKETTE DRIVES CONCURRENT MAINTENANCE CANCELLED", then do the following:

1) **Advise the customer that the 3745 is to be powered OFF.**

2) Press Power OFF on the control panel.

3) **Switch CB1 OFF.** Refer to Figure 4-70 on page 4-50.

4) Go to step 9 on page 4-52.

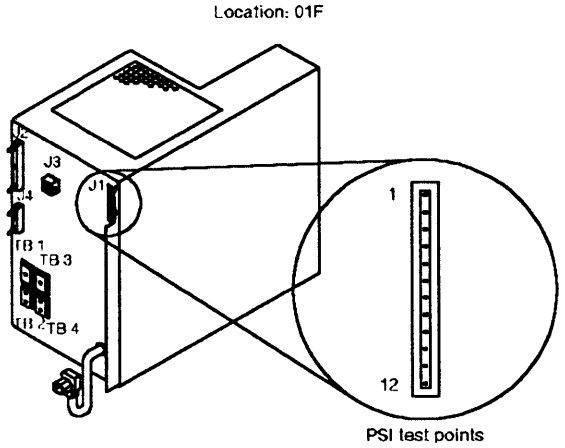


Figure 4-71. PS1

9. **Warning: Use the ESD kit and procedures.**
10. Refer to Figure 4-72 then take away the MOSS board covers 1 (7 screws must be removed 2).

Refer to Figure 4-73 and do the following:.

11. Locate the FDD 1.
12. Remove the 2 cables 2 at the back of the FDD.
13. Remove the 4 securing screws from the assembly 3.
14. Slide the FDD assembly out.

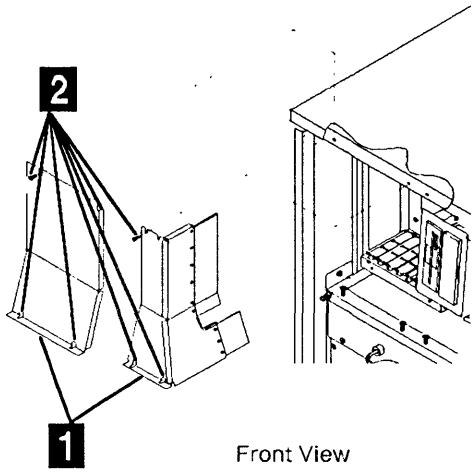


Figure 4-72. MOSS Covers

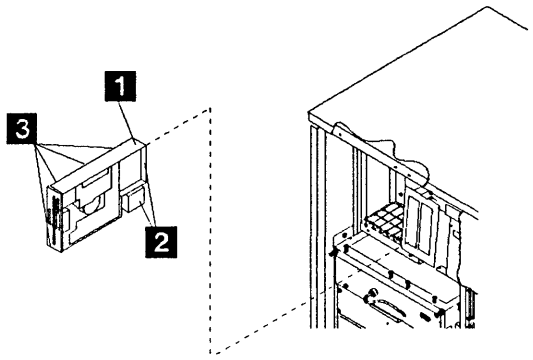


Figure 4-73. FDD Removal

Installation Procedure

1. Check that the new FDD has a jumper in position 0, refer to Figure 4-74.

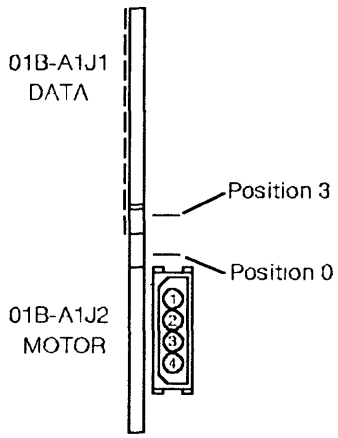


Figure 4-74. FDD Connectors

2. Install the new FDD assembly with the 4 screws **3**. Refer to Figure 4-73 on page 4-52.
3. Reconnect the 2 cables at the back of the FDD **2**. Refer to Figure 4-73 on page 4-52.
4. Re-install the covers of the MOSS board **1** with the 7 screws **2**. Refer to Figure 4-72 on page 4-52.

   Note: In the remaining steps, it is assumed that the microcode is at the same level on both the diskette and the hard disk.
5. Re-apply power as follows:
   a. If you powered OFF the machine, then go to step 12.
   b. If you did not power OFF the machine, then go to step 6
6. Install the primary diskette in the FDD.
7. Press the 'Function' key on the control panel until **9** (Load from Diskette) is displayed in the function window.
8. Press the 'Validate' key.

   Note: This action will also run MOSS diagnostics and complete a MOSS IML. A successful completion will result in a code **F0E**,**F0F** or **000**. If any other code is displayed, an error was detected. See "Panel Codes" on page 1-19
9. Remove the primary diskette from the FDD.
10. Close the front door.
11. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.
12. Install the primary diskette in the FDD.
13. Switch CB1 ON.
14. Power 3745 ON with function **9** (Load from Diskette).
15. A successful completion will result in a code **F0E**,**F0F** or **000**. If any other code is displayed, an error was detected. See "Panel Codes" on page 1-19
16. Remove the primary diskette from the FDD.
17. Close the front door.
18. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

HDD Exchange Procedure

Removal Procedure

For physical locations, refer to Figure 4-75.

IMPORTANT

The MOSS must have been loaded from the Diskette. If you are not sure, execute a MOSS IML from Diskette. Refer to "Load from Diskette" option B on section "How to Perform Control Panel Operations" on page 1-8.

Check that the 'Power Control' display is set to local (3) on the control panel. If yes, go to step 3.

If not, proceed with step 1.

1. Press the 'Power Control' key until **3** (Local mode) is displayed in the power control window.
2. Press the 'Validate' key.
3. Press the 'Service' key until **1** (Maintenance 1) is displayed in the service window.
4. Press the 'Validate' key.
5. Disable the MOSS area as follows:
   a. Call Menu 2.
   b. Type MOF on the selection line.
   c. Press SEND.
   d. "MOSS OFFLINE" is displayed.
6. Open the front door.
7. Remove power as follows:
   a. Call Menu 1 (See PF key line).
   b. In Menu 1 type DIF in the selection area for 'Disk Functions'.
   c. Press SEND.
   d. You get the 'Disk Functions Screen'.
   e. Type **7** in the selection area for 'Power OFF Disk/Diskette Drive'.
   f. Press SEND.
   g. If you get on the screen "POWER OFF SUCCESSFUL. CONCURRENT MAINTENANCE ACCEPTED", then go to step 8 on page 4-55.
   h. If you get on the screen "POWER OFF UNSUCCESSFUL. CONCURRENT MAINTENANCE REJECTED", then do the following.
      1) **Advise the customer that the 3745 is to be powered OFF.**
      2) Press Power OFF on the control panel.
      3) **Switch CB1 OFF.** Refer to Figure 4-75
      4) Go to step 8 on page 4-55.

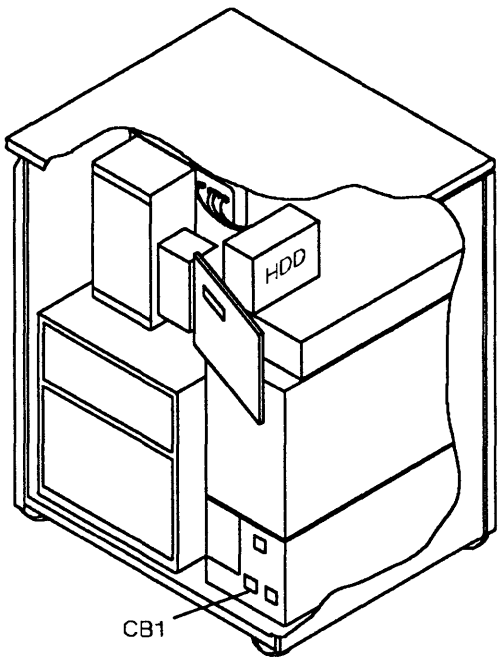


Figure 4-75. HDD and CB1 Locations

8. **Warning: Use the ESD kit and procedures..**
9. Open the control panel door.

Refer to Figure 4-76 and do the following:

10. Locate the HDD **1**.
11. Remove the 3 cables (and the ground wire if any) from the drive **2**.
12. Unfasten the HDD assembly **3** from the frame. Two screws **4** must be removed.
13. Slide HDD assembly out **3**.
14. Remove the 4 screws **5** which maintain the HDD to the assembly bracket.

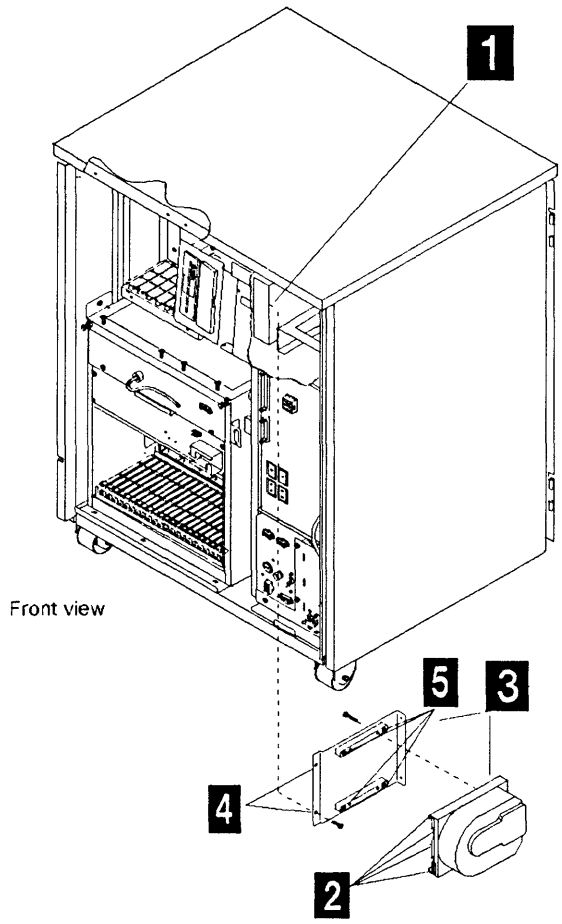


Figure 4-76. HDD Removal

Installation Procedure

1. Ensure that there is a jumper in position 1 of the new HDD. Refer to Figure 4-78 or to Figure 4-77 on page 4-57 according to the HDD type.
2. Install the new HDD on the assembly bracket with the 4 screws **5**.
3. Slide in the HDD assembly and fasten it to the frame with the 2 screws **4**.
4. Reconnect the 3 cables and the ground wire **2**.

   Note: After HDD exchange, it will be necessary to IML from the diskette.
5. .Re-apply power as follows:
   a. If you powered OFF the machine, then go to step 16.
   b. If you did not power OFF the machine, then go to step 6
6. Install the primary diskette in the FDD.
7. Press the 'Function' key on the control panel until **9** (Load from Diskette) is displayed in the function window.
8. Press the 'Validate' key.

   Note: This action will also run MOSS diagnostics and complete a MOSS IML. A successful completion will result in a code **F0E**,**F0F** or **000**. If any other code is displayed, an error was detected see "Panel Codes" on page 1-19
9. Refer to "Service Function Guide" to initialize and restore the HDD. When previous action is completed, a MOSS IML from the HDD will have been executed.

   Note: This action will also run MOSS diagnostics and complete a MOSS IML. A successful completion will result in a code **F0E**,**F0F** or **000**. If any other code is displayed, an error was detected see "Panel Codes" on page 1-19
10. Remove the diskette from the FDD.
11. Close the control panel door.
12. Close the front door.
13. Refer to the "Installation Guide", chapter 3, and enter the customer default password, then update and activate the maintenance password.
14. Ask the customer to update the customer password if needed.
15. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.
16. Install the primary diskette in the FDD.
17. Switch CB1 ON.
18. Power 3745 ON.
19. Refer to "Service Function Guide" to initialize and restore the HDD. When previous action is completed, a MOSS IML from the HDD will have been executed.

    Note: This action will also run MOSS diagnostics and complete a MOSS IML. A successful completion will result in a code **F0E**,**F0F** or **000**. If any other code is displayed, an error was detected see "Panel Codes" on page 1-19
20. Remove the diskette from the FDD.
21. Close the control panel door.
22. Close the front door.
23. Refer to the "Installation Guide", chapter 3, and enter the customer default password, then update and activate the maintenance password.
24. Ask the customer to update the customer password if needed.
25. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

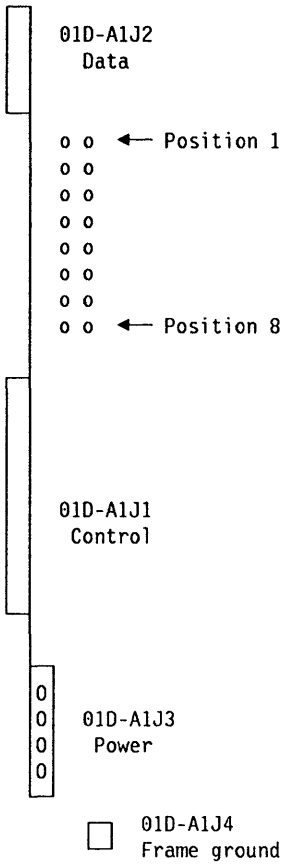


Figure 4-77. HDD connectors and jumpers (old model).

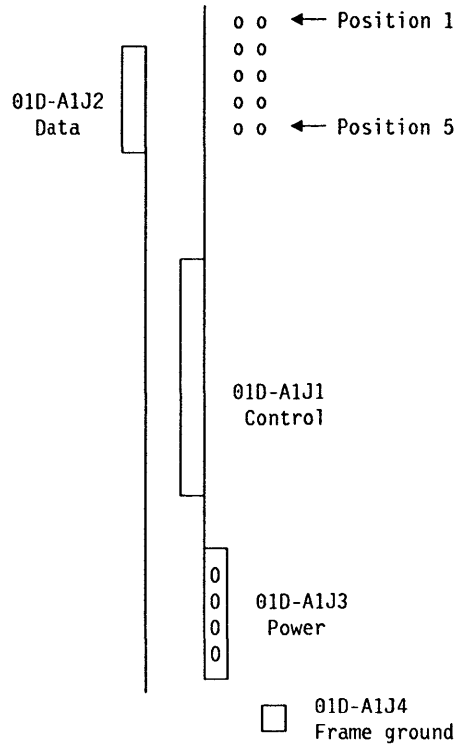


Figure 4-78. HDD connectors and jumpers (new model).

TERMD/TERMI Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the Control panel.
3. Open the front door and the rear door.
4. **Switch CB1 OFF.** Refer to Figure 4-79

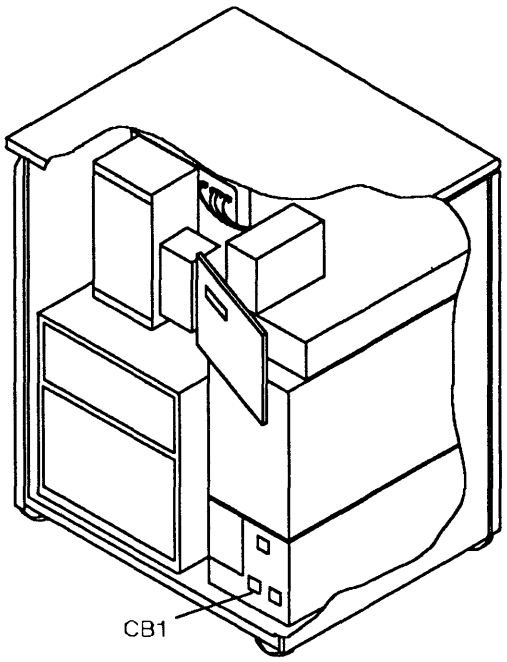


Figure 4-79. CB1 Location

5. Take away the grid of the Basic board. (4 screws must be removed). Refer to Figure 4-80.
6. Remove the retainer which holds the terminator card to the board (1 screw must be removed).
7. Remove the suspected terminator card. Refer to Figure 4-81.

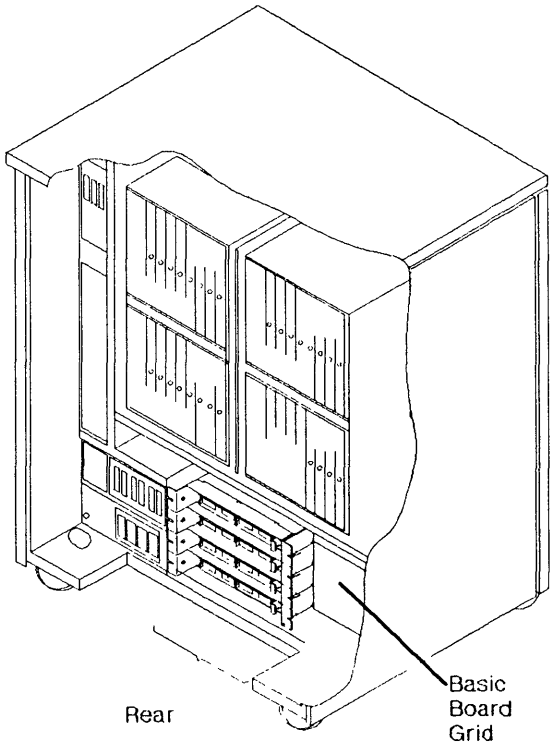


Figure 4-80. Basic Board Grid

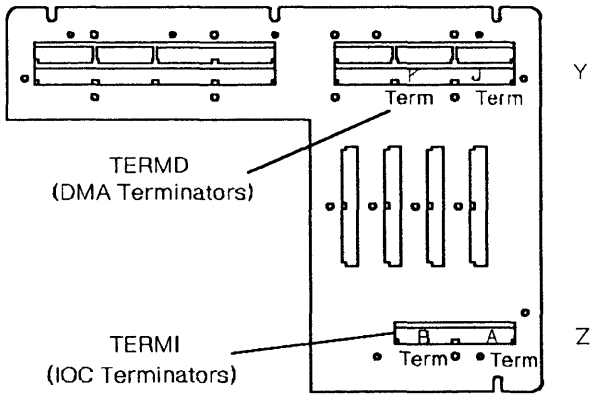


Figure 4-81. Terminator Card Locations

Installation Procedure

1. Install the new terminator card.
2. Re-install the retainer.
3. Install the grid of the Basic board.
4. Close the rear door.
5. Switch CB1 ON.
6. Close the front door.
7. Power 3745 ON.
8. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

PS1 Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door.
4. Open the rear door.
5. **Switch CB1 OFF.** Refer to Figure 4-82.
6. Locate PS1 and Primary power box. Refer to Figure 4-82.
7. Take away the DMUX/PS1 cover. Refer to Figure 4-83. Two screws must be removed **1**.

Refer to Figure 4-85 and to Figure 4-84 on page 4-61 and do the following:

8. At the Primary power box remove the power cable going to PS1 **2**.
9. Remove the cover which protects TB1 to TB4 (2 screws must be removed).
10. Remove the cover which protects TB5 and TB6 (2 screws must be removed).
11. Verify that on each side of PS1, the power cables are labelled according to their positions. If not, do so. Then remove the cables from PS1.
12. Remove the 2 screws **3** which hold PS1 to the frame.
13. For ease of the following step, remove the cable between FAN1 and the primary power box (J7).
14. Slide PS1 out.

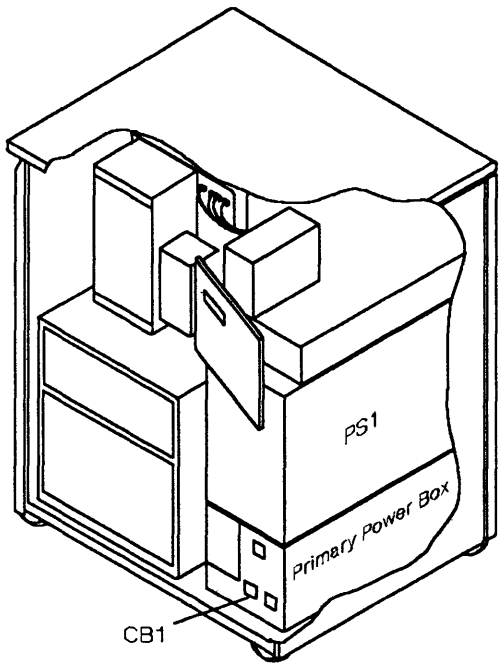


Figure 4-82. Power Supply 1 and CB1 Locations

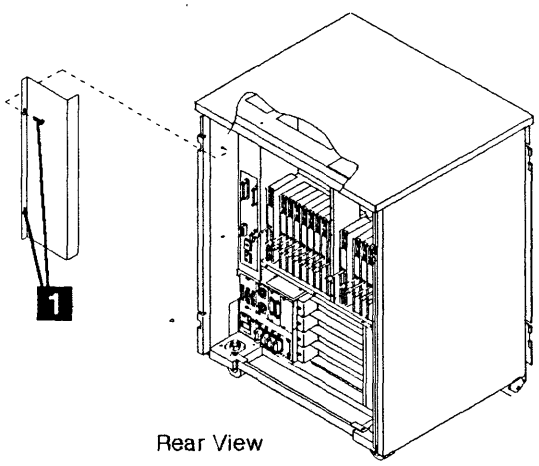


Figure 4-83. Power Supply 1 Cover

Installation Procedure

1. Install the new PS1 in the frame and fasten it with the 2 screws 3.
2. Reconnect the cable between the FAN1 and the primary power box (J7).
3. Reconnect the power cables in their proper positions on PS1 front and rear sides.
4. Re-install the cover which protects TB1 to TB4 with 2 screws. Refer to Figure 4-85.
5. Re-install the cover which protects TB5 and TB6 with 2 screws. Refer to Figure 4-85.
6. Re-install PS1 cover with the 2 screws 1.
7. At the primary power box reconnect PS1 power cable 2.
8. Switch CB1 ON.
9. Close the front door and the rear door.
10. Power 3745 ON.
11. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

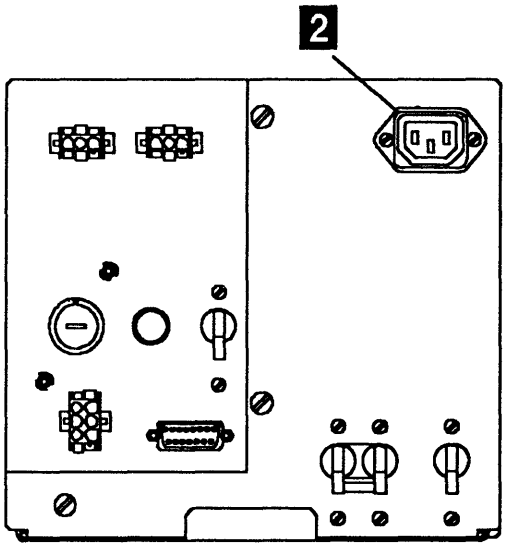


Figure 4-84. Primary Power Box

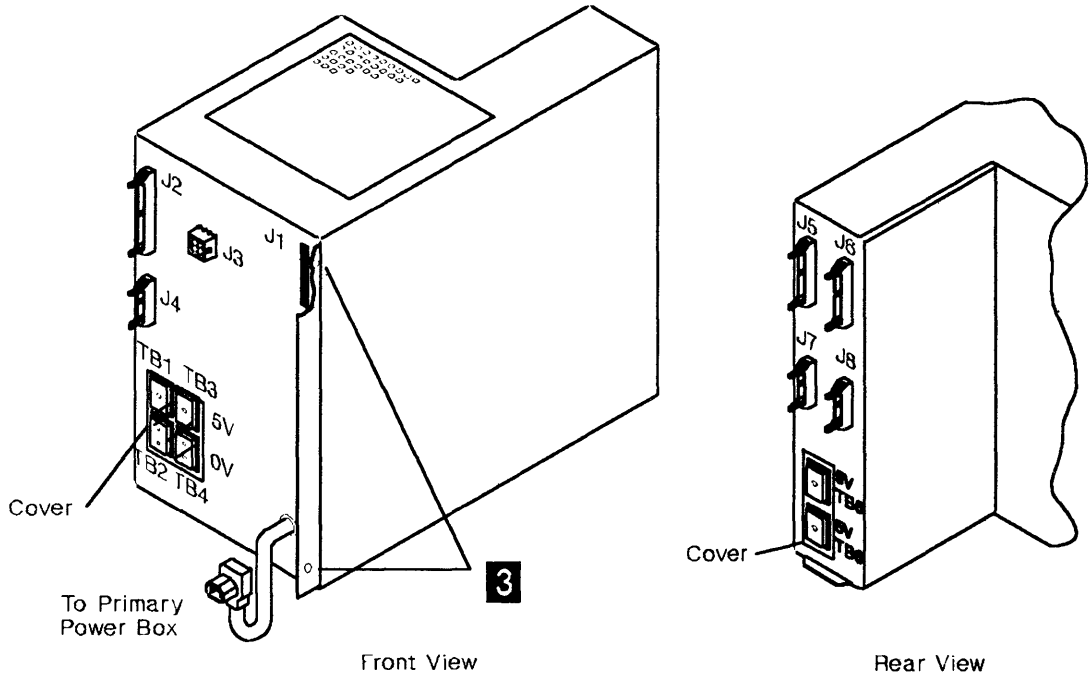


Figure 4-85. Power Supply 1

PS2 and Primary Power Box Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door and the rear door.
4. **Switch CB1 OFF.** Refer to Figure 4-86.
5. **Set OFF the Customer power supply switch related to the 3745 and install the "Warning" panel on the switch.**
6. Locate PS 2 and the primary power box. Refer to Figure 4-86.

Refer to Figure 4-87 and to Figure 4-88 on page 4-63 then do the following .

7. Disconnect the main power cable from outlet J3.
8. **Release the ground wire** 1 from the frame.
9. At the front side and at the rear side of the primary power box, verify that the cables are labelled according to their positions. If not, do so. Then remove all the cables.
10. Remove the 4 screws 2 which secure the primary power box to the frame.
11. Slide the primary power box out **and place it on a safe working area.**
12. Remove the 6 screws 3 which secure the PSs covers 4.
13. Remove the PSs covers 4.
14. Remove the 2 screws 5 which secure the DC/DC converter cover 6.
15. Remove the DC/DC converter cover 6.

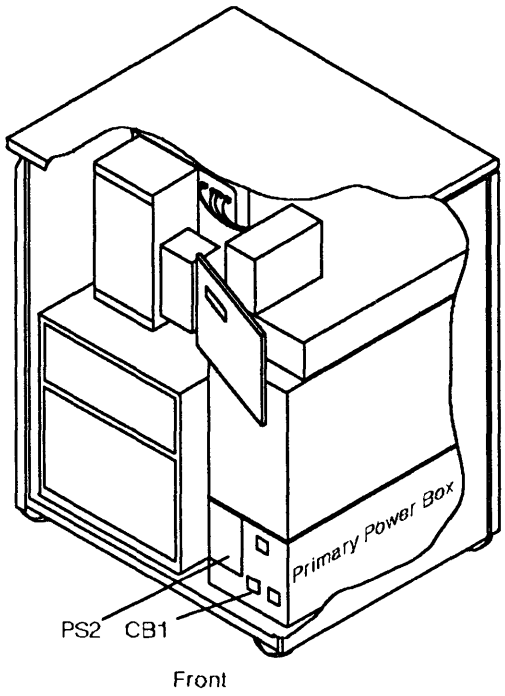


Figure 4-86. Primary Power Box, Power Supply 2 and CB1 Locations

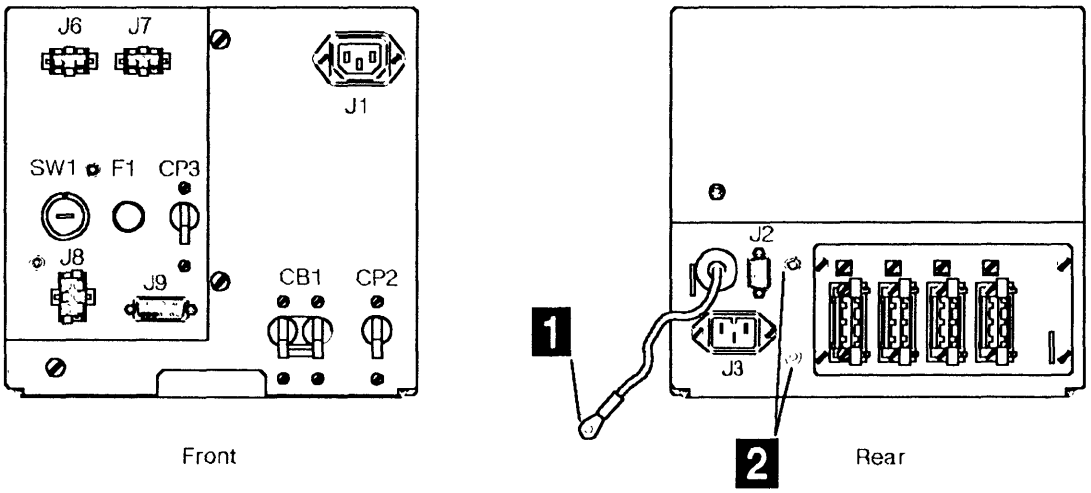


Figure 4-87. Cable Locations on Primary Power Box

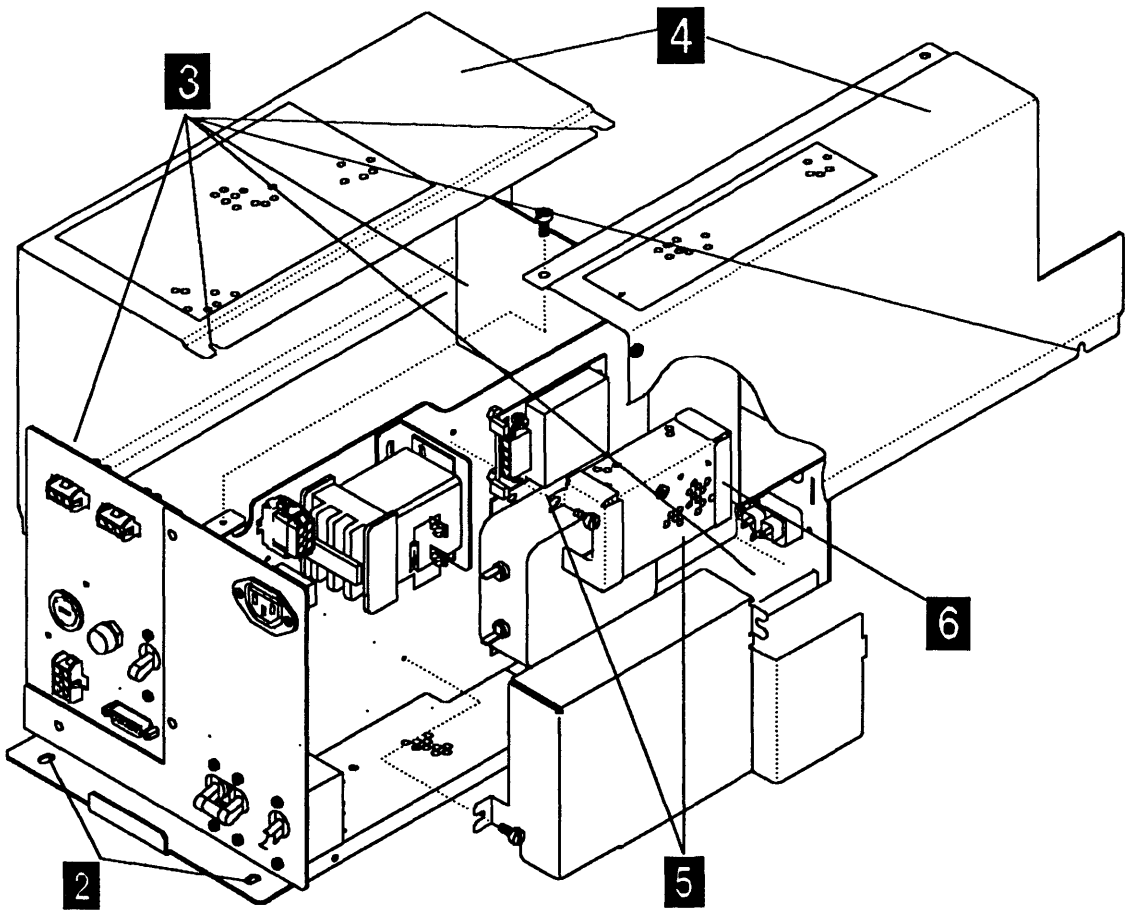


Figure 4-88. PS2 in Primary Power Box

Refer to Figure 4-89 and do the following .

16. Disconnect the 3 cables 7 and remove the ground wire at the DC/DC converter connector 9 .
17. Remove the 5 screws 8 which maintain the PS2 on the primary power box.
18. Remove the PS2.

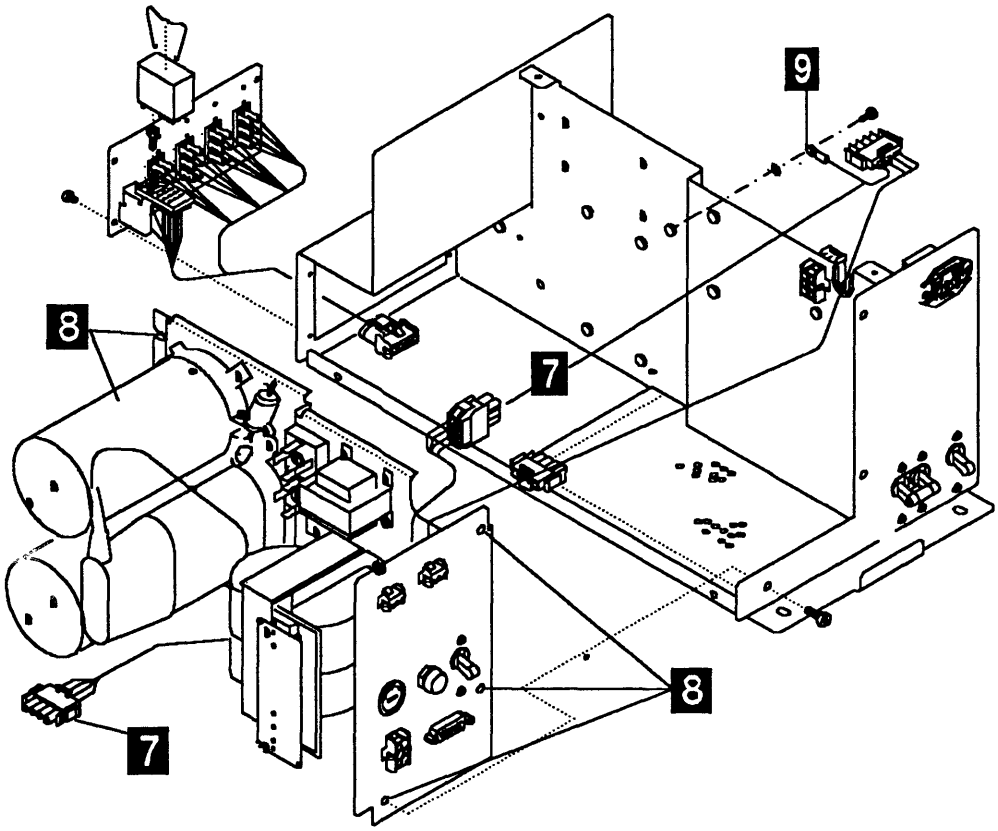


Figure 4-89. PS2 and Primary Power Box Assembly

Installation Procedure

1. If you are exchanging PS2 install the new PS2 in the primary power box.
   If you are exchanging the primary power box install PS2 in the new primary power box.
   Use the 5 screws **8**.
2. Reconnect the 3 cables **7** and re-install the ground wire at the DC/DC converter connector **9**.
3. Re-install the DC/DC converter cover **6** with the 2 screws **5**.
4. Re-install the PSs covers **4** with the 6 screws **3**.
5. Slide the primary power box in the frame and fasten it with the 4 screws **2**.
6. **Reconnect the ground wire** **1** to the frame.
7. Reconnect all the cables in their proper position at the front side and at the rear side of the primary power box.
8. Reconnect the main power cable in outlet J3.
9. Set ON the Customer power supply switch related to the 3745 and remove the "Warning" panel.
10. Switch CB1 ON.
11. Close the front door and the rear door.
12. Power 3745 ON.
13. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic in ODG you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

EPO Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door and the rear door.
4. **Switch CB1 OFF.** Refer to Figure 4-90.
5. **Set OFF the Customer power supply switch related to the 3745 and install a "Warning" panel on the switch.**
6. Locate the primary power box and the EPO. Refer to Figure 4-90 and to Figure 4-91.

Refer to Figure 4-92 and to Figure 4-93 on page 4-67 then do the following:

7. Disconnect the main power cable from the outlet J3.
8. At the front side and at the rear side of the primary power box, verify that the cables are labelled according to their positions. If not, do so. Then remove all the cables.
9. **Release the ground wire** 1 from the frame.
10. Remove the 4 screws 2 which secure the primary power box to the frame. Refer to Figure 4-92 on page 4-67 and Figure 4-93 on page 4-67.

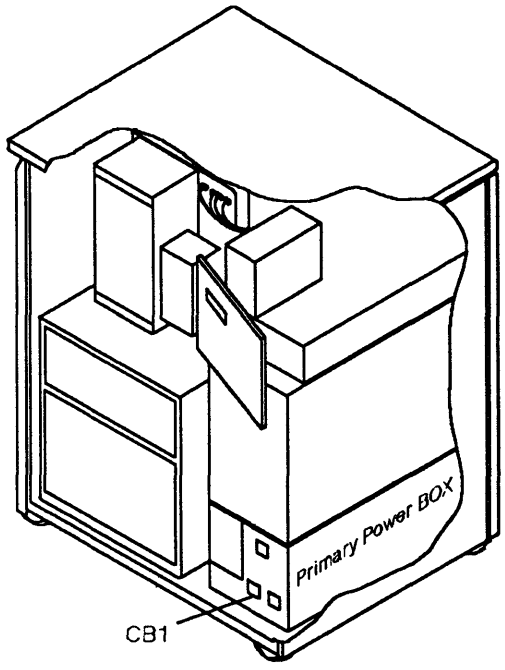


Figure 4-90. Primary Power Box and CB1 Locations

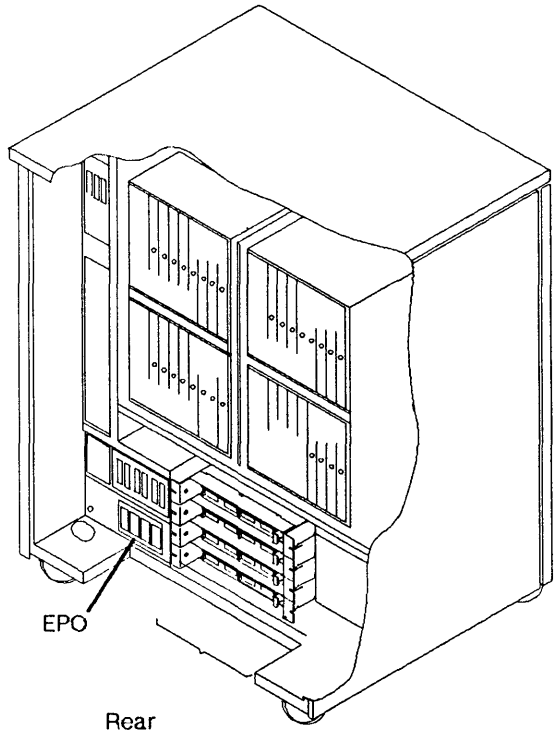


Figure 4-91. EPO Location

11. Slide the primary power box out **and place it on a safe working area.**
12. Remove the 4 screws 3 which secure PS2 cover.
13. Remove PS2 cover 4.

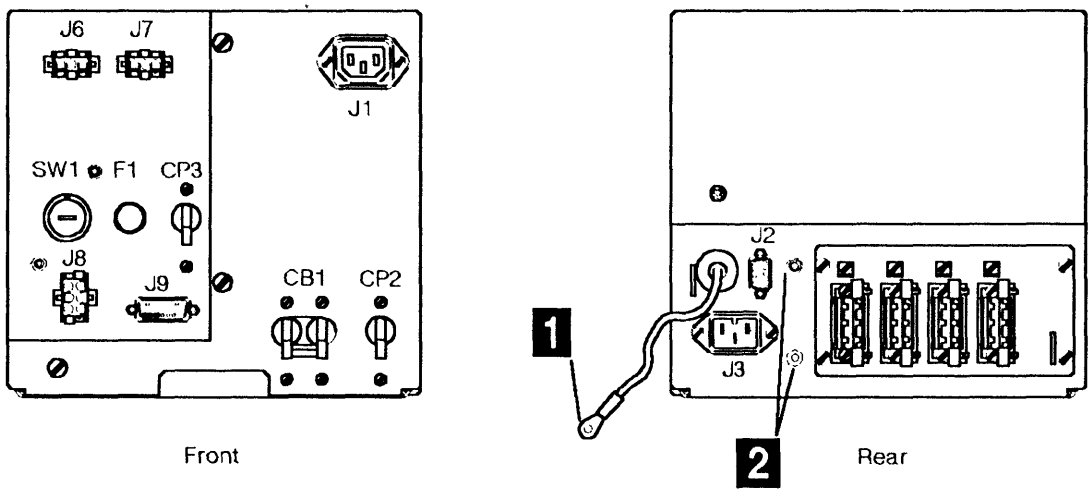


Figure 4-92. Cables on Primary Power Box

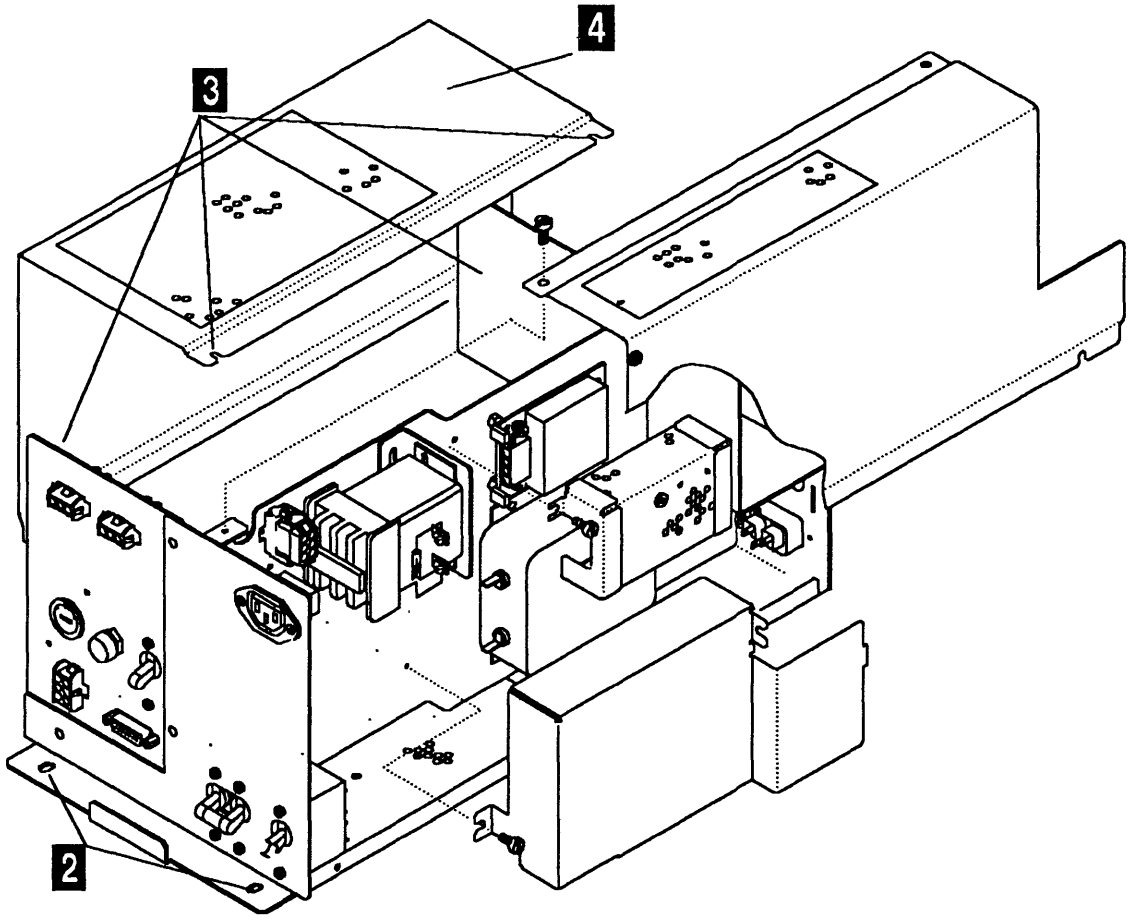


Figure 4-93. Primary Power Box and PS2 Cover Removal

Refer to Figure 4-94 and do the following:

14. Disconnect the cable 7 from PS2.
15. Remove the 4 screws 8 which secure the EPO plate to the frame, then remove the EPO assembly 9.

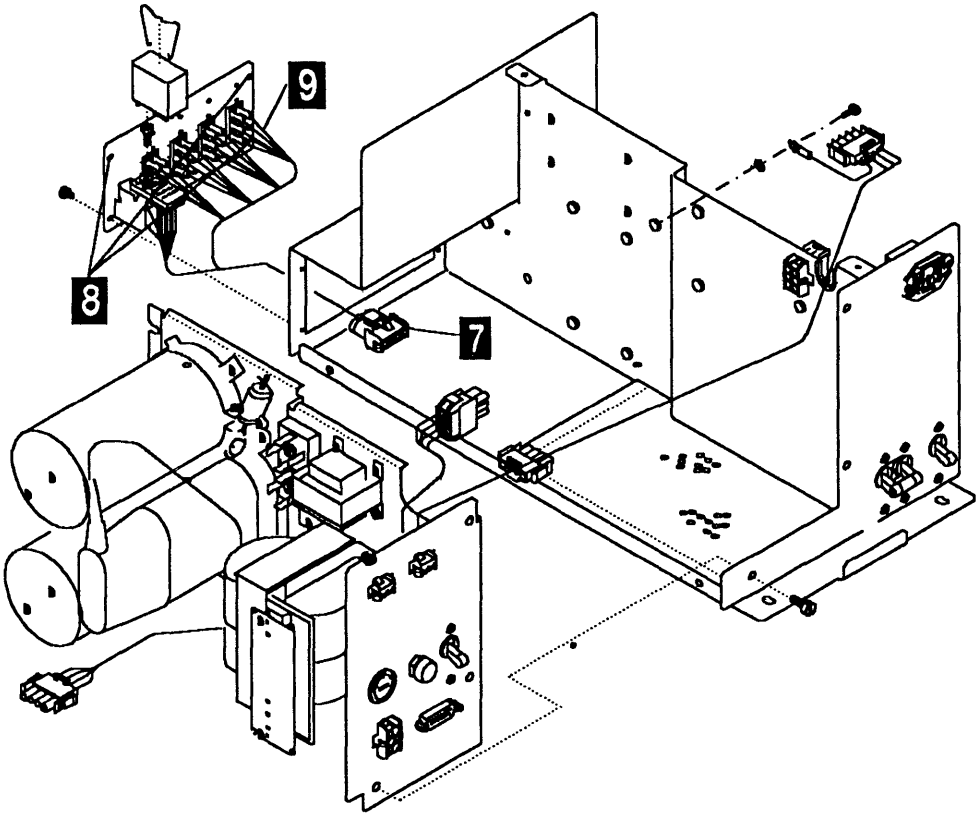


Figure 4-94. EPO Assembly

Installation Procedure

1. Install the new EPO assembly and fasten it with the 4 screws **8**.
2. Reconnect the cable **7**.
3. Re-install the PS2 cover **4** with the 4 screws **3**.
4. Slide the primary power box in the frame and fasten it with the 4 screws **2**.
5. **Reconnect the ground wire** **1** on the frame.
6. Reconnect all the cables in their proper position at the front side and at the rear side of the primary power box.
7. Reconnect the main power cable in outlet J3.
8. Set ON the Customer power supply switch and remove the "Warning" panel.
9. Switch CB1 ON.
10. Close the front door and the rear door.
11. Power 3745 ON.
12. Referring to Chapter 3, "How to Run 3745 Diagnostics" on page 3-1, run the same diagnostic you ran before you exchanged the FRU, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

Basic Board Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door and the rear door.
4. **Switch CB1 OFF.** Refer to Figure 4-95.
5. Locate the board. Refer to Figure 4-95.

Refer to Figure 4-96 on page 4-71 and do the following .

6. Take away the Basic board cover **1** (loosen the 2 screws **2** and lift up the cover).
7. Take away the 2 MOSS board covers **3** (7 screws must be removed **4**)
8. Take away the Basic board grid (4 screws must be removed). Refer to Figure 4-97 on page 4-71
9. At the channel tail gate, set all the select out switches to **bypass**, if any channel adapter is installed.
10. At PS1 take away the cover of the 4 FDS cables (2 screws must be removed), then disconnect these 4 cables and the multi-voltage cable going to the Basic board. Refer to Figure 4-98 on page 4-71.

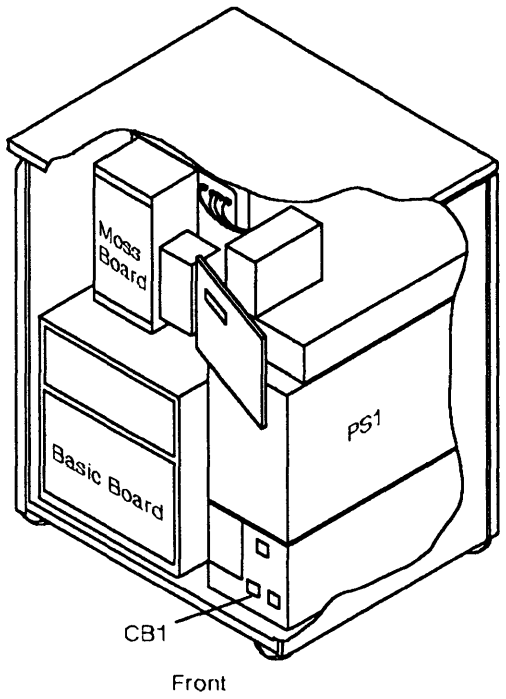


Figure 4-95. Basic Board, MOSS Board and CB1 Locations

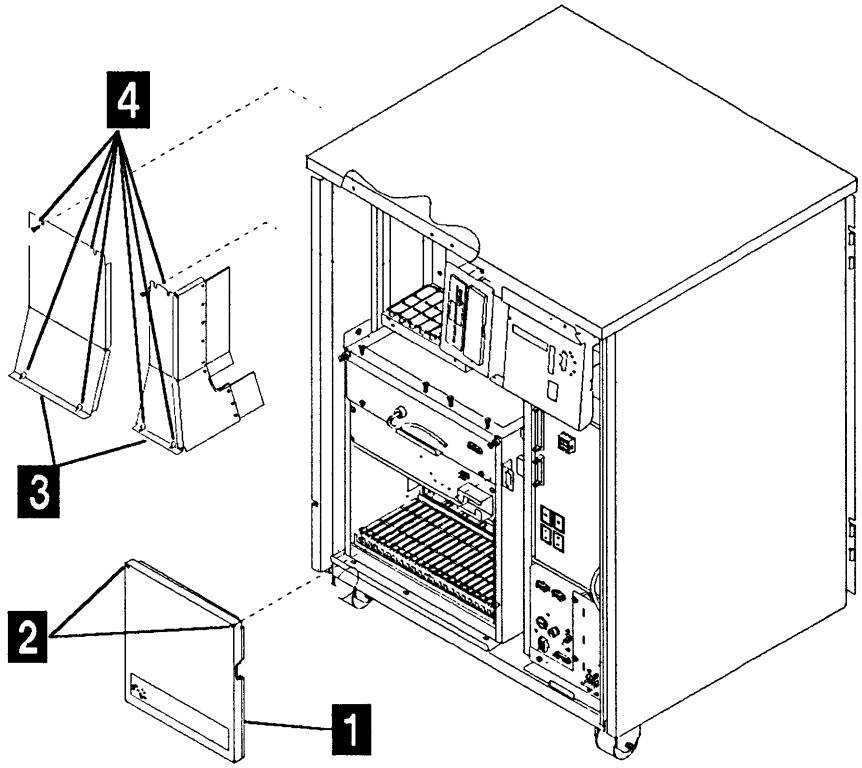


Figure 4-96. Basic and MOSS Covers

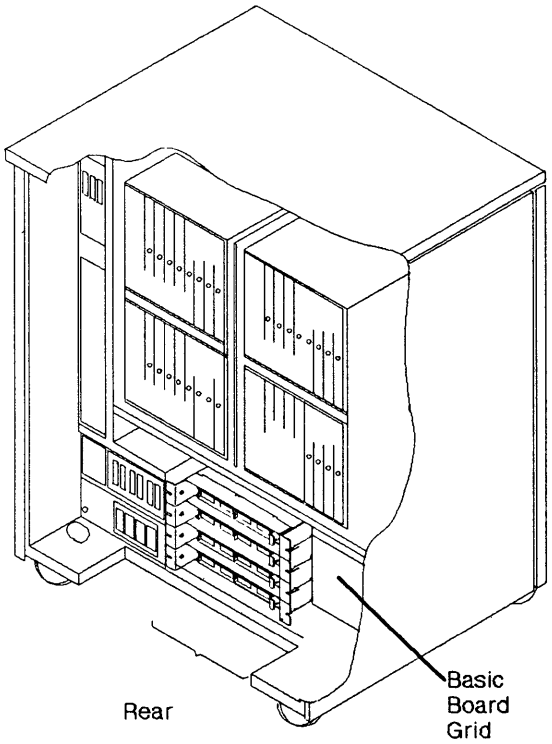


Figure 4-97. Basic Board Grid

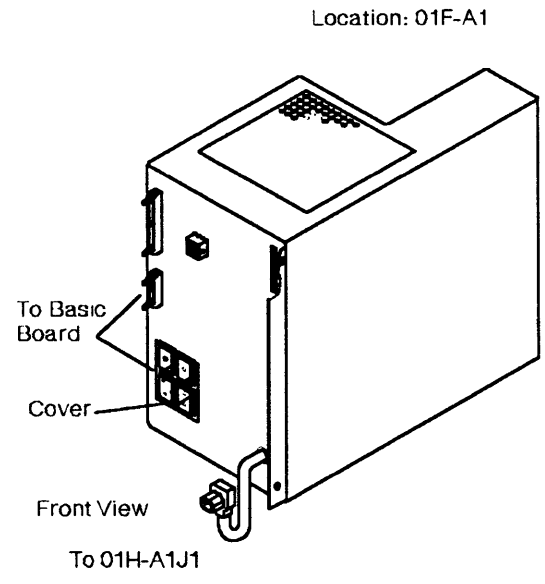


Figure 4-98. FDS and Multivoltage Cable Locations on PS1

11. At Fan 2, disconnect the air flow detector cable and the power cable. Refer to Figure 4-99.
12. Remove the 2 screws 1 which maintain Fan 2 to the frame.
13. Slide Fan 2 assembly out.

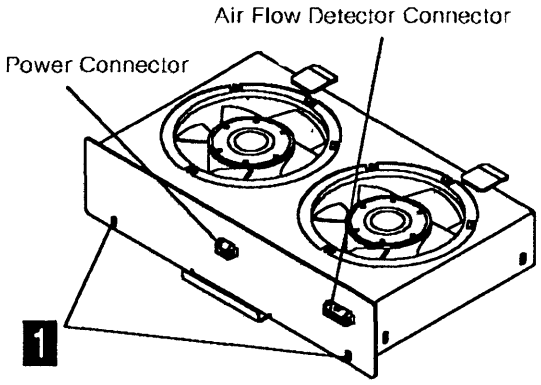


Figure 4-99. FAN 2 Air Flow Detector and Power Connectors

14. At the MOSS board disconnect the 4 cables going to the Basic board. Refer to Figure 4-100.
15. Open the clamps which secure these cables up to the Basic board enclosure.
16. **Warning: Use the ESD kit and procedures.**
17. Remove the cross-over connectors.
18. Check if the cards and the cables from the cards are labelled according to their positions, if not, do so. Unplug the cables from the cards, then remove the cards and store them in a safe place. (do not remove the horizontal cards on row Z, they will be removed later).
19. At the rear side of the board remove the channel tail gate cables if any channel adapter is installed.
20. Remove the 5 screws 5 which maintain the enclosure to the frame. Refer to Figure 4-101, then slide the enclosure out of the machine taking care not to damage the cables. Place the enclosure on a safe working area.

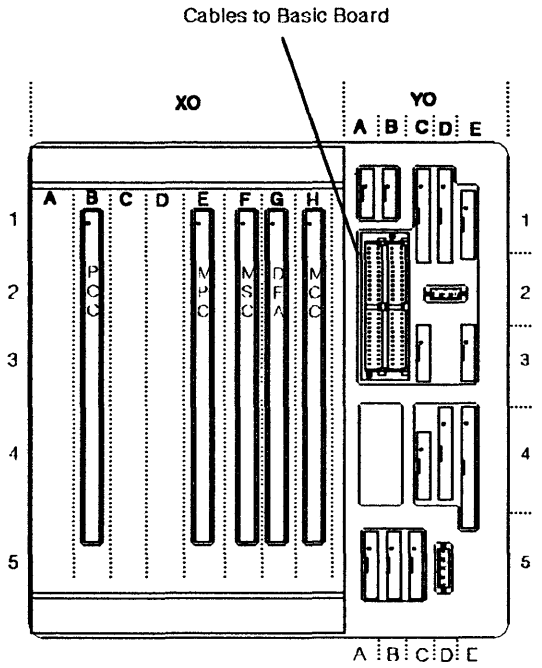


Figure 4-100. MOSS to Basic Cable Locations

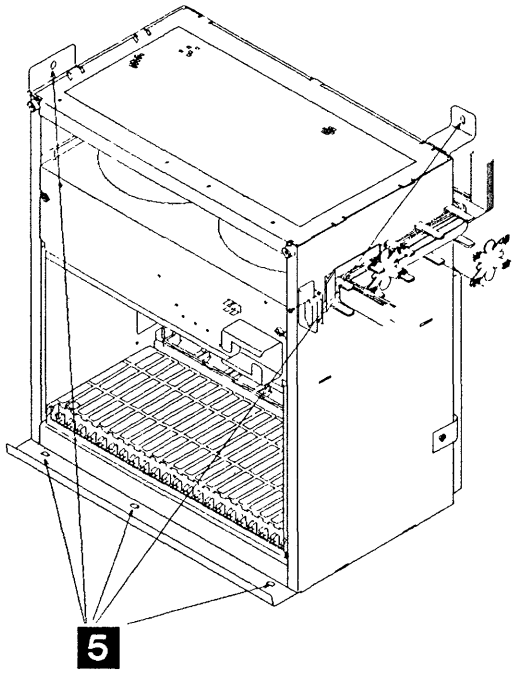


Figure 4-101. Basic Board Enclosure

Refer to Figure 4-102 and do the following: .

21. Remove the 10 screws **6** which secure the retainers which hold the cables and the terminator cards on rows Y and Z. Then take away the retainers.
22. Remove the terminator cards and store them in a safe place.
23. Remove the 2 screws **7** which hold the two ground FDS cables on the rack assembly.
24. Disconnect the cables and remove them with the retainer.
25. At the front side, remove the retainer at the bottom of the board, row Z (1 screw must be removed).
26. Remove the DCREG cards (if they are present).

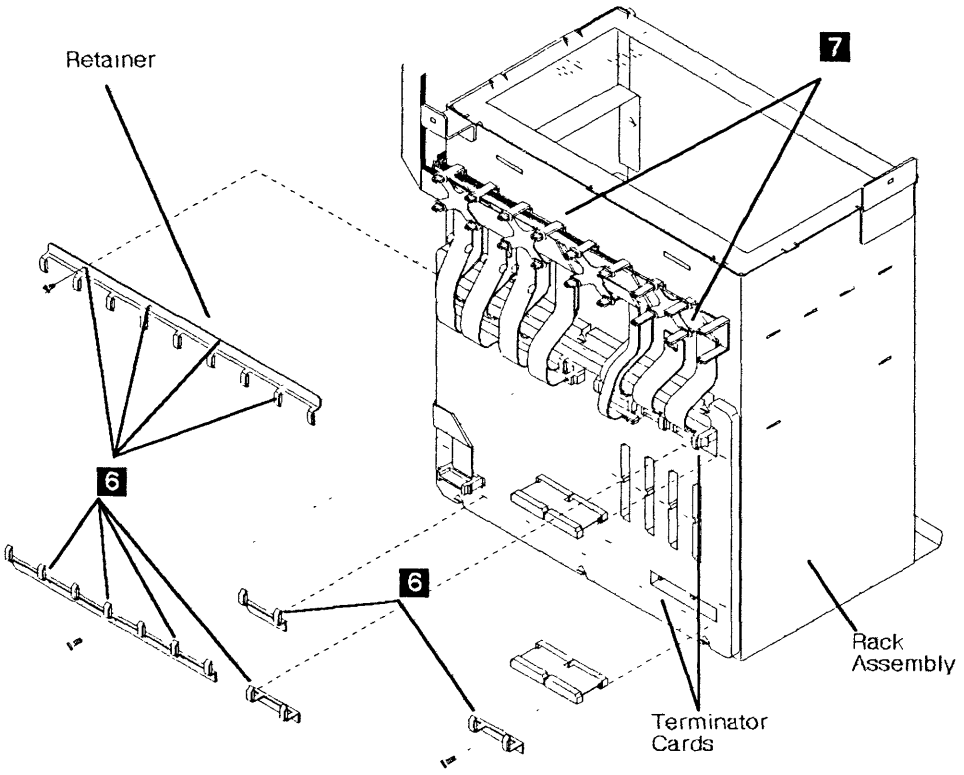


Figure 4-102. Basic Board Cables

27. Remove the 6 screws 8 which secure the board assembly to the rack assembly. Refer to Figure 4-103. Remove the board assembly.

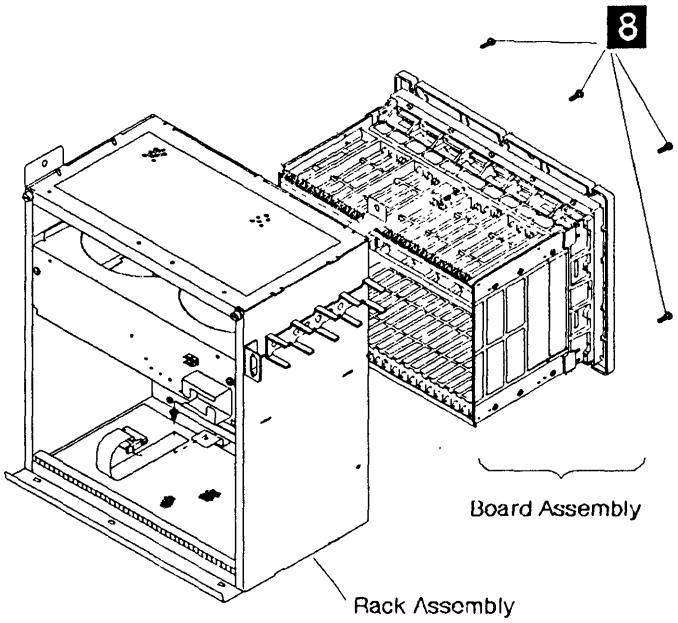


Figure 4-103. Basic Assembly 1

28. Remove the 14 screws 9 which hold the stiffener to the board. Refer to Figure 4-104, take away the stiffener.

29. Remove the 4 screws 10 which hold the board to the ASM gate. Refer to Figure 4-104, remove the board.

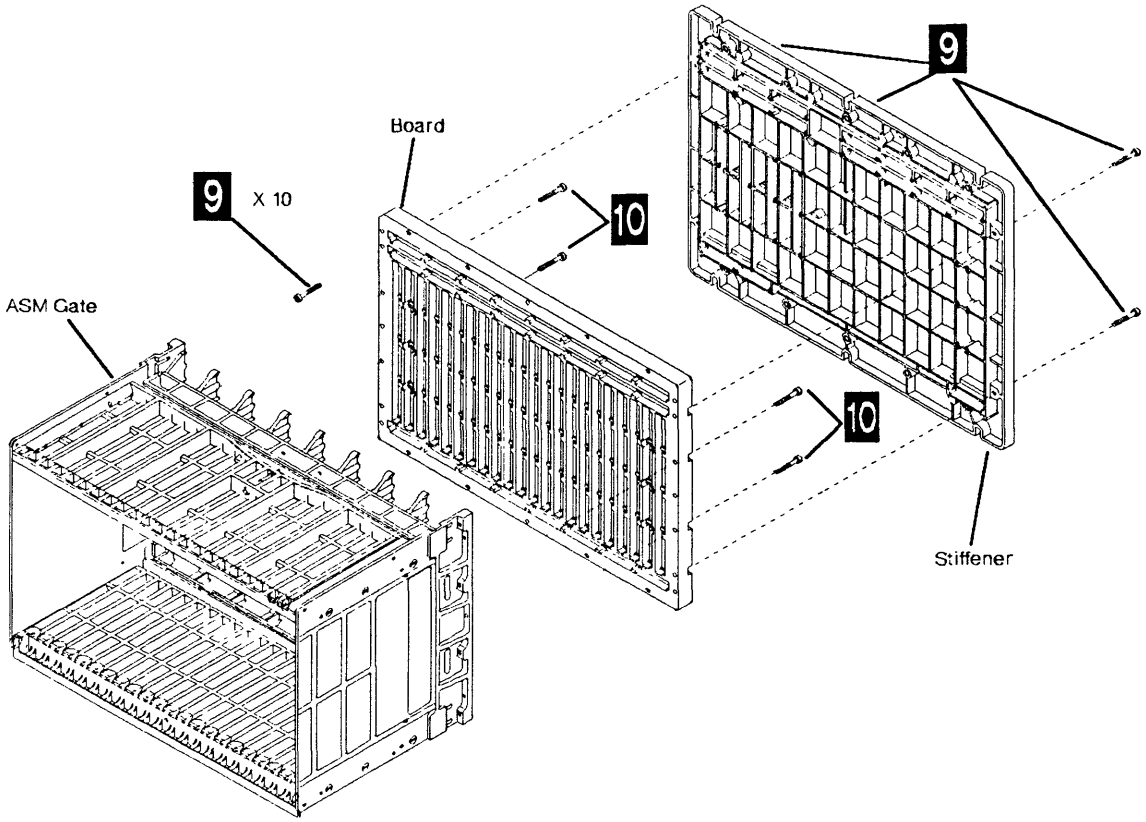


Figure 4-104. Basic Assembly 2

Installation Procedure

1. Place the new board on the ASM gate and fasten it with the 4 screws. **10** . Refer to Figure 4-104 on page 4-75.
2. Install the stiffener on the board and fasten it with the 14 screws. **9** Refer to Figure 4-104 on page 4-75.
3. Install the DCREG cards (if present) in the board and tighten them with the retainer.
4. Install the board assembly on the rack assembly and fasten it with the 6 screws **8** . Refer to Figure 4-103 on page 4-74.
5. Reconnect the two ground FDS cables and fasten them to the rack assembly with the two screws **7** . Refer to Figure 4-102 on page 4-73.
6. Reconnect the other cables. Refer to Figure 4-102 on page 4-73 and to Figure 4-105.
   - Reconnect the cables located on the upper Y row.
   - Install on these cables the upper retainer with 4 screws.
   - Reconnect the cables located on the lower Y row.
   - Install on these cables the retainer with 3 screws.
   - Reconnect the cable on the Z row.
   - Install on this cable the retainer with 1 screw.

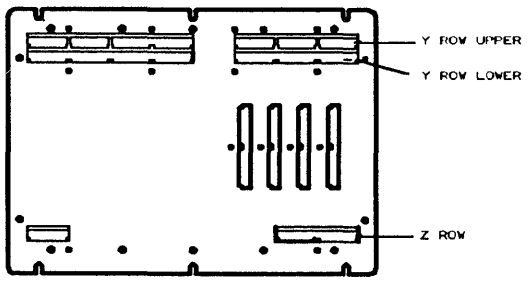


Figure 4-105. Y and Z rows

7. Install the terminator cards and tighten them with the two retainers (1 screw per retainer). Refer to Figure 4-102 on page 4-73.
8. Slide the enclosure inside the machine frame taking care not to damage the cables.
9. Fasten it to the frame with the 5 screws **5** .Refer to Figure 4-101 on page 4-72.
10. If any channel adapter is installed, reconnect the channel tail gate cables at the rear side of the board.
11. **Warning: Use the ESD kit and procedures.**
12. Install the cards in their correct location according to their labels. If you have suspicions about the locations, refer to Figure 4-4 on page 4-7, or to Figure 4-5 on page 4-8, or to Figure 4-6 on page 4-9.
13. Install the cross-over connectors and cables. If you have suspicious about cross-over location, refer to Figure 4-4 on page 4-7, or Figure 4-5 on page 4-8, or Figure 4-6 on page 4-9.
14. At the MOSS board, reconnect the 4 cables from Basic board and close the clamps which maintain them. Refer to Figure 4-100 on page 4-72.
15. Install Fan 2 assembly in the frame and fasten it with the 2 screws **1** . Refer to Figure 4-99 on page 4-72.
16. Reconnect the air flow detector cable and the power cable at Fan 2.
17. At PS1 reconnect the 4 FDS cables and the multivoltage cable from Basic board and close the clamps which maintain them. Reinstall the cover with the 2 screws. Refer to Figure 4-98 on page 4-71.
18. Replace the grid of the bace board with the 4 screws. Refer to Figure 4-80 on page 4-58.
19. At the channel tail gate set all the select out bypass switches to **normal**, if any channel adapter is installed.
20. Close the rear door.
21. Re-install the MOSS board covers with the 7 screws **4** .
22. Re-install the Basic board cover with the 2 screws **2** .
23. Switch CB1 ON.
24. Close the front door.
25. Power 3745 ON.
26. Run all diagnostics, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

LIC Board Type 1 and 3 Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door and the rear door.
4. **Switch CB1 OFF.** Refer to Figure 4-106.

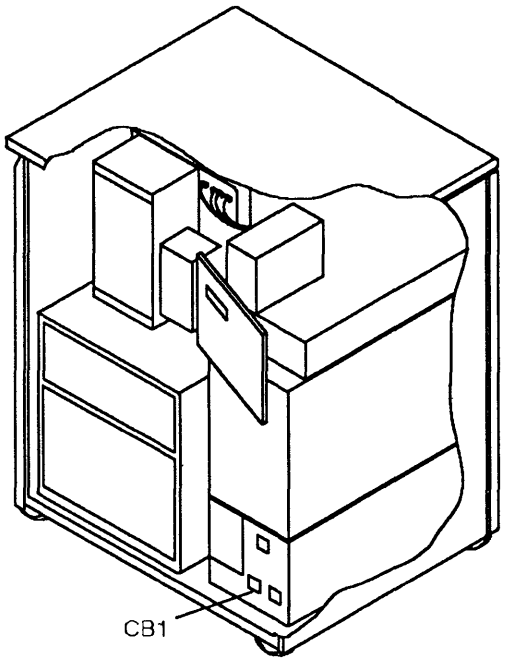


Figure 4-106. CB1 Location

5. Locate the board to exchange. Refer to Figure 4-107.

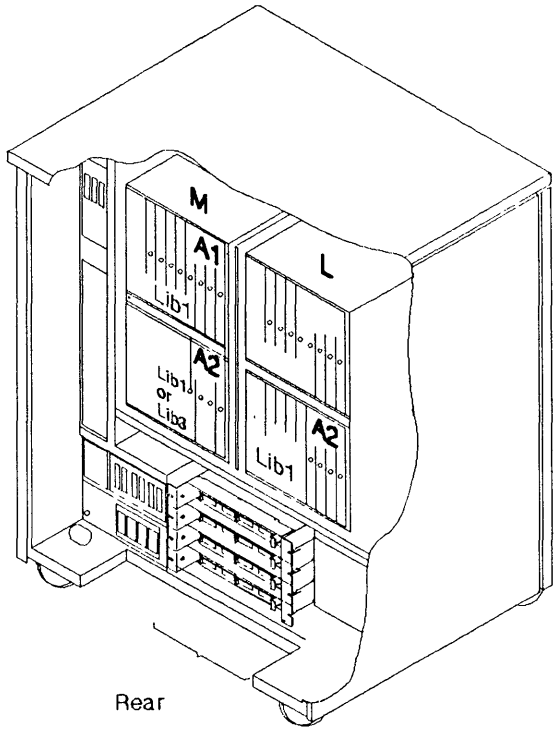


Figure 4-107. LIC Board Type 1 Locations

6. Take away one of the DMUX covers. Refer to Figure 4-108. Two screws must be removed **1**. (Two kinds of DMUX cover exist according to the LIC board location).

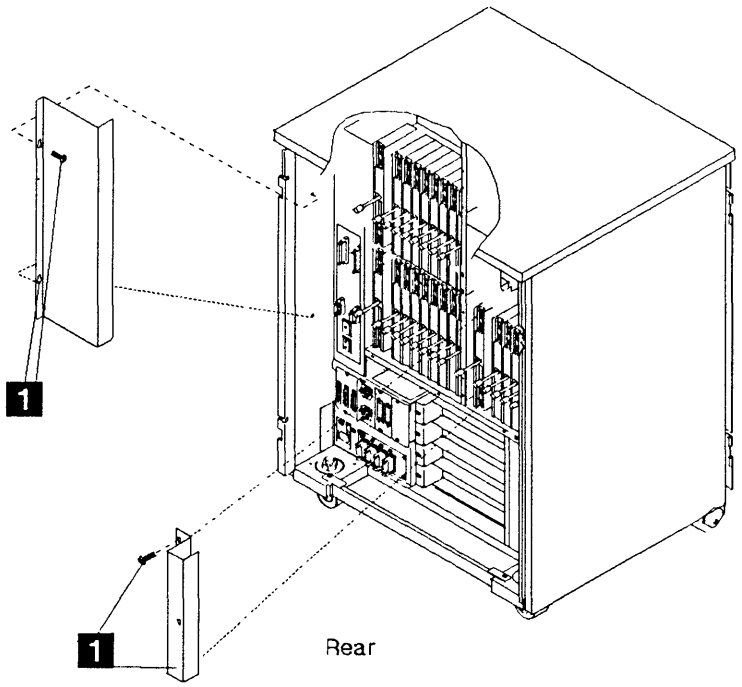


Figure 4-108. DMUX Cover

Refer to Figure 4-109 and do the following:

7. Verify that the serial link cable(s) on the DMUX are labelled according to their positions. If not, do so. Then remove the serial link cable(s).
8. Verify that the LIC cables are labelled according to their positions. If not, do so. Then remove the LIC cables.
9. Note the type and locations of the LICs.The LIC type is indicated by the color of the thumb screw.

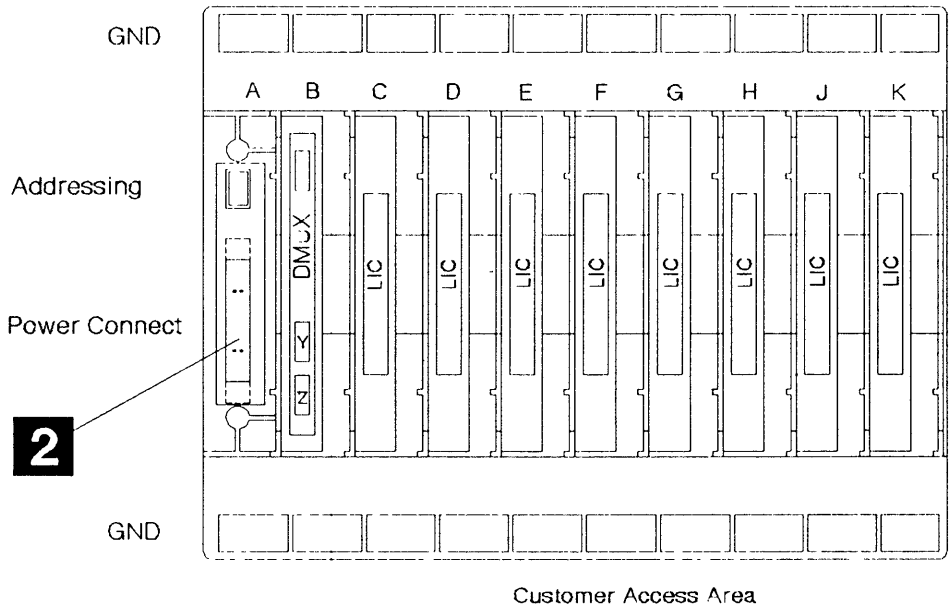


Figure 4-109. LIC Locations

LIC board location	Address switches 5 to 1	LIC type	Thumb screw color
01M-A1	00001	LIC type 1	Brown
01M-A2	00000	LIC type 3	Blue
01L-A2	01000	LIC type 4A	Green
.	.	LIC type 4B	Green
.	.	.	.
.	.	DMUX	White

10. **Warning: Use the ESD kit and procedures.**

    Remove the LICs and the DMUX by unfastening the thumb screws holding them to the board. (See "LIC Exchange Procedure" on page 4-42 and "DMUX Exchange Procedure" on page 4-36 for more details about removals).

Refer to Figure 4-109 on page 4-80 and Figure 4-110 and do the following.

11. Disconnect the power cable 2 from the LIC board.
12. Remove the 4 screws 3 holding the board assembly ton the frame.
13. Remove the LIC board assembly.
14. Note the board address for later use.

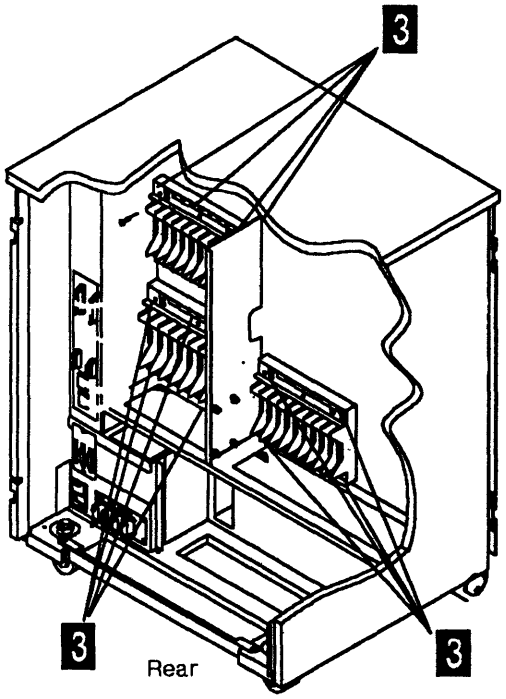


Figure 4-110. LIC Board Assembly

Installation Procedure

1. Refer to Figure 4-109 on page 4-80 and set the same board address as you noted during the board removal.
2. Refer to Figure 4-110 then mount the new LIC board assembly in place and secure it with the 4 screws 3.
3. Refer to Figure 4-109 on page 4-80, then reconnect the flat power cable 2.
4. **Warning: Use the ESD kit and procedures.**

   Install the LICs and DMUX in their proper positions and fasten the thumb screws holding them to the board. Fingers strength is enough, do not use tools.
5. Install the LIC cables on the LICs.
6. Install the serial link cable(s) on the DMUX.
7. Refer to Figure 4-108 on page 4-79, then install the DMUX cover with 2 screws 1.
8. Close the rear door.
9. Switch CB1 ON.
10. Close the front door.
11. Power 3745 ON.
12. Run all diagnostics, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93

LIC Board Type 2 Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the Control panel.
3. Open the front door and the rear door.
4. **Switch CB1 OFF.** Refer to Figure 4-111
5. Locate the board to exchange. Refer to Figure 4-113 on page 4-83
6. Take away the SMUX covers. Refer to Figure 4-112 (4 screws must be removed 1).

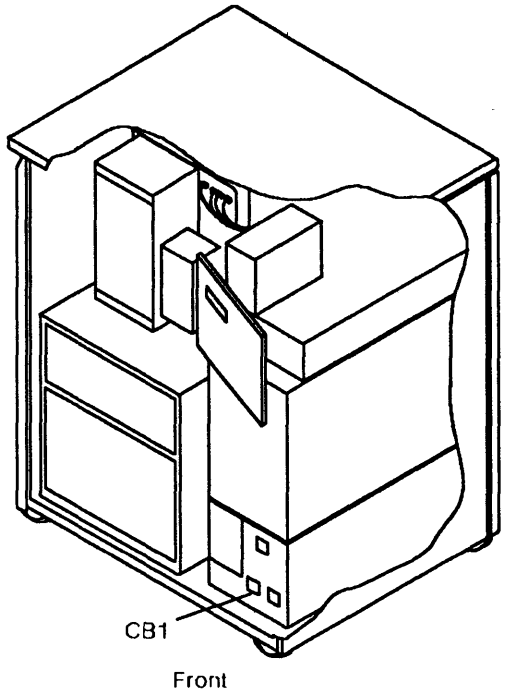


Figure 4-111. CB1 Location

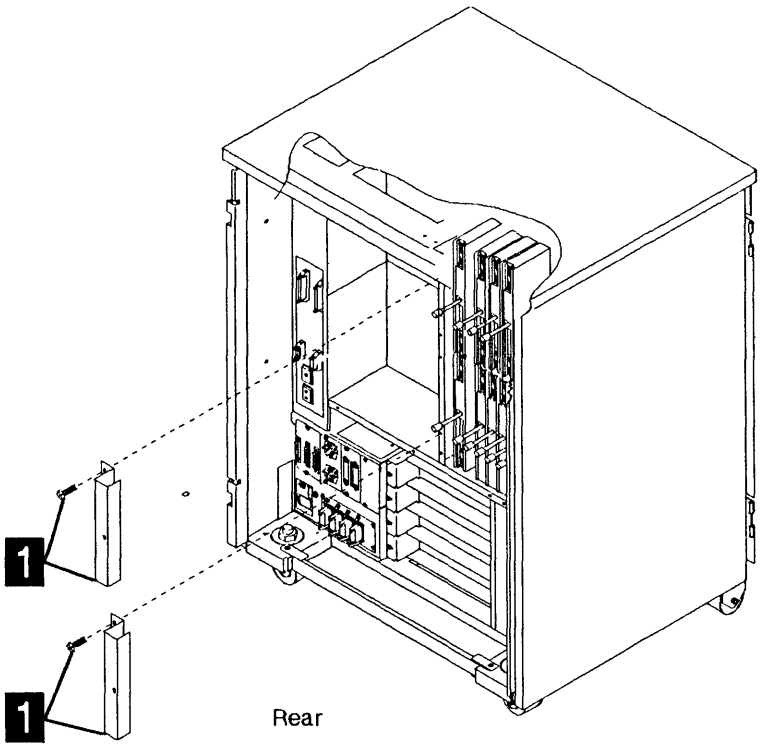


Figure 4-112. SMUX Cover

Refer to Figure 4-114 and do the following.

7. Remove the serial link cable (if installed) from the SMUX. (This cable may be absent on SMUXB if SMUXA and flat cable **2** are present).
8. Remove the flat cable **2** (if installed) which connect the two SMUXs, if two LIC boards type 2 are present in the machine. (These cable may be absent in spite of the presence of the two boards).

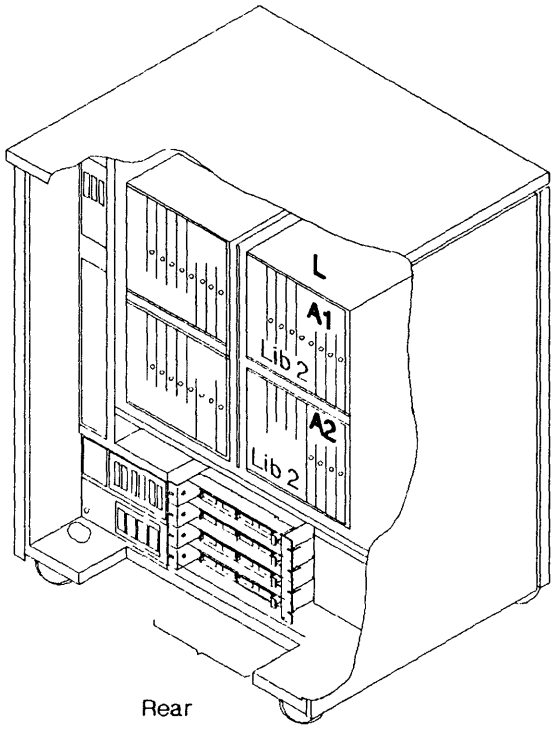


Figure 4-113. LIC Board Type 2 Locations.

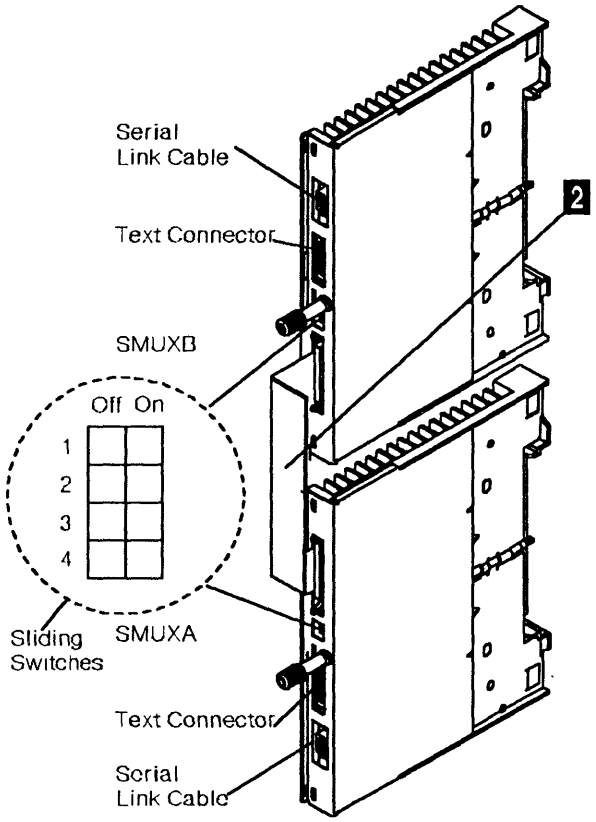


Figure 4-114. SMUX Link and Cable.

Refer to Figure 4-115 and do the following:

9. Verify the LIC cables are labelled according to their positions. If not, do so. Then remove the LIC cables from the LICs.

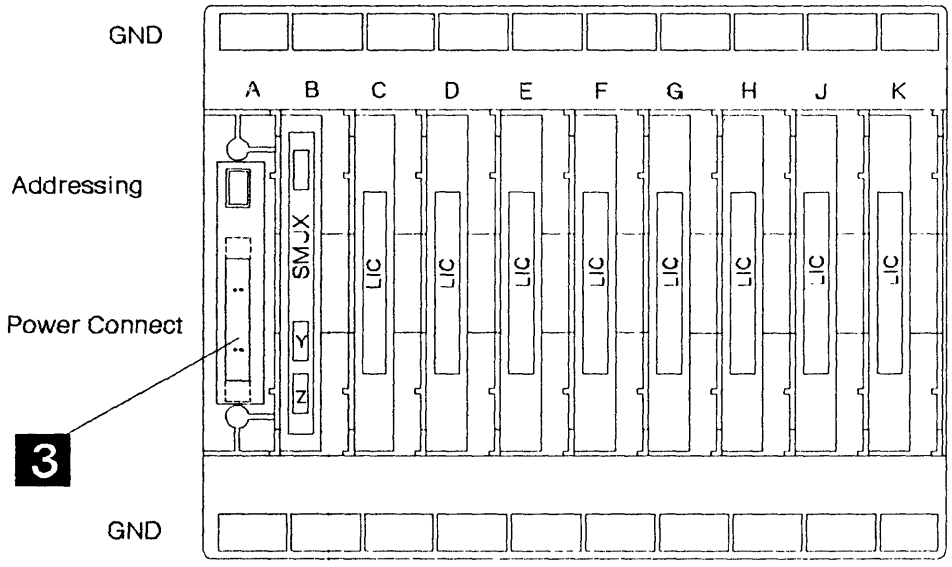


Figure 4-115. LIC Locations

LIC board location	Address switches 7 to 1
01L-A1	0000010
01L-A2	0000011

10. Note the types and locations of the LICs.
11. **Warning: Use the ESD kit and procedures.**

    Remove the LICs and the SMUX by unfastening the thumb screws holding them to the board.

Refer to Figure 4-115 and Figure 4-116 and do the following:

12. Disconnect the power cables 3 from the LIC board, and remove the screw and washer keeping ground strap to the frame 7.
13. Remove the 4 screws 4 holding the board assembly to the frame.
14. Remove the LIC board 5 and the ground bracket 6.
15. Note the board address for later use.

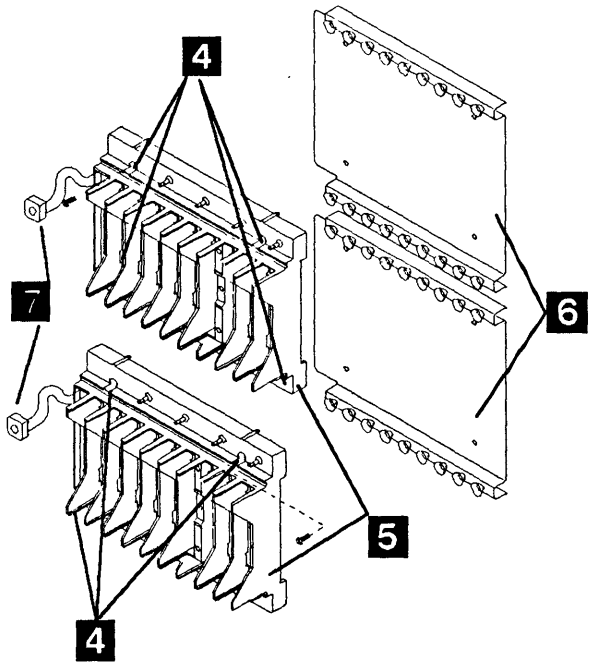


Figure 4-116. LIC Board Assembly

Installation Procedure

1. Refer to Figure 4-115 on page 4-84 and set the same board address as you noted during the board removal.
2. Refer to Figure 4-116 on page 4-84 then mount the new LIC board **5** and the ground bracket **6** in place and secure them with the 4 screws **4**.
3. Refer to Figure 4-115 on page 4-84, then reconnect the flat power cables **3**.
4. Refer to Figure 4-116 on page 4-84, then mount the ground strap on the LIC board to the frame with the screw and a washer **7**.
5. **Warning: Use the ESD kit and procedures.**

   Install the LICs and SMUX in their proper positions and fasten the thumb screws holding them to the board. Fingers strength is enough, do not use tools.
6. Install the LIC cables on the LICs.
7. Refer to Figure 4-114 on page 4-83, then install the serial link cable (if any) on the SMUX.
8. Install the flat cable (if any) between the two SMUXs.
9. Refer to Figure 4-112 on page 4-82, then install the SMUX cover with 2 screws **1**.
10. Close the rear door.
11. Switch CB1 ON.
12. Close the front door.
13. Power 3745 ON.
14. Run all diagnostics, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

MOSS Board Exchange Procedure

Removal Procedure

1. **Advise the customer that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door.
4. **Switch CB1 OFF.** Refer to Figure 4-117.
5. Locate the board. Refer to Figure 4-117.
6. Take away the covers of the MOSS board **1**. (7 screws must be removed **2**). Refer to Figure 4-118.

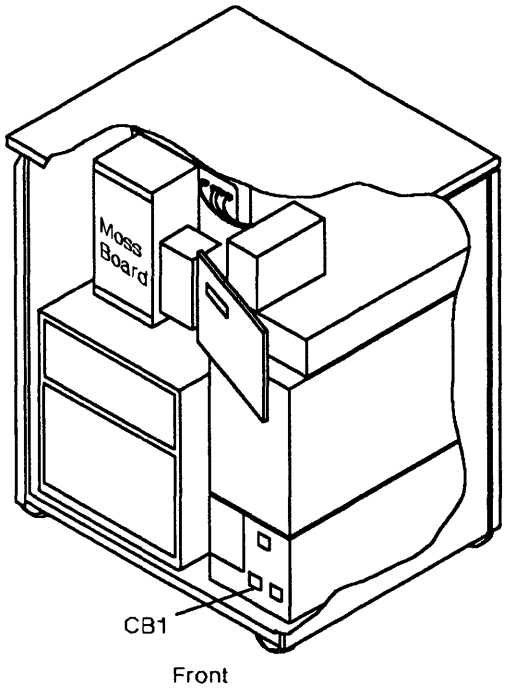


Figure 4-117. MOSS Board and CB1 Locations

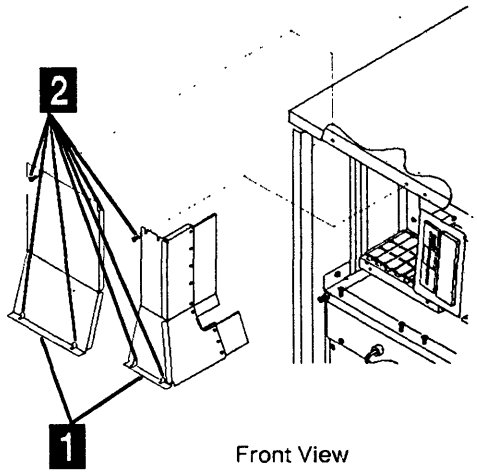


Figure 4-118. MOSS Board Covers

7. **Warning: Use the ESD kit and procedures.**

Refer to Figure 4-119 and do the following:

8. Check if the cassettes are labelled according to their positions. If not, do so. Then remove the cassettes and store them in a safe place.
9. Verify that the cables are labelled according to their position. If not, do so. Then remove all the cables from the board.

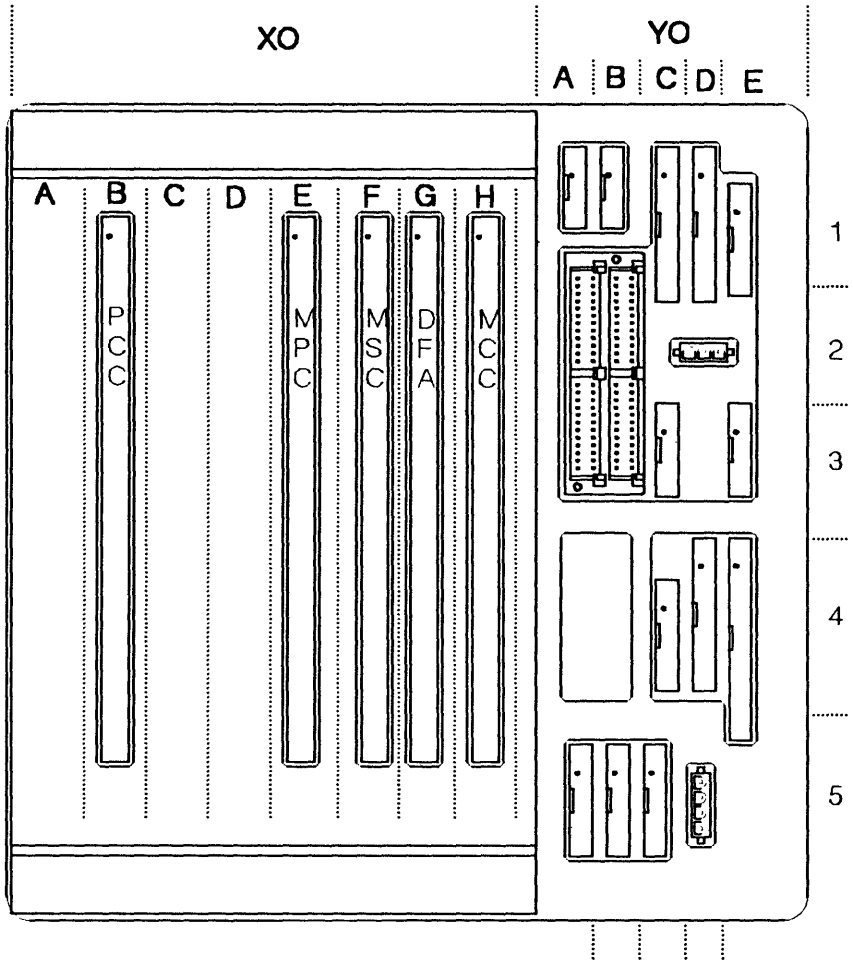


Figure 4-119. MOSS Board Cards and Cables

10. Remove the 8 screws **3** which maintain the MOSS board enclosure in the frame. Refer to Figure 4-120. Then remove the enclosure and place it in a safe working place.

11. Remove the 12 screws **4** which hold the MOSS board on the stiffener. Refer to Figure 4-120. Then remove the MOSS board.

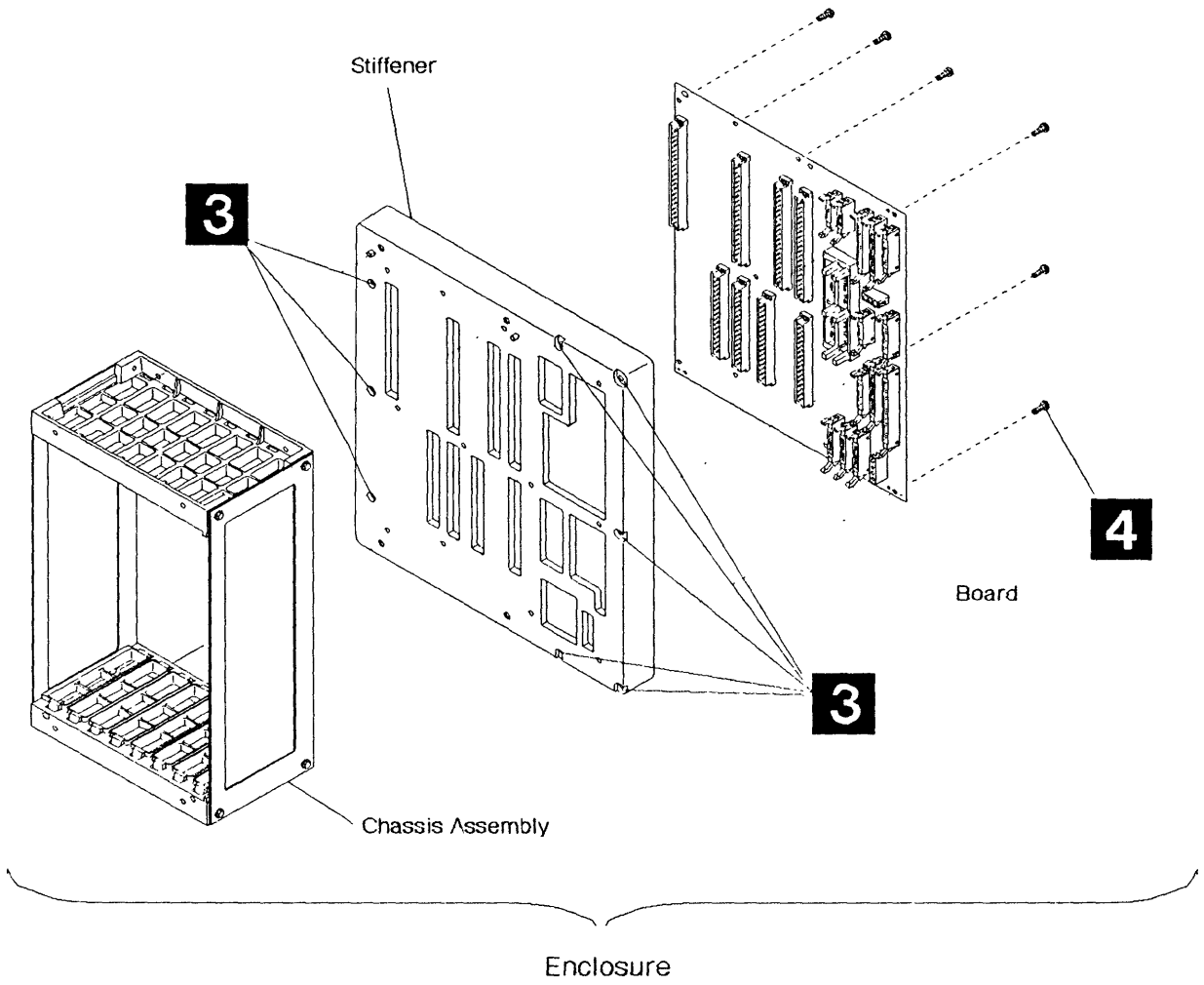


Figure 4-120. MOSS Board Enclosure

Installation Procedure

1. Place the new board on the stiffener and fasten it with the 12 screws 4. Refer to Figure 4-120 on page 4-88.
2. Replace the MOSS board enclosure in the machine frame and fasten it with the 8 screws 3. Refer to Figure 4-120 on page 4-88.
3. **Warning: Use the ESD kit and procedures.**
4. Reconnect the cables and the cassettes in their correct location according to their labels. Refer to Figure 4-119 on page 4-87.
5. Install the covers of the MOSS board with the 7 screws 2.
6. Switch CB1 ON.
7. Close the front door.
8. Power 3745 ON.
9. Run all diagnostics, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

Channel Tail Gate Exchange Procedure

Removal Procedure

1. **Ask the customer to disable the channel related to the suspected channel tail gate connector. Also advise him that the 3745 is to be powered OFF.**
2. Press Power OFF on the control panel.
3. Open the front door and the rear door.
4. **Switch CB1 OFF.** Refer to Figure 4-121.
5. Locate the channel tail gate. Refer to Figure 4-123 on page 4-91.
6. Take away the Basic board grid. (2 screws must be removed). Refer to Figure 4-123 on page 4-91.
7. At the channel tail gate connectors, set all the select out bypass switches to **Bypass**. Refer to Figure 4-122.
8. Disconnect the channel bus and tag cables from the channel tail gate connector to be removed.
9. In order to allow the customer to use the channel during the repair time, you have to connect the cables together or to the terminators.
10. Remove the 2 screws which maintain the channel tail gate connector. See note.
11. At the Basic board rear side disconnect the corresponding flat cables by loosening the retention screw. **These parts are fragile, handle them with care.**
12. Remove the "connector-flat cables" assembly from the channel tail gate rack.

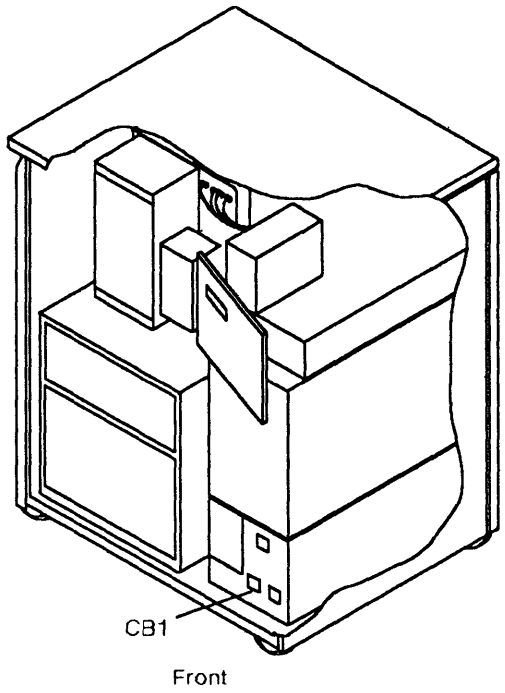


Figure 4-121. CB1 Location

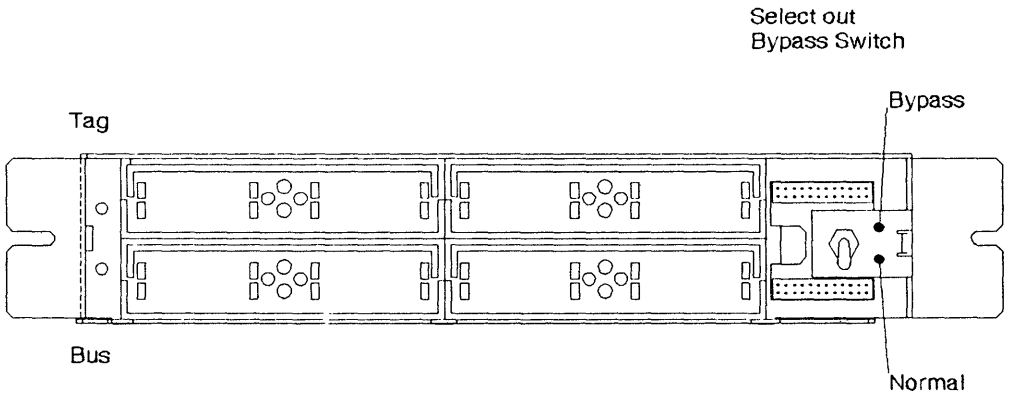


Figure 4-122. Select Out Switch

* An easier access to a lower located channel tail gate connector can be obtained by removing the upper one(s). For each channel tail gate connector use the steps 10 to 12. **Do not disconnect the channel bus and tag cables from the connectors.**

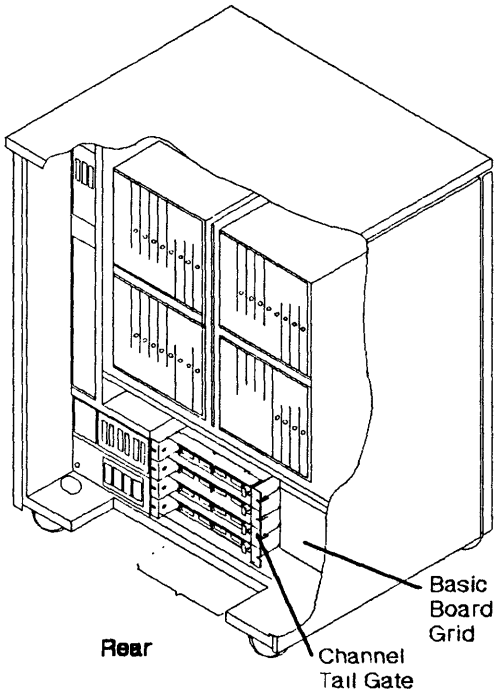


Figure 4-123. Channel Tail Gate and Basic Board Grid

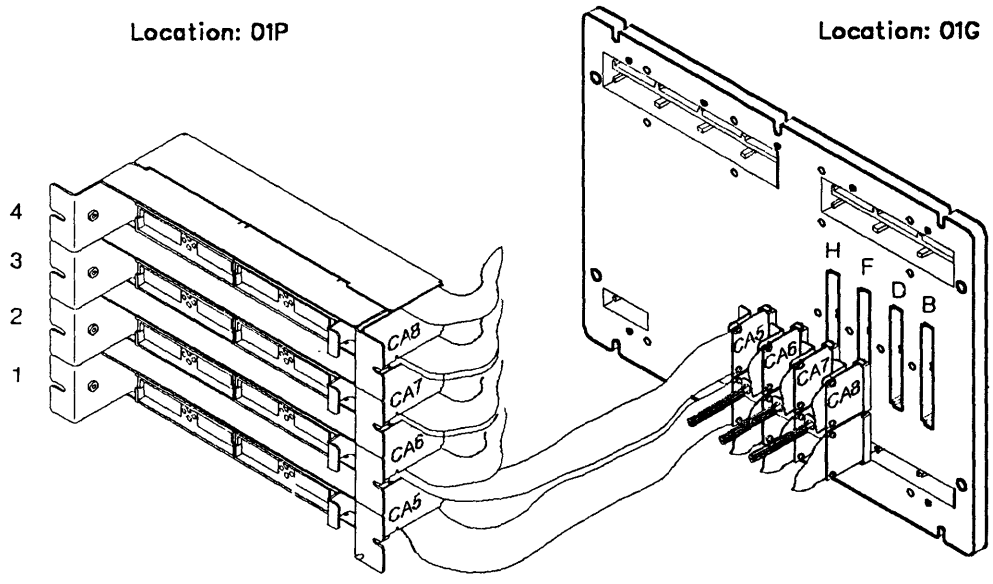


Figure 4-124. Channel Tail Gate, Cables and Basic Board.

Installation Procedure

1. Install the new "connector-flat cables" assembly on the channel tail gate rack.
2. Connect the flat cables at the Basic board rear side. **Be sure that the connector is fully plugged before securing the screw.** (The retention screw is not designed to achieve the connection.)
3. Hold the channel tail gate connector with the 2 screws.
4. If the customer restarted the channel **ask him to disable anew this channel.**
5. Reconnect the channel bus and tag cables on the channel tail gate connector.
6. Set all the select out bypass switches to **normal.**
7. Replace the Basic board grid with the 2 screws.
8. Close the rear door.
9. Switch CB1 ON.
10. Close the front door.
11. Power 3745 ON.
12. Run the channel wrap test on each channel, refer to "How to Run the Channel Wrap Test" on page 3-16, then go to "Action to Take After a Diagnostic Run or an FRU Exchange" on page 4-93.

Action to Take After a Diagnostic Run or an FRU Exchange

Diagnostic and Exchange Result Analysis 0000

001

This procedure analyzes the results of the diagnostics or an FRU exchange and tells you what to do next.

When MOSS diagnostics detect an error, a hex code is set on the control panel. The code can be decoded by using "Panel Codes" on page 1-19.

When ODG/CDG diagnostics detect an error, a reference code is given on the diagnostic screen, see Figure 3-5 on page 3-10.

This reference code can be decoded to find the action to take using the BRC function in menu 3. If required, see "Using Reference Codes" on page 1-18.

Did diagnostics initialization completed and the diagnostic started to run?
Yes **No**

002

Start the MOSS diagnostics. Refer to "How to Run MOSS Diagnostics" on page 3-3.

003

Did diagnostics run without a message for manual intervention?
Yes **No**

004

Follow the instructions given by the diagnostics. Then, go back to this procedure according to the result.

005

Was the diagnostic result obtained before any FRUs were exchanged?
Yes **No**

006

Go to Step 025 on page 4-94.

007

(Step **007** continues)

007 (continued)

Did the diagnostic detect a failure?
Yes **No**

008

– Go to Step 018 on page 4-94.

009

Was the failure other than 'unexpected error'?
Yes **No**

010

Was the diagnostic running in CDG mode ?
Yes **No**

011

Run the previous diagnostic for the upper level in the 'run all' diagnostics.
For example, TRSS > IOC Bus > CCU. Go to "Diagnostic Requirements:" on page 1-60

012

Analyse the reference code. Refer to "Using Reference Codes" on page 1-18.
Continue with Step 013.

013

You may have started this service call to exchange FRUs called by a reference code or panel code.

Is the first FRU called by diagnostics different from the FRU you were going to exchange?
Yes **No**

014

Perform FRU exchange using Chapter 4, "3745 FRU Exchange" on page 4-1.

015

(Step **015** continues)

015 (continued)

Is there a common FRU given by both lists?
Yes **No**

016

– If you do not have the first FRU called by the diagnostics, obtain it.

If you have the FRU or when you obtain the FRU, go to "FRU Machine Requirements:" on page 1-58and follow instructions to exchange it.

017

Consider it is the first FRU of the list and perform FRU exchange using Chapter 4, "3745 FRU Exchange" on page 4-1.

018

Were HPTSS diagnostics being run for a suspected FESH card?
Yes **No**

019

Go to Step 022.

020

– In 3745 frame 01 at tail gate location 01Q, remove cables from the HPTSS lines to be tested. Refer to Figure 4-2 on page 4-5.
– Install wrap plugs in the sockets of 01Q for the lines to be tested.
– Update the CDF to show that the lines to be tested have wrap plugs installed. Refer to "Service Function Guide, Chapter CDF" on page 3.
– Run HPTSS diagnostic routines VI and VK if V.35 wrap plug is installed, or VJ and VK if X.21 wrap plug is installed, or VI, VJ, and VK if both types of wrap plugs are installed. Refer to "How to Run Internal Function Tests" on page 3-7.

Did the diagnostic run free of error?
Yes **No**

021

Go to Step 013 on page 4-93.

022

(Step **022** continues)

022 (continued)

Is the FRU you were processing, the last FRU called for the error?
Yes **No**

023

You have an intermittent error or an error not detected by this diagnostic.

Continue using this manual for the next FRU called. Go to "FRU Machine Requirements:" on page 1-58.

024

All parts of the machine required for FRU exchange will now be available for service.

Now change all FRUs called, using, Chapter 4, "3745 FRU Exchange" on page 4-1.

025

Have you been told to exchange all FRUs for an intermittent problem?
Yes **No**

026

Go to Step 032 on page 4-95.

027

Did the diagnostics run error free or power successfully ON?
Yes **No**

028

You have a problem with the new FRU. Try another one or put the original back in. Refer to Chapter 4, "3745 FRU Exchange" on page 4-1and continu next step.

029

Have all the FRUs called been exchanged?
Yes **No**

030

Go to Chapter 4, "3745 FRU Exchange" on page 4-1 for next FRU called.

031

Go to "CE Leaving Procedure" on page 4-97.

032

(Step **032** continues)

032 (continued)

Was the FRU other than a power supply?
Yes **No**

033

Has the power supply successfully powered up?
Yes **No**

034

Go to Step 046.

035

Go to "CE Leaving Procedure" on page 4-97.

036

Did the last run of diagnostics or IML detect an error?
Yes **No**

037

Go to "CE Leaving Procedure" on page 4-97.

038

Is the error the same as before?
Yes **No**

039

Go to Step 044.

040

– As the problem is not solved by changing this FRU you have to put the original back in. Refer to "Exchange Procedures" on page 4-1 then continue with the next step.

Have all the FRUs called been changed?
Yes **No**

041

See in "FRU Machine Requirements:" on page 1-58 if the next FRU and the FRU you just exchanged have the same 'Diagnostic' and 'Area'.
(Step **041** continues)

041 (continued)

Are both the same 'Diagnostic' and 'Area'.
Yes **No**

042

Follow the "FRU Machine Requirements:" on page 1-58.

043

Go to "Exchange Procedures" on page 4-1 for the next FRU called.

044

– Check what you have done:
  - Cards, seating
  - Cables
  - Crossovers, location and orientation
  - Switches in correct position.

– Run diagnostics again, IML or any other action you were asked after FRU exchange.

Was a failure detected?
Yes **No**

045

Go to "CE Leaving Procedure" on page 4-97.

046

During your path through the MIP, have you recorded an "Other Action" or "MAP" to use?
Yes **No**

047

You may have a defective new FRU, or multiple problems. Try to determine if restarting the full procedure, or if an other symptom may help you.
Suspect also cables, boards and voltages.
It could also be necessary to run diagnostics with the 'ALL' option in offline mode.
In any case, contact your support structure for further assistance.

048

Go there now.

CE Leaving Procedure

The maintenance package has determined that the 3745 is ready to be returned to normal operation. You should use the following list to ensure that the machine is in suitable condition for customer operation and that call information is recorded.

1. Replace any cables removed.
2. Do all actions that apply in the following list:

If You Have	What You Should Do
Exchanged all the FRUs called for an intermittent problem or a problem not detected by the diagnostics (tentative repair which could be unsuccessful).	Use the manual BER correlation (BRC, refer to *IBM 3745 Service Functions, Chapter 2*) to point out some additional potentially failing FRUs. 1. Find in the Error Log Display the alarm with the Reference Code you used to exchange the FRUs. 2. Select the BER range which occurs in the same time frame as the alarm. 3. In the menu '3' type 'BRC'. 4. Enter the most recent and the oldest BER in the range you have selected then press 'SEND'. 5. Note the extra FRUs, if any, provided by the BER correlation and advise the HSC/HCS or update the PMH in case of problem reoccurence.
Exchanged a Board	If the new board has a different part number with regard to the old one, you have to update the 'Board Level' label located in the front door.
Exchanged a LIC Board	Check the address plugging.
Exchanged a FRU with a different P/N	Upgrade the CDF. Refer to "Service Function Guide, Chapter CDF" on page 3 to upgrade or verify the CDF.
Used the MIP for an installation	Go back to the installation procedure in the Installation Manual.
Exchanged the PCC card or Battery with power OFF	Tell the customer that the "TOD-clock" and "scheduled power ON" services will have to be recreated.
Exchanged the HDD	Tell the customer that he will have to refresh the NCP on this disk if he uses HDD to load the control program.
Run the wrap diagnostic on the CA	Ensure that the wrap plug is removed and replaced by the normal cable.

3. IML the MOSS as follows:
   - Set service to (*0*) (normal mode).
   - Set function to (*1*) (MOSS IML).
4. Do all actions that apply in the following list:

If you have	What You Should Do
Been working on the channels area in Concurrent Diagnostic mode	Restore the adapters back to NCP, using the channel service screen; refer to "CA Restore Procedure" on page 4-100.
Been working on the TSS or HPTSS adapter area in concurrent diagnostic mode	• Remove all wrap plugs installed during this service call. • Replace all modem and line cables removed during this service call. • If you altered CDFs during this service call, check CDFs and update if necessary, refer to the Service Function Guide, Chapter CDF • IML the scanners disconnected from the NCP during this call; this can be done by selecting 'IMS' from menu 1. When IML is complete, the adapters will automatically be connected to the NCP. • Ask the customer to reactivate the lines stopped during the maintenance.
Been working with TRSS in concurrent diagnostic mode	• Connect the TRAs you disconnected during this service call back the to NCP, refer to "TRA Reconnect Procedure" on page 4-100. • Ask the customer to reactivate the lines stopped during the maintenance.

5. Log off the console by typing 'OFF' on any displayed screen.
6. Set the console in use according to customer requirements.
7. Restore the power mode as it was before your intervention.
8. Do all actions that apply in the following list:

If You Have	What You Should Do
Had the whole configuration	Ask the customer to IPL and load the NCP into the CCU. Verify that IPL completes whithout errors. If the system is not available to load the NCP into the CCU, return the console to maintenance mode and IPL the CCU in step by step. At the beginning of phase 4 (IPL stop with Phase 4 displayed) , verify that you do not have the message 'SCANNER(s) not IMLED xxxx' displayed. Continue to end of phase 4.
Disabled some channels	Ask the customer • To re-enable them using the CID screen. • To put them online from the host.

9. Replace all covers and close the doors.
10. Leave the machine in a **safe** condition.
11. Record the actions taken and the FRUs replaced during the call.

If the origin of the intervention was an alarm A5 report as preventive maintenance (Service Code 08).

12. Update the PMH record for this call.
13. Return parts to the stock room.

CA Restore Procedure

1. On the 3745 console, call Menu 3 and type **CAS** in the selection area for channel adapter services.
2. Press SEND.
3. Type **4** for concurrent maintenance commands.
4. Press SEND.
5. Type the channel adapter number corresponding to this FRU in the CA number = = = > field.
6. Press SEND
7. Type **RES** in the command = = = > field.
8. Press SEND.
9. Re-initiate the same procedure from step 5 for the associated CA if any.

How to Put MOSS Online

Note: MOSS can only be put online if the NCP is running.

1. Using the console, call Menu 2 (See PF key line).
2. In Menu 2 type **MON** in the selection area.
3. Press SEND.
4. 'MOSS ONLINE' will be displayed on the screen.

TRA Reconnect Procedure

For this procedure you may wish to refer to Figure 1-8 on page 1-69, Figure 1-10 on page 1-70 and Figure 1-9 on page 1-69.

1. On the 3745 console, call Menu 3 (See PF key line).
2. In Menu 3 type **TRS** in the selection area for 'TRSS services'.
3. Press SEND.
4. You get the 'TRSS Function Selection Screen'.
5. Type **1** in the selection area for 'TRA Selection Screen'.
6. Press SEND.
7. You get the 'TRA Selection Screen'.
8. Type the TRA number in the TRA # = = > field.
9. Press SEND
10. You get the 'TRSS Function Selection Screen'.
11. Type **2** in the selection area for Connect/Disconnect.
12. Press SEND.
13. You get the 'TRA Connect/Disconnect Selection Screen'.
14. Type **CT** in the input area to connect the selected adapter to the NCP.
15. Press SEND.
16. Re-initiate the same procedure from step 5 for the associated TRA if any.

Appendix A. Maintenance Aids

Contacting Support

You may wish to record your support structure telephone number here.

_____

You may be directed to call support for various reasons. When support is called you may be asked to perform specific tasks. In the following pages you will find information about why you call support and references to where you will find information about the tasks you may have to perform.

- "Control Program Maintenance Aids" on page A-3.
- "MOSS Microcode Maintenance Aids" on page A-5.
- "Scanner Microcode Maintenance Aids" on page A-7.
- "Special Tools" on page A-9.
- "Shipping Group Tools" on page A-11.
- "PKD (Portable Keypad Display) Maintenance Aids for LIC 5/6" on page A-13.

© Copyright IBM Corp. 1989 1990

Notes.

Control Program Maintenance Aids

The following list gives some possible causes of control program errors.

- A hardware configuration change has been performed and there is a difference between the hardware configuration and the control program generation.
- The customer has made some software changes.
- A PTF has been incorrectly applied.
- A PTF exists for the problem but has not been applied.

The following table shows where to find useful information in case of a suspected control program error.

Information	Where to find it
Customer procedures for diagnosis	*ACF/SSP Diagnosis Reference*
How to perform control program procedures	*IBM 3745 Advanced Operation Guide*
How to execute NCP functions	*IBM 3745 Advanced Operation Guide*
Line Interface Display (LID)	*IBM 3745 Advanced Operation Guide*
Port Swap	*IBM 3745 Advanced Operation Guide*
LIC Swap	*IBM 3745 Advanced Operation Guide*
Stand-Alone Link Test (SALT)	*IBM 3745 Advanced Operation Guide*
Catalogued Procedures (CP1 to CP6)	*IBM 3745 Advanced Operation Guide*
LIC internal wrap test	*IBM 3745 Problem Determination Guide*
LIC wrap test with wrap plugs	*IBM 3745 Advanced Operation Guide*
Netview* program alerts	*NetView Bibliography.*

Notes.

MOSS Microcode Maintenance Aids

The following table shows where to find useful information in case of a suspected microcode error.

Information	Where to find it
How to apply an MCF	*IBM 3745 Service Functions*
How to display, delete a MOSS dump	*IBM 3745 Service Functions*
Save, restore, format the MOSS hard disk drive	*IBM 3745 Service Functions*
How to dump MOSS	*IBM 3745 Service Functions*

Notes.

Scanner Microcode Maintenance Aids

The following table shows where to find useful information in case of a suspected scanner microcode error.

Information	Where to find it
MCF	*IBM 3745 Service Functions*
Patches	*IBM 3745 Service Functions*

Notes.

Special Tools

Maintaining the 3745 requires using tools in addition to those in the IBM service representative's tool kit. The tools needed include:

General Purpose Tools

Tool	Qty	Part Nbr.
PT2-220v	1	1749268
or		
PT2-110v	1	1749269
PT3-220v	1	6406001
or		
PT3-110v	1	6406000
PT3-TPAM Acc. kit	1	83X9300
TPLM	1	1749290
Display	1	1749270
Digital voltmeter	1	8309874
	or	8496278
EIA breakout panel	1	453637
Oscilloscope	1	
either		
Tektronix 454**	459559	
Tektronix 475**	453215	
Tektronix 2235**	6428880	
Tektronix 2465 A**	8309847	
High voltage probes	2	453698

ESD kit

Part Name	Part Nbr.
ESD kit	6428316
This kit contains:	
ESD mat	6428274
Wristband (small size)	6428167
(large size)	6428169
ESD ground cord	6428166

Notes.

Shipping Group Tools

The following tools are shipped with the machine:

Tool	Qty	Part Nbr.
Segment board	2	5997533
Console wrap plug (31XX)	1	6398697
Console wrap plug (3727)	1	2667737
Console wrap plug (7427)	1	26F1801
Console wrap plug (PC*/PS2*)		
1 26F0320		
LIC 1-4 wrap plug	1	65X8927
CA bus wrap plug (old)	1	03F4301
or		
CA bus wrap plug (new)	1	26F1755
CA tag wrap plug (old)	1	03F4300
or		
CA tag wrap plug (new)	1	26F1754
CA bus terminator	1	2282675
CA tag terminator	1	2282676
EPO plug	1	8482303
Cover keys	2	1643894
Bypass card type 1 (BPC1)	1	03F4372
Bypass card type 2 (BPC2)	1	66X0965

The following tools are shipped when an HPTSS is installed in the machine:

V35 Wrap Plug	1	58X9349
X21 Wrap Plug	1	58X9354

The following tool is shipped when a LIC3 is installed in the machine:

LIC 3 wrap cable	1	65X8928

The following tools are shipped when a LIC-5 or LIC-6 is installed in the machine.

PT2 adapter cable	2	11F4816
LIC-5/6 wrap plug (tail gate)	1	11F4815

plus one of the following tools.

LIC-5/6 wrap block (cable end) P/N according to the country.

U.S / Canada	1	66X0807
Japan	1	6124644
Austria	1	6162946
France	1	6162955
Germany	1	6162950
Belgium	1	6162950
Luxemburg	1	6162950
Israel	1	66X1954
Hong Kong	1	65X8070
Italy	1	6162957
Switzerland	1	66X0748
U.K.	1	65X8069
Netherlands	1	6162948

Notes.

PKD (Portable Keypad Display) Maintenance Aids for LIC 5/6

Configuration

On a LIC type 5 or 6, the configuration parameters are set from the PKD,
refer to the "3745 Connection and Integration Guide" for detailed procedure.

On a LIC type 5, the following configuration parameters are "service representative only":
MODE (native or CCITT), CD SENSIT (normal or low) and L XMIT LEVEL.
They must be set by using the **'B'** command as follows:

1. Enter the **B 300** at the PKD.
2. Press **GO** several times to get the desired option message.
3. Press **ERASE** and enter the new value if applicable.
4. Press **GO** to validate the new value.

B commands (only for LIC type 5)

The following other **B** commands can be used by the CE for miscellaneous actions:

- B 100 Reload default configuration.
- B 555 Address a remote modem (using the modem serial number) to change some parameters.
- B 666 Increase the time out from 30 seconds to 10 minutes.
- B 703/704/705 CO/CS functions, allows remote commands.
- B 730 Send a 1004 Hz tone on telephone line.

Manual tests

The following manual test can be executed on a LIC type 5:

- Local self-test
- Remote self-test
- Local status report
- Remote status report
- Analog test (line analysis)
- Digital test (transmit/receive test)
- Manual loopback.

The following manual test can be executed on a LIC type 6:

- Local self-test
- Digital test (transmit/receive test)
- Manual loopback.

Refer to the "3745 Connection and Integration Guide" Part 3 for detailed procedure.

List of Abbreviations

A	ampere
AC	1) alternating current 2) address compare
ACK	affirmative acknowledgment (BSC)
AFD	airflow detector
AIO	adapter-initiated operation
ASCII	American National Standard Code for Information Interchange
BASA	basic board A
BASB	basic board B
BASC	basic board C
BATRY	FRU name of the battery
BCCA	Buffer chaining channel adapter
BER	box event record
BPC1	FRU name of the bus propagation card to replace the CAL card
BPC2	bus propagation card to replace the TRM card
bps	bits per second
BRC	BER reference code
BSC	binary synchronous communication
CA	channel adapter
CAB	channel adapter board
CADR	FRU name of the channel adapter driver receiver card
CADS	Channel adapter data streaming
CAL	FRU name of the channel adapter logic card
CBx	FRU name of circuit breaker number x
CCITT	Comite Consultatif International Telegraphique et Telephonique
CCU	central control unit
CCW	channel command word
CD	carrier detector (signal)
CDF	configuration data file
CDG	concurrent diagnostic
CDS	configuration data set (NCP/EP)
CE	customer engineer
CEPT	Comite Europeen des Postes et Telecommunications
CID	channel interface display function
CLDP	controller load/dump program
CNM	communication network management
CO/CS	contact operate / contact sense
CP	1) communication processor 2) control program
CPx	FRU name of circuit protector number x
CRP	check record pool
CRU	customer replaceable unit
CS	cycle steal
CSC	FRU name of the scanner for medium-/low-speed lines
CSCW	cycle steal control word
CSG	cycle steal grant
CSGH	cycle steal grant high
CSGL	cycle steal grant low
CSP	FRU name of the communication scanner processor associated with the FESH card for high speed lines (**CSC** scanner for the medium-/low-speed lines)
CSR	cycle steal request
CSRH	cycle steal request high
CSRL	cycle steal request low
CSS	control subsystem
CTS	clear to send (signal)
dc	direct current
DCE	data circuit-terminating equipment
DCREG	FRU name of the dc regulator card
DE	device end (channel status)
DFA	FRU name of the disk file adapter card
DIF	disk function
DMA	direct memory access
DMUX	FRU name of the double multiplex card
DRS	data rate select
DTE	data terminal equipment
DTR	data terminal ready (signal)
EC	engineering change
EIA	Electronic Industries Association
ENQ	enquiry (BSC)
EPO	emergency power-OFF

© Copyright IBM Corp. 1989 1990

ERC	error reference code
FAN1	FRU name of the power supply box fan
FAN2	FRU name of the logic box fan
FCC	Federal Communications Commission
FDD	FRU name of the flexible disk drive
FE	field engineering
FESH	FRU name of the front-end scanner (high-speed)
FRU	field-replaceable unit
ft	foot
GPT	generalized PIU trace
GTF	generalized trace facility
HCS	Hardware Central Service
HDD	FRU name of the hard disk drive
hex	hexadecimal
HLIR	high-level interrupt request
HPTSS	high-performance transmission subsystem
HSB	high-speed buffer (cache)
HSS	high-speed scanner
HW	hardware
Hz	Hertz
IBE	internal box error
ID	identifier
IEEE	Institute of Electrical and Electronics Engineers
IFT	internal function test
IML	initial microcode load
in.	inch
INN	intermediate network node
IOC	input/output control
IO	input/output
IOH	input/output halfword (instruction)
IOHI	input/output halfword immediate (instruction)
IPL	initial program load
IR	interrupt request
IRR	interrupt request removed
ISO	International Organization of Standardization
KB	kilobyte (1024 bytes)
kbps	kilobits per second
kg	kilogram
kHz	kilohertz
LA	1) load address (instruction) 2) line adapter
LED	light-emitting diode
LIB	line interface coupler board
LIB1	LIC board type 1 for LICs 1, 3, and 4 (models A and B)
LIB2	LIC board type 2 for LICs 5 and 6 (models A and B)
LIB3	LIC board type 3 for LICs 1, 2, and 3 (model C)
LIB4	LIC board type 4 for LICs 5 and 6 (model C)
LIC	line interface coupler card
LICx	FRU name of line interface coupler card type x
LID	line interface display
LLIR	low-level interrupt request
LPDA	Link Problem Determination Aid
LS	local storage
LSAR	local storage address register
LSR	local storage register (CSP)
LSS	low-speed scanner
LSSD	level-sensitive scan design
m	meter
mA	milliampere
MB	megabyte; 1 048 576 bytes
MCC	FRU name of the MOSS control card
MCF	microcode fix
MCT	machine configuration table
MDOR	MOSS data operand register
MES	miscellaneous equipment specification
MHz	megahertz
min	minute
MIO	MOSS input/output
MIOC	MOSS I/O control bus
MIP	Maintenance Information Procedures
mm	millimeter
MMIO	memory mapped input/output
MOSS	maintenance and operator subsystem
MPC	FRU name of the MOSS processor card
MSA	machine status area

MSAU	multistation access unit
MSC	FRU name of the MOSS storage card
MUX	multiplex function
mV	millivolt
NAK	negative acknowledgment character (BSC)
NCCF	Network Communications Control Facility
NCP	Network Control Program
NCTE	network communication terminal equipment
NLDM	Network Logical Data Manager
NMVT	network management vector transport
NPDA	Network Problem Determination Application
NPSI	network packet switching interface
oc	overcurrent
OLT	online test
ov	overvoltage
PANEL	FRU name of the control panel
PC	personal computer
PCC	FRU name of the power control card
PCF	primary control field (storage)
PKD	portable keyboard display
PIO	program-initiated operation
PNLC	FRU name of the panel card
POR	power-ON reset
PROM	FRU name of the programmable read-only memory module
PS	power supply
PCSS	power control subsystem
PSTCE	product support trained CE
PS1	FRU name of power supply number 1
PS2	FRU name of power supply number 2
PTCE	product-trained CE
PTT	Post, Telephone and Telegraph (agency)
PUC	FRU name of the CCU card
PV	parity valid (signal)
RAC	repair action code
RCV	receive
RD	receive data (signal)
RETAIN	Remote Technical Assistance Information Network
RFS	ready for sending (signal)
RI	1) register to immediate operand (instruction) 2) ring indicator (same as CI)
RIM	request initialization mode (SDLC)
RNIO	OS/VS VTAM IO trace
ROS	read-only storage
RPO	remote power-OFF
RSF	remote support facility
RTS	request to send (signal)
R/W	read/write
SAR	storage address register
SCTL	FRU name of the storage control card
SDLC	Synchronous Data Link Control
SIM	set initialization mode (SDLC)
SMUXA	FRU name of the single multiplex card for LIC board type 2
SMUXB	FRU name of the single multiplex card for LIC board type 2
SNA	Systems Network Architecture
SNRM	set normal response mode (SDLC)
STO	FRU name of the storage (card)
SVC	supervisor call
SWx	FRU name of switch number x
T	transmit (signal)
TA	tag address
TCM	1) thermally-controlled module 2) trellis coded modulation
TD	1) tag data 2) transmitted data (signal)
TERMD	FRU name of the DMA terminator card
TERMI	FRU name of the IOC terminator card
TI	test indicator (signal)
TIC	token-ring interface coupler
TIC1	FRU name of the TIC card type 1 (4 Mbits only)
TIC2	FRU name of the TIC card type 2 (4 and 16 Mbits)
TPS	two-processor switch
TRA	token-ring adapter
TRM	FRU name of the token-ring multiplexer card that controls up to two TICs

Abbreviation

TRSS	token-ring subsystem
TSS	transmission subsystem
T1	US service for very high speed transmissions at 1.5 million bps
UA	unnumbered acknowledgment (SDLC)
UC	universal controller
UEPO	unit emergency power-Off
URSF	universal remote support facility
V	volt
VB	valid byte (signal)
VAC	volts, alternating current
VDC	volts, direct current
VH	valid halfword (signal)
VTAM	Virtual Telecommunications Access Method
V.24	CCITT V.24 recommendation
V.25	CCITT V.25 recommendation
V.28	CCITT V.28 recommendation
V.35	CCITT V.35 recommendation
XI	X.25 SNA interconnection
XID	exchange identification
X.21	CCITT X.21 recommendation
X.25	CCITT X.25 recommendation

Glossary

This glossary defines all new terms used in this manual. It also includes terms and definitions from the *IBM Dictionary of Computing*, GC20-1699.

adapter-initiated operation (AIO). A transfer of up to 256 bytes between an adapter (CA or LA) and the CCU storage. The transfer is initiated by an IOH/IOHI instruction, and is performed in cycle stealing via the IOC bus.

alarm. A message sent to the MOSS console. In case of an error a reference code identifies the nature of the error.

alert. A message sent to the host console. In case of an error a reference code identifies the nature of the error.

autoBER. A program to automatically analyse a BER file.

automaint. A function that uses autoBER to isolate failing FRUs.

box event record (BER). Information about an event detected by the controller. It is recorded on the disk/diskette and can be displayed on the operator console for event analysis.

block multiplexer channel. A multiplexer channel that interleaves blocks of data. See also *byte multiplexer channel*. Contrast with *selector channel*.

byte multiplexer channel. A multiplexer channel that interleaves bytes of data. See also *block multiplexer channel*. Contrast with *selector channel*.

cache. A high-speed buffer storage that contains frequently accessed instructions and data; it is used to reduce access time.

central control unit (CCU). In the 3745, the controller hardware unit that contains the circuits and data flow paths needed to execute instructions and to control its storage and the attached adapters.

channel adapter (CA). A communication controller hardware unit used to attach the controller to a host processor.

clear channel. Mode of data transmission where the data passes through the DCE and network, and arrives at the receiving communication controller unchanged from the data transmitted. The DCE or network can modify the data during transmission because of certain network restrictions, but must ensure the received data stream is the same as the transmitted data stream.

communication controller. A communication control unit that is controlled by one or more programs stored and executed in the unit. Examples are the IBM 3705, IBM 3725/3726, IBM 3720, and IBM 3745.

communication scanner processor (CSP). The processor of a scanner.

communication subsystem. The part of the controller that controls the data transfers over the transmission interface.

configuration data file (CDF). A MOSS file that contains a description of all the hardware features (presence, type, address, and characteristics).

control panel. A panel that contains switches and indicators for the use of the customer's operator and service personnel.

control program. A computer program designed to schedule and to supervise the execution of programs of the controller.

control subsystem (CSS). The part of the controller that stores and executes the control program, and monitors the data transfers over the channel and transmission interfaces.

data circuit-terminating equipment (DCE). The equipment installed at the user's premises that provides all the functions required to establish, maintain, and terminate a connection, and the signal conversion and coding between the data terminal equipment (DTE) and the line. For example, a modem is a DCE (see *modem*.)

Note: The DCE may be separate equipment or an integral part of other equipment.

data terminal equipment (DTE). That part of a data station that serves as a data source, data link, or both, and provides for the data communication control function according to protocols.

direct attachment. The attachment of a DTE to another DTE without a DCE.

high-performance transmission subsystem (HPTSS). The part of the controller that controls the data transfers over the high-speed transmission interface (speed up to 2 million bps).

high-speed scanner. Line adapter for lines up to 2 million bps, composed of a communication scanner

© Copyright IBM Corp. 1989 1990

processor (CSP) and a front-end high-speed scanner (FESH).

initial microcode load (IML). The process of loading the microcode into a scanner or into MOSS.

initial program load (IPL). The initialization procedure that causes 3745 control program to commence operation.

input/output control (IOC). The circuit that controls the input/output from/to the channel adapters and scanners via the IOC bus.

internal clock function. A LIC function that provides a transmit clock for sending data, and retrieves a receive clock from received data, when the modem does not provide those timing signals. When the terminal is connected in direct-attach mode (without modem) the ICF also provides the transmit and receive clocks to the terminal, via the LIC card.

line adapter (LA). The part of the TSS, HPTSS, or TRSS that scans and controls the transmission lines. Also called *scanner*.

For the TSS the line adapters are low-speed scanners (LSSs).

For the HPTSS the line adapters are high-speed scanners (HSSs).

For the TRSS the line adapters are token-ring adapters (TRAs).

line interface coupler (LIC). A circuit that attaches up to four transmission cables to the controller.

low-speed scanner. Line adapter for lines up to 256 kbps, composed of a CSC card.

maintenance and operator subsystem (MOSS). The part of the controller that provides operating and servicing facilities to the customer's operator and the IBM service representative.

NetView™. An IBM licensed program used to monitor a network, manage it, and diagnose its problems.

Network Control Program (NCP). An IBM licensed program that provides communication controller support for single-domain, multiple-domain, and interconnected network capability.

operator console. The IBM Operator Console that is used to operate and service the communication controller (CC) through the MOSS. Optionally an alternate console may be installed up to 120 m from the CC, or a remote console may be connected to the (CC) through the switched network.

scanner. A device that scans and controls the transmission lines. Also called *line adapter*.

selector channel. An I/O channel designed to operate with only one I/O device at a time. Once the I/O device is selected, a complete record is transferred one byte at a time. Contrast with *block multiplexer channel, multiplexer channel*.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information through a user application network. The structure of SNA allows the users to be independent of specific telecommunication facilities.

token-ring subsystem (TRSS). The part of the controller that controls the data transfers over an IBM Token-Ring Network.

The TRSS consists of one token-ring adapter (TRA).

token-ring adapter (TRA). Line adapter for an IBM Token-Ring Network, composed of one token-ring multiplexer card (TRM), and two token-ring interface couplers (TICs).

transmission subsystem (TSS). The part of the controller that controls the data transfers over low- and medium-speed, switched and non switched transmission interfaces.

The TSS consists of up to six low-speed scanners (LSSs) associated with the LICs units (LIUs), through serial links (SLs).

two-processor switch (TPS). A feature of the channel adapter that connects a second channel to the same channel adapter.

V.24,25,35. EIA/CCITT recommendations on transmission interfaces

X.20 bis, 21, 21 bis, 21 native, 25. CCITT recommendations on transmission interfaces

IBM 3745 Communication Controller
Models 130,150, and 170
Maintenance Information Procedures (MIP)
Part 2
Order No. SY33-2070-2

READER'S COMMENT FORM

Please write your comments concerning this manual in the space reserved below. We will greatly appreciate them and will consider them for later releases of the present manual.

In advance, thank you.

Note: Staples can cause problems with automated mail sorting equipment.
Please use pressure sensitive or other gummed tape to seal this form.

SY33-2070-2

Reader's Comment Form

Fold and tape | **Please Do Not Staple** | Fold and tape

Stamp

IBM France
Centre d'Etudes et Recherches
Service 0762 - BP79
06610 - La Gaude
France

Fold and tape | **Please Do Not Staple** | Fold and tape

If you would like a reply, please print:

Your Name

Company Name _____ *Department* _____

Address _____

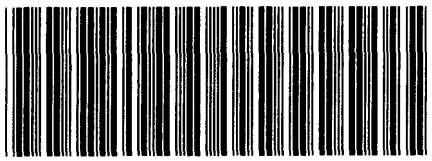
_____

_____

IBM Branch Office serving you _____

Part Number
03F5018

SY33-2070-02



Printed in U.S.A.